Understanding variations in children's subjective well-being

A longitudinal analysis

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Summary

There is a growing research and policy interest in the topic of subjective well-being (SWB), including in relation to children. Quite a lot is now known, from cross-sectional analysis, about factors associated with variations in the SWB of children in the UK. However there is a lack of longitudinal analysis which can help to clarify the mechanisms involved. This is an important gap if research on children's SWB is to generate findings which can be practically useful. In addition the issues of the conceptualisation and measurement of children's SWB have not been fully explored in UK research.

This dissertation sets out to address these evidence gaps. The analysis uses data from three panel and cohort studies – the British Household Panel Survey, the Understanding Society survey and the Millennium Cohort Study – all of which include large, and broadly representative, samples of children in the UK and ask children some questions about their SWB

The dissertation begins by addressing conceptual and measurement issues. It explores the extent to which the data support the most common conceptual framework of SWB - the tripartite model – and identifies the most appropriate measures of SWB to use for the analysis. It then aims to answer two broad substantive research questions. First, to what extent are early childhood factors associated with later subjective well-being (at 11 years old)? Second, how does subjective well-being vary between the ages of 11 and 15 and what factors are associated with this variation?

The analysis draws on Bronfenbrenner's ecological model of child development to theorise the ways in which current and historical factors may affect children's SWB. It considers a range of both contextual (e.g. family socio-economic status) and process (e.g. parent-child relationships) variables. The analytical methods used for this purpose are logistic regression; linear regression, including fixed effects and random effects models for panel data; and latent growth curve modelling. Additionally, confirmatory factor analysis is utilised to test measures of SWB.

The key findings are as follows. First, in terms of conceptual and measurement issues, the data provide support for the tripartite model of SWB commonly used in the literature on adults' SWB. The psychometric analysis also provides new insights into the way in which variables in the data sets might best be used to represent SWB. Second, children's life satisfaction, happiness and sadness at the age of 11 are not strongly predicted by their family and socio-economic circumstances at nine months old, nor by the quality of their relationship with their main parent at three years old. Third, there is a much stronger relationship between contemporaneous factors such as family relationships and bullying and trajectories of children's SWB between the ages of 11 and 15, with some evidence that these factors predict future as well as current SWB. These conclusions hold even when making use of the longitudinal nature of the data to control for unobserved fixed explanatory variables.

Overall, the analysis presented suggests that how children feel about their lives can best be understood in terms of recent rather than historical factors and provides further evidence of the much stronger associations between children's SWB and quality of family and peer relationships, rather than socio-economic factors. It also suggests that the etiology of SWB is different from that of other childhood well-being measures, and it is argued that this is a strength that can help to stimulate new directions for social research on children and childhood. The analysis, and the conclusions that can be drawn from it, are limited by the quality of SWB measures available and the timing of data collection for the studies. It will be valuable for future research specifically on children's SWB, and new longitudinal and panel studies in the UK, to use better SWB measures. There is also a need for longitudinal research over shorter time periods to explore further the directions of association between SWB and other factors.

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Part 1

Background

Chapter 1: Introduction

The question of what makes for a good childhood is an important one. It is of interest and relevance for children and young people, parents, policy makers, practitioners working with children and anyone else concerned with the quality of children's lives. And, of course, because of children's dependent status, adults' views and beliefs about this question, and the resulting priorities that adults pursue in relation to children, have an enormous impact on children themselves.

This dissertation focuses on one way of thinking about a good childhood – how children themselves evaluate and feel about their lives, or their 'subjective well-being' (SWB). There is a growing interest in children's subjective experience of their lives. This development reflects two shifts[1] in the policy and research discourse on children's well-being which have taken place over the last decade or so – first, indicator sets and discourse have begun to incorporate subjective as well as objective data; and, second, children's well-being in the present has begun to be considered as well their future well-being or 'well-becoming'. The first of these two shifts – towards the use of subjective indicators of child well-being – is part of a wider growing interest in subjective well-being in general and will be discussed in more detail in Chapter 2. The second shift is linked to new ways of thinking about childhood as an important life stage in its own right, rather than primarily as a preparation for adulthood, and of children as competent social actors. These ideas are associated with the 'new sociology of childhood' (James & Prout, 1997).

As a result of these shifts, measures of children's subjective well-being have come to be taken more seriously. One of the first major examples of this was the inclusion of an indicator of subjective well-being in one of UNICEF's influential report cards on child well-being (UNICEF, 2007). More recently the OECD's Programme for International Student Assessment (PISA) has included measures of children's life satisfaction and their views about their experiences at school (OECD, 2017). And in the UK, the Office for National Statistics includes a number of subjective measures in their set of indicators of child well-being which is a component of their programme for measuring

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[1] See discussion of these and several other shifts in research in Ben-Arieh (2008) .

national well-being (ONS, 2014a). UNICEF has also continued to make use of indicators of subjective well-being and has argued that these can provide an important complementary perspective to objective indicators (UNICEF, 2013).

Research on children's SWB has developed substantially in recent years and there is now a considerable amount of evidence available on the topic both in the UK and internationally. It has been demonstrated that it is possible to formulate evaluative questions to ask children about their SWB, at least from the age of 10 years old, and that children's responses are sufficiently reliable and stable for research purposes. There is now data on recent trends in children's SWB in the UK; and also comparative international evidence about how children's SWB varies around the world. A substantial amount of research has been undertaken, including in the UK, about circumstances and factors that are linked to children having higher or lower subjective well-being which might inform the kinds of potential uses of SWB evidence discussed above. This material will be reviewed more fully in Chapter 3.

Despite this progress, a major limitation of the published evidence is that it is almost entirely based on analysis of information gathered at one point in time through self-report surveys. This means that it cannot provide insights into (a) how SWB develops and changes for individual children over time; (b) the possible directions of influence between SWB and other factors; or (c) the links between SWB at a given point in time and circumstances and experiences earlier in childhood. There are therefore substantial gaps in our understanding of how and why children's SWB varies. This also has implications for the potential to recommend areas for intervention to improve children's SWB.

This dissertation aims to address this shortage of evidence, making use of information gathered from children and their families at different points in time. It looks at two substantive questions. The first relates to the extent to which variations in children's subjective well-being at the age of 11 years old can be predicted by circumstances earlier in their childhood. The second relates to how children's subjective well-being varies between the ages of 11 and 15 years old and what factors are associated with this variation. A conceptual framework for this exploration of links between SWB and contemporaneous and historical factors is presented in Chapter 4. This is the first

study, either in the UK or internationally, to take a broad overview of the links between SWB and other issues from very early childhood to middle adolescence. In doing so it makes a unique contribution to the literature in this field.

Additionally, and as a foundation for the two questions discussed above, the dissertation evaluates the statistical properties of measures of SWB available in the data sets used for analysis, and the extent to which these measures fit the most commonly-used conceptual framework of SWB (the tripartite model, discussed in Chapter 2) which was originally developed through research with adults. The dissertation also therefore makes a contribution to the conceptualisation and measurement of children's SWB.

The analysis uses three UK cohort and panel studies which contain measures of children's SWB – the Millennium Cohort Study (MCS) which is a longitudinal study following a cohort of children born early in the new millennium; and the British Household Panel Study (BHPS) and its successor the Understanding Society survey which consist of annual surveys of members of a panel of UK households. The data sets, and the different ways in which they are utilised, are described in Chapters 5, 6 and 10. The combined use of these data sets means that two strengths of the study are the large-scale representative nature of the samples and the possibility of taking a longitudinal perspective across the whole of childhood and youth.

The analysis employs a range of statistical techniques include confirmatory factor analysis, linear and logistic regressions, fixed-effects regressions and latent growth curve modelling to address the three research questions. These methods, and their strengths and weaknesses, are discussed in the introductory chapters (5, 6 and 10) to the parts of the dissertation where they are used.

The results of the analysis are presented in Parts 2 to 4. Part 2 (Chapter 5) addresses the conceptual and measurement issues discussed above. Part 3 (Chapters 6 to 9) presents findings on the analysis of the links between early childhood factors and children's SWB at the age of 11. Part 4 (Chapters 10 to 14) presents analysis of trajectories and fluctuations in children's SWB between the ages of 11 and 15 and factors associated

with these patterns. There is then a concluding chapter which summarises the findings and discusses their implications for policy, practice and research.

The analysis indicates that family and socio-economic circumstances, and parent-child relationships in early childhood, do not have much direct influence on children's SWB by the age of 11 years old. However, children's SWB at the age of 11 years old, and trends and fluctuations in their life satisfaction between 11 and 15 years of age, are linked to inter-personal factors – such as the quality of their relationships with parents and the extent to which they are bullied by other children – during this period. These findings hold when the longitudinal nature of the data is utilised to control for unobserved time-invariant factors. The analysis extends previous research by demonstrating that these experiences of relationships are predictive of trajectories in children's SWB over time. The analysis also highlights some important differences in trajectories for girls and boys. As well as being substantively important in their own right these findings suggest that it may also be important to explore differences between sub-groups of children based on other factors such as ethnicity or social class.

A key theme running through the above analysis is that SWB is distinctive from other commonly-measured indicators of well-being during childhood. Factors that have been found to be strongly associated with other indicators – such as the link between persistent poverty and both low educational attainment and poor mental health – are not such important factors in understanding why some children are less satisfied with their lives or happy than others. This is demonstrated by running an analysis of the same factors using a measure of emotional and behavioural difficulties in place of SWB as the dependent variable, which produces very different results. While this type of finding may be unsettling to researchers of childhood who are used to thinking about the links between structural inequalities and child 'outcomes', it does mean that SWB provides a different perspective through which to explore what constitutes a 'good childhood'. This emphasises the importance of a continued exploration of children's SWB.

In analysing children's SWB longitudinally the dissertation makes a unique contribution to research evidence in this field. In addition, the analysis presented provides important new insights into the measurement of SWB which can be of value

for future research on this topic. The final chapter discusses some of the practical and policy implications of the findings and identifies directions for future research. These include the need to develop better measures of SWB and the potential value of undertaking longitudinal studies with smaller gaps between waves in order to learn more about directions of influence between SWB and factors associated with it.

Chapter 2: Subjective well-being

The growth in research on children's SWB in the UK over the past decade has taken place, and needs to be understood, within the context of a broader and longer-term body of work on SWB in general (mostly with adult populations). This chapter provides an overview of this broader context. It describes the development of the SWB concept over the last fifty years; the reasons for its growing importance; and a brief account of key strands and controversies in the SWB literature (primarily based on research with adults) that are relevant to the topic of this dissertation.

2.1 Introduction: The developing modern interest in subjective well-being

In 1967, Wilson published a journal article entitled 'The correlates of avowed happiness'. He reviewed more than fifty psychological research studies on happiness stretching back to around 1930. His conclusion was that:

> 'The happy person emerges as a young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, high job morale, modest aspirations, of either sex and of a wide range of intelligence.'

<div align="right">Wilson, 1967, p. 294</div>

He cited Dodge (1930) who stated that 'the theory of the happy life has remained at about the level where the Greek philosophers left it' (ibid., p. 302). Wilson argued that this was still 'essentially correct' in 1967 (ibid., p. 302). Seventeen years later, Diener (1984), who has been one of the most prominent SWB researchers over the last few decades, estimated that more than 700 additional articles had been published on SWB since Wilson's review. A more recent review by Diener (2013) estimated that by 2012 there were about 12,000 publications. This explosion of interest in the topic of SWB can be explained by at least two conceptual developments – in the fields of psychology and economics – over the last few decades.

In the field of psychology there has been a growing recognition of, and concern about, the fact that research has focused much more strongly on mental ill-health than on mental health. Diener (1999) cites a review by Myers and Diener (1995) which estimated that 'Psychological articles examining negative states outnumber those examining positive states by a ratio of 17 to one' (Diener, 1999, p. 277). Dissatisfaction

with this situation stimulated the development of the positive psychology movement based on the argument that a state of positive well-being is more than the absence of mental health problems:

> 'The exclusive focus on pathology that has dominated so much of our discipline results in a model of the human being lacking the positive features that make life worth living. Hope, wisdom, creativity, future mindedness, courage, spirituality, responsibility, and perseverance are ignored or explained as transformations of more authentic negative impulses.'
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> Seligman & Csikszentmihalyi, 2000, p. 5

While this article is often cited as a key originating text in the development of the idea of positive psychology, Froh (2004) has pointed out that the origins of the idea can be traced much further back to ideas of optimal human functioning proposed by William James in the early 1990s and the work of Abraham Maslow, who wrote a chapter in the 1950s entitled 'Toward a Positive Psychology' (Maslow, 1954, cited in Froh, 2004).

The field of positive psychology has developed rapidly since the time of Seligman and Csikszentmihalyi's article, with studies not only of subjective well-being but also a range of related concepts including psychological well-being, flourishing, flow, optimism and purpose in life.

The second key development that has contributed to the interest in SWB is a growing recognition over the last fifty years of the limitations of traditional economic indicators such as GDP as measures of societal progress. In fact, this idea was eloquently stated by Robert Kennedy in 1968:

> 'But even if we act to erase material poverty, there is another greater task, it is to confront the poverty of satisfaction – purpose and dignity – that afflicts us all. Too much and for too long, we seemed to have surrendered personal excellence and community values in the mere accumulation of material things. Our Gross National Product, now, is over $800 billion dollars a year, but that Gross National Product – if we judge the United States of America by that – that Gross National Product counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities. It counts

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Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children. Yet the Gross National Product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile. And it can tell us everything about America except why we are proud that we are Americans.'

<div align="right">Kennedy, 1968</div>

There is a connection between the ideas in the above quote and the social indicators movement which emerged in the 1960s and which 'was dedicated to measuring, monitoring and analysing the welfare of the population in new, better and more differentiated ways than had previously been considered standard' (Noll, 2017, p. 7). This movement originated in the US (Noll, 2004) and was subsequently taken up in a number of European countries. For example, in Germany, Wolfgang Zapf – a pioneer of social indicators research in the country – incorporated ideas about quality of life into his work; and this led to the inclusion of subjective well-being indicators in German social surveys (Glatzer, 2012). More recently, in the Netherlands, Ruut Veenhoven also pioneered the use of subjective indicators for social policy purposes (Veenhoven, 2002). The *Social Indicators Research* journal, founded in 1974, has been a focal point for the development of subjective measures of well-being as part of the social indicators tradition.

In recent years, the idea of 'Beyond GDP' indicators reflected in Kennedy's quote has been increasingly adopted by policy organisations. The European Union has a 'Beyond GDP' initiative[2] and other important developments include the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz, Sen & Fitoussi, 2009) and the OECD's Better Life Index[3] (OECD, 2015) which includes life satisfaction. The OECD has also published guidelines on the measurement of subjective well-being (OECD, 2013).

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[2] http://ec.europa.eu/environment/beyond_gdp/index_en.html
[3] http://www.oecdbetterlifeindex.org/

In the UK, the political salience of well-being was boosted by an initiative launched by David Cameron in 2010 to develop national measures of well-being. The Office for National Statistics and the Cabinet Office have taken forward this work and there are now sets of national well-being for adults (ONS, 2016), young people (ONS, 2014b) and children (ONS, 2014a), all of which include subjective measures. Alongside this development of measures, the ways in which subjective measures of well-being might be used for policy purposes has begun to be explored (e.g. O'Donnell et al., 2014).

2.2 Conceptualising subjective well-being

This section provides a brief overview of the conceptualization and measurement of SWB in research with adult populations, as this has substantially preceded and informed similar developments in relation to children's SWB.

There is no consensus on a definition of the concept of SWB. However, a particular framework - the 'tripartite model' – has emerged as by far the most commonly used in this field. Before discussing this model, some initial clarification of terminology is required. Subjective well-being can be viewed as a sub-category of a broader category of 'self-reported well-being'. This latter category incorporates other ideas about aspects of people's well-being that they can report on directly such as psychological well-being, social well-being and mental health issues. I will begin by describing the concept of SWB, focusing on the tripartite model. I will then go on to discuss the conceptual distinction between subjective well-being and some of these other concepts.

In an article reviewing progress in the study of SWB, Diener (1984) identified three 'hallmarks' of the SWB field – (a) that it is necessarily subjective and excludes any objective indicators; (b) that it includes positive as well as negative measures; and (c) that it includes a global assessment of the whole of a person's life. Within this broad context, he went on to discuss a model of SWB which distinguishes between one cognitive (or evaluative) component and two affective (or experiential) components. This model has subsequently been termed the 'tripartite model of SWB' and is sometimes attributed to Diener (e.g. Busseri & Sadava, 2011) although he cites its origins in Andrews and Withey (1976). It has become much the most common framework of SWB in the research literature; there is substantial empirical support for

the distinction between the cognitive and subjective components in adult populations; and it has been the basis for thousands of articles (Busseri & Sadava, 2011).

In this formulation, the cognitive component of subjective well-being relates to evaluations that people make of their lives; while the affective component refers to feelings and emotions, both positive and negative. The cognitive component is thought to be more stable and less prone to fluctuations as a result of short-term events (e.g. a bad day at work or school) than the affective component. There is empirical support for this idea (Eid & Diener, 2004).

Within the tripartite framework, the *cognitive* component can refer both to an overall evaluation of life and/or to evaluations of specific aspects of life (often referred to as 'domains'). Many writers view satisfaction with life as a whole as being a summary evaluation which is the result of people's satisfaction with various domains – i.e. people make an assessment of different parts of their lives and use this information to reach an overall assessment about their life as a whole (which has been termed a 'bottom-up approach'). However it is not clear that people form evaluations of life satisfaction in this way. There is evidence that rather than trying to access all relevant information, people stop the process once they feel they have assessed enough information to make a judgement, and that easily accessible information, mood and contextual factors can all play an important part (Schwarz & Stack, 1999). The 'bottom-up' idea has also been challenged by theories which argue that people's satisfaction judgements are to a substantial extent determined by their personality or genetic predispositions and that domain satisfactions are then also an expression of these dispositions (a 'top-down' approach) (Diener, 1984; Headey et al., 1991). This point will be discussed further below.

Irrespective of the extent to which global life satisfaction evaluations are a function of domain satisfactions, the latter remain an important aspect of SWB. People's judgements about specific aspects of their lives can provide valuable insights into their subjective experience. Many different domain frameworks of cognitive SWB have been proposed and there is no agreement on a single set of domains (Cummins, 1996). In fact, it seems likely that the appropriate set of domains will vary according to context. For example, '(paid) work' has often been proposed as a domain in frameworks of

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adults' SWB (although it is by no means relevant to all adults); but it may be more useful instead to consider 'school' in relation to children's SWB. The relevant domains may also vary according to other factors such as cultural context. Various efforts have also been made to identify domains of children's SWB (e.g. Huebner et al., 2006; Cummins & Lau, 2005; Tomyn & Cummins, 2011).

There is also a substantial body of research on the conceptualisation and measurement of the *affective* component of subjective well-being. Bradburn (1969) viewed affect as a balance between positive and negative emotions, and this led to the idea of the Affect Balance scale – calculated by subtracting negative affect from positive affect. This idea is still widely used but it became apparent that it was an over-simplification, particularly because of empirical evidence (e.g. Watson, Clark & Tellegen, 1988) that positive and negative affect were distinct dimensions of SWB rather than opposite ends of a single continuum. More complex conceptualisations have also been proposed. Russell (1980) presented the circumplex model of affect based on two dimensions – pleasure-displeasure and degree-of-arousal – and this was further developed in Barrett and Russell (1998). It is more common in contemporary SWB research to adopt these two-dimensional or multi-dimensional concepts of affective SWB than to utilise Bradburn's idea of affect balance.

While the tripartite model has reached a high level of acceptance and is in very widespread practical use by SWB researchers, there are continuing debates about it. Stone and Mackie (2013) consider the possibility that the cognitive and affective concepts of SWB may actually be opposite ends of a temporal continuum and therefore that the distinction between them is arbitrary, although they conclude that the empirical evidence is generally supportive of the distinction. Busseri & Sadava (2011) highlighted a lack of clarity about the relationship between the two components. They identify five different possibilities; and argue that it is vital for researchers to be clear about which of these options they are basing their work on. For example, life satisfaction, positive affect and negative affect may be viewed as three components of an overarching construct (SWB). This is the approach that seems closest to the original conceptualisation discussed by Diener, and therefore is the approach adopted in this dissertation.

On the whole, though, alternative frameworks of the SWB concept itself are relatively scarce in the literature. Conceptually, there has been much more debate about the boundaries of the SWB concept and its relationship to other ideas of self-reported well-being and mental health. I will now go on to discuss these other concepts.

One important related concept is that of *psychological well-being*. The distinction between subjective and psychological well-being has been linked to two different strands of ancient Greek philosophy – 'hedonia' and 'eudaimonia'. In this binary arrangement 'hedonia' is sometimes used to refer to all aspects of SWB discussed above; while 'eudaimonia' refers to ideas of psychological well-being or flourishing and is linked with Aristotle's ideas about leading a good or virtuous life (Ryan and Deci, 2001). Two prominent conceptions of eudaimonia or psychological well-being are Ryan & Deci's (ibid.) proposal of three basic psychological needs – autonomy, competence and relatedness – which they argue are requirements for well-being; and Ryff's (1989) framework of six components – self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth – which she sees as constituting psychological well-being.

In addition to eudaimonic conceptions, other ideas and frameworks of self-reported well-being have been put forward. Keyes (1998) proposed a three-component model consisting of *emotional well-being* (similar to subjective well-being); *psychological well-being* (based on Ryff's categorisation) and *social well-being*. Brown & Kasser (2005) discuss the concept of *ecological well-being* – i.e. behaving in a way which involves collective responsibility and is ecologically sustainable – and its links with subjective well-being. Fisher et al (2000) proposed the concept of *spiritual well-being* consisting of four dimensions – one's relationship to oneself, to others, to the environment and to something or someone beyond the human level (transcendence). In the UK, the term *mental well-being* has also gained some ground, mainly in relation to the development and use of the Warwick-Edinburgh Mental Health Scale (Tennant et al., 2007); although this idea remains outside the mainstream of international SWB research at present.

It is also important to acknowledge that concepts of well-being may vary across cultures. There is a growing body of literature on this topic. For example, Joshanloo (2012) considers happiness from the perspective of Islam and, comparing this with

Western conceptions, concludes that there are significant differences in the two perspectives. He argues that the Islamic conception of happiness is closer to the concept of eudaimonic well-being than subjective well-being, and that considerations of transcendence, spirituality, mystical experience and the after-life should also be considered. Hofmann (2013) links some of the components of well-being to Buddhist teachings and discusses different conceptions of happiness in individualistic and collectivist cultures.

All of these ideas represent potential avenues for future research on children's self-reported well-being if appropriate measures related to the concepts can be developed. However they are not specifically considered further in the discussion that follows for the practical reason that there is very little available data from child populations in the UK relating to any of these concepts with the exception of SWB.

Finally, it is necessary to discuss the distinction between SWB and mental health. As discussed earlier, one of the key ideas underpinning the positive psychology movement was that positive mental health is more than simply the absence of mental health problems. This idea has been evaluated empirically with mixed results. At a broad level there is empirical evidence that measures of mental health and mental ill-health are correlated but distinct (Keyes, 2005; Westerhof & Keyes, 2009; Winefield et al., 2010). On the other hand, more detailed work has suggested that there is a stronger overlap between SWB and some forms of mental ill-health such as depression (Headey et al., 1993; Wood et al., 2010) than with others such as anxiety (Headey et al., 1993; Bergsma et al., 2011). Findings may also vary somewhat depending on the SWB component being considered. A second way of evaluating the extent of distinction is through examining correlates of the two constructs. There appear to be a number of common factors associated with self-reported well-being and ill-being, but also some distinct factors (Huppert, 2009; Winefield et al, 2010). There is also some evidence of distinct biological correlates (Ryff et al., 2006). In summary there is mixed evidence from recent research on the distinction between positive and negative mental health, but probably, on balance so far, sufficient evidence to continue to consider the proposition of distinctiveness.

2.3 Key themes and controversies

At an early stage, research on SWB established that the majority of adults evaluate their life satisfaction and happiness positively but that, at any given point in time, there are a minority of people who have low SWB. Much of the attention of SWB researchers has been devoted to trying to understand and explain why individual people's SWB varies – or, in other words, why some people are much more satisfied with their lives, more happy and less sad than others. A separate strand of research has pursued the question of why SWB varies between countries. I will focus in this section on providing an overview of research with adult populations on interpersonal variations in SWB as the question of international variations is not directly relevant to the topic of the dissertation.

As the quote from Wilson at the beginning of this chapter illustrates, early research mainly attempted to explain variations in SWB using information on people's characteristics and circumstances. This included factors such as age, gender, marital status, income and educational qualifications. It soon became evident that these types of factors could only explain modest amounts of the interpersonal variation in SWB (Campbell, 1976; Andrews & Withey, 1976).

At the same time there was emerging evidence that suggested that people's SWB may gradually adapt and revert to an individually normative level, even after major positive and negative life events. One of the earliest studies on the influence of life events on SWB was by Brickman, Coates & Janof-Bulman (1978) and suggested that lottery winners and people experiencing a severe disability tended to return to their prior state of well-being in the medium-term. This study was based on very small sample sizes and had weak statistical power. However other studies similarly demonstrated a relatively short impact of life events on SWB. For example, Suh, Diener and Fujita (1996) studied 115 participants over two years and concluded that only recent events (within the last three months) influenced SWB. Findings such as these gave rise to the 'set-point theory' of subjective well-being (Lykken & Tellegen, 1996) which contends that levels of subjective well-being are relatively stable in the long term and that individuals tend to recover their sense of well-being even after significant positive or negative life events. However, there is also contrary evidence, particularly

in relation to the negative and longstanding impact of unemployment on SWB (e.g. Clark et al, 2008). More recently, studies of Brickman & Coates' original topics – lottery winners (Gardner & Oswald, 2007) and disability (Oswald & Powdthavee, 2008) – have also suggested that adaptation to these events is only partial. Even if adaptation is complete within a number of years (such as appears to be the case after the death of a partner) this is a substantial portion of a person's life and it does not follow that such fluctuations in SWB are not important.

An idea which is related to set-point theory is the theory of SWB homeostasis proposed by Cummins (2010). He describes this idea as analogous to the body's homeostatic maintenance of physiological states such as body temperature. Cummins (2014) argues that the response that research participants give to questions about satisfaction with life as a whole 'does not represent a cognitive evaluation of their life. Rather it reflects a deep and stable positive mood state' (ibid, p. 188). Cummins views this state as representing an individual 'set point' that has genetic origins.

Research has been conducted on the extent to which SWB has a genetic component. A much-quoted study of twins (Lykken & Tellegen, 1996) estimated that 40% to 55% of the variation in SWB can be explained by genes. Since that time it has become commonplace in the literature on SWB to state that a large proportion of SWB is heritable. However, the evidence is not unequivocal. First, Lykken and Tellegen actually use, as their measure of well-being, a component of a scale of personality traits, rather than, for example, a measure of life satisfaction. So it could be argued that they were measuring the genetic roots of personality traits rather than SWB. Second, as Diener (1999) points out there are features specific to twin studies, such as the shared pre-birth environment that need to be taken into account. Third, studies which have gathered SWB data from parents and children have found relatively weak inter-person correlations (Casas et al., 2008; Clair, 2012). In fact, Clair found that the quality of parent-child relationships was a stronger predictor of children's life satisfaction than was parental life satisfaction. These findings are surprising and challenging to genetic theories given the shared family environment, and the potential effects of interactions between people, as well as substantial shared genetic make-up. Finally, recent advances in genetic research indicate that the links between genes, environment and

well-being are complex and that, for example, environment-gene interactions may also be an important part of the picture (Pluess, 2015). These advances in evidence suggest that the heritability findings cited above may be both an over-estimate and an over-simplification.

One of the mechanisms by which it is proposed that genetics might exert an influence on SWB is through personality traits. The link between personality and SWB has been a key theme in research on adult populations. Indeed there is a significant cross-sectional correlation between measures of personality and measures of SWB, which may have some underlying genetic origin (see meta-analysis in Heller et al., 2004). This set of findings led to the 'top-down' approach. In this approach, personality is seen as a key driver for life satisfaction and this in turn tends to affect people's satisfaction within certain domains. This is contrasted with the 'bottom-up' approach that views SWB as being influenced by the circumstances of people's lives and by other factors and events within their environment. The debate between these two approaches remains unresolved, with competing evidence to support both sides. An integrative approach, which incorporates both top-down and bottom-up theories, recognising the importance of personal and situational factors, has been proposed (Heller et al, 2004).

Despite the strong claims made by some researchers that personality can explain large amounts of the variation in SWB, there are reasons to be wary of the idea that the observed correlations between personality and SWB mean that the first 'predicts' the second. One issue is that there seems to be considerable overlap between the two concepts; and, in view of this, Schmutte and Ryff (1997) argue that the observed associations between them may be tautological. A second issue is that there may be common-method variance in measures of personality and SWB gathered through the same survey questionnaire, for example. This will lead to an over-estimate of the strength of the association. Third, the argument that personality predicts SWB rests on the assumption that personality is relatively stable and that therefore causality only runs in one direction. However, it is not clear that this assumption holds true. For example, Specht, Egloff and Schmukle (2013), using a large longitudinal data set in Germany, found that baseline life satisfaction and changes in life satisfaction over time predicted change in personality, while there was less evidence of an influence in the

opposite direction. This reverses the top-down theory. The question about the assumed stability of personality is especially pertinent in relation to children's SWB as will be discussed in the next chapter.

In summary, the relatively limited explanatory power of contextual factors has led to a range of other explanations for interpersonal variations in SWB – related to genetics, personality and predispositions. There is strong evidence that these types of factors play an important part in understanding why SWB varies between individuals, but causal links are not always entirely clear and, even after taking these factors into account, there is still a substantial amount of remaining variance to be explained, both between individuals and within individuals over time.

Two other important strands of research have provided some additional insights into inter- and intra-personal variations in SWB. The first of these has focused on the links between people's relationships and their SWB. There is substantial evidence of significant associations between aspects of interpersonal relationships and SWB (Saphire-Bernstein & Taylor, 2013); although the strength of these associations depends on the type of measure of relationships being used. Measures of the quality of people's relationships tend to correlate quite strongly with measures of SWB. However, as discussed above in relation to personality and SWB, there are issues of construct overlap and common-method variance to consider. First, satisfaction with the quality of one's relationships can be regarded as a domain satisfaction and therefore a component of SWB; as it is, for example in the widely-used Personal Well-being Index (International Wellbeing Group, 2013). This means that it cannot logically also be treated as a factor external to SWB that predicts it. Second, quality of relationships are often measured by self-report surveys and this raises the issue of shared method variance with responses to questions about SWB asked in the same survey (Lucas et al., 2008). Factual measures about relationships – such as marital status and the number of close friends that one has – have much smaller correlations with SWB – comparable, for example, with those for income (Lucas & Dyrenforth, 2006). Lucas et al. (2008) argue that it is 'necessary to show robust associations between non-self-report relationship quality measures and SWB' (op. cit., p. 2009); but if it is the experienced quality of relationships that is important for SWB then it is not clear how this could be achieved.

A broader point highlighted by this issue is that there tends to be a blurred boundary between what is included and excluded from the SWB concept. SWB researchers need to take special care in clarifying their view of this, for each piece of research, and to reflect this clarity in their design, analysis and interpretation of findings.

The second additional strand of research has been the exploration the associations between people's behaviours and activities and their SWB. A review of research on this topic (Aked & Thompson, 2011) distilled five types of behaviours that may be linked to well-being. These behaviours – connecting, being active, taking notice, keeping learning and giving – have been popularised in the UK as 'five ways to well-being'. Studies have investigated the links between SWB and a diverse range of other behaviours, such as health-related behaviours (e.g. Blanchflower et al., 2013). One of the challenges for this strand of research is to disentangle the impact that these activities might have on SWB from the possibility that people with higher SWB might be more likely to engage in them, or that people self-select into these activities based on other factors that are associated with higher or lower SWB. Researchers have begun to address these challenges using sophisticated statistical techniques and longitudinal data. For example, Binder and Freytag (2013) use propensity score matching, as well as taking account of personality, and report evidence of a positive impact of regular volunteering on SWB. There have also been experimental studies that have demonstrated the short-term and longer-term beneficial impacts on people's SWB of behaviours such as expressing gratitude (e.g. Emmons & McCullough, 2003; Rash et al., 2011).

In summary, after over fifty years of developments, SWB research with adult populations has reached the point where there is a rich set of empirical evidence on interpersonal variations, recognising the potential contribution of 'top-down' influences such as genetics and personality, alongside the influence of 'bottom-up' factors' such as contexts, life events and relationships, as well as other considerations such as the potential links between people's behaviours and choices and their SWB. There is also a recognition of potential interactions between these different factors (e.g. personality-environment interactions) and of bi-directional relationships between SWB and other factors. This provides a context for the relatively recent development of

research on children's SWB, including in the UK, which has primarily only taken place over the last decade. Because of this issue of chronology, research on children's SWB has tended often to take a lead from research on adults' SWB. However there are also many important differences between the nature of children's and adults' lives. For example, children spend much of their time at school; and they generally have less choice, autonomy and self-determination than adults. This means that concepts and findings relating to adult SWB may not be directly transferrable to the study of children's SWB, and additional issues may also need to be considered. The next chapter focuses specifically on research on children's SWB, which provides a more direct context for the research questions to be explored in this dissertation. It also focuses on research that has been undertaken in the UK. The reason for this geographical focus is that the correlates of children's SWB have been found to differ between countries, as will be discussed.

Chapter 3: Children's subjective well-being in the UK

3.1 Overview of UK research on children's SWB

Over the last decade there has been a gradual increase in the amount of research evidence available on children's subjective well-being in the UK. This has primarily come through two routes. The first is the analysis of data contained within UK panel and longitudinal studies such as those that are used as the data source for the new analysis presented later in this dissertation. The British Household Panel Survey (BHPS), its successor the Understanding Society study (USS), and the Millennium Cohort Study (MCS) all contain some questions in child self-completion questionnaires which can and have been viewed as asking about subjective well-being. The Growing Up in Scotland (GUS) cohort study also contains some SWB questions. The second route is through an ongoing programme of research specifically on children's subjective well-being developed by The Children's Society and the University of York (TCS/UoY). In addition to these two main routes, there has also been some analysis of UK data on life satisfaction gathered in the international Health Behaviour in School-aged Children (HBSC) survey.

There is also a growing international research literature on children's subjective well-being. However, this section will focus on a review of the key findings from the UK literature for two reasons. First, there is now enough UK evidence to cover most of the main topic areas amenable to cross-sectional data analysis. There are not many obvious gaps in this respect that have been covered in greater depth in other countries. Second, the research has indicated that the factors affecting children's subjective well-being are not necessarily the same across countries. For example, Klocke, Clair and Bradshaw (2015) show that the association between experiences of bullying and subjective well-being varied substantially within a sample of European and North American countries; and Bradshaw et al. (2017) and Rees (2017b) report similar results from a study of countries across a broader range of economic and cultural contexts. Findings from research in other countries may therefore not be generalisable to the UK context. Thus the focus is on studies relating to the UK unless otherwise stated. Some international studies are discussed where they raise particularly important points or for topics where UK evidence is sparse.

In order to identify relevant UK literature, an initial search was conducted using the Web of Science academic journal database[4]. Terms were used in the search of the article title to identify potential subjective well-being literature[5] and to focus on search results related to children[6]. When initially conducted this search yielded just over 3,500 results from 2000 to 2015. Additional search terms[7] were then added to restrict the search to literature relating to the UK, which resulted in a total of around 300 references. The titles and abstracts of these references were scanned for relevance. References were retained if (a) they appeared to relate to the SWB concepts explored in this dissertation, (b) used data gathered from children in the UK, and (c) included some form of quantitative analysis. The first criteria was the most complex to implement because, for example, there were studies using concepts such as 'emotional well-being' and 'school well-being' but these did not appear to connect with the concepts of life satisfaction, positive affect and negative affect being explored in this dissertation and so were not included in the final list of literature to be reviewed.

This search was updated towards the end of the writing of the dissertation. Additionally, during the course of the work other literature was identified through a 'snowballing' approach; through searching the publications list of researchers known to be working on SWB in the UK; and through use of the Centre for Longitudinal Studies bibliography[8] which was useful in identifying relevant literature using the data sets used in the dissertation.

In total, 31 references were identified which met the criteria and related to children's SWB in the UK. Table 3.1 lists the studies, providing an indication of topics and identifying key characteristics – (a) whether or not they are peer-reviewed academic journal articles; (b) the design of the analysis undertaken; (c) whether the data was

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[4] http://wok.mimas.ac.uk/

[5] TI=(wellbeing) OR TI=(well-being) OR TI=(well being) OR TI=(satisf*) OR TI=(happiness) OR TI=(happy) OR TI=(affect*)

[6] TI=(child*) OR TI=(youth) OR TI=(young people) OR TI=(adolesc*) OR TI=(teen*)

[7] TS=(United Kingdom) OR TS=(UK) OR TS=(Britain) OR TS=(England) OR TS=(Wales) OR TS=(Scotland) OR TS=(Northern Ireland) OR TS=(British) OR TS=(English) OR TS=(Welsh) OR TS=(Scottish) OR TS=(Northern Irish)

[8] http://www.cls.ioe.ac.uk/Bibliography.aspx?sitesectionid=647&sitesectiontitle=Bibliography

gathered specifically for the analysis or whether secondary data was used; and (d) the data source used.

While the main literature search was restricted to references making use of quantitative data, some mention is warranted of the emerging field of qualitative research exploring children's understandings of subjective well-being. A literature review by Dex & Hollingworth (2012) identified 20 substantial studies (including eleven in the UK) which had researched children's perspectives on well-being in general using qualitative methods, and several other studies have been published since that review. These studies have primarily been able to provide insights into two issues – (a) the components or domains that children perceive as contributing to the overall concept of subjective well-being and (b) some of the factors that they feel influence it.

Dex & Hollingworth compare a diverse set of lists of domains and sub-domains identified by different researchers. This is similar to the situation with the general literature (primarily in relation to adults) where lists of domains have proliferated. From a conceptual viewpoint it is often difficult to choose between the frameworks proposed. Empirically it may be that statistical techniques such as factor analysis could help to identify the most appropriate set of domains for a particular population.

Despite these conceptual challenges, one of the major contributions of this strand of enquiry is to ensure that topics relevant to children are incorporated into the conceptualisation. For example, Gabhainn & Sixsmith (2005), in Ireland, identified animals and pets as important contributors to well-being for primary school children; while in the UK, consultation with primary school children (The Children's Society, 2008) identified themes such as play. It seems unlikely that these themes would have been identified by applying and modifying frameworks to children's SWB that were originally developed with adults.

Most of the studies are focused within specific countries including Australia, Finland, Germany, Ireland, Italy, Spain and the US (Andresen, Hurrelmann, & Schneekloth, 2012; Bourke & Geldens, 2007; Chaplin, 2009; Fattore, Mason, & Watson, 2007; Fattore, Mason, & Watson, 2009; Fattore, Mason, & Watson, 2012; Gabhainn & Sixsmith, 2005; Thoilliez, 2011; Uusitalo-Malmivaara, 2012). A notable exception is Crivello et al.

(2008) which explored children's ideas about well-being growing up in poverty in four countries – Ethiopia, Peru, Vietnam and India. Across these studies (single and multi-country) a recurrent theme is the fundamental importance of relationships, with family, friends and a wider community for children's sense of well-being.

In contrast to the fairly concrete domains such as relationships, health, local area identified in many studies, Dex & Hollingworth note that several studies identified more abstract concepts. In the UK, The Children's Society (2006) identified a set of themes – love, support, safety, fairness, respect and freedom – which cut across many of the domains (such as family, friends, school, etc.) identified in that research. Fattore et al (2009) also identified themes of a more abstract nature such as agency, safety and security.

The second aspect which the research has covered are the factors that children perceive as impacting on their sense of well-being. To some extent, these factors are context-dependent. So, for example, in Crivello et al.'s study, children in Peru cited lack of basic services such as water and electricity; while in Ethiopia children cited having to start paid work at a very young age. These may not be common concerns in the UK. However many other factors identified by children as detrimental to their well-being such as family breakdown, violence, living apart from parents, hunger, violence within the local area, and so on, cut across countries and contexts. These types of factors are not so much about the conceptualisation of children's well-being as about understanding its determinants. It seems likely that these determinants will vary in significance from one context to another and developing an understanding of these differential influences is an important topic for cross-cultural research in particular.

These qualitative studies have therefore provided some valuable insights into children's ideas about well-being, but they also have a number of important limitations.

One aspect is the difficulty of generalising about children as a homogeneous group, particularly on the basis of age and development. Dex & Hollingworth argue that there has so far been insufficient attention to this issue, and that concepts may need to

vary across different age groups of children. Linked to this is a lack of discussion of child development concepts within the current literature reviewed above.

A second key limitation is that, because these studies have tended to start from children's perspectives, they have not managed to fully explore the extent to which some of the concepts proposed in the general literature make sense to children. So there is very little discussion about the distinction between cognitive and affective components of subjective well-being or that between life satisfaction and a sense of flourishing (although this latter distinction is implicit in some of the material gathered from children). This means that at this stage, this strand of work remains relatively isolated from the main conceptual debates within the general literature and these links could be strengthened in the future.

This qualitative literature has to some extent informed the evolution of quantitative research on children's SWB. This is true, for example, in the UK where the work cited by The Children's Society (2006) was designed as a precursor to a large-scale survey designed to gather quantitative data. Themes that were identified through the qualitative research –, such as the importance of relationships with family and friends, the impact of bullying, and the complex relationship between economic circumstances and children's sense of well-being – informed the development of survey questions. This influence can be seen in subsequent outputs from this ongoing project included in the list in Table 3.1 – Goswami (2012); Main and Bradshaw (2012); Main (2014). The remainder of this section returns to a consideration of the literature involving quantitative analysis of children's SWB in the UK.

The remaining sections of this chapter will look at the conceptualisations of SWB discussed in these studies; the way that SWB was operationalised and measured; some general descriptive findings about levels, patterns and trends in children's SWB in the UK; and the work that has been done in these studies to attempt to explain variations in children's SWB. The chapter concludes with an evaluation of the strengths and limitations of the current evidence base and the way that this evaluation has informed the rationale for the research questions addressed in this dissertation.

Table 3.1: Studies of children's SWB using UK data

Author(s)	Year	Abbreviated Title	Peer	Design	Pri/Sec	Data
Abdallah et al.	2014	Exploring the links between children's activities and their SWB	Y	C	P	TCS
Beardsmore & Siegler	2014	Measuring National WB -Exploring the WB of Children in the UK, 2014	N	C	S	Various
Booker et al.	2015	Media use, sports participation, and well-being in adolescence	Y	C	S	USS
Booker et al.	2014	Well-Being in Adolescence—An Association With Health-Related Behaviours	Y	C	S	USS
Bradshaw & Keung	2010	Trends in child subjective well-being in the UK	Y	RC	S	BHPS
Bradshaw et al.	2011	Children's SWB: International comparative perspectives [incl. UK analysis]	Y	C	P	TCS
Chan & Koo	2010	Parenting Style and Youth Outcomes in the UK	Y	C	S	BHPS
Chanfreau et al.	2008	Predicting wellbeing	N	C	S	MCS/USS
Goswami	2012	Social Relationships and Children's Subjective Well-Being	Y	C	P	TCS
Goswami	2014	Children's SWB: Socio-demographic Characteristics and Personality	Y	C	P	TCS
Knies	2011	Life satisfaction and material well-being of young people in the UK	N	C	S	USS
Knies	2017	Income effects on children's life satisfaction: Longitudinal Evidence	N	L	S	USS
Levin, Currie & Muldoon	2009	Mental WB and subj. health of 11- to 15-year-old boys and girls in Scotland	Y	RC	S	HBSC
Main & Bradshaw	2012	A child material deprivation index	Y	C	P	TCS
Main	2014	Child Poverty and Children's SWB	Y	C	P	TCS
Mostafa & Platt	2014	Poverty and deprivation .. MCS: Initial findings from the age 11 survey	N	C	S	MCS 5
Parkes et al.	2016	What shapes 7-year-olds' SWB ? Prospective analysis of early childhood ...	Y	L	P	GUS
Patalay & Fitzsimons	2016	Correlates of Mental Illness and Wellbeing in Children: Are They the Same?	Y	C	S	MCS 5

Author(s)	Year	Abbreviated Title	Peer	Design	Pri/Sec	Data
Pople & Rees	2016	The Good Childhood Report 2016	N	C	PS	TCS
Pople et al.	2015	The Good Childhood Report 2015	N	C	PS	TCS
Pople et al.	2014	The Good Childhood Report 2014	N	C	PS	TCS
Powdthavee & Vernoit	2013	Parental unemployment and children's happiness: A longitudinal study	Y	L	S	BHPS
Powdthavee & Vignoles	2008	Mental Health of Parents and Life Sat. of Children: A Within-Family Analysis	Y	L	S	BHPS
Rees & Bradshaw	2016	Exploring Low Subjective Well-Being Among Children Aged 11 in the UK	Y	C	S	MCS 5
Rees et al.	2010a	Understanding Children's WB: A national survey of young people's WB	N	C	P	TCS
Rees et al.	2013	The Good Childhood Report 2013	N	C	PS	TCS
Rees et al.	2012	The Good Childhood Report 2012	N	C	PS	TCS
Robson	2010	Changes in Family Structure and the WB of British Children	Y	L	S	BHPS
Wolke & Skew	2011	Bullied at home and at school: Relationships to behaviour .. and unhappiness	N	C	S	USS
Wolke & Skew	2012	Family factors, bullying victimisation and wellbeing in adolescents	Y	C	S	USS
Yucel & Yuan	2015	Parents, Siblings, or Friends? Exploring Life Sat. among Early Adolescents	Y	C	S	USS

Key: Peer = Whether peer reviewed; Design=Cross-sectional, Repeated Cross-sectional or Longitudinal; Pri/Sec=Whether primary or secondary data is used; Data= BHPS (British Household Panel Survey); USS (Understanding Society); MCS (Millennium Cohort Study); TCS (The Children's Society); HBSC (Health Behaviour in School-aged Children Survey); GUS (Growing Up in Scotland).

3.2 Conceptualisation of children's subjective well-being in UK research

Within the above set of studies using UK data, there are variable levels of attention to conceptualising SWB. A majority of the references identified have used data from the British Household Panel Survey (BHPS), the Understanding Society Survey (USS) and the Millennium Cohort Study (MCS) fourth and fifth sweeps. These studies share a common set of six questions (asking about happiness with life as a whole and with different aspects of life), although the MCS also contains some questions not appearing in the other two surveys. The papers analysing these data sets use a range of terminology; with the same measures variously being described as measuring 'subjective well-being', 'life satisfaction', 'happiness' and 'mental well-being'. Underlying this range of terms there is generally little or no discussion of SWB concepts in these papers. Most authors introduce the concept in a fairly straightforward way, although some articles provide a sentence or two containing a very brief definition. There are a few exceptions. Patalay and Fitzsimons (2016) discuss the distinction between positive and negative approaches to defining 'mental health' and pursue this idea through comparing the correlates of measures of SWB and mental health symptoms. Bradshaw et al. (2011) provide some discussion including the distinction between positive and negative affect. Rees and Bradshaw (2016) briefly discuss the tripartite model. Overall, however, conceptual discussion of SWB is very thin in this literature. Given that this is secondary data, the differences in terminology and the lack of conceptualisation do not necessarily affect the research process or the results obtained from analysis. However, the lack of clarity in these studies does suggest the risk of using variables in ways that may not make conceptual sense, as will be discussed in the next section on measurement issues.

The remaining literature, based on three other sources of data, contain more extensive conceptual discussion. Levin et al. (2009), used data from the Health Behaviour in School-aged Children (HBSC) study. They discuss the divide between hedonic and eudaimonic well-being and also, within hedonic well-being, the 'tripartite model' of life satisfaction, positive affect and negative affect. A number of papers stem from a joint research programme of children's SWB by The Children's Society and University of York (TCS/UoY) which adopted the tripartite model and developed and tested sets of measures to represent different aspects of the model. Detailed conceptual

discussions of this model are contained within Main (2014) and Rees et al. (2013). This programme also tested and utilised three single-item measures of self-reported well-being originally developed by the Office for National Statistics (ONS) for use with adults although there is no longitudinal data available relating to these measures which would have been suitable for use in this dissertation. Finally, using data from the Growing Up in Scotland (GUS) birth cohort survey, Parkes et al. (2016) adopt a measure developed in TCS/UoY research and this article also contains some clarification of concepts underlying the variables being used, with reference to the tripartite framework.

In summary, where researchers have discussed conceptual issues in the set of literature identified, they have tended to follow the broad outlines of the most common conceptual frameworks that were described in the previous section. The SWB concept itself is generally viewed as consisting of life satisfaction, positive affect and negative affect (the tripartite model) and is distinguished from psychological well-being and from mental ill-health. However, a majority of papers did not clarify or discuss concepts in any great detail.

3.3 Measurement of children's subjective well-being in UK research

Most of the studies used multi-item measures of SWB. They generally report reliability coefficients and these tend to be of an acceptable level. Test-retest reliability analysis is less commonly mentioned, although it is reported for the life satisfaction measure developed by TCS/UoY (Goswami, 2012). Several studies also report the results of exploratory factor analyses for multi-item measures of single constructs or for multiple constructs. For example, Rees & Bradshaw (2016) report on an exploratory factor analysis of the fifth sweep of the MCS, the results of which are consistent with the tripartite framework of life satisfaction, positive affect and negative affect. So, to the extent that they are reported, the testing of measurement properties of the SWB measures used in the analyses generally shows results that support the frameworks being used. The main gap in this body of literature is more detailed testing of multi-item measures using methods such as confirmatory factor analysis (CFA). Only one reference (Yucel & Yuan, 2015) mentions CFA, but there is insufficient detail on the method used to assess its merits. Options for testing single-item measures are more

limited but there is no reporting of convergent or discriminant validity or test-retest reliability for these measures. To summarise, the testing of the measures is mostly at quite a basic level and does not fully reflect typical current practices for psychometric testing. Given that the conceptual framework for SWB is well-developed, there are opportunities for much greater use of CFA in particular.

A measurement issue that is addressed by a number of the authors relates to the shape of SWB distributions. It has long been established in the literature on adult populations that life satisfaction, for example, is not normally distributed. Most people tend to pick values in the top half of the range and typically mean scores lie in the 70% to 80% part of the scale (Cummins, 2003). The distributions tend to be even more strongly skewed among children, particularly at younger ages. Some authors argue in favour of still treating SWB measures as being on an interval scale based on testing by Ferrer-i-Carbonnel & Frijters (2004) which suggested that results are similar whether, for example, ordinal or linear regression is used. One article (Main, 2014) uses tobit regressions on the basis that this method allows for censored data. However this is also debatable. If, for example, the top of the scale is labelled something like 'completely satisfied' then a tobit model would not be appropriate as it would it assume that it is possible to have values greater than that, which would not logically be possible. Some researchers resort to collapsing the measure into a binary variable and using logistic regression. This raises issues about where to place the cut-off point. It also means that it is not straightforward to calculate fit statistics and compare models. Finally, two papers combine different approaches. Powdthavee & Vernoit (2013) use linear regression (with a single-item life satisfaction question on a seven-point scale) but then replicate the analysis using ordinal and logistic regressions to check for consistency of results. Rees and Bradshaw (2016) take a similar approach, initially running logistic regressions but then repeating the analysis with linear regressions to calculate fit statistics. This type of combined approach is perhaps the best balance between statistical rigour and generating findings that are easy to interpret.

Overall, the papers reviewed tend to pay some attention to measurement issues. However there are also limitations and gaps, such as the scarcity of confirmatory factor analysis. In addition there are some examples of construction of measures without any

underlying conceptual framework. This overall picture has informed one of the key questions to be addressed in this dissertation as will be discussed later in this chapter.

3.4 Children's' subjective well-being in the UK: Levels, trends and demographics

Before moving on to the other main focus of this chapter, which is the evidence on explaining variations in children's SWB, a few brief notes are provided on levels, trends and demographics as these are relevant background information for what follows.

The general picture of levels of child SWB in the UK is that the large majority of children report positive SWB. In the most recently published analysis of USS data, children aged 10 to 15 had a mean score for happiness with life as a whole (usually considered to be a measure of life satisfaction) of 8.08 out of ten (Pople & Rees, 2016). The most recent mean scores for the three ONS measures of overall well-being (ONS, 2014a) for 10- to 17-year-olds are all around 7.5 out of ten (Pople & Rees, 2016). Research has also been concerned with the percentage of children with low well-being. For the ONS measures the percentage of children and young people aged 10 to 17 who score below the mid-point on the scale was 4.5% for life satisfaction, 7.3% for feeling happy yesterday and 5.2% for finding life worthwhile. So, while most children have relatively high SWB there is a proportion who do not and, although the percentages are quite small, they still add up to substantial numbers of children at any given moment in the UK. Much of the focus of published UK research, and also the main focus of this dissertation, is in seeking to understand these variations in SWB.

Researchers have also looked at time trends in some of these measures. An analysis of a long-term time series of children's responses to a question on happiness with life as a whole asked in the same way in the BHPS and USS from 1996 until the present (Pople & Rees, 2016) found a small decrease in life satisfaction from about 1999 to 2002, followed by an increase up to 2008 when the BHPS data collection ended. In the USS there was a small decrease in life satisfaction from 2009 to 2014. There were also some patterns in trends for individual domains such as a significant long-term decrease in children's satisfaction with their appearance.

Research has come up with mixed findings on demographic variations in children's SWB. There is a pattern of decreasing SWB with age, at least across the 10- to 15-years-old age range (Pople & Rees, 2016). This is also a finding in other countries (e.g. Goldbeck et al., 2007; Uusitalo-Malmivaara, 2014). There is not a completely clear picture for gender. Some multivariate analyses (e.g. Patalay & Fitzsimmons, 2016) report that girls have lower life satisfaction than boys; while others (e.g. Goswami, 2014) find no significant gender difference. There is more consistent evidence of gender differences in some domains. Girls tend to be happier than boys with their lives at school, but less happy than boys with their appearance. Ethnic variations are also a little unclear. There is some evidence that children of Indian, Pakistani and Bangladeshi origin may have slightly higher than average life satisfaction (Goswami, 2014; Rees & Bradshaw, 2016). Other studies (e.g. Patalay & Fitzsimons, 2016) do not find this pattern. Goswami (2014) also reports that disabled children appear to have lower than average life satisfaction. The key message here, though, is that with the exception of the age patterns, none of these factors explain more than a very small amount of the overall variation in children's SWB. I will now turn to the evidence assessing other potential sources of this variation.

3.5 Explaining variations in children's subjective well-being

Beyond the conceptualisation and development of SWB measures, and the identification of general levels of SWB and trends, most of the UK research has focused on attempting to explain variations in children's SWB through looking at variations either in mean SWB or in the proportion of children having low SWB. Before describing and evaluating the evidence that has been generated, it is worth considering some possible explanations as to why some children may have lower SWB than others. The various potential explanations that are most commonly employed in the literature on adults' and children's SWB are categorised and depicted in Figure 3.1.

Figure 3.1: Categorisation of different sources of variation in SWB
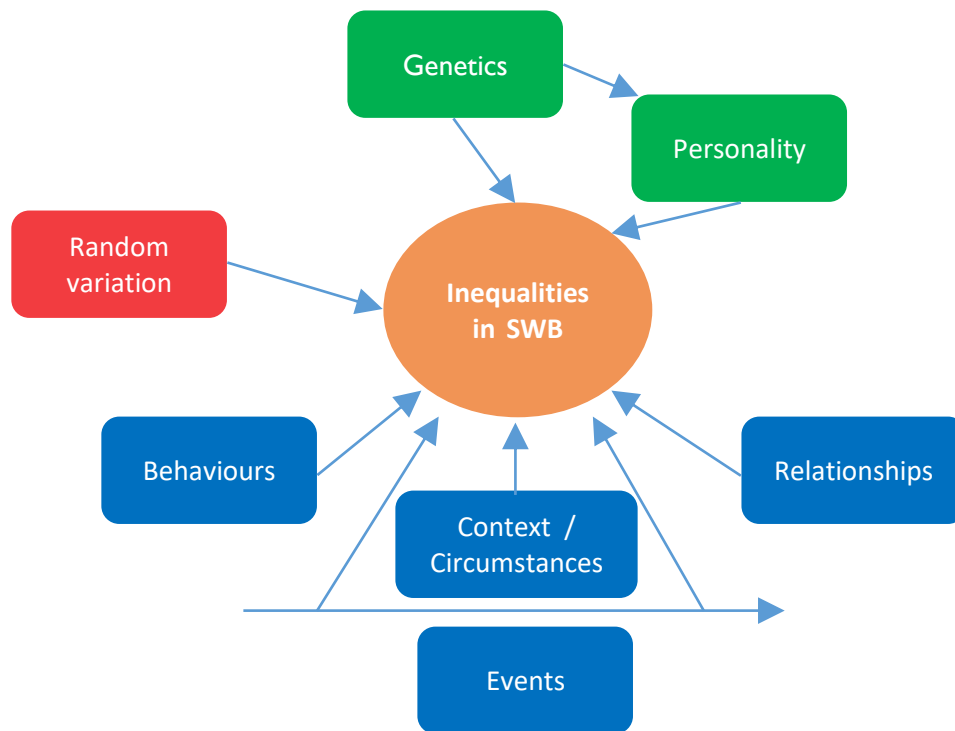
First of all it is clear that there will be some *short-term fluctuations* in how children rate their SWB. The testing that was reported above indicated that there was an acceptable level of short-term stability in life satisfaction scores. However there clearly is variation and this matches research with adults which has found, for example, fluctuations in people's life satisfaction ratings over the course of a research interview (Helliwell et al., 2012; Diener et al., 2013). This type of variability can probably be regarded as random and might even itself out in large samples. It will therefore not affect mean scores but it will increase variance and will reduce the proportion of variation that it is possible to explain by other factors.

A second source of variations will be due to fixed or relatively stable individual factors (a 'top-down' approach). This might include *genetic predispositions* but also *temperament* and *personality*. As with adults, some children may have an in-built tendency to be more positive or optimistic in their ratings than others. This issue has already been discussed in relation to adult SWB above. In addition to the limitations to this explanation of variations in SWB outlined earlier, the assumption of the stability of personality may be less well-founded in relation to children than adults. A meta-analytical review by Roberts and DelVecchio (2000) reported substantially lower test-

retest correlations in personality measures for children aged 6 to 11 years old and adolescents aged 12 to 17 years old than for adults.

Other sources for variation relate to the 'bottom-up' theory that factors in people's lives determine their SWB. These types of factors might include *contexts* or *circumstances* such as parental education, family structure, household economic circumstances and the area in which they live. An important feature of these factors is that they are external to the child and it is unlikely that there is a two-way relationship between them and child SWB. That is, it is not likely that children's level of SWB might affect these factors. Children's own *behaviours* may affect their SWB. For example, children who are more physically active or who volunteer may have higher SWB. Reciprocal relationships are more plausible here – children who are more active may be happier and/or children who are happier may be more active. While the diagram represents a static picture, *events* in terms of changes of context or circumstance might also influence SWB dynamically over time. These might include things such as a change in family structure or household income. It is possible that such factors will cause fluctuations in SWB in the short term and the longer term. A final set of factors is children's ongoing daily experiences of *relationships* with others, which might be termed *process* factors. Examples of these kinds of factors are being supported by teachers, or being treated fairly by parents. An important point about these factors is that it is much more possible that they have a reciprocal relationship with children's SWB. That is, children who have low SWB (for some other reason) may end up having more negative experiences of inter-personal relationships.

In summary, it is proposed that a fairly comprehensive enumeration of the types of factors that might explain variations in children's SWB (apart from very short-term fluctuations) includes genetic predispositions, personality, circumstances, events, processes, and behaviours. Certainly, all of the research that has been done in the UK to try to explain variations in children's SWB can be discussed in terms of these six categories. I will now go on to discuss the key findings of research on each of these broad categories.

3.5.1 Genetics

There is no UK research directly exploring genetic influences on children's SWB. However one relevant piece of work in this context is an analysis of associations between the SWB of children and their parents (Clair, 2012) mentioned earlier. Clair's analysis of data from the BHPS found that, cross-sectionally, the life satisfaction of both parents only predicted around 2% of a child's life satisfaction. This is remarkable because, apart from shared genetic make-up, children and parents experience shared environmental influences (such as common stressors) and there may also be spillover effects from one member of the household to another (e.g. if one person is depressed it may affect other people's sense of well-being). The finding of a weak association between parent and child SWB is, nevertheless, consistent with research in other countries (e.g. Ben-Zur, 2003, Casas et al., 2007 and 2008). The overall picture from these studies is very much at odds with the evidence from twin studies which has suggested a very high genetic component to SWB. However, in addition to limitations discussed in Chapter 2, these studies (e.g. Lykken & Tellegen, 1996) were based on data from adults not children and it may be that the stable component of SWB becomes larger with age. Despite the strong claims made by some researchers about the size of the genetic influence on SWB there is not yet clear evidence of such a strong link for children's SWB in the UK.

3.5.2 Personality

Another proposed top-down influence on SWB, which to some extent has genetic roots, is personality. Overall, there is evidence in the UK and elsewhere of a significant cross-sectional correlation between measures of personality and measures of SWB, which may have some underlying genetic origin. However, as a general principle, it is incorrect to interpret a correlation as evidence of causality and the assumption that personality is more stable than SWB is unproven, particularly among children. It is plausible for example that unhappy children will become more introverted rather than that introverted children are less happy. This remains an interesting topic for future research. Later in this dissertation I present some analysis of links between various factors and children's SWB using fixed-effects regressions which take account of fixed unobserved variables such as the stable component of personality.

The only published UK-based analysis of the link between personality and children's SWB (Goswami, 2014) found that the Big Five personality factors – openness to experience, conscientiousness, extraversion, agreeableness and emotional stability – made a substantial contribution (19% improvement in adjusted R^2 after controlling for socio-demographic factors) to explaining variations in life satisfaction among children aged 10 to 15 years old. Of the five personality factors, emotional stability made the strongest contribution, followed by openness, extraversion and conscientiousness. Agreeableness did not contribute significant unique variance. Studies in other countries have focused either on the Big Five personality factors (Suldo, Minch & Hearon, 2014; Vazsonyi et al., 2015); on Cloninger's psychobiological model of personality (Garcia & Moradi, 2012; Moreira et al., 2015); or on both (Garcia, 2011; Garcia, 2012). There is also a study in China (Xie et al., 2016) using a culturally-specific personality measure. These studies all find significant associations between personality measures and SWB measures with fairly substantial effect sizes. However the caveats noted earlier in this chapter and in Chapter 2 about the potential overlap in content of personality and SWB questions; the possibility of influences in both directions; and the limited evidence to support the assumption of stability of personality in children should also be borne in mind. Additionally there may be common-method variance in self-report questionnaires that contain items in similar formats (e.g. Likert scales) for personality and SWB.

In summary, there is some evidence to support the idea of top-down influences on SWB, particularly in terms of personality. On the other hand, if personality explains a fifth of the variation in children's SWB (as found by Goswami's analysis) then there is still likely to be a substantial proportion of variation to be explained, even after allowing for measurement error. I will now turn to the UK evidence on possible bottom-up influences on children's SWB using the categorisation introduced earlier of circumstances, events, relationships and behaviours.

3.5.3 Circumstances

Early UK evidence on variations in children's SWB according to circumstances suggested a fairly limited association. For example, Rees et al. (2010) found that family structure only explained around 2% of the variation in SWB, with children living in lone-parent families having lower life satisfaction than those living with both birth

parents. Other studies also find either no effect or limited variation in children's SWB according to family structure.

Research using traditional measures of socio-economic status have also only been able to explain small amounts of the variation in children's SWB. Knies (2011; 2017) reports only a small effect of household income on children's life satisfaction; while Main and Bradshaw (2012) find that household income explains around 2% of the variation in the life satisfaction of children aged eight to 15 years old. More recent analyses of the MCS also confirm this picture. Patalay & Fitzsimons (2016) report a small significant negative relationship between household income and child SWB at the age of 11 years old using Wave 5 of the MCS. However, the small effect size and the direction of effect may be attributable to the fact the analysis also incorporates other socio-economic measures. Rees and Bradshaw (2016), using the same data, report a significant positive association between household income and child SWB (life satisfaction, happiness and sadness) at the bivariate level, although this no longer remains significant in multivariate analysis. Mostafa and Platt (2014) present a bivariate analysis of the links between family income poverty over the first five sweeps of the MCS and children's life satisfaction. They find that any experience of poverty is associated with lower mean SWB than no experience of poverty. This is a rare piece of longitudinal analysis on this topic. However, the analysis is purely bivariate and so does not take into account the possible influence of any other factors. In summary, although these results are somewhat inconsistent, they suggest a rather weak association between household income and child SWB.

Other measures using social class and proxy poverty indicators also show weak or no associations. Chanfreau et al. (2008) find no evidence of differences in children's happiness at the age of seven years old according to housing tenure or eligibility for free school meals. Children whose parents were in managerial and professional occupations were less likely to be happy and more likely to worry than children whose parents were in intermediate and routine jobs. Main and Bradshaw (2012) report that children who had a parent in paid work, who did not receive free school meals and who had a bedroom of their own had significantly higher SWB but the effect size was small. Patalay and Fitzsimons (2016) and Rees and Bradshaw (2016) both find no

evidence of significant associations between parental education and child SWB. Rees and Bradshaw also find no link between either of a parent-reported measure of household-level material deprivation or housing tenure and children's low life satisfaction, although the deprivation measure was significantly linked to a small extent with low happiness and high sadness.

One of the most important developments in links between economic factors and children's SWB has been the use of child-centred material deprivation indexes. This approach follows the ideas of Peter Townsend who argued that:

> 'Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the type of diet, participate in the activities and have the living conditions and the amenities which are customary, or at least widely encouraged or approved in the societies to which they belong. Their resources are so seriously below those commanded by the average family that they are in effect excluded from the ordinary living patterns, customs, and activities.'
>
> Townsend, 1979, p. 31

Taking this idea as a starting point, Main and Bradshaw (2012) describe the development of a child-centred material deprivation index in the UK, which was created through discussions with children and refined through statistical testing. They report that this index explains around 10% of the variation in children's SWB compared to only around 2% explained by household income. Thus it seems that children are more affected by economic conditions that they directly experience than by more distal factors such as household income. They also make the important point that it is possible for a child to be classified as 'poor' in terms of material deprivation even though their family is not classified as 'poor' in terms of household income.

In summary, socio-economic factors are significantly associated with children's SWB but the strength of this association is very much dependent on the socio-economic measure being used. There is an important message from the work of Main and Bradshaw on the child-centred material deprivation measure. It highlights the risk of reaching the wrong conclusion about variations in children's SWB when relying on traditional household-based indicators. Further evidence of this is provided by Rees and Bradshaw (2016) who find that a measure of family economic strain does have a significant association with children's SWB. This suggests that another route through

which economic factors may influence children's SWB is via the effect on parents' levels of stress which may then have an effect on parent-child relationships.

3.5.4 Events

The influence of events on people's SWB and the longevity of that influence has been a major controversy in the literature on adult populations. As reviewed earlier there is substantial, although not unequivocal, evidence that people tend to recover their SWB within periods of a few years even after a major negative event. On the other hand, the debate over this issue has tended to be quite conceptual rather than practical. It has not paid much attention to the fact that several years of low SWB is a quality-of-life issue and something that people would generally wish to avoid. Bearing that point in mind it does seem to be of practical importance to understand which events have a particularly detrimental effect on people's SWB and how long that effect tends to last.

The research on children's SWB in the UK has included analyses of the impact of changes in family structure (Robson, 2010), parental unemployment (Powdthavee & Vernoit, 2013) and experiences of being bullied (Wolke & Skew, 2011 & 2012; Goswami, 2012). Studies on the first two of these topics have used longitudinal data. The general picture from these studies is that there is evidence of a connection between life events and children's SWB. If one assumes a one-directional causal link the impact of bullying, in particular, is relatively strong – explaining as much of the variation in children's life satisfaction as range of demographic factors combined (Pople et al., 2015). An interesting outcome of Powdthavee and Vernoit's analysis on the impact of parental unemployment is that it has different impacts according to the child's age. For younger children it is linked with slightly higher well-being, possibly because of the increase in time available for the child, whereas for older children the impact is negative. This illustrates that there may be important differences in influences on children's SWB at different ages. In summary, the limited existing evidence suggests that events may be an important part of the overall picture of understanding variations in children's SWB.

3.5.5 Processes

There is a consistent picture across different studies (e.g. Clair, 2012; Goswami, 2014; Patalay & Fitzsimons, 2016; Rees & Bradshaw, 2016) of relatively strong associations

between variables that measure the quality of children's inter-personal relationships and their SWB. For example, Rees et al. (2010) report that a single question about levels of harmony within the family had a far stronger association with children's life satisfaction than the type of family structure that they lived in. In general these kinds of findings suggest that processes may have a much stronger influence on children's SWB than contexts.

However, a big challenge here is to be able to clearly distinguish between variables that measure SWB and variables that do not. This is particularly a problem when the quality of relationships is reported by the child, along with their SWB. There may be common-method variance (e.g. when the questions about relationships use similar formats to the questions about SWB). More fundamentally, as discussed in Chapter 2, Section 2.3, there is a question to be resolved about the boundaries of SWB measurement. For example, Goswami (2012) reports that a set of questions about children's family relationships had a strong association with their life satisfaction. However, many of the questions asked about family relationships in this study were from Huebner's Multidimensional Student Life Satisfaction Scale. This creates a conceptual difficulty – if these questions are part of a life satisfaction scale, how can they also be used to predict life satisfaction? This issue requires careful handling and a thoughtful conceptualisation of the proposed meaning of variables being included in the analysis.

3.5.6 Behaviours

Finally, as in the field of research on adult SWB, there has been a developing interest in the extent to which children's behaviours and activities might be associated with their SWB. Three published studies (Abdallah et al., 2014; Booker et al., 2014 and 2015) have explored the associations between children's SWB and a range of behaviours including sports participation, social media use, paying attention to surroundings, and so on. This is a potentially fruitful area for research but the above studies are all based on cross-sectional analysis and it is not clear what the direction(s) of influence between behaviours and SWB might be. For example, while participating in sports might increase SWB it is equally plausible that children with higher SWB might be more inclined to be take part in sports.

3.6 Discussion

Substantial progress has been made over the last decade in developing evidence on many aspects of children's SWB in the UK, making use of secondary data sources and the primary data generated by several surveys focused on children's SWB. Strengths of the accumulated evidence include descriptive information on trends in children's SWB and a growing number of findings on correlates of SWB from cross-sectional analysis. This work has also thrown some light on the distinction between measures of positive well-being and mental health problems for children; and has identified ways in which correlates of SWB for children compare and contrast with those for adults. Although there is still more work to be done across a range of issues, there are three notable specific weaknesses which have informed the development of the ideas in this dissertation.

The first is the shortage of longitudinal analysis. It is interesting to note that one of the key conclusions of Wilson's (1967) review with which Chapter 2 started was that:

> 'Further studies merely correlating happiness with numerous other variables are not recommended.'
>
> Wilson, 1967, p. 305

Yet in 1999, Diener et al., in a review of three decades of progress in subjective well-being, noted:

> 'SWB research is limited by the almost exclusive reliance on cross-sectional correlational designs with inadequate tests of causal hypotheses. This shortcoming leaves researchers in an uncertain position regarding the causal priority of the variables they study.'
>
> Diener et al., 1999, p. 277

Progress has been made since that time in relation to the study of adult populations, but as far as the study of children's SWB goes this is still a reasonable summary of the current situation. There is a scarcity of longitudinal analysis and sometimes assumptions of causality are implicit in the findings (e.g. the link between bullying and SWB) without acknowledgement of possible alternatives. Key issues about the impact of earlier factors on children's current SWB; stability and change in children's SWB over time; and the links between children's SWB and later outcomes in adulthood have

hardly been explored at all. The primary aim of this dissertation is to address some of these evidence gaps.

A second key weakness is that there has been inadequate attention to testing of the SWB measures used in the analysis, particularly in relation to the set of measures contained in the UK cohort and panel studies. The general literature on SWB in adult population has illustrated how important it is to pay attention to measurement issues. Yet, in research on child SWB in the UK, researchers have employed sophisticated analysis techniques while at the same time not devoting a great deal of effort to the conceptualisation, validity and reliability of the SWB variable utilised in the analysis. Therefore another aim of the dissertation is to consider such measurement issues carefully as a foundation to the analysis conducted and also as a potential contribution to the broader development of measures of child SWB in the UK. This issue is addressed in Chapter 5.

Finally, as also outlined earlier, there is a lack of attention in most of the UK literature on this topic to clarifying the hypothesised mechanisms that link the factors being considered with children's SWB. The next chapter addresses this issue in connection with the analysis presented in this dissertation.

Chapter 4: Aims, concepts and methods

The previous chapter summarised the existing state of knowledge about the contexts, correlates and outcomes of children's subjective well-being in the UK. It concluded that, while significant progress has been made in this field of research over the last decade, there is still a substantial lack of longitudinal analysis. This means that not enough is currently known about either the mechanisms through which particular factors influence SWB or the way in which SWB develops over time. One major gap in the current evidence on children's SWB in the UK is an exploration of how children's evaluations of their lives at a particular point in time are influenced by a combination of experiences and events that have happened to them up to that point. This is an important issue because research on other childhood issues, discussed later in this chapter, suggests a substantial effect of historical and cumulative factors throughout childhood on outcomes at a given age. A second key gap is to understand the potential directions of influence between SWB and its correlates over time. These two gaps are a barrier to extracting clear policy and practical implications from the research on children's SWB.

4.1 Overall aims of the dissertation

The analysis presented in this dissertation was formulated with the idea of addressing the three limitations identified at the end of the previous chapter – measurement issues, conceptualisation of mechanisms through which factors might affect SWB, and longitudinal analysis. Therefore the dissertation will focus on three key questions specifically in relation to children in the UK:

Research Question 1: To what extent do available measures of children's SWB fit the most common conceptual frameworks of SWB?

Research Question 2: To what extent are early and middle childhood factors associated with children's later subjective well-being?

Research Question 3: How does individual children's subjective well-being vary over time and what factors are associated with this variation?

As discussed in Chapter 3, Section 3.1, the reason for focusing exclusively on the UK is that comparative international research shows that the factors affecting children's SWB vary from country to country. In view of these differences, it is important to develop a greater understanding of the ways in which different factors and experiences in children's lives affect their SWB within specific national contexts. This informed the decision to restrict the analysis to the UK as an achievable goal. Future research could build on this analysis by comparing longitudinal findings in other countries.

The analysis presented in Parts 2 to 4 of the dissertation will address the limitations identified in Chapter 3 in terms of measurement issues and scarcity of longitudinal analysis. This chapter will focus on the second limitation – the lack of conceptualisation of mechanisms through which various factors might affect children's SWB. Having clarified the conceptual framework, the chapter then covers other aspects which are a foundation for the analysis by describing the methodological decisions that were made regarding the data sets to be used and the types of statistical analysis to be undertaken.

4.2 Concepts

4.2.1 Subjective well-being

In relation to the first question the dissertation will address, with a specific focus on children, some of the measurement and related issues discussed in Chapters 2 and 3 such as the distinctiveness of different proposed components of SWB and the relationship between SWB and mental health problems. It will seek to add to existing knowledge about the psychometric properties of single- and multi-item measures of cognitive and affective SWB as well as evaluating the proposed distinction between positive well-being and mental ill-health.

The analysis will take as a starting point two key dominant conceptual ideas about SWB, which have been described in some detail in the previous chapters. The first key idea is the tripartite model of SWB – comprising cognitive, positive affective and negative affective components – as proposed by Andrews & Withey (1976) and promoted by Diener (1984), which was discussed in Chapter 2, Section 2.2. The second key idea is the distinction between SWB and mental health problems (Seligman & Csikszentmihalyi, 2000), which is a key foundation for the positive psychology discipline as discussed in Chapter 2, Section 2.1. Neither of these key conceptual ideas

have previously been fully evaluated in relation to the SWB of children in the UK, and rarely in other countries either. Therefore the first aim of the analysis, as indicated in the first research question, will be to evaluate these ideas specifically in relation to the SWB of children in the UK. If these ideas are supported by the data then they can be utilised as the basis for answering the second and third research questions. If not, then alternative concepts and operationalisations of SWB will be needed in order to proceed with the analysis. In view of this, it is expected that the answers to the first research question will not only provide a foundation for the subsequent analysis to be presented in this dissertation, but will also make an important new contribution to the conceptualisation and measurement of children's SWB more generally.

4.2.2. Factors explaining variations in subjective well-being

The second and third research questions represent a 'bottom-up' approach to explaining variations in subjective well-being. As discussed in Chapter 2, Section 2.3, this approach views environmental factors as influencing people's evaluations of specific aspects of their lives which in turn feed into their sense of overall well-being. This is contrasted with a 'top-down' approach which sees personality factors as the major influence on people's overall SWB which in turn influences their satisfaction with different aspects of their lives. The adoption of a 'bottom-up' approach is derived from the discussion in Chapter 2 on two grounds. First, the broad outcome of the body of research on the relative merits of 'bottom-up' and 'top-down' approaches is that there is some support for both perspectives. Second, this research has exclusively been conducted with adult populations and the assumption of stability of personality (which is central to the 'top-down' approach) is less warranted in the case of children and young people than it is for adults. Unfortunately, there is no available data on children's personality in UK longitudinal data sets that contain data on children's SWB. So it is not possible at the moment to explore the question of the stability of personality, and its relationship with SWB, directly. However there is some potential, in the two household panel studies, to used fixed effects models to account for the time-invariant component of subjective well-being – which may represent personality and other factors – and this approach is taken in Chapter 11. The use of such models enables a more confident evaluation of the relationship between environmental factors and people's SWB.

Based on the 'bottom-up' assumption that environmental factors do have some explanatory power in terms of subjective well-being, a useful starting point is to consider what factors in children's lives might theoretically be expected to influence how they feel about and evaluate their lives; and what kind of framework might be helpful in conceptualising the inter-relationships between the factors and SWB. There is relatively little published conceptual work specifically on longitudinal influences on children's SWB. So a range of longitudinal studies in the UK were reviewed which have looked at the relationships between various factors in children's lives and other outcomes, including cognitive, behavioural and mental health indicators. Many of these studies use the data sets employed in this dissertation and this is additionally helpful because the researchers will have faced the same challenges in terms of operationalising key concepts and selecting relevant variables from these secondary data sources.

I will make use of the studies identified at appropriate points throughout this section and in other parts of the dissertation. However, I begin with some over-arching comments about the frameworks that have been employed. One of the common themes in many of the articles is the distinction between 'distal' and 'proximal' factors affecting children's development. While the precise use of these terms varies a little from one writer to another, there is a fair deal of consistency in terms of defining factors such as household economic status, parental education and family structure as 'distal'; and factors such as parent-child relationships, parenting styles and the home learning environment as 'proximal' factors. A second common theme is the attempt to identify pathways and mediators to clarify the potentially complex relationships between many of the factors considered. So, for example, a number of studies (e.g. Gregg & Washbrook, 2011; Kiernan & Huerta, 2008) hypothesise that the effects of distal socio-economic factors on children's outcomes are partly or fully mediated by proximal factors such as the parent-child relationship.

In connection with this discussion about proximal and distal factors, a number of the writers (e.g. Goodman et al., 2011; Sabates and Dex, 2015; Patalay and Fitzsimons, 2016) explicitly cite Bronfenbrenner's ecological model of child development (Bronfenbrenner, 1979). This model is probably the most influential framework within

this field, and one that seems to have had a broad influence on the development of childhood research in the UK. So before proceeding further I will briefly summarise some key aspects of Bronfenbrenner's model which are particularly relevant to research on the relationship between factors in children's lives throughout childhood and child outcomes.

One aspect of the model which is often cited is the idea that the child's ecological environment 'is conceived as a set of nested structures, each inside the other like a set of Russian dolls' (Bronfenbrenner, 1994, p. 39). These nested structures are the microsystem, the mesosystem, the exosystem, the macro system and the chronosystem. The microsystem refers to the child's direct interactions with others. The mesosystem consists of the links between microsystems (e.g. home and school). Exosystems are links between settings not all of which the child belongs to (e.g. the link between the child's home and the parent's place of work). The macrosystem represents the broad characteristics of the culture within which the above nested systems operate. Finally, Bronfenbrenner draws attention to stability and change over time in the child and her/his environment through the inclusion of the chronosystem in his model.

In addition to this broad way of thinking about different spheres of influence on children's lives, two other important ideas in Bronfenbrenner's theory are particularly valuable in developing a conceptual framework of the association between various factors in children's lives and their SWB. The first is that Bronfenbrenner puts considerable emphasis on the proximal processes that take place within the child's microsystem (Bronfenbrenner, 1994). For very young children the dominant part of the microsystem will be the family, but as children mature other settings such as school, peers and the local community typically become more important components of the child's microsystem. Further, Bronfenbrenner emphasises the interactive nature of these proximal processes. Thus even when considering the simple case of interactions between one child and one parent, he stresses the importance of recognizing the 'reciprocity' of the relationship (Bronfenbrenner, 1977) – i.e. that the child's actions can affect the parent, as well as vice versa. This important insight has become increasingly recognised in research on children and families through the replacement of the idea of 'parenting' with that of 'parent-child relationships' (O'Connor & Scott, 2007). Where

there are more than two actors involved – for example, in the case of a child living with both parents – Bronfenbrenner also points out that it is important to consider more complex cases of reciprocity: 'Such larger systems must be analysed in terms of all possible subsystems (i.e. dyads, triads, etc.) and the potential second- and higher order effects associated with them' (Bronfenbrenner, 1977, p. 520).

A second key idea is that proximal processes must be understood within their environmental context. Bronfenbrenner refers to this as a 'process-person-context model' (Bronfenbrenner, 1994, p. 38). He provides an example from a research study of the effect of parental monitoring on the high school achievement of their children. Monitoring had the largest positive effect for children living with both birth parents whose mother had stayed in education beyond high school. He terms this configuration of contexts as an 'ecological niche' (ibid, p. 39). Another important feature of this example is that 'the effects of the proximal processes are more powerful than those of the environmental contexts in which they occur' (ibid, p. 39). This is relevant to some of the findings on children's SWB discussed in Chapter 3 – such as that family harmony/conflict was a much stronger predictor of children's life satisfaction than family structure.

Bearing the above ideas from Bronfenbrenner in mind, one grey area in the UK literature on child outcomes, is the position and role of measures of parental well-being – including physical health, mental health and SWB – in the frameworks employed. For example, Sabates and Dex (2015) include parental depression in a list of proximal factors, but their use of the 'proximal' category is a little different to some other writers as it does not refer to Bronfenbrenner's idea of 'process' (e.g. parent-child relationships) but rather a range of factors within the family that might impact on process. Dearden, Sibieta and Sylva (2011), on the other hand, categorise postnatal depression along with family interactions, parenting style, etc. under a broad heading of 'early childhood caring environment'. There is some risk of lack of clarity here in distinguishing between what the child experiences – i.e. parent-child interactions – and factors that may be affecting this experience – e.g. parental depression. There may be differences in the extent to which parents' experience of depression spills over into their interactions with their children.

A second issue is the extent to which researchers take account of Bronfenbrenner's point about reciprocity. A useful example of the importance of considering the possibility of reciprocity is the relationship between parental mental health and children's life satisfaction. Powdthavee and Vignoles (2008) find that parental distress predicts children's life satisfaction one year later, while taking account of prior life satisfaction; but also that children's life satisfaction predicts their father's (but not their mother's) mental distress one year later, controlling for prior parental distress. Webb et al. (2017) on the other hand do not find that children's happiness affects parental distress, and only find effects of parental distress on children's happiness for girls. They also note that research on this topic so far has not adequately investigated the pathways through which parental and child well-being are connected.

The issue of reciprocity requires careful handling. I will not address it in terms of the potential impact of children's SWB on parents' well-being in the current work. This has been at least partly explored in the above cited research and is also not of direct relevance to my research questions. I have taken the decision also not include measures of parental well-being as independent variables in the analysis. I believe that, as discussed above, there are too many unanswered questions about reciprocity in this particular case. This topic requires further detailed study as an issue in its own right and it is beyond the scope of this dissertation to address it adequately.

Finally, in this introductory discussion, some clarification is required regarding the language I will use to refer to the concepts reviewed above. I will focus on Bronfenbrenner's ideas of 'context' and 'process' because these seem to me to be more precise and clear than terms such as 'proximal' and 'distal' which have been employed in different ways by different writers. 'Context' will refer to factors such as socio-economic status, parental education and family structure which are relatively external to children's SWB and unlikely to interact with it – i.e. it is reasonable to assume that these are independent variables which may predict children's SWB either directly or indirectly. 'Process' will refer to children's experiences of key people in their lives. In the analysis of early childhood processes in Chapter 8 the focus will be on parent-child relationships. However in the analysis of the age range from 11 to 15 years old in Chapters 10 to 13, processes will also refer to children's relationships with peers. In

addition the term 'characteristics' will be used to refer to things such as gender, age and ethnicity that are either constant or are not amenable to change as a result of other factors considered.

4.2.3 The link between early childhood factors and children's later SWB

The analysis in relation to the second research question will focus on the extent to which the context of children's lives in early childhood and processes during this period might explain variations in children's later SWB. It is important to consider why from a theoretical perspective these types of associations might exist. That is, for example, why might household income when a child was nine months old affect their SWB at 11 years old over and above the effect of current household income? There is relatively little theory specifically on this topic, but an examination of theories proposed for SWB in general, and also for the links between early childhood factors and other outcomes later in childhood, can both be helpful in identifying some potential hypotheses.

One possibility that can be derived from the literature on SWB is a hypothesis that children are able to make a long-term cognitive evaluation of their life as a whole and therefore will have lower life satisfaction if they have experienced long-term or persistent disadvantage than if they have only experienced recent disadvantage. In that case, both current and historical context could be expected to have some influence on current SWB. Moreover, this logic should not apply to affective SWB which does not involve a historical perspective. Therefore it would be expected that cognitive measures of SWB would show a stronger association than affective measures with historical context, while the influence of current context might be more equal. This evaluative hypothesis is represented by arrow A in Figure 4.1.

A second possibility is that context and processes in early childhood may have a cumulative effect on children's SWB over time. This phenomenon has been observed in relation to cognitive development. One reason for the socio-economic differentials in children's cognitive and educational outcomes is the effect of disadvantage on development at earlier ages. Earlier lags in development can be exacerbated as children grow older causing them to fall further behind meaning that, for example, social class differentials widen with age (Feinstein, 2003). There is evidence of a similar

phenomenon in relation to the development of mental health problems. Reiss (2013) reports on a systematic review of the link between socio-economic inequalities and children's mental health problems. She finds that disadvantaged children have a considerably elevated risk of developing such problems and that persistent disadvantage exacerbates this risk. Reiss identifies two relevant theoretical perspectives – 'The social causation hypothesis implies that the stress associated with a low social position contributes to the development of mental disorders, whereas the social selection hypothesis suggests that genetically predisposed individuals drift down to such a position' (ibid, p. 28). She concludes that the evidence reviewed provides some support for both of these hypotheses.

In both the above instances (Feinstein and Reiss) the key idea is that there is some continuity and development in the dependent variable over time. However, it is not so apparent that this type of cumulative mechanism is applicable to SWB. Certainly, the affective component would not be expected to be cumulative and to be influenced by affect at earlier ages as it is taken to be an assessment of current or recent moods and emotions. It is also not clear from the SWB literature that cognitive SWB at one point is expected to have a direct effect on cognitive SWB at another point (although there may be linkages over time due to environment stability and factors such as personality traits). The cumulative hypothesis is represented by arrows B1 and B2 in Figure 4.1.

Figure 4.1: Potential linkages between contexts, processes and subjective well-being (Research Question 2)
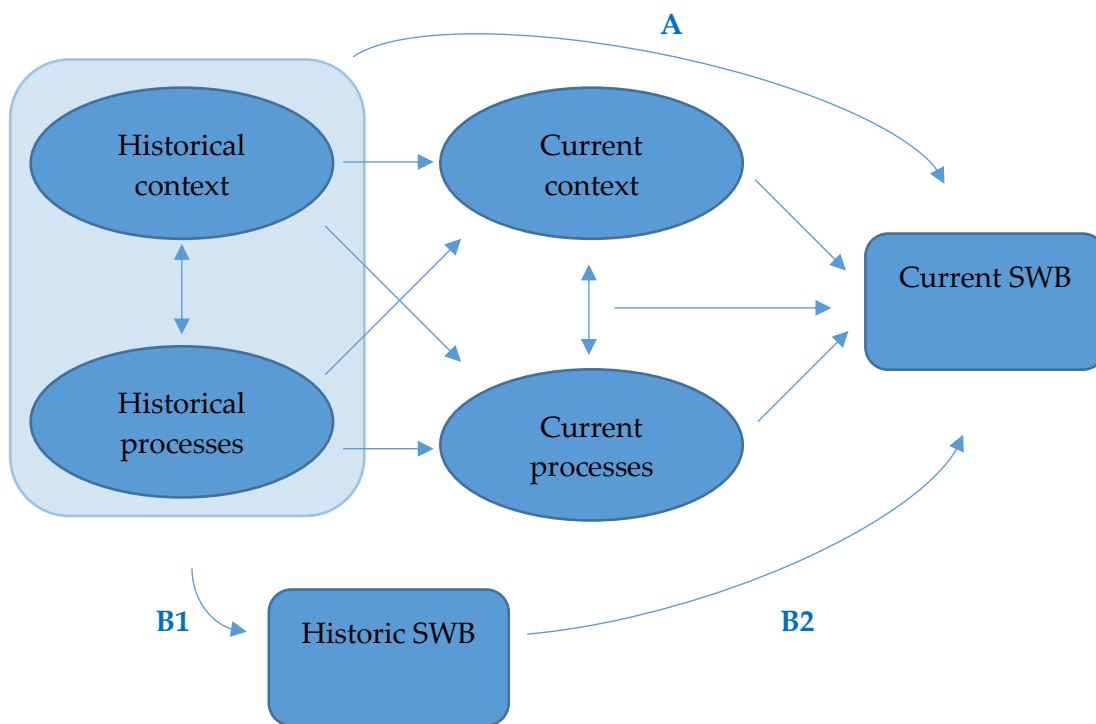
There are a range of other plausible pathways between early childhood contexts and processes and children's later SWB represented by other arrows in Figure 4.1. For example, historical contextual factors may have had a cumulative effect on current context and processes such that these affect children's current SWB. Thus persistent poverty is likely to lead to poorer current material conditions (e.g. quality of housing) than temporary current poverty and also may have had a corrosive effect on family relationships. Alternatively, a more complex hypotheses is that past contextual disadvantage led to process problems at earlier points in time (e.g. poor parent-child relationships) that have persisted and possibly accumulated such that they affect current SWB.

For the purposes of Research Question 2 it is not necessary to fully explore the way in which earlier childhood factors (contexts and processes) may be fully mediated by current factors in terms of their impact on children's SWB. This is an important question for social research on childhood – for example, does persistent poverty affect current parent-child relationships? – but that kind of question lies outside the scope of the current study as it is not specifically about children's SWB and could equally be applied to any other dependent variable. Chapters 7 and 8 will focus on the simpler

question of whether information about children's earlier childhood experiences can explain *additional* variation in children's later SWB over and above that explained by current contexts and processes. If the answer to this is 'yes' then it might suggest that one or both of the first two possibilities – the evaluative hypothesis and the cumulative hypothesis – could be relevant, although it may also only be a result of omitted variables at the point at which SWB is measured. If the answer is 'no' then this might suggest a fully mediated hypothesis. In this case early childhood factors cannot really tell us anything distinctively important about variations in SWB, although questions about relationships between early childhood circumstances and current circumstances remain important ones for the study of childhood more generally.

4.2.4 *Explaining variations in the SWB of individual children over time*

Research Question 3 raises a different set of conceptual issues. As discussed in Chapter 3, Section 3.5, it is already fairly well-established that process factors such as the quality of parent-child relationships and children's experiences of being bullied have much stronger associations with children's SWB than do contextual factors such as household income and family type. This is in line with Bronfenbrenner's assertion that process factors are more important than contextual factors for children's development.

It is possible that the associations between processes and SWB are spurious and can be explained by contextual factors. For example, the link between frequently being bullied and low SWB could be spurious in the sense that both can be explained by poverty. This will be tested for in the analysis in Chapter 10, although it seems unlikely that this can provide a full explanation given that contextual factors have weak associations with SWB.

Another possibility that stems from Bronfenbrenner's work is that there may be interactions between characteristics or contexts and processes. So, for example, being bullied may affect children's SWB more strongly at some ages than at others. This is an important issue to consider and there has been relatively little analysis of this, even with cross-sectional data, so this will also be addressed in the current analysis.

However, the most important advantage that longitudinal analysis can bring is the potential to utilise the power of having information about the same children over time.

This potential will be utilised in three ways. First, some analysis will be undertaken of patterns of children's SWB across a four-year age range. Surprisingly little analysis of this kind has been undertaken. As the analysis will demonstrate, new insights can be gained from simple descriptive analysis of the extent of stability and change in SWB over time. Part 3 of the dissertation will present three measures of patterns of SWB – mean scores over time, fluctuations over time and trajectories. Second, it is then possible to relate these summary measures of SWB patterns with independent variables to develop an understanding of whether particular factors in children's lives at one point in time are predictive of ongoing patterns of SWB. Third, it is also possible to use the additional power of longitudinal data to control for unobserved fixed factors in children's lives and therefore to build up a clearer picture of time-varying factors that may be associated with children's SWB. This type of work can potentially either verify and strengthen, or on the other hand call into question, the findings from cross-sectional analysis.

This concludes the discussion of conceptual frameworks and hypotheses which will underpin the analysis presented in Parts 3 and 4. The final section of this chapter will review the main statistical methods to be used in the analysis.

4.3 Data and methods

The research questions formulated above, based on the concepts and literature reviewed in Chapter 3, informed a number of decisions that were made about the design, data sources and methods for the analysis presented in this dissertation. This section provides an account of this decision-making process.

The intention to undertake longitudinal analysis across the whole of childhood informed the key initial decision about whether to gather new data or to utilise existing data sources. Undertaking primary longitudinal research is a highly complex, costly and lengthy process. It would have been impractical to undertake this task to generate primary data for this thesis. Therefore it was decided to make the best possible use of existing UK longitudinal data sets. The UK is fortunate to have a number of high-quality panel and cohort studies involving children and families. The decision to base the dissertation on secondary data analysis was taken with some prior awareness and knowledge of these studies.

4.3.1 Selecting the data sets

Having decided to focus on existing UK data sources with a longitudinal element, three additional criteria were determined for assessing which sources to use.

1. The data sets should necessarily include questions asked directly of children that can be viewed as potentially fitting into the conceptual framework of SWB outlined earlier.

2. The data sets should ideally be large-scale and broadly representative of the child population in the UK.

3. More recent data would be preferred over older data as it is possible that the factors that affect SWB are evolving over time in line with demographic and technological changes in society[9].

Based on these three criteria, an assessment was made, in early 2014 during the planning phase for the work, of available data sets with longitudinal data held in the UK Data Archive[10]. Two studies emerged as fully meeting all three criteria – the Millennium Cohort Study and the Understanding Society survey. In addition, the British Household Panel Survey met the first two criteria but, being the predecessor to Understanding Society, was a little more dated, having ended in 2008. A number of other important studies were considered and ruled out. The Longitudinal Survey of Young People in England and the Avon Longitudinal Study of Parents and Children did not fully meet any of the three criteria. Our Future (the Longitudinal Study of Young People in England, LSYPE2) was not sufficiently well advanced to provide longitudinal data. The Growing Up in Scotland survey does include measures of children's SWB in some waves but does not cover the whole of the UK and, at the time of the initial assessment, was not sufficiently advanced to address the key research questions. Older UK cohort studies such as the National Child Development Study and the 1970 British Cohort Study were discounted on the basis of not having currently relevant data.

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[9] See, for example, recent discussion of the links between social media use and children's SWB in Booker et al. (2015)

[10] www.data-archive.ac.uk/

The three data sets selected for the analysis were therefore the Millennium Cohort Study (MCS), the Understanding Society survey (USS) and the British Household Panel Survey (BHPS) which, due to it covering an earlier time period, will only be used where it can provide additional insights not available from the first two studies. The MCS is a birth cohort study of children in the UK born around the turn of the millennium, for which five waves of data following children up to the age of 11 years old were available at the time the analysis was undertaken. The USS is an annual household panel survey that began in 2009 and includes data gathered directly from children aged 10 to 15 years old. Data for the first five waves of the study were available at the time when analysis was planned. The BHPS is the predecessor to the USS and was an annual household panel survey which ran from 1991 to 2008. Self-report data from children aged 11 to 15 years old was included in this study from 1994 onwards. The studies are discussed in much more detail in Chapters 5, 6 and 10. The next part of this section focuses on describing the ways in which these studies can contribute towards answering the research questions

4.3.2 *The ways in which the data can be utilised to answer the research questions*
In relation to the first research question, the MCS data offers the means to explore both the tripartite model of SWB and the relationship between SWB and mental health problems. First, it is possible to utilise a set of 12 questions that appear to tap into the three components of the tripartite model and to test whether the patterns in the data conform with the expectations of the model. Analysis along these lines is presented in Chapter 5. Second, it is possible to test the validity of the tripartite model by examining whether there are differences in the correlates of each component. This consideration is included in the analysis in Chapters 7 and 8. This potential is restricted to the MCS data as the USS and BHPS do not contain adequate questions that appear to relate to positive and negative affect in order to test out the tripartite model.

Additionally, in relation to the first research question, the MCS and the USS both offer possibilities to test the proposed distinction between subjective well-being and mental ill-health, as both include versions of the Strengths & Difficulties Questionnaire (SDQ) developed by Robert Goodman and colleagues. In the MCS fifth sweep the parent-reported version (Goodman, 1997) is used. In alternating waves of the USS the child-reported version (Goodman, Meltzer & Bailey, 1998) is used. Terminology is important

here. As Goodman (2000) clarifies the SDQ does not provide a clinical diagnosis of mental health problems but shows good predictive power in relation to diagnoses made by mental health professionals. The terms used to describe the SDQ vary from one paper to another and seem to have evolved over time. For example, in an early paper, Goodman and Scott (1999) describe it as a 'brief behavioural screening questionnaire'. However, in recent papers (Goodman, Lamping & Ploubidis, 2010; Goodman & Goodman, 2012) it is described as a measure of 'mental health problems' in children aged 4-17 that can be administered to parents/carers, teachers and children aged 11 or over' (Goodman & Goodman, 2012, p. 426). It has also been referred to in this way in other recent research on children's SWB (Patalay & Fitzsimons, 2017). The rationale for choosing to use the term 'mental health problems' in this dissertation is that I will use the measure to extend the work of Patalay and Fitzsimons in addressing the debate regarding whether positive SWB and mental ill-health are opposite ends of a single continuum or are separate constructs as discussed in Section 2.2. Within this conceptual context, and following Patalay and Fitzsimons, it is relevant to refer to the scale as measuring mental health problems in the same way as Goodman does above. The SDQ is useful for the purposes of this dissertation in two ways.

First, it is possible to look at the relationship between indicators of SWB and the SDQ; and thus to test the proposition that there is a difference between a sense of positive well-being and the presence or absence of specific mental health problems. Two UK research studies reviewed in Chapter 3 have already provided some testing of this through correlations between SWB measures and the SDQ. The intention of the analysis in Chapter 5 is to extend this testing using the more sophisticated technique of confirmatory factor analysis. This does not appear to have previously been done in published research.

Second, it is possible to look at the extent to which various factors of interest vary in their explanatory power in relation to SWB and the SDQ. This is an approach taken by Patalay and Fitzsimons (2016) in cross-sectional analysis of the MCS Wave 5 data. Comparing the results of regressions using SWB and the SDQ as dependent variable is useful for two reasons. It can establish the value of the distinction between the two concepts. Additionally, where explanatory power for SWB is low, the use of the SDQ as

an alternative dependent variable can provide some insights into whether this is to do with the statistical power of the tests being undertaken. Thus, where it has been found in other studies that certain childhood factors have substantial explanatory power in relation to children's mental health problems, but these are found to be much weaker in the current analysis, then this might raise doubts about the statistical properties and power of the independent variables. On the other hand, if associations with the SDQ are broadly in line with previous research then this can help to give more confidence in the estimates of explanatory power for SWB.

Turning to the second research question about the links between early childhood factors and children's later SWB, a decision was necessary about what age ranges to focus on. It was decided to look across the age range from zero to 11 years old for conceptual and pragmatic reasons. Conceptually it is not yet clear what is the minimum age at which children can make cognitive evaluations of their well-being. However, most research has tended to focus on children of secondary school age and there is evidence that measures of SWB have reasonably good statistical properties from about the age of 11 upwards. It may well be that some or many children can make cognitive evaluations at younger ages; and it also seems likely that children can reliably answer questions about affective SWB – such as the frequency of feeling happy – at younger ages than they can about their satisfaction with 'life as a whole'. Practically, it is only the MCS that can provide reliable data on early childhood circumstances for a representative sample of children. At the time when the analysis plan was formulated, data was only available for children up to the age of 11 years old. These factors determined the age range for the analysis undertaken to answer the second research question, which included data gathered from parents when the child was nine months and three years old (the first two sweeps of the MCS) and from the parents and the child at the age of 11 years old (the fifth sweep). As far as I am aware the analysis presented on this topic is the first of its kind covering this age range. The only similar previous UK research identified in Chapter 3 is the Parkes et al (2016) study of children aged seven years old in Scotland; and I am not aware of any studies

in other countries that have taken this kind of longitudinal approach in relation to children's SWB[11].

Finally in relation to the third research question, data on individual children's SWB over time was available in the USS from the age of 10 to 15 years old and in the BHPS from the age of 11 to 15 years old. It was decided for coherence of the overall piece of work to start the analysis of age-related patterns in children's SWB from the age of 11. This meant that this analysis picks up where the MCS analysis concludes. It would have been possible to start from the age of 10 years old in the USS. However, there were only five waves of that data available at the time when the analysis was started. So including a sixth age cohort would not have made a great deal of difference to the total sample of cases with data across multiple waves. Moreover, as will be explained in Chapter 10, it was necessary also to use the British Household Panel Survey for some of the analysis and this only measured children's SWB from 11 years old upwards. The upper limit for the third research question was primarily dictated by pragmatic considerations. After the age of 15, panel members in the USS and BHPS move into the adult part of the survey and the format of SWB questions is different in the adult questionnaires. Trying to integrate young people aged 16 and 17 years old to extend the study to the end of the legal definition of childhood would have therefore introduced a large amount of extra complexity into the analysis. The USS and BHPS contain a rich set of data on current household circumstances and also on a number of factors which have been found to be associated with children's SWB in cross-sectional analysis, such as experiences of being bullied and the quality of family relationships. The associations between these types of factors and children's SWB over time will be explored in Chapters 10 to 13. I was not able to find any published research in the UK that had explored trajectories of children's SWB over time, and on this basis the analysis presented in relation to the third research questions makes a unique contribution to the literature on this topic.

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[11] While working on this dissertation I also prepared an article using data from the fourth sweep of the MCS where children report on positive and negative affect but not on their cognitive SWB. This article is currently under review.

4.3.3 Analytical strategies

Finally, a brief overview of the main analytical strategies is provided here, with more details to be provided at later points. In addition to initial univariate and bivariate statistical analysis, five multivariate analytical techniques are used in this dissertation in order to address the three research questions. Three of these techniques are forms of regression modelling – linear, logistic and fixed effects. The remaining two techniques are forms of structural equation modelling (SEM) – confirmatory factor analysis and latent growth curve modelling. The reasons for their use, their strengths and limitations are discussed in the introductory chapters to each part of the analysis.

Most of the analysis was run in Stata 13 which was the current version available when the work was started. Some of the analysis in Part 4 was run at a later point in time in Stata 14. All of this analysis was then checked using the same or closely similar procedures in R. Some of the SEM analysis was run using the *lavaan* package in R rather than in Stata as the R package offered better estimation options for the particular characteristics of the data being analysed.

Although much more detail will be provided about specific analytical techniques in subsequent chapters, some general comments about the statistical analysis which are relevant across the different pieces of analysis are as follows:

1. Survey design issues. Each of the surveys analysed in this dissertation used complex sampling strategies including stratification and clustering; and post-survey weights are provided in the data sets to correct for under- and over-representation of particular sub-groups. This information is used wherever possible, using the *svyset* commands in Stata and the *survey* package in R. Using these options also automatically means that robust standard errors are calculated. Any instances where it was not possible to use these options are noted.

2. Missing data. Issues with missing data, and the possibility of approaches to deal with this, such as multiple imputation, are discussed at various points in the results chapters.

3. Significance levels. Due to the large sample sizes being used for analysis, the main focus of discussion of results is based on a 99% confidence level (p<0.01). Results that meet this criteria are generally marked with a double asterisk in tables. For information, results that were significant with 95% confidence are marked with a single asterisk but are not generally discussed in the text.

4.3.3   *The structure of the remainder of the dissertation*

This concludes the first part of the dissertation which has described the background and context to the research; and its aims, conceptual framework and methods. The remainder of the dissertation is split into four parts. Parts 2 to 4 present results in relation to each of the three research questions. Part 5 contains a concluding chapter summarising the findings and their implications.

Part 2

Measuring children's subjective well-being

Chapter 5: Evaluating the conceptual framework of subjective well-being

5.1 Overview

This part of the dissertation will address the first research question about the measurement of children's SWB – to what extent do available measures of children's SWB fit the most common conceptual frameworks of SWB? The analysis will be undertaken in three stages.

The first stage will look at the extent to which available data on children's SWB fits the proposed tripartite model of children's SWB consisting of cognitive SWB, positive affect and negative affect. This model has been supported by data in adult populations, as reviewed in Chapter 2, Section 2.2; and also by a study of children in the US (Huebner and Dew, 1996). However, comprehensive testing of this model in child populations in the UK has not been undertaken. Rees and Bradshaw (2016) report on the use of exploratory factor analysis with the Millennium Cohort Study which yielded three factors broadly matching the tripartite conceptualisation. The analysis presented here builds on that work by using confirmatory factor analysis. This is a more appropriate approach than exploratory factor analysis given that there is a clear conceptual framework and the question to be addressed is whether this is supported by empirical data.

As will be seen, the first stage of analysis using the approach just described provides good statistical support for the tripartite framework. So the second step in the analysis is to assess the most appropriate measures to operationalise each of the three components of the framework. This stage also uses confirmatory factor analysis to test the fit of various sets of items, based on conceptual considerations. This analysis suggests that some multi-item measures that have been utilised in previous UK analysis of the data sets used in this dissertation do not meet recommended criteria for goodness-of-fit. On the basis of the analysis a set of measures are identified that will be used to represent the different components of SWB in the remainder of this dissertation.

The final stage of analysis presented in this part of the dissertation examines the evidence in support of the proposed distinction between SWB and mental ill-health, which is one of the key ideas underlying the development of positive psychology (Seligman & Csikszentmihalyi, 2000). Some previous UK research (Patalay & Fitzsimons, 2016; Rees, 2017a) has explored the issue and has suggested that there are distinct correlates of positive and negative measures of well-being. The analysis presented here extends this work using both parent-reported and child-reported measures of emotional and behavioural difficulties. It provides further support for the distinction between these measures of mental ill-health and children's SWB.

The analysis presented in this part of the dissertation serves two different functions. It provides a foundation for the later parts of the dissertation by undertaking a careful examination of the psychometric properties of measures of children's SWB, reflecting current best practices in terms of the use of confirmatory factor analysis. This approach has not been very much used in previous UK research on children's SWB. In doing this, it also generates new insights into measurement issues which are of broader relevance and can inform future research on children's SWB, particularly when using the data sets analysed here.

Before presenting the findings from these three stages of analysis, the next three sections of this chapter will provide an overview of the data sets used in analysis; of the specific variables that have been identified to represent SWB; and of the main statistical technique used in the analysis.

5.2 The data sources

This part of the dissertation makes use of three data sets, which will also be used at various later points. These are the Millennium Cohort Study (MCS), the British Household Panel Survey (BHPS) and the Understanding Society survey (USS). As discussed in Chapter 4, these three data sets have been selected because they contain longitudinal data, which is a key focus of this dissertation for the reasons discussed in Part 1, and also met three criteria – (a) they all contain some variables that can be viewed as measuring children's SWB; (b) they are large-scale data sets that are sampled to be representative of the child population in the UK; and (c) they are all relatively

recent. This section provides a brief overview of each data set and the variables used for the analysis. The Appendix provides some further details about each study.

5.2.1 Millennium Cohort Study (MCS)

The MCS is a longitudinal birth cohort study of children in the UK born soon after the start of the new millennium. Ethical approval for each wave of the study was gained from a medical research ethics committee (Hansen, 2014).

A total of 18,522[12] families participated in the first sweep of the study which was undertaken when children were around nine months old. Five subsequent sweeps have been conducted when children were around three, five, seven, 11 and 14 years old. Only the first five sweeps of data are used in this dissertation as data for the sixth sweep was not available at the time the research plan was developed. At the fifth sweep, 13,287 families were still involved in the survey.

In this part of the dissertation, the data from the child self-report survey in the fifth sweep of the study (University of London, 2017c), when children were 11 years old, is used as this was the first sweep in which a range of SWB measures potentially relevant to the tripartite model were asked. Some affective SWB questions were asked of children in the fourth sweep but are not sufficient for the purposes of the analysis to be undertaken here. These were analysed in Chanfreau et al. (2008).

5.2.2 British Household Panel Survey (BHPS)

The BHPS is a UK household panel survey which ran annually from 1991 to 2008. It began with a panel of more than 5,500 households in England, Scotland and Wales. Additional samples from Scotland and Wales were added in 1999 and a sample of households in Northern Ireland were included in 2001. The study gathered information from all people over the age of 16 years old in the households. From Wave 4 the study also included self-completion questionnaires for young people aged 11 to 15 years old. Typically this data represented between around 800 and 1,200 young people in each wave of the survey. Data from the final wave of this study (University

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[12] This figure is given by Platt (2014) but Hansen (2014) states 18,552

of Essex, 2010) is used here to complement the analysis undertaken using the other two data sets.

5.2.3 Understanding Society survey (USS)

The USS was the successor to the BHPS which began in 2009 with a much larger sample of 40,000 UK households. It continued many of the questions from the BHPS; and members of the BHPS panel were invited to join the survey in Wave 2. Each wave runs over a two-year period. The USS includes a youth self-completion questionnaire similar to the one in the BHPS. The age range for the questionnaire was extended (compared to the BHPS) to include 10-year-olds but, for this dissertation, it was decided for consistency between the three data sets only to analyse data relating to children aged 11 to 15 years old. Typically up to 4,000 children aged 11 to 15 complete each questionnaire. The first five waves of data (University of Essex, 2015) were available when the analysis for this dissertation was initiated. A sixth wave of data has become available at the time of writing but is not included as the analysis had already been undertaken.

5.3 Measures of SWB available in the data sets

None of the data sets or documentation explicitly identify any particular questions as representing children's subjective well-being. However each data set contains a number of variables that have been treated by researchers as representing aspects of SWB. I will describe these variables and also consider the case for them to be considered as measuring children's SWB. As discussed in Chapter 2, subjective well-being (SWB) is generally viewed as being a multi-dimensional construct and various conceptualisations of it have been proposed. For the purposes of this dissertation, my starting point will be the tripartite model of SWB originally proposed by Andrews and Withey (1976) and promoted by Diener (1984). This model makes a distinction between cognitive and affective components of SWB; and, within the affective component, between positive and negative affect.

5.3.1 SWB variables in the MCS

The MCS fifth sweep child self-report questionnaire contained six questions asking children how they felt about school work, school, family, friends, appearance and life as a whole. The response options for these questions were on a scale from 1 to 7. The

labels 'Completely happy' and 'Not at all happy' are shown above the numbers '1' and '7' on the scale. Children were asked to indicate 'How do you feel about the following parts of your life?'. For the purposes of this dissertation, I will treat these questions as falling into the category of cognitive SWB. The rationale for this is that, although the questions ask children how 'happy' they are, they do not refer to a specific time frame and the aspects of life that they refer to are broad categories or domains, including 'life as a whole'. The word 'happy' is used in various ways in everyday English and is not restricted in its meaning to mood and emotion. For example, if one asks someone how happy they are with the area that they live in, this will not be interpreted as a question about current mood but as relating to a broader sense of satisfaction with the local area. Similarly, in the current context, asking children about their happiness with life as a whole, especially without specifying a time frame, can be regarded as a question about life satisfaction rather than positive affect. This argument will be tested later by examining bivariate correlations between this question and a question about recent happiness, and also by confirmatory factor analysis. With the same reasoning, the other questions about family, friends and so on will be considered as questions about domain satisfaction, also part of the cognitive SWB concept.

The distributions of children's responses to these questions are provided in Table 5.1. For ease of interpretation, the scores have been reversed onto a scale from 0 to 6 where a higher score indicates higher SWB. Data are weighted and, given the low proportions of missing data (between 2.9% and 3.5% for each variable), the distributions can be regarded as reasonably representative of the child population in the UK in this age cohort. The distribution of all six variables is heavily skewed towards the more positive end of the scale, although it is notable that the percentage of children who were 'completely happy' varies considerably – being highest for family and lowest for school work.

Table 5.1: Happiness with aspects of life: Frequencies (MCS Age 11 survey)

	Family	Friends	Appear-ance	School	School work	Life
0 - Not at all happy	2.7%	2.0%	3.3%	3.4%	2.1%	2.4%
1	1.2%	2.0%	3.9%	3.1%	2.2%	1.8%
2	1.5%	2.2%	6.4%	4.0%	5.3%	2.5%
3	2.4%	4.2%	11.8%	6.2%	15.0%	5.7%
4	4.3%	8.8%	15.6%	10.8%	20.1%	10.1%
5	13.8%	24.1%	21.9%	20.8%	26.9%	25.4%
6 – Completely happy	74.0%	56.7%	37.1%	51.7%	28.3%	52.1%

Source: MCS, Fifth Sweep, Unweighted N = 13,287. Percentages are for weighted data

The MCS fifth sweep child self-completion questionnaire also contained a set of questions that asked children how often they had felt or experienced certain things in the last four weeks – happy, worried, sad, afraid or scared, laughing and getting angry. Response options were on a five-point scale from 'never' to 'almost always'. Because these questions have a specific, and relatively short, time frame and because they refer to moods and emotions, I will treat them as representing the affective component of SWB. The first two items relating to 'happy' and 'laughing' will be viewed as asking about positive affect and the remaining four items will be viewed as asking about negative affect.

The distribution of responses to these questions is shown in Table 5.2. Levels of missing data were below 5% for all questions. The first two distributions are very heavily skewed towards the positive end of the continuum with just over half of children saying that they 'almost always' felt happy (55%) and laughed (51%) in the last four weeks. These patterns suggest that perhaps children were thinking about how many days in the last four weeks they had experienced these feelings as it is implausible that half of children laughed almost all of the time over a four-week period. There was a little more variation in the other four questions with over 10% of children saying that they 'often' or 'almost always' felt worried in the last four weeks and a similar pattern for feeling angry. Only around a quarter of children said they 'never' felt angry (24%) or sad (27%).

Table 5.2: Feelings in the last four weeks: Frequencies (MCS Age 11 survey)

	Happy	Laugh	Worried	Sad	Afraid or scared	Angry
Never	1.8%	1.1%	43.3%	27.4%	52.7%	24.6%
Almost never	3.4%	1.7%	26.6%	39.6%	28.9%	36.9%
Sometimes	12.0%	11.5%	19.8%	25.7%	13.3%	27.6%
Often	28.3%	35.2%	7.4%	6.1%	3.7%	8.3%
Almost always	54.5%	50.5%	2.9%	1.2%	1.4%	2.6%

Source: MCS, Fifth Sweep, Unweighted N = 13,287. Percentages are for weighted data.

These questions have not been used to any great extent by researchers. One exception is Rees and Bradshaw (2016) which analysed binary variables based on the questions about happiness and sadness, along with the question about happiness with life as a whole. Key relevant findings from this article are reviewed in Chapter 4 and Chapter 6.

5.3.2 SWB variables in the USS

The Understanding Society survey also includes the six questions discussed above about happiness with five aspects of life and with life as a whole. The questions are worded in exactly the same way as the MCS. However there is a difference in the way that the response options for these questions are presented to children in the USS. Instead of the descriptive labels above the end points of the scale which were used in the MCS questionnaire, the USS questionnaire uses emoticons above each of the seven response options. These questions are asked in the youth self-completion survey in every wave of the USS. There are no questions that tap into the affective component of SWB.

5.3.3 SWB variables in the BHPS

The BHPS included in the youth self-completion survey, from Wave 4 onwards, five questions about happiness with life as a whole and different aspects of life. These were five of the six questions discussed above - happiness with life as a whole, family, friends, appearance and school work. The missing question about school was added from Wave 12 onwards. Question formats were identical to those in the USS. The BHPS youth completion survey also intermittently included some questions that might be regarded as tapping into the affective dimension of SWB, such as frequency of feeling bored. However, because these were not included consistently it is not possible to

make use of them for longitudinal analysis which requires measurement at each time point.

5.3.4 Measures of mental health problems in the MCS and USS

The final section of this chapter will look at the extent of association between measures of SWB and the Strengths and Difficulties Questionnaire (SDQ) – available in two of the data sets. As discussed earlier, although terminology to refer to the SDQ varies, and it is often referred to as a measure of emotional and behavioural difficulties, I will refer to it in the dissertation as a measure of mental health problems. A rationale for this has been provided in Section 4.3.2.

The SDQ includes five sets of five questions each, which are designed to tap into emotional symptoms, peer problems, conduct disorders, hyperactivity/inattention disorders and pro-social behaviour. The questions use a three-point scale ('Not true', 'Somewhat true', 'Certainly true') plus an option not to respond. Each set of five questions is summed to create a score from zero to ten. The scores for the first four dimensions are then summed to make a 'total difficulties score' ranging from zero to 40. The questions on pro-social behaviour do not contribute to this score. The SDQ measure has been used and validated in many countries (Achenbach et al., 2008) although attempts at verifying the proposed five-factor structure have yielded mixed results (Goodman et al., 2010). The parent-reported version of the SDQ was included in Wave 5 of the MCS and the child-reported version was including in the child self-completion questionnaire in Waves 1, 3 and 5 of the USS. Both of these sets of data are utilised here.

5.3.5 Summary of available measures of SWB and mental health problems

To summarise the above, Table 5.3 lists the different measures of SWB and mental health problems available in each data set and used for the analysis in this chapter.

Table 5.3: Overview of available SWB measures in three data sets

	MCS Age 11	USS Waves 1-5	BHPS Waves 4-18
Cognitive SWB			
Happiness with life as a whole	✓	✓	✓
Happiness with family	✓	✓	✓
Happiness with friends	✓	✓	✓
Happiness with appearance	✓	✓	✓
Happiness with school work	✓	✓	✓
Happiness with school	✓	✓	(✓)*
Positive affect			
Frequency of feeling happy	✓		
Frequency of laughing	✓		
Negative affect			
Frequency of feeling sad	✓		
Frequency of feeling worried	✓		
Frequency of feeling afraid or scared	✓		
Frequency of feeling angry	✓		
Emotional and behavioural difficulties			
Parent-reported SDQ	✓		
Child-reported SDQ		✓	

* Happiness with school was only include in the BHPS from Wave 12 onwards

5.4 Statistical methods

In addition to simple univariate and bivariate analysis, the main analytical method employed in this part of the dissertation is confirmatory factor analysis (CFA). CFA is a member of the family of techniques that comes under the broader heading of structural equation modelling (SEM). A common characteristic of SEM techniques is that they incorporate latent variables that 'generally correspond to hypothetical constructs or factors, which are explanatory factors presumed to reflect a continuum that is not directly observable' (Kline, 2011, p. 9). In this context, observed variables are seen as measures that represent the underlying latent variable. A second common characteristic of SEM is that it incorporates terms that explicitly recognise error, including random measurement error. I will discuss these points further in relation to the specific analysis presented in this part of the dissertation.

Within this family of techniques, CFA has the aim of evaluating the extent to which observed data fit a pre-determined conceptual model, which may include one or more constructs represented by latent variables. Thus, whereas exploratory factor analysis

(EFA) aims to identify and extract factors from observed data, CFA aims to test whether the data confirms or supports a hypothesised factor structure. While EFA is exploratory and inductive, CFA is theory-driven and deductive. These orientations reflect the reason I have chosen to use CFA to test the structure of data on children's SWB. In this case, there is already a clear conceptual model – the tripartite model discussed earlier – and the aim of the analysis is to assess the extent to which the data from children fits this proposed model (which has previously primarily been developed and tested with data from adult populations).

It follows from this discussion of general principles that the starting point for CFA is to specify one or more conceptual models that will be tested. Figure 5.1 shows two such models, making use of the SWB variables available in the MCS. The first of these, Model A, is a simple one-factor model where all 12 observed variables reflect one underlying construct. The second, Model B, reflects the tripartite model with three latent variables relating to cognitive SWB, positive affect and negative affect respectively. The curved bi-directional arrows on the right of Model B represent covariances between the latent variables as they are not assumed to be entirely unrelated to one another. The small round circles indicate error terms. It is possible also to specify that errors are correlated although this should only be done when there are clear conceptual reasons and not purely with the goal of improving model fit (Kline, 2011, p. 357-8). It is important to note the direction of the arrows between the latent variables (ovals) and the observed variables (rectangles). The arrows run from the latent variable to each observed variable. This reflects an underlying idea of the relationship between the two which is fundamental to SEM – i.e. that it is the latent variables that have a direct effect on the observed variables (Brown, 2015, 47) rather than vice versa.

Figure 5.1: Two alternative conceptual frameworks for children's SWB

Model A
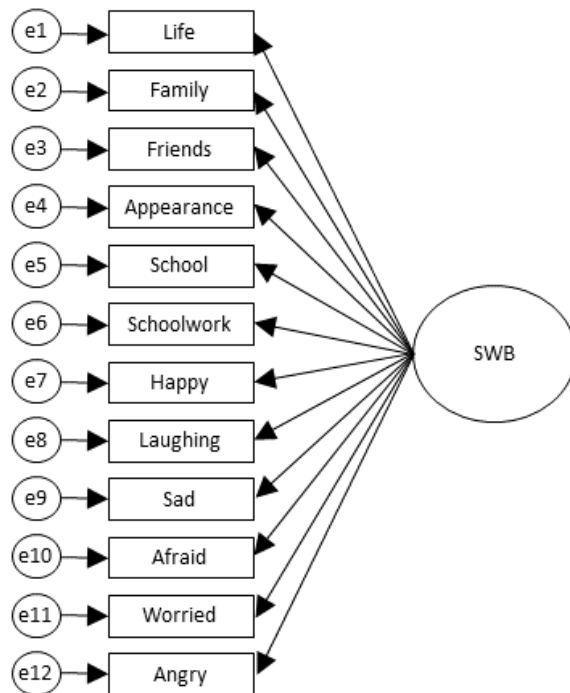
Model B
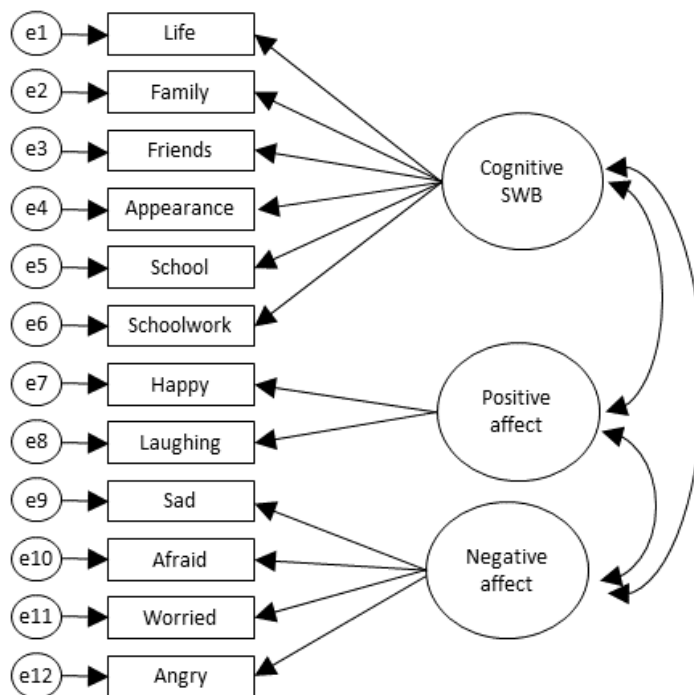
The central idea of undertaking CFA is to test the fit of one or more models. CFA operationalises this goal through making use of the variance-covariance matrix of the observed variables (Brown, 2015, p. 51). A key principle of CFA is parsimony (Kline, 2011, p. 358) – that is, to find the simplest model which reaches an acceptable level of fit of the data rather than to seek to increase fit statistics by incrementally small amounts at the expense of simplicity. Various estimates of the goodness-of-fit of a model can be generated. One possibility is to use a chi-squared statistic of model fit. However, this option used on its own has a number of drawbacks including that with large sample sizes there is an in-built tendency to reject models (Fan, Thompson & Wang, 1999). As a consequence, in addition to examining and reporting the chi-squared statistic, it is common to also examine other indicators of goodness-of-fit and these fall into three categories – absolute fit indexes, parsimony correction indexes and comparative fit indexes (Brown, 2015, 70-73). There are different options within each category, but a fairly common strategy is to use the standardized root mean residual (SRMR), which is an absolute fit index; the root mean square error of approximation (RMSEA) as a parsimony correction index; and the comparative fit index (CFI). This strategy will be used here.

There is no consensus on appropriate thresholds for goodness-of-fit using these measures, but a very widely-cited set of guidelines was produced by Hu and Bentler (1999). They suggested the following criteria for acceptable fit when working with large samples – an SRMR close to or below 0.08, an RMSEA close to or below 0.06, and a CFI close to or above 0.95. These criteria will be applied to the results of analysis presented. As Brown (2015) notes, these should be regarded as rules of thumb rather than strict cut-off points as there is evidence that, on the one hand, slightly less stringent criteria (e.g. RMSEA below 0.08) may indicate acceptable fit and that slightly more strict criteria (e.g. RMSEA below 0.05) may indicate 'good' fit. Ultimately the analyst must make a judgement based on the balance of evidence from the different fit measures; additional tests of model specification, which will be discussed shortly; and a good knowledge of the data being analysed and the underlying conceptual framework.

Using the above measures, and the principle of parsimony, it is possible to compare the fit of models such as those shown in Figure 5.1. For example, first the single-factor model can be evaluated for goodness-of-fit; then the three-factor model can be evaluated; and then a judgement can be made of the relative fit of each model and the extent of gains from using the more complex model. This is a common approach to CFA and one that will be used to assess the tripartite model of SWB in comparison with the simpler model where all 12 observed variables load onto a single latent variable.

In addition to global measures of model fit, it is recommended that analysts also examine more detailed aspects of the model to check whether they conform to expectations. More focused measures of fit can be used for this purpose to check the model specification. It is common practice to examine the standardized residuals of the residual variance-covariance matrix which represent the difference between the predicted and observed matrices. The occurrence of one or more large standardized residuals (Brown, 2015 suggests using 1.96 as a cut-off point in this context) may indicate problems with the model that need further exploration. A second approach is to examine modification indexes. These give an indication of how much improvement would be made to the model if a parameter was allowed to vary freely rather than be constrained by the model. Saris, Satorra and van der Veld (2009) recommend an approach using modification indexes and an indicator of expected parameter change to identify model misspecification issues. Their recommended approach has been adopted for the analysis undertaken here, making use of the *miPowerFit* procedure in the *semTools* package in R (semTools Contributors, 2016). Additionally it is important to examine size, direction and statistical significant of individual item parameter estimates such as the factor loadings (Brown, 2015). A low factor loading for a particular observed variable may indicate problems with the model that need to be considered further. This issue will also be considered in relation to models that indicate good overall fit.

Confirmatory factor analysis can be extended to assess the extent to which a model fits in a comparable way across different sub-groups. This is termed multi-group CFA. One context in which this method is commonly used is to evaluate whether a particular

model works in the same way across countries. For example, Casas (2017) applies this technique to measurement of children's cognitive SWB in a comparative international context. It is also appropriate to use multi-group CFA to look at sub-groups within a sample, such as whether a model functions comparably for females and males or across different age groups. It is possible that a particular factor model will have acceptable fit for each sub-group but nevertheless not show measurement invariance between sub-groups. This can mean that while it is acceptable to use the measure for analysis of each sub-group, analytical results should not be compared between sub-groups. This is an important issue and will be explored in relation to gender and age in the analysis below.

A multi-group CFA follows a number of logical steps to test measurement invariance between groups (Brown, 2015; van de Schoot, Lugtig & Hox, 2012). First, a CFA model is tested separately for each group. Then, a test of factor structure is undertaken for all groups simultaneously. This is referred to by Brown as a test of 'equal form' and by van de Schoot et al. as 'configural' invariance. Then a test is run with factor loadings constrained to be equal across groups which is a test of 'equal factor loadings' (Brown) or 'metric' invariance (van de Schoot et al.). Then a third test is also run with loadings and intercepts constrained to be equal – 'equal intercepts' (Brown) or 'scalar' invariance (van de Schoot et al.). I will use Brown's terminology below as I think it is simpler and clearer. The change in various fit statistics between the different nested models is examined to assess the extent of measurement invariance. A typical guideline is that if a more constrained model involves a change of greater than 0.01 in the CFI or RMSEA statistics then the additional level of measurement invariance is not supported. The test of equal form is a basic foundation for the subsequent models and the goodness-of-fit of this initial model is evaluated in the same way as described earlier for CFA in general. If the test of equal factor loadings is acceptable then this indicates that there is comparable meaning and structure to the measures between the sub-groups and therefore comparisons can be made, for example, of results of regressions between groups. If, additionally, the test of equal intercepts is acceptable then this indicates that it is possible to compare the mean scores of different groups using the measure. This approach will be used below to compare models between females and males and between children of different ages.

A final general analytical point about CFA relates to the type of estimators used to evaluate the models. Standard maximum likelihood estimation assumes multivariate normality. This assumption is not warranted for the SWB variables to be utilised in the analysis. It is still possible to run maximum likelihood estimation in this circumstance and the resulting parameter estimates may be reasonably accurate but standard errors are likely to be too small (Kline, 2011, p. 176). In this circumstance, robust estimation methods are available and will be used here. The main analysis is conducted using the *lavaan* package (Rosseel, 2012) in R utilising full information maximum likelihood estimation for missing data and robust Huber-White estimators and standard errors. Checks of the robustness of key aspects of the analysis are also undertaken using WLSM estimators in the *lavaan* package, which are also suitable for non-normal data; and, in Stata, using maximum likelihood estimation with nonparametric bootstrapping, which is an alternative approach when faced with non-normal data (Kline, 2011, p. 177).

5.5 Testing the tripartite model of subjective well-being

The variables in the MCS fifth sweep data provide the opportunity to undertake statistical testing of the conceptual distinction in the tripartite model between cognitive SWB, positive affect and negative affect among children aged around 11 years old. In order to do this, three confirmatory factor analyses were run.

The first was a single-factor model of SWB (Model 5a) which included all 12 of the variables described in Section 5.3. The fit of this model was poor (χ^2=9659.88, df = 54, p<.001, CFI = 0.686, RMSEA = .117 [90% confidence interval = .115–.119], SRMR=0.101) which does not provide convincing evidence that these 12 variables tap into a single construct.

The second model (Model 5b) tested a three-factor SWB 'tripartite' framework consisting of cognitive, positive affect and negative affect components. The fit of this model was much better and reached acceptable (although not excellent) levels (χ^2=2060.85, df = 51, p<.001,CFI = 0.934, RMSEA = 0.055 [.053–.057], SRMR=0.036). The model and parameters are shown in Figure 5.2. The correlations between the three factors were 0.384 between cognitive SWB and positive affect; 0.371 between cognitive SWB and negative affect; and 0.453 between positive and negative affect. Additional

tests for model misspecification were run as discussed earlier. There were only a small number of parameters (three out of 89) where this test suggested some model misspecification and based on the guidelines proposed by Saris et al. (2009) this does not indicate substantive problems with the model specification. However, while the tests in general are supportive of the tripartite model it should be noted that the factor loading for the 'Laugh' variable is rather lower than the others which suggests some limitations to the model. Ideally more than two variables would be available to represent each of the proposed factors.

Figure 5.2: Confirmatory factor analysis of three-factor model of subjective well-being
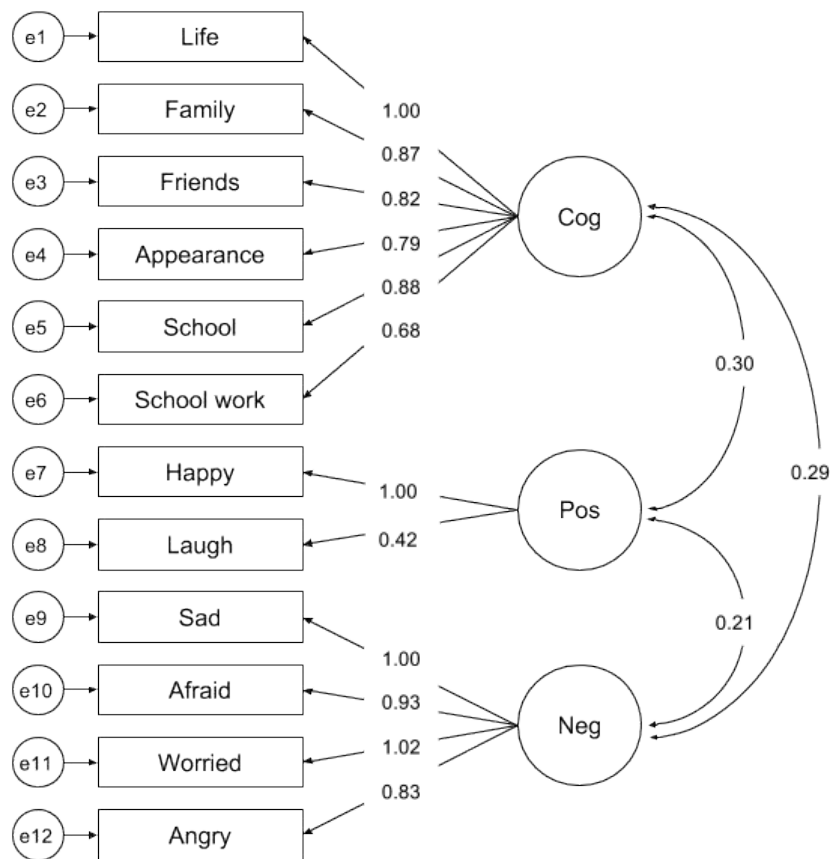
Overall, therefore, based on the criteria discussed in Section 5.4, this second model fits the data well. As a check on these findings two alternative methods of model testing were undertaken. Both alternative methods can only use data for the 12,145 cases in the data set for which complete data for the 12 variables was available. First, an alternative estimator (WLSM) was used in the specification of each model using the lavaan package. Fit statistics for the three-factor model exceeded the recommended thresholds

and were therefore acceptable (CFI=0.962, RMSEA=0.047, SRMR=0.038) whereas for the one-factor model they were not (CFI=0.683, RMSEA=0.131, SRMR=0.106). Second, the models were run in Stata using maximum likelihood estimation with bootstrapping (50 replications). The conclusions of this alternative analysis were the same as above. Model 1 (single-factor) had unsatisfactory fit (CFI=0.710, RMSEA=0.138, SRMR=0.109) whereas Model 2 (three factors) had close to acceptable fit (CFI=0.937, RMSEA=0.066, SRMR=0.039).

In summary, the results from these three models provide support for the proposed tripartite model of SWB in comparison with a single-factor model. This finding adds to the sparse existing evidence which has tested the tripartite model of SWB with child populations and is, as far as I am aware, the first evidence on this topic using confirmatory factor analysis with data from children in the UK.

It is possible also to estimate a higher second-order overall SWB factor linked to the three first-order factors in Figure 5.2. When there are only three first-order factors, the part of the model with a second-order factor is only just identified and therefore it is not possible to test the goodness of fit of the second-order structure (Rindskopf & Rose, 1988). However this approach would enable a test of the proportion of variance that is explained by the overall SWB second-order latent variable and the three first-factor latent variables (Guio et al., 2017a) and this would be a potential direction for further analysis. Another approach that might be tested in future research would be to test a bi-factor model (e.g. Chen et al., 2013).

5.6 Testing measures of each component of the tripartite model

Having established the case for distinguishing between cognitive SWB, positive affect and negative affect, the next step in the analysis process was to test various options for key variables to represent each of the three dimensions of SWB. An important issue is whether to make use of multi-item or single-item measures. In general, multi-item measures may be preferred to single-item measures due to their greater reliability and stability (Krueger & Schkade, 2008). More specifically, the single-item measures in the data sets have a relatively small number of response points (seven for the cognitive SWB questions and five for the affective SWB questions). Cummins and Gullone (2000), on the basis of a review of literature on subjective quality of life measures, argued for

the use of expanded scales beyond seven points. More recently, Leung (2011) tested self-esteem Likert scales with four, five, six and 11 points and found that 11-point scales had the lowest skewness and kurtosis and were closest to a normal distribution.

Additionally, because the majority of people choose a positive score for SWB questions, the scale restricts most respondents' choices to two or three options. This is a significant drawback compared to 11-point scales often used for single-item measures in SWB research where there are five positive options. It limits the potential usefulness of the single-item measures, particularly those for positive and negative affect, for some types of statistical analysis that are designed for cardinal, continuous variables. Thus there are potential benefits to utilising multi-item measures, provided such measures are conceptually well-formulated and statistically sound. The next three sub-sections discuss conceptual issues and presents the results of statistical testing of possible multi-item measures for each of the three components of SWB discussed in the models above. The two affective components are discussed first because data was only available for these components in the MCS data set.

5.6.1 Positive affect

For positive affect, the potential for identifying a multi-item measure is very limited. There were only two positive affect variables in the MCS; the rationale for their inclusion is not explained in the survey documentation; the correlation between them was relatively low (Pearson correlation = 0.251; Spearman correlation = 0.239; Kendall's tau-b = 0.219); and, as identified earlier, it can be seen from the CFA model in Figure 5.2 that the variable relating to frequency of laughing had a relatively weak factor loading. On this basis, conceptually and statistically these two variables are not adequate to create a satisfactory scale. So it is not possible to utilise a multi-item measure of positive affective SWB in the analysis. It was therefore decided to proceed with the use of a single-item measure. Of the two options – happiness or laughing – the first is much closer to a general positive affect item than the second, both in everyday language and based on the circumplex model of affective SWB (Barrett & Russell, 1998). The circumplex model classifies affective descriptions on two dimensions – unpleasant-pleasant and deactivation-activation. For example 'tense' is classified as an unpleasant and activated state. Barrett and Russell depict 'happy' as being close to the

mid-point between deactivation and activation; and so the question about the frequency of feeling happy was chosen to represent positive affect.

5.6.2 Negative affect

The situation was potentially more promising in relation to negative affect as there were four variables in the MCS data set that could potentially be used, although again the conceptual basis for their inclusion in the questionnaire is not clear. A scale made up of the four items had reasonable reliability[13]. However a confirmatory factor analysis had mixed fit statistics with a good CFI statistic but an RMSEA statistic above the recommended threshold (χ^2=258.69, df = 2, p<.001, CFI = 0.966, RMSEA = 0.100 [.091–.109], SRMR=0.026). Further, there was some evidence of model misspecification (for two pairs of variables, Worried-Afraid and Sad-Angry). On the basis of these tests there does not seem to be a viable multi-item measure of negative affective SWB in the MCS fifth sweep. Therefore, for this component also, a single-item was selected. Based on everyday language use, and the Barrett and Russell classification discussed above, the question about frequency of feeling sad was selected to represent negative affect.

5.6.3 Cognitive SWB

For the cognitive component of SWB the situation was more complex both because a greater number of variables were available for consideration and also because this component was measured in all three studies used for the analysis. This also meant that data was available to test the functioning of the measures across a wider age range than was possible for affective SWB.

It has become fairly common practice when conducting analysis on life satisfaction using the cognitive SWB data in the MCS, BHPS and USS to create a composite variable by summing responses to the six[14] available questions about happiness with family, friends, appearance, school, school work and life as a whole. This approach is taken, for example, in Wolke and Skew (2012), Booker et al. (2014) and Yucel and Yuan (2015), all of which analyse Wave 1 of Understanding Society; and Patalay and Fitzsimmons

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[13] Cronbach's α = 0.749. A potential extension to this analysis would be to use the information from the CFA model to calculate McDonald's ω_h which could provide a better measure of reliability (Zinbarg et al., 2005)

[14] Or five items in some of the earlier waves of the BHPS which did not include the 'school' question.

(2016) which analyses the fifth sweep of the MCS. However, there are conceptual and statistical issues to consider with this approach which have not been adequately discussed in the above literature.

Conceptually, simply combining the six items asking about happiness with family, friends, appearance, school, school work and life as a whole is debatable for several reasons. First, the aspects of life included in the survey are an incomplete list of the domains that may be relevant to children's lives (important missing domains include money/possessions, health, time use – see Dex & Hollingworth, 2012 for a review). Second, there are two items related to school which means that the scale may tend to over-estimate the associations of SWB with school-related factors and under-estimate associations with non-school factors. Finally, in terms of the hierarchical model of domain satisfactions and life satisfaction discussed in Chapter 2, the scale combines items at different levels of abstraction.

The above issues are probably of sufficient concern to rule out the use of this six-item measure purely on conceptual grounds. There are also statistical issues to consider. All articles using versions of this scale report reliability coefficients above 0.7. However only Yucel and Yuan (2015) undertake confirmatory factor analysis. They report an excellent fit for the six items using confirmatory factor analysis (CFA) for a sub-group of children in a preliminary subset of data from Wave 1 of Understanding Society but provide limited information about the model-fitting approach. The analysis below attempts to replicate these findings using confirmatory factor analysis with the MCS data set, the complete data set from Wave 1 of USS and with the most recent wave of the BHPS.

Model 5c in Table 5.4 shows the results of a CFA using all six items loading onto a single factor for the fifth sweep of the MCS. The CFI value of 0.941 is adequate, but the RMSEA value is above the recommended maximum threshold and its confidence interval extends beyond guidelines for acceptability. In addition, tests for model misspecification using the guidelines of Saris et al. (2009) indicate a problematic covariance between school and school work and inconclusive tests for two other covariances (family–school work and family–life). Thus, the data in the MCS study does not provide good support for using the six-item scale.

A more conceptually coherent approach is to omit the item asking about happiness with life as a whole and creating a scale based on the five domain satisfaction items (Model 5d), although it still has the drawbacks of omitting key domains and potentially over-emphasising the school domain. However a CFA using these five items has poorer and unacceptable fit statistics (see Table 5.4) than the six-item CFA. So this option does not appear to be a useful one.

One further possibility is to create a four-item scale consisting of satisfaction with family, friends, appearance and school (Model 5e). This addresses two of the three drawbacks of the six-item scale (conceptual confusion between domain and life satisfactions, and over-emphasis of school satisfaction). This approach is also relatively close to a validated five-item scale of children's life satisfaction – the Brief Multidimensional Student Life Satisfaction Scale (Huebner et al., 2006) which consists of family, friends, self, school and living environment domains. The CFA fit statistics of this model are excellent (Model 5e in Table 5.4), the test for model misspecification did not highlight any issues; and the reliability of the scale is 'good'[15].

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[15] Cronbach's alpha = 0.75. See also note 13.

Table 5.4: Confirmatory factor analysis of multi-item cognitive subjective well-being scales (using robust standard errors)

	Model 5c Six items (MCS)	Model 5d Five items (MCS)	Model 5e Four items (MCS)
Loadings			
Family	1.000**	1.000**	1.000**
Friends	0.938**	1.034**	1.042**
Appearance	0.891**	0.923**	0.856**
School	1.000**	1.153**	1.005**
School work	0.771**	0.882**	
Life	1.136**		
Fit statistics			
df	9	5	2
χ^2	945.318	710.595	15.248
CFI	0.941	0.934	0.998
RMSEA	0.090	0.105	0.023
RMSEA confidence interval	0.086–0.093	0.099–0.110	0.015–0.031
p-value RMSEA <=0.05	0.000	0.000	1.000
SRMR	0.040	0.038	0.007

As the same set of questions are included in the USS, it is possible to replicate the above analysis with this data also. Additionally, because the USS data covers a wider age range than the MCS it is possible to use multi-group CFA to test whether the measures tested work in the same way for all age cohorts. The first part of the analysis with the USS Wave 1 data (Table 5.5) produced very similar overall conclusions to those of the MCS analysis above. Model 5f including all six SWB questions – relating to family, friends, appearance, school, school work and life as a whole – did not unequivocally meet the requirements for adequate model fit. Neither did the five-item model excluding the item about life as a whole (Model 5g). However the four-item model (Model 5h), showed good fit in the USS data also.

Table 5.5: Confirmatory factor analysis of multi-item cognitive subjective well-being scales (using robust standard errors)

	Model 5f Six items	Model 5g Five items	Model 5h Four items
Loadings			
Family	1.000**	1.000**	1.000**
Friends	0.729**	0.841**	0.865**
Appearance	1.205**	1.212**	1.182**
School	1.327**	1.681**	1.291**
School work	1.083**	1.367**	
Life	1.346**		
Fit statistics			
df	15	10	6
χ^2	3369.521	2058.739	1253.295
CFI	0.929	0.928	0.990
RMSEA	0.081	0.085	0.039
RMSEA confidence interval	0.074–0.088	0.076–0.095	0.024–0.055
p-value RMSEA <=0.05	0.000	0.000	0.864
SRMR	0.039	0.036	0.013

Source: USS, Wave 1, N = 4,099 (unweighted)

One of the additional issues that needs to be considered in the analysis of the USS data is whether the measure reflects the same construct within individuals over time (Widaman, Ferrer & Conger, 2010). This is not a trivial matter. If the same set of questions is interpreted differently by people at different points in time then a measure based on these questions is not comparable over time. This issue may be particularly pertinent to the study of children's SWB as developmental changes over time may lead to variance in the understanding and interpretation of questions. For this reason, the four-item model was tested for measurement invariance by age and also (for reasons that will become apparent a little later in this section) by gender following the procedures for multi-group CFA outlined in Section 5.4.

Results of the testing of measurement invariance are summarised in Table 5.6. The measure meets the requirements of weak (equal loadings) invariance according to both age and gender. This means that it is acceptable to use this variable for comparisons of regression coefficients across age and gender groups. However, the model did not meet the requirements for strong (equal intercepts) invariance because the incremental change in the CFI and RMSEA statistics between the equal loadings and equal intercepts models was well above the recommended maximum threshold of 0.01. This

indicates that comparisons of means on this measure across gender and age groups are not appropriate. Additionally the lack of strong measurement invariance has important implications as it indicates that it is not possible to use this measure for some of the analysis presented in later chapters – such as latent growth curve modelling (Widaman et al., 2010).

Table 5.6: Measurement invariance of four-item cognitive SWB measure by age and gender

Age	CFI	ΔCFI	RMSEA	ΔRMSEA
Equal form	0.987		0.054	
Equal loadings	0.979	0.008	0.047	0.007
Equal intercepts	0.939	0.040	0.065	0.017
Gender	CFI	ΔCFI	RMSEA	ΔRMSEA
Equal form	0.991		0.047	
Equal loadings	0.983	0.008	0.049	0.002
Equal intercepts	0.935	0.048	0.081	0.032

Source: USS, Wave 1, N = 4,099 (unweighted)

Finally, the overall confirmatory factor analysis was run using Wave 18 (the most recent) of the BHPS. Here because the question about happiness with school was not including in all waves of the BHPS (although it was available in Wave 18), the four-item model included happiness with schoolwork instead. The results were very similar to those for the USS and the MCS. Neither the six-factor (Model 5i) nor the five-factor model (Model 5j) had acceptable fit, but the four-factor model (Model 5k), comprising family, friends, appearance and school work in this instance, had excellent fit.

Table 5.7: Confirmatory factor analysis of multi-item cognitive subjective well-being scales (using robust standard errors)

	Model 5i Six items	Model 5j Five items	Model 5k Four items
Loadings			
Family	1.000**	1.000**	1.000**
Friends	0.787**	0.856**	0.799**
Appearance	1.236**	1.250**	1.109**
School	1.414**	1.862**	
School work	1.098**	1.371**	0.821**
Life	1.338**		
Fit statistics			
df	15	10	6
χ^2	892.988	581.654	301.849
CFI	0.914	0.878	0.999
RMSEA	0.083	0.107	0.012
RMSEA confidence interval	0.070–0.095	0.089–0.126	0.000–0.052
p-value RMSEA <=0.05	0.000	0.000	0.941
SRMR	0.045	0.046	0.011

Source: BHPS, Wave 18, N = 1,222 (unweighted)

The analysis presented in this section shows a high degree of consistency in the analysis of potential multi-item measures of cognitive SWB using three different data sets. The six- and five-item models considered here do not have acceptable fit statistics and are therefore not suitable for use as multi-item measures. This is an important new finding of wider relevance as the six-item model has been used to represent SWB in a number of previous analyses of these data sets. A four-item model does have acceptable fit and is suitable for use in correlation and regression analysis but not for comparing means between genders or across age groups.

Therefore, considering the combination of conceptual and statistical issues discussed, it would appear that the two most useful measures of cognitive SWB to consider are the single-item measure of happiness with life as a whole, which can be taken to represent life satisfaction; and the four-item measure consisting of the sum of children's responses to questions about happiness with family, friends, appearance and school (or, in the case of the BHPS, school work). The single-item measure has greater simplicity and conceptual clarity but the multi-item measure has a larger range of values. Both of these measures are utilised at different points in the analysis in later chapters based on the above statistical considerations. However, the testing indicates

that the four-item measure does not function in exactly the same way for females and males or at different ages between 11 and 15 years old. Therefore it may not be suitable for comparing mean scores by gender or between age groups. In these circumstances, researchers sometimes attempt to establish partial scalar invariance; but this approach has been subject to criticism (Marsh et al., 2017) and was not adopted here. However other researchers may wish to explore the four-item measure further using the recently-developed method of multiple group factor analysis alignment as outlined in the above-cited article by Marsh et al.

Due to the concerns identified about measurement invariance, the four-item measure is not employed for the types of longitudinal analysis undertaken in Part 4 of the dissertation. For these types of analysis therefore a single-item measure of happiness with life as a whole is used to represent the cognitive component of SWB as has been done in a number of previous studies.

To summarise, the conceptual consideration and statistical testing of various options has led to the following conclusions about SWB variables to be used in the analysis in the following chapters. Positive and negative affect, which are only measured in the MCS, will be represented by single-item measures of the frequency of recently feeling happy and sad respectively. The cognitive component of SWB will be represented by a single-item measure of life satisfaction (happiness with life as a whole) and, in specific circumstances, by a four-item measure of cognitive SWB consisting of happiness with family, friends, appearance and school (or school work in the BHPS).

5.7 Testing the proposed distinction between **SWB** and mental health problems

A final objective of this chapter is to explore the relationship between subjective well-being and mental health problems. The Strengths & Difficulties Questionnaire was described earlier in Section 5.3.4. In this section the parent-reported SDQ in the fifth sweep of the MCS and the child-reported SDQ in the first wave of the USS are used to explore the connections between children's SWB and mental health problems. It was intended to run a confirmatory factor analysis of single-factor and two-factor models including SWB and SDQ measures. However, CFA of the four SDQ domain scores which make up the total difficulties scores did not yield acceptable fit in terms of CFI

or RMSEA statistics either in the MCS parent-reported data (CFI=0.922 , RMSEA=0.159) or in the USS child-reported data (CFI=0.848, RMSEA=0.199). Therefore it was not possible to proceed with this analysis. In view of this, correlations were calculated between the total difficulties score and the SWB variables to be used in the analysis. Results are shown in Table 5.8 for the MCS fifth sweep. Although all correlations are statistically significant with 99% confidence the size of the correlation coefficients is quite small. In the MCS, with the parent-reported SDQ, the correlations for all four variables are in the region of -0.2 indicating that one variable only explains around 4% of the variation in the other. The correlations in the USS between the two SWB variables and the child-reported SDQ scores are considerably higher - in the region of -0.46 to -0.48 and indicate an explanatory power of around 23%. This higher level of correlation in the USS compared to the MCS may be due to the fact that in the USS both the SWB and SDQ measures are being reported by the same respondent – i.e. the child – whereas in the MCS they are not. However, even these higher correlations in the USS are not large enough to suggest that these variables are tapping into the same concept. The extent of discriminant validity between these two measures could be tested further using Multi Trait Multi Method models in future research.

Table 5.8: Bivariate (Pearson) correlations between SDQ total difficulties score and SWB variables

	Life satisfaction	Cognitive SWB	Happiness	Sadness
MCS fifth sweep	-0.190**	-0.229**	-0.189**	0.181**
USS Wave 1	-0.460**	-0.476**		

5.8 Chapter summary and discussion

This chapter has explored the subjective well-being data available in the data sets with three aims – to examine the extent to which the data fit the conceptual models of SWB discussed in Chapter 2; to identify a set of SWB measures which will be used in the analysis in subsequent chapters; and to test the evidence on the relationship between SWB and mental health problems. The chapter concludes with a summary of findings in relation to each aim and their implications.

5.8.1   The structure of children's subjective well-being

The first aim was to explore the extent to which the data supports the idea of a tripartite model of subjective well-being (Andrews & Withey, 1976; Diener, 1984) as

discussed in Chapter 2 that distinguishes between three separate components of SWB – cognitive, positive affect and negative affect. The analysis indicates reasonable support for this framework and therefore for the idea that child SWB can be viewed as a multidimensional construct in the same way that has been proposed in the literature on adults' SWB. This is an important finding in itself as there has been little previous exploration of this issue with this age group. An important question to be answered in the analysis in Part 3 will be the extent to which different factors make a differential contribution to explaining variations in children's life satisfaction, positive affect and negative affect.

5.8.2 The measurement of children's subjective well-being

The second aim was to identify a set of SWB measures that can be used consistently throughout the analysis in the subsequent chapters. Confirmatory factor analysis does not generally provide good support for the use of multi-item measures constructed from variables available within the three data sets. The only exception is that there may be a case for the use of a four-item measure of cognitive SWB. These conclusions also have a broader relevance. Recent research using the USS data set (e.g. Wolke and Skew, 2012; Booker et al., 2014; Yucel and Yuan, 2015) has tended to utilise a six-item measure of cognitive SWB. The analysis presented in this chapter suggests that this measure does not have adequate statistical properties. This emphasises the importance of developing measures on a sound conceptual and statistical basis. The conclusion of this aspect of the analysis is that for some of the subsequent analysis it will be necessary to utilise single-item variables although this is also not without its drawbacks.

5.8.3 The relationship between children's subjective well-being and mental health problems

The third and final aim of the chapter was to explore the association between the measures of children's SWB and a parent-reported measure of children's mental health problems. The results of this analysis suggest that, in line with theoretical expectations, and with previous analysis (Patalay & Fitzsimons, 2016), the association between these variables was not that strong. This supports the idea that positive subjective well-being is not merely the opposite end of the same continuum as mental health problems (Seligman & Csikszentmihalyi, 2000).

Part 3

Early childhood factors and children's later subjective well-being

Chapter 6: Background, data and methods

This part of the dissertation addresses the second research question regarding the associations between early childhood factors and children's subjective well-being at the age of 11 years old. It uses data from the first, second and fifth sweeps (University of London, 2017a, 2017b and 2017c) of the Millennium Cohort Study (MCS). The rationale for the research question has already been provided in Chapters 3 and 4. This introductory chapter to Part 3 reviews previous literature relevant specifically to this research question; describes the way that the MCS data was prepared for this particular analysis; summarises the variables used to represent children's SWB at the age of 11 years old; and outlines the statistical methods used in the analysis.

6.1 Relevant previous literature

There has been a substantial amount of published research of correlates of children's SWB based on cross-sectional analysis. However, so far there has been almost no analysis of the influence of early childhood circumstances on children's later SWB. There are two exceptions.

Mostafa and Platt (2013) use the MCS to look at the associations between income-based poverty in childhood and child SWB at the age of 11 years old. Their findings do not show a clear additional effect of earlier poverty once current poverty status is taken into account. However their analysis is limited in that it only considered income poverty. The analysis presented in Chapter 7 will add to this picture by covering a wider range of early socio-economic factors.

The second previous longitudinal study is by Parkes et al. (2016). They use data from the Growing Up in Scotland study to examine the link between children's SWB at the age of seven years and 10 months old and their earlier experiences. This study is unusual in using a measure of life satisfaction with this age group. They find that three parenting factors measured at 46 to 70 months – dysfunctional parenting, protectiveness and the home learning environment – all directly predicted children's later life satisfaction. Additionally, living in a remote location uniquely predicted later life satisfaction. Maternal distress, maternal education, area deprivation and living in a lone-parent family in early childhood (10 to 34 months) had indirect effects on later

child life satisfaction, mediated by the parenting factors. Poverty in early childhood did not predict children's life satisfaction at seven years 10 months old either directly or indirectly when considered jointly with other factors. This is an important study given the lack of longitudinal research in this field. The findings on the stronger links between processes (parenting factors) than contextual factors on later SWB provide a valuable insight. However the study does have two important limitations. First, the gap between the measurement of parenting factors and measurement of life satisfaction is relatively short (two years). Second, measures of parenting at the same point as life satisfaction are not considered. Therefore it is not clear whether the parenting factors affect later life satisfaction directly, or only indirectly through their relationship with contemporaneous parenting factors. The analysis presented in the next two chapters will build on this work by (a) considering the impact of early childhood factors at a later point in childhood (11 years old); and (b) evaluating whether these factors predict children's life satisfaction over and above contemporaneous factors.

As a background to the analysis presented, it is relevant also to briefly review some cross-sectional findings from two recent articles (Patalay & Fitzsimons, 2016; Rees & Bradshaw, 2016) that have utilised the same data set and similar sets of variables. The findings from these two cross-sectional analyses provide an important context within which to view the new findings presented in the forthcoming chapters.

Patalay and Fitzsimmons undertake an analysis of factors associated with children's subjective well-being[16] and also with an indicator of children's mental health problems reported by their parents. They find that factors such as socio-economic status and family structure do significantly predict children's SWB but, along with some health-related factors, only explain around 6% of the variation in the dependent variable. When variables measuring parent-child relationships, peer relationships and bullying, and children's feelings about school are introduced, the explanatory power of the model increases to around 26%. In terms of the framework used in this dissertation, therefore, Patalay and Fitzsimmons analysis suggests that 'process' factors are more

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[16] They use the term 'mental well-being', but the variables used correspond with those considered in Chapter 5 when discussing cognitive SWB.

important than 'context' factors in explaining why some children have higher or lower SWB than others. An innovative aspect of this study is that they conduct the analysis using the same independent variables and a measure of mental health problems as a dependent variable. They report that the independent variables explain a much larger amount (around 47%) of the variation in this second variable. They also find that some variables are significant predictors of one dependent variable but not the other. For example, children with special education needs had significantly higher levels of mental health problems than other children but did not have significantly different SWB. On the other hand, greater feelings of neighbourhood safety were significantly associated with significantly higher child SWB but not with differences in mental health problems. They note that the correlation between their two dependent variables was around 0.2 and conclude that it is important to consider the two concepts of SWB and mental health problems separately. The method of comparing findings for SWB and mental health problems used by Patalay and Fitzsimmons is adopted in some of the analysis presented in the following chapters.

A second recent analysis of the data from the fifth sweep of the MCS (Rees & Bradshaw, 2016) takes a different approach and utilises binary measures of life satisfaction, happiness and sadness[17]. It had two main objectives. The first was to assess whether information reported by parents could help to explain more of the variation in children's SWB than had previously been possible with child-reported data. Second, it aimed to explore whether there were differences in the factors that predicted low life satisfaction, low happiness and high sadness in children. In relation to these two broad objectives it found that some parent-reported variables did significantly predict children's SWB. Notably, variables relating to the parent's relationship with the child emerged as significant predictors. However the power of these variables was rather limited in comparison with the amount of variation in SWB that could be explained by child-reported factors, such as experiences of being bullied. There was some tentative evidence of differential relationships between the independent variables and the three

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[17] This is a paper that I wrote with a colleague while working on this dissertation and the analysis uses the same SWB measures as used in this dissertation. I was responsible for undertaking all of the statistical analysis in the article.

different SWB variables. In particular, frequency of being bullied was more strongly associated with high sadness than with low life satisfaction or low happiness.

These two studies paint a fairly consistent picture. While context variables such as economic factors do matter to children's SWB, the quality of children's close relationships with those around them emerge as being more important. They also provide some insights into potential differences in the factors associated with the different components of SWB, as well as differences in predictors of SWB and mental health problems. A limitation of both articles is that they are quite broad in their approach, considering a wide range of factors across many different aspects of children's lives. Perhaps because of this they both lack a strong theoretical framework setting out why particular factors might be expected to be associated with children's SWB.

The analysis presented in the following two chapters will build on the above cross-sectional analyses in two ways. First, it will explore the importance of contextual and process factors much earlier in children's lives for their current sense of well-being. Second, it will focus more clearly on a narrow range of factors and consider the reasons and mechanisms through which these might be expected to affect children's SWB, based on the discussion in Chapter 4. Chapter 7 will present analysis of links between children's family and socio-economic circumstances at nine months old and their SWB at the age of 11. Chapter 8 will present a similar analysis including parent-reported information about their relationships with the child at three years old. In order to provide the foundations for this analysis, the remainder of this chapter describes the decisions that were made about the processing of data in preparation for analysis. It also discusses the ways in which the SWB variables identified in Chapter 5 will be utilised in this analysis; and the analytical methods that will be used in this part of the dissertation. Details about the independent variables selected from the data sets are then included in the introductions to each of the subsequent two chapters.

6.2 The data source and preparation for analysis

Some initial details of the MCS, including rates of attrition, were provided in Chapter 5. For this part of the dissertation, because the analysis of the MCS presented in Chapters 6 and 7 focuses on children's SWB at the age of 11 years old, only the 13,287

households participating in that sweep of the study are included. In the small number of households in the study where there were twins (168 cases) and triplets (7 cases), only the first child in the data set is included to avoid some households appearing several times and the consequent issues of clustering of children within households. The data from parents utilised in the analysis was collected from the main parent contributing information to the study at each time point. All but 28 of these respondents at the first sweep were female and all but nine were a natural parent of the child, so the term 'main parent' is used for accuracy but almost always refers to the 'birth mother'.

Using the identification numbers provided in the data set it is possible to link data across the different sweeps of the study. All available data on the variables of interest from the first and second sweep were merged with the fifth sweep data. On this basis, the total number of cases that it was possible to include in the analysis is shown in Table 6.1. Note that, even in the first sweep, data is not available for all families, as some families missed this stage and joined the study in the second sweep.

Table 6.1: Participation in earlier sweeps of the survey of families in the Age 11 survey

	First sweep Age 9 months	Second sweep Age 3	Fifth sweep Age 11
Total number of families in fifth sweep	13,287	13,287	13,287
Number participating	12,813	12,113	13,287
Participating families as a % of total	96.4%	91.2%	100%

Source: Own analysis of MCS data, sweeps 1 to 5

As data was not available for all cases at the first sweep (3.6% missing) or the second sweep (8.8% missing), the possibility of imputing data was considered in relation to these cases. It was decided that imputation of whole missing waves of data for these analyses would not be an appropriate technique because simulations have found, for example, that such an approach does not necessarily improve regression estimates and may even increase standard errors (Young and Johnson, 2015). Tests were run to compare those included and excluded on the basis of missing waves of data. Excluded children were significantly more likely to be from minority ethnic groups and, at Wave 5, also significantly more likely to be living in England than the other three countries

and to be living in a one-parent family. They were also living in households with significantly lower income. Therefore a limitation of the analysis in Chapters 7 and 8 is that the samples included cannot be regarded as fully representative of the UK child population.

This leaves the question of whether to impute missing data for relevant variables for cases included in the analysis. Imputation of the SWB variables was ruled out because these are treated as dependent variables and imputation of such variables is not recommended for techniques such as linear regression as it only serves to increase error in the variable (von Hippel, 2007). Missing data in the independent variables used in Chapter 7 was relatively sparse and one of the key variables used (household income) already contained imputed data calculated by the MCS survey team(Hansen, 2014). In view of both of these considerations, it was decided to not routinely impute values for the small amount of missing data in other independent variables. However for some of the analysis in Chapter 8 there were much higher rates of missing data for some independent variables and therefore, for that particular analysis component, multiple imputation was used.

6.3 Using the SWB variables in the analysis

The analysis presented in each chapter is in two parts. In the first part, the influence of the independent variables on each of the three components of SWB is examined. The purpose of this analysis is two-fold – (a) to evaluate the extent to which the independent variables can explain variation in any or all of the dependent variables; and (b) to explore whether there are different associations of the independent variables with each component of SWB. The second purpose is important because SWB theory would suggest that the cognitive component of SWB should be more stable and less influenced by short-term contemporaneous factors than the affective components. If this is the case then cognitive SWB might be expected to show a clearer association with long-term factors than does affective SWB. The evidence on this matter will be evaluated. Because the intention of this part of the analysis is partly to compare results between the three dependent variables it is necessary to use the same technique for all three. Linear regression has been used in previous research with a single-item life satisfaction variable, which is measured on a seven-point numerical scale. However it

is less clear whether this technique can be extended to the two single-item measures of affect as these use a five-point verbal scale. As well as the smaller number of response options, it is more difficult to argue that verbal scales consisting of options such as 'Never', 'Sometimes' and 'Often' can be regarded as interval variables as would be required for linear regression. All three variables are clearly ordinal and so ordinal logistic regression was considered as an alternative. However this relies on the 'proportional odds' or 'parallel lines' assumption (Brant, 1990; Williams, 2006) and some initial exploratory analysis[18] using the *ordinal* package in R (Christensen, 2015) suggested that this assumption did not hold for this analysis. Due to these doubts it was decided to use binary logistic regression for this part of the analysis. This still leaves the question of what cut-off points to use to create the binary variables.

Table 6.2 shows the distribution of the three single-item variables in the MCS fifth sweep (also shown in Chapter 5, Tables 5.2 and 5.3). As there is no clear interpretation of what might constitute 'low' or 'high' values of these variables, it was decided to undertake the analysis using several different cut-off points for each. This practice enables an assessment of whether there are any particular threshold effects and can give more confidence in results if they are similar when using different cut-off points.

Table 6.2: Distributions of three single-item SWB measures

	Life sat.		Happy	Sad
0 - Not at all happy	2.4%	Never	1.8%	27.4%
1	1.8%	Almost never	3.4%	39.6%
2	2.5%	Sometimes	12.0%	25.7%
3	5.7%	Often	28.3%	6.1%
4	10.1%	Almost always	54.5%	1.2%
5	25.4%			
6 – Completely happy	52.1%			

Source: MCS, Fifth Sweep, Unweighted N = 13,287. Percentages are for weighted data

There are potentially problems with logistic regression estimation if one of the two values of the dependent variable is a rare event (King & Zeng, 2001). This depends on

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[18] For example, using models to predict low life satisfaction with control variables plus equivalised household income quintiles, an anova test indicated that the coefficients for the income variable using a nominal logistic regression model differed significantly from those from an ordinal logistic regression model. This suggests that the proportional odds assumption is not met (Christensen, 2015).

the number of cases in the smaller group. Guidelines on this matter are difficult to find but, while there does not seem to be a universally agreed cut-off criterion, it is possible that only having a few hundred cases in one group could be problematic (Allison, 2012). It was therefore decided to restrict the cut-off points so that the smaller group represented at least 5% of the sample – which should yield above 500 cases given the levels of missing data in the data set. This suggests that the most extreme cut-off could be a score of two or less for life satisfaction (6.7%); a response of 'Never' or 'Almost never' for positive affect (5.3%); and a threshold of 'Often' or 'Almost always' for negative affect (7.3%). Clearly a range of other options are possible and these (excluding cases where only one response option is contained in one value of the binary variable) are listed in Table 6.3. To avoid displaying large numbers of similar tables, the version of each variable marked with an asterisk will be used for the analysis presented in the tables and will be the main focus of the discussion. A guideline for selecting these versions was previous research (e.g. Main & Bradshaw, 2012) that has suggested that between 9% and 10% of children aged 15 can be considered to have 'low' SWB. However, for positive affect this would have meant using Version 1 which is very close to the split threshold of 95-5. So for positive affect, Version 2 in Table 6.3 was used as the main focus instead. Any differences in the analysis when using different versions will be noted in the text.

Table 6.3: Variations of binary SWB variables used for the analysis

	Low score (less positive)		High score (more positive)	
Cognitive SWB	*Value*	*%*	*Value*	*%*
Version 1	0 to 2	6.7%	3 to 6	93.3%
Version 2*	0 to 3	12.4%	4 to 6	87.8%
Version 3	0 to 4	22.5%	5 to 6	77.5%
Positive affect	*Value*	*%*	*Value*	*%*
Version 1	Never/Almost never	5.3%	Sometimes–Almost Always	94.7%
Version 2*	Never–Sometimes	17.2%	Often/Almost always	82.8%
Negative affect	*Value*	*%*	*Value*	*%*
Version 1*	Often/Almost always	7.3%	Never to Sometimes	92.7%
Version 2	Sometimes–Almost always	33.0%	Never/Almost never	67.0%

Source: MCS, Fifth Sweep, Unweighted N = 13,287. Percentages are for weighted data

This discussion of dependent variables has established the background for the analysis in Chapters 7 and 8, which focuses on the association of children's SWB at the age of 11 years old with (a) early children family and socio-economic factors; and (b) parenting factors respectively. The final section of this chapter will describe the main analytical procedures that are used in the analysis presented in these two chapters.

6.4 Statistical methods

Given that the aim of the analysis in this part of the dissertation is to assess the extent to which sets of historical and contemporaneous factors can predict children's levels of SWB and mental health problems at a given point in time, standard multiple regression models which seek to estimate the relationship between a single dependent variable and a number of independent variables are an appropriate methodology. Two forms of regression are employed. First, where the dependent variable is treated as an interval variable (as is the case with the four-item cognitive SWB variable and the measure of mental health problems) linear regression is used. Second, where it is only possible to use a binary dependent variable as discussed above, logistic regression is used. There are some important differences between these two methods but also many aspects in common. I will first discuss the general principles of linear regression focusing on how this method is used in this specific analysis. I will then go on to discuss some additional issues relating to logistic regression.

6.4.1 Linear regression

Ordinary least squares (OLS) or linear regression enables the simultaneous consideration of a number of predictors (independent variables) of a particular outcome (dependent variable). Compared with bivariate analysis this means that the analyst is able to identify which factors remain important when holding other factors constant. As an example, bivariate analysis might show that children living with lone parents have significantly lower SWB than children living with two parents; but the researcher may be aware that lone-parent households tend on average to have lower incomes. Thus a regression analysis taking family structure and income into account simultaneously will enable the researcher to assess whether living with a lone parent is associated with lower child SWB when holding income constant. While this is a powerful technique it is important to be clear that it does not confirm the direction of

the link between the independent and dependent variables. In fact this link is hypothesised or proposed by the analyst. Therefore linear regression can not show that one factor *causes* another.

Linear regression models the variation in the dependent variable as a linear combination of the products of the independent variables. A coefficient is estimated for each independent variable along with a constant representing the intercept value of the dependent variable on the y-axis when all the independent variables are equal to zero. There is also a residual error term implicit in the model. The equation can be represented as follows:

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_{3} + \ldots + \beta_n x_n + \varepsilon \qquad \text{(Equation 6.1)}$$

where:

y is the dependent variable

α is the intercept

x_i are the independent variables

β_i are coefficients for each of the independent variables

ε is the error term

Various statistics are available for the overall fit of this model. The adjusted R-squared statistic is widely used and can be interpreted as the proportion of the variation in the dependent variable that is explained by the independent variables, which is often termed the explanatory power of the model.

Linear regression makes a number of assumptions about the nature of the data and these may not always be completely supported for SWB data. One issue is that SWB variables usually consist of a discrete number of responses and it is debatable whether they can be treated as interval or continuous variables. Additionally, distributions of these variables tend to be highly skewed towards more positive levels of SWB, and are not normally distributed. It is important that this is taken into consideration in analysis. As discussed in Chapter 4, an analysis by Ferrer-i-Carbonnel & Frijters (2004) found that there was little substantive difference in the conclusions drawn from analyses treating SWB as an interval or ordinal variable. A further issue is whether these variables should be treated as censored because of possible ceiling effects due to

the limited number of options in the scale. One article by Main (2014) treats a life satisfaction variable in this way and uses a tobit regression model which accounts for censored data. However it is not yet clear whether this approach is better than linear regression, especially in cases where the implication of the top of the scale is that it represents a maximum level of SWB, in which case the assumption of censored data is not correct.

Although these are important issues, linear regression has substantial advantages in terms of ease of interpretation of coefficients and the potential to generate a measure of explanatory power as discussed above. Bearing these points in mind, and based on the findings of Ferrer-i-Carbonnel and Frijters discussed above, it is common practice to use linear regression with SWB variables. Recent examples of UK research on child SWB using this approach are the analyses by Patalay and Fitzsimons (2016) and Parkes et al. (2016) discussed earlier in this chapter. I have therefore chosen to follow this approach and use linear regression selectively when utilising the four-item cognitive SWB variable which has a range of possible responses from zero to 24.

Key assumptions and considerations of the linear regression model (based on discussion in Hutcheson and Sofroniou, 1999) include multivariate normality; constant error variance of the dependent variable (or homoscedasticity); absence of multicollinearity (particularly high correlations between independent variables); influential observations or outliers, which can disproportionately affect the model; and model misspecification, which occurs when an important variable is omitted from the model.

In the linear regression analyses presented in Sections 7.4 and 8.4, the following tests and remedial measures were used in relation to the relevant points[19] above as follows. A number of these checks utilise residuals, which are the extent to which each predicted value of the dependent variable differs from the observed value:

- Normality was assessed by an examination of plots of residuals (P-P and Q-Q plots) and by the Shapiro-Wilks test. Generally there were substantial

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[19] Based on guidelines published on https://stats.idre.ucla.edu/stata/webbooks/reg/chapter2 /stata-webbooksregressionwith-statachapter-2-regression-diagnostics/

departures from normality. Possible remedial measures in this situation include transformation of the dependent variable. A log transformation of the dependent SWB variable was tested and tended to improve although not completely resolve these issues. Checks of the significance tests of coefficients and the fit statistics using the logged variable did not suggest that this changed the substantive conclusions (although fit statistics tended to improve by a small extent). Because results of untransformed variables are easier to interpret, and because I have not found any examples of previous studies that have transformed SWB variables in this way, the results for the untransformed variables are presented and discussed.

- Constant variance was assessed by examining residual plots and by running the Breusch-Pagan test. Generally for the linear regressions presented here there was evidence of violation of this assumption (heteroscedasticity) and, so, robust standard errors were calculated in all models to take account of this.

- Checks for multicollinearity were carried out by calculating variance inflation factors (VIFs) for fitted models. VIFs of greater than ten are deemed problematic. This check was run for all regression models presented and any problems and remedial actions are noted in the text.

- The presence of outliers was checked by examining studentised residuals and identifying any particularly large values (exceeding +2 or -2). This was done for the current analyses. However, probably because of the highly skewed distribution of the dependent variable, there were a large number of observations with the lowest SWB score that exceeded these guidelines. On the other hand there were no uniquely excessive outliers and so no remedial action was taken.

- Specification errors were checked in Stata using the *linktest* function. This was done for each regression model fitted and any issues with this are reported in the text

An extension of linear regression which is used in one piece of analysis in Chapter 7 is multivariate regression (available using the *mvreg* command in Stata). This consists of

the simultaneous estimation of equations for several dependent variables with the same set of independent variables. The coefficients obtained are identical to those from running each equation separately. The advantage of calculating all the equations at the same time is that it is then possible to run tests to compare statistically the relative effect size of a particular independent variable across the different equations.

Although linear regression should strictly only be done with continuous dependent variables, it is common practice, particularly in economics, also to use linear regression with binary variables. Hellevik (2009) and Mood (2010) argue that in many instances this practice is defensible and that it has certain advantages over logistic regression models (to be discussed in the next section) due to the ease of interpretability of model results. This method is used sparingly in a few key points in the dissertation as a complement to other methods such as logistic regression.

6.4.2 Logistic regression

Based on the discussion in Section 6.3, logistic regressions were run when binary dependent variables were used. The key difference between linear and logistic regression models is the nature of the link function between the dependent and independent variables. In the case of linear regression this is the identity function. While this is applicable for normally distributed continuous variables it is not appropriate for binary variables for several reasons including that the predicted values can lie outside the possible range of possible values of the dependent variable and that the variance of the error term is correlated with the dependent variable which implies heteroscedasticity (Pampel, 2000; Best & Wolf, 2014). To overcome these problems, in logistic regression, a different type of link function is used – the logit function, which is based on the natural logarithm of the odds of the event represented by the positive value of the binary variable. Using this alternative link function it is possible to apply analysis using logistic regression in a similar way to linear regression in that the the log odds of the dependent variable are modelled as a linear function of the independent variables. Thus the logistic regression can be represented by the following equation:

$$logit(p) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_n x_n + \varepsilon \qquad \text{(Equation 6.2)}$$

where the left-hand side of the equation is the log odds of the probability of a positive value of the binary dependent variable and other terms are as in Equation 6.1

Although there are many similarities between linear and logistic regressions, there are also important differences of testing and interpretation of logistic regression models. One key issue is that the coefficients of the model cannot be interpreted in such a straightforward way as for linear regression. This is because they relate to the transformed dependent variable (log odds) rather than the untransformed dependent variable. It is possible to express the coefficient in terms of odds ratios but these are not comparable across models (Mood, 2010). A second issue is that it is not possible to generate a straightforward measure of the explanatory power of the model, like the R-squared of a linear regression which can be thought of as the percentage of variance in the dependent variable explained by the independent variables. Various pseudo R-squared statistics have been proposed but none of these are entirely satisfactory.

Logistic regression does not have all the same assumptions as linear regression. For example, heteroscedasticity is inevitable as discussed above. However, several of the key assumptions and diagnostic tests discussed above, including issues of multicollinearity, specification errors and outliers for logistic regression are also relevant to logistic regression (Menard, 1995). These were handled in the same way for the logistic models as described earlier for the linear regression models. Additionally, with logistic regression it is important to take care with very unevenly split independent variables (Hutcheson & Sofroniou, 1999) and this has been taken into account in preparing variables for the analysis – for example, when collapsing variables to create binary or factor variables.

This discussion of statistical methods used in the analysis concludes this introductory chapter to Part 3. The following two chapters apply these methods to analyse the relationship between children's SWB at 11 years old and (a) their socio-economic and family circumstances at nine months old; and (b) the quality of parent-child relationships at three years old.

Chapter 7: Children's socio-economic and family circumstances at nine months old and their subjective well-being at 11 years old

This is the first of two chapters presenting statistical analysis of the links between early childhood factors and children's subjective well-being (SWB) at the age of 11 years old. There are two different aims of this analysis. The first is to test whether children's early circumstances are statistically associated with their levels of SWB at 11 years old; and whether these associations still hold once children's circumstances at 11 years old are taken into account. The second aim of the analysis is to test the idea discussed in Chapter 2 about the structure of SWB. This involves exploring the extent to which measures capturing the three proposed components of SWB – cognitive, positive affect and negative affect – are distinct from one another and have differing relationships with the independent variables included in the analysis. This issue is of conceptual interest because if such differences are found then this supports the idea that SWB is a multidimensional construct.

The reasons why poverty early in childhood might impact on children's SWB at a later age have already been discussed in Chapter 4. A number of potential mechanisms were identified including the possibility that low SWB accumulates over time (although this does not seem particularly likely); the indirect effect that experiences of poverty may have on child's relationships with family and friends that then create the later conditions for low SWB; and the child's awareness of experiences of poverty leading them to make a negative evaluation of their life as a whole. As suggested in Chapter 4, the latter two of these possibilities might be expected to show a greater effect of poverty on cognitive SWB than on affective SWB.

7.1 Variables

The focus here is on family and socio-economic factors which are very unlikely to have bi-directional relationships with children's subjective well-being. As discussed in Chapter 4, measures of parental mental health or SWB may not be independent of children's SWB as it is conceivable that the relationships are reciprocal; and therefore this factor is not included in the analysis presented here. The independent variables used in the analysis are as follows.

7.1.1 Poverty

Child poverty is not solely about levels of household income but is multi-dimensional (Gordon & Nandy, 2012), and there are various approaches to its measurement, as evidenced by several papers on the topic in a recent journal special issue (Chzhen, Gordon & Handa, 2017; de Milliano & Plavgo, 2017; Guio et al. 2017b). It is also important to recognize that household income cannot tell us anything about the distribution of resources within households and this is a salient issue when considering children's experiences of poverty and deprivation (Main & Bradshaw, 2012; Chzhen et al., 2017). As reviewed in Chapter 3, Section 3.5.3 the choice of poverty measure has substantive implications for the nature and size of the relationship between poverty and children's SWB.

For the analysis in this dissertation I will follow the multi-dimensional approach developed in relation to the MCS data by Bradshaw and Holmes (2005). They use three different types of measures – income-based measures (household income and also receipt of welfare benefits as a proxy for low income), deprivation (lack of basic necessities) and self-assessed (by the main parent) financial situation.

- Income: The first measure is household income, equivalised using a formula developed by the OECD to take account of variations in household size. Due to some doubts about the accuracy of the income variable in the first and second sweeps (Ward et al. 2007), the derived variable giving the equivalised income quintile is used for the analysis presented here. Some testing was done using the full equivalised income variable in the fifth sweep, and also using the log of this variable, and it did not affect the substantive conclusions drawn from cross-sectional analyses. So the use of the variable based on quintiles does not seem to have substantial drawbacks.

- Indicators of material deprivation are available in the fifth sweep of the survey and a scale consisting of a count of how many of five items the household has are used in the initial cross-sectional analysis of this sweep. A more complex approach was also tried, creating a weighted score (as in Knies, 2011) but this did not change the conclusions of the analysis, so for simplicity the basic count variable is used in this chapter.

- The third measure is the response to a question 'How well would you say you [and your husband] are managing financially these days?'. Responses were on a five-point scale ranging from 'living comfortably' to 'finding it very difficult'. Two categories 'fairly difficult' and 'very difficult' were combined due to the low number of cases in the latter category.

Unfortunately in the first sweep of the MCS there is no suitable measure of deprivation, so for this sweep it is only possible to use two measures of poverty relating to income and the main parent's self-assessed financial situation.

7.1.2 Other socio-economic indicators

In addition to poverty, a number of other socio-economic factors have been found to be associated with child outcomes and so three additional variables are included in the analysis.

- Parental qualifications: A derived variable in the MCS data set indicating the highest level of NVQ qualification obtained by the main parent was used for the analysis. Dummy variables were created for each level of qualification, and for overseas qualifications, for use in the logistic regression analysis

- Parental employment: binary variable was created to indicate whether at least one parent/carer was in paid work.

- Housing tenure: A variable was created to indicate whether the home was owned[20] or not[21].

7.1.3 Family characteristics

The following family characteristics, which have either been found to be associated with variations in children's SWB or with other child outcomes, were included in the analysis:

- Main parent's age at birth of child: The age in years of the main parent at the time of the birth of the child was available in the data set. The raw ages were

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[20] Includes 'own outright', 'own – mortgage/loan' and 'part rent/part mortgage (shared equity)'
[21] Includes 'rent from local authority', 'rent from housing association', 'rent privately' and a small number of cases of 'living with parents', 'live rent free' and 'squatting'

grouped into five age bands as follows: under 21, 21 to 25, 26 to 30, 31 to 35, 36 and over.

- Family structure: At nine months old the large majority of children lived either with both birth parents or with one lone birth parent (usually the mother). So, for this sweep, a binary variable was used to distinguish between these two groups. At 11 years old there was more diversity of household structure and so a variable with four categories – both birth parents, step-family, lone-parent and 'other' – was used.

- Household size: Two variables were utilised in the analysis – a count of the number of siblings of the cohort child who were living in the household, and a count of the total number of people living in the household.

7.1.4 Control variables

Four control variables were also included in the multivariate analysis:

- the gender of the child,

- the age of the child in months at the time of the fifth sweep of data collection,

- the ethnicity of the child, and

- the country of the UK that they were living in at the fifth sweep.

The first two of these variables were included because research has often indicated significant variations in SWB according to age and gender. The ethnicity and country variables were included because some previous research has identified variations in SWB according to these two factors (e.g. Goswami, 2014; Rees & Bradshaw, 2016). Future research might also explore other control variables, such as the child's birth position among siblings, which have not been explored or included in previous research.

7.2 Descriptive statistics and bivariate analysis

Statistical tests were carried out of the bivariate associations between each independent variable measured at nine months old and the three binary SWB variables. Chi-square tests were used for all variables except the child's age in months for which a simple

logistic regression was undertaken. Results are summarised in Table 7.1. The rows containing the variable description provide the results of statistical tests of bivariate association with each of the three binary dependent variables. A single asterisk indicates a significant association at the 95% confidence level; a double asterisk at the 99% confidence level; and a triple asterisk at the 99.9% level. This latter confidence level is used to distinguish between associations, because the chi-square test is sensitive to sample size. Additionally, where the p-value was less than 0.001, Cramer's V was calculated for categorical variables as an indication of effect size and is shown in brackets. Apart from the variable about the child's age, the rows containing the categories within each variable show the percentage of cases in the weighted sample within the category and the percentage of children within the category with low SWB for each dependent variable. For the child's age the row shows the mean age in months and coefficients from logistic regressions.

Looking first at the control variables, there was a significant association between children's age (in months) at the time of the interview and two of the SWB variables – life satisfaction and sadness. In both cases the percentage with low SWB slightly decreased with increasing age. This is unexpected given that previous research consistently shows a decrease in SWB with age (see Chapter 2). A similar result was reported for this data set using a different SWB variable in Patalay and Fitzsimmons (2016). As there is a very narrow age range here it is possible that these patterns are due to effects related to the child's position within the school year. There were no significant differences according to gender or ethnicity. There were significant differences (p<.05) for country of residence. The highest percentage of children with low life satisfaction lived in England and the lowest in Northern Ireland; while the highest percentage with low happiness also lived in England and the lowest in Wales. Wales had marginally the highest percentage of children with high sadness and Northern Ireland had the lowest.

Table 7.1: Bivariate associations between independent variables when children were nine months old and SWB variables when children were 11 years old

	% of sample	Low life satisfaction	Low happiness	High sadness
Age at fifth sweep		***	ns	**
Age in months	Mean=134	Coef.= -.030	Coef.= -.011	Coef.= -.033
Gender		ns	ns	ns
Female	48.9%	12.8%	17.8%	7.6%
Male	51.1%	12.1%	16.6%	7.0%
Ethnicity		ns	ns	ns
White	84.8%	12.7%	17.3%	7.3%
Mixed	3.5%	12.0%	18.7%	7.3%
Indian	2.0%	8.0%	13.3%	5.5%
Pakistani and Bangladeshi	4.9%	8.8%	15.4%	8.5%
Black or Black British	3.4%	14.6%	20.2%	8.6%
Other	1.4%	10.3%	13.2%	2.2%
Country (at fifth sweep)		*	*	ns
England	82.4%	12.7%	17.7%	7.5%
Wales	4.9%	12.1%	13.9%	7.6%
Scotland	8.7%	11.6%	16.0%	6.2%
N. Ireland	4.0%	9.0%	14.7%	5.3%
Income		***(.059)	**	***(.067)
Lowest quintile	24.0%	15.0%	19.8%	9.9%
Second quintile	21.3%	14.6%	17.8%	8.9%
Third quintile	19.2%	11.6%	15.7%	6.3%
Fourth quintile	18.2%	10.7%	15.9%	5.2%
Highest quintile	17.3%	8.8%	15.4%	5.0%
Self-rated financial status		***(.066)	**	*
...living comfortably	23.2%	8.9%	15.9%	6.5%
doing alright	36.1%	11.9%	15.9%	6.7%
just about getting by	28.7%	15.0%	18.6%	8.8%
finding it difficult		14.4%	19.5%	7.2%
Main parent's level of education		***(.054)	**	***(.057)
None of these	15.5%	14.7%	18.5%	8.2%
NVQ level 1	9.2%	16.8%	21.5%	9.8%
NVQ level 2	30.3%	12.4%	17.1%	8.0%
NVQ level 3	14.1%	12.1%	15.8%	6.7%
NVQ level 4	25.3%	10.0%	15.6%	5.4%
NVQ level 5	3.0%	8.9%	13.7%	4.1%
Overseas qualification only	2.8%	12.3%	19.0%	10.2%
Parents'/carers' employment		***(.047)	**	***(.041)
At least one person employed	78.7%	11.5%	16.4%	6.6%
No-one employed	21.3%	15.7%	20.0%	9.7%

	% of sample	Low life satisfaction	Low happiness	High sadness
House ownership		***(.068)	***(.039)	***(.065)
No	43.5%	15.5%	18.9%	9.7%
Yes	56.5%	10.1%	15.8%	5.5%
Main parent's age at birth of child		**(.041)	*	*
Under 21	13.9%	16.2%	20.6%	9.6%
21 to 25	19.3%	13.0%	16.3%	7.7%
26 to 30	30.2%	11.6%	16.6%	6.8%
31 to 35	25.4%	11.0%	16.4%	6.7%
36 and over	11.4%	12.0%	17.0%	6.2%
Number of parents		***(.041)	***(.036)	**
One	17.3%	15.8%	20.8%	9.4%
Two	82.7%	11.7%	16.3%	6.8%
Number of people in household		ns	ns	ns
Two	5.3%	14.9%	20.3%	9.6%
Three	34.4%	11.7%	17.0%	6.6%
Four	33.6%	12.5%	16.9%	7.0%
Five	16.2%	11.6%	15.7%	7.3%
Six or more	10.5%	14.4%	18.6%	9.0*
Number of siblings		ns	*	ns
0	42.1%	11.9%	16.3%	7.2%
1	35.3%	12.4%	17.2%	6.8%
2	15.0%	12.4%	16.8%	8.1%
3 or more	7.5%	14.6%	21.4%	8.4%

'ns' indicates that there was no significant difference (p-value > 0.05).

* indicates a p-value <=0.05 and >=.01

** indicates a p-value <.01

*** indicates a p-value <.001

The general picture for the poverty and other socio-economic variables is fairly

consistent. Children who lived in less advantaged circumstances at nine months old –

i.e. lower household income; greater parent-reported financial difficulties; lower

educational level of the main parent; in a household with no parent/carer in paid

employment; and not in owner-occupied housing – generally had significantly higher

likelihoods of low SWB at the age of 11. The range of values of low life satisfaction, in

particular, for these economic variables is quite large. Around 15% of children in the

lowest household income quintile at nine months old had low life satisfaction at the

age of 11 compared to 9% of children in the highest quintile. Around 14% to 15% of

children who, at nine months old, lived with a parent who was finding their financial

situation 'difficult' or was 'just about getting by' had low life satisfaction at the age of 11 compared to 9% of children whose parent(s) were 'living comfortably'. Around 10% of children living in owner-occupied housing at nine months old had low life satisfaction at age 11 compared to 16% of other children.

In terms of other family characteristics there was more of a mixed picture. Children whose main parent (almost always the mother) was under 21 years old when they were born had a higher likelihood of low SWB at the age of 11 years old than other children. Children living with one birth parent at nine months old also had a higher likelihood of low SWB at the age of 11 years old than children living with both birth parents. There was no significant association between household size when the child was nine months old and the SWB variables; and there was limited evidence of an association for number of siblings either.

Overall, this bivariate analysis suggest that children living in less advantaged circumstances at nine months old are more likely to have low life satisfaction, a low level of happiness and a high level of sadness at the age of 11 years old. This is notable given the gap of a decade between these two time points. There are also some tentative indications here, comparing the significance levels and effect sizes between columns, that happiness may have a weaker association with early childhood socio-economic factors than life satisfaction and sadness. That is an aspect that will become clearer through the multivariate analysis.

7.3 Multivariate analysis

This section extends the bivariate analysis to examine the extent to which variables measured when children were nine months old are significantly associated with children's SWB at 11 years old, when considered in combination with other variables. Given the binary nature of the dependent variables, the analysis in this section utilises logistic regression. An initial point to note about this multivariate analysis is that many of the dependent variables had moderately strong associations with each other. For example, parents in lower income households were significantly more likely to report financial strain[22]. However a test following the procedures outlined in Chapter 6 did

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[22] Spearman's rho = -0.45; Kendall's tau-b = -0.35

not indicate any problems with multicollinearity when including all of the first sweep or all of the fifth sweep independent variables in the analysis

The analysis which is presented here was conducted in a number of steps for each dependent variable. First there is a base model (Model 7a) which only includes the control variables. Model 7b presents a cross-sectional analysis of control variables and contextual factors at the age of 11 years old. This is a necessary foundation for the analysis that follows. Model 7c includes the control variables plus the contextual variables measured when the child was nine months old. This model provides an indication of which of the context variables at nine months old make a unique contribution to predicting low SWB at the age of 11 years old. Finally, Model 7d adds the contextual variables measured at the age of 11 years old to Model 7c. This then provides a test of whether the context at nine months old provides any additional insights into the likelihood of low SWB at 11 years old, once the child's circumstances at this older age are considered. Because one of the aims here was to compare the results for each dependent variable, the analysis in this section was only run for cases that had non-missing values for all three dependent variables. Given the sample size the focus of the discussion is on variables that make a significant contribution to the model at the 99% confidence level but significant variables at the 95% confidence level are also shown in the tables.

7.3.1 Control variables

Table 7.2 shows the base model with control variables only. There was no evidence of a statistically significant gender difference in the odds of low SWB for any of the three dependent variables. This is in line with the analysis presented in Chapter 6. Age made a significant contribution to predicting the odds of low life satisfaction and high sadness, with older children having lower odds. As noted earlier in the chapter this is unexpected based on previous research findings. The reason for the pattern observed here is unclear. One possibility that was considered was that, within the relatively narrow age range of this sample there is an effect of the month of birth within the academic year. Research indicates that there are differences in educational attainment and other outcomes according to month of birth (Crawford, Dearden & Greaves, 2013). This hypothesis was tested. There was some evidence of variation in SWB according to month of birth but the age pattern remained much the same even when this factor was

taken into account. Children of Pakistani/Bangladeshi origin had significantly lower odds of low life satisfaction than White children. Compared to children in England, children in Northern Ireland were less likely to have low life satisfaction or high sadness and children in Wales were less likely to have low happiness. The control variables are included in all subsequent models but, for brevity, are not included in the statistical tables. Some points are discussed about changes in the above patterns in the final model.

Table 7.2: Logistic regressions of SWB variables onto control variables

	Model 7a(1) Low life satisfaction		Model 7a(2) Low happiness		Model 7a(3) High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Female	1.05	[0.87, 1.27]	1.09	[0.94, 1.28]	1.08	[0.87, 1.34]
Age in months	0.97**	[0.95, 0.99]	0.99	[0.97, 1.01]	0.97**	[0.94, 1.00]
Ethnic group [ref=White]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Mixed	0.88	[0.54, 1.45]	1.09	[0.73, 1.64]	1.00	[0.53, 1.89]
Indian	0.60	[0.26, 1.35]	0.68*	[0.41, 1.10]	0.64	[0.28, 1.47]
Pakistani/Bangladeshi	0.66**	[0.47, 0.93]	0.85	[0.61, 1.18]	1.15	[0.73, 1.82]
Black British	1.07	[0.62, 1.83]	1.14	[0.73, 1.79]	1.11	[0.61, 2.02]
Other	0.75	[0.29, 1.98]	0.69	[0.34, 1.41]	0.28*	[0.07, 1.05]
Country [ref=England]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Wales	0.94	[0.74, 1.19]	0.74**	[0.59, 0.93]	1.05	[0.79, 1.42]
Scotland	0.87	[0.62, 1.21]	0.90	[0.72, 1.13]	0.85	[0.55, 1.32]
N Ireland	0.62**	[0.47, 0.82]	0.79*	[0.63, 1.00]	0.65**	[0.44, 0.96]
Observations	12,436		12,436		12,436	

7.3.2 Context at 11 years old and SWB at 11 years old

Before moving on to a multivariate analysis of the associations between family and socio-economic factors at nine months and children's SWB at 11 years old, it is useful as a baseline to look at the cross-sectional associations at 11 years old. This is helpful because the analysis here takes a more focused approach than that in the previous cross-sectional analysis of the fifth sweep (Patalay & Fitzsimons, 2016; Rees & Bradshaw, 2016) discussed earlier.

Results of this analysis are presented in Table 7.3. There is some evidence of the influence of family economic factors. The measure of material deprivation and/or the measure of family financial strain contributes significantly to all three models with

children experiencing higher levels of deprivation tend to have lower SWB. The equivalised income quintile variable does not contribute to the models at the 99% confidence level, but this is discussed further below. None of the other variables make a significant contribution at this level of confidence, although there are a few scattered significant coefficients at the 95% confidence level. Primarily then it is direct measures of household economic status, rather than other socio-economic variables such as parental education and variables relating to the characteristics of the household that have most power in predicting low SWB. There is no clear evidence here that economic factors affect any one component of SWB more or less than another.

The results match the earlier cross-sectional studies in finding a lack of a significant effect of household income once a range of other factors are taken into account. However this flat approach to cross-sectional analysis may conceal the indirect role that income could play in contributing to some of the other factors. For example, income is likely to have an effect on family financial strain and material deprivation. This is not directly relevant to the research questions being explored in this dissertation, but it would be incorrect to conclude from the above analysis that income does not matter for children's SWB, especially because of the bivariate patterns shown in Table 7.1. Future cross-sectional work might use path analysis to gain a more complete picture of the role of different socio-economic variables in predicting children's SWB.

Table 7.3: Logistic regressions of SWB variables onto control variables and context variables measured at 11 years old

	Model 7b(1) Low life satisfaction		Model 7b(2) Low happiness		Model 7b(3) High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Income quintile						
[ref=lowest]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Second	1.08	[0.73, 1.60]	0.94	[0.69, 1.27]	1.04	[0.80, 1.35]
Third	1.22	[0.80, 1.87]	0.72*	[0.51, 1.01]	0.99	[0.72, 1.36]
Fourth	0.98	[0.59, 1.62]	0.73	[0.48, 1.11]	0.98	[0.67, 1.43]
Highest	1.04	[0.56, 1.96]	0.72	[0.44, 1.16]	0.90	[0.58, 1.39]
Financial status						
[ref=comfortable]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Alright	1.37*	[0.96, 1.96]	1.37**	[1.05, 1.78]	1.06	[0.89, 1.27]
Getting by	1.53**	[1.08, 2.18]	1.15	[0.88, 1.52]	1.04	[0.86, 1.26]
Difficult	1.37	[0.88, 2.13]	1.19	[0.86, 1.64]	1.14	[0.89, 1.46]
Material deprivation score [ref=None]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
One	1.07	[0.83, 1.38]	1.14	[0.93, 1.39]	1.32**	[1.09, 1.60]
Two	1.24	[0.92, 1.66]	1.24	[0.93, 1.65]	1.23**	[1.01, 1.51]
Three or more	1.35*	[0.94, 1.93]	1.26	[0.91, 1.74]	1.37**	[1.07, 1.77]
No parent in paid work	0.87	[0.63, 1.19]	1.01	[0.77, 1.32]	1.12	[0.90, 1.40]
Owner-occupied housing	0.81*	[0.64, 1.04]	0.99	[0.79, 1.26]	0.91	[0.75, 1.09]
Education [ref=none]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
NVQ Level 1	1.15	[0.78, 1.71]	1.20	[0.84, 1.72]	1.09	[0.83, 1.43]
NVQ Level 2	0.92	[0.64, 1.32]	1.03	[0.77, 1.38]	1.08	[0.86, 1.34]
NVQ Level 3	1.06	[0.68, 1.64]	0.95	[0.66, 1.37]	1.10	[0.82, 1.49]
NVQ Level 4	0.86	[0.56, 1.31]	1.13	[0.81, 1.57]	1.25*	[0.97, 1.61]
NVQ Level 5	0.85	[0.51, 1.41]	1.04	[0.70, 1.56]	1.05	[0.74, 1.49]
Overseas	0.87	[0.41, 1.85]	0.94	[0.56, 1.55]	1.15	[0.78, 1.71]
Main parent age at birth [ref=under 21]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
21 to 25	0.88	[0.64, 1.20]	0.88	[0.66, 1.17]	0.94	[0.74, 1.18]
26 to 30	0.86	[0.61, 1.21]	1.00	[0.77, 1.29]	0.94	[0.75, 1.19]
31 to 35	0.86	[0.60, 1.23]	1.05	[0.77, 1.43]	0.99	[0.77, 1.26]
36 and over	0.96	[0.64, 1.45]	1.10	[0.78, 1.55]	0.99	[0.73, 1.35]
One-parent household	1.40*	[0.98, 2.01]	1.10	[0.81, 1.49]	1.16	[0.90, 1.50]
Number of people	0.98	[0.77, 1.24]	0.89	[0.71, 1.11]	1.08	[0.90, 1.30]
Number of children	1.10	[0.84, 1.44]	1.20	[0.93, 1.55]	1.04	[0.85, 1.27]
Observations	11,790		11,790		11,790	

Key: * denotes p<0.05; ** denotes p<0.01

7.3.3 Context at nine months old and SWB at 11 years old

The third step in the analysis was to test whether the independent context variables measured when the child was nine months old made a significant contribution to predicting children's SWB at the age of 11. Results of logistic regressions including all the context variables measured at nine months old plus control variables are summarised in Table 7.4. The key point here is how few of the variables make a significant contribution to the model. Children not living in owner-occupied housing, and children whose families were finding things more difficult financially, at nine months old had a higher likelihood of low life satisfaction at 11 years old. The only early childhood factor that predicted likelihood of children having low happiness at the 99% confidence level was that children living with a greater number of children nine months old were more likely to be unhappy at the age of 11. There were more marginal effects (95% confidence) for living with a young main parent and living in smaller households. For sadness, lower income and living in owner-occupied housing at nine months old predicted high sadness at the age of 11 years old. In summary there is only a small amount of evidence that children's life satisfaction, happiness and sadness at the age of 11 years old is linked to their family characteristics and socio-economic circumstances in very early childhood, even when not taking current circumstances into account. On the other hand, it is perhaps notable that early childhood circumstances have any association with simple binary variables of children's life satisfaction, happiness and sadness ten years later.

Table 7.4: Logistic regressions of SWB variables onto control variables and context variables measured at nine months old

	Model 7c(1) Low life satisfaction		Model 7c(2) Low happiness		Model 7c(3) High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Income quintile						
[ref=lowest]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Second	1.14	[0.82, 1.57]	0.95	[0.72, 1.25]	0.94	[0.64, 1.38]
Third	1.02	[0.70, 1.49]	0.86	[0.61, 1.23]	0.73	[0.48, 1.12]
Fourth	1.02	[0.69, 1.52]	0.91	[0.65, 1.28]	0.62**	[0.39, 0.99]
Highest	0.94	[0.61, 1.45]	0.94	[0.63, 1.39]	0.62*	[0.37, 1.02]
Financial status						
[ref=comfortable]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
Alright	1.23*	[0.96, 1.57]	0.97	[0.79, 1.19]	0.87	[0.64, 1.18]
Getting by	1.44**	[1.09, 1.89]	1.09	[0.89, 1.35]	0.95	[0.68, 1.34]
Difficult	1.32*	[0.92, 1.89]	1.10	[0.82, 1.48]	0.72*	[0.47, 1.11]
No parent in paid work	1.04	[0.73, 1.49]	0.92	[0.69, 1.24]	1.01	[0.67, 1.52]
Education [ref=none]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
NVQ Level 1	1.18	[0.80, 1.74]	1.27	[0.89, 1.81]	1.36	[0.85, 2.16]
NVQ Level 2	0.90	[0.63, 1.28]	1.00	[0.73, 1.36]	1.23	[0.83, 1.81]
NVQ Level 3	0.95	[0.65, 1.39]	0.96	[0.69, 1.35]	1.12	[0.74, 1.71]
NVQ Level 4	0.88	[0.59, 1.30]	0.98	[0.71, 1.37]	1.02	[0.66, 1.55]
NVQ Level 5	0.88	[0.50, 1.56]	0.90	[0.54, 1.50]	0.89	[0.40, 1.95]
Overseas	0.97	[0.51, 1.85]	1.22	[0.75, 1.99]	1.62	[0.79, 3.34]
Owner-occupied housing	0.75**	[0.58, 0.97]	0.96	[0.79, 1.18]	0.66**	[0.48, 0.91]
Main parent age at birth						
[ref=under 21]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]	1.00	[1.00, 1.00]
21 to 25	0.88	[0.63, 1.24]	0.78*	[0.58, 1.05]	0.98	[0.63, 1.53]
26 to 30	0.88	[0.61, 1.28]	0.80	[0.60, 1.08]	1.05	[0.69, 1.59]
31 to 35	0.86	[0.58, 1.27]	0.78	[0.56, 1.10]	1.14	[0.73, 1.80]
36 and over	0.92	[0.59, 1.45]	0.78	[0.52, 1.16]	1.05	[0.61, 1.80]
One-parent household	1.08	[0.77, 1.51]	1.10	[0.82, 1.48]	0.97	[0.64, 1.49]
Number of people	1.04	[0.88, 1.23]	0.88*	[0.76, 1.03]	1.04	[0.87, 1.24]
Number of children	1.01	[0.83, 1.23]	1.24**	[1.04, 1.48]	0.98	[0.78, 1.23]
Observations	11,915		11,915		11,915	

Key: * denotes p<0.05; ** denotes p<0.01

7.3.4 Context at nine months and 11 years old and SWB at 11 years old

The final step in this part of the analysis was to test whether any of the variables at nine months old made a significant contribution to predicting children's SWB at 11 years old once family and socio-economic circumstances at that later age are also taken into account. Logistic regressions were run including all of the variables in Table 7.4

plus the context variables at the age of 11 years old listed earlier with the exception of the main parent's academic qualifications. Tests indicated that there may be issues of multicollinearity including this variable from both sweeps and this is perhaps not surprising as many adults' level of educational qualification will not change that much. Results (not shown) indicate that only one context variable from the first sweep made a significant contribution to any of the models. This was that children not living at nine months old in owner-occupied housing had greater likelihood of high sadness at the age of 11 years old even once their circumstances at 11 years of age are taken into account. When using alternative versions of the binary variables (see Table 6.2 for details) the only different conclusions were that (a) housing tenure did not significantly contribute to high sadness using Version 2 of this variable; and (b) living with a main parent with NVQ Level 1 (but not other levels) at nine months old was associated with higher odds of low happiness than living with a main parent with no qualifications when using Version 2 of this dependent variable.

In conclusion, and particularly given the variability in findings when considering alternative versions of the dependent variables, there was no firm evidence of family and socio-economic factors at nine months old having a direct effect on children's SWB at 11 years old at the 99% confidence level once the same factors at 11 years old are controlled for. Nevertheless, these early childhood factors will have some indirect effect on children's later SWB as, for example, there is an association between the occurrence of poverty in early childhood and the likelihood of poverty at later ages. This conclusion leaves open the hypothesis that persistence of factors such as poverty may still have an impact on children's later SWB. However, an analysis undertaken while working on this dissertation and published as a journal article (Rees, 2017a) found no evidence to support this hypothesis either.

7.4 Comparing results for SWB and mental health problems

The final part of the analysis in this chapter compares the explanatory power of the independent variables considered above in predicting subjective well-being and mental health problems (MHP). As discussed in Chapter 3 there are two reasons why this is of interest. First, running tests using the SDQ measure of MHP can verify the explanatory power of the independent variables being used, as it has been established

through previous research that there is substantial socio-economic variability in children's MHP. Second, comparing results for SWB and MHP can provide an insight into the extent to which the factors differ in their etiology. This can in turn clarify the value of distinguishing between positive and negative measures of mental health, as proposed by positive psychologists.

Table 7.5 shows the results of linear regressions of the four-item cognitive SWB variable and the SDQ total difficulties score onto the context variables at nine months old and 11 years old, plus control variables. The two dependent variables were rescaled so that their possible values ranged from zero to ten to aid comparability of findings. Due to space considerations only independent variables which made a significant contribution to one or both models are shown in the table. The first point to note about these results is the large difference in explanatory power of the two models. The independent variables considered explained less than 3% of the variation in children's cognitive SWB at the age of 11 years old compared to almost 15% of their SDQ scores at the same age. The higher explanatory power for the MHP variable confirms that the relative lack of significant findings in the models discussed earlier in this chapter cannot wholly be attributed to inadequacies in the independent variables. The difference in explanatory power between the two models provides support for the idea that subjective well-being and negative mental health indicators are not measuring the same concept.

Looking in a little more detail at the results[23], the findings for SWB confirm those in the logistic regression models discussed earlier. Once information on the contemporaneous circumstances of children's lives is taken into account, early childhood circumstances do not have any additional explanatory power in terms of children's levels of cognitive SWB at the age of 11 years old. In comparison, it is interesting to note that the main parent's level of educational qualifications, the extent of household financial difficulties, and housing tenure, all measured when the child is nine months old, are

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[23] All the differences between the two models noted in this and the next paragraph were tested by running a multivariate regression, using the *mvreg* comand in Stata, and then testing the null hypothesis that each relevant pair of coefficients was equal. In all cases the null hypothesis was rejected. It is not possible within Stata to run multivariate regressions with the svy command, so these results do not take full account of the survey design, but weights for the data set were used.

significant predictors of their MHP at the age of 11 years old, even after family and socio-economic circumstances at that age are taken into account. This suggests that early childhood disadvantage has a different relationship with the development of mental health problems than with subjective well-being.

Some of the differences between the two models in relation to the control and fifth sweep variables are also noteworthy. Boys had a significantly higher likelihood of MHP but there was no significant gender difference in SWB. There were also differential patterns for children of Black British origin and those living in Scotland and Northern Ireland. Both household income and financial difficulties were significant predictors of MHP whereas only the latter was a significant predictor of SWB. Children living in a lone-parent family had significantly lower SWB than children living with both birth parents but did not have significantly higher MHP.

Table 7.5: Linear regressions of cognitive SWB and SDQ total difficulties score onto control and context variables

	Model 7d Cognitive SWB		Model 7e Total difficulties	
	b	CI (99%)	b	CI (99%)
Control variables				
Female	-0.04	[-0.18,0.10]	-0.34**	[-0.42,-0.26]
Age in months	0.02**	[0.01,0.04]	-0.02**	[-0.03,-0.01]
Ethnic group [ref=White]				
Mixed	0.24	[-0.16,0.64]	-0.05	[-0.33,0.23]
Indian	0.27	[-0.10,0.63]	-0.10	[-0.36,0.16]
Pakistani/Bangladeshi	0.41**	[0.03,0.78]	-0.19**	[-0.37,-0.02]
Black British	0.23	[-0.37,0.82]	-0.56**	[-0.86,-0.26]
Other	0.05	[-0.73,0.83]	-0.14	[-0.43,0.15]
Country [ref=England]				
Wales	0.11	[-0.07,0.29]	-0.07	[-0.18,0.04]
Scotland	0.14	[-0.10,0.39]	-0.12*	[-0.24,0.00]
N Ireland	0.42**	[0.22,0.63]	-0.14*	[-0.28,0.00]
Wave 5 (11 years old)				
Income quintile [ref=lowest]				
Second	0.03	[-0.28,0.34]	-0.14	[-0.33,0.05]
Third	-0.04	[-0.39,0.30]	-0.33**	[-0.56,-0.11]
Fourth	0.02	[-0.38,0.42]	-0.46**	[-0.72,-0.20]
Highest	-0.06	[-0.47,0.36]	-0.51**	[-0.79,-0.23]
Financial status [ref=comfortable]	0.00	[0.00,0.00]	0.00	[0.00,0.00]
Alright	-0.21**	[-0.40,-0.02]	0.09*	[-0.02,0.20]
Getting by	-0.36**	[-0.57,-0.16]	0.25**	[0.13,0.37]
Difficult	-0.40**	[-0.66,-0.14]	0.51**	[0.36,0.67]
No parent in paid work	0.05	[-0.22,0.33]	0.32**	[0.15,0.49]
Household type [ref=Both birth parents]	0.00	[0.00,0.00]	0.00	[0.00,0.00]
Step-family	-0.50**	[-0.77,-0.23]	0.35**	[0.19,0.52]
Lone-parent	-0.43**	[-0.69,-0.18]	0.07	[-0.10,0.23]
Other	-0.95*	[-2.12,0.22]	0.82*	[-0.10,1.74]
Wave 1 (nine months old)				
Financial status [ref=comfortable]				
Alright	-0.02	[-0.18,0.13]	0.04	[-0.07,0.14]
Getting by	-0.11	[-0.29,0.07]	0.21**	[0.07,0.34]
Difficult	-0.01	[-0.31,0.29]	0.20**	[0.02,0.38]
Education [ref=none]				
NVQ Level 1	-0.11	[-0.48,0.26]	-0.10	[-0.33,0.13]
NVQ Level 2	0.05	[-0.24,0.33]	-0.13	[-0.31,0.06]
NVQ Level 3	0.04	[-0.26,0.34]	-0.15*	[-0.34,0.03]
NVQ Level 4	-0.00	[-0.31,0.31]	-0.23**	[-0.43,-0.04]
NVQ Level 5	-0.13	[-0.55,0.28]	-0.21*	[-0.45,0.03]
Overseas	-0.00	[-0.48,0.48]	-0.14	[-0.44,0.17]
Owned housing	0.09	[-0.12,0.30]	-0.12**	[-0.23,-0.00]
Observations	11,807		11,807	
Adjusted R-squared	2.5%		14.8%	

Overall this analysis suggests that there are significant and substantively important differences in the extent to which various current and historical family and socio-economic factors predict children's level of SWB and their mental health problems at the age of 11 years old. This analysis fills an important gap in the research evidence on children's SWB. However, using the first wave of the MCS it has only been possible to look at contextual factors in early childhood and not at process factors such as the nature of parent-child relationships. It is possible that this latter type of factor will have greater explanatory power in terms of children's later SWB. The next chapter explores this possibility utilising data from the second sweep of the MCS carried out when children were around three years old.

Chapter 8: Parent-child relationships at three years old and children's subjective well-being at 11 years old

The previous chapter explored the links between children's contextual circumstances (socio-economic and family characteristics) at nine months old and their SWB at 11 years old. The analysis found some evidence of an association between disadvantage in very early childhood and SWB at the age of 11. However this association disappeared once the child's context at the age of 11 years old was taken into account. The conclusion from this analysis is that very early childhood contextual circumstances have little or no direct impact on later SWB, although they are related to children's later circumstances which do in turn have some impact on SWB.

While this analysis provides fairly conclusive evidence that early childhood contexts do not have a great influence on children's later SWB, what is missing is a consideration of children's early relationships with their parents and their later SWB. This chapter addresses this issue. The first sweep of the MCS contained very limited information about the quality of parent-child relationships at nine months old. So this chapter instead utilises data from the second sweep, which contains a wider array of measures gathered when the child was around three years old.

There is substantial evidence that children's relationships with their parents in early childhood have far-reaching effects. A strong strand of this evidence emanates from attachment theory (Bowlby, 1969; 1988). A review by Ranson and Urichuk (2008) demonstrates the strength of association between parent-child attachment relationships and a range of later outcomes including social-emotional competence, cognitive functioning and physical and mental health. A number of analyses of the MCS data have found evidence of links between various aspects of early parent-child relationships and child well-being (in the broad sense of the term) (e.g. Flouri, Tzavidis & Kallis, 2010; Malmberg & Flouri, 2011; Kiernan & Huerta, 2008; Kiernan & Mensah, 2011). However there has been no analysis, using the MCS data, of the relationship between these early childhood factors and children's SWB; and, in fact, very little analysis of this topic using other data in the UK or other countries either. This chapter aims to address this gap.

In Chapter 4, an analytical framework was presented, drawing on ideas from Bronfenbrenner's ecological system of child development. The framework distinguished between contexts (of the kind considered in the previous chapter) and the processes involved in close relationships which will be the primary focus of this chapter. At the age of three years old, the most important close relationships for the large majority of children will be within their family. So the focus here will be on family relationships. More specifically, given the data available within the MCS, the focus will be on the relationship between the child and their primary carer, as it is this person who provided a lot of the information for the study.

Bronfenbrenner (1994) argued that proximal processes have a greater direct bearing on child development than the more distal contextual factors. Context often influences child development indirectly through its impact on proximal processes. In relation to children's SWB some support for this argument is provided by Rees and Bradshaw (2016), using the same data set and SWB variables as is used here, which found that children's reports of the quality of their close relationships with family and peers at the age of 11 years old were stronger predictors of their SWB at that age than a range of socio-economic factors (reported by parents). On this basis, while the previous chapter did not find a link between early childhood contexts and children's later SWB, it is still possible that proximal processes in early childhood will have some impact on later SWB.

The analysis will look at a range of available information from the main parent about conflicts and closeness in their relationship with the child, about disciplinary practices and also about the general atmosphere within the home. The associations between these aspects of children's lives at the age of three years old and their SWB at the age of 11 years old will be explored. Additionally, as discussed in Chapter 4, Section 4.2.2, Bronfenbrenner emphasises the need to pay attention to interactions between contexts and processes. In context of the analysis to be presented below it is possible that certain aspects of parent-child relationships when the child is three years old may have a differential impact on children's later SWB depending on the context within which they occur. The analysis will therefore also consider such possible interactions. Two contextual variables are selected for this purpose – household income and family

structure. This will enable an examination of whether aspects of parent-child relationships are more or less powerful predictors of later SWB in economically richer or poorer households and in different types of families. This is relevant for the reasons outlined in Chapter 4 that there may be 'ecological niches' whereby particular process factors have a larger impact in some contexts than others. In terms of the factors to be considered in this chapter it could be, for example, that strong early parent-child relationships play a particularly important positive role in more disadvantaged families, protecting children from some of the long-term impacts of poverty. This hypothesis will be explored in the analysis below. As in the previous chapter, the main aim here will be to investigate whether information about children's lives at three years old can explain variation in their SWB at 11 years old, after taking into account information about children's lives at the latter age.

The structure of the chapter is similar to the previous one. First, some information will be provided about the measures from the second and fifth sweeps of the survey to be used in the analysis and the relationships between them. Next, the extent to which information about processes and contexts at the age of three years old can predict SWB at the age of 11 years old will be explored. Then, additional information about children's lives at the age of 11 years old will be introduced and the analysis will evaluate whether the information at three years old still has any predictive power on SWB at the age of 11 once this contemporaneous information is taken into account.

All of the data in this chapter uses, as a starting point, 11,141 cases for which there was second sweep data available and for which data on SWB was available at the age of 11 years old. For reasons already discussed in Section 6.2, imputation methods are not appropriate for these sources of missing data. However imputation has been used to address levels of missing data for some of the independent variables used in the analysis as discussed below.

8.1 Measures

8.1.1 Process measures at three years old

The second sweep of the MCS included the 15-item Child-Parent Relationship Scale (Short Form) (Pianta, 1995). Sample items are 'I share an affectionate, warm relationship with [child]' and '[child] easily becomes angry with me'. The items are

considered to consist of two sub-scales relating to conflicts and closeness and both sub-scales have good statistical reliability (Johnson et al., 2012). The two sub-scales provided as derived variables in the MCS data set based on responses from the main parent are used here. The conflict scale ranged from zero to 32 and the closeness score from zero to 28. Three additional scales were used based on work undertaken on the MCS data by Barnes et al. (2014). Two of these scales are about the main parent's use of discipline. One related to 'withdrawal of attention' (two items about withdrawal of attention and treats as sanctions) and the other to 'overt punishment' (three items about smacking, shouting and telling off). The third scale consisted of three questions about lack of organisation in the home environment (e.g. 'the atmosphere in our home is calm'). Descriptive statistics are shown in Table 8.1.

Table 8.1: Process variables (at three years old): Descriptive statistics

Variable	Range	Mean	SD	Valid	% Missing
Pianta conflicts	0 – 32	9.10	5.87	9,753	12.4%
Pianta closeness	0 – 28	26.59	2.33	9,576	14.1%
Discipline – withdrawing	0 – 8	3.50	2.11	9,658	13.3%
Discipline – overt	0 – 12	6.38	2.36	9,591	13.9%
Home organisation	0 – 12	5.26	1.44	11,140	<0.1%

Bivariate correlations between these five variables are shown in Table 8.2. All but one of the correlations were statistically significant and of weak to moderate size. The strongest associations were between the three scales related to conflicts and discipline. There was no association between the closeness scale and discipline-withdrawing.

Table 8.2: Process variables (at three years old): Bivariate correlations (Pearson)

Variable	Pianta conflicts	Pianta closeness	Discipline withdrawing	Discipline overt
Pianta closeness	-0.268**			
Discipline – withdrawing	0.282**	0.012		
Discipline – overt	0.368**	-0.074**	0.405**	
Home organisation	0.146**	-0.096**	0.039**	0.025**

denotes p<0.01; ** denotes p<0.001

As can be seen from Table 8.1, there were substantial levels of missing data for four of the five variables. Additionally these missing values were distributed across a larger number of cases so that in total around 21% of cases had missing values for at least one

variable, but only around 9% of cases had missing values for all five variables. Because the levels of missing data for these independent variables are much higher here than for those in the previous chapter, multiple imputation has been used in the logistic regression analysis. This was carried out using the *mvn* option of the *mi impute* procedure in Stata. This option uses Markov Chain Monte Carlo methods. An underlying assumption of these methods is that the data is normally distributed (von Hippel, 2013). This assumption is not fulfilled with the SWB variables being used in this analysis. However von Hippel reports that possible modifications to take account of non-normal distributions may create more biases rather than reduce bias; and concludes that, until alternative imputation procedures are made available in the future, the use of the method adopted here is reasonable. Johnson and Young (2012) also report, on the basis of simulation studies, that the detailed choices between specific modern imputation methods 'had minor effects on the estimates and substantive conclusions' (ibid, p. 926). The use of auxiliary variables to contribute towards imputation was considered. However the obvious auxiliary variables showing significant associations with patterns of missing data in the above five variables were household income and number of parents in the household. As these variables were also going to be included in the estimation models it is not recommended also to use them as auxiliary variables for imputation purposes (Allinson, 2009). Twenty imputations were calculated because more than ten imputations are recommended to improve the stability of the estimates (Johnson & Young, 2012), and this has become increasingly practical to achieve with modern computing capabilities.

8.1.2 *Context measures at three years old*

Two context variables at three years old were considered in this analysis – household income and household structure. For income, two alternative variables were used for different purposes as will be explained later. One was the equivalised household income quintile and the other was a binary variable indicating whether the household was in poverty (below 60% of median income). Around a third (33%) of households were below the poverty threshold. For family structure, for children of this age there are still only two main family forms – both birth parents (77% of unweighted sample) and one birth parent (19%). Only around 2% of children lived in a step-family. So a binary variable was used for family structure indicating whether one (19%) or two

parents/carers (81%) lived in the household. More than three-quarters (76%) of one-parent households were in poverty compared to less than a quarter (23%) of two-parent households.

8.1.3 Relationship between process and context measures at three years old

The relationships between the process and context measures were tested using simple linear regressions (equivalent to robust t-tests when using complex survey data) (Table 8.3). Parents were likely to report higher conflicts with, and lower closeness to, their child in one-parent households and in households in poverty. However the difference in mean scores for the closeness variable were very modest. There was no evidence of differences in discipline practices according to family structure and only a very modest difference for the use of overt discipline according to poverty status.

Table 8.3: Associations between process and context variables (at three years old)

Variable	Pianta conflicts	Pianta closeness	Discipline withdrawing	Discipline overt	Home dis-organisation
Family structure	**	**	ns	ns	**
One parent	10.52	26.21	3.66	6.44	5.51
Two parents	9.21	26.54	3.52	6.43	5.29
Poverty	**	**	ns	*	**
No	9.07	26.69	3.55	6.47	5.17
Yes	10.25	26.02	3.53	6.34	5.65

denotes p<0.01; ** denotes p<0.001

8.1.4 Process variables at 11 years old

Unfortunately the MCS contains relatively few variables relating to proximal processes when the child is 11 years old. The analysis here will focus on three measures reported by parents that were utilised in Rees and Bradshaw (2016) and were found to have significant associations with children's SWB. The first is a single-item binary measure of whether the parent said they had frequent battles with the child. Around 29% of parents answered 'yes' to this question. The second is a question about how close the parent felt to the child. There were four response categories in the original question but two were combined for the analysis due to small numbers of cases in one category. Around 7% of parents said they felt 'not very' or 'fairly' close to the child; 34% said 'very close'; and 59% said 'extremely close'. The third variable used is a measure of a count of how many of seven permissive behaviours (e.g. not implementing a regular

bedtime for children on weekdays) the parent engaged in. Around 65% of parents engaged in none of the seven behaviours, 23% in one and 12% in more than one.

8.1.5. Relationship between process measures at three and 11 years old

The relationships between the process measures were tested using binary and ordered logistic regressions (Table 8.4). There were statistically significant relationships between all five process measures at three years old and all three process measures at 11 years old. For example, the Pianta conflicts score when the child was aged three years old was much higher (3.6 points difference on a 32-point scale) where the parent reported frequent battles with the child when they were 11 years old than when they did not. This suggests, as might be expected, a degree of continuity of parent-child relationships between when the child was three years and 11 years old

Table 8.4: Associations between process variables at three and 11 years old

Variable	Pianta conflicts	Pianta closeness	Discipline withdrawing	Discipline overt	Home dis-organisation
Frequent battles	**	**	**	**	**
No	8.32	26.65	3.36	6.12	5.27
Yes	11.97	26.21	4.06	7.20	5.43
Closeness to child	**	**	**	**	**
Not very/fairly	12.28	25.48	4.05	7.15	5.55
Very	10.22	26.34	3.73	6.66	5.35
Extremely	8.68	26.73	3.42	6.23	5.28
Permissive parenting	**	**	**	**	**
None	9.20	26.60	3.61	6.38	5.21
One	9.98	26.37	3.52	6.58	5.46
More than one	10.31	25.99	3.31	6.47	5.75

denotes $p<0.01$; ** denotes $p<0.001$

8.1.6 Context variables at 11 years old

The context variables included at 11 years old were the same as those listed in the previous chapter. Note here that the main parent's level of educational qualifications when the child was 11 years old was included in the analysis because this was not included as one of the context variables when the child was three years old, so there are no issues with multicollinearity.

Control variables were the same as those used in the analysis in the previous chapter – child's age, gender, ethnicity and country of residence.

8.2 Bivariate analysis

The next step in the analysis was to investigate the extent to which the five process variables at three years old individually predicted each of the SWB variables at 11 years old – that is, to what extent do the quality of parent-child relationships at three years old predict children's life satisfaction, happiness and sadness eight years later? Results of logistic regressions using single independent variables are shown in Table 8.5. Each of the five process variables significantly predicted the odds of low life satisfaction at the age of 11 years old, although the strength of the association was modest for parent-child closeness at the age of three years old. Most of the process variables also predicted the odds of low happiness at the age of 11 years old, with the exception of the use of withdrawing disciplinary practices at three years old. There was less evidence of an association between parent-child relationships at three years old and children feeling sad at 11 years old. The relationships were only significant at the 95% confidence level for the conflicts, closeness and overt discipline variables.

Table 8.5: Associations between process variables at three years old and subjective well-being at 11 years old

Variable	Pianta conflicts	Pianta closeness	Discipline withdrawing	Discipline overt	Home dis-organisation
Life satisfaction	**	*	**	**	**
High	9.33	26.51	3.52	6.38	5.30
Low	10.34	26.31	3.78	6.75	5.55
Happiness	**	**	ns	**	**
High	9.25	26.54	3.53	6.37	5.29
Low	10.33	26.25	3.67	6.71	5.48
Sadness	*	*	ns	*	ns
Low	9.39	26.52	3.54	6.41	5.32
High	10.21	26.23	3.71	6.60	5.43

* denotes p<0.05; ** denotes p<0.01

8.3 Multivariate analysis

Given that there is some evidence of significant bivariate associations between parent-child relationships when the child is three years old and the child's SWB when they are 11 years old, multivariate analysis was undertaken to explore these relationships

further. Logistic regressions predicting each of the three SWB variables were undertaken in three steps. First, the five process variables at three years old plus control variables were entered into the models. Then, the two context variables when the child was three years old were added. Finally, the context and process variables when the child was 11 years old were added. Control variables are included in all models but are not shown in the tables due to space considerations.

8.3.1 Process variables at three years old

Table 8.6 summarises the results of logistic regression for each of the three SWB binary dependent variables with the process variables at three years old as independent variables. Two of the process variables – overt forms of discipline and the level of home disorganisation – uniquely predicted the odds of low life satisfaction at the age of 11 years old. Children who were more often overtly disciplined (smacked, shouted at or told off) and lived in less organised households when they were three years old had a higher probability of low life satisfaction at the age of 11. These two variables plus less parent-child closeness uniquely predicted low happiness. None of the process variables contributed to predicting high levels of sadness.

Table 8.6: Logistic regression of SWB variables onto parent-child relationships at the age of 3

	Model 8a(1) Low life satisfaction		Model 8a(2) Low happiness		Model 8a(3) High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Pianta conflicts	1.02*	[1.00,1.04]	1.02	[1.00,1.04]	1.01	[0.99,1.04]
Pianta closeness	0.98	[0.95,1.02]	0.97*	[0.93,1.00]	0.97	[0.92,1.02]
Discipline – withdrawing	1.02	[0.97,1.08]	1.00	[0.96,1.05]	1.02	[0.95,1.09]
Discipline – overt	1.04	[0.98,1.09]	1.04**	[1.00,1.08]	1.03	[0.97,1.10]
Home disorganisation	1.11**	[1.04,1.18]	1.07**	[1.01,1.13]	1.04	[0.97,1.12]
Observations	11,306		11,306		11,306	

* denotes p<0.05; ** denotes p<0.01

8.3.2 Model 2: Process and context variables at three years old

Table 8.7 shows the logistic regressions with the introduction of the two context variables. Taking household income and family structure into account made some small differences to significance levels for the process variables but the odds ratios for these variables remained did not differ substantively in any of the three models. Additionally, household income contributed to predicting life satisfaction and sadness

but not happiness. Children living in poorer households at the age of three years old had higher odds of low life satisfaction and high sadness at the age of 11 years old, holding other variables in the model constant. Children living in one-parent households had higher odds of low life satisfaction, with 95% confidence, than children living in two-parent households; there was no significant association for happiness or sadness.

Table 8.7: Logistic regression of SWB variables onto parent-child relationships and family circumstances at the age of 3

	Model 8b(1) Low life satisfaction		Model 8b(2) Low happiness		Model 8b(3) High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Pianta conflicts	1.01	[0.99,1.03]	1.02	[1.00,1.03]	1.01	[0.98,1.03]
Pianta closeness	0.99	[0.95,1.03]	0.97*	[0.94,1.00]	0.97	[0.93,1.02]
Discipline – withdrawing	1.02	[0.97,1.08]	1.00	[0.96,1.05]	1.01	[0.95,1.08]
Discipline – overt	1.04*	[0.99,1.10]	1.04**	[1.00,1.08]	1.04	[0.97,1.10]
Home disorganisation	1.08**	[1.01,1.15]	1.06*	[1.00,1.16]	1.01	[0.94,1.09]
Income quintile						
Second	0.85	[0.64,1.13]	1.16	[0.88,1.50]	0.99	[0.70,1.38]
Third	0.69**	[0.51,0.94]	0.92	[0.70,1.20]	0.69*	[0.48,1.01]
Fourth	0.61**	[0.44,0.86]	0.87	[0.65,1.18]	0.62**	[0.43,0.90]
Highest	0.55**	[0.38,0.78]	0.93	[0.69,1.25]	0.57**	[0.38,0.86]
One-parent household	1.22*	[0.94,1.57]	1.15	[0.92,1.45]	1.20	[0.87,1.66]
Observations	11,256		11,256		11,256	

*denotes p<0.05; ** denotes p<0.01*

Models were run with interaction terms between the five process variables and each of the two context variables (for simplicity the poverty variable rather than income quintiles was used in this context). There was no evidence of significant interactions between process and context in terms of explaining SWB at the age of 11 years old. Thus for example, the relationship between overt discipline at the age of three years old and low life satisfaction at the age of 11 years old did not vary according to whether the household was in poverty or the number of parents/carers in the household when the child was three years old.

8.3.3 Introducing process variables at 11 years old

The analysis above established that the measures of parent-child relationships at three years old have some predictive power in terms of children's life satisfaction and

happiness at the age of 11 years old. The next step in the analysis is to look at whether this still holds true once information about parent-child relationships when the child is 11 years old is taken into account. Table 8.8 summarises analysis of this issue. Controlling for what is known from the MCS about parent-child relationships when the child is 11 years old, some process variables measured when the child was three years old still make a significant contribution to predicting low SWB at 11 years old. Children living in more disorganised homes at the age of three are more likely to have low life satisfaction at the age of 11 years old. Children living in such homes and also those who are subject to overt forms of discipline (smacking, being shouted at and told off) at the age of three are more likely to have low happiness at the age of 11. Again there was no link between parent-child relationships at the age of three years old and their likelihood of reporting high levels of sadness at 11 years old. Some or all of the parent-child relationship measures at the age of 11 also make a significant contribution to each of these models, in a similar way to that reported in Rees and Bradshaw (2016).

Table 8.8: Logistic regression of SWB variables onto parent-child relationships at the age of 3 and 11 years old

	Model 8c(1) Low life satisfaction		Model 8c(2) Low happiness		Model 8c(3) High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Second sweep (3 years old)						
Pianta conflicts	1.01	[0.99,1.03]	1.01	[0.99,1.03]	1.00	[0.98,1.03]
Pianta closeness	0.99	[0.95,1.03]	0.97	[0.93,1.01]	0.97	[0.92,1.02]
Discipline – withdrawing	1.02	[0.97,1.08]	1.00	[0.95,1.05]	1.01	[0.94,1.08]
Discipline – overt	1.03	[0.98,1.09]	1.04*	[1.00,1.08]	1.04	[0.98,1.11]
Home disorganisation	1.09**	[1.02,1.16]	1.06*	[1.00,1.12]	1.03	[0.95,1.12]
Fifth sweep (11 years old)						
Frequent battles w child	1.45**	[1.17,1.80]	1.32**	[1.12,1.57]	1.43**	[1.09,1.87]
Closeness to child						
Very	0.74*	[0.52,1.04]	0.67**	[0.50,0.91]	0.75	[0.47,1.20]
Extremely	0.66**	[0.47,0.92]	0.57**	[0.42,0.77]	0.73	[0.46,1.17]
Permissive parenting						
One	1.08	[0.87,1.35]	0.96	[0.78,1.18]	1.10	[0.83,1.46]
More than one	1.59**	[1.16,2.16]	1.38**	[1.08,1.78]	1.46*	[0.99,2.17]
Observations	10,383		10,383		10,383	

* denotes p<0.05; ** denotes p<0.01

8.3.4 Introducing context variables

A final step in this analysis involved also introducing context variables from the second and fifth sweeps into the models. For brevity, Table 8.9 shows results only for the process variables at three years old, but the models also included control variables, context variables at three years old and 11 years old, and process variables at 11 years old. Once this was done only one process variable at three years old made a significant contribution to any of the three models at the 99% confidence level. This was that overt forms of discipline at three years old still significantly predicted higher odds of low happiness at the age of 11 years old after taking into account information about parent-child relationships at the age of 11 and socio-economic and family circumstances at both ages. Home disorganisation at three years old also made a significant contribution with 95% confidence to predicting low life satisfaction at 11 years old. These results for the process variables at three years old did not differ substantively when different versions of the binary dependent variables were used.

Table 8.9: Logistic regression of SWB variables onto parent-child relationships at the age of 3 and 11 years old

	Model 8d(1)		Model 8d(2)		Model 8d(3)	
	Low life satisfaction		Low happiness		High sadness	
	OR	CI (99%)	OR	CI (99%)	OR	CI (99%)
Second sweep (3 years old)						
Pianta conflicts	1.01	[0.98,1.03]	1.01	[0.99,1.03]	1.00	[0.97,1.03]
Pianta closeness	1.00	[0.96,1.04]	0.97	[0.94,1.01]	0.98	[0.93,1.03]
Discipline – withdrawing	1.01	[0.96,1.07]	0.99	[0.95,1.04]	1.01	[0.94,1.08]
Discipline – overt	1.04	[0.99,1.10]	1.04**	[1.00,1.09]	1.05	[0.98,1.12]
Home disorganisation	1.06*	[0.99,1.14]	1.05	[0.98,1.11]	0.99	[0.91,1.08]
Observations	10,320		10,320		10,320	

* denotes p<0.05; ** denotes p<0.01

8.3.5 Summary of findings in this section

To summarise the results of this part of the analysis, there is some evidence that aspects of parent-child relationships at the age of three years old are predictive of children's SWB at the age of 11 years old. However, very few of these associations are statistically significant once process factors at 11 years olds, and contextual factors at three years old and 11 years old are taken into account. So there is very little evidence

that parent-child relationships at three years old directly affect children's SWB at 11 years old. However significant associations between aspects of parent-child relationships at the two ages were found (Table 8.4) such that children experiencing more negative relationships with parents at three years old were more likely also to be experience more negative relationships with parents at 11 years old. Thus, the quality of early relationships may have an indirect effect on later SWB through their links with the quality of later relationships. Additionally, no evidence was found of 'ecological niches' whereby early parent-child relationships may have a more important bearing on later SWB for some sub-groups of children on the basis of household income or family structure.

8.4 Comparing explanatory power for SWB and mental health problems

This final section of the chapter presents a comparison of the explanatory power of the independent variables for indicators of SWB and mental health problems. As in the previous chapter, this is done through two linear regressions to compare the explanatory power of these variables in relation to the four-item measure of cognitive SWB and the total difficulties score of the SDQ. Results are shown in Table 8.10.

For cognitive SWB the only contextual variable at either sweep that made a significant contribution to the model was family type. Children living in step- and lone-parent families had significantly lower SWB than those living with both birth parents. The findings for the process variables at three years old are broadly in line with those from the logistic regression models. None of these variables contributed to the model at the 99% confidence level, but greater conflicts and more overt disciplinary practices at three years old were associated with lower mean SWB at 11 years old at the 95% confidence level. All three indicators of the quality of the parent-child relationships at the age of 11 years old – frequent battles with the child, closeness to the child and frequency of permissive behaviours – also contribute to the model with 99% or 95% confidence.

Table 8.10: Linear regressions of cognitive SWB and SDQ total difficulties scores at age 11 onto process and context variables at age 3 and 11

	Model 8e Cognitive SWB		Model 8f Total difficulties	
	b	CI (99%)	b	CI (99%)
Second sweep process				
Pianta conflicts	-0.02*	[-0.05, 0.01]	0.13**	[0.09, 0.16]
Pianta closeness	-0.01	[-0.07, 0.06]	-0.13**	[-0.22,-0.05]
Discipline - withdrawing	-0.02	[-0.09, 0.05]	0.04	[-0.06, 0.13]
Discipline - overt	-0.06*	[-0.13, 0.01]	0.05	[-0.03, 0.13]
Home disorganisation	-0.05	[-0.16, 0.06]	0.23**	[0.11, 0.35]
Second sweep context				
Income quintile [ref=lowest]				
Second	0.05	[-0.48, 0.57]	0.26	[-0.37, 0.90]
Third	0.20	[-0.32, 0.72]	-0.30	[-0.99, 0.40]
Fourth	0.16	[-0.36, 0.69]	-0.50	[-1.21, 0.22]
Highest	0.41	[-0.16, 0.98]	-1.18**	[-1.92,-0.44]
One-parent household	-0.05	[-0.57, 0.48]	-0.01	[-0.57, 0.55]
Fifth sweep process				
Frequent battles	-0.85**	[-1.20,-0.50]	4.63**	[4.22, 5.04]
Closeness to child [ref=not very/fairly]				
Very close	0.50	[-0.21, 1.21]	-1.52**	[-2.36,-0.68]
Extremely close	0.88**	[0.20, 1.57]	-2.18**	[-2.96,-1.40]
Permissive behaviours [ref=none]				
One	0.02	[-0.32, 0.36]	0.14	[-0.21, 0.49]
More than one	-0.44*	[-0.92, 0.04]	0.86**	[0.25, 1.48]
Fifth sweep context				
Income quintile [ref=lowest]				
Second	-0.20	[-0.82, 0.43]	-0.02	[-0.79, 0.75]
Third	-0.34	[-1.08, 0.40]	-0.74*	[-1.63, 0.16]
Fourth	-0.19	[-0.97, 0.59]	-1.07**	[-2.11,-0.03]
Highest	-0.46	[-1.36, 0.43]	-1.18*	[-2.38, 0.01]
Parent's educational qualification [ref=none]				
NVQ Level 1	0.06	[-0.64, 0.76]	-0.34	[-1.15, 0.47]
NVQ Level 2	0.20	[-0.40, 0.79]	-0.42	[-1.06, 0.23]
NVQ Level 3	0.14	[-0.60, 0.89]	-1.04**	[-1.86,-0.21]
NVQ Level 4	0.10	[-0.55, 0.74]	-0.90**	[-1.63,-0.17]
NVQ Level 5	-0.02	[-0.81, 0.78]	-0.83*	[-1.68, 0.02]
Overseas only	0.22	[-0.84, 1.28]	-0.05	[-1.08, 0.98]
No parent/carer in paid work	-0.07	[-0.62, 0.48]	1.08**	[0.46, 1.71]
Household type [ref=Both birth parents]				
Step-family	-0.58**	[-1.11,-0.05]	1.31**	[0.73, 1.89]
Lone-parent family	-0.52**	[-1.01,-0.02]	0.32	[-0.25, 0.88]
Other	-0.25	[-2.11, 1.62]	4.99**	[0.85, 9.13]
Number of children in household	-0.07	[-0.41, 0.26]	-0.07	[-0.52, 0.37]
Number of people in household	0.07	[-0.16, 0.30]	-0.23	[-0.56, 0.10]
Owner-occupied housing	0.27	[-0.14, 0.69]	-0.18	[-0.72, 0.36]
Adjusted R squared	3.4%		32.0%	
Observations	10,489		10,489	

* denotes $p<0.05$; ** denotes $p<0.01$. Adjusted R^2 statistics were obtained using *mibeta* command

In contrast, a greater number of variables at both survey sweeps contribute to explaining variation in MHP at the age of 11 years old. Children who have more conflicts with their parent, are less close to the parent and live in a more disorganised home at three years old have higher MHP scores at 11 years old, taking other factors into account. High income when the child is three years old is associated with lower MHP scores at 11 years old. Indicators of parent-child relationships – frequent battles with the child, closeness and permissive parenting behaviours – at the age of 11 also contribute to explaining variation in MHP scores. Finally, living in higher income families; with a parent with lower educational qualifications; in households where no parent/carer is in paid employment; and in step-families and 'other' family types are all associated with higher MHP scores.

The most telling overall finding was that the two models have substantially different explanatory powers – all the variables combined explain less than 4% of the variation in cognitive SWB at the age of 11 years old, compared to around 32% of the variation in mental health problems. The quality of parent-child relationships when a child is three years old and 11 years old, plus family and socio-economic circumstances at these two ages, all contribute to predicting children's emotional & behavioural difficulties at the age of 11 years old to a far greater extent than is the case for predicting children's subjective well-being at 11 years old.

The final chapter in this part of the dissertation presents and discusses the key findings from the analysis presented in this and the previous chapter.

Chapter 9: Early childhood factors and children's later subjective well-being: Summary and discussion

This part of the dissertation has addressed the second key research question of the dissertation: To what extent are early and middle childhood factors associated with children's later subjective well-being? It has explored the extent to which a range of factors in early childhood (when the child was nine months old and three years old) are statistically associated with children's SWB at the age of 11, and the extent to which those statistical associations differ depending on the measure of SWB being used. It has also compared the relative extent to which the factors being considered contribute to explaining variations in SWB and mental health problems. It has extended the previous cross-sectional analysis of the MCS data in relation to children's SWB (Patalay & Fitzsimons, 2016; Rees & Bradshaw, 2016) and has added to the scarce longitudinal literature on this topic. The main focus of the analysis is, as explained in Chapter 4, Section 4.2.3, whether early childhood factors have a direct effect on children's later SWB over and above the effect of contemporaneous factors.

Most of the early childhood contextual and process factors considered showed a statistically significant relationship, at the bivariate level, with one or more of the components of children's SWB at the age of 11 years old. Children who lived in poor households when they were nine months old had a significantly greater likelihood of low life satisfaction, low happiness and high sadness when they were 11 years old than children who did not live in poor households. Similarly, there was a link between living in a less well organised home at three years old and having low life satisfaction and low happiness (but not high sadness) at 11 years old. The effect size of these associations was relatively small.

When these factors were considered jointly using logistic regression, a smaller number of significant associations remained. The key test of the explanatory power of these early childhood variables was when variables measured at 11 years old covering similar topics were also included in the regression models. The outcomes of this stage of the analysis was that no significant relationship between a contextual factor at nine months old and a SWB variable at 11 years old remained consistently across different versions of each binary measure. These findings are in line with those of Mostafa &

Platt (2013) who, using the MCS data, found inconclusive evidence of an effect of early childhood income poverty on SWB at the age of 11 years old in comparison with experiencing poverty at the age of 11. They are also consistent with the findings of Parkes et al. (2016) using data from the Growing Up in Scotland survey that found little evidence of the influence of earlier contextual factors on children's SWB at the age of seven years old.

Turning to the more extensive data gathered when children were three years old, some process factors regarding parent-child relationships at this age did show a significant association with SWB at the age of 11 years old after contemporaneous factors were taken into account. Children living in less organised homes at the age of three years old had a greater likelihood of low life satisfaction and low happiness at the age of 11 years old. These findings are consistent with those of Parkes et al. (2016) who found that measures of parenting two years previously made a significant contribution to predicting the life satisfaction at the age of seven years old in Scotland. However the influence of these variables was quite limited once contextual factors at three and 11 years old and process factors at 11 years old were taken into account.

The analysis provides two further insights. First, there was only limited evidence of differential associations between the independent variables and the three components of SWB. Thus there is little here to support the practical usefulness of the tripartite model with this age group. On theoretical grounds it would be expected that temporally distant factors should explain more of the variation in life satisfaction than in positive or negative affect, but there is not much evidence to support this hypothesis. There were some indications in Chapter 8 that parent-child relationships at three years old tended to predict children's feelings of sadness at the age of 11 years old less well than they did for happiness or life satisfaction. However, the fact that most of the associations being examined were, even when statistically significant, relatively weak for all three SWB variables means that this is not a particularly good testing ground for this question of the distinctiveness of the different components of the tripartite model.

More conclusively, the analysis demonstrates substantial differences between the extent to which early childhood factors explain variations in cognitive SWB and mental

health problems when children are 11 years old. The analysis indicates that these factors are much more powerful predictors of mental health problems than they are of SWB. For example, the information about children's lives at three years old and 11 years old included in the models predicted 32% of the variation in the measure of children's mental health problems compared to less than 4% of the variation in children's cognitive SWB. Some of the process factors at three years old continued to make a significant and substantive contribution to explaining later mental health problems even when contemporaneous factors were taken into account, which was not the case for SWB. These findings are consistent with and extend the cross-sectional analysis of MCS data by Patalay and Fitzsimons (2016) that used a similar technique.

The findings presented in this section have a number of implications which will be identified briefly here and discussed more fully in the concluding chapter. Some are issues which will be explored further in the analysis in subsequent chapters. From a conceptual and measurement point of view, the analysis provides mixed support for the adoption of the tripartite model of SWB with this age group, but much stronger support for the idea that positive well-being and mental health problems are distinct concepts.

From a policy and practical perspective, on the basis of the findings presented here, there seems limited potential to identify early childhood factors which can explain the extent to which children might feel satisfied with their lives or happy or sad at the age of 11 years old. There does not appear to be the same social stratification of child SWB as has been found for other child 'outcomes' of policy interest such as educational attainment or mental ill-health. This suggests that research, practice and policy attention should turn to other factors, and perhaps particularly those occurring closer in time to the point at which SWB is measured. Some of these issues will be explored further in the next part of the dissertation.

Part 4

Children's well-being between 11 and 15 years old

Chapter 10: Background, data and methods

This final analytical part of the dissertation is concerned with the third research question about the way in which children's SWB develops and changes between the ages of 11 and 15 years old and factors associated with these patterns. It uses data from two related studies – the Understanding Society survey (USS) (University of Essex, 2015) and its predecessor the British Household Panel Survey (BHPS) (University of Essex, 2010). This introductory chapter reviews the background and aims of this part of the dissertation, provides details of the studies and data preparation, and discusses the statistical methods used.

10.1 Background

The UK research literature on children's SWB between the ages of 11 and 15 years old was reviewed thematically in Chapter 3. Most of this research is based on cross-sectional analysis. Due to the availability of data, the published research has primarily focused on the cognitive component of SWB. This analysis shows only small associations between many contextual factors such as household income (Main & Bradshaw, 2012), family structure (Goswami, 2014) and children's life satisfaction. Main and Bradshaw show that a child-centred material deprivation index can explain much more of the variation in children's life satisfaction than household income. However, unfortunately, a measure of this kind is not available in the data sets used here. Information about children's lives such as their behaviours have also been shown to have significant but modest associations with their life satisfaction (Abdallah et al., 2014; Booker et al, 2014; Booker et al., 2015). Information about the quality of social relationships, including relationships with family, with friends, and experiences of being bullied by other young people (Goswami, 2012; Wolke & Skew, 2012) have much stronger cross-sectional associations with children's life satisfaction than contextual factors. For this reason, it is these types of factors that will be the focus of this part of the dissertation.

There have been a small number of studies using longitudinal analysis. These have demonstrated significant associations with children's cognitive SWB of family structural change (Robson, 2010); parental unemployment (Powdthavee & Vernoit,

2013); and household income (Knies, 2017). The effect sizes reported in these studies are quite modest[24] and tend to support the conclusions of cross-sectional analysis that these types of contextual factors can only explain small amounts of the variations in children's SWB. However these studies do provide a demonstration of the potential for using the additional analytical possibilities presented by longitudinal data to enhance understanding of the factors associated with variations in children's SWB. The analysis in this part of the dissertation uses a similar method (fixed effects modelling) to that used in these studies and also a second technique (latent growth curve modelling) which, as far as I am aware, has not previously been used in published UK research on children's SWB.

During the initial planning stages of this work the intention was also to make use of statistical methods such as cross-lagged panel models to evaluate the direction of influences between SWB and family relationships and bullying respectively. It was envisaged that this type of method might have been able to shed some light, for example, on whether children who were bullied were more likely to have lower SWB and/or whether children who had lower SWB were more likely to be bullied. However, this approach proved not to be possible for two reasons. The first is that the time lags between waves of data collection were either one or two years (depending on the data set and variables being considered). On reflection it did not seem likely that an experience of being bullied two years previously would have a strong association with current SWB, given all the other factors in children's lives over that period. Additionally, a key assumption of these types of models is that the two variables being analysed do not affect each other contemporaneously. This seems a very unlikely assumption in terms of the variables being considered here. To utilise these types of models effectively longitudinal data would be required for more than two waves over much shorter periods of time and this is a potential future direction for primary research on children's SWB.

The next two chapters will examine the extent to which the strong associations found between two factors – the quality of parent-child relationships and experiences of

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[24] In fact in the case of Knies (2017) significant household income effects are only found when using a 90% confidence interval.

being bullied by other children – that have been found in cross-sectional analysis are also present when making use of the additional potential of longitudinal data. In this way the analysis will make a significant new contribution to this field of research. The remainder of this chapter describes the data that is used and the way it was prepared for longitudinal analysis; also clarifies the rationale for the measure of SWB used in this part of the dissertation; and discusses the statistical techniques used.

10.2 The data sources and processing

The structures of the USS and BHPS data sets are very similar and the data preparation for the longitudinal analysis proceeded in a similar way for both. The initial data manipulation involved merging the data from the self-completion questionnaires (and some associated data about the household) for all waves and then creating two data sets for different types of analysis:

- A 'wide' data set where each case represents a person and their responses over the five waves are all contained within one row of the data file with a group of responses for each age.

- A 'long' data set where each case represents a specific wave and person, and the variables for each case include an indicator of both the age of the person and the wave of the survey to which the data relates.

The reason for merging data in this way is that neither of the studies has a large enough sample of a specific cohort of children to enable longitudinal analysis. Merging data for children from different waves according to age can provide a much larger sample. However, one consequence of this merging is that it is not straightforward to weight the data as the weightings provided in the original data sets relate to each wave not each age group. Using unweighted data means that the results of analysis are not necessarily generalisable to the child population of the UK as a whole. However there was no obvious solution to the weighting issue. A review of other analysis of similar data sets (BHPS and USS) was undertaken to try to identify best practice. Two articles were identified which used pooled BHPS data from children across waves in a similar way (Robson, 2010; Powdthavee & Vernoit, 2013). Both of these analyses used unweighted data. Given this precedent, and as the main purpose of the analysis is to

explore associations within the data rather than to make estimates of population prevalence, it was decided to proceed with analysis of pooled unweighted data. This issue will be acknowledged later in the discussion of results.

10.2.1 The restructured Understanding Society data set

In total the restructured USS data set contained just under 8,800 cases with a roughly even gender split (50.3% male, 49.7% female). A breakdown of the number and percentage of cases with different numbers of completed waves of data is shown in Table 10.1. There were relatively few cases (2.7%) with complete data for all five waves. This was not only due to attrition but also to do with children joining or leaving the age group of the survey. Because at the time when the analysis was undertaken there were only five waves available, children between 11 and 15 years old can only be included in all five waves if they were 11 years old during Wave 1 and also participated in all subsequent waves. There are around 4,000 cases per wave and just over 800 children were aged 11 years old in Wave 1 so this is the maximum number of children who could possible have complete data for all five waves. There are a total of 18,620 age-specific observations for these cases.

Table 10.1: Numbers of children participating in different numbers of complete waves of the Understanding Society survey youth questionnaire, Waves 1 to 5

No. of complete waves	No. of cases	% of cases
Five	238	2.7%
Four	1,032	11.7%
Three	1,673	19.0%
Two	2,430	27.6%
One	3,423	38.9%

There are quite high levels of missing waves as illustrated in Table 10.2 for children who were aged 11 in each of the first three waves. Less than half of children aged 11 years old in Wave 1 completed more than three waves of data. As a result of these patterns some consideration needs to be given to the potential consequences of missing data. This will be returned to below.

Table 10.2: Illustrative examples of incomplete participation across waves 1 to 3

Wave in which child was aged 11 years old	% of waves for which data is available				
	One	Two	Three	Four	Five
Wave 1	19%	15%	18%	20%	27%
Wave 2	13%	15%	25%	48%	na
Wave 3	16%	25%	59%	na	na

Some of the statistical techniques to be used for longitudinal data analysis require data to be measured at a minimum of three time points, although gaps are permissible. For this reason, a shorter data set was also constructed including all children for whom there were at least three waves of subjective well-being data (with some missing data within each wave being allowed). As shown in Table 10.1, a total of 2,943 children participated in at least three waves of data collection. However there were some cases where at least partial subjective well-being data was not available for all three waves and so the total number of children with usable data for the purposes of analysis was 2,806.

Bivariate comparisons were run to compare the 2,806 children included in the cross-wave analysis with the 5,990 not included in order to identify any key differences between the two groups. Results of chi-square tests and t-tests as relevant, using a 99% confidence interval, are as follows:

- There was no significant gender difference between the two groups (49.7% of those included were female compared to 49.5% of those excluded).

- There was no significant difference in mean life satisfaction scores at any of the five ages. Scores were in fact very close at each age. For example, at age 11 mean life satisfaction for those included was 5.08 compared to 5.05 for those excluded.

- There were significant differences in family type at the ages of 13, 14 and 15. Children living with both birth parents were more likely to be included than children living in a step family or lone parent family. For example, at age 15, 65% of those included living with both birth parents, 10% in a step family and 25% with a lone parent. Corresponding figures for those excluded were 59%, 12% and 29%.

- There was a significant difference in mean equivalised household income between the included and excluded groups at the ages of 13 upwards, but not at younger ages. The difference was largest at 13 when it was more than £100 per month (mean equivalised income was around £1,300 per month, ranging from zero to over £15,000)

And in relation to the other topics covered in the following chapters:

- There were no significant differences in the extent of children feeling supported by family at any of the five ages.

- There were no significant differences in the frequency of being bullied at school (either physical or other) at any of the five ages.

Thus there was no difference between children included in and excluded from the analysis on four out of six key variables used in the analysis in this part of the dissertation. The differences in family type and income were only found in older age groups. The presence of these differences means that the sample cannot be taken to be representative of the general population of young people in this age group – in particular being more likely to be living with two parents and to have a higher than average income from the age of 13 upwards.

10.2.2 The restructured British Household Panel Survey data set

The restructured BHPS data set related to 5,057 children. The number of waves in which children participated is summarised in Table 10.3. Over 3,200 children participated in at least three waves of the survey.

Table 10.3: Numbers of children participating in different numbers of complete waves of the BHPS youth questionnaire, Waves 4 to 18

No. of complete waves	No. of cases	% of cases
Five	1,412	27.9%
Four	995	19.7%
Three	816	16.1%
Two	854	16.9%
One	980	19.4%

The following are comparisons of the two groups for key variables using a 99% confidence level.

- There was no significant gender difference between the two groups

- There was no significant difference in mean life satisfaction scores at any age

And in relation to the other key variables covered in the chapters in this part:

- There was a significant difference in worries about bullying only at one age. For children aged 12 years old, 41% of the included sample worried about being bullied compared to 33% of the excluded group.

- There was only a significant difference in frequency of arguing with one's mother at the age of 14 years old. However the differences in percentages were not that large – for example 43% of children in the excluded group hardly ever argued with their mother compared to 41% of the included group.

- Children in the included group were significantly less likely to talk to their mother about things that mattered to them than the excluded group at the ages of 14 and 15.

Thus there were only significant differences between the included and excluded groups for three of the 21 comparisons made in the tests above. This does not raise major concerns about differences between those included and excluded from the sample.

10.3 Using the SWB variables in the analysis

The SWB variables used in this part of the dissertation are derived from the work presented in Chapter 5. The two key issues for this part of the dissertation are (a) that variables are only available to measure the cognitive component of SWB; and (b) the multi-item measure was found not to have strong (scalar) measurement invariance across age groups. This means that mean scores on this measure can not be compared across age groups. Because the two main analytical techniques used in this part rely on age-based comparisons it was therefore decided exclusively to use the single-item life satisfaction measure for analysis. There are also drawbacks to this approach. The

measure may not strictly meet the assumptions of being a cardinal variable which underpin some methods. Nevertheless it is very common to treat single-item SWB measures with seven response options or more in this way. As discussed earlier, there is evidence from Ferrer-i-Carbonell and Frijters (2004) that assuming cardinality or ordinality makes little difference to the substantive conclusions that are drawn from analysis. A further drawback of most SWB measures, and particularly in the case of children, is their skewed distributions. One of the measures that can be taken to mitigate this issue is to use robust standard errors and this approach is followed where relevant throughout the analysis in the following chapters. This measure will be referred to as life satisfaction and has been transformed onto a scale from 0 to 10 for ease of interpretation of the results.

Table 10.4 shows the distribution of responses to this question by age for the Wave 1 Understanding Society data. There is a shifting age-related pattern at the higher end of the distribution with a lower proportion of children selecting the highest point on the scale as age increases. However there is a relatively small change across the lower end of the distribution. Using one of the cut-off points described for the MCS analysis earlier, the percentage with low SWB (a score of 3 or less) is 9.0% of 11-year-olds compared to 12.7% of 15-year-olds. This illustrates the limitation of relying on binary variables which can fail to represent shifts across different parts of the distribution. This is an argument in favour of treating this as an interval variable. Note that this is cross-sectional rather than longitudinal analysis. A more rigorous approach to analysing trajectories over time within cases, using latent growth curve modelling will be taken in Chapter 12.

Table 10.4: Distribution of single-item life satisfaction question by age

	11 years old	12 years old	13 years old	14 years old	15 years old
0 (lowest)	.6%	.8%	1.1%	1.0%	1.3%
1	.6%	.5%	.6%	1.1%	1.3%
2	0.7%	1.3%	2.8%	2.9%	3.1%
3	7.1%	7.2%	6.9%	7.5%	7.0%
4	14.4%	16.3%	17.6%	17.7%	21.6%
5	34.9%	34.9%	37.0%	40.2%	36.4%
6 (highest)	41.6%	39.1%	34.0%	29.7%	29.5%

Source: USS, Wave 1, N = 4,099 (unweighted). Weightings used for analysis.

Figure 10.1 shows mean life satisfaction scores by age and gender. Girls have higher mean life satisfaction (8.6 out of 10) than boys (8.3) at 11 years old but their mean scores decrease much more rapidly so that by the age of 15 years old they are 0.3 of a point lower than boys. The gender differences in mean scores were statistically significant (p<0.05) at 11 (girls higher than boys) and at 14 and 15 years of age (boys higher than girls). The Pearson correlation between age and life satisfaction was statistically significant (-0.09; p<0.001) for the sample as a whole. It was larger (-.14, p<.001) for girls than for boys (-.04; p=0.03). In summary, in the USS data, there is an overall age-related downward trajectory in children's SWB between the ages of 11 and 15, and discernible gender differences. These age and gender patterns will be explored more fully in the next two chapters.

Figure 10.1: Mean life satisfaction by age and gender in USS Wave 1
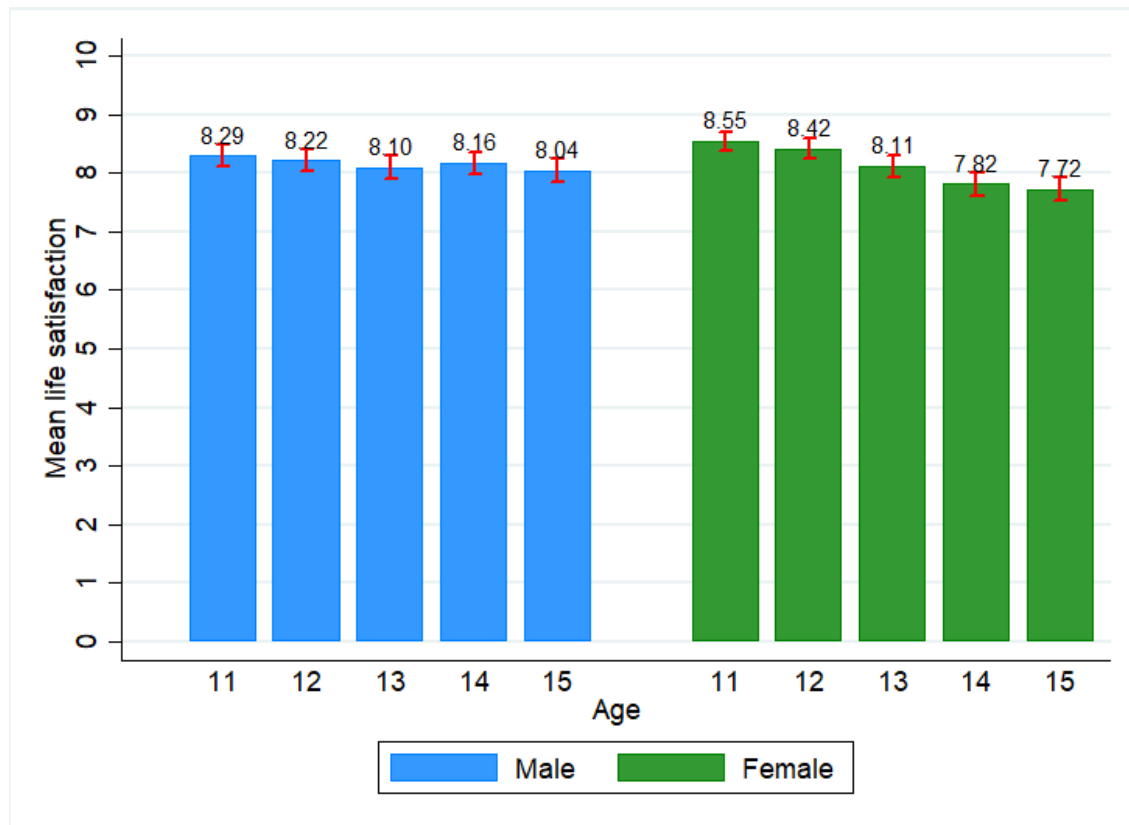
Source: Understanding Society, Wave 1. N=4,099 (unweighted).
Analysis used weighted data. Red error bars show 95% confidence intervals.

10.4 Methods

The analysis in this part of the dissertation uses two additional types of multivariate analysis not used in previous chapters – fixed effects regression and latent growth

curve modelling. The core aims and principles of these two methods are discussed below.

10.4.1 *Fixed effects regressions*

Fixed effects regression is an extension of the logic of linear regression discussed in Chapter 6, which makes use of the fact that longitudinal data consists of numerous linked pieces of data for the same people. As Allison (2009) identifies, the requirements for this type of analysis are that there are measurements of a comparable dependent variable for each individual on at least two occasions. The major advantage of fixed effects models is that they can use the repeated information for the same individual to control for fixed factors, irrespective of whether these have been observed or not. Or to put it another way 'Use each individual as his or her own control' *(*ibid, p. 2). This ability to control for unobserved variables is a major advantage of this approach and can be used, for example, to take account of fixed personality traits. On the other hand there are drawbacks. A limitation is that it is not possible to include any fixed factors in the model, or factors that change little or very slowly over time. So, for example, one cannot include ethnicity or gender as an independent variable. Second, fixed effects models tend to have much larger standard errors than models which treat all the effects as random.

Despite these drawbacks, the benefits of controlling for unobserved variables mean that this approach has started to be utilised in SWB research (Boyce, 2010). As Boyce explains the key difference between a fixed effects (FE) approach and a random effects (RE) approach to analysis of longitudinal data is that in RE the unobserved individual heterogeneity is assumed to be uncorrelated with the observed independent variables whereas in FE it is assumed to be correlated. To take an example from the next chapter, an RE approach would assume that in predicting SWB, being bullied was uncorrelated with personality traits whereas an FE approach would assume a correlation. As suggested by Boyce, as in this example, the assumption of no correlation is often implausible.

The basic formulation of a fixed effects model is as follows (with equations taken from Allison, 2009). The starting point is a simple equation which is a slight variation on the Equation 6.1 for linear regression in Chapter 6:

$$y_{it} = \mu_t + \beta x_{it} + \gamma z_{it} + \alpha_i + \varepsilon_{it} \qquad \text{(Equation 10.1)}$$

where:

y_{it} is the value of the dependent variable for individual i at time t

μ_t is the intercept at time t

β is a vector of coefficients for each of the independent time-varying independent variables x

γ is a vector of coefficients for each of the independent independent variables z that do not vary over time

α_i is an error term for each individual

ε_{it} is an error term for each individual at each time

Although aspects of the notation of Equation 10.1 are different to Equation 6.1, the key difference is the inclusion of two error terms, one of which is constant over time for each individual and one of which can vary over time.

Formulating the equation in this way, means that if the equation is written for two different time points and then one equation is subtracted from the other, then the γz_{it} and α_i which are the same at each time point cancel each other out, which gives the following equation:

$$\Delta y_i = \Delta \mu + \Delta \beta x_i + \Delta \varepsilon_i \qquad \text{(Equation 10.2)}$$

where Δ indicates a difference score between the two points of time

So if the z variables in Equation 10.1 represent fixed personality traits, these would be controlled for and disappear from Equation 10.2, leaving only time-varying independent variables such as experiences of bullying.

The FE model is often contrasted with a RE model which can also be represented by Equation 10.1, but with the assumption that the α_i term is treated as random rather than fixed and is independent of the other explanatory variables. It is usually helpful to run FE and RE models with the same variables and to compare standard errors. In particular this can be useful in identifying any variables in the FE model which may have particularly high standard errors, as this is one of the potential weaknesses of the FE approach.

The analysis of FE and RE models presented in Chapter 11 looks at the relationship between (a) experiences of being bullied, and (b) quality of family relationships and SWB using longitudinal data from the British Household Panel Study. The approach taken closely follows that used by Powdthavee and and Vernoit (2013) who analysed the effects of parental job loss on children's life satisfaction using the same data set.

The choice to use linear regressions and random-effects and fixed-effects regression models reflects the statistical training received during the course of the dissertation and is consistent with methods used in previous research on children's SWB in the UK. However, other possible techniques such as Cox's Proportional Hazards model, Generalized Estimating Equations and mixed-effects models might also be used with the type of longitudinal data analysed here and these are potential directions for future research.

10.4.2 Latent growth curve modelling

The second multivariate method used in this part of the dissertation is latent growth curve modelling (LGCM). This is a member of the SEM family and many of the principles of this technique are the same as those discussed for confirmatory factor analysis in Chapter 5. So, for example, the use of variance-covariance matrices; the potential to use robust estimators and full information maximum likelihood estimation in case of missing data; and the type of goodness-of-fit statistics, and the thresholds adopted, have already been covered in Chapter 5 and apply in the same way here. I will focus in this section on the additional and distinctive features of LGCM.

The core idea of LGCM is to estimate trajectories of variables over time. In this type of modelling the values of the observed variables at each time point are used to estimate two or more underlying latent variables. If a linear trajectory is estimated then there are two latent variables that relate to the intercept (starting point) and slope of the trajectory. LGCM is a flexible approach and it is also possible to estimate curvilinear trajectories of various kinds – for example three latent variables can be estimated to represent a quadratic model. The basic linear model is depicted in Figure 10.2 for a variable observed at three time points. The variables in boxes are the observations at Time 1, Time 2 and Time 3 which are assumed for simplicity here to be equally-spaced time points. The latent variable representing the intercept has a loading of 1 for each

time point; while the variable representing the slope has a loading of zero for T1, one for T2 and two for T3. Thus the intercept factor represents the starting point and the slope represents the change in value of the variable between two consecutive time points (Duncan, Duncan & Stryker, 2006), which is constant here as this is a linear LGCM. There is also a covariance term between the intercept and the slope.

Figure 10.2: Linear latent growth curve modelling with observations at three time points
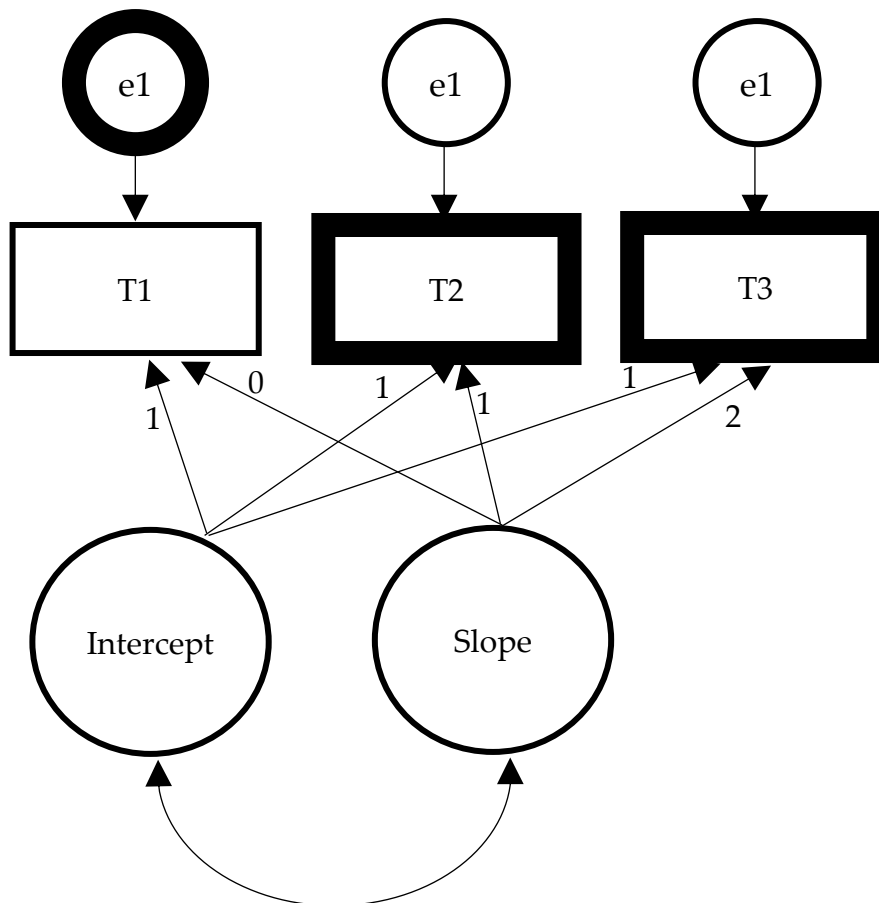
The interpretation of the parameters of the model is easiest explained through the application of a concrete example and this is done in Chapter 12. The above is referred to as an unconditional LGCM as there are neither predictors nor outcomes associated with the latent variables. However, a strength of this approach is that it is possible to introduce either or both of these additional elements. Again, this is easier to explain with an example than in the abstract and is covered more fully in Chapter 12, where a model with predictors is illustrated in Figure 12.5.

Despite the potential of LGCMs, they have very rarely been used in research on children's SWB and the analysis presented in Chapter 12 is one of the first of its kind to apply the technique to exploring trajectories in children's SWB over time.

That concludes the introductory chapter for this part of the dissertation. The rest of this part proceeds as follows. Chapter 11 presents some initial cross-sectional analysis using the variables considered in the subsequent longitudinal analysis. This is necessary because there are some limitations of previous cross-sectional analysis that need to be addressed. This is then followed by the use of fixed effects regressions which utilise the longitudinal nature of the data to test whether the results of cross-sectional analysis still hold when attempting to control for fixed unobserved factors. Chapter 12 then provides a picture of trajectories of, and fluctuations in, children's SWB between the ages of 11 and 15 years old. Although this is primarily descriptive analysis similar work has not previously been published and it generates new insights into the course of children's SWB in this age range. The second part of this chapter then further utilises the longitudinal nature of the data by employing latent growth curve modelling to explore the associations between parent-child relationships and experiences of being bullied respectively and trajectories of children's SWB. Chapter 13 summarises the findings from this part of the dissertation and relates them to previous research.

Chapter 11: Factors associated with children's SWB across the 11 to 15 age range

11.1 Background

This chapter is the first of two to focus on two factors that have been identified in cross-sectional analysis as being strongly associated with children's SWB. The aim is to extend this previous analysis by utilising the additional potential of longitudinal data. The findings from the previous cross-sectional studies have been used as a starting point in order to identify which independent variables to include in the analysis.

As reviewed in Chapter 2, there is now a substantial amount of published cross-sectional analysis of factors associated with children's SWB in the UK. Two recent analyses of the MCS data for children aged around the age of 11 years old (Patalay & Fitzsimons, 2016; Rees & Bradshaw, 2016) have both shown that 'process' factors such as family relationships, bullying and school engagement are much stronger predictors of children's SWB than 'context' factors such as family structure, household income and parental educational qualifications. A key argument running through this thesis is that this broad pattern of findings is one of the things that distinguishes children's SWB from other 'well-being' measures such as behavioural development, cognitive development and educational attainment which have much stronger socio-economic gradients.

In terms of the data sets to be used in this part of the dissertation, there have been several recent analyses of the USS Wave 1 data which it is relevant to review briefly. Knies (2011) found that neither household income nor a household material deprivation index nor a child material deprivation index significantly predicted the life satisfaction of children aged 10 to 15 years old once age, gender, country of residence, number of birth parents in the household, and number of children in the household were taken into account. Knies (2017) extended this analysis using longitudinal analysis of data from several waves of the USS but still only found evidence of significant effects of household income for older children (from 13 upwards) with 90% (but not 95%) confidence. This tends to support the picture from the MCS analyses in Part 3 where family economic factors (as opposed to child-focused economic variables) were only weakly associated with children's SWB.

Yucel and Yuan (2015) found that parent-child relationship quality, bullying by friends and bullying by siblings all explained variance in what is described by the authors as 'life satisfaction' after controlling for various other factors. Wolke and Skew (2012) report similar findings for bullying by siblings and other peers. However there are limitations to these two analyses. They both use the six-item measure of SWB which was shown in Chapter 5 to be problematic for conceptual and statistical reasons. Additionally, both analyses used an early release of the USS Wave 1 data which did not contain all cases and both only covered a sub-sample of these cases (children not living with a sibling were excluded from both analyses and Yucel and Yuan also excluded children not living with both birth parents). Third, these analyses did not explore the extent to which the associations might vary according to age and gender. In addition to these issues, the authors made different decisions of how to handle some of the independent variables than will be taken here. In view of these considerations, it was decided initially to undertake cross-sectional analysis of a complete single wave of USS data with the independent and dependent variables that will then also be used in the longitudinal analysis, to act as a reference point. Wave 1 of the study was chosen for this purpose because there is data attrition in later waves and because the results would then be comparable to some extent with the above cross-sectional studies that also used a subset of Wave 1 data.

The overarching goals of the analysis in this and the next chapter are to develop a picture of how the associations between children's SWB and family relationships and bullying develop and vary over time, and to consider any evidence of differences in these patterns according to gender. The specific inclusion of gender as a topic here is informed by the evidence presented in the previous chapter of different patterns of SWB for females and males between the ages of 11 and 15. It is intended that the analysis will shed some light on factors that may explain these differences.

11.2 Independent variables

This section describes the independent variables to be used in the analysis and also provides some information on age variations in these variables and associations in children's responses to them over time.

11.2.1 Family relationships

The USS and BHPS youth self-completion questionnaires both include four questions asking children how often they quarrel with their mother and, separately, with their father; and how often they talk to their mother, and separately their father, about the things that matter to them. These questions have a five-point response scale – 'Most days', 'More than once a week', 'Less than once a week', 'Hardly ever' and 'Don't have a mother / father'. They were asked in every wave of the BHPS and are currently asked in every second wave of the USS. The distribution of responses for these questions in Wave 1 of the USS is shown in Table 11.1.

Table 11.1: Frequencies: Questions about children's relationships with parents

	Talks with mother	Quarrels with mother	Talks with father	Quarrels with father
Most days	35.1%	11.8%	16.2%	8.3%
More than once a week	24.6%	18.4%	17.6%	10.8%
Less than once a week	18.3%	23.3%	21.1%	18.3%
Hardly ever	21.1%	45.3%	38.9%	56.1%
Doesn't have [parent]	1.0%	1.2%	6.2%	6.5%

Source: USS, Wave 1, Children aged 11 to 15. N = 4,099 (unweighted). Weightings used for analysis.

This formulation of questions poses some problems for the analysis. According to household information in the data set, around 94% of children lived with their birth mother and a further 2% lived with a stepmother. On the other hand only 62% of children lived with their birth father and a further 11% with a stepfather. This means that over a quarter of children lived in a household without a birth father or stepfather. However, the questions about relationships with each parent described above do not specify that they are only about parents that the child lived with, but offer an opt-out if the child does not have the relevant parent. As can be seen in the table above, only around 1% of children selected the 'Don't have a mother' option for these questions and 6% of children selected the 'Don't have a father' option. Because such a high proportion of children lived with their mother this is not necessarily a major problem for the analysis. However in terms of fathers it is clear that many children were answering questions about a father who did not live with them. It is unclear what the data actually means in this context. How meaningful is it to count the frequency of quarrelling with a father you do not actually live with (and therefore may also rarely

be in contact with)? And, how valid is it to simply combine this data with that for children who do live with their father? It seems likely that children who live with their father will be more likely to talk with them and quarrel with them than children who do not. These issues do not seem to have been considered in some previous analyses of these questions which has calculated the mean of the answers for mothers and fathers as a measure of parent-child relationships.

In view of the problems described above, for the analysis in this dissertation a decision was taken only to include children who were living with a birth or stepmother (thus excluding around 4% of cases) and mainly to focus on the variables asking about the child's relationship with their mother. This is not an ideal solution but seemed the best available given the doubts about the validity of the data about fathers. The number of parents in the household was used as a control variable to take account of the fact that children are living in different family types. Missing data was less than 2% for each of the two variables about relationships with the mother. However, some supplementary analysis including the data for relationships with fathers, only for children who lived with their mother and father is presented at the end of this chapter.

Tables 11.2 and 11.3 show the distribution of responses to the two questions about the child's relationship with their mother by age. There was some evidence of children talking less frequently with their mother as they got older. The age pattern in relation to quarrelling is less marked but there appears to be a convergence of experience as children grow older – with a smaller proportion of children in both the 'Most days' and 'Hardly ever' categories..

Table 11.2: Frequency of talking to mother about things that matter, by age

	Most days	More than once a week	Less than once a week	Hardly ever
11 years old	45%	23%	17%	16%
12 years old	39%	27%	16%	19%
13 years old	32%	27%	18%	23%
14 years old	31%	24%	21%	25%
15 years old	31%	23%	21%	24%

Table 11.3: Frequency of quarrelling with mother, by age

	Most days	More than once a week	Less than once a week	Hardly ever
11 years old	13%	14%	22%	51%
12 years old	12%	17%	23%	49%
13 years old	12%	19%	24%	45%
14 years old	13%	24%	22%	41%
15 years old	11%	19%	27%	43%

The USS, but not the BHPS, also includes a question about the extent to which children feel supported by their family. Response options are 'I feel supported by my family in most or all the things I do', 'I feel supported by my family in some of the things I do' and 'I do not feel supported by my family in the things I do'. In the Wave 1 survey only 1.2% of children aged 11 to 15 selected the last option, and 19.2% selected middle option. So these two categories have been combined in the variable used in this analysis – which is therefore binary with an approximate 80%-20% split. Data was missing for this variable for less than 2% of cases.

Table 11.4 shows the percentage of children who felt that they were at least mostly supported by their family. There was a decrease in this percentage from around 85% of 11-year-olds to 76% of 15-year-olds. There was no evidence of gender differences in relation to this question.

Table 11.4: Percentage of children who felt mostly supported by their family, by age and gender

	All	Female	Male
11 years old	85%	86%	85%
12 years old	81%	82%	80%
13 years old	79%	80%	79%
14 years old	77%	76%	78%
15 years old	76%	76%	76%

There was evidence of some stability in these variables across age in the pooled longitudinal USS data set. Two-year cross-wave correlations (Kendall's tau-b) ranged from 0.35 to 0.40 for the variable about quarrelling and from 0.22 to 0.36 for the variable about talking. Correlations tended to be a little higher across older age ranges

than younger ones. However the level of these correlations still indicates a substantial amount of movement in these variables over time. For example, looking at the highest cross-wave correlation, of the children who argued with their mother most days at 13 years old only 37% still did so at 15 years old while 18% hardly ever did so. The movement was, however, mostly in one direction. Only 4% of children who hardly ever argued with their mother at 13 years old argued with her most days at 15 years old.

11.2.2 Bullying

The USS youth self-completion questionnaire contains two questions about experiences of being bullied at school[25]. These ask about frequency of being bullied physically and in other ways. As with the above questions about relationships with parents, the bullying questions are only asked in every second wave of the USS. Response options and distributions in Wave 1 of the USS are shown in Table 11.5. Because of the highly skewed nature of these distributions and small numbers in some categories, binary variables were created that simply indicated whether or not the child had been bullied. Missing data was close to 1% for each of these variables in USS.

Table 11.5: Frequencies: Questions about being bullied at school

	Physically bullied	Other bullied
Never	81.8%	69.7%
Not much (1-3 times in last six months)	14.2%	21.6%
Quite a lot (more than 4 times in the last six months)	2.4%	5.3%
A lot (a few times every week)	1.5%	3.4%

Source: USS, Wave 1, Children aged 11 to 15. N = 4,099 (unweighted). Weightings used for analysis.

Table 11.6 shows basic frequency statistics for responses to each of the two questions by age group.

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[25] It should be noted that there are also questions in the survey about bullying by siblings. Frequency of sibling bullying has also been associated with subjective well-being (Wolke & Skew, 2011). The reason this issue has not been chosen for consideration here is that some children do not have siblings and so focusing on this issue would not be generalisable to all children and would also further reduce the available cases in the data set available for analysis.

- Most children had not experienced either form of bullying at school in the last six months.

- Physical bullying was less common than other forms of bullying. Rates of being physically bullied declined substantially with age from 22% of 11-year-olds to 9% of 15-year-olds. Frequent physical bullying ('quite a lot' and 'a lot') also declined from around 6% of 11-year-olds to around 2% of 15-year-olds.

- Rates of being bullied in other ways also declined with age, although not so substantially, only really falling notably between 14 and 15. Here also frequent bullying declined somewhat.

Table 11.6: Frequency of being bullied at school in the last six months by age group

	Never	Not much	Quite a lot	A lot
Physically bullied				
11 years old	78%	16%	4%	2%
12 years old	80%	14%	3%	2%
13 years old	85%	12%	2%	1%
14 years old	86%	12%	2%	1%
15 years old	91%	8%	1%	1%
Bullied in other ways				
11 years old	66%	23%	7%	4%
12 years old	67%	22%	6%	4%
13 years old	69%	22%	6%	4%
14 years old	70%	21%	5%	4%
15 years old	76%	16%	4%	3%

Table 11.7 shows the percentage of children who had ever been bullied in each way in the past six months by gender for each age group:

- Males were significantly more likely to be bullied than females at all ages. Physical bullying more than halved for both genders between 11 and 15.

- There was little difference between the genders for other forms of bullying.

Table 11.7: Percentage of children who had been bullied at least once at school in past six months by bullying type, age and gender

	Physically bullied			Bullied in other ways		
	All	Female	Male	All	Female	Male
11 years old	22%	14%	30%	34%	31%	37%
12 years old	20%	15%	24%	33%	32%	33%
13 years old	15%	11%	19%	31%	32%	31%
14 years old	14%	11%	17%	30%	33%	27%
15 years old	9%	6%	14%	24%	24%	24%

It is also relevant to look at cross-wave associations in experiences of bullying (Table 11.8).

- Children who had been physically bullied at one age were more than four times as likely also to be physically bullied two years later

- Children who had been bullied in other ways at one age were also two times as likely (or more) also be bullied in other ways two years later.

- These associations were all statistically significant so there is evidence here of persistence of bullying experiences across quite wide age ranges.

Table 11.8: Percentage of children who had experienced each form of bullying at one age by whether they experienced the same form of bullying two years previously

	Physically bullied		Bullied in other ways	
	Bullied at 11	Not bullied at 11	Bullied at 11	Not bullied at 11
13 years old	39%	9%	55%	19%
	Bullied at 12	Not bullied at 12	Bullied at 12	Not bullied at 12
14 years old	37%	8%	49%	19%
	Bullied at 13	Not bullied at 13	Bullied at 13	Not bullied at 13
15 years old	28%	6%	33%	17%

The BHPS does not include these variables but does have a question about the extent to which children worried about being bullied at school. This question had three response options – 'A lot', 'A bit' and 'Not at all'. Distributions of responses in the pooled longitudinal data set were around 7%, 29% and 64% for these categories respectively.

With only three response options, and a highly skewed distribution, this could not be treated as an ordinal variable, so a binary variable was created combining the smaller two categories so that it had a roughly 64%-36% split. The percentage of children who worried about bullying was significantly higher for females (41%) than for males (31%). There was also a significant decrease in worrying with age from around 43% at 11 years old to around 26% at 15 years old.

11.2.3 Control variables

Four control variables were included in the cross-sectional analysis – age, gender, equivalised household income and family type. As there is little evidence of a major influence of socio-economic factors on children's SWB there did not seem to be any purpose served by including more control variables than this.

11.3 Cross-sectional analysis

Before describing, in the next section, the findings of the analysis making use of longitudinal data, this section presents cross-sectional analysis of Wave 1 of the USS. As indicated earlier, the reason for doing this is that analysis using a similar set of variables has not previously been published with a complete wave of the USS. Presenting some cross-sectional findings provides a foundation for the analysis that follows in Section 11.4.

11.3.1 Bivariate analysis

Initially a bivariate analysis was run between the dependent variable and each independent variable. Table 11.9 shows the results. There were significant associations between each of the five independent variables and life satisfaction. Children who felt better supported by family, talked more frequently and argued less frequently with their mother and were bullied (physically and other) less frequently had higher life satisfaction. The substantial differences in mean life satisfaction scores according to the frequency of 'other' forms of bullying stands out in particular. The small minority of children to whom this happened a lot had mean scores almost three points lower on a ten-point scale than children who did not experience this at all.

Table 11.9: Bivariate associations between dependent variable and life satisfaction

	% of sample (weighted)	Mean life satisfaction [CI (99%)]	
Family support			
Sometimes or Not	20.3%	6.94	[6.66–7.22]
Mostly	79.7%	8.44**	[8.34–8.55]
Talks with mother			
Most days	35.4%	8.49	[8.32–8.67]
More than once a week	24.8%	8.26*	[8.08–8.43]
Less than once a week	18.5%	8.08**	[7.87–8.28]
Hardly ever	21.3%	7.46**	[7.18–7.74]
Argues with mother			
Most days	11.9%	7.33	[6.93–7.74]
More than once a week	18.6%	7.71*	[7.45–7.97]
Less than once a week	23.6%	8.16**	[7.95–8.35]
Hardly ever	45.9%	8.51**	[8.36–8.66]
Bullied – physical (last 6 months)			
Never	81.9%	8.33	[8.22–8.44]
Not much	14.2%	7.47**	[7.18–7.76]
Quite a lot	2.4%	6.99**	[6.05–7.92]
A lot	1.5%	6.16**	[4.59–7.73]
Bullied – other (last 6 months)			
Never	69.7%	8.35	[8.35–8.57]
Not much	21.6%	7.36**	[7.36–7.82]
Quite a lot	5.3%	6.76**	[6.76–7.79]
A lot	3.4%	5.49**	[5.49–7.23]

Understanding Society, Wave 1, Age 11 to 15, unweighted N=4,045.
Analysis takes account of survey design
Significance levels compared to first category, * = p<.05, **=p<.01

11.3.2 Linear regressions

The next step in the analysis was to run a linear regression with life satisfaction as a dependent variable and the five focal variables plus control variables (Table 11.10). All five independent variables made a significant contribution to explaining variation in life satisfaction. In addition, females, older children and those living in lone-parent and step-families had lower life satisfaction. The overall explanatory power of the model was around 20%. The explanatory power of a model with control variables only was around 2% so the majority of the explanatory power of the regression shown in the table was due to the family relationships and bullying variables.

Table 11.10: Linear regression of life satisfaction onto quality of family relationships, frequency of bullying and control variables

Model 11a	b	CI (99%)
Family support		
Sometimes or Not (ref)	0.00	
Mostly	0.60**	[0.42, 0.78]
Argues with mother		
Most days (ref)	0.00	
More than once a week	0.18	[-0.08, 0.44]
Less than once a week	0.31**	[0.06, 0.57]
Hardly ever	0.44**	[0.19, 0.69]
Talks with mother		
Most days (ref)	0.00	
More than once a week	-0.12*	[-0.26,0.02]
Less than once a week	-0.19**	[-0.34,-0.04]
Hardly ever	-0.43**	[-0.62,-0.25]
Bullied – physical		
No (ref)	0.00	
Yes	-0.31**	[-0.52,-0.11]
Bullied – other		
No (ref)	0.00	
Yes	-0.45**	[-0.61,-0.30]
Female	-0.10*	[-0.22, 0.03]
Age (years)	-0.07**	[-0.11,-0.03]
Equivalised income	0.00	[-0.10, 0.10]
Family type		
Both birth parents (ref)	0.00	
Lone parent	-.16**	[-0.28, 0.05]
Step-family	-0.19*	[-0.34,-0.03]
Other	-0.364	[-0.76, 0.03]

N=3,843. Adjusted R^2= 0.206

To investigate whether the independent variables exerted a differential influence on life satisfaction at different ages and according to gender, several models were then run – (a) with interactions between age and each of the five independent variables; (b) with interactions with gender; (c) with age interactions separately for each gender. None of the interaction effects were statistically significant. So there is no evidence of a differential influence of these variables on life satisfaction according to age or gender.

11.3.3 Alternative cross-sectional regression models

The use of linear regression with single-item life satisfaction variables of this kind is common in the literature. For example, Knies (2011) took this approach with the USS

data and Powdthavee and Vernoit (2013) did the same with the BHPS data, both using the same dependent variable as above. As discussed in Chapter 5 there is some evidence to support this practice, although this is based on scales with more response options and surveys of adults. In order to provide a check on the above findings a number of alternative regression models were run as follows – ordered logistic regression; binary logistic regression with a low life satisfaction indicator (a score of three or less on the scale from zero to six); linear regression with the same variable; a logistic regression with an alternative binary indicator with a threshold score of four or less; and a linear regression with this variable. The results of these alternative regression models broadly supported the conclusions of the above linear regression model. In all five alternative models each of the five independent variables made a significant contribution to the model. For the variable about the child arguing with their mother, only the 'Hardly ever' category was significantly different to the reference category in some of the models.

11.3.4 Concluding comments

In line with previous research, there is strong evidence here of substantive associations between quality of family relationships and children's SWB and between children's experiences of being bullied by peers and their SWB. This evidence provides a foundation for the longitudinal analysis that will be presented on bullying and on family relationships in this and the next chapter.

11.4 Controlling for individual heterogeneity

The final piece of analysis in this chapter will use the nature of the panel data available in the data sets to explore whether the association with bullying and SWB still remains after taking account of unobserved fixed characteristics of children. As discussed earlier, fixed-effects regressions are a commonly-used technique when longitudinal data is available and have the potential to control for the influence of unobserved fixed factors. On the other hand, this potential comes at a cost of larger standard errors. Although this is a drawback, if significant effects are found for independent variables using this method it does provide additional confidence that the effect is a meaningful one.

This analysis requires both the dependent and independent variables to be measured in all waves of data, and for as many waves to be included as possible. For this reason this piece of analysis uses the BHPS data set which asked questions about bullying and family relationships in every (or almost every) youth self-completion questionnaire. The process used here follows to a great extent that used by Powdthavee and Vernoit (2013) to analyse the effects of parental job loss on children's life satisfaction using the same data set. However a key difference is that it is quite unlikely that there is a reciprocal relationship between life satisfaction and parental job loss. It is quite plausible that there is a bi-directional association between life satisfaction and worrying about bullying or relationships with parents. In view of this possibility, it is important to acknowledge that the models presented here are based on the assumption that worrying about bullying and the quality of relationships with parents influence life satisfaction, so a finding of a significant effect does not demonstrate causality.

11.4.1 Bullying

Model 11b in Table 11.11 shows a random effects model regressing life satisfaction onto worries about bullying and age. The fact that the question wording was about being worried about bullying rather than direct experience of being bullied should be borne in mind in interpreting the results. The model is in line with expectations from the earlier analysis in this chapter and from previous research. Children who are more worried about bullying have lower life satisfaction. There is also evidence that life satisfaction decreases with age.

Model 11c uses a fixed effects approach. This means that it controls for variables not included in the model that are constant over time. This could include personality, but may also include other time invariant factors such as social class which probably do not change for most children across a four-year time period. The model shows that taking these factors into account reduces the coefficient for bullying, but that it remains statistically significant. Model 11d introduces interaction terms to see whether worrying about bullying has a differential impact on life satisfaction at different ages. The results indicate that it has most impact at the age of 14, at which age the interaction effect is statistically significant. Finally, because of earlier evidence about gender differences, the basic fixed-effects model was run separately for females and males (Models 11e and 11f). The effect of the bullying variable was significant in both models

although the coefficient was larger for females than males. As would be expected from earlier analysis, age showed a stronger association with life satisfaction for females than males.

Table 11.11: Random and fixed effects regressions of life satisfaction onto worries about bullying and age

	Model 11b RE All	Model 11c FE All	Model 11d FE All	Model 11e FE Female	Model 11f FE Male
Worried about bullying	-0.59**	-0.37**	-0.22**	-0.45**	-0.29**
	(0.04)	(0.04)	(0.08)	(0.06)	(0.06)
Age (ref = 11 years old)					
12 years old	-0.04	-0.03	0.01	-0.12	0.06
	(0.05)	(0.05)	(0.06)	(0.07)	(0.06)
13 years old	-0.21**	-0.19**	-0.13*	-0.39**	0.02
	(0.05)	(0.05)	(0.06)	(0.07)	(0.06)
14 years old	-0.32**	-0.28**	-0.13*	-0.50**	-0.06
	(0.05)	(0.05)	(0.06)	(0.07)	(0.07)
15 years old	-0.48**	-0.42**	-0.33**	-0.65**	-0.19*
	(0.05)	(0.05)	(0.07)	(0.08)	(0.07)
Worried about bullying x 12 years old			-0.10		
			(0.10)		
Worried about bullying x 13 years old			-0.13		
			(0.10)		
Worried about bullying x 14 years old			-0.41**		
			(0.11)		
Worried about bullying x 15 years old			-0.23		
			(0.12)		
Observations	13,050	13,050	13,050	6,462	6,588

The figures in the columns show coefficients with standard errors in brackets.

* indicates $p<0.05$; ** indicates $p<0.01$

11.4.2 Family relationships

The same analytical approach using random and fixed effects regressions was used for measures of family relationships. Here also the analysis uses the pooled BHPS data set as this included the questions about relationships with mother in every wave. However this survey did not include the question about family support.

The results of the regression models are shown in Table 11.12. In the random effects model (Model 11g) both focal variables – frequency of quarrelling with mother and frequency of talking with mother – make a significant contribution to explaining variation in life satisfaction. Children who hardly ever argued with their mother had a

life satisfaction score around one point higher on a ten-point scale than children who argued with their mother most days. Children who hardly ever talked with their mother had a life satisfaction score around 0.5 out of ten lower than children who talked with their mother most days. Age also had the usual expected relationship with life satisfaction. In the fixed effects model (Model 11h) the two relationship variables still significantly contributed to the model, taking into account unobserved fixed factors (e.g. personality), although the size of the coefficients was lower in Model 11h than Model 11g. A model was also run with interaction terms between each relationship variable and age. There was only one marginally significant interaction term out of the 16 included so this adds little insight and is not reproduced here for brevity. Models 11i and 11j in Table 11.12 display results of the fixed effects model separately for females and males. There was evidence of stronger associations between the two relationships variables and life satisfaction for females than males as well as the usual difference in age-related patterns.

Table 11.12: Random and fixed effects regressions of life satisfaction onto relationships with mother and age

	Model 11g	Model 11h	Model 11i	Model 11j
	RE	FE	FE	FE
	All	All	Female	Male
Argues with mother (ref=most days)				
more than once a wk.	0.44**	0.31**	0.39**	0.09
	(0.07)	(0.07)	(0.10)	(0.10)
less than once a wk.	0.71**	0.50**	0.55**	0.29**
	(0.07)	(0.08)	(0.10)	(0.11)
hardly ever	0.97**	0.73**	0.78**	0.52**
	(0.07)	(0.08)	(0.11)	(0.11)
Talks with mother (ref=most days)				
more than once a wk.	-0.09*	-0.07	-0.11	-0.05
	(0.04)	(0.05)	(0.06)	(0.07)
less than once a wk.	-0.23**	-0.17**	-0.32**	-0.07
	(0.05)	(0.06)	(0.08)	(0.08)
hardly ever	-0.54**	-0.35**	-0.54**	-0.21*
	(0.05)	(0.06)	(0.09)	(0.08)
Age (ref=11 years old)				
12 years old	0.01	0.00	-0.09	0.06
	(0.05)	(0.05)	(0.06)	(0.06)
13 years old	-0.12*	-0.13**	-0.30**	0.04
	(0.05)	(0.05)	(0.07)	(0.06)
14 years old	-0.18**	-0.20**	-0.42**	-0.01
	(0.05)	(0.05)	(0.07)	(0.07)
15 years old	-0.30**	-0.32**	-0.52**	-0.09
	(0.05)	(0.06)	(0.08)	(0.08)
Observations	13,345	13,345	7,798	7,979

The figures in the columns show coefficients with standard errors in brackets.

* indicates $p<0.05$; ** indicates $p<0.01$

These findings raise the question of whether there might also be gender differences in terms of relationships with fathers. In order to explore this issue, the same models were run again for the sub-set of children who lived with a father or stepfather (see earlier discussion) and the results are shown in Table 11.13. There are some interesting patterns here. First, in Model 11l (random effects) all four parent relationships variables made a significant contribution to the model, although talking with mother was only statistically significant in relation to a comparison with the two points at either end of the scale. Fixed effects results in Model 11m showed the same patterns with slightly smaller coefficients. Model 11n in Table 11.13 for females suggests that

two relationships variables – arguing with mother and talking with father – have stronger associations with life satisfaction than the other two – talking with mother and arguing with father – which only show significant effects for comparisons between the 'most days' and 'hardly ever' categories. For males (Model 11o, Table 11.13) there are a fewer significant patterns. Boys who rarely argued with their mother had significantly higher life satisfaction with those that did so most days; and talking with their father less than once a week or more rarely was associated with lower life satisfaction. A conclusion from this analysis is that in opposite-sex two-parent families (which here includes stepfamilies) children's quality of relationships with both parents is associated with their life satisfaction.

The relative importance to children's SWB of relationships with mothers and fathers in different types of households is a potentially fruitful area for further research. For example, the questions about relationships with fathers (where the child lived with their father, or perhaps also where they had substantial contact with a non-resident father) could be included in models similar to that shown in Table 11.12 along with dummy variables (e.g. whether living with father). It would then also be possible to introduce interaction effects to test whether the relationship with each parent had differential effects in different family types.

Table 11.13: Random and fixed effects regressions of life satisfaction onto relationships with mother and father and age (children who live with a father or stepfather)

	Model 11l RE All	Model 11m FE All	Model 11n FE Female	Model 11o FE Male
Argues with mother (ref=most days)				
more than once a wk.	0.39**	0.26**	0.38**	0.06
	(0.08)	(0.09)	(0.12)	(0.13)
less than once a wk.	0.56**	0.35**	0.48**	0.15
	(0.09)	(0.10)	(0.13)	(0.15)
hardly ever	0.75**	0.53**	0.57**	0.41**
	(0.09)	(0.10)	(0.14)	(0.15)
Talks with mother (ref=most days)				
more than once a wk.	-0.02	-0.02	-0.04	0.01
	(0.05)	(0.06)	(0.08)	(0.09)
less than once a wk.	-0.04	-0.01	-0.16	0.15
	(0.06)	(0.07)	(0.10)	(0.11)
hardly ever	-0.29**	-0.21*	-0.43**	-0.02
	(0.07)	(0.09)	(0.11)	(0.13)
Argues with father (ref=most days)				
more than once a wk.	0.11	0.07	0.06	0.10
	(0.10)	(0.10)	(0.15)	(0.14)
less than once a wk.	0.28**	0.26*	0.28	0.24
	(0.10)	(0.11)	(0.15)	(0.15)
hardly ever	0.35**	0.28*	0.37*	0.18
	(0.10)	(0.11)	(0.16)	(0.15)
Talks with father (ref=most days)				
more than once a wk.	-0.20**	-0.19*	-0.36**	-0.07
	(0.07)	(0.08)	(0.13)	(0.11)
less than once a wk.	-0.36**	-0.32**	-0.37**	-0.36**
	(0.08)	(0.09)	(0.13)	(0.13)
hardly ever	-0.55**	-0.40**	-0.45**	-0.41**
	(0.08)	(0.09)	(0.14)	(0.13)
Age (ref=11 years old)				
12 years old	0.07	0.06	-0.02	0.12
	(0.05)	(0.05)	(0.08)	(0.07)
13 years old	-0.03	-0.06	-0.21**	0.08
	(0.05)	(0.05)	(0.08)	(0.07)
14 years old	-0.12*	-0.15*	-0.29**	-0.01
	(0.06)	(0.06)	(0.09)	(0.08)
15 years old	-0.27**	-0.30**	-0.45**	-0.16
	(0.06)	(0.06)	(0.09)	(0.09)
Observations	10,032	10,032	4,909	5,123

The figures in the columns show coefficients with standard errors in brackets.

* indicates $p<0.05$; ** indicates $p<0.01$

11.5 Concluding comments

The patterns in the cross-sectional analysis presented in Section 11.3 are very much in line with previous cross-sectional research findings on the importance of these variables to children's life satisfaction. They are also consistent with Bronfenbrenner's arguments about the primary importance of process rather than context for children's development and well-being, which was discussed in Chapter 4.

One of the important additional contributions that the analysis in this chapter makes to the evidence on these associations is to use statistical methods that control for potential unmeasured confounding factors. This might include personality (although as discussed in Chapter 4 it is not certain that it is appropriate to assume that this is fixed for children) and similar traits such as optimistic disposition. It might also include other factors that do not change for many children across the 11 to 15 age range such as school and local area and, to a lesser extent, family structure and wealth. To the extent that any of these factors are stable they are accounted for in the fixed-effects regressions. These regressions still show significant associations between SWB and both family relationships and experiences of being bullied. The regressions still rely on an assumed direction of influence and it is not possible to rule out reverse or bi-directional influences. Despite this limitation, the evidence presented provides additional confidence about the strong associations for these variables previously identified in cross-sectional research.

Additionally, the analysis suggests that the (assumed) impact of bullying on life satisfaction may vary with age. There is also evidence that the (assumed) impacts of bullying and family relationships vary in strength according to gender. These are both aspects of the findings that would warrant further and more detailed future exploration.

The findings presented in Section 11.4 are an important new contribution to research on the relationships between process factors (such as experiences of being bullied or quality of parent-child relationships) and children's cognitive SWB. Having established through this analysis a stronger case for the robustness of the associations between SWB and the two factors considered in this part of the dissertation – family

relationships and bullying, the next chapter explores the extent to which these two factors are associated with trajectories of SWB across the 11 to 15 years old age range.

Chapter 12: Patterns of children's subjective well-being from 11 to 15 years old

Background

The Understanding Society survey (USS) data set provides an opportunity to examine patterns of children's subjective well-being over time using a recent, large and representative sample of children in the UK. This potential has not been fully exploited by researchers. Some descriptive work has been published using the USS data comparing children's levels of SWB (Pople & Rees, 2016). This has shown evidence of decreases in children's satisfaction with family, appearance, school and life as a whole between the ages of 10 and 15. There are also gender differences in children's satisfaction with life as a whole, particularly among older age groups. Girls aged 14 and 15 years old have significantly lower mean life satisfaction than boys. These findings are based on cross-sectional analysis of the Wave 5 data. They are broadly borne out by the descriptive analysis of the Wave 1 data presented in Chapter 10.

However it is possible to go further than this and to use the longitudinal nature of the USS data to analyse within-person changes over time. This is one of the aims of this chapter. It will look at patterns of children's subjective well-being over a five-year time span in three different ways – through means, fluctuations and trajectories. This descriptive work will then form a foundation for further analysis presented later in the chapter that explores the links between children's subjective well-being between the ages of 11 and 15 and other factors in their lives.

12.1 Stability and change in SWB between the ages of 11 and 15

There are several ways in which the longitudinal nature of the USS data can be used to develop a fuller understanding of age-related patterns in children's SWB. One question that can be addressed fairly simply is to assess levels of stability in life satisfaction within cases over time. This analysis uses the pooled data set of all available cases as described in Chapter 10.

A bivariate correlation matrix for life satisfaction at different ages using all available pairs within the data set is shown in Table 12.1 (numbers of cases are shown in brackets). All correlations were statistically significant (p<.001). As would be expected,

stability decreases with an increase in the time gaps in measurement (across rows). It also appears to increase a little when measured across the same time gap at older ages (along the diagonals). Looking down the final column, in regression terms, the proportion of variation in SWB (square of correlation) at age 15 explained by SWB at earlier ages is 6% from age 11, 9% from age 12, 13% from age 13 and 23% from age 14.

Table 12.1: Bivariate (Pearson) correlations between life satisfaction at different ages (all available pairs)

	Age 12	Age 13	Age 14	Age 15
Age 11	0.417 (1476)	0.336 (1479)	0.242 (955)	0.272 (334)
Age 12		0.454 (2016)	0.362 (1476)	0.322 (807)
Age 13			0.490 (2027)	0.358 (1331)
Age 14				0.479 (1341)

Patterns of low life satisfaction (scores of 3 or less out of 6) were also explored. Only one case had low life satisfaction in all five waves. A further six cases had low life satisfaction in four out of five waves and nine cases had three instances of low life satisfaction. Over two-thirds of cases never scored lower than four out of six. Table 12.2 shows the percentage of children who had low life satisfaction based on their life satisfaction status a year earlier. For example 34% of children who had low life satisfaction at the age of 11 also had low life satisfaction at the age of 12; while only 8% of children who did not have low life satisfaction at the age of 11 had low life satisfaction at the age of 12. Similar patterns are evident at older ages. In fact the difference between the two groups is even larger by the age of 14 and 15. At both these ages 43% of children who had low life satisfaction one year previously had low life satisfaction, compared to 8% to 9% of children who did not have low life satisfaction one year previously. These results suggest substantial persistence of low life satisfaction across ages. These percentages were also calculated across longer periods. Children who had low life satisfaction at the age of 11 had a 40% likelihood of low life satisfaction at 15 years old compared to 12% of children who did not have low life satisfaction at the age of 11. The available sample only consisted of 339 cases but the difference was statistically significant (p <.001).

Table 12.2: Percentages of children having low life satisfaction at each age, by their life satisfaction status (high/low) a year earlier (all available pairs)

		12 years old	13 years old	14 years old	15 years old
Previous year	High	8%	7%	9%	8%
	Low	34%	43%	43%	43%

In summary, there is evidence of some stability but also substantial change in children's life satisfaction scores between the ages of 11 and 15 in the Understanding Society data. The next sections focus on different ways of summarising these patterns of stability and change. Due to the nature of the analysis being presented, the remainder of this chapter uses the smaller pooled sample of children who participated in at least three waves of the survey between the ages of 11 and 15 as discussed in Chapter 10. The analysis presents three different ways of looking at within-person patterns of SWB across this age range. The first two of these – means and fluctuations – are dealt with in the next section; and then the third – trajectories, using latent growth curve modelling – is presented in Section 12.3.

12.2 Means and fluctuations in SWB between the ages of 11 and 15

12.2.1 Mean SWB

The simplest approach to summarising patterns of children's SWB between the ages of 11 and 15 is to generate a mean score for each child across all waves in which they participated in the survey. Among children in this age group who completed the youth self-completion in at least three waves, the mean life satisfaction score across waves was 4.88 out of 6. This mean did not vary significantly according to whether children had participated in three, four or five waves of the questionnaire and so no distinction is needed on this basis here. The distribution of mean scores is shown in Figure 12.1. Less than 3% of children had a mean cross-wave score below the mid-point of the scale (3 out of 6). Around one in nine children (11%) scored the maximum in all waves in which they participated.

Figure 12.1: Distribution of mean cross-wave life satisfaction scores (Understanding Society)
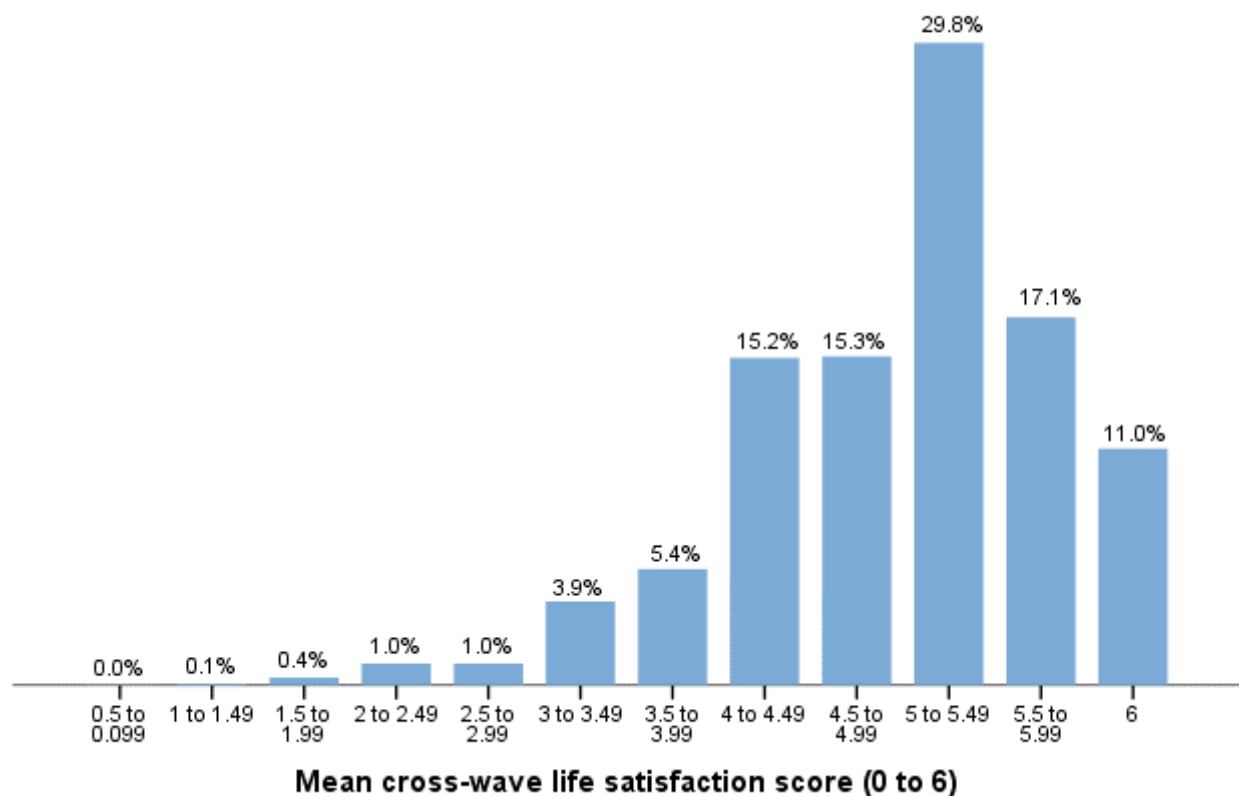
Mean cross-wave scores for girls (4.81) were significantly lower than for boys (4.95) although the effect size (ω^2) was less than 0.01 so this difference was substantively very small. Gender differences in patterns of SWB will become clearer in the subsequent sections. The mean scores considered in this section provide a way of smoothing out any fluctuations in SWB over time and this may be one useful approach to summarising children's SWB across this age range.

12.2.2 Fluctuations

Another way at looking at SWB within cases across ages is the extent to which SWB scores fluctuate. Table 12.3 provides a descriptive summary of levels of fluctuations in life satisfaction for children who participated in at least three waves of the USS between the ages of 11 and 15:

- Most children scored the maximum SWB of six out of six at least once.

- Few ever scored the minimum score of zero out of six but a substantial minority had a score of three or less out of six at least once

- Change in SWB was very common (the large majority of cases) but extreme fluctuation between very high and very low scores was relatively rare.

Table 12.3: Summary of maximum and minimum life satisfaction scores and ranges across waves

		0	1	2	3	4	5	6
5 values (213 cases)	Max				.5%	5.2%	31.5%	62.9%
	Min	1.9%	3.3%	7.5%	18.8%	31.9%	31.9%	4.7%
	Range	9.9%	42.3%	29.6%	11.3%	4.7%	1.4%	.9%
4 values (928 cases)	Max				1.2%	4.5%	30.8%	63.5%
	Min	1.9%	3.0%	7.0%	15.5%	29.3%	33.6%	9.6%
	Range	15.9%	44.3%	23.5%	9.8%	3.8%	1.8%	.9%
3 values (1665 cases)	Max			.4%	1.4%	7.7%	32.5%	58.0%
	Min	1.3%	2.9%	5.0%	13.7%	28.2%	36.4%	12.6%
	Range	23.8%	46.2%	19.6%	6.3%	2.7%	.9%	.4%

Several different ways of summarising levels of change for individual cases were considered. It is possible to calculate within-case standard deviations of scores or arc percentage change scores. These approaches were tested but it became apparent that these were not useful measures given the small number of observations and of response options to the life satisfaction question. Therefore a simple approach was used of summing the absolute value of the change score difference between each pair of waves and dividing this sum by the number of change score differences. So, for example, a child who scored 1 ,3, 5 and 7 on four consecutive waves would have a score of 2 (three changes of 2 points, equals 6 divided by 3 changes). I will refer to this as the mean change score.

Figure 12.2 shows the distribution of these mean change scores for children with at least three pairs of consecutive data. Around 15% of these children showed no fluctuation across waves. Additionally almost a quarter (23%) only showed a small mean change score of less than 0.5. Around 30% of children had a mean change score of more than one point on a seven-point scale. There was no significant difference in the extent of fluctuation in life satisfaction scores according to gender.

Figure 12.2: Distribution of mean change scores (children with at least 3 consecutive pairs of data)

Mean absolute change score
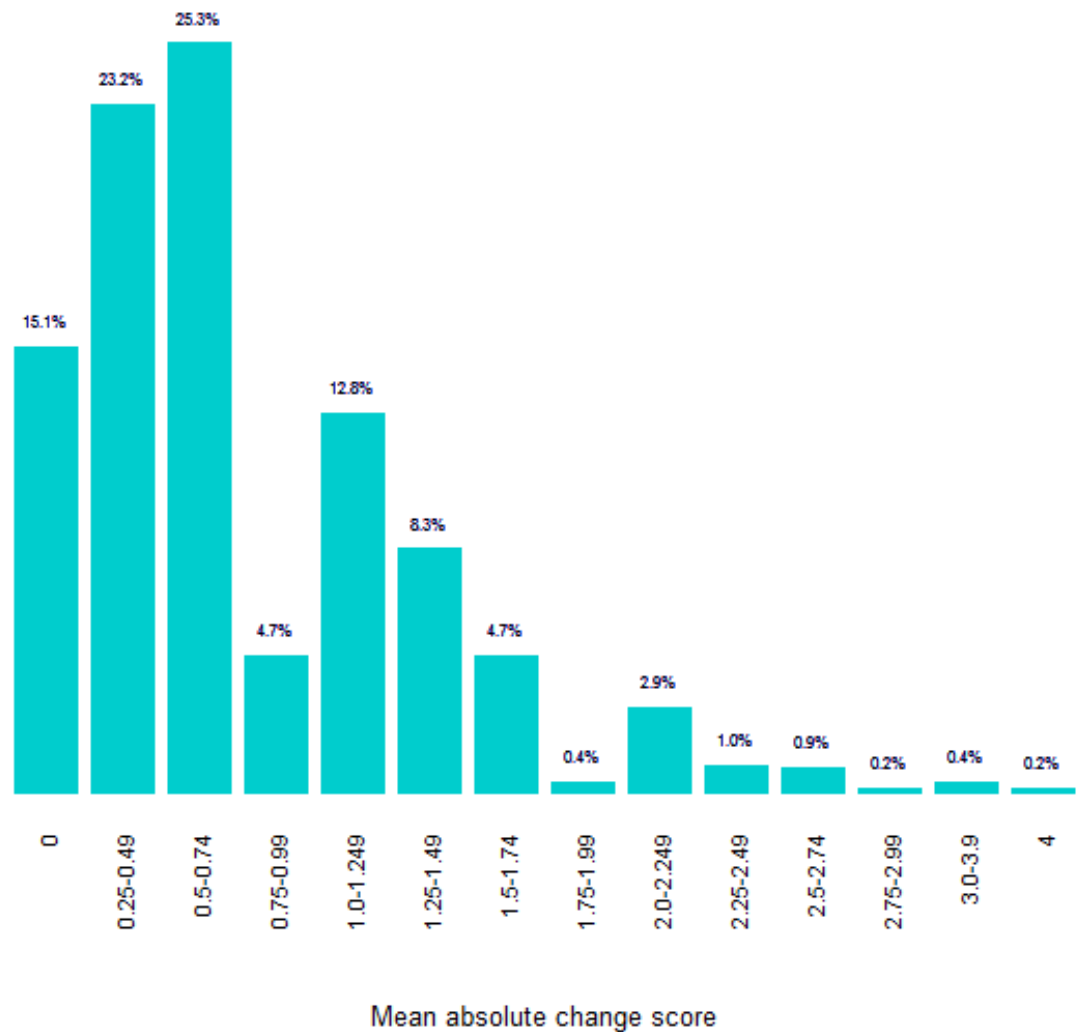
There was a moderately strong negative correlation between the mean life score and the mean change score – Pearson correlation = -0.507, p<0.01. Thus, children whose life satisfaction changes more also have lower mean life satisfaction. However because the distribution of life satisfaction is so highly skewed this is almost inevitable. Nevertheless the correlation is not so high as to suggest that these two measures are capturing exactly the same thing. The analysis below explores how mean SWB scores and the extent of fluctuation in scores relate to some other relevant information about children's lives across the 11 to 15 age range.

12.2.3 Relationships between the contexts and circumstances of children's lives and patterns of their SWB across the 11 to 15 age range

A third way of summarising children's SWB over time – based on estimating trajectories is presented in the final analytical section of this chapter. However, before that, some analysis will be presented of the associations between the above two measures and the independent variables introduced in the previous chapter. In order to do this the measures described above were calculated for the pooled BHPS data set because this has consistent variables at each wave of the survey.

In order to begin to explore the relationships between the summary measures of SWB discussed earlier and the context and circumstances of children's lives between the ages of 11 and 15 some simple descriptive analysis was undertaken using the BHPS. The BHPS gathered information from all household members. Because this is a household panel rather than a child cohort study there was no 'main parent' interview and the same information was gathered from each household member aged 16 and over. Information on the relationships between members is included in the data files. Some information (e.g. income) relates to the household. Other information (e.g. level of education) relates to each individual. Where information related to individuals a decision needed to be taken as to which people in the household to link with the child who was completing the youth questionnaire between the ages of 11 and 15. It would be possible, but highly complex, to link information about every family member. More realistically, a decision had to be made about how to handle some of the information gathered from parents – such as financial difficulties and academic qualifications. Because a much greater proportion of children were still living with their mother than their father in this age range it was decided for the purposes of this analysis to only consider the individual information gathered from the mother, which was available in around 99% of cases. This is sufficient to undertake some exploratory analysis and generate some useful insights. It is an approach that could be developed further, considering different participants within households, such as a father when present, in future research.

The following variables were available in all or almost all waves of the BHPS and were used in the analysis:

- Family economic status: Equivalised household income and a question asked of the parent about the extent of financial difficulties they were experiencing (on a five-point scale).

- Housing tenure: A variable containing information about different types of housing tenure which was collapsed into a binary variable – owned or rented.

- Number of parents: Variables indicating the number of couples and lone parents in the house which were used to create a binary variable – one parent and two parents. There were very few cases (less than 1%) where neither of these applied and these were excluded.

For the family economic variables, mean scores were calculated across all five years (related to the ages at which the child completed the youth questionnaire). For the other two factors, categorical summary variables were created. For housing tenure the summary variable indicates whether the child always lived in owned housing, always in rented housing or a mixture of these two, between the ages of 11 and 15. For number of parents the summary variable indicates whether the child always lived with one parent, always with two or a mixture of these, between the ages of 11 and 15.

Additionally, the child-reported variables about experiences of being bullied and quality of relationships with parents which were analysed in the previous chapter were included in the analysis. Means of the scores at each age were calculated and these are used in the analysis that follows.

Table 12.4 summarises bivariate associations for the parent-reported variables. All of these family context variables were significantly associated with children's mean life satisfaction score. Children had higher mean scores if they were living with two parents, in owned accommodation, in a family that was better off and where the mother reported fewer financial difficulties. They were all significantly associated with fluctuations in child SWB. So children were more likely to experience fluctuations in their life satisfaction if during this five-year period they did not always live with two parents, if they lived for some or all of the time in rented accommodation, if their families had lower income and had greater financial difficulties. In general the strength of associations with fluctuations in child SWB were stronger than with mean child

SWB across this age range. These findings provide an important insight into the dynamics of child SWB which have been relatively unexplored in previous research.

Table 12.4: Bivariate relationships between family context and child SWB summary measures between the ages of 11 and 15

		Child SWB measure (11 to 15)	
		Mean	Fluctuations
Equivalised household income (5-year mean)	Correlation	0.088	-0.149
	Sig.	***	***
Parent-reported financial difficulties (5-year mean)	Correlation	-.097	0.104
	Sig.	***	***
Housing tenure (5-year summary measure)	Always owned	8.18	1.386
	Mixture	7.81	1.650
	Always rented	7.84	1.800
	Anova sig.	***	***
Number of parents (5-year summary measure)	Always one	7.860	1.699
	Mixture	7.877	1.619
	Always two	8.160	1.430
	Anova sig.	**	**

Linear regressions were also run for each SWB variable using the four variables above as independent variables. Results were rather inconclusive, perhaps due to correlations between the effect of the different variables (although multicollinearity did not appear to be an issue). However the explanatory power of these models was very modest – around 2% in relation to mean SWB and 3.6% in terms of fluctuations. There is thus once again not very strong support here for the impact of socio-economic factors on children's SWB, although it is interesting that they had the greatest predictive power for fluctuations.

The three child-reported family and peer variables show a significant association with mean child SWB between the ages of 11 and 15 (Table 12.5). Worrying about bullying has the strongest association. Each of the variables was also significantly associated with fluctuations in child SWB at the bivariate level.

Table 12.5: Bivariate relationships (Pearson correlations) between aspects of children's lives and child SWB summary measures between the ages of 11 and 15

	Child SWB measure (11 to 15)	
	Mean	Fluctuations
Talks to mother	.210***	-.149***
Quarrels with mother	-.253***	.139***
Worries about bullying	.303***	.198***

The findings in this section provide some new insights into the stability and change in children's SWB across the 11 to 15 age range and demonstrate that both mean SWB scores and fluctuations in SWB scores are significantly associated with a range of other contextual and process factors in children's lives. Consistent with other analysis presented in this dissertation the association with process factors is much stronger than with contextual factors. The final part of the analysis presents a third way of viewing children's SWB over time – trajectories – and explores the associations between these trajectories and the two process factors of family relationships and children's experiences of bullying.

12.3 Trajectories

Trajectories in children's life satisfaction have already been looked at in a simple way in Table 10.4 and Figure 10.1 through summary statistics for each age group in the reshaped data set. However there are several limitations to this simple descriptive approach. The first is that the samples of children being compared at each wave are not identical for the reasons explained earlier. This means that this is not purely longitudinal analysis and some of the observed differences could be to do with differences in the samples. A second limitation is that simple description does not provide information about the statistical significance of the observed patterns in terms of means or variances. A third limitation is that it is not possible to extend this analysis to incorporate predictors and co-variates.

These limitations can be addressed using latent growth curve modelling. As discussed earlier this approach aims to find the best fitting within-case trajectory. This approach belongs to the structural equation modelling family. Estimation of growth curves was conducted using the lavaan package in R. There are some statistical issues inherent in this approach, given the highly skewed distributions of the life satisfaction variable

and the fact that there is quite a lot of missing data across waves. The missing data means that it is not possible to use estimation procedures which might be most appropriate for the variable (such as WLVS estimators or bootstrapping). Therefore, full information maximum likelihood estimation was used and (Huber-White) standard errors were calculated due to the skewed distributions.

This section begins with a general descriptive exploration of trajectories of children's SWB between the ages of 11 and 15 years old. It then goes on, in two separate sub-sections to explore the link between these trajectories and two factors – experiences of being bullied and relationships with parents.

Results of an unconditional linear growth curve model are summarised in Model 12a in Table 12.6. The intercept mean, slope mean, intercept variance, slope variance and intercept-slope covariance were all statistically significant. Some detailed interpretation of these statistics will be provided here but will then be treated more concisely for other models discussed below.

The intercept mean was just over five and the p-value simply indicates that the estimated value of the intercept was significantly different from zero. The slope mean shows that mean life satisfaction decreases by about 0.1 with each age increment. The p-value indicates that the slope is significantly different from a zero slope line. The statistically significant variances of the slope and intercept indicate that there is significant variation in these values for individuals within the sample. In terms of the intercept this indicates substantial variation in children's starting points at the age of 11. In terms of the slope this means that some people have significantly steeper decreases while others have significantly smaller decreases or potentially increases in life satisfaction over this age range. Finally the significant negative covariance between the intercept and the slope indicates that children who initially score higher have significantly steeper decreases than children who initially score lower. Thus there is to some extent a convergence over time which may be due to regression towards the mean. The fit statistics for this linear model are acceptable based on common thresholds (CFI>0.95, RMSEA <0.05, p-value of RMSEA<=0.05 is above 0.5, SRMR<0.05). However there is potentially room for improvement here and this can be seen in Figure 12.3 which shows the estimated linear growth curve as a continuous grey line and the

observed means as squares. It can be seen that the linear growth curve fits well from 11 to 14 but then departs from the observed means.

Due to this pattern a quadratic growth curve was also estimated. Statistics for this are summarised in Model 12b in Table 12.6. Here the fit statistics are substantially improved. The estimated curve is depicted in Figure 12.3 as dotted black line. It can be seen that the estimated position at age 15 is slightly closer to the observed values. The quadratic solution is considerably more complex to interpret particularly when incorporating into more complex models with multiple measures as presented in the next chapter. In fact it can be seen from Figure 12.3 that the problematic issue for both growth curves is the levelling off of life satisfaction between the ages of 14 and 15. A linear model fitted to the age range 11 to 14 only (Model 12c in Table 12.7) shows excellent fit statistics. So the conclusion of the analysis so far is that life satisfaction decreases in a fairly straightforward linear fashion from 11 to 14 and is then roughly flat between 14 and 15.

Table 12.6: Summary of unconditional latent growth curve model (robust standard errors)

	Model 12a Linear, 11 to 15	Model 12b Quadratic, 11 to 15	Model 12c Linear, 11 to 14
Intercept mean	5.077**	5.086**	5.090**
Linear slope mean	-0.101**	-0.122**	-0.114**
Quadratic slope mean		0.006	
Intercept variance	0.571**	0.674**	0.588**
Linear slope variance	0.051**	0.400**	0.088**
Quadratic variance		0.020**	
Intercept-Slope covariance	-0.065**	-0.221*	-0.090**
Intercept-Quadratic covariance		0.033	
Linear-Quadratic covariance		-0.083**	
df	10	6	5
χ^2	55.079	12.970	11.038
CFI	0.957	0.993	0.992
RMSEA	0.040	0.020	0.021
RMSEA confidence interval	0.031–0.049	0.006–0.034	0.005–0.035
p-value RMSEA <=0.05	0.960	1.000	1.000
SRMR	0.045	0.017	0.020

Figure 12.3: Unconditional latent growth curve models for life satisfaction
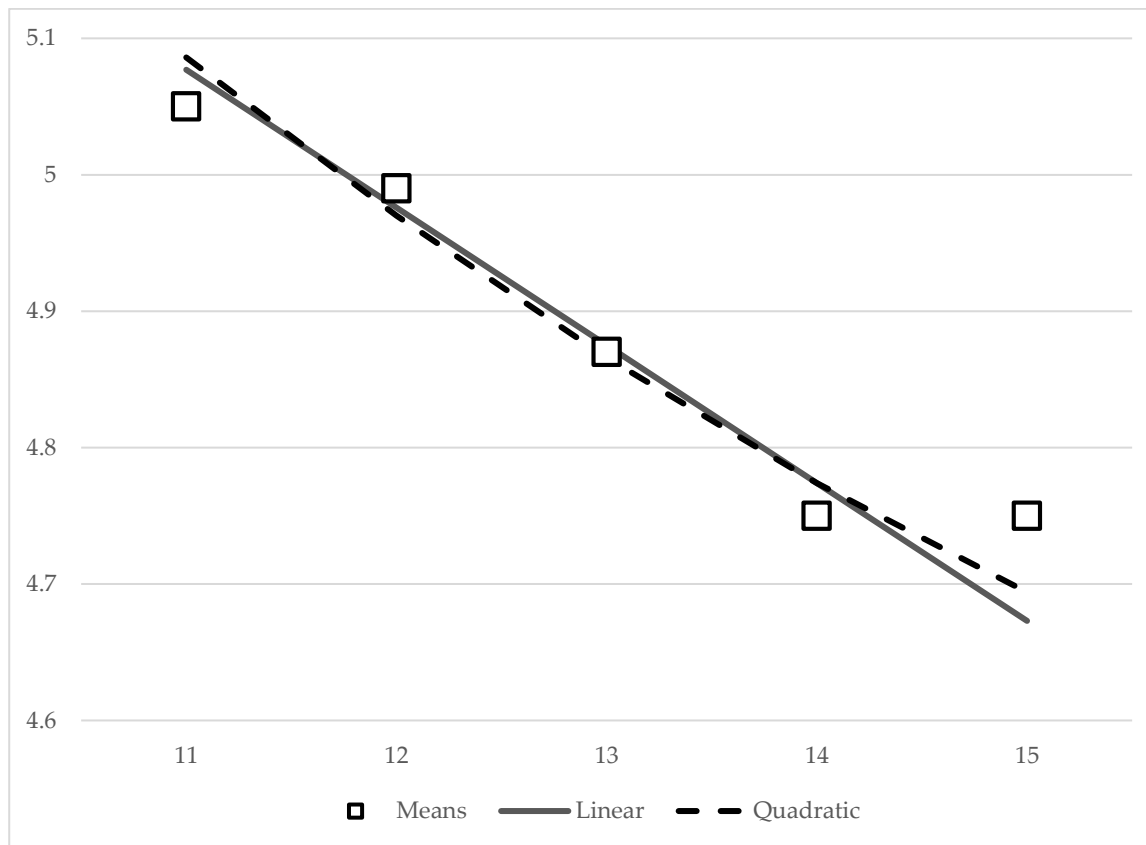
There remains an issue with the apparent different trajectories for females and males identified through the descriptive statistics in Figure 10.1. So the next step in the analysis was to introduce gender as a (time-invariant) covariate in the linear growth curve model. This was done for both the 11 to 15 and 11 to 14 linear models. Results are summarised in Table 12.7. In both cases, the fit indices show small improvements compared to the corresponding statistics in Table 12.6. However the more important point here is that the regressions of slope and intercept onto gender are statistically significant. In particular the slope-gender regression coefficient is negative. Given that male was coded as 1 and female as 2 in this dataset, this indicates a significantly steeper slope for females than males. For example, in the 11 to 15 model, the estimated slope for males can be calculated as 0.096 (linear slope mean) minus 1 times -0.131 (slope-gender regression) which equals -0.035 indicating a very shallow decreasing trajectory for males. The slope for females is then the above slope with a second figure of 0.131 subtracted which equals -0.166, i.e. a much steeper downwards slope. In summary this analysis indicates that females and males have substantially different life

satisfaction trajectories between the ages of 11 and 15 and combined (female and male) latent growth curve models may conceal important gender differences.

Table 12.7: Summary of linear latent growth curve model with gender as a covariate (robust standard errors)

	Model 12d Linear, 11 to 15	Model 12e Linear, 11 to 14
Intercept mean	4.902**	4.872**
Linear slope mean	0.096**	0.118**
Intercept variance	0.566**	0.581**
Linear slope variance	0.047**	0.082**
Intercept–Gender regression	0.117*	0.146*
Slope–Gender regression	-0.131**	-0.156**
Intercept–Slope covariance	-0.060	-0.083
df	13	7
χ^2	59.746	11.896
CFI	0.963	0.995
RMSEA	0.036	0.016
RMSEA confidence interval	0.028–0.044	0.000–0.029
p-value RMSEA <=0.05	0.998	1.000
SRMR	0.040	0.017

A further step was to estimate models for each gender separately. The results are summarised in Table 12.8. For females a linear model across the 11 to 15 age range did not have adequate fit statistics (Model 12f). A quadratic model across this age range (Model 12g) showed improved fit although the quadratic slope mean was not significantly different from zero. Although the model fit was adequate this suggests doubts about the practical value of this model. For females across the 11 to 14 age range a linear model (Model 12h) showed excellent fit. The reason for the findings can be seen by the plot of the observed means for females in Figure 12.4 where there is a levelling off of life satisfaction for females at 14 to 15. For males a linear model (Model 12i) showed excellent fit statistics. However the slope coefficient is quite small (-0.036) with a p-value of 0.001. Given this result a flat model (intercept term only) was estimated (Model 12j). The fit statistics for this model were just adequate. Therefore for males there is only weak evidence of a slope in the trajectory of life satisfaction between the ages of 11 and 15 (see also Figure 12.4).

Table 12.9: Summary of latent growth curve models for each gender (robust standard errors)

	Females			Males	
	Model 12f Linear, 11 to 15	Model 12g Quadratic, 11 to 15	Model 12h Linear, 11 to 14	Model 12i Linear, 11 to 15	Model 12j Flat, 11 to 15
Intercept mean	5.137**	5.159**	5.161**	5.021**	4.949**
Linear slope mean	-0.168**	-0.217**	-0.191**	-0.036*	
Quadratic slope mean		0.014			
Intercept variance	0.605**	0.656**	0.613**	0.518**	0.450**
Linear slope variance	0.057**	0.430**	0.103**	0.037*	
Quadratic variance		0.022*			
Intercept-Slope covariance	-0.066*	-0.171	-0.090**	-0.053	
Intercept-Quadratic covariance		0.019			
Linear-Quadratic covariance		-0.090*			
df	10	6	6	10	10
χ^2	50.528	12.128	9.842	13.268	43.577
CFI	0.929	0.989	0.989	0.993	0.937
RMSEA	0.054	0.027	0.026	0.115	0.041
RMSEA confidence interval	0.041– 0.068	0.004 –0.047	0.000– 0.048	0.000– 0.032	0.030– 0.052
p-value RMSEA <=0.05	0.288	0.973	0.966	1.000	0.906
SRMR	0.066	0.022	0.029	0.030	0.055

Figure 12.4: Latent growth curve trajectories in children's life satisfaction by gender
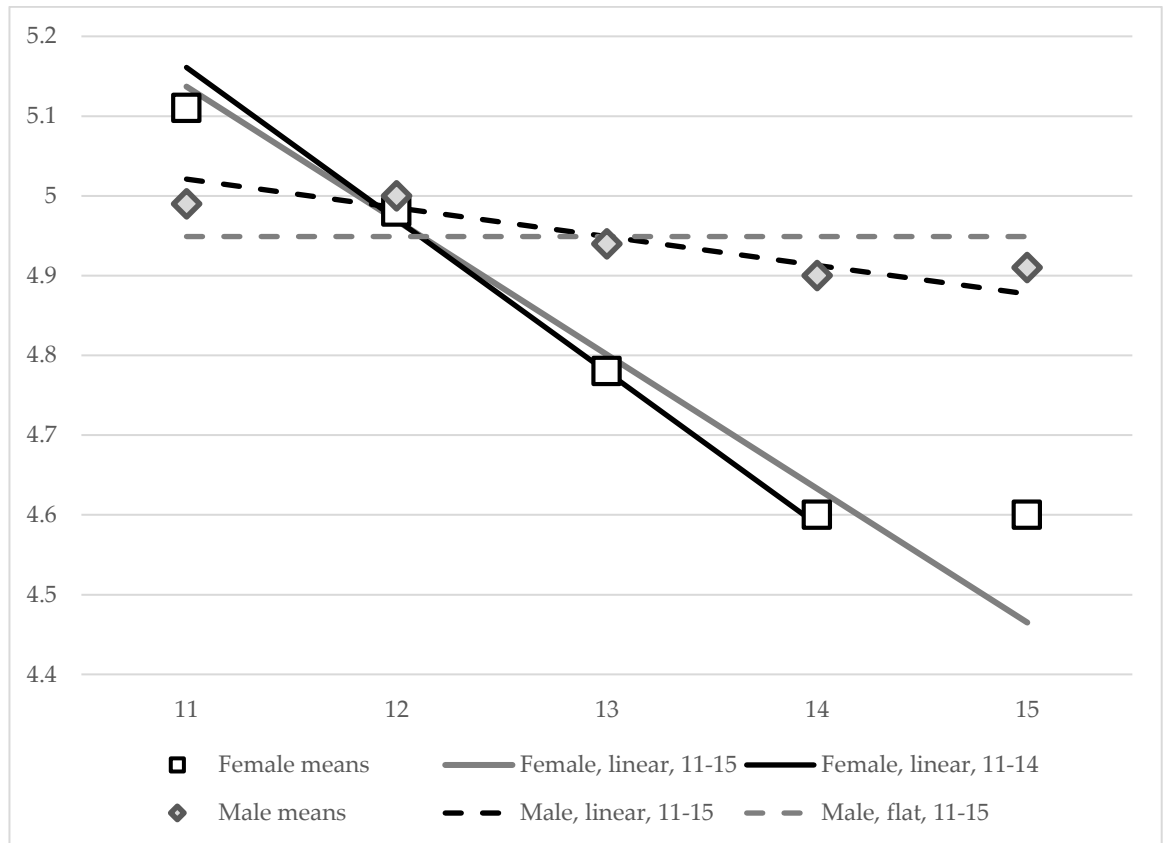
The key conclusion from this analysis using latent growth curve modelling is that females and males have significantly different trajectories in life satisfaction between the ages of 11 and 15. For females there is a significant downward slope while for males there is little or no change. These conclusions are very much in line with those from the simple descriptive analysis presented earlier in this section. However the latent growth curve approach maximises the use of available information in the data set, while offering more precision and providing a means of testing and statistically comparing different estimated trajectories.

12.3.1 SWB trajectories and bullying

Now that appropriate latent growth curve models have been fitted, it is possible to explore the relationship between these trajectories and the focal variables of this part of the dissertation. A starting point for this analysis is to introduce the focal variables at the age of 11 years old as predictors of the trajectories. A second step is then to build up a picture of stability and change in each focal variable and how these relate to trajectories. In this section this is done for the bullying variables and in the next section for variables regarding family relationships.

The first models tested here involve simultaneously introducing binary predictor variables depending on whether a child was bullied in each way at the age of 11. The intercept and slope of the growth curves are then regressed onto these variables. Because of the flat trajectory of life satisfaction between 14 and 15, the models used here only relate to the 11 to 14 age range. Because of the significantly different growth curves for females and males, models are estimated separately for each gender. A path diagram illustrating the model to be fitted is shown in Figure 12.5.

Figure 12.5: Illustration of path diagram for linear growth curve model with predictor variables
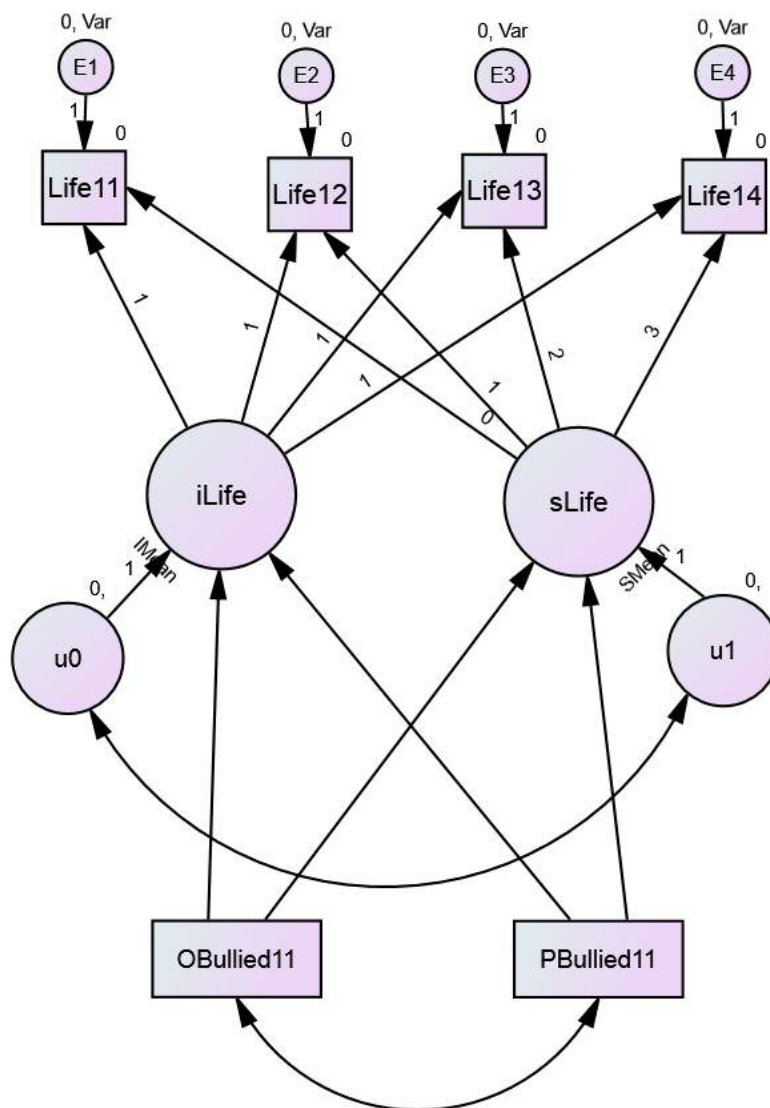
Results of this model are shown in Table 12.9. The main points are similar for both genders although, as already established in the previous chapter, the slopes of the growth curves are different. Whether a child was physically bullied did not

significantly predict the intercept at age 11. However whether a child was bullied in other ways at the age 11 did. Children who were bullied in other ways had mean life satisfaction scores almost 0.5 lower for females and almost 0.4 points for males on the six-point scale than children who were not bullied. The regression coefficients in the model for the slopes were non-significant. At first sight this may seem a rather uninteresting result. However the fact that the slopes were no different implies that the gap in subjective well-being at age 11 between children who were bullied and not bullied (as evidenced by the significant intercept–other bullying coefficient already noted) is maintained between the ages of 11 and 14. Children who were bullied at the age of 11 continue, on average, to have lower life satisfaction than other children three years later. Of course, this does not imply a causal link as many other factors may explain this pattern.

Table 12.9: Summary of linear latent growth curve model with whether bullied (physical and other) at age 11 as predictors (MLR estimation and robust standard errors)

	Model 12k Female	Model 12l Male
Intercept mean	5.322**	5.211**
Linear slope mean	-0.170**	-0.076*
Intercept variance	0.558**	0.492**
Linear slope variance	0.101**	0.060*
Intercept–PBully regression	-0.112	-0.153
Slope–PBully regression	-0.074	0.067
Intercept–OBully regression	-0.464**	-0.394**
Slope–OBully regression	-0.036	0.049
df	9	9
χ^2	15.816	10.761
CFI	0.987	0.997
RMSEA	0.023	0.012
RMSEA confidence interval	0.000–0.040	0.000–0.032
p-value RMSEA <=0.05	0.997	1.000
SRMR	0.034	0.021

Some further analysis of an exploratory nature was undertaken to try to gain a clearer picture of different trajectories. This analysis made use of linear growth curve models of life satisfaction between the ages of 11 and 14 together with information about the occurrence of bullying at both 11 and 13. In terms of the latter, four sub-groups were

formed depending on whether children had or had not experienced bullying at each of the two time points. A multi-group growth curve model was then fitted in order to assess the extent to which different permutations of bullying at 11 and 13 years of age were related to similar or different trajectories of SWB.

This analysis relates to a sample of just under 800 cases for which data on bullying was available at both 11 and 13. The numbers and percentages of cases in each group were as shown in Table 12.10. Most children (71%) had not been physically bullied at either time point and only 8% had been at both. Experiences of other forms of bullying were more common. Just over half of children (53%) had not experienced this at either time point but almost one in five (19%) had experienced it at both time points.

Table 12.10: Numbers and percentages of children bullied or not at ages 11 and 13 by bullying type

	Physical bullying		Other bullying	
	Number	%	Number	%
Not bullied	561	71%	421	53%
Bullied at 11 only	107	14%	122	15%
Bullied at 13 only	56	7%	100	13%
Bullied at 11 and 13	67	8%	149	19%
Total	791		792	

Separate latent growth curve models were fitted for the two forms of bullying. For each form of bullying the relationship between the four permutations above and life satisfaction trajectories from 11 to 14 was assessed. Because of the number of cases models were not fitted separately for each gender. The model for physical bullying did not converge, possibly due to the small number of cases in some categories. The model for other forms of bullying had acceptable fit statistics (CFI=0.970, RMSEA=0.047, p-value RMSEA<=0.05 = 0.526, SRMR = 0.061). The four linear growth curves estimated by the model are shown in Figure 12.6. Group 1 is those children who had not been bullied in other ways at either age; Group 2 are those who were bullied at 11 years old but not at 13; Group 3 are those that were not bullied at 11 but were at 13; and Group 4 are children who were bullied in other ways at both points in time.

Both the intercepts and slopes of these trajectories provide some useful insights. The mean life satisfaction scores at age 11 are higher for the two groups of children who had not been experiencing bullying in the six months leading up to that time point.

However it is notable that the mean score for those who would later be bullied at 13 years old is lower than for those who would not. Additionally the mean score is lower for those who end up being bullied at both time points than those who are bullied at 11 but not at 13. All four slopes are negative, indicating decreasing life satisfaction between 11 and 14 years of age. However one slope – for children who were bullied at 11 but not at 13 (Group 2) – is much shallower than the others. This means that these children do not experience a very substantial drop in life satisfaction and by the age of 14 are much closer to Group 1 who did not experience bullying at either time point. The slope for Group 4 is slightly steeper than for Group 1 suggesting a slight widening of the gap in life satisfaction between these two groups with age. The same is true to a lesser extent for Groups 3 and 1. By the age of 14 children in Group 4, who had experienced bullying at both measured time points had mean life satisfaction scores of around 4.2 out of 6 compared to around 4.9 out of 6 for Group 1 who had not been bullied at either point.

Figure 12.6: Linear latent growth curves of life satisfaction for different permutations of other forms of bullying at the ages of 11 and 13 (MLR estimation with robust standard errors)
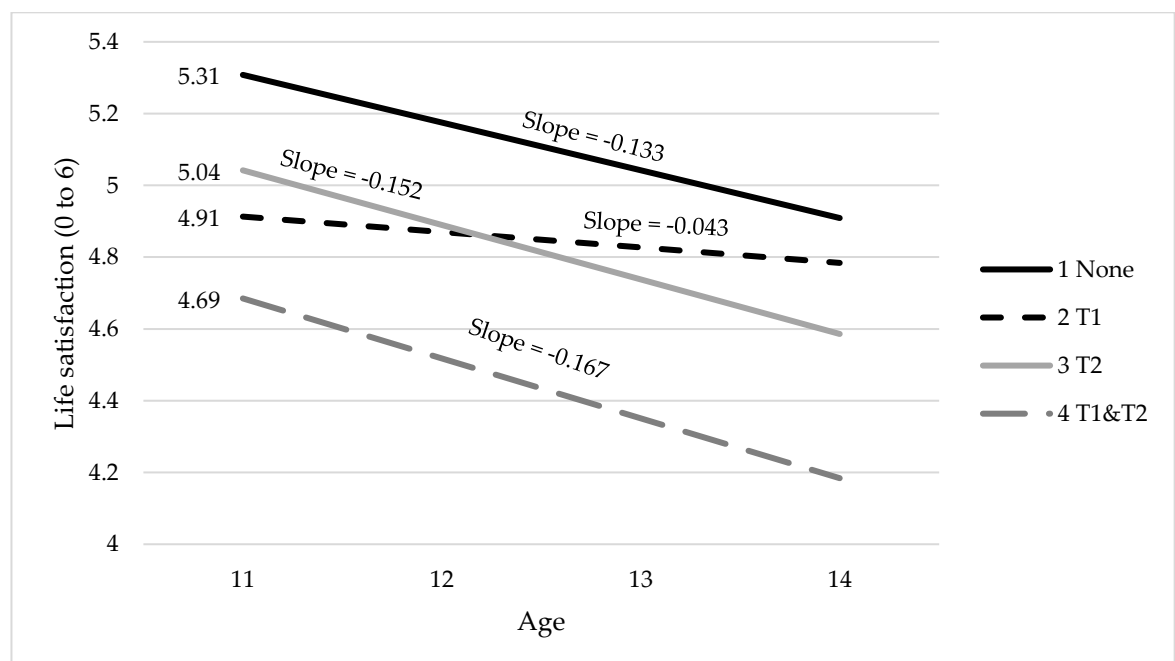
The above model was also run with additional regression terms for the intercept and the slope onto gender. Here also the model fit was acceptable (CFI=0.966, RMSEA=0.047, p-value RMSEA<=0.05 = 0.535, SRMR = 0.057). None of the gender-intercept coefficients were statistically significant – suggesting that females and males

within each of the four groups start off with similar mean life satisfaction at the age of 11. The gender-slope coefficients were marginally significant for Groups 2 and 4 – suggesting that the decline in trajectories of life satisfaction differed between females and males. The coefficient indicated that for these groups the age-related decline in life satisfaction was steeper for females than males.

The findings summarised in Figure 12.6 are tentative for several reasons. First, there is the possibility of selection bias as this is a sub-sample of children participating in at least three of the first five waves of the survey. Second, information on bullying is only available at two time points two years apart. At both time points the question asks about experiences over the previous six months so this only represents a partial picture of children's experiences of being bullied. Third, the sample size is relatively small with only 100 cases in the smallest group. Bearing these points in mind, to the extent that variations in subjective well-being may be attributable to experiences of being bullied, the patterns in this analysis suggest that (a) the effect on life satisfaction of experiencing bullying at age 11 may fade gradually over a three-year period; (b) there is already some difference in life satisfaction at age 11 between children who will be bullied at 13 and those who will not; and (c) the effects of persistent bullying on life satisfaction are quite substantial.

Overall, this analysis adds to the existing cross-sectional findings on the link between experiences of being bullied and children's subjective well-being in several ways. Children who experienced either form of bullying at any age tended to have lower intra-personal mean life satisfaction across the 11 to 15 age range and there was also some evidence that they were likely to experience greater fluctuations in life satisfaction. Moreover, the analysis of trajectories shows that children who were bullied had substantially different SWB trajectories across the 11 to 14 age range from children who were not bullied. This is important evidence because, as far as it goes, it does not support the 'set point' theory of adaptation to permanently negative circumstances. On the other hand there is more optimistic evidence also in Figure 12.6 that might indicate that when bullying ceases children's life satisfaction can improve. The final section of Chapter 11, presenting fixed effects model which take account of

individual heterogeneity, also supports the evidence on an association between bullying and children's SWB although this does not imply causality.

Unfortunately, as outlined in the introduction to this chapter, due to issues with the timing of the data and quality of the variables, it was not possible to take this analysis further to address issues of possible directions of influence between bullying and SWB. It remains plausible that the relationship is in either or both directions. Key requirements of future research to explore this issue would be shorter gaps between waves of data collection (perhaps three months would be optimum) and stronger measures both of SWB and of bullying.

12.3.2 Trajectories of SWB and family relationships

As in the previous section, useful information about the relationship between family relationships and patterns of children's SWB between the ages of 11 and 14 (after which SWB tends to level off) can be gained from latent growth curve models. This section looks at the extent to which the variables about family support and about quality of relationships with their mothers are linked with trajectories in children's SWB across this age range.

Table 12.11 shows the results of such a model with the binary variable about whether children felt mostly supported by their family at the age of 11 as a predictor variable. For females, the family support variable significantly predicted the mean level of SWB at age 11. Girls who felt their family mostly supported them had SWB scores about 0.74 points higher (on a scale from 0 to 6) than those who felt less strongly supported. There was no relationship between family support at age 11 and the slope of the curve, suggesting that the above gap remained fairly constant between 11 and 14. As with the findings for bullying, this is more interesting than it first appears because it might be expected that the gap would narrow with time. The fit of this model was only just adequate however. For males, the family support variable also made a significant contribution to predicting the mean level of SWB at age 11. Additionally there was a statistically significant interaction between family support at age 11 and the slope of the SWB trajectory. Boys who initially felt more supported by their family at 11 years old experienced a decrease in SWB of around 0.16 points per year. Thus over the age range considered the gap between the two groups (high and low support) would have

narrowed from around 0.8 points at age 11 to around 0.3 points at age 14. The fit of this model is very good.

Table 12.11: Summary of linear latent growth curve model with whether the child feels mostly supported by family at age 11 as predictor (MLR estimation and robust standard errors)

	Model 12m Female	Model 12n Male
Intercept mean	4.519**	4.376**
Linear slope mean	-0.250**	0.058
Intercept variance	0.509**	0.472**
Linear slope variance	0.115**	0.057*
Intercept – Family support regression	0.740**	0.807**
Slope – Family support regression	0.052	-0.162*
df	7	7
χ^2	19.657	7.169
CFI	0.942	0.999
RMSEA	0.062	0.007
RMSEA confidence interval	0.035-0.091	0.000-0.051
p-value RMSEA <=0.05	0.211	0.943
SRMR	0.042	0.029

Table 12.12 summarises similar models using the variables regarding frequency of talking to and arguing with mother as predictor variables. As these are ordinal variables, and it is not clear that they can be treated as interval variables, they have been collapsed into binary variables with as close to a 50-50 split as possible for this piece of analysis. For talking with their mother, a value of one indicates that the child talked to their mother most days and a value of zero indicates less frequently. For arguing with their mother a value of one indicates that they hardly ever did this and a value of zero indicates that they did so more frequently.

Both models had good fit statistics. However the values of 1.0 for the CFI and 0.0 for the RMSEA in Model 12p should not be viewed as representing a 'perfect' fit. They are attributable to the fact that the chi-squared statistic for this model is lower than the degrees of freedom which means that the results of the calculations of the CFI and RMSEA exceed their upper and lower bounds respectively. These statistics should therefore be viewed with caution.

The key messages from the two models are very similar. Talking to one's mother frequently and arguing infrequently are both associated with higher SWB at age 11 for girls and boys. Neither variable significantly predicted the SWB slope suggesting that the differences in SWB at age 11 persist up to the age of 14.

Table 12.12: Summary of linear latent growth curve model with frequency of arguing with and talking to mother at age 11 as predictors (MLR estimation and robust standard errors)

	Model 12o Female	Model 12p Male
Intercept mean	4.863**	4.805**
Linear slope mean	-0.149**	-0.029
Intercept variance	0.535**	0.538**
Linear slope variance	0.102**	0.071
Intercept–TalkM regression	0.386**	0.285**
Slope–TalkM regression	-0.094	-0.066
Intercept–ArgM regression	-0.193*	-0.216**
Slope–ArgM regression	-0.009	-0.039
df	9	9
χ^2	14.315	6.246
CFI	0.990	1.000
RMSEA	0.021	0.000
RMSEA confidence interval	0.000-0.038	0.000-0.020
p-value RMSEA <=0.05	0.998	1.000
SRMR	0.025	0.014

The analyses in this section indicate significant links between the quality of children's family relationships at the age of 11 years old and their SWB trajectory between 11 and 14 years old. Children who had poorer quality family relationships at the age of 11 years old tended to start with poorer life satisfaction than children with better quality family relationships and for the most part this gap in life satisfaction tended to persist for these children up to the age of 14 years old. It has already been established from cross-sectional analysis that the quality of family relationships, from the child's perspective, is one of the factors more powerfully associated with children's SWB. The analysis presented here adds to this picture by providing several new insights into the association between the quality of children's family relationships and their SWB.

First, the observed associations tend to persist over time. Children who are not getting on well with their parents at the age of 11 have lower life satisfaction at that age and tend on average to continue to have lower life satisfaction than their peers at least up to the age of 14. Second, the associations between quality of relationships and SWB remains after taking account of unobserved fixed factors (e.g. personality). This is, as far as I am aware, the first analysis of this topic using this method. This evidence strengthens the case for considering family relationships an important factor affecting children's SWB although it does not demonstrate causality. It is still plausible that children's level of life satisfaction may affect the quality of their family relationships. For example, children with low life satisfaction might tend to argue more with parents. As with the discussion of bullying in the previous chapter, new data using better measures and shorter time scale would be needed to unpick the directions of influence here.

Chapter 13: Children's subjective well-being between 11 and 15 years old: Summary and discussion

This part of the dissertation has focused on the third key research topic of the dissertation which is to develop a greater understanding how children's SWB varies between the ages of 11 and 15 years old and which factors are associated with this variation. Due to the availability of data in the Understanding Society (USS) and British Household Panel Surveys (BHPS) it was only possible to consider this question for the cognitive component of SWB through a single-item measure of life satisfaction as discussed in Chapter 5. Also due to the availability of suitable data, two types of factors have been selected as a focus for this analysis – quality of family relationships and experiences of being bullied. These are both factors that have previously been found to have relatively strong associations with SWB in cross-sectional analysis.

An initial cross-sectional analysis of Wave 1 of the USS indicated significant age and gender variations in life satisfaction. Mean life satisfaction decreased with age but this was much more pronounced for females than males and from a starting point at the age of 11 years old where girls had slightly higher mean life satisfaction than boys, by the age of 14 years old the situation was reversed. This analysis was confirmed by within-person analysis of trajectories using latent growth curve modelling. Trajectories of boys' life satisfaction were relatively flat across this age range while girls' life satisfaction declined significantly between 11 and 14 and then appeared to level off to 15 years old. This difference informed the subsequent work in this part of the dissertation in terms of ensuring that tests were run separately for females and males. Two other summary measures of children's SWB between the ages of 11 and 15 years old were also created. The first was the mean of life satisfaction scores across measurement points between these ages and the second was the extent of fluctuation of life satisfaction between consecutive waves. These measures show a picture of both stability and change in children's SWB across this age range. This is confirmed by cross-wave correlations which were moderate (0.4 to 0.5) over periods of one year but weaker (between 0.2 and 0.4) as the gap between measurements increased. There is thus quite substantial within-person change in children's life satisfaction across this age range and this suggests the potential for interventions that might improve

children's SWB. Nevertheless it is also notable that 43% of those children who had low life satisfaction at the age of 11 years old also had low life satisfaction at 15 years old, compared to only 8% of children who did not have low life satisfaction at 11 years old. There is thus some evidence of a group of children with recurrent low life satisfaction over this four-year period. As far as I am aware this descriptive analysis of patterns of individual children's SWB over time is the first of its kind using UK data and it provides new insights into the phenomenon, which are then developed further by making use of the three approaches – means, fluctuations and trajectories – in subsequent analysis.

The second key part of the analysis uses fixed effects regression models to test whether the significant association of family relationships and bullying respectively with children's SWB still holds when taking into account unobserved fixed factors. The results of this analysis shows that each of these factors is still a significant predictor of SWB using the fixed-effects approach. These are important new findings that give greater confidence in the hypothesised impacts of family relationships and experiences of being bullied on children's SWB, although reverse or bi-directional causality cannot be ruled out.

The final part of the analysis looked at the extent to which quality of family relationships and bullying, as well as contextual factors, are linked to patterns of children's SWB over the 11- to 15-years-old age range. Family type and socio-economic circumstances were again only weakly related to SWB using these measures, although it is interesting to note that there were significant associations of all four of the variables with the measure of fluctuations in children's life satisfaction. In fact this measure was more sensitive to these circumstances than was the mean. This provides at least tentative evidence that changes in children's circumstances may cause fluctuations in their SWB (here it is not really plausible that there is a relationship in the opposite direction between, say, fluctuation in children's SWB and household income). Children living in low-income households tended to have greater fluctuations in SWB across this age range. This is, as far as I am aware, a newly identified issue in research on children's SWB and could be explored further. Again here, measures of children's relationships were more strongly related to the SWB measures than

contextual circumstances were. The analysis of trajectories of SWB between 11 and 14 years of age suggests that children who at 11 years old were being bullied more frequently and had poorer quality family relationships have lower life satisfaction not only at that age but also subsequently, at least up to the age of 14 years old when trajectories of life satisfaction tend to level off.

Additionally, throughout the analysis there is evidence of gender differences both in terms of patterns of SWB across the age range considered and in terms of the strength of association with other factors. In broad terms, there is a pattern of girls' SWB declining much more markedly than boys' between the ages of 11 and 14, and also of family relationships and bullying having a somewhat stronger association with SWB for girls than boys. This highlights the importance of considering gender, and also potentially other types of individual characteristics, when exploring patterns of, and influence on, children's SWB. It also leaves the question of what other factors may be more important in explaining variations in boys' SWB than girls'.

The analyses described above have provided some important new evidence about the link between children's experience of close relationships and how satisfied they feel with their lives. This evidence suggests first that these links are not temporary and that children with poorer quality relationships have consistently lower than average well-being across adolescence and second that these links are robust to tests that take account of fixed factors such as children's personality which may be implicated in the statistical associations observed. Thus the evidence presented here strengthens the previous cross-sectional findings on the association of quality of relationships and experiences of bullying with children's SWB in this age range (Goswami, 2012; Wolke & Skew, 2012; Yucel & Yuan, 2015; Patalay & Fitzsimons, 2016; Rees & Bradshaw, 2016). The evidence that bullying is associated with longer-term lower levels of life satisfaction also adds to the accumulating evidence on the long-term impacts of childhood bullying well into adulthood (see reviews in Wolke & Lereya, 2015; McDougall & Vaillancourt, 2015).

The broad conclusion is that the links examined in this analysis do exist but it is still not possible to be sure about the directions of influence between these different issues. A key implication of this analysis is that shorter-term longitudinal studies with good

quality variables are needed to make progress in identifying whether, for example, low

life satisfaction leads to being bullied and/or being bullied leads to low life satisfaction.

Part 5

Conclusions

Chapter 14: Summary and discussion

This dissertation set out to understand why some children are more satisfied with their lives, happier and less sad than others. The broader context within which this research is situated is a growing interest in the UK and elsewhere in the idea of measuring how people feel about their lives for policy and practical purposes. At present, there is a relative shortage of evidence gathered from children that can contribute to these developments. This situation means that there is a risk that, in terms of practical implications, the quality of life of children (who comprise a substantial proportion of the total population) will be side-lined in comparison with that of adults. Moreover, focusing on children's experiences of and feelings about their lives in the present is potentially an important way of acknowledging childhood as a life stage in its own right, rather than simply as a preparation for adulthood. For these two reasons it is important that this issue of children's subjective well-being is explored more fully.

Previous studies, primarily using information gathered at single points in time (cross-sectional data), have identified factors and contexts which are associated with children feeling more or less satisfied or happy with their lives. The current work builds on and extends this body of work, and makes a unique contribution to this field, by adopting a longitudinal perspective from birth through to 15 years of age. While a small number of studies have used longitudinal analysis in the field of subjective well-being, as far as I am aware there has been no previous published research[26] on the links between early childhood factors and children's later subjective well-being during adolescence. There has also been very little research looking at the progression of children's subjective well-being across time.

The analysis reported here therefore represents an important step forward in developing an understanding of how and why children's subjective well-being varies. It looks at children's subjective well-being between the ages of 11 and 15 from two different perspectives. First, it examines the relationship between how a child evaluates and feels about their life at the age of 11 years old, and their early life circumstances.

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[26] A recent initiative at the LSE, led by Richard Layard, has adopted a life-course perspective to subjective well-being (Layard et al., 2014), but this project does not utilise measures of subjective well-being during childhood, although it does cover emotional health.

Second, it explores how children's evaluations of their lives between the ages of 11 and 15 years old are related to their other experiences during this period. Additionally, and addressing a third key issue in this field of research, the analysis discusses some important measurement issues, identified through testing available SWB variables in these data sets, and generates new insights on this topic which are of wider relevance for SWB research.

The analysis makes use of data from three large-scale broadly representative UK studies with a longitudinal element which contain questions about children's subjective well-being – the Millennium Cohort Study (MCS), the Understanding Society Survey (USS) and the British Household Panel Survey (BHPS). These data sets contain a range of other information gathered from children and their parents and offer considerable potential for longitudinal analysis relating to children's SWB, which has not previously been exploited. They contain large numbers of cases and include samples that are broadly representative of the child population. Weightings and other information are available to take account of factors such attrition, variations in sampling probabilities and clustering and stratification. This means that it is possible to calculate robust confidence intervals for estimates and that, in many instances, the findings presented are generalisable to the broader population of children. They also contain repeated waves of measurement in relation to the same people (as children and later as adults), and linked information gathered from parents, and therefore offer a rich set of options for longitudinal analysis.

Alongside these strengths, there are also some limitations inherent in secondary data analysis in general and in these data sets in particular. The analysis is inevitably restricted in scope by the available variables and this applies both to SWB and other variables. In terms of the SWB variables, various issues and limitations of these were identified in the analysis in Chapter 5. The MCS has the strongest set of variables because there are questions related to all three components of SWB – cognitive, positive affect and negative affect – whereas the other two studies only have cognitive SWB measures. The cognitive SWB measures are limited because there is only one context-free life satisfaction question and the five domain satisfaction items do not represent a full range of the key aspects of children's lives identified through previous

research (Dex & Hollingworth, 2012). Furthermore, the response scales for these variables are restricted to seven options which is less than optimal for SWB variables because the large majority of people respond in the positive half of the continuum. Ultimately, due to these limitations, much of the analysis relies on single-item measures, for which there are issues of reliability and stability, and in some cases it was necessary to utilise binary variables and logistic regression which in turn limited the nature of the conclusions that could be drawn from the analysis.

Turning to the other variables utilised in the analysis, all the data sets contain a very large array of variables to choose from and these adequately cover many of the key factors that might be explored. For example, there is good data on household income in all three data sets and this represents a considerable advantage over studies that have only utilised self-report data from children. On the other hand there were still some notable gaps or shortages of relevant information. In particular, the MCS is relatively weak on data on the quality of family and parent-child relationships. The child self-completion questionnaire at the age of 11 asks no questions about this apart from a domain satisfaction question, and the data from parents about this issue is rather sparse and varies across waves. There is also very little data on children's direct experiences of poverty or material deprivation, which have been shown to have much stronger associations with their SWB than variables such as household income. So some of the findings about the links between economic factors and SWB may under-estimate the importance of these issues in children's lives.

Despite the large size of the studies, sample size was sometimes an issue for some aspects of the analysis, particularly where this involved linking data from children across different waves of the panel surveys. Due to missing waves, the final samples of children in the analysis were often quite small and it was not possible to weight the data or to be sure exactly how representative it was of the general child population.

Finally, although the ability to link data across annual cycles of measurement is a potential strength, the timing of the gap between cycles also has some weaknesses for the types of issues which may be relevant to children's SWB. For example, relying on comparing frequency of recent bullying at two time points 12 months apart, and life satisfaction questions asked at the same time points is probably not the ideal way to

investigate the direction of relationships between these two issues. Research with adult populations has suggested that events during the last three months are particularly important for understanding variations in SWB. Therefore, ideally repeated longitudinal data over shorter cycles would be useful to explore the dynamics of child SWB and the relationships with changes in other factors such as frequency of being bullied.

Having reviewed the rationale for the research, and the strengths and limitations of the analysis presented, the remainder of this concluding chapter is divided into two parts. First, a brief summary of the key findings from the analysis in relation to each of the research questions is provided. Then, there is a discussion of key messages and implications of these findings.

14.1 Summary of key findings

The work presented in Parts 2 to 4 of the dissertation was undertaken with the aim of answering three questions:

1. To what extent do available measures of children's SWB fit the most common conceptual frameworks of SWB?

2. To what extent are early and middle childhood factors associated with children's later subjective well-being?

3. How does individual children's subjective well-being vary over time and what factors are associated with this variation?

Part 2 focused on the first of these questions. A key finding from Chapter 5 is statistical support for the distinction proposed in the tripartite model of subjective well-being between life satisfaction, positive affect and negative affect. Confirmatory factor analysis of the MCS data found that a three-factor model with separate latent factors for life satisfaction, positive affect and negative affect had excellent fit statistics while a one-factor model including the same variables did not. This is an important finding in its own right as it is the first statistical test of this kind of the tripartite model with children in the UK. Two studies in the US (Huebner, 1991; Huebner & Dew, 1996) had

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also found support for this framework with different age groups of children and young people using exploratory factor analysis.

Having established statistical support for the tripartite model, Chapter 5 also used confirmatory factor analysis to explore the most appropriate ways of utilising the variables available in the three data sets to represent the three components of this model. As well as establishing a foundation for the analysis that follows in Parts 3 and 4, this aspect of the analysis also generated some important messages that have wider implications. Careful testing of various options for measures of cognitive SWB presented in Chapter 5 suggests that the most common multi-item measure used in previous UK research to operationalise this concept does not have satisfactory psychometric properties. An alternative measure is proposed which, while it still has limitations, is more defensible conceptually and statistically. This analysis can inform more accurate and valid research on SWB using the same data sets in the future.

The final aspect of the first research question to be explored in Part 2 is the distinction between positive and negative mental health. One of the key ideas of the positive psychology movement – a key stimuli for the development of research on subjective well-being – is that positive mental health is more than the absence of mental disorders. This proposition has been supported by research with adults in various countries, demonstrating for example that is not unusual for people with diagnosed mental health problems to feel relatively satisfied with their lives (Bergsma et al, 2011). There has also been a strand of literature in the US exploring this idea of a dual-factor model of mental health with children (e.g. Greenspoon & Saklofske, 2001). There were limitations in options for testing this proposition due to the properties of the data available. However, the size of correlations between the measures of subjective well-being and mental health problems were moderate and did not suggest that these were capturing one and the same concept.

Part 3 focused on the second research question and examined the extent to which available information about children's early childhood predicted their later SWB. The overarching finding from the analysis presented in Chapters 7 and 8 is that children's evaluations of, and feelings about, their lives at the age of 11 years old are not strongly predicted by available data on their family and economic circumstances in very early

childhood (at nine months old). Neither are they strongly predicted by the quality of parent-child relationships when the child is three years old. In fact, once current circumstances at the age of 11 years old are taken into account, information about children's early years has very little value in terms of predicting children's subjective well-being at 11 years old. These are new and important findings. There is one previous piece of UK research published on the longitudinal links between family factors and children's subjective well-being in middle childhood (Parkes et al., 2016); but no previous research that has taken the longer term view presented in Part 3, either in the UK or elsewhere. This is a significant gap in the research on children's subjective well-being. Children's early life circumstances are known to predict the development of cognitive skills, educational attainment, behavioural and mental health outcomes. Supplementary analysis presented in this dissertation confirmed that the factors being considered explained much more of the variation in a measure of potential mental health problems at the age of 11 years old than in measures of subjective well-being. Thus the findings presented in Chapters 7 and 8 highlight an important difference in the influences on subjective well-being compared to other childhood outcomes. I will return to this point and its implications in the discussion.

In addition to the broad central conclusion outlined above, there are a number of more detailed findings presented in Chapters 7 and 8 that warrant some comment. Family economic factors at 11 years old are significantly associated with children's life satisfaction, happiness and sadness at that age. Moreover, when various family and socio-economic factors are considered jointly, the economic factors seem more important in explaining variation in children's SWB than factors such as parental education, employment status and age. These latter factors have all been shown to have a relationship with other child outcomes. This point is illustrated in the analysis at the end of Chapter 7 where parental employment status and parental education are shown to significantly predict variations in children's mental health problems at the age of 11 years old, while not predicting life satisfaction using the same explanatory variables and analytical approach.

The analysis in Chapter 8 also shows that several aspects of the parent-child relationship (as reported by the main parent) at the age of 11 years old are associated

with children's SWB at that age. Where parents reported more frequent battles with their children, felt less close to them, and engaged more frequently in permissive parenting practices such as not implementing a regular bedtime, children tended to have significantly lower SWB. There was very limited evidence that the quality of parent-child relationships when the child was three years old predicted their SWB at the age of 11 years old, once these relationship factors at 11 years old were taken into account. Nevertheless there was evidence of a strong statistical link between quality of parent-child relationships at the two ages. For example, children living in a disorganised home environment at the age of three did have a significantly higher chance of low life satisfaction and low happiness at the age of 11. This relationship weakened when parent-child relationships at 11 were taken into account. But, where children lived in a disorganised home at the age of three, parents were more likely to report battles with their child, less feelings of closeness and more permissive parenting at the age of 11. This suggests that the quality of relationships at an early age does persist to some extent and future research might explore in more detail the direct and indirect pathways between early parent-child relationships and attachment and children's later SWB. Additionally, as in Chapter 7 there was clear evidence in Chapter 8 of a much stronger link between parent-child relationships at three and 11 years old and children's mental health problems at the age of 11 than there was for children's life satisfaction at the same age, using the same analytical approach. The implications of this will be returned to in Section 14.2.

The third key research question covered in Part 4 focused on explanations of variations and patterns in subjective well-being between the ages of 11 and 15 years old. It has already been established through previous cross-sectional analysis that children's experiences of being bullied, and of the quality of their relationships with their parents, are closely linked to their evaluations of their lives as a whole. Part 4 extends and strengthens this evidence in three ways.

It is the first analysis that I am aware of that has explored patterns and trajectories of individual children's SWB over time. While some previous research has compared average levels of SWB across different age groups, this analysis has not looked at this through linking individual children. This latter approach has a number of benefits in

terms of the insights it can provide and these are illustrated in the analysis in Chapters 11 and 12.

The first half of Chapter 12 provides a descriptive account of the progression of individual children's SWB across a five-year age range from 11 to 15 years old. It reveals considerable change in life satisfaction across this age range. Nevertheless children who had low life satisfaction at the age of 11 years old were more than five times as likely as other children to have low life satisfaction at the age of 15 years old. An important finding from this descriptive analysis is that children's family and socio-economic circumstances were significantly associated not only with average levels of, but also fluctuations in their SWB. Children from poorer families, those who lived in rented housing and those who experienced changes in housing tenure and family structure were all more likely than average to experience fluctuations in their SWB. This supports the sparse previous research on the impact of changes in children's circumstances on their SWB (Robson, 2010; Powdthavee & Vernoit, 2013). Finally, the analysis of trajectories of SWB between 11 and 15 using latent growth curve modelling shows clear gender differences, with girls' life satisfaction decreasing substantially between the ages of 11 and 14 while boys' life satisfaction stayed relatively constant on average.

This analysis of trajectories lays the foundation for the second key strand of findings in this part of the dissertation. This is that the differences in children's subjective well-being linked to their experiences tend to persist for a considerable period of time. Thus, children who report arguing more frequently with their parents at a given point in time tend not only to be less satisfied with their lives at that point, but also are more likely to be less satisfied with their lives several years later. Similar findings apply to experiences of bullying which are also linked with lower life satisfaction over a period of years. The inequalities in children's subjective well-being that are linked to their experiences therefore tend to be maintained over time. These findings considerably strengthen the existing cross-sectional evidence about the fundamental importance of the quality of children's relationships for their sense of well-being. They also make an important contribution to the more general SWB literature on the extent to which people adapt to negative circumstances and return to a 'set point' of SWB. There was

some evidence of a closing of the gap between children who had and had not been bullied at the age of 11 years old. However this gap was still evident to some extent several years later. In general, there was also evidence in this analysis of stronger links between these process factors and trajectories of SWB for females than for males.

The third and final component of analysis in Part 3 made use of longitudinal data to explore whether previous cross-sectional findings on the links between SWB and process factors such as being bullied and feeling supported by family still held once unobserved fixed factors (e.g. personality traits) were taken into account. The analysis, using fixed effects regressions, suggests that these links are still present. These findings are important because they add substantially to the evidence of associations between relationship factors and SWB, although they still cannot say anything conclusive about the directions of influence inherent in these associations. Here also there was some evidence of stronger associations for females than males.

14.2 Discussion

In the final section of the chapter I will discuss some of the key implications from this set of findings for understandings of children's subjective well-being in particular and children's experiences of childhood more broadly. I will begin by revisiting the conceptual and measurement issues with which the first part of the dissertation began. I will then move on to consider two broad cross-cutting messages from the findings in different parts of the dissertation. Then, I will draw out some implications of the work for future policy, practice and research on this topic.

14.2.1 Concepts of subjective well-being

The analysis focuses on two different aspects of the conceptualisation of SWB – the tripartite framework representing different components of SWB, and the distinction between SWB and mental health problems. As summarised above, the psychometric testing in Part 2 supported both of these proposed ideas. However, if different constructs are clearly distinct from one another, then one should also expect to see different patterns of association between them and other factors. On this point, the evidence in Part 3 is more mixed.

On the one hand there was very clear evidence of different patterns of association for measures of cognitive SWB and mental health problems. The final sections of Chapters 7 and 8 present regression models that show substantial differences in explanatory power for these two measures, and also different patterns of association of various independent variables. Children's mental health problems at the age of 11 years old are much more strongly predicted than children's cognitive SWB at the same age by contemporaneous and historical contextual and process factors. More specifically, particular variables such as parental education are significant predictors of children's mental health problems but not their SWB. There are less clear examples in this analysis of historical factors that more strongly predict SWB than mental health problems. But other analysis of the MCS using a wider range of contemporaneous factors has found such evidence. Patalay and Fitzsimons (2016) report that obesity and feelings of neighbourhood safety are significant predictors of cognitive SWB at the age of 11 years old but not mental health problems. It does seem, therefore, that, as indicated in research with adult populations, SWB and mental health problems among children are distinct phenomena. This point is important because there is a potential for linguistic confusion in the use of the term 'mental health'. This is probably not helped, in the UK, by the emergence of the term 'mental well-being'. It is important to keep in mind that mental well-being and mental ill-health are not opposite ends of a single continuum. Future research could useful continue to pursue this theme and identify different correlates of the two.

On the other hand, the analysis presented in Chapters 7 and 8 did not produce very clear evidence of differential correlates of the different components of the tripartite framework. There were a few tentative indications in this respect. In Chapter 7, there was a pattern of historical and current family economic factors being a little more strongly associated with life satisfaction and sadness than with happiness. In Chapter 8, it appeared that early parent-child relationships were more strongly associated with later life satisfaction and happiness than with sadness. However, these findings were not conclusive and this may have been partly attributable to limitations in the properties of the binary variables used and the generally low levels of explanatory power of early childhood circumstances for children's later SWB. Rees and Bradshaw (2016) used a wider variety of child- and parent-reported factors from the fifth sweep

of the MCS and also only found tentative evidence of differential associations with life satisfaction, happiness and sadness, although this analysis is hampered by the same limitations of the three SWB variables. In summary, so far there is no clear evidence that different factors predict life satisfaction, happiness and sadness to a different extent. This means that, while the measurement analysis in Chapter 5 supported the tripartite framework, there is still a need to demonstrate the practical utility of distinguishing between these different components of SWB. Future studies with scalable multi-item measures of each component are needed in order to draw stronger conclusions one way or the other about this issue. Alternatively, it may be more useful to consider SWB as a single construct – measured through a scale constructed from combination of the components of the tripartite model. The analysis presented in Chapters 5 7 and 8 could be extended to explore this possibility.

This issue has important implications that should be considered in the future development of surveys that include children's SWB measures – including UK longitudinal studies; and also international initiatives such as the Children's World project (Rees, 2017b) and the potential longitudinal European Cohort Study (Pollock et al., 2018).

14.2.4 How one measures subjective well-being matters

Another aspect of the analysis in Chapter 5 that warrants some further discussion is the testing of the properties of various multi-item measures of SWB. This aspect of the analysis highlighted the importance of taking care when creating multi-item measures on the basis of convenience rather than concepts. It has become common practice for UK researchers to make use of a score which is the sum of six items asking children about their happiness with family, friends, appearance, school, schoolwork and life as a whole which are available in all three of the data sets analysed here. This has been described as a measure of 'life satisfaction', 'happiness' and 'mental well-being'. Various writers have reported that the scale has good reliability. However, more detailed testing undertaken for this dissertation using confirmatory factor analysis indicates that this measure does not fully meet accepted criteria to be used as a scale. Moreover there is evidence of measurement variance between females and males and between children of different ages. There are also conceptual issues with this scale, and there are risks that it over-estimates the importance of school factors to children's

overall SWB. Therefore it is concluded that use of this measure of overall SWB is not fully defensible. A reduced four-item version (family, friends, appearance and school) had better statistical fit but there was still evidence of measurement variance by gender and age.

A broad message from this aspect of the analysis is that measures intended to represent life satisfaction but which consist of the sums of domain satisfactions need to be developed carefully; should have a strong conceptual basis; and should also be based on a thorough consideration of relevant domains. It is possible that these domains may vary across childhood and for different sub-groups. A second message is that some of the previously published literature using the six-item scale may be misleading and its conclusions should be viewed with circumspection.

A second aspect of measurement which was introduced in Part 3 probably represents an innovation in the field of research on children's subjective well-being. This involved the calculation of summary measures of SWB based on repeated measurements over time (up to five annual waves of data in the BHPS and Understanding Society data sets). The approach was to calculate two different measures. The first was a mean of scores across all waves. The second was a measure of fluctuation in SWB calculated as the mean absolute variation between consecutive waves. The analysis in Chapter 10 showed that these two measures had different associations with other variables both during adolescence and in early adulthood. For example household income was more strongly associated with fluctuations in SWB than with the mean scores. This suggests that children living in lower income households may be more prone to changes in SWB. Overall, looking at the progression of SWB over a period of time in different ways through means and fluctuations seems to have some value. This is an approach that could be utilised in other future research on SWB both with children and with adults.

14.2.3 The distinctiveness of subjective well-being

I now turn to some broader messages coming out of the analysis presented in the dissertation. A first important overarching message from the analysis relates to the distinctiveness of subjective well-being in comparison with other commonly-used measures of 'well-being' or 'outcomes' such as educational attainment and mental ill-

health. UK social research on these kinds of outcomes routinely looks for explanations on the basis of factors such as household income, parental education and family structure. These studies have demonstrated socio-economic gradients for many childhood outcomes. For example, children living in persistent poverty in the early years have much poorer cognitive development by the age of seven than children who have never experienced poverty (Dickerson and Popli, 2015). The analysis in Chapter 7 also shows the substantive association between socio-economic factors at various points in childhood and children's mental health problems at the age of 11 years old.

Subjective well-being appears to be different. Children's relationships, particularly contemporaneous ones, are much more important than contextual factors (such as socio-economic and family circumstances) in understanding how they feel about their lives. This might seem an obvious conclusion, but so much social research about children is focused on the impact of structural factors, rather than direct experiences, that it is actually of more importance than might initially appear.

This is not an entirely new message. It was already established in UK research that children's evaluations and feelings about their lives were not very strongly related to, for example, their family's current level of income. Analysis of cross-sectional data had also already demonstrated that children's experiences of family and peer relationships are much more strongly associated with how they feel about their lives than household income or family structure are. The analysis presented in this dissertation extends and strengthens this conclusion using longitudinal data.

It is not the case that structural factors do not matter at all. On average children living in poverty are less satisfied with their lives. It is more that these patterns are much weaker when attempting to predict children's life satisfaction than when attempting to predict, for example, whether they have mental health problems. It is also important to acknowledge that it is not yet entirely clear to what extent children's reports of their experiences are independent of their reports of life satisfaction or happiness and this is an important topic for future research to explore further.

With these caveats in mind, the findings presented here nevertheless carry some important messages for children's social research in general. They suggest that

researchers should keep an open mind about what issues are considered relevant to understanding phenomena of interest. This message extends not only to approaches to analysis but also to decisions about what data to gather. It is notable, for example, that the child self-completion questionnaire in Wave 5 of the Millennium Cohort Study asks no specific questions about children's views of their relationships with their parents while finding room for 19 questions on children's experience of, and views about, drinking alcohol. This is rather remarkable given the fundamental importance of family relationships to children's well-being.

It is possible to envisage that the findings from research on children's subjective well-being could be used to develop a more child-centred agenda for social research about children and childhood. This would involve all childhood researchers taking a constructively critical approach to stereotyped ways of thinking about what does and does not matter for child well-being and outcomes. An example is the recent research on child-centred measures of material deprivation (Main & Bradshaw, 2012; Main; 2014) which arose from the joint programme of research on children's SWB by The Children's Society and University of York. It has demonstrated compelling evidence that these child-centred measures are much stronger predictors of children's life satisfaction and happiness than traditional household-based economic measures. This work has provided important new insights on variations in children's subjective well-being, and may also be highly relevant to work on other child outcomes.

14.2.4 Children's subjective well-being and diversity

A second important overarching message from the analysis relates to possible diversity in children's experience of subjective well-being and the factors affecting it within different sub-groups of the population. In this respect, gender emerges as an important issue in the analysis several ways.

In Chapter 10, it was reported that multi-item measures of children's subjective well-being constructed through summing their levels of satisfaction with different aspects of life did not work in the same way for girls and for boys. This means that, strictly speaking, it is not permissible to compare the mean scores for girls and boys using these types of measures. Underlying this finding is the possibility that the questions

have a different meaning or significance according to gender. This is an important issue for further consideration in future research.

The analysis of the progression of children's life satisfaction between the ages of 11 and 15 in Chapters 10 to 12 demonstrated different trajectories for girls and boys. Girls become increasingly dissatisfied with their lives from the age of 11 to 14 while boys, on average, have very similar levels of life satisfaction across this age range. The overall result of these different average trajectories was that, while girls and boys were roughly equally satisfied with their lives at the age of 11, girls were significantly less satisfied than boys at the age of 14. For both genders there was little difference in mean levels of life satisfaction between the ages of 14 and 15. Also in Chapter 11, it was shown that girls' and boys' life satisfaction may be differentially associated with other issues in their lives. It appears that girls' life satisfaction may be more strongly affected than boys' by bullying and the quality of family relationships. This also raises the question of what other factors might be more salient to understand variations in the subjective well-being of boys than girls.

A specific message from this group of findings is that researchers of child subjective well-being should pay careful attention to gender issues. It is quite common for published research to include gender as an independent variable in models attempting to predict variations in children's subjective well-being. However, very little attention has been paid to (a) whether the measures being used function equally for girls and boys; (b) whether there are interactions between gender and other independent variables. This is an important area for future research. There are also practical implications. If there are gender differences in the extent to which children's experiences of bullying or family relationships affect their life satisfaction, then it will be important to take these differences into account in aiming to improve children's subjective well-being. It may be that a different emphasis is needed for interventions according to gender.

But there is also a broader implication of the findings on gender differences. So far most UK research on children's subjective well-being has tended to treat children as a homogeneous group. Even the issue of what matters for children's SWB at different ages has been rather neglected. There has also been relatively little attention to other

aspects of diversity in SWB research. It will be important for future research and discourse on children's subjective well-being to be more attentive to issues of possible difference and diversity, not only in levels of SWB but also in the factors that may impact upon it. As well as gender, this kind of work might extend to social class, ethnicity and a range of other factors.

14.2.5 Directions for future research

A number of the points made above suggest directions for future research on children's SWB. Major issues have been identified in the dissertation about the conceptualisation and measurement of the various components of children's SWB. In particular some practices which have been used in other analysis to create summary measures intended to represent children's happiness or life satisfaction from a set of variables available in all three data sets appear to be questionable. There are several implications of this.

First, researchers using these data sets should be much more careful in the construction of composite measures as there is a risk that approaches based on convenience could yield incorrect and misleading conclusions. As well as the results of the confirmatory factor analysis, the discussion in Chapter 5 also discusses some potential extensions to this approach including testing a model involving a second-order factor representing overall SWB, including the use of hierarchical omega analysis to test alternative models (Guio et al., 2017b; Zinbarg et al., 2005); testing a bifactor model (Chen et al., 2013); and the possibility of testing for partial scalar invariance where full measurement invariance does not hold using the multiple group factor analysis alignment method (Marsh et al., 2017). All of these are possible directions for future research on measurement issues .Second, there is a need to advocate for a longer-term strategy of improving the current questions on SWB routinely included in UK longitudinal data sets. Third, and a prerequisite for the above, is the need to undertake statistical validation and conceptual clarification of other measures of SWB currently in use in the UK to ensure that they are fit for the purpose intended. The ability to draw strong conclusions from the analysis presented here has been hampered by measurement issues and this will continue to be a problem for research on child SWB until the above actions have been taken.

Moving away from measurement issues, there is a need for further longitudinal work on children's SWB and a key limitation of the current analysis was the time gap between observations. Other research suggests that a gap of one year is not the most useful for research on this topic and there is a need for longitudinal studies over shorter cycles (e.g. three months). This type of study could lead to firmer conclusions about the direction of association between SWB and other factors in children's lives.

Extending beyond implications that can be directly derived from the findings presented here, the policy salience of SWB would be enhanced if it was found that SWB during childhood was connected with outcomes later in life. There is a small amount of evidence suggesting that this may be the case (Olsson et al., 2012; Layard et al., 2014). More research of this nature would be useful and informative.

14.2.6 Practical and policy implications

This dissertation had broad aims and was not designed to generate specific recommendations for policy and practice in relation to children and young people. However, there several general implications stemming from the findings presented and the conclusions drawn which are relevant to policy and practice audiences.

A strong message from this analysis is that the factors associated with variations in children's SWB appear to be very different from those associated with other topics about childhood typically studied by social researchers – such as educational outcomes, mental health problems, behavioural issues, and so on. The implication of this broad finding is that the types of actions that might be taken to tackle inequalities in children's SWB are likely to be different from those aimed at tackling educational inequalities, for example. Moreover, if the goal of practice or policy interventions is to improve the quality of children's lives during childhood then these differences in the nature of the phenomenon require an open-minded approach from practitioners and policy makers. This echoes the point made in Section 14.2.3 about the need for childhood researchers to think differently.

It has become common in the UK to argue that early childhood is a key developmental stage that has far-reaching implications for outcomes later in childhood, in adolescence and in adulthood. This is based on sound evidence of the long-term impact of early

childhood disadvantage for some outcomes. However, the findings presented in Part 3 suggest that early childhood interventions may not be particularly effective in improving children's later subjective well-being. The lack of early childhood predictors suggests that researchers should focus efforts on identifying more contemporaneous circumstances and events that may be linked to how children evaluate and feel about their lives.

There are significant variations in SWB trajectories between the ages of 11 and 14 and there is also evidence of substantial fluctuations in levels of SWB from one year to the next. The potential to identify the factors associated with these variations and fluctuations is limited by the variables available and the time gaps of measurement in the secondary data which was analysed. However, evidence was found of significant associations with variations in experiences of being bullied and in the perceived quality of relationships with parents. There was evidence that gaps in SWB persisted over time and tentative evidence that changes in these aspects of children's lives predicted later SWB levels.

The above two broad conclusions are useful to the extent that the goal of improving children's SWB is accepted as important. In this case, the longitudinal analysis paints a dynamic picture and suggests the possibility of intervening to improve SWB. Quality-of-life interventions might usefully focus much more on recent factors than those earlier in childhood, and much more on process factors than contextual ones. Thus, initiatives aimed at improving children's quality of life are likely to take on quite a different complexion to those aimed, for example, at improving educational outcomes.

The two process factors that were the focus of analysis in Part 3 were experiences of being bullied and quality of parent-child relationships. Both seem an important part of the picture in understanding why some children are more satisfied, happier and less sad than others. It seems possible that interventions aimed at reducing bullying and improving parent-child relationships may lead to improvements in levels and trajectories of SWB. This hypothesis could be tested through evaluative studies of interventions.

The issue of bullying is particularly interesting because this was identified by children as having a fundamental impact on their quality of life in exploratory qualitative research on children's understandings of well-being in the UK more than a decade ago (The Children's Society, 2006). As reviewed in Chapter 3, the substantial association between experiences of being bullied and low SWB has been a recurring finding in quantitative research in the UK since that time. In parallel, as discussed in Chapter 13 other researchers have begun to identify much longer-term impacts of childhood bullying. Recent analyses of UK longitudinal data (Takizawa, Maughan, & Arseneault, 2014; Takizawa et al., 2015) have found that childhood bullying uniquely predicts physical and mental health problems much later in life. In fact, Takizawa et al. (2014) estimated that the effects of childhood bullying were 'similar to those of being placed in public or substitute care' (p. 777) and a recent review of long-term effects of bullying by Wolke and Lereya (2015) concluded that 'Bullying by peers has been mostly ignored by health professionals but should be considered as a significant risk factor and safeguarding issue' (p. 879).

This example highlights the potential of factors that affect children's well-being to also affect their well-becoming and points to the potential to develop new areas of research, policy and practice connecting childhood and adult outcomes. Research on children's SWB has a unique potential to contribute to improving the quality of life of children in childhood and in future adulthood. The key message from this discussion is for practitioners and policy makers, as well as researchers, to take into consideration factors identified as important through research on children's SWB when weighing up their goals and priorities.

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Appendix: Details of the three studies used for analysis

1. Millennium Cohort Study (MCS)

The MCS is a longitudinal birth cohort study of children born soon after the start of the new millennium. The children included in the sample were born between September 2000 and August 2001 in England and Wales; and between November 2000 and January 2002 in Scotland and Northern Ireland (Hansen, 2014).

Sampling

The sampling strategy involves a selection of around 400 electoral wards. The sample in each country of the UK is divided into strata based on a measure of area disadvantage and, in England only, there is a third stratum for areas with high minority ethnic populations. Thus there are a total of nine strata. The disadvantaged and ethnic minority strata were over-sampled. There was also a booster sample in Wales. Weights are available in the data set to correct for these disproportionate samples.

Response rates

The number of possible families and the number and proportion of families participating at each wave are shown in Table A1. Note that some additional families that had been omitted from the original sample in England entered the survey at the second sweep (Platt, 2014). It can be seen from Table A1 that there was substantial sample attrition across the five sweeps. Weightings have been calculated by the MCS study team to balance the sample to take account of attrition.

Table A1: Families participating in the first five sweeps of the MCS survey

	Sweep 1 9 months	Sweep 2 3 years	Sweep 3 5 years	Sweep 4 7 years	Sweep 5 11 years
Total number of families	18,522	19,244	19,244	19,244	19,244
Number participating	18,522	15,590	15,246	13,857	13,287
Participating families as % of total	100%	81%	79%	72%	69%

Reproduced from Platt (2014, Table 1.3)

Participants and data collection

Information was gathered by trained interviewers from the main parent, and a partner if present in the household, at each sweep; from the cohort child in the second to fifth sweeps; from older siblings in the second and third sweeps; and from teachers in the fourth and fifth sweeps (England and Wales only). Additionally birth records were gathered at the first sweep; medical records at the second to fifth sweeps ; and education records (England, Wales and Scotland) at the third to fifth sweeps.

Content

The data sets therefore contain a huge range of information about children and the families they live in. There is a strong focus on children's health and education. Only a few selected variables from the data set are used in the analysis for this dissertation. The main focus is on information provided by children in a self-completion questionnaire in the fifth sweep of the study when they were around 11 years old. Children's answers to questions about subjective well-being from this questionnaire are used throughout Part 2 and 3 of the dissertation. These are described fully in Section 5.3. The main parents' answers to the questions in the Strengths and Difficulties Questionnaire (Goodman, 1997) are also utilised. These data are then connected with demographic and socio-economic information from the first and fifth sweeps (see Section 7.1) and similar data plus some additional information from the main parent about their views of their relationship with their child from the second and fifth sweep (see Section 8.1).

Further information

Full documentation about the MCS is available on the following web pages:

https://www.cls.ioe.ac.uk/page.aspx?sitesectionid=851

https://discover.ukdataservice.ac.uk/series/?sn=2000031

2. Understanding Society Survey (USS)

Understanding Society is a UK household panel survey that began in 2009 as a much-expanded successor to the British Household Panel Survey (BHPS) discussed in the next section. Each wave of the survey runs for 24 months, but new waves start annually so there is an overlap between each successive pair of waves. The analysis in

this dissertation uses data from the first five waves of the survey which were available at the time when data analysis started. Subsequently two further waves have been completed. All of the information below is taken from the user guide to Waves 1 to 5 (Knies, 2015) unless otherwise stated.

Sampling

The survey began with a general population sample (GPS) of 45,374 households and an ethnic minority booster sample (EMB) of 10,077 households. The GPS sample was drawn in two stages with postcode sectors being sampled at the first stage and households within postcodes at the second stage. The EMB population sample was drawn from households in postal sectors with relatively high proportions of ethnic minority groups. Relevant households within this sample were then screened to identify whether they included any people from ethnic minority groups. In Wave 2, the remaining active participants from the BHPS also joined the sample.

Response rates

Table A2 provides an overview of the number of households approached at each wave of the survey; the proportion of households responding; the number of potential respondents (aged 10 to 15) to the youth self-completion questionnaire in the responding households; and the proportion of those young people who completed the questionnaire. The dissertation only uses data from 11 years old upwards and generally response rates were lowest for the children aged 10 years old. The USS data sets provides weights to take account of sample attrition and non-response.

Table A2: Households participating in the first five sweeps of the USS

	Households		Young people	
	N base	% response	N base	% response
Wave 1, 2009-11	55,451	54%	6,607	74%
Wave 2, 2010-12	39,942	76%	5,498	74%
Wave 3, 2011-13	36.411	76%	5,911	75%
Wave 4, 2012-14	31,979	81%	5,380	75%
Wave 5, 2013-15	29,046	84%	4,943	75%

Household statistics are taken from Knies (2015).
Statistics relating to young people are compiled from technical reports provided with the data sets

Participants and data collection

Most USS data collection is done by computer-aided personal interview, although telephone interviewing has been used during the last phase of fieldwork recruitment from Wave 3 onwards. The fieldwork is conducted by trained interviewers. Data is gathered from all adults in the household and from all children and young people aged 10 years old and over. Members of the original sample are generally followed and retained in the sample when they change households.

Content

The content of the survey is wide-ranging and one of the inherent design features is that there is some variation in the information gathered from one wave to the next. For example, all of the first five waves gathered information about childcare, employment and household finances; but nutrition, physical activity and physical work were only covered in two waves. This applies to the youth self-completion survey also. Six questions about cognitive SWB are included in every wave, but questions about bullying and relationships with parents are only covered in alternating waves. A long-term content plan for the survey has been published[27] which provides an overview of topics covered.

Further information

Full documentation about the USS is available on the following web pages:

https://www.understandingsociety.ac.uk/

https://discover.ukdataservice.ac.uk/series/?sn=2000053

3. British Household Panel Survey (BHPS)

The British Household Panel Survey was initiated as an annual survey of a representative sample of more than 5,500 households in England, Scotland and Wales in 1991. The survey ran for 18 waves until 2008. Extension samples of 400 to 500 households from Scotland and Wales were integrated into the sample from wave 9

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[27]

https://www.understandingsociety.ac.uk/d/182/long_term_content_plan_updated_March_2015_2.pdf?1428670412

onwards; and in Wave 11 a sample from Northern Ireland was also introduced. The information below is from Taylor et al. (2010) unless otherwise stated.

Sampling

The sample for the survey involved three stages. In the first stage postcode sectors (250 in the initial sample) were selected as primary sampling units (PSU). Regional information was used for implicit sampling. The second stage involved selecting 'delivery points' (roughly equivalent to addresses) within each PSU (on average around 30 per PSU in the initial sample). The final stage was to select households from within delivery points. This might include houses in multiple occupation for example. Subsequently, from Wave 2 onwards, all eligible adults within households selected at Wave 1 were followed up, including those who had changed address.

Response rates

Table A3 provides an indication of typical response rates to the BHPS based on the original Wave 1 sample. There was some attrition over time but between 84% and 92% of eligible households participated to some extent in each wave. The table also shows response rates of children aged 11 to 15 years old to the youth questionnaire within participating households. This data is taken directly from the data files for each wave, These rates are a little higher than the rates reported for early waves in the documentation so may be slight over-estimates, but Taylor et al. does not provide this information for all waves. However generally it seems that response rates were higher here than for the USS.

Participants and data collection

Data was gathered by trained interviewers during visits to the households. A pen-and-paper mode was used for the first eight waves but from Wave 9 onwards components of the data collection were conducted using computer-assisted personal interview. As with the USS, all members of the household aged 16 years old and over were asked to provide data. Additionally from Wave 4, youth interviews were also conducted with members of the household aged 11 to 15 years old.

Table A3: Households from the original sample participating in the Waves 4 to 18 of the BHPS; and response rates to the youth questionnaire

	Households		Young people	
	N base	% response	N base	% response
Wave 4, 1994	6099	87%	826	94%
Wave 5, 1995	6037	86%	785	95%
Wave 6, 1996	5985	87%	780	96%
Wave 7, 1997	5935	92%	758	95%
Wave 8, 1998	5591	90%	1006	94%
Wave 9, 1999	5672	88%	998	94%
Wave 10, 2000	5688	87%	1520	93%
Wave 11, 2001	5696	86%	1533	92%
Wave 12, 2002	5483	89%	1364	94%
Wave 13, 2003	5464	87%	1314	93%
Wave 14, 2004	5415	87%	1606	87%
Wave 15, 2005	5415	87%	1572	90%
Wave 16, 2006	5423	86%	1487	91%
Wave 17, 2007	5415	85%	1380	90%
Wave 18, 2008	5354	84%	1348	91%

Household statistics are taken from Taylor et al. (2010).
Statistics relating to young people are calculated from the data sets

Content

As with the USS the BHPS had a wide-ranging content covering diverse topics relating to the household and its members. A thesaurus of subjects covered in the BHPS is provided in Appendix 6.3 of Taylor et al. (2010). In terms of the questionnaire for children, one of the advantages of the BHPS data is that the questionnaire remained more stable from one wave to the next than the USS one. Five SWB questions were included in every way and a sixth was included from Wave 12 onwards. Questions about bullying and family relationships were included in all or almost all waves. This feature enabled some of the analysis presented in Part 3.

Further information

Full documentation about the BHPS is available on the following web pages:

https://www.iser.essex.ac.uk/bhps

https://discover.ukdataservice.ac.uk/series/?sn=200005