Well-being evidence for policy: A review

Contents

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Over the last 30 years, there has been a considerable growth in academic research on the causes of well-being. In general, this literature gives a fairly consistent picture of which factors have associations with subjective well-being. However, it is only in the last few years that there has been the corresponding level of interest from policymakers at national level. This is seen, for example, by the start of a programme of work at the UK Office for National Statistics, commissioned by the Prime Minister, on Measuring National Well-being. This document aims to provide the tools necessary to transfer this academic knowledge into a practical format for policymakers.

It does this by reviewing the current evidence (up to the end of 2011) – providing an introduction to the state of current knowledge. The policy areas which have been identified include: the economy, social relationships and community, health, the local environment, education and care. There is also a section on personal characteristics, which, although often not amenable to direct policy changes, play an important part in the understanding of the factors that are important to an individual's well-being.

It should be noted, however, that this is an overview of the evidence only – it is not comprehensive and no attempt has been made to assess the quality of all the research included. As it is a glimpse of current knowledge in a continually expanding field, it will be updated regularly to keep policymakers abreast of the academic development of well-being research.

Academic context

There has been a growth in academic research on well-being since the mid-1970s, particularly expanding in the last decade (MacKerron, 2011; Abdallah *et al.*, 2008). Many cite Richard Easterlin's 1974 paper, *Does economic growth improve the human lot? Some empirical evidence,* as heralding the beginning of this field of research, although it has been called 'a beginning of [the] process' of 'rediscovery within economics of SWB [subjective well-being accounts]', which had been largely forgotten since the late nineteenth century (MacKerron, 2011). Easterlin's paper found that economic growth in a country did not necessarily lead to a rise in average levels of happiness, sparking a new interest that grew rapidly from the mid-1990s onwards, with investigators using large-scale social survey data to explore the statistical relationships between subjectively reported well-being and a variety of personal, social, and economic factors.

There was also important interest from two groups of psychologists. Behavioural psychologists began to explore what empirical evidence about people's behaviour said about the traditional assumptions of economics. The positive psychology movement has also had visible success in rebalancing the attentions of the psychology profession away from repairing damage and

towards ‘making the lives of all people better’ (Seligman, 2011; Seligman and Csikszentmihalyi, 2000; Csikszentmihalyi, 1990).

Policy context

In the last ten years the policy interest in well-being has grown in line with academic interest in this area.

In the UK, the Local Government Act 2000 gave local authorities in England and Wales the power to ‘promote the economic, social and environmental well-being of their area’, acknowledging that policy should be concerned with people holistically and cover a broad range of positive outcomes.

The publication of the national sustainable development strategy in 2005 led to the first official attempt to define well-being in UK policy. The strategy stated that a key component of sustainable development included ‘promoting personal well-being, social cohesion and inclusion and creating equal opportunity for all’. As a result, the cross-governmental *Whitehall Well-being Working Group* (W3G) was formed, commissioning research to help conceptualise and define well-being and its links to sustainability,[1] and in 2007 published a ‘shared understanding’ of well-being (Defra, 2007).

Also in 2007, two large international conferences, hosted and attended by organisations such as the Organisation for Economic Co-operation and Development (OECD), the European Commission (EC) and the United Nations (UN), called for broader measures of societal progress.

Further significant research on well-being was commissioned by the UK Government Office for Science, in the form of the *Foresight Project on Mental Capital and Well-being*. The resulting report, published in 2008, outlined the findings of an extensive two-year study which examined the policy factors influencing the development of well-being (BIS, 2008).

In 2008, French president Nicolas Sarkozy launched the Commission on the Measurement of Economic Performance and Social Progress (the Stiglitz Commission) led by Nobel prize winners Joseph Stiglitz and Amartya Sen. It was motivated by ‘increasing concerns…about the adequacy of current measures of economic performance…[and] about the relevance of these figures as measures of societal well-being, as well as measures of economic, environmental, and social sustainability’ (Stiglitz *et al.*, 2009). The Commission reported to huge international attention in 2009, and was quickly viewed by statistical offices around Europe as setting an agenda to which they needed to respond. The report recommended that subjective measures of the quality of life should be collected by governments, and played an important role in creating the widespread perception that measuring subjective well-being was a proposal worthy of serious policy attention.

In October 2010, the UK Prime Minister David Cameron announced that the Office for National Statistics was going to start measuring subjective well-being, as well as constructing an index of national well-being, which would be decided following public and expert consultation.

He announced two key innovations: that the Office for National Statistics would begin to use subjective well-being measures on its flagship national survey from

[1] One of the pieces of work that was commissioned was led by the economist Paul Dolan (see References, Dolan *et al.,* 2006). As well as producing a comprehensive review of the evidence to date on drivers of well-being, this created a helpful taxonomy of models of well-being, later used by **nef** in producing our dynamic model of well-being. W3G also commissioned **nef** to undertake a review of the relationship between sustainable development and well-being.

the following April, and also that it would be asked to hold a national debate as a part of a programme to create a new measure of national progress, known as *Measuring National Well-being*.

Since then, there have been further developments in the government's well-being agenda, notably the publication of a Treasury working paper discussing how well-being analysis can be used in policy evaluation (Fujiwara and Campbell, 2011) and an update to the government's 'policy evaluation bible', *The Green Book*, to reflect the new technique.

In addition the cross-national momentum has continued since 2010 – in 2011 a UN General Assembly declaration invited member states 'to pursue the elaboration of additional measures that better capture the importance of the pursuit of happiness and well-being in development with a view to guiding their public policies'. [2] This wider process is already being undergone by several countries, including Germany, Italy, and Canada, which are also working to develop and use well-being measures in policy and politics (Kroll, 2011).

The task now is to begin transferring the large and growing body of academic literature to policymakers in all of these countries.

This review consists of the following sections:

The **Glossary** explains key surveys used, measures used, and some of the common abbreviations that appear in this review.

The **Introduction** reviews some of the key sources of well-being data, the types of measures used and outlines the key methodological issues with this evidence.

Part 1 presents a summary of the current literature on well-being and its determinants and has been structured by policy areas. Policies made in each of these areas will have the potential to explicitly affect well-being. This report aims to provide an overview of current findings but it *is not* a fully comprehensive review – for this, readers should turn to individual study findings and literature associated with specific areas of research.

Part 2 compares some of the relative effects of the different factors to give an idea of how they compare in terms of their influence on well-being. This provides useful information for policymakers who have (often limited) funds and are under pressure to direct these towards the policies with maximum benefits for subjective well-being.

The **Appendix** includes most of the fuller data tables that were used as sources for Part 2 to compare the effect sizes of different independent variables within well-being equations. They are intended to give readers more information, and the largest three coefficients are highlighted within each table.

References: Given its emphasis on evidence from the literature, in this review we use the traditional academic referencing style, giving (author and date) at the appropriate point of the text. The full list of references is given at the end of the document.

[2] http://www.un.org/ga/search/view_doc.asp?symbol=A/65/L.86

Glossary

This glossary includes a section describing the main surveys that are used in well-being research; a section on common well-being measures; a section on statistical terms; and the abbreviations found in this review.

Surveys

The **World Values Survey (WVS)** grew out of the European Values Survey (EVS) group. It surveys a population sample from over 40 countries every five years. It includes the questions *All things considered, how satisfied are you with your life as a whole nowadays?* (on a scale of 1 Dissatisfied to 10 Satisfied) and *Taken all things together, would you say you are…'* (1 Very happy, 2 Quite happy, 3 Not very happy, 4 Not at all happy).

The **European Values Survey (EVS)** is a nationally representative cross-sectional survey of over 20 European countries undertaken every 9 years since 1981. It includes the questions *All things considered, how satisfied are you with your life as a whole nowadays?* (on a scale of 1'Dissatisfied to 10 Satisfied) and *Taken all things together, would you say you are…* (1 Very happy, 2 Quite happy, 3 Not very happy, 4 Not at all happy).

The **Eurobarometer** is a survey of 300 000 people in 12 European countries. Interviews are one-to-one in people's homes and questions include *On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?*

The **Gallup World Poll** is a worldwide survey which has used Cantril's ladder as a question on satisfaction with life: *Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?*

The **US General Social Survey (GSS)** has surveyed a sample of 30 000 Americans since 1972, asking the question *Taken all together, how would you say things are these days? Would you say you are …?* (Very happy=3, Pretty happy=2, Not too happy=1).

The **International Social Survey Program (ISSP)** is an annual programme of cross-national collaboration on surveys covering topics important for social science research. It covers 41 member countries and includes the question *If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole?* (on the scale: 4 very happy, 3 fairly happy, 2 not very happy and 1 not at all happy).

The **European Social Survey (ESS)** is an academically-driven survey which collects data in over 20 European countries. In the core questionnaire module it

asks the question *All things considered, how satisfied are you with your life as a whole nowadays? Please answer using this card, where 0 means extremely dissatisfied and 10 means extremely satisfied* and *Taking all things together, how happy would you say you are?* (on a scale of 0–10). In 2006/2007, it included a well-being module where it asked over 50 detailed questions about components of well-being, including *How much of the time during the past week were you happy?* (on a scale of 1–4).

The **New Democracies Barometer** uses a sample of 1000 people from Central and Eastern European countries to see how attitudes and behaviour change as people gain more experience of democracies.

The **German Socio-Economic Panel (GSOEP)** is household panel survey, in which all members of the household are asked to participate in annual face-to-face interviews. There are over 24 000 respondents who have participated in at least one of the 24 waves.

The **British Household Panel Survey (BHPS)** (now called **Understanding Society**) began in 1991 and follows the same representative sample of individuals over time. It is household-based, and every adult member of each sampled household is interviewed. Since its beginnings, it has included the question *How satisfied are you with your life overall? (*response scale of 1 not satisfied at all to 7 completely satisfied) and *Would you say that you are more satisfied with life, less satisfied, or feel about the same you did a year ago?*

Measures

This is a glossary of the most common measures of well-being that have been used by studies reported in this literature review:

Life satisfaction is the most commonly used subjective measure of well-being in the literature. The usual wording for the life satisfaction question is as follows: *All things considered, how satisfied are you with your life as a whole these days? Please give a score of 0 to 10 where 0 means extremely dissatisfied and 10 means extremely satisfied.* However, it is sometimes worded in a slightly different way.

Overall happiness. The World Values Survey question wording for overall happiness is: *Taking all things together, would you say you are: 1 Very happy, 2 Quite happy, 3 Not very happy, 4 Not at all happy?*

Happiness in the past. The ESS, Gallup World Poll and the UK Office for National Statistics all ask questions about how happy respondents have felt over some period in the recent past, most commonly ‘yesterday’ or ‘in the past week’.

Cantril’s Ladder, also known as Cantril’s Self-Anchoring Scale, asks respondents to *Imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you.* It then asks: *On which step of the ladder would you say you personally feel you stand at this time?*

The **Warwick-Edinburgh Mental Well-being Scale (WEMWBS)** is a 14-item scale specifically developed to capture psychological well-being. It is designed to measure both hedonic and eudaimonic aspects of positive mental well-being and enquires about how people have been feeling and functioning over the past two weeks, obtaining a single total score. There is also a shortened version, known as the SWEMWBS, which consists of seven items and which has been shown to have good psychometric properties as a measure of a single well-being factor.

The **Centre for Epidemiological Studies Depression (CES-D) Scale** measures current levels of depression, focusing mainly on the affective component, and includes positive as well as negative items.

The **Satisfaction with Life scale** is a short five-item instrument designed to measure cognitive judgments of satisfaction with one's life.

The **General Health Questionnaire (GHQ)** was developed as a screening instrument to detect psychiatric disorders in community settings and non-psychiatric clinical settings. It asks several questions on psychological well-being and, from these, constructs a score. For the purpose of well-being research, the GHQ scores are inverted so that a high score represents high well-being (rather than as a measure of depression, which is the primary use for which the scale was designed).

Well-being research often uses **domain satisfaction** as a means of assessing satisfaction with different areas of their lives, such as their work, family life, or social life. Here a distinction is drawn between well-being from life as a whole, and the well-being associated with a single area of life.

The **Day Reconstruction Method (DRM)** instructs respondents to write a diary about 'yesterday'. Within this they evaluate episodes of about an hour long, in terms of emotions felt (e.g. impatient for it to end, happy, frustrated/annoyed, depressed/blue, worried/anxious, enjoying myself, tired, stressed) on a scale of 0 'not at all' to 6 'very much'. The number of negative time episodes during an entire day is used to construct a 'U-Index' (Kahneman *et al.,* 2004a).

It should be noted that when it comes to well-being measurement, children's well-being is often treated in a different way to the measurement of adults' well-being. This is because it may not be appropriate to ask children to self-report in the same way as adults. Instead, many of the measures are composite measures, which combine objective and subjective domains, rather than single measures (which tends to be the approach in research on adults).

Statistical terms

Variable. In quantitative research, a variable is a numerically-defined measure associated with a particular unit of analysis (e.g. a person, or a country). In effect it is a measure within a dataset that can change e.g. age, income, employment status.

Dependent variable. The outcome that the researcher is interested in – in the case of well-being, this is often a measure of life satisfaction.

Independent variable. Variables which are used in statistical analyses to explain changes in the **dependent variable**. In this review, independent variables such as unemployment, household income, self-rated health and generalised trust are considered.

Ordinal variable. An ordinal variable is one where the order of scores matters but not the absolute difference in values. For example, a score of 7 is higher than a score of 5, and that is more than a score of 3. But the difference between the 7 and the 5 may not be the same as that between 5 and 3, and they should be treated as ranked categories.

Continuous variable. A continuous variable is one that can be assumed to have a continuous distribution function, so there are equal intervals between scores. For example, the difference in the amount of well-being between a score of 4 and 5 can be assumed to be the same as the difference in the amount of well-being between scores of 8 and 9. Treating variables as continuous allows the use of more sensitive statistical tools.

Regression analysis. Many of the studies reviewed here assess the relative importance of different factors for overall well-being. To do this, data is analysed using regression analysis. Regression analysis examines the separate effects of a number of **independent variables** on a single **dependent variable** (in this case well-being) to identify which are statistically related, **controlling for the effects** of the other variables, and to compare their relative strength.

Ordinary Least Squares (OLS) regression. OLS regression is the form of **regression analysis** used when the **dependent variable** is a **continuous variable**.

Ordered logit model (also called the ordered logistic regression or proportional odds model) is the form of regression analysis used when the **dependent variable** is an **ordinal variable**.

Fixed effects model. A fixed effects model is a statistical model that treats some of the independent variables as fixed, for example the personal characteristics or genetics of a person are assumed not to change over time.

Well-being equations. Well-being equations are equations that use data from **regression analysis** to show the relative contribution of several different factors (i.e. **independent variables**) on overall well-being (i.e. the **dependent variable**) – the idea is that if you were to use the equation form with individual-level data on these factors for a particular person, this equation would predict her overall well-being.

Controlling for effects. In addition to telling you the predictive value of the overall model, **regression analysis** tells you how well each **independent variable** predicts the **dependent variable**, controlling for each of the other **independent variables**.

Abbreviations

BHPS – British Household Panel Survey

CES-D – Centre for Epidemiological Studies Depression scale

EC – European Commission

ESS – European Social Survey

EVS – European Values Survey

GHQ – General Health Questionnaire

GSOEP – German Socio-Economic Panel survey

GSS – General Social Survey

ISSP – International Social Survey Program

OECD – Organisation for Economic Co-operation and Development

OLS – ordinary least squares

UN – United Nations

WEMWBS – Warwick-Edinburgh Mental Well-being Scale

WVS – World Values Survey

Part 1: A summary of the existing evidence

Introducing the evidence

The number of academic studies of well-being and its determinants has grown rapidly in the past two decades. There is now a substantial amount of research on well-being undertaken by economists, psychologists, and other social scientists. In Part 1, we provide an overview of the current state of the literature we think will be most useful to policymakers from this continually expanding field of research. The rapid growth of the literature leads us to expect that this review will need to be regularly updated to reflect the ever-increasing interest in this topic.

The literature sometimes suffers from a lack of clarity over the use of the term 'well-being', which is used interchangeably with subjective well-being, life satisfaction, and happiness. Please note, in this report 'well-being' and 'subjective well-being' are both used to refer to the subjective measurement of well-being, which is most commonly undertaken via a question on life satisfaction. As such, when reporting on results throughout this review, if not specified well-being generally refers to the life satisfaction measure.

Data sources

In terms of data sources, subjective well-being data mostly consists of the aggregated self-reports of respondents to social surveys. Widely used datasets that include well-being items include those from the World Values Survey (WVS), the European Values Survey (EVS), the Eurobarometer, the Gallup World Poll, the US General Household Survey (GSS), the International Social Survey Program (ISSP), the European Social Survey (ESS), the German Socio-Economic Panel (GSOEP), and the British Household Panel Survey (BHPS) (now called *Understanding Society*). The glossary has a more detailed description of each of these.

These datasets are analysed by well-being researchers to establish statistical relationships between specific variables and well-being. Some of these surveys, such as the WVS and the Gallup World Poll are used to make comparisons between the average levels of well-being across different countries. Surveys that include a sample of individuals from only one country produce data at the individual-level. This is used to compare well-being of individuals within a country.

Among individual-level datasets, the simplest studies provide a cross-section of one country (a snapshot of a group of individuals at a certain point in time). Sometimes, for the purpose of analysis, a number of years of cross-sectional data are pooled; and sometimes data is collected from the same individuals

over time (panel data). At the country-level, average levels of well-being can be compared, and again, sometimes multiple years are combined for analysis.

In most cases, the well-being data are based on a single item life satisfaction question or a question on overall happiness.[3] However, other types of subjective well-being data include WEMWBS, General Health Questionnaire (GHQ) scores,[4] Centre for Epidemiological Studies Depression (CES-D) Scale, Cantril's Ladder, the U-Index constructed from Day Reconstruction Method (DRM) data, and others. For a more detailed description of these measures, consult the glossary.

Data has also collected in small, individually designed experiments and surveys; results from these have often been important in guiding the areas of further research.

Methodological issues

There are several methodological issues surrounding well-being research to be considered when looking at the existing evidence.

First, most of the research mentioned here describes associations between personal, social, and economic factors (such as unemployment, income, relationships) and measures of subjective well-being. These associations on their own do not imply causation. This is especially the case in cross-sectional studies, where causation cannot be established definitively. However, many of the longitudinal studies (comparing data over time) show that well-being changes in line with changes in certain variables, and in these cases there are stronger grounds to claim a causal relationship, especially where there is a plausible causal mechanism.

Second, although many of the studies point to similar conclusions, the precise findings will depend on study design. For example, where findings from different studies do contrast, one (or both) of the studies may have failed to control for correlated explanatory factors (MacKerron, 2011) or may have been designed to control for different factors.

Third, a fundamental problem in making comparisons between international data (both cross-sectional and time-series) is that it is assumed that response scales are used in the same way across different countries, across time, and across groups of respondents within a country. However, there is some evidence to suggest this is not the case; for example, Americans tend to report situations more positively than, say, East Asians (Kapteyn *et al.,* 2010). There is also an argument that the concepts of 'life satisfaction' and/or 'happiness' cannot be translated to capture the same idea. Evidence shows that cultural norms explain a relatively small part of the variation in well-being levels internationally (Veenhoven, 1993; Helliwell *et al.,* 2010) which seems to suggest that translation is not a major source of difficulty (Shao, 1993; Veenhoven, 2000); however, this remains contested.

Measures of life satisfaction and happiness have a high degree of validity, reliability and consistency (Diener *et al.,*1999) and strongly correlate with other

[3] Refer to the Glossary. The usual wording for the life satisfaction question is as follows: 'All things considered, how satisfied are you with your life as a whole these days? Please give a score of 0 to 10 where 0 means extremely dissatisfied and 10 means extremely satisfied.' The World Values Survey question wording for overall happiness is: 'Taking all things together, would you say you are: 1 Very happy, 2 Quite happy, 3 Not very happy, 4 Not at all happy?'

[4] Refer to the Glossary. GHQ scores are inverted in order to act as a measure of well-being – so that a high score represents high well-being – rather than as a measure of depression, which is the primary use for which the scale was designed.

methods of well-being measurement, such as reports of significant others, clinical interviews, and the number of positive and negative events recalled by the individual (Clark *et al.*, 2008).

Fourth, Johns and Ormerod (2007) highlight a methodological problem that arises when using subjective well-being measures, especially when considering their relationship with income. The measures, such as life satisfaction and overall happiness, commonly use a bounded scale; for example, 0–10, 0–5 or 0–3. This means that respondents who have chosen the highest value cannot subsequently score any higher, even if their well-being rises. This gives rise to a further issue when subjective well-being is related to a variable such as GDP or income, which (in theory) appears to be able to rise without limit, as any increases that this rise brings will become increasingly difficult to recognise on a bounded scale. However, three-point response scales (for which this would be a particular problem and on which Johns and Ormerod base much of their argument) are used increasingly rarely in well-being research. In addition, research *has* shown that life satisfaction has changed in response to economic conditions (Easterlin *et al.,* 2010; Stevenson and Wolfers, 2008; Di Tella *et al.,* 2003) and can still usefully demonstrate changes in the point at which diminishing returns begin.

Although this review divides the literature first into different policy areas and then by relationships between different factors and well-being, many of the different factors are interrelated and multidirectional. This means that their relationship with well-being is often not straightforward. In many cases, improving well-being leads to other positive benefits as well, such as improved health and social capital (Diener and Chan, 2011; Lyubomirsky *et al.,* 2005); and vice-versa; worsening well-being can lead to a vicious cycle whereby some of its determinants, such as good social relationships, are damaged, in turn contributing to further decreases in well-being (Brehm and Rahn, 1997). This review, however, is focused on those policy factors that the evidence suggests are associated, often causally, with well-being as an *outcome*.

Policy areas

The key findings about each factor are highlighted as numbered points in blue italicised text, with the supporting evidence detailed below. The section relating to each policy area ends with a boxed summary of findings.

The policy areas discussed are:

1. The economy
2. Social relationships and community
3. Health
4. Education and care
5. The local environment

There is also a section on personal characteristics. Although this is not a policy area in the same sense as the others – many of the characteristics described cannot be directly or even indirectly influenced by policy – they are still included for several reasons: (1) some of the areas *are* policy-relevant – for example, studies have shown that early interventions can affect child development (C4EO, 2010); and (2) it's important to understand how much scope there is for change *over and above* the influence of these key areas on well-being

outcomes. This is often done by using these factors as control variables[5] when analysing the data.

In each of these areas, government policies are used to directly and indirectly control, influence and mediate factors that have explicit and strong effects on several different aspects of people's well-being. Again, it must be stressed that this is *not* a fully comprehensive review but instead is intended as an introduction to the existing well-being literature and will be updated on an annual basis.

[5] Refer to the Glossary for an explanation of control variables.

1.1 The economy

The economy is a key area where government policies are used to directly and indirectly control, influence and mediate factors that have explicit and strong effects on several different aspects of people's well-being. The policy-relevant factors included in this section are: income, economic growth, income inequality, unemployment, types of work, hours worked, quality of work, benefits/welfare payments, inflation, debt and commuting.

Income

The nature of the association between income and well-being has received considerable attention, mostly from economists. The relationships that have been revealed are often complex and, because of this, they have been the subject of much disagreement and debate. However, there are several key findings that appear relatively consistently from the literature, described in detail below.

It is noticeable that the logarithm of income (log income), rather than raw income, is often used by authors to study the relationship between income and well-being. A log function is a mathematical transformation using the power to which a base, such as 10, must be raised to produce a given number. For example, the logarithm of 100 to the base 10 is 2 because 10 squared (i.e. raised to the power of 2) is 100. This means that if a variable *grows* at a constant percentage rate over time, the graph of its logarithm is a straight line.

Log income is generally used because it allows researchers to produce models of the relationship between income and well-being that better fit the existing data. A logarithmic relationship like this illustrates Weber's law – the rule that *percentage* change rather than absolute amount is a better way of evaluating changes or differences in, for example, income, to people's lives. In other words, a £1000 raise does not have the same significance for the chief executive of a big corporation as for someone earning the minimum wage but if you doubled each of their incomes, the effect might be similar for both of them.

The use of log income rather than raw income already implies that there are diminishing returns to well-being. It is this idea that forms the basis for much of the debate about the impact of income on well-being.

The key findings from the evidence can be summarised as follows:

Most of the evidence suggests that *at any given time* income and well-being are correlated, both at the level of the country (i.e. richer countries tend to have higher average well-being levels) and of the individual (i.e. richer individuals tend to have higher well-being). For both these levels of analysis, however, most evidence reveals diminishing marginal returns to income: once a certain level of national or individual income is obtained, increases in income do not translate into increases – or only into small increases – in well-being. There is also evidence that the amount of social capital moderates the effect of income on well-being.

Most evidence *over time* reveals that in several, but not all, developed countries (e.g. USA, Germany) levels of well-being have not risen, or have risen very little, over the past 30 or so years, despite rises in national income per capita. However, time-series data are not available for a lot of countries and the quality is often mixed so there has been disagreement about what this evidence shows about the relationship between well-being and income over time.

These findings are discussed in detail below.

1. *Across countries, higher income nations generally experience higher average levels of subjective well-being at any given point in time (cross-sectional data).*

Most cross-national studies find a correlation between log GDP per capita and measures of well-being (normally life satisfaction) of between 0.5 and 0.7 (Dolan *et al.,* 2008; 2006; Diener and Biswas-Diener, 2002). This suggests a strong and consistent correlation between the log of national income and well-being such that higher-income countries experience higher levels of subjective well-being, although as noted above, the use of log income implies there are diminishing marginal returns.

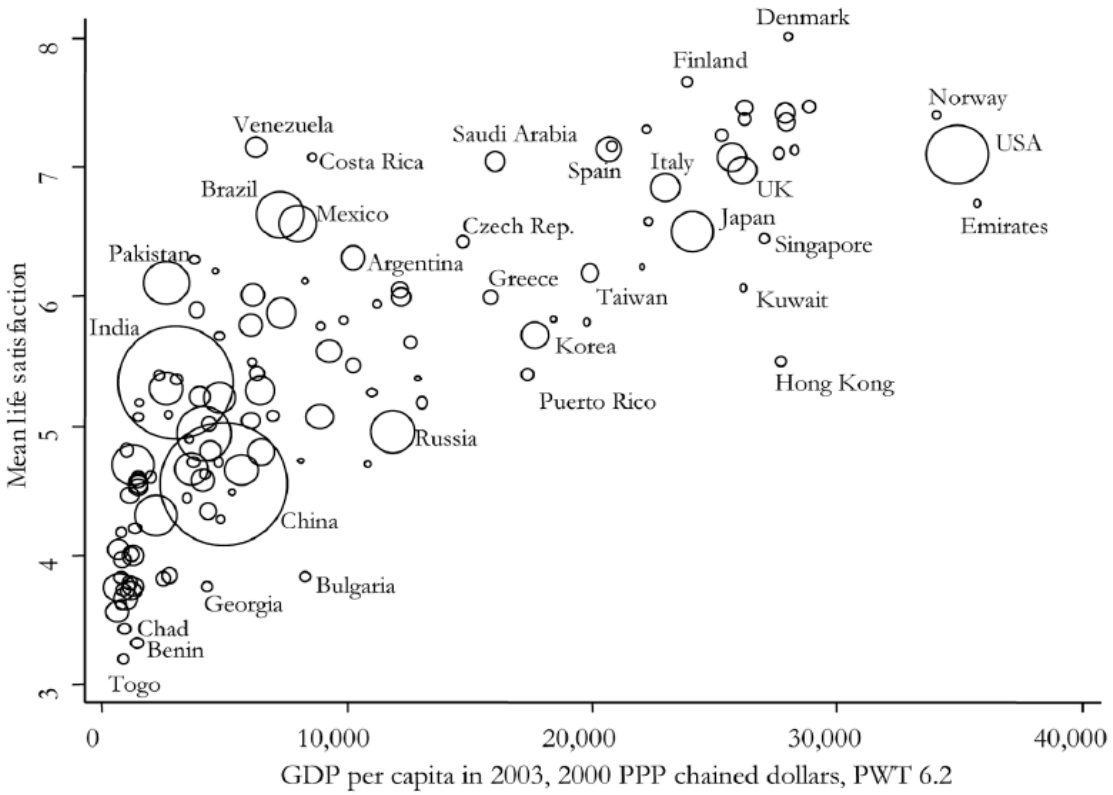
Regression analyses of survey data from different countries, such as Germany (GSOEP[6]) and the USA (GSS), and from across countries, such as the WVS, the Eurobarometer, and others, result in very similar coefficients for the effect of log income on happiness, with a unit rise in log income raising happiness by 0.6 units on average (Layard *et al.,* 2010; 2008).

The (mostly) positive correlations between average levels of life satisfaction and national income exist even when individual or household income is controlled for (MacKerron, 2011; Easterlin and Sawangfa, 2010; Deaton, 2008; Stevenson and Wolfers, 2008; Dolan *et al.,* 2008, 2006; Fayey and Smyth, 2004; Diener and Seligman, 2004; Di Tella *et al.,* 2003; Helliwell, 2003; Diener and Biswas-Diener, 2002; Inglehart and Klingemann, 2000).

However the extent of this correlation depends on *which countries are considered* – a broader international sample, including low-, middle-, and high-income countries, produces a stronger correlation than a mainly high-income sample (Diener and Seligman, 2004; Hellliwell, 2003). This implies that, as countries become richer (i.e. their levels of per capita income rise) the correlation between national income and well-being weakens. (See *Income, Finding 5* and Figure 1).

[6] Refer to the Glossary for a full list of survey abbreviations.

Figure 1. Life satisfaction and national income (Deaton, 2008).



Notes: The horizontal axis is per capita GDP in 2003 measured in purchasing power parity dollars at 2000 prices. Each circle is a country – the diameter is proportional to the size of the population, and marks average life satisfaction and GDP for that country.

2. *The correlation across countries between high national income and well-being is substantially reduced once quality of government, democracy and social capital is controlled for.*

Studies which use some national level controls, such as a measure of the quality of democracy, find that the effect of national income on subjective well-being is somewhat reduced. For example, once Inglehart and Klingemann (2000) included an index for democracy in their model, the effects of GDP per capita on a combined life satisfaction and overall happiness score were significantly reduced. Helliwell and Putnam (2004) found that there was no significant effect of per capita median income on life satisfaction or happiness in several international datasets (e.g. WVS, EVS, and US Benchmark Survey) once a range of social capital variables were controlled for. And when studies controlled their data for the effects of health, quality of government and human rights, the effect of income on national well-being was no longer statistically significant (Abdallah *et al.,* 2008; Vermuri and Constanza, 2006; Frey and Stutzer, 2002).

However, these results must be interpreted with caution, as there is also a strong cross-country correlation between income and many of these sorts of variables, such as democracy (Acemoglu *et al.,* 2008), which makes it difficult to separately identify the effects of either national income levels or social capital levels on well-being.

3. *Within countries, individual income and life satisfaction are positively related at any point in time (cross-sectional data).*

Most cross-sectional studies reveal a positive correlation between the log of individual (or household) income and people's reported well-being (Kahneman and Deaton, 2010; Layard *et al.,* 2010; Dolan *et al.,* 2008; 2006; Easterlin, 2001).

This relationship is stronger at certain life stages. For example, one study has found that the log of household income per capita increases life satisfaction for individuals aged under 49 but not for those aged 50 or over (Gerlach and Stephan, 1996) and the youngest and oldest groups seem to be less influenced by income than the middle aged (Cummins *et al.,* 2004) although the relationship between age and income is not always significant (Marks and Flemming, 1999).

4. *The shape of the relationship between an individual's income and well-being within a country shows diminishing marginal returns and merits close attention.*

Much of the research described above which finds a significant positive effect of income on well-being, has been calculated by entering the income in logarithmic form. The use of log income rather than raw income implies a curvilinear effect, i.e. that there are diminishing returns to well-being. Thus the data reveal that at any given time, individuals at the top of the income distribution express greater happiness than those with lower incomes, but additional income affects the happiness of the poor more than the happiness of the rich. It must be noted, however, that the *magnitude* of the cross-sectional within-country effect of income on subjective well-being is still under dispute and there is some disagreement as to whether the relationship between log of average income and well-being shows signs of weakening at high national income levels (Sacks *et al.,* 2010; Di Tella *et al.,* 2010; Layard *et al.,* 2010; 2008; Deaton, 2008; Stevenson and Wolfers, 2008; Blanchflower and Oswald, 2004).

Interestingly, a recent US study found a weakening of the relationship between income and individual well-being, when measured by emotional well-being.[7] Emotional well-being rose with log income until an annual income of approximately $75 000, beyond which there was no relationship. However, when Cantril's Ladder[8] was used as the measure of well-being, the relationship with log income was steady, with no sign of diminishing up to the top limits of the income measure used in this study (> $120 000) (Kahneman and Deaton, 2010).

In addition, the pattern of diminishing marginal returns from increasing income may also relate to the methodological issue described earlier which arises because subjective well-being is measured on a bounded scale (Johns and Ormerod, 2007). Because well-being scales are bounded, once fairly high

[7] Emotional well-being is defined as 'the emotional quality of an individual's everyday experience – the frequency and intensity of experiences of joy, stress, sadness, anger and affection that makes one's life pleasant or unpleasant' (Kahneman and Deaton, 2010: 1). This same study found that satisfaction of life, measured using a ladder (see Footnote 4), *did* rise with log income, and with no sign of diminishing marginal returns at any point up to the highest income group reported by the study, which was <$120 ,000 .

[8] Cantril's Ladder, also known as Cantril's Self-Anchoring Scale, asks respondents to imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. It then asks 'on which step of the ladder would you say you personally feel you stand at this time?'
http://eu.gallup.com/Poll/118471/World-Poll.aspx

levels of subjective well-being have been reached, it is very difficult for them to increase much more. For example on a short well-being scale of 0–3, if the average score is 2.2, the biggest possible increase is 35 per cent (when everybody scores 3). In theory, average income could increase by more than 35 per cent but be *unable* to lead to further increases in the average well-being score. This is why in practice longer well-being scales are usually preferred by well-being researchers. In addition, differences between average levels of reported well-being in developed countries show that the measures are far from saturated and there is still plenty of room for improvements.

5. *Across developed nations there is not always a relationship between changes in national income and changes in levels of well-being over time (longitudinal data) – suggesting that once a certain level of national income per capita has been reached (which varies from country to country) general increases in national income per capita do not necessarily translate into substantial increases in subjective well-being.*

If, at any time, richer countries (generally) have higher well-being than poorer countries, we might expect that as countries become richer they would also become happier. However, when longitudinal data is analysed, the relationship between national income and well-being does not always reflect this. This was first discovered by the economist Richard Easterlin, who found that although income per capita had risen steadily for the past 30 or so years in the USA, the average level of well-being had not (Easterlin, 1974). The same pattern was then revealed for a number of other developed countries, including several western European nations. The 'Easterlin Paradox' therefore refers to the fact that average happiness has remained relatively constant over time in a number of developed countries despite large increases in per capita income but that cross-sectional data both within and across countries show rising income leads to increases in subjective well-being (usually measured by life satisfaction).

This finding has been replicated by several studies since Easterlin (1974); for example, in western European countries from 1973–2010, in the USA since 1976 and in West Germany since 1984[9] (Layard *et al.,* 2010); in the USA from 1972 to 2008 (Blanchflower and Oswald, 2011) and across international samples (Easterlin *et al.,* 2010; Easterlin and Angelescu, 2009; Frey and Stutzer, 2002; Easterlin 1995). However, this finding cannot be generalised to all cases, and some countries, such as Japan and Italy, seem to show rising levels of well-being alongside growth in GDP (Stevenson and Wolfers, 2008).

6. *Relative income has been found to have a substantial and important effect on well-being and explains much of the association between income and well-being*

Relative income has been found to have a substantial and important effect on well-being in an increasingly large number of studies (Van Praag and Ferrer-i-Carbonell, 2010; Powdthavee, 2010). For example, Luttmer (2005) studied the US National Survey of Families and Households data and found that the more a person's neighbours earn, the lower their own self-reported happiness, controlling for their income. Frey and Stutzer (2005) showed that levels of life satisfaction were associated with the ratio of actual income to required income (the amount of income that people evaluated as 'sufficient'), with no independent role for absolute income. They found that what people perceived as sufficient income was totally dictated by their relative economic situation, rather than the amount of income they earned in absolute terms. Stutzer (2004) and van de Stadt *et al.* (1985) found in Dutch and Swiss data that required

[9] Layard *et al.* (2010) confined all of these samples to White people aged 30–55, in order to 'clarify the analysis'.

income is powerfully affected by generally prevailing levels of income in an individual's community.

Similar results have been found in Canada (Barrington-Leigh and Helliwell, 2008; Helliwell and Huang, 2010) and Germany (Wolbring *et al.,* 2011; Vendrik and Woltjer, 2007; Ferrer-i-Carbonell, 2005) and have led to support for the hypothesis that relative income explains the diminishing well-being returns of income (in high-income countries at least) from Layard (2011; 2005); Clark and Senik (2010); Daly *et al.* (2010); Layard *et al.* (2010); Knight *et al.* (2009); Di Tella and MacCulloch (2008); Fliessbach *et al.* (2007); Luttmer (2005); Senik (2005; 2004); Ferrer-i-Carbonell (2005); and Hagerty (2000).

Recently, some authors have begun to argue based on empirical findings that it is the rank – the *order* that people are placed in terms of income – that matters more than relative income in explaining the diminishing marginal returns of income to well-being (Powdthavee, 2011; 2009; Boyce *et al.,* 2010; Brown *et al.,* 2008).

7. *The satisfaction with life measure and Cantril's Ladder seem to be more strongly related to income than other measures of well-being, for example overall happiness or 'emotional well-being'.*

Leigh and Wolfers (2006) and Lelkes (2006b) found that the association between life satisfaction and income was stronger than that between overall happiness and income. Kahneman and Deaton (2010) found that income was more closely related to life evaluation (measured by Cantril's Ladder) than to emotional well-being (measured by questions about emotional experiences yesterday). When plotted against log income, life evaluation rises steadily. However, although emotional well-being also rises at first with log income, beyond an annual income of approximately $75 000, there was no relationship.

8. *Higher income-growth countries seem to experience higher levels of subjective well-being although this relationship is complex and depends on the national income per capita.*

The relationship between the *rate* of income growth in a country and well-being has often been analysed in a similar way to the relationship between national income and well-being and is subject to a similar level of contestation (MacKerron, 2011).

When a broad international sample of countries is compared, the evidence on the relationship between growth rate and well-being appears mixed. For example, whilst several papers, for example, Sacks *et al.* (2010), Stevenson and Wolfers (2008), Inglehart *et al.* (2008), and Hagerty and Veenhoven (2006; 2003) have found a positive relationship between growth rate and well-being, even when controlling for the level of income (Haller and Hadler, 2006); others, for example Easterlin and Sawangfa (2010) and Easterlin (2005) have failed to find any relationship. A cause of much dispute, particularly between Easterlin and his colleagues on the one hand and Stevenson, Wolfers and colleagues on the other, is the question of what is an appropriate period of time over which to consider this relationship; and how much the length of the time-series will affect the conclusions drawn.

Lora and Chaparro (2009) using Gallup World Poll data for 122 countries, found that, although countries with higher levels of per capita GDP have higher levels of happiness on average, controlling for *levels* of per capita GDP, individuals in countries with positive growth rates tend to have lower levels of happiness. Graham (2009) describes this as 'the paradox of unhappy growth'.

When data is being considered at the aggregate level (looking at a group of countries), the positive effects of growth experienced by some countries are

'cancelled out' by the negative effect of growth on others. When disaggregated data is considered, the picture can become clearer. For example, Stevenson and Wolfers (2008) found insignificant effects of growth in general but when they looked at the first stages of growth, they found strong negative effects, for example in the 'miracle' growth economies but a positive or insignificant effect is seen in countries in later stages of growth. A similar relationship between economic growth and well-being at the country level has been found by Graham and Chattopadhyay (2008). These findings point to the importance of *speed* of growth in determining whether the relationship appears positive or negative.

9. At the individual level, lower household income appears to lead to lower children's well-being

Tomlinson *et al.* (2008) analysed individual-level data from the BHPS and concluded that growing up in impoverished households directly impacted on the well-being of children and young people.

Income inequality

- Although not wholly conclusive, evidence suggests that a higher level of income inequality in a country seems to reduce the average subjective well-being of its citizens.

Although the evidence on the relationship between inequality and well-being has been mixed, with some studies failing to find a cross-national relationship and some even finding a positive relationship (Berg and Veenhoven, 2010; Clark, 2003b; Bjørnskov *et al.*, 2008; Veenhoven, 1996), it seems that most studies find a negative relationship between income inequality and well-being. Where authors find a relationship, it seems to hold across countries (Helliwell and Huang, 2008; Diener *et al.,* 1995), across states in the USA (Alesina *et al.,* 2004) and in cross-city comparisons (Hagerty, 2000).

This relationship is stronger in some countries than others:

- Inequality measures (Gini indices) calculated at the state level (USA) or country level (Europe) reveal that inequality is adversely associated with the well-being of Americans and Europeans (Alesina et al., 2004). However, there are differences in the income and ideological groups that are most adversely affected by inequality in the two regions: overall happiness decreases with inequality in particular for poor and politically left-leaning people In Europe, whilst in the USA it is the well-being of the rich that is more adversely affected by higher levels of inequality (Alesina et al., 2004).
- Schwarze and Härpfer (2007) used the GSOEP life satisfaction question and regional Gini inequality indices and found that the well-being of Germans is adversely affected by inequality.
- Winkelmann and Winkelmann (2010) investigated the effect of inequality on the middle classes, by considering the relationship between the Gini coefficient of the pre-tax income distribution, and individuals' income satisfaction, across over 2400 observations from the Swiss Household Panel. Results strongly suggest that increased inequality lowers the income satisfaction of middle class individuals, ceteris paribus,[10] given own income.

and seems to hold for children's well-being (Statham and Chase, 2010):

[10] All other things being equal or held constant.

- Average levels of children's well-being (in Europe, and measured by the UNICEF index, of largely objective measures) were not related to average income in a country, but were negatively correlated with both levels of income inequality and the percentage of children living in relative poverty (Bradshaw and Richardson, 2009; Pickett and Wilkinson, 2007).

Longitudinal data indicates the relationship may be causal:

- Using General Social Survey data from 1972 to 2008, Oishi et al. (2011) found that Americans were on average happier in the years with less income inequality that in the years with more income inequality. They also demonstrated that the inverse relation between income inequality and happiness was explained by perceived fairness and general trust.

However, the effect of income inequality on subjective well-being seems to partly depend on real or perceived social mobility (Senik, 2005; Alesina *et al.,* 2004), so that if individuals perceive there is a good opportunity for social mobility, they will tolerate and therefore feel happier with a higher level of income inequality than if perceived levels of social mobility are low.

Benefits and welfare payments

1. Higher public spending and benefit entitlements appear to be associated with higher well-being at the national level.

Although results are not unanimous, the balance of evidence seems to suggest that higher public spending and benefit entitlements are associated with higher levels of well-being.

Di Tella *et al.* (2003) analysed individual-level European data and found that a higher benefit replacement rate (using the OECD index of pre-tax replacement rates, i.e. unemployment benefit entitlements divided by an estimate of the expected wage) is associated with higher life satisfaction for both the unemployed and the employed. At the international level, studies have found that nations with the highest levels of happiness have strong welfare states and public spending (Kotakorpi and Laamen, 2010; Pacek and Radcliff, 2008; Di Tella *et al.,* 2003).

Pacek and Radcliff (2008) found that indicators of 'decommodification'[11] and the 'social wage'[12] had a strong effect on life satisfaction. Using the most recent wave of World Values Survey data (2005–2008, 2009), Flavin *et al.* (2011) found that in advanced industrial democracies, citizens were more satisfied with their lives as the level of state intervention in the market economy increased. Across countries they found that life satisfaction varies directly with the extent of the state intervention to 'protect' citizens against pure market forces (measured by tax revenue, government consumption as a share of GDP, the social wage, and welfare expenditures), net of economic, social, and cultural factors.[13] They also find that this relationship is constant across

[11] The degree of decommodification is the degree to which welfare services, such as education and healthcare, are free from the market.

[12] The social wage is defined as the average gross unemployment benefit replacement rates for two earning levels, three family situations, and three durations of unemployment (OECD 2009).

[13] The individual-level factors they control for are: income, education, self-reported health, gender, age, marital status, unemployment status, church attendance and interpersonal trust. The country-level factors they control for are: GDP per capita, unemployment rate, and a measure of the 'individualism' of a country's culture.

different levels of income and different political ideologies, such that the effects of social policy benefit everyone in society, rich and poor, liberal and conservative.

However, not all the evidence is consistent with the above findings: Ouweneel (2002) found a strong negative effect of unemployment benefits on well-being and Veenhoven (2000) found no relationship between the welfare state and subjective quality of life.

2. *In Europe, there is a positive relationship between child well-being and both national spending on family services and benefits, and GDP.*

Analyses of the Index of Child Wellbeing in Europe (which includes a mix of objective and subjective indicators) revealed both a positive relationship between child well-being and national spending on family benefits and services, and a positive relationship between child well-being and GDP (Statham and Chase, 2010; Bradshaw and Richardson, 2009).

Unemployment

Note that this section considers the evidence on the effects of individual unemployment on individual well-being; the next section looks at the evidence of the relationship between the unemployment *rate* and well-being.

1. *Unemployment is strongly negatively correlated with various measures of subjective well-being. This relationship exists over a range of national and international datasets.*

Compared to their employed counterparts, unemployed people have lower well-being, measured in terms of:

- Lower life satisfaction (Blanchflower and Oswald, 2011; Luechinger *et al.,* 2010; Wolbring *et al*., 2011; Graham, 2009; Graham and Felton, 2006; Haller and Hadler, 2006; Hudson, 2006; Pichler, 2006; Clark and Lelkes, 2005; Ferrer-i-Carbonell and Gowdy, 2005; Helliwell and Putnam, 2005; Oswald and Powdthavee, 2005; Schoon *et al.,* 2005; Weinzierl, 2005; Fayey and Smyth, 2004; Frijters *et al*., 2004; Graham *et al.,* 2004; Headey and Wooden, 2004; Stutzer, 2004; Winkelmann, 2004; Bukenya *et al.,* 2003; Di Tella *et al.,* 2003; 2001; Helliwell, 2003; Gerdtham and Johannesson, 2001; Graham and Pettinato, 2001a; Frey and Stutzer, 2000; Winkelmann and Winkelmann, 1998; Gerlach and Stephan, 1996).
- Lower well-being measured according to domain satisfaction (Cummins *et al.*, 2004).
- Lower inverse GHQ scores (Shields and Price, 2005; Thomas *et al*., 2005; Clark, 2003a; Wildman and Jones, 2002; Clark and Oswald, 1994).
- Worse psychological health (Theodossiou, 1998; Korpi, 1997).
- Lower overall happiness (Blanchflower and Oswald, 2011; Haller and Hadler, 2006; Pichler, 2006; Luttmer, 2005; Van den Berg and Ferrer-i-Carbonell, 2005; Alesina *et al.,* 2004; Blanchflower and Oswald, 2004a; Hayo, 2004; Di Tella *et al*., 2003; Graham and Pettinato, 2001a).

Evidence from a range of well-being surveys shows that unemployed people have around 5–15% lower life satisfaction scores than their employed counterparts (Di Tella *et al.,* 2001[14]).

[14] In this study life satisfaction was modelled as a continuous variable. A continuous variable is one where there are equal intervals between scores. For example, the

Using European data, unemployment reduced the probability of having a high life satisfaction score and a high overall happiness score of at least 8 out of 10 by 19 per cent and 15 per cent, respectively (Lelkes, 2006a). Other studies report even higher probabilities for the effect of unemployment, with unemployed men being 32 per cent to 77 per cent less likely to be in a higher life satisfaction category[15] (Australian males: Carroll, 2007; UK males: Blanchflower and Oswald, 2004a, respectively; also see Clark, 2003a; Winkelmanand Winkelman, 1998). A similar range of probabilities is found for the effect of unemployment on the likelihood of reporting high well-being amongst females (Carroll, 2007).

2. *Unemployment is negatively associated with well-being across a range of nations but the size of its effect seems to vary across countries and across studies.*

Variations in the influence of unemployment on life satisfaction across countries suggest that social norms and institutional differences (that vary by country) can influence the non-income-related costs of unemployment.

For example, unemployment appears to have very different effects for men in different countries: it seems to be less painful for Australian men than for men in other countries, namely Germany, Britain and the USA. However female estimates are similar across countries; although there is often a difference between the effects on men and women within the same country, for example it is more painful for women than men in Australia (Clark, 2010; Dolan *et al.,* 2008; 2006; Carroll, 2007).

The effects of unemployment appear to be larger amongst those in high-income countries (Fayey and Smyth, 2004) and different studies seem to find varying effects, for example the effects of unemployment appear to be larger amongst the middle-aged (compared to the old) (Winkelmann and Winkelmann, 1998). The evidence on whether the effect is larger for the young is mixed (Pichler, 2006; Winkelmann and Winkelmann, 1998; Clark and Oswald, 1994). A larger effect was also found for those with higher education in Britain (Clark and Oswald, 1994) and those with right-wing political leanings in the USA (Alesina *et al*., 2004).

3. *Although some people with lower well-being may be more likely to become unemployed, these 'selection effects' do not explain the size of the relationship between unemployment and well-being.*

While a number of authors note the possibility of selection effects – that people who have lower well-being are more likely to be unemployed, rather than unemployment leading to lower well-being *per se* – most evidence, especially from longitudinal studies, shows that the unemployment *does* have an impact on well-being (Lucas *et al.,* 2004) although effect sizes are often reduced slightly when selection effects are taken into consideration (Dolan *et al.,* 2008; 2006; Ferrer-i-Carbonell and Gowdy, 2005; Oswald and Powdthavee, 2005).

difference in the amount of well-being between a score of 4 and 5 is the same as the difference in the amount of well-being between scores of 8 and 9.

[15] This is when life satisfaction is modelled as a continuous variable (see footnote above) which, unlike an ordinal variable, this treats well-being scales as a measurement where the difference between two values is meaningful.

4. *Although people may adapt somewhat to being unemployed, the effect does not seem to completely disappear.*

Although some evidence has been published showing that the negative impact of unemployment reduces with the length of unemployment (Clark and Oswald, 1994), other studies have found that individuals who are unemployed for over a year experience a more negative reaction to unemployment than those unemployed for a shorter amount of time (Lucas *et al.,* 2004), an effect that is not reduced by previous experience of unemployment. In fact, Louis and Zhao (2002) found that any experience of unemployment in the past 10 years had a negative impact on a combined general happiness scale.

5. *The loss of well-being far exceeds that expected from the reduction in income from unemployment.*

Many studies of unemployment have revealed that the reduction in well-being due to unemployment is larger than the reduction attributable to the loss in income (Blanchflower and Oswald, 2011; Clark, 2010; 2003; Dolan et al., 2008; 2006; Carroll, 2007; Lelkes 2006a; Ferrer-i-Carbonell and Gowdy, 2005; Oswald and Powdthavee, 2005; Alesina et al., 2004; Blanchflower and Oswald, 2004a; Fayey and Smyth, 2004; Lucas et al., 2004; Di Tella et al. 2001; Winkelman and Winkelman, 1998; Clark and Oswald, 1994).

The estimates of the non-pecuniary well-being costs of unemployment have ranged from a loss equivalent to a loss of the equivalent of around £28 500[16] in annual income for Australian men and around£58 400 for Australian women (Carroll, 2007) to a loss of around £71 250 in annual income for German men and of around £17 500 for German women (Carroll, 2007 from Clark *et al.,* 2001 analysis).

In addition to the negative psychological effect of unemployment on well-being in terms of current insecurity, it may also affect the level of earnings people expect to earn over their lifetimes (Carroll, 2007). Wildman and Jones (2002) used a fixed-effect model[17] to control for satisfaction with finances and expectations of future financial position. They found that, amongst men, the negative unemployment coefficient fell from 1.98 points (on a 0–36 GHQ Likert scale) to 0.89 which suggests that some of the damaging effect of unemployment may stem from the insecurity of future finances.

Unemployment rate

1. *National and regional unemployment rates have been found to reduce subjective well-being*

National unemployment rates have been found to reduce subjective well-being in European countries (Luechinger *et al.,* 2010; Di Tella *et al.* 2003, 2001; Wolfers, 2003) and in the USA (Alesina *et al.,* 2004). Using large samples of US data, Helliwell and Huang (2011) found very large negative regional spill over effects of unemployment that reduce the subjective well-being of those who are still employed but who live in regions with higher general unemployment rates.

[16] Amounts were originally calculated in Australian dollars and were converting to British pounds for the purpose of this review based on February 2012 exchange rates. The original amounts in AUD$ were (in order): AUD$42 100, AUD$86 300, AUD$105 100, and AUD$25 800.

[17] Refer to the Glossary.

2. *However the effects of individual unemployment on well-being seem to be partially 'neutralised' in high-unemployment regions.*

It seems that the effects on an individual of being unemployed diminish when a high enough proportion of the local population is also unemployed. The level of regional unemployment at which the negative effects of individual unemployment are neutralised have been estimated at 22 per cent (Shields and Price, 2005) and at 24 per cent (Clark, 2003a) using UK data. The latter study also found that having an unemployed partner is detrimental for well-being for employed people, but beneficial for the unemployed.

Inflation

1. *After controlling for individual personal characteristics, inflation has been found to have a consistent negative effect on individuals' well-being.*

Using country-level data, both cross-sectional (Bjørnskov, 2003) and time-series (Wolfers, 2003) studies do not find a significant effect of inflation on life satisfaction. Controlling for individual personal characteristics, however, inflation has been found to have a consistent negative effect (Alesina *et al.,* 2004). The inflation impact is stronger for those with right-wing political beliefs (Alesina *et al.,* 2004).

A volatile inflation rate has also been found to reduce life satisfaction (Wolfers, 2003) and happiness (Whiteley *et al.,* 2010; Gandelman and Hernandez-Murillo, 2009; Di Tella *et al.,* 2003; 2001; Helliwell, 2003).

Type of work

1. *There appears to be a positive effect of being self-employed on well-being, but the evidence is mixed.*

In OECD countries, it has been found that the self-employed typically report higher levels of overall job satisfaction than the employed (Clark, 2010). A robust positive effect of self-employment (compared to employment) on well-being has been found in UK, international (ISSP) and US (GSS) data (Blanchflower and Oswald, 1998).

However, a later study of US and European data suggests this positive effect may be limited to the rich (Alesina *et al.,* 2004) and this is supported by evidence that amongst workers in the UK, casual work (which, unlike self-employment, is not characterised by people owning their own means of production and having considerable self-direction) seemed to be detrimental to men's mental health and women's life satisfaction (Bardasi and Fracesconi, 2004).

Other European studies have failed to find a significant difference in life satisfaction between being employed and being self-employed (Lelkes, 2006b; Shields and Price, 2005; Stutzer, 2004; Frey and Stutzer, 2000).

Quality of work

1. *When workers function well and feel secure in their job they are more satisfied with their work.*

There is a link between how well workers function in their job and how satisfied they are with their work (Van Praag and Ferrer-i-Carbonell, 2010). This is shown by international data (Clark, 2010).

Helliwell and Huang (2010) estimated the effects of several non-financial job characteristics, such as workplace trust, decision-making, and conflicting

demands, on overall life satisfaction, using several Canadian datasets. They find that the effects are largest for workplace trust. Interestingly, decision-making was found to increase job satisfaction but had no effect on life satisfaction.

There is a powerful link between job insecurity and low well-being (Blanchflower and Oswald, 2011) and research has revealed that there is high well-being cost of job changes (Bonhomme and Jolivet, 2009).

Research reveals gender differences in terms of job satisfaction: in most countries men are less satisfied with their job than women, all else being equal (Van Praag and Ferrer-i-Carbonell, 2010).

Evidence also shows that higher levels of engagement and job satisfaction lead to higher productivity rates and other measures of improved work performance such as sickness-absence, customer satisfaction, employee turnover, etc. (Donald *et al.,* 2005; Harter *et al.,* 2003; Cropanzano and Wright, 1999).

Hours worked

1. *There seems to be an inverse U-shaped relationship between hours worked and subjective well-being.*

Subjective well-being seems to increase with the number of hours worked up until a certain level, beyond which additional hours worked have a negative effect on well-being.

Some data from Germany (GSOEP) and the UK (National Child Development Study (NCDS)) suggests that life satisfaction increases with the number of hours worked up to a certain level (Luechinger *et al.,* 2010; Weinzierl, 2005) and that men in full-time employment have higher life satisfaction that men in part-time employment (Schoon *et al.,* 2005). However, there are other studies that suggest no difference in life satisfaction, GHQ and happiness scores between full-time and part-time work (Blanchflower and Oswald, 2005; 2004a; Bardasi and Francesconi, 2004).

There is some evidence from the GSOEP which suggests that well-being rises as the number of hours worked rises but only up to a certain point, beyond which well-being starts to decrease – in other words, there is an inverse U-shaped relationship between life satisfaction and the number of hours worked (Meier and Stutzer, 2008). Van Praag and Ferrer-i-Carbonell (2010) found that the number of working hours has a negative effect on job satisfaction. But in fact, working overtime has a positive effect on job satisfaction.

The effect of working hours seems to vary across the life course. At least some work amongst older individuals is associated with an increase in reported happiness and a decrease in negative well-being (Baker *et al.,* 2005; Ritchey *et al.,* 2001).

Debt

1. *In general, credit card and 'unmanageable' debt is associated with lower well-being. This relationship, however, does not hold for mortgages or investment debt.*

Research has revealed a link between debt and well-being: in general, debt is associated with lower well-being, measured subjectively. Credit card debt has been shown to lead to lower well-being (Brown *et al.,* 2005; Cummins *et al.,* 2004) and needing to borrow money mid-week increases the chances of being unhappy (Borooah, 2005). Unmanageable debts have also been linked to increased risk of developing depression and anxiety-related problems (Skapinakis *et al.,* 2006) and a cross-sectional, nationally representative survey

of over 8500 people across England, Wales, and Scotland found that the relationship between low income and mental disorders was weakened after adjustment for debt (Jenkins *et al.,* 2008).

However the evidence suggests that the *type* of debt is important – large secure debts, such as a mortgage, or debts for investments have not been found to impact negatively on life satisfaction (Brown *et al.,* 2005; Cummins *et al.,* 2004).

Commuting

1. *Commuting is associated with negative affect and a reduction in life satisfaction.*

Analysis of day reconstruction method (DRM) data from women revealed that it was whilst commuting that they experienced the lowest ratio of positive to negative emotions during the day (although even during this activity there were more positive emotions than negative emotions being experienced overall) (Kahneman *et al.,* 2004a).

Stutzer and Frey (2008) found (using German data) that people with longer commuting times reporting systematically lower subjective well-being levels. They found that people who commute 22 minutes (3 minutes less than the average UK commute time) one way per day, report on average a 0.10 point lower satisfaction with life than those who spend less time commuting. This finding has been replicated by other studies (Dolan *et al.,* 2008; 2006; Diener and Seligman, 2004). From analysis of time-use surveys, Putnam (2000) shows that for each additional ten minutes on the daily commute, involvement in community affairs is reduced by 10 per cent, which could provide a partial explanation for the effects on well-being.

It is likely that different modes of commuting are associated with different well-being outcomes; for example, one study revealed that those who found their journey relaxing were more likely to be cyclists or walkers, with car users more likely to find their journey stressful (Gatersleben and Uzzell, 2007).

Box 1: The economy: Key findings

- Across countries, higher income nations generally experience higher average levels of subjective well-being at any given point in time (cross-sectional data).
- The correlation across countries between high national income and well-being is substantially reduced once quality of government, democracy and social capital is controlled for.
- Within countries, individual income and life satisfaction are positively related at any point in time (cross-sectional data).
- However, at any given time, once a certain level of income (which varies from country to country) has been reached, the relationship between an individual's income and well-being within a country weakens.
- Across developed nations there is not always a relationship between changes in national income and changes in levels of well-being over time (longitudinal data) – suggesting that once a certain level of national income per capita has been reached (which varies from country to country) general increases in national income per capita do not necessarily translate into substantial increases in subjective well-being.
- Relative income has been found to have a substantial and important effect on well-being and explains much of the income-well-being relationship.
- The satisfaction with life measure and Cantril's Ladder seem to be more strongly related to income than other measures of well-being, for example overall happiness or 'emotional well-being'.
- Higher income-growth countries seem to experience higher levels of subjective well-being although this relationship is complex and depends on the national income per capita.
- At the individual level, lower household income appears to lead to lower children's well-being.
- Although not wholly conclusive, evidence suggests that a higher level of income inequality in a country seems to reduce the average subjective well-being of its citizens.
- Higher public spending and benefit entitlements appear to be associated with higher well-being at the national level.
- In Europe, there is a positive relationship between child well-being and both national spending on family services and benefits, and GDP.
- Unemployment is strongly negatively correlated with various measures of subjective well-being. This relationship exists over a range of national and international datasets.
- Unemployment is negatively associated with well-being across a range of nations but the size of its effect seems to vary across countries and across studies.
- Although some people with lower well-being may be more likely to become unemployed, these 'selection effects' do not explain the size of the relationship between unemployment and well-being.
- Although people may adapt somewhat to being unemployed, the effect does not seem to completely disappear.
- The loss of well-being far exceeds that expected from the reduction in income associated with unemployment.
- National and regional unemployment rates have been found to reduce subjective well-being.
- However the effects of individual unemployment on well-being seem to be partially 'neutralised' in high-unemployment regions.
- After controlling for individual personal characteristics, inflation has been found to have a consistent negative effect on individuals' well-being.

Box 1: The economy: Key findings cont.

- There appears to be a positive effect of being self-employed on well-being, but the evidence is mixed.
- When workers function well and feel secure in their job they are more satisfied with their work.
- There seems to be a U-shaped relationship between hours worked and subjective well-being.
- In general, credit card and 'unmanageable' debt is associated with lower well-being. This relationship, however, does not hold for mortgages or investment debts.
- Commuting is associated with negative affect and a reduction in life satisfaction.

1.2 Social relationships and community

The policy-relevant factors included in this section are: people's social activity, their community involvement, membership of religious and other organisations, volunteering, the levels of social trust and governance, and personal and familial relationships. These factors are estimated to have a considerable and large effect on levels of well-being, however there has been relatively less research conducted in this area compared to the attention given to economic factors.

Social activity

1. *Strong social networks and time spent socialising are positively associated with subjective well-being.*

Better social networks, defined both in terms of number of connections and strength of connections, and more time spent socialising are associated with higher levels of life satisfaction and overall happiness, and a decrease in depressive symptoms (Watson *et al.,* 2010; Dolan *et al.,* 2008; 2006; Lelkes, 2006b; Pichler, 2006). Individuals who actively participate in their community report higher levels of well-being than non-participants (Keyes, 1998) and evidence at both the aggregate and individual level suggests that social connections are among the most robust predictors of well-being (Stiglitz *et al.,* 2009).

The reported effects are large (Powdthavee, 2008). For example people who have frequent social contact with family, friends and neighbours have subjective well-being scores of almost a full point higher on an 11-point life satisfaction scale than people without this contact (Helliwell, 2006). The relationship remains even when controlling for levels of life satisfaction in previous periods (Baker *et al.,* 2005) and applies into older age (Ritchey *et al.,* 2001).

At the international level, countries with higher average levels of well-being have higher social capital and stronger friendship networks (Bjørnskov *et al.* 2008; Vermuri and Constanza, 2006; Bjørnskov, 2003). Survey data from many countries suggests that both trust and social connections have independent linkages to subjective well-being (Helliwell, 2011).

Bartolini and Bilancini (2010) have conducted an analysis which suggests that the absence of any rise in well-being in the USA over the twentieth century, in spite of improvements in economic conditions, can be largely attributed to declining social capital. They studied multiple data sources and compared US General Social Survey data with the GSOEP, and the four waves of the WVS, to provide evidence that it is changes in sociability (the quantity and quality of social relationships) that determine the long-term trends in well-being.

There is also evidence of the indirect effect of social relationships as a buffer to the negative impact of stress on well-being (Huppert, 2004; House *et al.,* 1988).

Volunteering

1. *There appears to be a positive relationship between volunteering and subjective well-being, and altruistic behaviour promotes subjective well-being.*

Thoits and Hewitt (2001) found a positive relationship between volunteering and happiness or life satisfaction, but also found that happier people tended to do more volunteering, raising the question of direction of causality. International research suggests that the benefits of generous and altruistic behaviour on subjective well-being are universal (Helliwell, 2011; Aknin *et al.,* 2010; Dolan *et al.,* 2006).

The effect on life satisfaction has also been shown to rise with *frequency* of volunteering, for example analysis of GSOEP data 1985–1999 illustrated that reported life satisfaction rose with the frequency of volunteering (Meier and Stutzer, 2008).

For elderly volunteers, a positive correlation between volunteering and life satisfaction is found (Wheeler *et al.,* 1998) and Greenfield and Marks (2004) found that amongst a subset of older people, volunteering was associated with more positive (but not less negative) emotion.

However, Haller and Hadler (2006) found no relationship at the country level between levels of volunteering and levels of happiness or life satisfaction across 34 countries using the WVS data.

Membership of organisations

1. *There is a positive relationship between subjective well-being and membership of (non-church) organisations.*

Research has also found a positive relationship between subjective well-being and membership of (non-church) organisations. An analysis of the ESS found that membership of more organisations increases life satisfaction (Pichler, 2006) and analyses of 49 countries from the WVS revealed that both national average membership of non-church organisations and individual involvement in non-church organisations are significantly positively related to life satisfaction (Helliwell and Putnam, 2004; Helliwell, 2003). However Blanchflower and Oswald (1998) found evidence to suggest that in the UK, belonging to a trade union decreases life satisfaction.

Membership of religious organisations

1. *Regular engagement in religious activities is positively related to well-being.*

The evidence shows fairly conclusively that regular engagement in religious activities is positively related to life satisfaction (Clark and Lelkes, 2005; Hayo, 2004), happiness (Cohen, 2002; Ferriss, 2002), positive emotion (Kahneman *et al.,* 2004b) and negatively associated with depressive symptoms (Lee *et al.,* 2001).

Mochon *et al.* (2008) showed that attending a religious service provided a ‘small and positive boost’ to reported well-being, which occurred across all of the religions surveyed. They hypothesise that it is the aggregation of lots of small boosts over time that contributes to the positive relationship between religiosity and well-being.

Analyses of one large cross-national sample revealed that religious variables accounted for 5–7 per cent of the variance in life satisfaction scores (Ellison,

1991; Witter *et al.,* 1985) and effect sizes seem to be comparable across different religious denominations (Cohen, 2002).

There is also some evidence to suggest that religious attendance reduces the effect size of income on happiness, 'insuring' against decreases in income, particularly, in a US context, for African Americans (Dehejia *et al.,* 2007).

Additional research has considered the *amount* of time engaged in religious activity: Helliwell (2003) looked at WVS data and found that higher life satisfaction was associated with church attendance once or more per week and Hayo (2004) found similar results in analysis of eastern European data. Myers (2000) reported national data showing that those who report the highest involvement with their religion are almost twice as likely to report being 'very happy' than those who are least involved, findings that have also been replicated by Ferriss (2002). However, when Clark and Lelkes (2005) analysed ESS data, they found that church attendance of once a month was sufficient to affect life satisfaction.

Lim and Putnam (2010) analysed panel data from the USA over 6–9 months, finding that increased church attendance over that period increases life satisfaction. However, they found that more overtly religious factors like theology (e.g. belief about the type of God or the afterlife) and private religious practices (e.g. experiencing God's presence in your life or frequency of prayer) did not predict greater life satisfaction. Instead, the benefits to well-being seem to come from the social aspect of religion – the fact that religious people regularly attend religious services and build social networks in their congregations.

Trust

1. *Social trust (trust in other people) is found to be associated with higher life satisfaction and happiness, and a lower probability of suicide.*

Studies find that trust in other people is associated with higher well-being (Bjørnskov, 2007; Helliwell, 2006; 2003; Hudson, 2006; Helliwell and Putnam, 2004). This finding has been shown using international data: analysis of WVS and ESS revealed that social trust, measured by trust in 'most other people' (a widely-used measure referred to as 'generalised social trust'), was associated with higher life satisfaction and happiness, and a lower probability of suicide (Helliwell, 2006; 2003; Helliwell and Putnam, 2004).

2. *Trust in key public institutions – for example, government, the police and the legal system – is associated with higher life satisfaction.*

Studies have found that trust in key public institutions is associated with higher life satisfaction (Dolan *et al.,* 2008; 2006; Hudson, 2006; Helliwell and Putnam, 2004).

Trust in different areas of life (such as in other people, in neighbours, in the police, in the government) are among the strongest associations with subjective well-being overall (Helliwell and Putnam, 2004). To have or not have trust in each of these key areas of life has the life satisfaction equivalent of more than a doubling of income (Helliwell and Wang, 2011). Trust seems to be independent in different life domains: survey data from many countries reveal that when respondents are asked to evaluate separately their trust in several different domains (e.g. in the workplace, in the police, among neighbours) their answers differ substantially (Diener and Seligman, 2004).

Governance

1. There is a positive association between democracy and life satisfaction.

International data shows that countries with higher levels of well-being generally have higher levels of democracy and democratic participation (Helliwell and Huang, 2008). Frey and Stutzer (2000) found that extended individual participation in the form of initiatives and referenda, and of decentralised (federal) government structures, raises life satisfaction (based on research comparing Swiss cantons).

Positive links between democracy and life satisfaction are found using international data, both when controlling for income (Inglehart and Klingemann, 2000) and language group (Dorn *et al.,* 2005). As referred to in the *Income* section, a higher level of democracy has also been found to reduce strength of the effect of income on well-being at the national level (Frey and Stutzer, 2002; Inglehart and Klingemann, 2000). Abdallah *et al.* (2008) found that indicators of socio-political capital (using variables of voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption from the *Governance Matters* dataset) were better predictors of life satisfaction than GDP in an analysis of 79 countries.

Increased democracy, however, does not *ensure* increased happiness. For example, Russia has shown a decline in happiness since adopting free elections in 1991 (Inglehart and Klingemann, 2000), indicating that the other changes it experienced over the period (such as decreases in average income) had stronger effects on subjective well-being than the rises in democracy.

Marriage and personal relationships

1. Being single is worse for well-being than being in a stable relationship.

A range of international studies reveal that being single is worse for well-being than being in a partnership, both when it is measured in terms of the positive effects on subjective well-being (happiness/life satisfaction) and in terms of the absence of negative effects (Dolan *et al.,* 2006; Diener *et al.,* 1999). Previous studies have shown that marriage moderates the heritability of depressive symptoms in women, suggesting that marriage may provide protection or compensation against genetic risks (Nes *et al.,* 2010).

Marriage was found to be an important factor in a regression analysis of the overall life satisfaction and happiness for US cross-sectional (2009) and longitudinal (1972–2008) data and international cross-sectional (2007) data (Blanchflower and Oswald, 2011). Indeed, some studies have found that an individual's relationships with their partner and family is the single most important domain for well-being (Bacon *et al.,* 2010; Kapteyn *et al.,* 2010). The stability of the relationship is important: the amount of well-being associated with living with an unmarried partner depends on the degree to which the relationship is perceived to be stable (Brown, 2000).

Evidence suggests that being married is associated with the highest level of well-being; being separated is associated with the lowest level of well-being – lower than that associated with being divorced or widowed (Blanchflower and Oswald, 2011; Dolan *et al.,* 2006; Helliwell, 2003) and that second marriages are associated with lower happiness scores (Blanchflower and Oswald, 2004a). Parental divorce is found in some (but not all) studies to reduce children's subjective well-being in adulthood (MacKerron, 2011).

Regular sex was associated with more positive well-being, especially when it was with the same partner (Blanchflower and Oswald, 2004a).

Family relationships

1. Family conflict is associated with lower children's well-being.

Although there is no association between poor child well-being and the prevalence of 'broken' families (where one of the parents no longer lives in the same residence as the child(ren)) in the Bradshaw index (a composite of objective 'drivers' of well-being and subjective well-being) (Bradshaw and Richardson, 2009; Mooney *et al.*, 2009), family conflict is negatively associated with children's subjective well-being (Gutman *et al.,* 2010; Rees *et al.,* 2009). Rees *et al.* (2009) found that a simple measure of how well families were getting along with each other was able to explain 20% of the variation in children's subjective well-being.

Having children

The effects of having children on people's well-being are not clear from the existing evidence. Overall, 13 of the studies reviewed by Dolan *et al.* (2008; 2006) showed no effects, 14 reported negative effects, 3 reported positive effects and 2 reported mixed effects.

Box 2: Community: Key findings

- Strong social networks and time spent socialising are positively associated with subjective well-being.
- There appears to be a positive relationship between volunteering and subjective well-being, and altruistic behaviour promotes subjective well-being.
- There is a positive relationship between subjective well-being and membership of (non-church) organisations.
- Regular engagement in religious activities is positively related to well-being.
- Social trust (trust in other people) is found to be associated with higher life satisfaction and happiness, and a lower probability of suicide.
- Trust in key public institutions – for example, government, the police and the legal system – is associated with higher life satisfaction.
- There is a positive link between democracy and life satisfaction.
- Being single is worse for well-being than being in a stable relationship.
- Family conflict is associated with lower children's well-being.

1.3 Health

The policy-relevant factors included in this section which are found to have an effect on subjective well-being are: the physical health of individuals, their psychological health, the amount of physical activity they participate in, other health behaviours and their average duration of sleep. In addition, there is evidence of a strong effect of subjective well-being on health.

Physical health

1. *Poor self-reported health is associated with lower subjective well-being and better self-reported health is associated with higher subjective well-being.*

In many studies health is measured subjectively – by using self-rated health status on surveys. This is where respondents are asked to rate their own health, rather than relying on the observations of physicians or biological measures of morbidity.

Fair and bad self-rated health reduces life satisfaction (Lelkes, 2006a; Clark and Lelkes, 2005; Flouri, 2004; Helliwell, 2004; 2003; Stutzer, 2004; Winkelmann and Winkelmann, 1998) and overall happiness (Lelkes, 2006a; Michalos *et al.,* 2000). Studies have shown that good self-reported health is associated with higher life satisfaction (Haller and Hadler, 2006; Weinzierl, 2005; Helliwell and Putnam, 2004; Winkelmann, 2004; Bukenya *et al.,* 2003; Gerdtham and Johannesson, 2001), increased inverse-GHQ scores (Clark, 2003b; Clark and Oswald, 2002; 1994) and increased overall happiness (Haller and Hadler, 2006; Ferrer-i-Carbonell and Frijters, 2004; Helliwell and Putnam, 2004; McBride, 2001).The effect size of health on subjective well-being remains substantial even after controlling for the reverse impact that subjective well-being has on health; and studies that use longitudinal data continue to show a strong effect of health on subjective well-being (Dolan *et al.,* 2008). One study found that current satisfaction with overall health is the most important of the domain satisfactions in determining overall happiness (Van Praag *et al.,* 2003).

The estimated monetary valuation of a change in well-being for a move from excellent to good health is that it is equivalent to a loss of £10 000 in annual income and a move from excellent to fair health is equivalent to a loss of £32 000. This compares with the valuation of a move from employment to unemployment being equivalent to a loss of £15 000 (Clark and Oswald, 2002).

2. *Poor objective health and disability are associated with lower subjective well-being, although this relationship is weaker than that of self-reported health and subjective well-being.*

Poor objective health (usually measured as the presence of illness) is associated with lower subjective well-being, measured in different ways (Dolan *et al.,* 2008; Baker *et al.,* 2005; Ferrer-i-Carbonell and Gowdy, 2005; Van den Berg and Ferrer-i-Carbonell, 2005; Diener and Seligman, 2004; Martin and Westerhof, 2003; Celiker and Borman, 2001; Evers *et al.,* 1997). However, this relationship is weaker than that of self-reported health and well-being (Diener and Seligman, 2004; Marmot, 2003; Lyubomirsky and Lepper, 1999).

Disability is also associated with:

- Lower life satisfaction (Oswald and Powdhavthee, 2005; Headey and Wooden, 2004; Menhert *et al.,* 1990).
- Reduced positive emotion, increased negative emotion and reduced purpose in life (Greenfield and Marks, 2004).
- Lower happiness (Blanchflower and Oswald, 2005).
- Reduced mental health (Headey and Wooden, 2004).

The evidence also suggests that a lowering of life satisfaction is associated with any health state that compromises people's ability to function day-to-day (Celiker and Borman, 2001; Evers *et al.,* 1997). The relationship between health and well-being still appears to hold for recent illnesses (in the last two weeks), especially if the illness lasted for more than two days (Shields and Price, 2005).

3. Although people may adapt somewhat to chronic illness, complete adaptation does not seem to occur.

There has been some evidence to suggest that that the negative effect of having a chronic illness or disability diminishes with the length of time an individual has experienced it (Oswald and Powdthavee, 2005), but complete adaptation has not been found in analysis of the data (Dolan *et al.,* 2008, 2006). Other evidence shows that for people with serious illnesses, such as congestive heart failure or acute myocardial infarction, mean levels of anxiety and depression remained substantially elevated one year after diagnosis (Dolan *et al.,* 2008; 2006; van Jaarsveld *et al.,* 2001).

4. Higher subjective well-being is associated with improved health and longevity.

Evidence indicates fairly conclusively that subjective well-being causally influences both health and longevity (Helliwell, 2011; Diener and Chan, 2011; Cohen and Pressman, 2006; Diener and Seligman, 2004). Subjective well-being has been associated with:

- Cardiovascular health (Blanchflower and Oswald, 2008b; Howell *et al*., 2007; Steptoe *et al.,* 2007; 2005; Diener and Seligman, 2004; Smyth *et al.,* 1998) including raised blood pressure (Brummett *et al.,* 2009; Raikkonen *et al.,* 1999), inflammatory and coagulation factors (Chida and Steptoe, 2008), thickening of carotid arteries (Paterniti *et al.,* 2001) and hypertension and adult-onset diabetes (Sapolsky, 2005).
- Immune functioning (Buck *et al.,* 2011; Diener and Chan, 2011; Segerstrom and Sephton, 2010; Howell *et al.,* 2007; Marsland *et al.,* 2007; 2006; Constanzo *et al.,* 2004; Ebrecht *et al.,* 2004; Cohen *et al*., 2003; Kohut *et al.,* 2002).
- Telomere shortening (the degeneration of DNA through its cumulative replication which is thought to contribute to the ageing process) (Tykra *et al.,* 2010; Damjanovic *et al.,* 2007; Lung *et al*., 2007; Epel *et al.,* 2004).
- Reproductive health (Buck *et al.,* 2011).
- Lower pain and greater pain tolerance (Howell *et al.,* 2007; Pressman and Cohen, 2005).
- Increased longevity (Helliwell, 2011; Snowdon, 2001; Danner *et al.,* 2001; Koivumaa-Honkanen *et al.,* 2000), including a strong and consistent relationship between reported subjective well-being and suicide (Daly and Wilson, 2009; Koivumaa-Honkanen *et al.,* 2001).

Psychological health

1. Psychological health has a very strong relationship with subjective well-being and seems to be more highly correlated with well-being than physical health.

Well-being and psychological health are highly correlated – mental disorders almost always cause poor well-being (Diener and Seligman, 2004; Packer *et al.,* 1997), for example:

- Depression and anxiety are associated with significant decreases in subjective well-being, for example, lower life satisfaction (Koivumaa-Honkanen *et al.,* 1999).
- Bipolar disorder is associated with significantly lower levels of well-being (Arnold *et al.,* 2000).
- Schizophrenia is associated with significantly lower levels of well-being (Suslow *et al.,* 2003; Bradshaw and Brekke, 1999; Koivumaa-Honkanen *et al.,* 1999).

This high correlation is perhaps unsurprising given that the concepts describing each (and often the measurement approaches used) are highly overlapping. However, well-being and psychological health are distinguished by several psychologists as two distinct dimensions (Keyes, 2005).

Physical activity

1. Physical activity has a beneficial effect on well-being (as well as on health).

Physical activity has been found to be positively associated with standard measures of well-being (Dolan *et al.,* 2008; Biddle and Ekkekakis, 2005) and also to be associated with:

- Reduced anxiety (O'Connor *et al.,* 2000; Taylor, 2000; Landers and Petruzzello, 1994; Petruzzello *et al*., 1991)
- Reduction in depression (Brosse *et al.,* 2002; Mutrie, 2000; O'Neal *et al.,* 2000; Craft and Landers, 1998).
- Improved mood (Arent *et al.,* 2000; Biddle, 2000).
- Reduced reactivity to psychosocial stressors (Dishman and Jackson, 2000; Sothmann *et al.,* 1996).

This relationship has been found across the genders and the life course, for example, for people aged over 60 using US data (Baker *et al.,* 2005; Ritchey *et al.,* 2001) and in Australian women (Dockerty, 2003).

The relationship seems to exist even for simple types of exercise, such as gardening (Ferrer-i-Carbonell and Gowdy, 2005). The *frequency* of engaging in physical activity is positively related to subjective well-being (Mochon *et al.,* 2008).

Other health behaviour

One study has found that smoking is an 'impressively strong predictor' of low well-being as measured by both emotional and life evaluation (Kahneman and Deaton, 2010). However the direction of causation should be interpreted with caution as it is also plausible that low well-being can lead to smoking, rather than the other way round.

Sleep

1. Sleep problems are associated with lower life satisfaction, lower happiness and a reduction in other measures of subjective well-being.

Kahneman *et al.* (2004a) used day reconstruction method (DRM) data to estimate the effects of sleep on well-being. They found that poorer sleep was associated with lower positive emotion and more negative emotion. This finding was supported by later research using the BHPS, which found that loss of sleep was associated with lower life satisfaction (Ferrer-i-Carbonell and Gowdy, 2005). However, the direction of causality is uncertain and there remains the possibility that lower well-being causes poor sleep, rather than vice versa.

2. In addition, optimum sleep levels are associated with positive benefits to most of the measures of subjective well-being.

Steptoe *et al.* (2008) found that both positive emotion and sense of purpose in life were inversely associated with sleep problems, after adjusting for age, gender, household income, and self-rated health. Zohar *et al.* (2005) and Hamilton *et al.* (2007a; 2007b) have also proposed a positive relationship between sleep and psychosocial functioning from their analysis of a sample of people in the USA, measured using Ryff's (1989) psychological well-being scale (which includes six dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth). After controlling for demographic differences, Hamilton *et al.* (2007a) found that 'optimal sleepers' (those reporting an average of 6–8.5 hours of sleep per night) reported fewer symptoms of depression and anxiety and higher levels of environmental mastery, personal growth, positive relations with others and self-acceptance.

Box 3: Health: Key findings

- Poor self-reported health is associated with lower subjective well-being and better self-reported health is associated with higher subjective well-being.
- Poor objective health and disability are associated with lower subjective well-being, although this relationship is weaker than that of self-reported health and subjective well-being.
- Although people may adapt somewhat to chronic illness, complete adaptation does not seem to occur.
- Higher subjective well-being is associated with improved health and longevity.
- Psychological health has a very strong relationship with subjective well-being, and seems to be more highly correlated with well-being than physical health.
- Physical activity has a beneficial effect on well-being (as well as on health).
- Sleep problems are associated with lower life satisfaction, lower happiness and a reduction in other measures of subjective well-being.
- In addition, optimum sleep levels are associated with positive benefits to most of the measures of subjective well-being.

1.4 Education and care

The policy-relevant factors included in this section are education, children's services, and informal care. There has been a substantial amount of research conducted in these areas, particularly on the relationship between education and well-being. However, despite this, the evidence is often mixed and so the findings should be interpreted with caution.

Education

1. Many (but not all) studies have found that more education is often associated with higher subjective well-being, when controlling for other variables (particularly income and health).

There is some evidence that spending more years in formal education is associated with better subjective well-being, shown by data from both national and cross-national surveys:

- Surveys within countries, such as the USA (Blanchflower and Oswald, 2011; 2004b; 1997; Lee and Bulanda, 2005; Alesina *et al.,* 2004; Bukenya *et al.*, 2003; Di Tella *et al.,* 2003; Subramanian *et al.* 2003; Easterlin, 2001; Brown, 2000), Ireland (Borooah, 2005), Switzerland (Frey and Stutzer, 2000), Sweden (Gerdtham and Johannesson, 2001), the Netherlands (Hartog and Oosterbeck, 1998), and Britain (Clark, 2003b).
- Surveys across countries, such as across Europe (Hudson, 2006; Lelkes, 2006; European Social Survey – Clark and Lelkes, 2005; Eurobarometer – Alesina *et al*., 2004; European Values Survey – Fahey and Smyth, 2004, Di Tella *et al*., 2003; New Democracies Barometer – Hayo, 2003; Blanchflower and Oswald, 1997); Latin America (Graham and Felton, 2006; Graham and Pettinato, 2001b) and in other international surveys (Dorn *et al.,* 2005; Blanchflower and Oswald, 2004b).

In addition, more education is associated with less mental illness in the USA (Kim and McKenry, 2002; Magdol, 2002; Brown, 2000) and Britain (Flouri, 2004).

Several, but not all, studies of education and subjective well-being have found a positive relationship between each additional level of education[18]. For example, Blanchflower and Oswald (2011), using data from the United States 1972–2008, found that each extra year of education in the United States was associated with 0.017 extra happiness points (on a scale from 1.0 to 3.0). The difference between completing high school and completing a college degree was therefore just over 0.06 happiness points.

[18] Educational levels are most commonly defined as: completion of high school, completion of an undergraduate degree, and post-graduate study and higher.

2. *However, some studies reveal no significant relationship or a negative relationship between education level and well-being, and in several cases it appears the relationship is non-linear.*

Some studies reveal no relationship between level of education and well-being, and some studies have actually found that more education is associated with worse subjective well-being in the USA (Baker *et al.,* 2005; Thoits and Hewitt, 2001) and in Britain (Ferrer-i-Carbonell and Gowdy, 2005; Shields and Price, 2005). Other studies have revealed no significant relationship (Van den Berg and Ferrer-i-Carbonell, 2005) in Britain (Flouri, 2004; Theodossiou, 1998), international data (Haller and Hadler, 2006), Australia (Headey and Wooden, 2004), USA (Peterson *et al.,* 2005; Smith, 2003), and West Germany (Smith, 2003).

Other studies suggest that the relationship is non-linear: several studies have found that middle level education (rather than the highest level education) is related to the highest life satisfaction (Helliwell and Putnam, 2004; Stutzer, 2004; Helliwell, 2003).

These different results are mostly likely because not all studies control for the same variables and the evidence shows that the education coefficient is often responsive to the inclusion of other variables within the model (Dolan *et al.,* 2006).

For example, there is some evidence to suggest that some of the benefits of education are indirect, via improved health (Bukenya *et al.,* 2003; Gerdtham and Johannesson, 2001) and social mobility. Diener *et al.* (1999) argue that most of the relationship between subjective well-being and education can be explained by the fact that the more highly educated tend to have higher incomes, better health, and more social contacts. Bukenya *et al.* (2003) looked at US data and Gerdtham and Johannesson (2001) at Swedish data, both finding that the indirect effect of education via health on well-being is likely to be considerable. Research on the indirect effect via social mobility and relative economic standing using data from Latin America suggests that the benefits to education may be positional rather than absolute (Graham and Pettinato, 2001a).

However, as noted by Dolan *et al.* (2006), if variables correlated with education are controlled for, the contribution which education is making to well-being may be underestimated; if the correlation is due in part to a *causal* path from education to higher income or better health, then fully controlling for income will underestimate the total size of the effect of education on well-being.

3. *There is a positive association between positive features of children's learning environments and their well-being.*

The school environment plays an important role in children's social, emotional, and behavioural well-being (Gutman and Feinstein, 2008a). It is an important factor in personal development and in promoting social well-being (Marks and Shah, 2004).

The positive association between learning and well-being has also been shown to predict change from childhood to adolescence:

- Children's learning and enjoyment in primary school predicts their later well-being in secondary school (Statham and Chase, 2010).
- For boys, learning in primary school has the strongest influence on their later behaviour, whereas for girls it is more predictive of social well-being (Gutman *et al.,* 2010).

In a UK study, it was revealed that the proportion of disadvantaged children in a school is one of the most important of the school effects on pupil well-being: pupils in schools with a higher percentage of disadvantaged pupils are more likely to be depressed, engage in antisocial behaviour and antisocial friendships, experience victimisation and report less satisfying friendships than pupils in more advantaged schools (Gutman and Feinstein, 2008b). However a UK study revealed that school factors explain 3 per cent or less of the variation in pupils' mental health and behaviour (Gutman and Feinstein, 2008b).

Informal care

1. *More time spent in informal care-giving is associated with lower subjective well-being.*

More time spent caring for others is associated with worse GHQ scores (Hirst, 2005; 2003), lower happiness (van den Berg and Ferrer-i-Carbonell, 2005) and more depressive symptoms (Marks *et al.,* 2002).

The transition into care-giving is also associated with several negative well-being outcomes, such as psychological distress for both sexes, poorer GHQ scores for women (Hirst, 2005), lower overall happiness, fewer feelings of personal mastery, and more depressive symptoms (Marks *et al.,* 2002).

DRM analysis revealed that caring for one's children was associated with more positive than negative emotion but was less positive than spending time with family and friends (Kahneman *et al.,* 2004a).

Box 4: Education and care: Key findings

- Many (but not all) studies have found that more education is often associated with higher subjective well-being, when controlling for other variables (particularly income and health).
- However, some studies reveal no significant relationship or a negative relationship between education level and well-being, and in several cases it appears the relationship is non-linear.
- There is a positive association between positive features of children's learning environments and their well-being.
- More time spent in informal care-giving is associated with lower subjective well-being.

1.5 The local environment

The policy-relevant factors included in this section are: the physical environment, housing, urbanisation, urban spaces and their design and pollution. The relationship between the climate and well-being, although not directly amenable to policy-making, is also considered.

Physical environment

1. Living in a deprived area, even after controlling for income, is detrimental to life satisfaction and affects other dimensions of well-being.

Living in an area which people perceive as deprived reduces subjective well-being (Abraham *et al.,* 2010; Dolan *et al.,* 2008; Ferrer-i-Carbonell and Gowdy, 2007; Guite *et al.,* 2006; Lelkes, 2006b; Shields and Price, 2005; Wiggins *et al.,* 2004).

Analysis of English data (from the Health Survey for England) revealed an inverse U-shaped relationship between the Index of Multiple Deprivation score of an area and symptoms of poor mental health, measured by the GHQ, although this was significant only for men (Shields and Price, 2005).

2. A positive perception of the surrounding landscape is linked to other dimensions of well-being.

Positive perceptions of the surrounding physical environment are linked to:

- Experience of positive emotions (Korpela *et al.,* 2002; Kaplan, 2001; Kuo and Sullivan, 2001; Herzog and Chernick, 2000; Hartig *et al.,* 1999; Kuo *et al.,* 1998).
- Stress reduction (Hartig *et al.,* 2003; 1996; Ulrich *et al.,* 1991).
- Increased social well-being (Abraham *et al.,* 2010; Leyden, 2003; Armstrong, 2000) through social integration, social engagement and participation, and through social support and sense of security.

This effect holds for older people (Milligan *et al.,* 2004; Booth *et al.,* 2000; Kweon *et al.,* 1998), and migrants (Rishbeth and Finney, 2006; Seeland and Ballesteros, 2004).

3. Natural landscapes appear to be more restorative than urban ones.

People prefer natural landscapes such as forests, beaches, parks, mountains, and sea/lakes for recovery from mental fatigue (Staats and Hartig, 2004; Staats *et al.,* 2003; Korpela *et al.,* 2001; Korpela and Hartig, 1996).

Walks in natural landscapes have a stronger effect on the ability to concentrate than urban walks (Hartig *et al.,* 2003) and the psychological health benefits of jogging in an urban park seem to be greater than those of street jogging (Bodin and Hartig, 2003).

Urban spaces and their design

1. *There is evidence that built environment features of neighbourhoods such as 'walkability' and street layout are positively related to well-being; it seems likely that this relationship operates indirectly via benefits to social capital for residents.*

Rogers *et al.* (2010) found that people who live in walkable communities[19] are more civically involved and have greater levels of trust than those who live in less walkable neighbourhoods. This evidence supports the hypothesis that the effects of urban areas on well-being operate through levels of social capital that are created for residents.

Support for this relationship also comes from evidence that residents living in cul-de-sacs are happier than those living on through-roads, something replicated by studies of several large datasets, since an original study in the 1960s of Dagenham (a suburb of London) (cited from Halpern, 2008). Similar studies have found that residents of houses at the end of streets are more likely to feel socially isolated than those living in houses on the middle of the street (cited from Halpern, 2008).

Housing

1. *High housing quality is positively associated with well-being; low housing quality is associated with lower well-being and psychological stress.*

Housing quality, which typically covers aspects of structural quality, maintenance, upkeep, and physical hazards (e.g. having a private bathroom, central heating, dampness, mould) is positively associated with well-being.

Evidence shows that poor quality housing increases psychological stress (Evans *et al.,* 2003; Evans, 2003). Ferrer-i-Carbonell and Gowdy (2005) found that living in a house which has pollution, grime, or other environmental problems reduces life satisfaction and Lelkes (2006a) found that living in a house with 'problems' reduces life satisfaction, especially if they are severe.

2. *Multi-dwelling housing is associated with adverse psychological health.*

In general, people living in high-rises seemed to have more mental health problems than those living in low-rises or houses; and living in single-family detached homes was typically associated with the best mental health outcomes (Evans *et al.,* 2003; Weich *et al.,* 2002; Evans, 2003).

In particular, high-rise housing is associated with lower psychological well-being of women with young children and evidence also points to a link with lower well-being of the young children themselves.

3. *Overcrowding is associated with lower well-being.*

Overcrowding, which is most commonly measured by the number of people per room, is associated with elevated psychological distress but not serious mental illness. Experimental studies with random assignment to short-term crowding in laboratory conditions reveal significant impacts on negative emotion as well as psychological distress (Evans, 2001), which are broadly the same as results observed in institutional settings, for example prisons and residential colleges (Evans, 2003). However, living alone is also a well-documented correlate of

[19] Walkable communities are most often defined in terms of accessibility, aesthetics/attractiveness, and connectivity.

mental illness (Evans, 2003).This suggests that well-being is highest for those who do not live in overcrowded conditions but do not live alone.

4. Living on a higher floor level is associated with lower well-being.

Poorer mental health is found among people who live on higher floor levels (Evans *et al.,* 2003). There is some discussion as to whether this finding can be explained (at least in part) by the relationship between multi-level dwelling housing and well-being (Evans, 2003) (see Finding 2).

5. Home ownership is associated with higher well-being; renting is associated with lower well-being.

The majority of research regarding the link between housing tenure and well-being supports the hypothesis that home-ownership is positively associated with well-being. A study using the WEMWBS measure observed statistically significant differences between WEMWBS score according to housing tenure with higher scores among owner-occupiers (Tennant *et al.,* 2007). Cummins (2006) found that the well-being of renters was well below the normal well-being range, particularly for older renters (46–55 years) and single parents.

The gradient in mental health status by housing tenure remains even after controlling for demographic variables such as age, gender, marital status, and education levels (Cairney and Boyle, 2004). Living in social housing appears to also be bad for subjective well-being (Brereton *et al.,* 2008).

Looking at domain satisfaction, Rohe and Basolo (1997) found that renters who became owners had a significantly higher level of housing satisfaction compared with those who remained renting during the same period. Ateca-Amestoy and Vera-Toscano (2008) found that homeowners are significantly more satisfied with their housing than those who are renting, findings that support a considerable amount of previous research in this area (Robinson and Adams, 2008; Taylor *et al.,* 2007).

Urbanisation

1. Subjective well-being appears to be lower in more densely populated areas and higher in rural areas.

There is evidence across a range of geographical locations (Europe, South America) that living in densely populated cities is detrimental to life satisfaction (Graham and Felton, 2006; Hayo, 2004; Gerdtham and Johannesson, 2001). Living in rural areas is found to be beneficial to life satisfaction (Hudson, 2006; Winter *et al.,* 1999).

However other studies have found results that, while not statistically significant, suggest that the relationship between population density and subjective well-being may not be linear (Peterson *et al.,* 2005; Shields and Price, 2005; Rehdanz and Maddison, 2005).

Pollution

1. The concentration of air pollutants in the region where an individual lives has a negative impact on subjective well-being.

In general, the concentration of pollutants in the region where an individual lives has a negative impact on their self-reported happiness (Frey *et al.,* 2010; Luechinger, 2009; MacKerron and Mourato, 2009; Di Tella and MacCulloch, 2008; Welsch, 2003; 2002). In more general terms, Ferrer-i-Carbonell and Gowdy (2005) found that perceptions of having ‘environmental problems’ where you live reduces life satisfaction. These findings are confirmed by other studies

which make comparisons between populations or over time (Luechinger, 2009; Di Tella and MacCulloch, 2008). Research has found that this relationship remained after controlling for income (Welsch, 2003; 2002).

A study by Welsch (2006) found that air pollution plays a statistically significant role as a predictor of inter-country and inter-temporal differences in subjective well-being. MacKerron and Mourato (2009) found that an annual increase in mean nitrogen dioxide concentration of 10µg/m^3 corresponds to a drop of nearly half a point of life satisfaction on an 11-point scale.

2. Noise pollution is associated with lower subjective well-being.

Van Praag and Baarsma (2005) found that aeroplane noise reduced the life satisfaction of inhabitants (using Dutch data). However, the loss of life satisfaction caused by the noise of aeroplanes was partly compensated by lower rents and house prices. The authors also found that the effect was reduced if households had noise insulation. Hart and Parkhurst (2011) found that the frequency of people talking in the street depended on how noise-free the environment was.

Crime

1. Crime is negatively associated with well-being, both for victims and for residents in areas of high crime rates.

European data has shown that being a victim of crime in the last five years reduces life satisfaction and the probability of reporting a life satisfaction score of 8 out of10 or higher falls by 0.03 percentage points (Lelkes, 2006b). Australian data also provides evidence of this relationship, for both property and violent crimes (Cornaglia and Leigh, 2011).

Studies also show that, controlling for whether individuals have already been victims of crime, feeling unsafe in the area where you live (defined by not feeling safe walking alone locally after dark) also reduces well-being, for example, the probability of reporting a life satisfaction score of at least 8 out of10 falls by 0.07 percentage points (Lelkes, 2006b). Australian data revealed a strong negative relationship between rates of violent crime in an area and the well-being of residents' (i.e. non-victims'), but a less strong relationship between property crime rates and the well-being of non-victims (Cornaglia and Leigh, 2011).

Transport

There is a lack of research on the relationship between use of different modes of transport and well-being. However, some evidence indicates that, compared to private transport, public transport may provide the opportunity for brief contact with other in one's community (Abdallah and Johnson, 2008) and a study of commuting revealed that those who found their journey relaxing were more likely to be cyclists or walkers, with car users more likely to find their journey stressful (Gatersleben and Uzzell, 2007). However, other evidence reveals that the possession and use of a car is positively associated with various components of well-being, for example mastery and self-esteem (Ellaway *et al.,* 2003). (See also *Commuting*).

Traffic

Most of the research on the amount of traffic in one's local environment and well-being has focused on the effects of noise pollution (See *Pollution, Finding 2*). A study of the effects of a substantial reduction in road traffic found it led to a

large decrease in annoyance and activity disturbances and an improvement in overall well-being (Öhrström, 2004).

Climate

1. Climate has an effect on subjective well-being and extreme weather is detrimental to well-being.

Temperature, hours of sunshine, rainfall, etc., all have an effect on happiness (Van Praag and Ferrer-i-Carbonell, 2010). This applies to western European climate differences (Van Praag, 1988) and climate differences on the Soviet-Russian territory (Frijters and Van Praag, 1998).

Extreme weather (measured in terms of temperature) is detrimental to an individual's happiness: higher mean temperatures in the coldest month increase happiness but higher mean temperatures in the hottest month reduce happiness (Rehdanz and Maddison, 2005). However, precipitation levels had no significant effect on overall happiness of an individual (Rehdanz and Maddison, 2005).

At the country-level, extreme weather is associated with lower national averages of happiness (Rehdanz and Maddison, 2005).

Box 5: The built environment: Key findings

- Living in a deprived area, even after controlling for income, is detrimental to life satisfaction and affects other dimensions of well-being.
- A positive perception of the surrounding landscape is linked to other dimensions of well-being.
- Natural landscapes appear to be more restorative than urban ones.
- There is evidence that aspects of neighbourhoods such as 'walkability' and street layout are positively related to well-being; it seems likely that this relationship operates indirectly via benefits to social capital for residents.
- High housing quality is positively associated with well-being; low housing quality is associated with lower well-being and psychological stress.
- Multi-dwelling housing is associated with adverse psychological health.
- Overcrowding is associated with lower well-being.
- Living on a higher floor level is associated with lower well-being.
- Home ownership is associated with higher well-being; renting is associated with lower well-being.
- Subjective well-being appears to be lower in more densely populated areas and higher in rural areas.
- The concentration of air pollutants in the region where an individual lives has a negative impact on subjective well-being.
- Noise pollution is associated with lower subjective well-being.
- Crime is negatively associated with well-being, both for victims and for residents in areas of high crime rates.
- Climate has an effect on subjective well-being and extreme weather is detrimental to well-being.

1.6 Personal characteristics

Personal characteristics, such as age, gender, ethnicity, personality, materialist values and genetics often have very important effects on people's well-being. Although most are not directly within the remit of policy-making, it is important for policymakers to be aware of these relationships and in some cases – such as through early interventions and child development programmes – there may be scope to influence them.

Age

1. *There is a U-shaped relationship between age and subjective well-being: as young people grow older their subjective well-being reduces, until a well-being minimum is reached between ages 35 and 50, and after that age subjective well-being increases again*.

Although much evidence suggests a negative relationship between age and well-being (across a range of subjective well-being measures), more sophisticated analysis reveals a positive relationship between age squared and life satisfaction, which suggests a U-shaped relationship (Van Praag and Ferrer-i-Carbonell 2010; Blanchflower and Oswald, 2008a; 2004a; Ferrer-i-Carbonell and Gowdy, 2005; Clark, 2003a; Di Tella *et al.* 2003). The lowest life satisfaction occurs in middle age, between about 35 and 50, with higher levels of well-being at younger and older ages (Dolan *et al.,* 2008; 2006). And, from a study of 80 countries from across the world, it seems that the lowest average ages at which life satisfaction is a minimum vary from country to country, for example from 35.2 years in Switzerland to 61.9 years in France (Blanchflower and Oswald, 2008a). The authors note that this U-shape is not produced by the influence of children in the household.

Interestingly, this parabolic[20] age effect seems to hold not only for life satisfaction, but also for nearly all other domain satisfactions such as job satisfaction, financial satisfaction (Plug and Van Praag, 1995) but *not* health satisfaction (Van Praag and Ferrer-i-Carbonell, 2008; 2004).

Gender

1. *There are international differences in subjective well-being across the genders.*

The balance of evidence suggests that women tend to report a larger range of scores for well-being measures, i.e. more positive scores for positive measures (e.g. happiness, Alesina *et al.,* 2004) but also more negative scores on negative measures (e.g. CES-D scores, Kim and McKenry, 2002; GHQ scores in the BHPS, Diener *et al.,* 2010; Clark and Oswald, 1994). It is not clear whether this greater range is attributable to greater variance in actual emotional experiences or greater willingness to report emotional diversity. It seems that in most

[20] This describes the U-shape of the relationship – refer to the glossary for more detail.

countries, however, males are less satisfied with their job than females under *ceteris paribus* conditions (Van Praag and Ferrer-i-Carbonell, 2010).

There are also differences across nations in this relationship. For example, men are happier than women in Russia, but women are happier than men in the USA. In Latin America, the gender effect is virtually zero (Van Praag and Ferrer-i-Carbonell, 2010).

Ethnicity

1. *Race is an important predictor of current happiness and life satisfaction in the United States, where the White population has higher levels of average well-being than the Black population. However, the lack of evidence from other countries means this cannot be generalised to Europe and other regions.*

In the USA, the balance of evidence suggests that White people have higher well-being than African Americans on both positive and negative measures (Dolan *et al.,* 2006; Lee and Bulanda, 2005; Magdol, 2002; Thoits and Hewitt, 2001). In one study, it was found that after controlling for prior levels of happiness and life satisfaction, race is the strongest predictor of current happiness and life satisfaction – stronger than age, gender, employment, and marital status (Thoits and Hewitt, 2001).

Evidence suggests this effect weakens over the life course: among older respondents there tend to be fewer differences in subjective well-being scores as a function of ethnicity (Baker *et al.,* 2005; Greenfield and Marks, 2004).

A methodological complication comes is that ethnicity is often recorded using a binary measure, i.e. White or non-White. Evidence suggests that some non-White ethnicities vary in their levels of well-being; for example, Hispanics tend to show higher levels of well-being than Black people (Luttmer, 2005).

However, it is still unclear how much of this evidence, which is mostly based on studies of US data, can be generalised to European or other countries (Dolan *et al.,* 2006).

Genetics

1. *Studies suggest that up to half of the variation in subjective well-being between individuals can be explained by genetics.*

A seminal study of identical twins raised apart suggests that up to half of the variation in subjective well-being could be genetically based (Tellegen *et al.,* 1988). Subsequent estimates have ranged from a third (De Neve *et al.,* 2010) to 38 per cent (Stubbe *et al.,* 2005) to 36–50% (Bartels and Boomsma, 2009) to 42–56% (Nes *et al.,* 2006). Nes *et al.* (2010) found in their twin study that genetic factors explained 51 per cent and 54 per cent of the variance in subjective well-being among unmarried males and females, respectively, and 41 per cent and 39 per cent in male and female married or cohabitating respondents. The fact that the proportions are well below 100 per cent indicates that genetic influences on well-being are contingent on what geneticists call the environmental context – any external influences on gene expression – much of which relates to the policy-relevant factors discussed in previous sections.

De Neve *et al.* (2010) propose that one of the explanations of genetic effects of well-being is the serotonin transporter gene (SLC6A4), which has two versions, one of which is transcriptionally more efficient version – it is better at converting the DNA without mistakes. There is additional evidence that more transcriptionally efficient alleles of the gene have been linked to optimism (Fox

et al., 2009) and less transcriptionally efficient alleles of the gene have been shown to moderate the influence of life stress on depression (Caspi *et al.,* 2003).

However, Weiss *et al.* (2008) used a representative sample of 973 twin pairs to argue that heritable differences in subjective well-being are entirely accounted for by the common genes linked to personality types, i.e. it is through their effect on personality that genes account for so much of the variance in subjective well-being (see also *Personality*).

Personality

1. Personality traits are strongly related to subjective well-being.

DeNeve and Cooper (1998) extensively reviewed the psychological literature and found that there were over 130 personality traits which correlated, both negatively and positively, with happiness. They found that people born with personality traits that can be classified as extraversion, agreeableness, conscientiousness, or openness to experience are more likely than others to report a very high life satisfaction or happiness score in a survey. The reverse relationship is found for people with personality traits classified in the neuroticism category.

This correlation between extraversion and experienced positive emotion has been found by many other studies (Weiss *et al.,* 2008; Diener *et al.,* 2003; Lucas and Fujita, 2000); as has the relationship between neuroticism and negative well-being (Schimmack *et al.,* 2008). Vittersø and Nilsen (2002) found that neuroticism explained eight times as much of the subjective well-being variance as extraversion.

Self-esteem has been found to be negatively associated with depressive symptoms (Kim and McKenry, 2002); and personality variables (e.g. self-worth) have been found to be positively correlated with life satisfaction in BHPS data (Ferrer-i-Carbonell and Gowdy, 2005).

There is evidence from WVS data that the strength of the relationship between personality and subjective well-being was slightly reduced once other factors, such as social trust and religious beliefs, are controlled for (Helliwell, 2006).

It should be noted that the strong relationship between personality traits and well-being is one of the reasons why regression models based on social survey data are often only able to explain moderate amounts of variance in well-being, since detailed personality measures are rarely included on large scale social surveys.

Materialist values

1. There is a negative relationship between materialist values and subjective well-being.

A review of the literature found that most studies revealed a negative relationship between materialist values – defined as a set of beliefs about the importance of acquiring possessions – and life satisfaction, showing that individuals who were more materialistic were less happy and less satisfied with their life overall (Ryan and Dziurawiec, 2001). In addition, Roberts and Clement (2007) found that materialism was negatively associated with eight quality-of-life domains.

There is also evidence of a relationship between well-being and intrinsic and extrinsic goals (Deci and Ryan, 2000; Kasser and Ryan, 1993, 1996, 2001).

Intrinsic goals are those that are inherently rewarding and do not depend on external validation; extrinsic goals are typically pursued as a means to some external reward, for instance financial success, image or popularity/status. Studies have shown that individuals who are more extrinsically motivated show lower well-being relative to those who are more intrinsically motivated (Kasser and Ryan, 1993, 1996, 2001; Sheldon and Kasser, 2005; Sheldon *et al.,* 2004).

Box 6: Personal characteristics: Key findings

- There is a U-shaped relationship between age and subjective well-being: as young people grow older their subjective well-being reduces, until a well-being minimum is reached between the ages of 35 and 50, and after that age subjective well-being increases again.
- There are international differences in subjective well-being across genders.
- Race is an important predictor of current happiness and life satisfaction in the United States, where the White population has higher levels of average well-being than the Black population. However, the lack evidence from other countries means this cannot be generalised to Europe and other regions.
- Studies suggest that up to half of the variation in subjective well-being between individuals can be explained by genetics.
- Personality traits are strongly related to subjective well-being
- There is a negative relationship between materialist values and subjective well-being.

Part Two: The relative impacts of different factors on well-being

Methodology for comparing effect sizes

The previous section described some of the relationships between well-being and various external factors – the drivers of well-being. These suggest a number of routes for policymakers who want to improve levels of well-being to pursue.

However, in many cases, policymakers have limited funds and so need to know where the biggest impact for policies will be, i.e. where to focus their attention in order to maximise the well-being returns on their investment. They will often have to decide between several alternative policies and so it is important to know the relative impact of one factor compared to others. Any single dataset can be analysed to reveal the relative impacts of different variables, such as unemployment, income, and health on well-being outcomes, but it is more difficult to compare and interpret effect sizes across datasets and studies because of the variation in study design.

Most studies of the effects of factors on subjective well-being are based on OLS (ordinary least squares) regression models; however, some use ordered logit and probit statistical modelling methods, which compare the relative probability scores.

OLS regression models control for a set of background characteristics (by omitting those categories that are going to act as the basis of the comparison) and then analyse the survey data to see how much of the dependent variable (in well-being research this is subjective well-being, usually measured as life satisfaction or overall happiness) can be explained by each of the independent variables (such as income, unemployment, good self-rated health).

The relative effect size is then standardised and shown as the beta coefficient, which indicates how many standard deviations of change in the independent variable are required to produce a change of one standard deviation in the value of the dependent variable (well-being). Coefficient ratios can therefore be used to compare the magnitude of the effects of the different independent variables.

From their analysis, researchers sometimes construct well-being equations. Well-being equations are equations that use data from regression models to show the relative contribution of several different factors on overall well-being – the idea is that if you were to plug in individual-level data on these factors, this equation would predict the overall well-being of the person concerned.

Although there is a fairly large body of evidence about the effect sizes of different factors, produced by regression modelling, there remains considerable

methodological difficulty in attempting to compare effect sizes across studies as they depend not only on the selection of independent variables that have been analysed in the model, but also on the background variables that have been chosen for (i.e. excluded from) the particular model used by researchers as well. This is because there are often different levels or categories of a particular overall characteristic, for example different levels of income that all fall under 'income', or levels such as 'excellent', 'good', 'fair' or 'poor' that are all describing a respondent's rating of their health. Often in regression models, each level or category needs to be treated as a separate variable, and one of these variables or levels is then chosen as a background (comparison) category in the regression model.

This leads to considerable differences in the structure of the models and therefore to the results obtained. This means that unless the background characteristics are the same and the variables included in the regression are the same (which happens rarely as there is no set theoretical reason to include/exclude variables), then *you are not comparing like with like*.

However, whilst bearing this methodological caveat strongly in mind, a comparison of the effect sizes across studies can be a useful exercise, particularly as there are some variables that seem to universally have larger effect sizes relative to others.

It should also be noted that these methodological problems are no longer an issue if an area (e.g. a city, local authority, region, or nation) collects and analyses its own subjective data for well-being, which it then uses as a basis for policy-making decisions. If the data is specific to the location that the policies are trying to improve, then the relative effect sizes will also be specific to this place and it will be clear where to invest in order to obtain the maximum benefits for citizens' well-being.

Despite the differences in structure of different regression models, researchers have identified a few drivers of well-being that seem to have consistent effect sizes across datasets. The following section uses several academic studies to compare the range of effect sizes of different variables on well-being. In order to provide a baseline for comparison, the effect sizes of income (or alternative income variables) are included wherever possible.

Comparing these studies both highlights the differences in effect sizes which are due to study design and the choice of variables to include and exclude; it also gives a flavour of the factors that appear to be important across this selection of studies. The studies included provide a range of both cross-sectional and time-series or panel data, from UK, US and European data. In each case, the dependent variable was life satisfaction or overall happiness, rather than domain satisfaction, or mental health.

Tables of all the well-being equations can be found in the Appendix. The largest three coefficients for each model have been highlighted for ease of comparison. However, because there appears to be little precedent for such calculations in the published social science literature, they should be treated with care.

Overview of findings

Well-being equations constructed using UK, US, and European data reveal a range of different effect sizes. However, there appears to be some consistency in the factors associated with the largest effect sizes: these are being unemployed (negative), being married (positive), being divorced or separated (negative), having good health (positive) and being in the highest income quartile (positive).

Note that in order to make readers aware of the source of the data that is being used to compare effect sizes, this section has been structured using a country-by-country approach.

UK data

Blanchflower and Oswald (2004b) used data on Britain from the Eurobarometer survey (1978–1995) to create well-being equations. They found that for the entire sample, **being unemployed** had the largest coefficient (-1.180), followed by **being divorced** and **being separated**. This was in comparison with being in the bottom income quartile (0.322). They also constructed well-being equations for each gender separately. They found that unemployment remained the largest coefficient for both genders (-1.488 and -.0720 for men and women respectively). However, for men this was followed by keeping house (-1.071) and being separated (-0.718); whilst for women it was followed by being divorced (-0.617) and being married (0.498).

Clark and Oswald (2002) analysed nine waves of the BHPS to create well-being equations. They included two equations: one for households with a yearly equivalent income of over £30 000, and one for households with a yearly equivalent income of over £20 000. For both groups the three largest coefficients were the same: **having excellent health** (2.199 and 2.232 for <£30k and <£20k groups respectively); **being widowed** (-1.845 and -1.752); and **having good health** (1.630 and 1.632).

European data

Di Tella *et al.* (2003) used an ordered probit model[21] to produce a life satisfaction equation for Europe (1975–1992) from Eurobarometer data. They found that the highest coefficient was for **unemployment** (-0.505) compared to the effect size of **being in the highest income quartile**, which was 0.397, which was the second largest coefficient. The third largest coefficient was that of **being separated** (-0.328).

The authors also used an ordered probit model to produce a happiness equation (rather than a life satisfaction equation) for Europe (1975–1992) using data from the same source (which asked *Taking all things together, how would you say you are these days – would you say you're very happy, fairly happy, not too happy these days?*). They found that the largest coefficient was for **being separated**, which was -0.398. This was followed by **being unemployed** (-0.390) and **being in the highest income quartile** (0.378).

Wolbring *et al.* (2011) used two different models to analyse the relative impact of different determinants of life satisfaction in Germany (using GSOEP data). Both models found that **age**, **age squared**[22]**,** and **good health** had the largest standardised beta coefficients. In the first model, age had a coefficient of -0.352; age squared had a coefficient of 0.387 and good health had a coefficient of 0.333. These figures are compared to the coefficient for log income of 0.169. In the second model age had a coefficient of -0.314; age squared had a coefficient of 0.351 and good health had a coefficient of 0.338, whilst the figure for log spatial relative income was 0.126.

[21] The regression includes year dummies from 1975 to 1992 and the base country is France.

[22] Using age squared accounts for the fact that the relationship between well-being and age is U-shaped

US data

Blanchflower and Oswald (2011) performed regression analyses on two different US datasets: the US General Social Survey, which since 1972 has annually asked 48 000 residents about their level of happiness; and the 2009 Behavioural Response Factor Surveillance System, a survey of over 300 000 Americans which asks about life satisfaction and mental health.

The US GSS data[23] revealed that the most important factor that affected average happiness scores was **being unemployed** (coefficient -0.234); compared to being temporarily not working (coefficient -0.078) or being retired (coefficient -0.004). The second largest coefficient was for **being married** (0.232) and the third was for **being separated** (-0.143).

In a second model, which included annual income as an independent variable, **being unemployed** produced a coefficient of -0.246, which is almost the same size as the equivalent of an extra $100 000 annual income in terms of effects on the overall happiness score, and was the second-largest coefficient. Analysis of this data using this second model also found that **being married** had the largest effect on overall happiness (coefficient 0.223). **Being Black** had the third-largest coefficient (-0.136).

The Behavioural Response Factor Surveillance System data showed[24] that the largest effect sizes were for **being unemployed for over 12 months** (-0.306) and **being unable to work** (-0.374). The effect size of **being married** (0.222) was the third largest coefficient.

In a second model which included income variables, the largest effect sizes were for **being unemployed for over 12 months** (-0.233) and **being unable to work** (-0.300) compared to than those for different income bands: $10–15k (0.033), $15–20k (0.076), $20–25k (0.088), $25–35k (0.119), $35–50k (0.170), $50–75k (0.224) and $75k or more (0.304). The third largest coefficient was that of having an **income of $75k or more**.

Graham (2009) created life satisfaction equations for the USA (1972–1998). She found that **being married** has the largest effect size (0.775), **being unemployed** also had a large effect size on life satisfaction (-0.684) and **health** had an effect size of 0.623.This can be compared with much smaller coefficients for income, for example log income had an effect size of 0.163.

Helliwell and Putnam (2005) analysed the US Benchmark survey (2000) and found that the largest effect sizes were **average trust** at the country level (0.843); and at the individual level: **'friends'** (0.519), **trust in neighbours** (0.425) and **'trust in police** (0.405).

Di Tella *et al.* (2003) used GSS data to construct a happiness equation (ordered probit) for the US 1972–1994. They found that **being in the highest income quartile** had the largest coefficient (0.398), followed by **being married** (0.380) and **being unemployed** (-0.379).

Making trade-offs: a case study of unemployment and inflation

It may be helpful in some cases to consider a specific trade-off between two factors that are known to affect well-being. However, it must also be noted, as above, that there remains considerable methodological difficulty in comparing

[23] Background characteristics are white, single and working full-time.

[24] Background characteristics were income over $10000, White, Alabama, single, employee, never attended school, and fruit and vegetables less than once a day or never.

effect sizes across studies as they depend on the independent variables that have been included and excluded from the particular model and also the selection of background categories in the model as well. In addition, since much of the data are cross-sectional, it does not reveal unknown longer-term effects of an increase or decrease in these variables on levels of well-being.

Therefore, as above, these results must be interpreted with caution, and this example is intended more to be *illustrative* of the power of well-being analysis to reveal priorities.

A specific example of a trade-off (made between two drivers of well-being) that is often cited is that between unemployment and inflation. Unemployment is already seen as an undesirable policy outcome, because it hurts individuals economically and requires extra government spending on welfare. Nevertheless, most governments tolerate a certain amount of unemployment because of its trade-offs with inflation and productivity. However, to truly understand the effects of unemployment and inflation on people's well-being, we can analyse subjective well-being indicators to reveal information about trade-offs that is not revealed by standard indicators.

Generally, research shows that the overall impact of a percentage increase in inflation is significantly less damaging on subjective well-being than the impact of a percentage increase in unemployment.

Several authors have considered the relative harm caused by inflation and unemployment. Di Tella *et al.* (2001) calculate that a one percentage point increase in the unemployment rate is compensated for by a 1.7 percentage point decrease in inflation. Thus if unemployment rate rises by 5 percentage points, the inflation rate must decrease by 8.5 percentage points to keep the population equally satisfied. These results were found using disaggregated data and once country time trends were introduced. Blanchflower (2007) used data from 25 OECD countries for 1973–2006 and his results were consistent with those of Di Tella *et al.* (2001).

Di Tella *et al.* (2003) used data from Eurobarometer for 12 European countries between 1975 and 1995 and from the American GSS for the period 1972–1994. They find that observed unemployment seems to cause more unhappiness than inflation and that the misery index (the sum of the unemployment rate and the inflation rate which assumes a one-to-one marginal rate of substitution between unemployment and inflation and which is often used by researchers and policymakers) underestimates the welfare cost of unemployment.

Wolfers (2003) found that a percentage point increase in the unemployment rate causes 4.7 times more unhappiness than a percentage point increase in inflation. He also found evidence that macroeconomic volatility, especially unemployment volatility, undermines well-being.

Gandelman and Hernandez-Murillo (2009) found that an individual's present and past assessments of personal well-being tend to be negatively affected by the country's inflation and unemployment levels. Expectations about future personal well-being are not affected by the level of inflation but are negatively affected by the level of unemployment.

Hence a percentage increase in unemployment is shown to be more damaging than a percentage increase in inflation. This finding, alongside the evidence of a larger effect size for unemployment than most other drivers of well-being that is revealed across many different studies, indicates that, in order to promote high well-being, minimising unemployment should be made even more of a priority than it already is.

Appendix: Comparing effect sizes

This appendix contains the well-being equations considered in Part 2, ordered by country or continent. The three largest coefficients in each table have been highlighted.

United Kingdom

Figure A1. Life Satisfaction Equations for Great Britain, 1975–1998 (Ordered Logits) - Year Dummies Included

Blanchflower and Oswald (2004b)

	All	Men	Women
Independent Variables	**Coefficient**	**Coefficient**	**Coefficient**
Age	-0.0424	-0.0433	-0.0402
Age squared	0.0005	0.0006	0.0005
Male	-0.1411	n/a	n/a
Retired	-0.0172	0.0103	-0.0934
Keeping house	-0.1184	-1.0712	-0.0970
Student	-0.0175	-0.0879	0.0870
Unemployed	-1.1798	-1.4878	-0.7196
Married	0.3996	0.3053	0.4984
Living as married	0.1155	0.0001	0.2464
Divorced	-0.5586	-0.3387	-0.6171
Separated	-0.5704	-0.7177	-0.4604
Widowed	-0.2675	-0.2895	-0.1500
Second income quartile	-0.0989	0.0564	0.1113
Third income quartile	0.1563	0.0673	0.2112
Fourth income quartile	0.3219	0.3096	0.3199

Figure A2. Wellbeing Panel Equations BHPS Waves One to Nine

Households with yearly equivalent income <£17000

Clark and Oswald (2002)

	Households with yearly equivalent income <£30,000		Households with yearly equivalent income <£20,000	
Independent Variables	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
Log of Household Equivalent Income	0.035	0.054	0.136	0.069
Age	-0.418	0.060	-0.404	0.063
Age squared/1000	2.230	0.332	2.449	0.349
Employed	0.922	0.071	0.967	0.074
Self-employed	0.998	0.124	0.992	0.131
Unemployed	-0.975	0.104	-0.911	0.107
Retired	0.786	0.131	0.679	0.137
Education: High	-0.158	0.168	-0.146	0.173
Education: A/O/Nursing	-0.067	0.166	-0.023	0.171
Health: Excellent	2.199	0.069	2.232	0.072
Health: Good	1.630	0.054	1.632	0.057
Married	0.150	0.128	0.206	0.139
Separated	-0.982	0.200	-0.863	0.212
Divorce	0.284	0.183	0.427	0.195
Widowed	-1.845	0.310	-1.752	0.326
One Child	0.087	0.089	0.043	0.094
Two Children	0.334	0.117	0.324	0.123
Three+ Children	0.080	0.170	0.061	0.176
Household size: 2	0.250	0.115	0.325	0.124
Household size: 3	0.102	0.123	0.132	0.132
Household size: 4	0.083	0.133	0.103	0.142
Household size: 5	0.273	0.155	0.315	0.163
Household size: 6+	0.139	0.200	0.185	0.207
Housing: Owned Outright	0.144	0.098	0.099	0.105
Housing: Rented	-0.166	0.089	-0.128	0.094

European

Figure A3. Life satisfaction equation for Europe, Ordered Probit: 1975 to 1992

Di Tella *et al.* (2003)

Independent variable	Coefficient	Standard Error
Unemployed	-0.505	0.020
Self-employed	0.060	0.012
Retired	0.068	0.014
Home	0.036	0.009
School	0.012	0.020
Male	-0.066	0.007
Age	-0.028	0.001
Age squared	3.20E-04	1.30E-05
Income quartile:		
Second	0.143	0.011
Third	0.259	0.013
Fourth (highest)	0.397	0.017
Education to age:		
15-18 years old	0.060	0.009
≥19 years old	0.134	0.013
Still studying	0.159	0.022
Marital status:		
Married	0.156	0.010
Divorced	-0.269	0.017
Separated	-0.328	0.025
Widowed	-0.145	0.013
Number of children:		
1	-0.032	0.008
2	-0.042	0.010
≥3	-0.094	0.016

Figure A4. Happiness equation for Europe, Ordered Probit: 1975 to 1986

Di Tella *et al.* (2003)

Independent variable	Coefficient	Standard Error
Unemployed	-0.390	0.023
Self-employed	0.038	0.016
Retired	0.060	0.020
Home	0.060	0.015
School	-0.015	0.031
Male	-0.067	0.013
Age	-0.035	0.002
Age squared	3.60E-04	1.90E-05
Income quartile:		
Second	0.131	0.014
Third	0.259	0.017
Fourth (highest)	0.378	0.019
Education to age:		
15-18 years old	0.025	0.012
≥19 years old	0.076	0.019
Marital status:		
Married	0.249	0.017
Divorced	-0.291	0.027
Separated	-0.398	0.040
Widowed	-0.197	0.021
Number of children:		
1	-0.033	0.012
2	-0.041	0.016
≥3	-0.111	0.027

Figure A5. Germany - determinants of life satisfaction in cross-sectional perspective, GSOEP 2008, standardised beta coefficients

Wolbring *et al.* (2011)

	Model 1	Model 2
ln income	0.169	
ln spatial relative income		0.126
Age	-0.352	-0.314
Age squared	0.387	0.351
Good health	0.333	0.338
ln number of friends	0.091	0.095
Single	-0.124	-0.123
Child(ren) in household	0.059	0.042
Unemployment	-0.080	-0.098
Church attendance	0.084	0.090
Social trust	0.066	0.070

United States

Figure A6. Happiness equation for the United States, Ordered Probit: 1972 to 1994

Di Tella *et al.* (2003)

Independent variable	Coefficient
Unemployed	-0.379
Self-employed	0.074
Retired	0.036
Home	0.005
School	0.176
Other	-0.227
Male	-0.125
Age	-0.021
Age squared	2.80E-04
Income quartile:	
Second	0.161
Third	0.279
Fourth (highest)	0.398
Education:	
High school	0.091
Associate/junior college	0.123
Bachelor's	0.172

Graduate	0.188
Marital status:	
Married	0.380
Divorced	-0.085
Separated	-0.241
Widowed	-0.191
Number of children:	
1	-0.112
2	-0.074
≥3	-0.119

Figure A7. Happiness Equations for the United States, General Social Survey 1972–2008

Blanchflower and Oswald (2011)

	(1)	(2)
Age	-0.0053	-0.0135
Age squared	0.00007	0.00016
Male	-0.0497	-0.0620
Black	-0.1312	-0.1362
Other non-white	-0.0456	-0.0400
Time trend	-0.0002	-0.0017
Number of years of schooling	0.0170	0.0126
Work part-time	-0.0282	-0.0051
Temp not working	-0.0775	-0.0584
Unemployed	-0.2343	-0.2164
Retired	-0.0043	0.0548
School	0.0335	0.1223
Home worker	-0.0384	-0.0179
Married	0.2322	0.2227
Widowed	-0.0924	-0.1017
Divorced	-0.0750	-0.0563
Separated	-0.1430	-0.1035
Parents divorced at 16	-0.0436	-0.0353
Annual income[25]		0.00246

[25] The annual income coefficient has here been scaled up by a factor of 1000.

Figure A8. Well-being Equations for the United States - BRFSS, 2009 - Life satisfaction

Blanchflower and Oswald (2011)

	(1)	(2)
Age	-0.0039	-0.0061
Age squared	0.00005	0.00007
Male	-0.0067	-0.0194
Number of adults in household	0.0013	-0.0036
Exercise past 30 days	0.1291	0.1165
Black	0.0175	0.0400
Asian	-0.0709	-0.0571
Hawaiian	0.0193	0.0299
American Indian	-0.0022	0.0248
Other race	-0.0162	0.0157
No race	-0.0848	-0.0647
Multi-race	-0.0180	-0.0547
Hispanic	0.0054	0.0369
Divorced	-0.0019	-0.0024
Married	0.2220	0.1646
Widowed	0.0385	0.0221
Separated	-0.0903	-0.0879
Living as married	0.0759	0.0532
Number of children in household	-0.0026	-0.0016
Self-employed	0.0047	0.0166
Unemployed <12 months	-0.3056	-0.2327
Unemployed ≥12 months	-0.2431	-0.1870
Home worker	-0.0086	0.0141
Student	-0.0007	0.0260
Retired	0.0035	0.0372
Unable to work	-0.3740	-0.2996
BMI	-0.0044	-0.0039
Fruit and Veg 1-3/day	0.0979	0.0905
Fruit and Veg 3-5/day	0.1487	0.1377
Fruit and Veg ≥ 5/day	0.1830	0.1716
Moderate exercise mins.	0.0000	0.00003
Vigorous exercise mins.	0.0000	0.00005
Grades 1-8	-0.0230	-0.0156

Grades 9-12	-0.0025	-0.0028
HS graduate	0.0246	0.0025
Some college	0.0348	-0.0091
College graduate	0.1034	0.0221
Smoked 100 cigarettes	-0.0623	-0.0577
$10k and <$15k income		0.0334
$15k and <$20k income		0.0755
$20k and <$25k income		0.0883
$25k and <$35k income		0.1193
$35k and <$50k income		0.1703
$50k and <$75k income		0.2240
$75k or more income		0.3044

Figure A9. Comparison of effect individual level and national/community level variables on happiness outcomes across US Benchmark Survey (2000)

Helliwell and Putnam (2005)

Independent variable	Coefficient
National/community level variables	
Per capita median income	-0.106
Average membership	-0.0022
Average trust	0.8432
Individual-level variables	
Membership, 0-8 scale	0.0274
Family	0.2108
Friends	0.5188
Neighbours	0.1276
Trust, general	0.2117
Trust in neighbours	0.4248
Trust in police	0.4050
Importance of God/religion	0.1166
Freq. attend religious service	0.1206
Commute time to work, hours	-0.0827
Self-reported health status	0.3512
Male	-0.1124
Aged between 25-34 years	-0.0504
Aged between 35-44 years	-0.0965

Aged between 45-54 years	-0.1178
Aged between 55-64 years	0.0017
Aged 65 years and up	0.0064
Married	0.3281
Living with a partner	0.1602
Divorced	0.0218
Separated	-0.1273
Widowed	0.0476
Unemployed	-0.1684
High-school graduate equivalent	0.0587
Between high school and university	0.0645
University graduate equivalent	0.0229

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