

Measuring National Well-being - What matters most to Personal Well-being?

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Abstract

This article uses data from the Annual Population Survey collected between April 2011 and March 2012 which includes measures of personal well-being. It describes the results of regression analysis – a statistical technique which analyses variation in well-being outcomes by specific characteristics and circumstances of individuals while holding all other characteristics equal. This allows for a better understanding of what matters most to personal well-being than when different factors are considered separately.

Introduction

This article is published as part of the Office for National Statistics Measuring National Well-being Programme. The programme aims to produce accepted and trusted measures of the well-being of the nation - how the UK as a whole is doing. The Office for National Statistics measures of well-being are organised into ten domains with each domain having between three and five separate indicators. More information about the measures can be found in the 'National Well-being wheel of measures' (ONS 2012). The aim of the Programme is to achieve an accepted and trusted set of National Statistics to help people understand and monitor national well-being.

As part of the Programme four measures of the personal well-being of individuals were developed (Tinkler & Hicks 2011). Since April 2011 these have been collected from respondents to the Annual Population Survey and asked of adults aged 16 and over. A [number of analyses of these data](#) have been released by ONS already which examine the measures and their distribution by specific characteristics.

These analyses considered how different factors are associated with personal well-being separately, for example, how self-reported health is related to the different measures of personal well-being. The regression analysis ([see section 5.1](#)) in this report takes factors from within the large scale Annual Population Survey together and considers how these are related to personal well-being. So when looking at how self-reported health is associated with personal well-being, it also controls for a range of other factors for example people's age and sex and ethnicity to name a few. This allows for a better understanding of what matters most to personal well-being as the relationship between the variable in question and personal well-being is considered knowing that other factors included in the analysis are held equal.

Although the regression analysis can show the nature, size and strength of the relationship between a specific personal characteristic or circumstance and personal well-being, we cannot say with certainty that the characteristic or circumstance has caused greater or lesser well-being.

As this data is like a snapshot of one point in time, we cannot establish whether a person's circumstances have contributed to their level of well-being or indeed whether their level of well-being has contributed to their current circumstances.

Key points

According to regression analysis of the 2011/12 Annual Population Survey in Great Britain, holding other variables equal:

- Self-reported health had the strongest association with all the measures of personal well-being, the second strongest association was employment status and the third was relationship status.
- People's sense of choice and contentment with their situation appear to be associated with personal well-being. For example, people who are employed but want a different or additional job have lower levels of personal well-being (including higher 'anxious yesterday' levels) than employed people who are not looking for another job.
- Some circumstances or characteristics appear to have a more global effect on all aspects of personal well-being, while others have a more discrete effect on only one or two areas. For example, self-reported health makes a large contribution to the explained variance between individuals across all four measures of personal well-being while age explains a moderate amount of the variance in relation to life satisfaction, but less on the other three measures of well-being.

Below are other interesting findings from across the well-being domains which are statistically significant but have smaller effects on ratings of personal well-being than the factors noted above:

- Living alone is negatively related to our personal well-being, regardless of relationship status. All household types where two or more people live together give higher ratings for 'worthwhile' and 'life satisfaction' than those living alone.
- People in the Black/African/Caribbean/Black British ethnic group rate their 'life satisfaction' and 'happiness yesterday' lower on average than the White group.
- People who say that they have a religious affiliation, rate their levels of 'happiness yesterday', 'life satisfaction' and 'worthwhile' higher than people who said they have no religious affiliation.
- People with the highest educational attainment have higher ratings of 'anxiety yesterday' on average than people with lower educational attainment.
- People in higher managerial and professional occupations give higher scores for 'anxious yesterday' levels on average than those in lower supervisory and technical occupations.
- Among a sub-sample of employees only, those who earn higher wages from their job give higher ratings for 'life satisfaction' on average than those earning less, but ratings for 'worthwhile', 'happy yesterday' and 'anxiety yesterday' were not related to earnings.
- People living in London gave similar ratings of their 'life satisfaction' than people living in other urban areas in Great Britain, but people living in the rural areas of almost all regions gave higher 'life satisfaction' ratings than people living in London.
- People living in the least deprived local areas reported slightly higher levels of 'anxiety yesterday' than people living in more deprived local areas.

Table 1 provides an overview of the size of the unique contribution that each variable in the analysis makes to personal well-being. The link beneath the table will take readers to the data on which the summary table is based.

Table 1: The size of the unique contribution that each variable makes to the explained variance in personal well-being

Factor	'Life satisfaction' (R ²)	'Worthwhile' (R ²)	'Happiness yesterday' (R ²)	'Anxious yesterday' (R ²)
Self-reported health	Large	Large	Large	Large
Economic activity	Large	Large	Moderate	Moderate
Marital status	Large	Moderate	Moderate	Very Small
Age	Moderate	Very Small	Small	Small
Mode of interview	Small	Small	Very Small	Very Small
Ethnicity	Small	Very Small	Very Small	Very Small
Region	Small	Small	Very Small	Small
Tenure	Small	Small	Very Small	Very Small
Religion	Very Small	Small	Small	Very Small
Socio-economic status	Very Small	Very Small	Very Small	Very Small
Index of multiple deprivation decile	Very Small	Very Small	Very Small	Very Small
Education	Very Small	Very Small	Very Small	Small
Gender	Very Small	Small	Very Small	Small
Disability	Very Small	Very Small	Very Small	Very Small
Migration	Very Small	Very Small	Very Small	Very Small
Children	Very Small	Small	Very Small	Very Small

Table source: Office for National Statistics

Table notes:

1. Large = contribution of 1.0 percentage point or more to R-square; Moderate= contribution of .05 < 1.0 percentage point to R-square; Small= contribution of 0.1 < 0.5 percentage point to R-square; Very small= contribution of less than 0.10 percentage point to R-square.

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Summary

Introduction

The analysis in this report is based on data from the Annual Population Survey (APS) collected from April 2011 to March 2012. The survey included the following four questions on personal well-being which ONS first added to the survey in April 2011:

- Overall, how satisfied are you with your life nowadays?
- Overall, to what extent do you feel the things you do in your life are worthwhile?
- Overall, how happy did you feel yesterday?
- Overall, how anxious did you feel yesterday?

Those taking part in the survey are asked to give their answers on a scale of 0 to 10 where 0 is 'not at all' and 10 is 'completely'.

The APS also collects a range of other information. These can be used to see how responses to each of the four personal well-being questions differ by a range of characteristics and circumstances. This article presents the results of regression analysis, a statistical technique which analyses the variation in responses to the personal well-being questions by specific characteristics and circumstances of individuals while holding all other characteristics equal. The key benefit of regression analysis is that it provides a better method of identifying those factors which matter most to personal well-being than an analysis looking at the relationship between only two variables at a time.

What matters most to personal well-being?

People's self-reported health was the most important factor associated with personal well-being, followed by their work situation and then their relationship status.

Even after holding other personal characteristics and circumstances equal:

- People who reported very bad health gave much lower ratings of personal well-being than those in good health. On the eleven point scale above (from 0 to 10), people in very bad health rated their 'life satisfaction' 2.4 points lower, their 'happiness yesterday' 2.6 points lower, the sense that what they are doing is 'worthwhile' 2.0 points lower than people in good health. Also, people in very bad health rated their 'anxiety yesterday' levels 2.1 points higher than people in good health.
- The second largest association with the four personal well-being questions was found to be employment status. Holding all else equal those who are unemployed rated their levels of 'life satisfaction', 'happiness yesterday' and the sense that what they are doing is 'worthwhile' significantly lower on average than people who are employed.
- Among the areas examined here, the nature of our relationships is the final area that should be highlighted as having an important influence on personal well-being. Holding all else equal and comparing people according to their relationship status shows that married people and those in civil partnerships rate their 'life satisfaction', the sense that their activities are 'worthwhile' and 'happiness yesterday' significantly higher than cohabiting couples, single, divorced and widowed people. Single people rated their 'happiness yesterday' on average 0.4 of a point lower than

those who are married or in civil partnerships. Widowed people rate their 'happiness yesterday' score 0.6 of a point lower on average than married people or people in civil partnerships. The 'anxiety yesterday' ratings of single, divorced and widowed people were also significantly higher than those of married people (between 0.1 and 0.2 of a point higher).

Other factors such as people's age, sex, ethnic group, migration status, religious affiliation, level of qualification, presence of children, reasons for inactivity, occupation, home ownership, and area where they live were also associated in different ways to personal well-being, but none to the same extent as health, unemployment and relationship status.

How does people's sense of choice and contentment with their situation affect their personal well-being?

People's sense of choice and contentment with their current situation also appears to be associated with their levels of personal well-being. It appears that it is more about where they are in life compared to where they want to be. For example:

- It is not just about having a job that matters to personal well-being, but also being content with that job. Permanent employees who wanted a different or additional job had lower levels of life satisfaction, a sense that what they do in life was worthwhile, feelings of happiness and increased levels of anxiety than those who did not want a different or additional job. Permanent employees who wanted a different job rated their 'life satisfaction' 0.7 points on average below that of permanent employees who didn't want a different or additional job. Similarly, their average ratings for both 'worthwhile' and 'happy yesterday' were 0.5 points below those of permanent employees who didn't want another job. In addition the anxiety ratings for those who wanted another job were 0.6 higher than those who didn't.
- Also those who are economically inactive and in caring roles but would rather be in paid work have lower personal well-being than those who are working and content with their jobs. In contrast, there is no difference in life satisfaction between people who are working and content with their job and those who are economically inactive and in a caring role with which they are content.

Some factors are more important to specific aspects of personal well-being than others

Finally, some circumstances are associated differently with the various aspects of personal well-being. For example, even after holding other personal characteristics and circumstances equal:

- People living with dependent children have a higher sense that what they do in life is worthwhile compared to those with no dependent children in the household. On the eleven point scale above (0 to 10), people with dependent children in the household gave ratings for 'worthwhile' almost 0.2 points higher on average than those with no dependent children in the household.
- Increased earnings of employees are associated with higher levels of life satisfaction but not with the sense that their activities are worthwhile nor with their day-to-day emotions. Employees with higher earnings therefore do not appear to have a sense that their activities are more worthwhile any more than those employees with lower earnings nor do they report significantly higher levels of happiness or lower levels of anxiety.

Further research

This analysis illustrates how the APS can be used to examine how different factors are associated with personal well-being. The strength of the APS is the large sample and range of variables about people's characteristics and circumstances, particularly labour market related variables. It is however, a cross-sectional sample survey and as such is not well suited to exploring how individual well-being may change over time. Given the large sample of the APS, it lends itself to further examination of small sub-groups of the population and of small geographic areas. These types of analyses would potentially offer new insights to help policy-makers identify areas of need and target policies.

1. Taking a closer look at what matters most to personal well-being

Personal well-being, often referred to as subjective well-being, is people's own assessment of their own well-being. Many factors have been shown to be related to personal well-being such as health, disability, age, ethnic group, employment situation, relationships, religious beliefs and participation, etc. However, studies comparing the importance of any specific circumstance or characteristic to personal well-being cannot provide a clear picture of which of the many possible personal characteristics and circumstances that may affect us actually make the strongest contribution to how we experience our lives and our sense of well-being. Special statistical techniques such as regression analysis ([see section 5.1](#)) are required to do this which look at the relationship of each characteristic or circumstance to personal well-being while holding other possible influences on well-being equal. This article presents the results of regression analysis undertaken by ONS to understand more about at what matters most to personal well-being.

Before moving on to the findings from this study, it is important to note that previous research in this area shows that our genes and personality explain much of the differences between people's levels of personal well-being. Indeed, it has been estimated that these differences may explain up to half of the variation observed between people in their level of personal well-being (Diener 1996).

This study uses data from the Annual Population Survey which does not include any measurement of personality or genetic differences. Excluding these important areas, we would hope to be able to explain up to 50% of the differences in personal well-being between people. In our analysis, we have explained between 10% and 19% of the differences in levels of well-being between people.

2. Research methods

2.1 How people were asked to rate their well-being

The research is based on data from the Annual Population Survey (APS) from April 2011 to March 2012. The survey provides a representative sample of people living in residential households in the UK and includes about 165,000 respondents.

In April 2011, ONS included four questions on the APS which focus on 3 aspects of personal well-being: how we assess our life satisfaction; whether we feel our lives have meaning and purpose;

and our recent experiences of positive and negative emotions. These ideas are measured by asking people aged 16 and over four questions:

- Overall, how satisfied are you with your life nowadays?
- Overall, to what extent do you feel the things you do in your life are worthwhile?
- Overall, how happy did you feel yesterday?
- Overall, how anxious did you feel yesterday?

Those taking part in the survey are asked to give their answers on a scale of 0 to 10 where 10 is 'completely' and 0 is 'not at all'. For the first three questions which are about positive aspects of personal well-being, a higher score indicates higher personal well-being. However, the fourth question asks about anxiety which is a negative emotion so a higher score here indicates lower personal well-being. In this report the abbreviations 'life satisfaction', 'worthwhile' 'happy yesterday' or 'happiness yesterday' and 'anxious yesterday' or 'anxiety yesterday' are used to refer to the four overall monitoring questions.

Interviewing for the survey goes on throughout the year and on every day of the week except Sundays. As researchers have found that people remember their emotions accurately only for the very recent past, the questions on daily emotions ask about happiness and anxiety yesterday. The fact that yesterday may not have been very typical of someone's normal emotional state will average out across the 165,000 people in the study to provide a good estimate of levels of happiness and anxiety in the UK overall.

2.2 Why ask people about their well-being?

The reason for asking people to assess these aspects of their lives is ultimately to help understand more about how people in the UK think their lives are going and what is most important in shaping their views. This is one part of the much larger ONS Measuring National Well-being Programme.

Overall, the Programme uses both objective information as well as information based on people's own views to monitor the well-being of the UK. This includes a wide range of measures developed after extensive public consultation undertaken in 2010-11 during the National Debate (Office for National Statistics 2011) to ask people what matters most to them. The Programme aims to provide information about how the UK is doing which moves beyond GDP as the main measure of societal progress. The goal is to provide policy makers with information which will enable them to take into account the likely impacts of their ideas on the well-being of the people and environment of the UK and therefore to make better decisions.

2.3 Approach to the regression analysis

There were three stages involved in the analysis. These were:

- Construction of the main model which was used in separate regressions with each of the four personal well-being questions;
- Construction of an another model used among employees only, a sub-set of the sample, in order to explore how earnings are related to personal well-being; and
- Analysis of each of the models using two different regression techniques, ordered probit regression and then replicating the analysis using ordinary least squares regression.

Constructing the main model

From the outset, the aim was to develop two models: one for the whole population and one specifically for employees to address the fact that the APS does not include household income data but does have earnings data for employees. The variables used in the models were chosen to capture specific aspects of the different ONS well-being domains including: our health, our relationships, what we do, where we live, our finances, and basic personal characteristics.

This also presented an opportunity to further knowledge about personal well-being by attempting to replicate the findings of others or to use alternative measures. This work represented an extension to the basic regression project. Findings from the alternative models are discussed in section 5 and the results of each model are presented in full in [Reference Table 4 \(770 Kb Excel sheet\)](#).

For some domains, such as 'Where we live', there is minimal data available directly from the APS. For this reason, a variable was added to the APS to try to capture more of the differences between places. This is based on the Indices of Multiple Deprivation (IMD) of England, Wales and Scotland.

As some of the place related variables, such as IMD deciles and rural/urban identification, could not be created from the data available. The analysis reported here therefore does not include respondents from Northern Ireland and focuses on Great Britain rather than the United Kingdom. Excluding Northern Ireland, the total sample size is approximately 163,000.

As noted, once the model was developed, the same basic set of variables was used in regressions with each of the four personal well-being questions. This included the following:

- Age (both age and age²)
- Sex
- Ethnicity
- Migration status
- Relationship status
- Economic activity status
- Housing tenure
- Self-reported health
- Self-reported disability
- Highest qualification held
- Socio-economic status,
- Presence of dependent and non-dependent children in the household,
- Religious affiliation,
- Geographical region,
- The relative deprivation of the area in which the individual lives,
- Whether the area is urban or rural,
- Mode of interview (telephone or personal interview)

Creating a model for exploring earnings and personal well-being

The next stage of work involved the specification of a model for use with employees for whom earnings information is available, a sub-sample of those included in the main analysis. Although household income has been shown by other research (Kahneman 2010; Pishke, 2011) to play a

role in our personal well-being, the Annual Population Survey does not include this information. Other variables which might provide a rough indication of the individual's financial situation were included in earlier versions of the regression models to see how well they worked, such as the Income Deprivation domain of the Indices of Multiple Deprivation and the individual's benefit status. Analysis was also undertaken using average household income in the areas where each respondent lives (using MSOA level data), but the results showed that it was not a significant factor in explaining personal well-being. This is probably because average household income in an area is not a very good substitute for individual household income.

The same approach was taken to this analysis as described above for the main sample and using the same variables noted above, but with additional variables on individual net earnings in the previous week, either as the log of last week's net wage or as a decile, (i.e. relative distribution of the net wage). Another variation used the same variables as in the main model, but also included information about household net earnings in the previous week using the same approach as for individual earnings. These were included in the models with employees in order to understand more about how income from work, either individually or at a household level, may influence personal well-being. The variables for household net earnings were created specially for this analysis using data available in the APS.

Approach to the analysis

The final stage of the work involved analysis of each model, first using ordered probit regression and then replicating it using OLS. This was done because the ordered probit technique is best suited to ordered nature of the responses to the personal well-being questions (ie, with responses on a scale from 0 to 10). However, the results of ordered probit analysis are difficult to explain to a wide audience in an accessible way. For this reason, it is generally considered acceptable to undertake the analysis first in ordered probit and then to replicate in OLS. If the findings are very similar, then they can be reported using the OLS regression results. In this case, the statistical significance, the signs and the relative sizes of the regression coefficients were very similar between the two methods and the choice of the regression method made little difference to the overall findings. This is also consistent with other similar research (Ferrer-i Carbonell and Frijters 2004; Stevenson and Wolfers 2008; Fleche et al., 2011).

The findings in this report are therefore based on the results of the OLS regressions for the sake of simplicity and ease of interpretation, but the results from both types of regression are included in the reference tables to enable comparisons.

Interpreting what the numbers mean

The numbers included throughout the text and in the tables at the beginning of each section are the unstandardised coefficients for each variable included in the main regression models. This shows the size of the effect that the variable has on the specific aspect of personal well-being considered. Numbers to indicate the size of the effects are presented only if they are from the main regression models and they are statistically significant. Where findings from the alternative models shed light on specific aspects of well-being, these are referred to in the text but no references are made to the coefficients to avoid direct comparisons with the main models. As noted, reference tables with the coefficients from the alternative models are available via links in each section.

In interpreting the findings, it is important to remember that these numbers represent the difference between two groups when all other variables in the model have been held equal. The comparisons are therefore between two people who are otherwise the same in every respect apart from the particular characteristic or circumstance being considered. This helps to isolate the effect of any specific characteristic or circumstance on personal well-being.

Throughout, in order to give a sense of the size of the relationship found between each individual characteristic and personal well-being, we have used the following schema. This summarises the size of the difference between how an individual from the reference group would rate their well-being for each question compared to how an individual from another group would rate the same question, holding other variables equal.

Under the tables, when results are referred to as 'significant at the 5% level', this means there is a probability of less than .05 (or less than one in twenty) that the result could have occurred by chance.

Schema for comparing the size of the relationship between each variable and personal well-being:

Large- a difference of 1.0 points or more between the average rating of the reference group and the group being studied after controlling for other factors

Moderate- 0.5 points < 1.0 points difference between the groups

Small- 0.1 points < 0.5 points difference between the groups

Very small- a difference of less than 0.10 points but which is still statistically significant

3. Our findings

The results of the regression analyses are summarised in the sections which follow. A table which provides a summary of the results for all the variables in the main model is available in [Reference Table 1 \(141.5 Kb Excel sheet\)](#). In order to illustrate the findings relevant to each section, an extract from Reference Table 1 is included in each section showing the results for the variables in that section.

3.1 Does who we are affect our personal well-being?

As noted earlier, aspects of who we are, such as our genes and our personality, have been shown to have an important influence on our sense of personal well-being. But beyond that, do our 'objective' personal characteristics like whether we are a man or a woman, our age or our ethnicity have a role to play?

3.1.1 Summary of findings on age, sex, ethnicity, migration and religion

Holding other factors equal:

- Personal well-being is highest among younger and older adults and dips in middle age
- Differences in personal well-being between men and women are small, but women report higher 'life satisfaction', 'worthwhile' and 'happy yesterday' levels. Women also reported slightly higher levels of 'anxious yesterday' than men
- People of Black/African/Caribbean/Black British ethnicities rated their 'life satisfaction' lower on average than White people. The size of this relationship was moderate.
- Indian and Pakistani people also rated their 'anxiety yesterday' higher than White people. The size of the differences found between these ethnic groups and the white reference group were small.
- People who have migrated to the UK rate their 'life satisfaction' and 'happiness yesterday' more highly on average than those who were born in the UK. Immigrants who settled in the UK more recently give slightly higher ratings for 'happy yesterday' than those who have been living in the UK for 12 years or more. Overall, the size of the relationship between migration status and personal well-being is small.
- People who say that they have a religious affiliation rate their levels of 'happiness yesterday', 'life satisfaction' and 'worthwhile' higher than people who said they have no religious affiliation. The size of relationship between religious affiliation and personal well-being is small.

3.1.2 Age

Looking first at age, the analysis shows that the relationship between age and the four subjective well-being measures is statistically significant but generally small. The findings are shown in **Table 2**.

After controlling for all the other factors, personal well-being is highest among younger people and older people. This is in line with previous ONS findings and other research that shows that the relationship between age and personal well-being is U-shaped. That is, our sense of personal well-being is highest among younger people and older people and is lowest among people in their middle years.

There may be two possible explanations for this. Firstly, this may be a 'cohort effect' in which people born in different eras have different experiences and expectations which shape their sense of well-being. If the age curve represents a cohort effect, we might expect that people born around the same time would maintain a similar level of well-being throughout their lives regardless of their age.

Another possible explanation is that our level of personal well-being may change as we move through our lives, have new experiences, and possibly change the way we look at things. A growing body of research (The Economist 2010; Dolan et al., 2008) notes that the U-shaped curve observed between age and well-being has been found consistently over 40 years of data collection. These differences consistently appear at particular points in the life cycle and after controlling for many other characteristics and circumstances which may influence personal well-being. This has led some researchers to suggest that the different levels of well-being observed at different points in life may be the result of internal changes within the individual rather than external circumstances.

For example, some recent studies have suggested the dip in well-being in middle age and the subsequent rise later in life may represent what has been called, the “death of ambition and birth of acceptance”. That is, people may come to accept their strengths and weaknesses and, “give up hoping to become chief executive or have a picture shown in the Royal Academy, and learn to be satisfied as assistant branch manager, with their watercolour on display at the church fete.” (The Economist 2010).

Overall, further research exploring the dynamics of well-being and how it changes over time and throughout the life cycle would be helpful. Analysis of longitudinal data which follows the same people over time would be particularly useful in shedding light on what happens to personal well-being as we age and why.

Table 2: Effects of age and sex on well-being ratings after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Age	-0.066*	-0.016*	-0.039*	0.05*
Age squared	0.001*	0*	0*	-0.001*
Sex				
Reference group: male¹				
Female	0.1*	0.23*	0.046*	0.254*

Table source: Office for National Statistics

Table notes:

1. The reference group for sex is 'male'.
2. * shows that the relationship is statistically significant at the 5% level.

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(30.5 Kb)

3.1.3 Sex

Turning to the relationship between a person’s sex and well-being, the results show that holding other factors equal, women rate their levels of ‘life satisfaction’, ‘happiness yesterday’ and ‘worthwhile’ higher on average than men, but the size of the differences between the sexes is small. For example, women rated their life satisfaction 0.1 points higher on average than men and worthwhile 0.2 points higher.

However, women also rated their level of 'anxiety yesterday' 0.3 points higher on average than men.

So all things being equal, women view their lives a bit more positively and report more 'happiness yesterday', but they also experience more anxiety.

Some studies that have also found differences in the well-being of men and women suggest that this could be due to women being more socially connected and involved than men. The implication is that women may care more what others think and this may make them more prone to anxiety. However, there are other studies that have found no differences between the sexes after controlling for other factors (Dolan et al., 2008).

The results here (see Table 2) suggest that in comparison to the other characteristics and circumstances included in the analysis, one's sex is not as important to well-being as many other factors.

3.1.4 How do ethnicity and immigration relate to personal well-being?

Ethnicity

The findings here suggest that there is a relationship between ethnicity and personal well-being once other factors are taken into account. However, the size of the relationship is small. **Table 3** summarises the effects of ethnicity on personal well-being ratings.

Findings of note are that, after controlling for individual characteristics, people from the Black/African/Caribbean/Black British ethnic group rated their life satisfaction 0.5 points lower on average than the White group. They also rate their 'happiness yesterday' 0.2 points lower on average than the White group.

People in the Bangladeshi ethnic group also rated both their life satisfaction and a sense that their activities are worthwhile lower than the White group (0.3 points lower and 0.2 lower respectively).

Those in both the Indian and Pakistani ethnic groups rated their levels of anxiety yesterday higher on average than those in the White group (0.2 points higher). Furthermore, Pakistani people also rated the 'worthwhile' question 0.2 points lower on average than White people.

The differences may in part be due to what can be described as 'cultural bias'. This may be because people from different cultures may interpret the question scales differently or be more likely to give more extreme or moderate ratings when asked to make an assessment of their life in this way. However, although the research literature suggests there are some cultural differences in the patterns of observed responses, it is difficult to say to what extent this represents error in the data rather than genuine differences in how people feel, or how they assess their lives (OECD, 2013). This presents a challenging research agenda for the future.

An alternative to the cultural bias theory is that these differences exist because they reflect people's responses to the circumstances that they find themselves in.

How does the personal well-being of migrants to the UK compare to the well-being of people born in Britain?

Some studies suggest that levels of personal well-being may differ between those who migrate to a country and those of people who were born there (Findlay et al., 2010; Gibson et al., 2012).

There is also research which suggests that the personal well-being of new migrants to a country may be different to that of immigrants who have lived there for a longer time. For example, the initial experience of disorientation and unhappiness which may be associated with recent migration may gradually disappear as people adapt to life in a new country in terms of language, customs, working and family lives.

In order to explore how the personal well-being of people who have come to the UK as migrants differs to that of people who were born in the UK, the regression analysis included variables indicating whether the respondent was born in the UK or not. If they were born in another country, information about how long ago they came to the UK is also included. The results are shown in Table 3.

After controlling for other factors, people who have migrated to the UK are somewhat happier and more satisfied with their lives than people who were born in the UK, but the size of the differences between them were small (around no more than 0.2 points difference in how they rated 'happy yesterday' and 'life satisfaction'). There were no statistically significant differences between people who were born in the UK and those who migrated from elsewhere in terms of their ratings for 'anxiety yesterday' or a sense that the things they do are 'worthwhile'.

This analysis went a bit further by comparing the well-being of those who were born in the UK to those who migrated to the UK more recently or those who have lived here for a longer time. The results indicate that people who settled in the UK more than 12 years ago rate their 'life satisfaction' 0.1 points higher on average than people who were born in the UK. Those who settled in the UK more recently (since 2009) rate their 'happiness yesterday' 0.2 points higher than those who were born in the UK. Although this may suggest interesting areas for further study, the differences between the well-being ratings for each of these groups are small.

Similarly to ethnicity, there may be cultural differences or linguistic differences in how people from different countries respond to the personal well-being questions, therefore these results should be treated with caution.

Finally, in constructing the models, analysis was also undertaken on an individual's nationality. This was not included in the final model because of the high correlation between the ethnicity and migration status, but the results of the analysis can be found in [Reference Table 4 \(770 Kb Excel sheet\)](#).

Table 3: Effects of ethnicity and migration on personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group:				
White¹				
Mixed/multiple ethnic groups	-0.145	0.019	0.039	0.158
Indian	-0.037	-0.057	0.02	0.205*
Pakistani	-0.112	-0.242*	-0.12	0.217*
Bangladeshi	-0.305*	-0.216*	0.001	0.311
Chinese	-0.095	-0.189	0.013	0.094
Any other Asian background	0.036	-0.072	0.066	0.017
Black/African/Caribbean/Black British	-0.473*	-0.102*	-0.195*	0
Arab	-0.236	-0.118	-0.179	0.34
Other ethnic groups (including gypsy travellers)	-0.131*	-0.157*	-0.074	0.151
Not stated or missing	-0.379	-0.058	-0.194	-0.15
Reference group: not a migrant¹				
New migrant (since 2009)	0.04	-0.032	0.197*	0.076
Medium term migrant (came between 2000-2009)	0.004	-0.081*	0.167*	0.073
Long term migrant (came before 2000)	0.124*	0.038	0.058	-0.058

Table source: Office for National Statistics

Table notes:

1. The reference group for ethnicity is 'White' and the reference group for migration status is 'not a migrant'.
2. * shows that the relationship is statistically significant at the 5% level.

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(32.5 Kb)

3.1.5 How does religious affiliation relate to personal well-being?

The Annual Population Survey does not ask about people's political, philosophical, religious or other beliefs, but it does ask about their religious affiliation¹. This is just a simple indication of whether someone identifies themselves with a religion or not and can only be considered a first look at the well-being of those who say that they have a religion compared to those who do not. Other studies that have looked at the relationship between religion and well-being have explored degree of religious conviction, attendance at religious services, and social connections made through participation in religious activities. This would be an interesting area for further research, but the Annual Population Survey does not have any information on these topics.

The findings which are summarised in **Table 4** show that, other things being equal, respondents who said that they have a religious affiliation rate their levels of 'happiness yesterday', 'life satisfaction' and 'worthwhile' higher on average than people who said they do not have a religious affiliation. Specifically, those with a religious affiliation, rate their life satisfaction 0.1 points higher, 'worthwhile' 0.2 points higher and 'happiness yesterday' 0.2 points higher on average than those who do not have a religious affiliation. All of these differences would be considered small.

There is also a very small, but statistically significant difference between the two groups in ratings for 'anxiety yesterday'. Those with a religious affiliation give higher ratings for their anxiety levels.

Several studies have demonstrated that religious faith and spirituality can contribute to a person's mental and physical well-being. Some of these have found a positive relationship between higher levels of well-being and religious beliefs or activities and concluded that this could be due to several factors including religion helping people to cope with troubling life circumstances such as sickness or death of a loved one. However, other studies have found that religious faith can impact negatively on a person's well-being. For example, personal relationships may suffer if those we care about do not share the same religious convictions (James & Wells 2003).

Table 4: Effects of religious affiliation on personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group:				
No religious affiliation¹				
Any religion reported	0.132*	0.206*	0.169*	0.067*
Not stated or missing	-0.091	0.031	0.052	0.109

Table source: Office for National Statistics**Table notes:**

1. The reference group for religious affiliation is 'no religious affiliation'.
2. * shows that the relationship is statistically significant at the 5% level.

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(20.5 Kb)

3.2 How important are health and disability to well-being?

The National Debate (Office for National Statistics 2011) highlighted the importance of health among the things that really matter to personal well-being and this has been confirmed by numerous studies. Previous ONS publications have also highlighted a very clear positive relationship between self-reported health and 'life satisfaction', a sense that our activities are 'worthwhile' and 'happy yesterday', and a negative relationship between health and 'anxious yesterday'. These findings are from bi-variate analysis looking only at the relationship between self-reported health and personal well-being. The regression analysis enables us to go further and to look at the size and strength of the relationship between self-reported health and personal well-being when other factors are held equal.

3.2.1 Key points

Holding other factors equal:

- The size of the relationship between self-reported health and personal well-being is larger than any other variable included in the regression model.
- 'Life satisfaction' scores for people who say they have very bad health are much lower on average than for people who say they have good or very good health.

- There is also a large and positive relationship between people's assessments of their health and their ratings of 'happiness yesterday' and 'worthwhile'. People who say their health is bad report higher levels of 'anxiety yesterday' on average than people who say their health is good.
- People who reported a disability gave lower ratings on average for life satisfaction and 'happiness yesterday' and higher ratings for 'anxiety yesterday' than people who did not report a disability.
- The size of the relationship between self-reported disability and personal well-being is small.

3.2.2 The challenge of measuring the relationship between health and personal well-being

An important question in the regression analysis was which variable representing health should be included in the model in order to best capture the relationship between health and personal well-being. The following were two of the key considerations taken into account in developing the model:

- Health and disability are both likely to be related to personal well-being, but they are closely related to each other and this makes it difficult to be sure that the effects of each are captured while holding the other equal.
- The data from the Annual Population Survey include information about health and disability based on people's own assessments. This means that we are using people's **views** about their health and whether they have a disability rather than relying on more objective information from a source such as medical records. It may be that our views about our health and disability are related to our sense of well-being in different ways than objective measures of health and disability would be.

In order to explore these issues, several different ways of approaching the analysis were tried before opting for the version reported here in the main model. The results from each of these models can be found in [Reference Table 4 \(770 Kb Excel sheet\)](#) and more detailed discussion of the factors taken into account in deciding which variables to use to measure health and disability are discussed further in section 5.3.3.

Table 5: Effects of self-reported health and self-reported disability on personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group: not disabled¹				
Disabled - both DDA and work-limiting	-0.112*	-0.007	-0.06*	0.183*
Not stated or missing	0.016	0.058	-0.005	-0.008
Reference group: good health¹				
very good	0.422*	0.364*	0.458*	-0.481*
fair	-0.531*	-0.419*	-0.544*	0.631*
bad	-1.463*	-1.162*	-1.466*	1.333*
very bad	-2.428*	-1.958*	-2.561*	2.107*
Not stated or missing	-0.667*	-0.492*	-0.577*	0.668*

Table source: Office for National Statistics**Table notes:**

1. The reference group for self-reported disability is 'not disabled' and the reference group for self-reported health is 'good health'.
2. * shows that the relationship is statistically significant at the 5% level.

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3.2.3 The bigger picture on the relationship between self-reported health, self-reported disability and personal well-being

The key finding from this analysis is that self-reported health has a large and significant relationship with personal well-being. Self-reported disability has a significant but much smaller relationship with well-being when other variables are held equal including self-reported health.

The main model includes both self-reported disability and self-reported health, and the correlation between the two is high but not perfect. For example, people who report that they have a disability

are also more likely to report that they are in fair, bad or very bad health than people who do not report a disability. However, a third of those who said they have a disability also said their health is good or very good. This suggests that there is quite a lot of overlap between the variables, but they are not measuring exactly the same thing.

How much difference does self-reported health make to ratings of personal well-being?

Other things being equal, 'life satisfaction' scores for people who said they were in very bad health were 2.4 points lower on average than for people who said they were in good health and almost 3 points lower than for people who said they were in very good health.

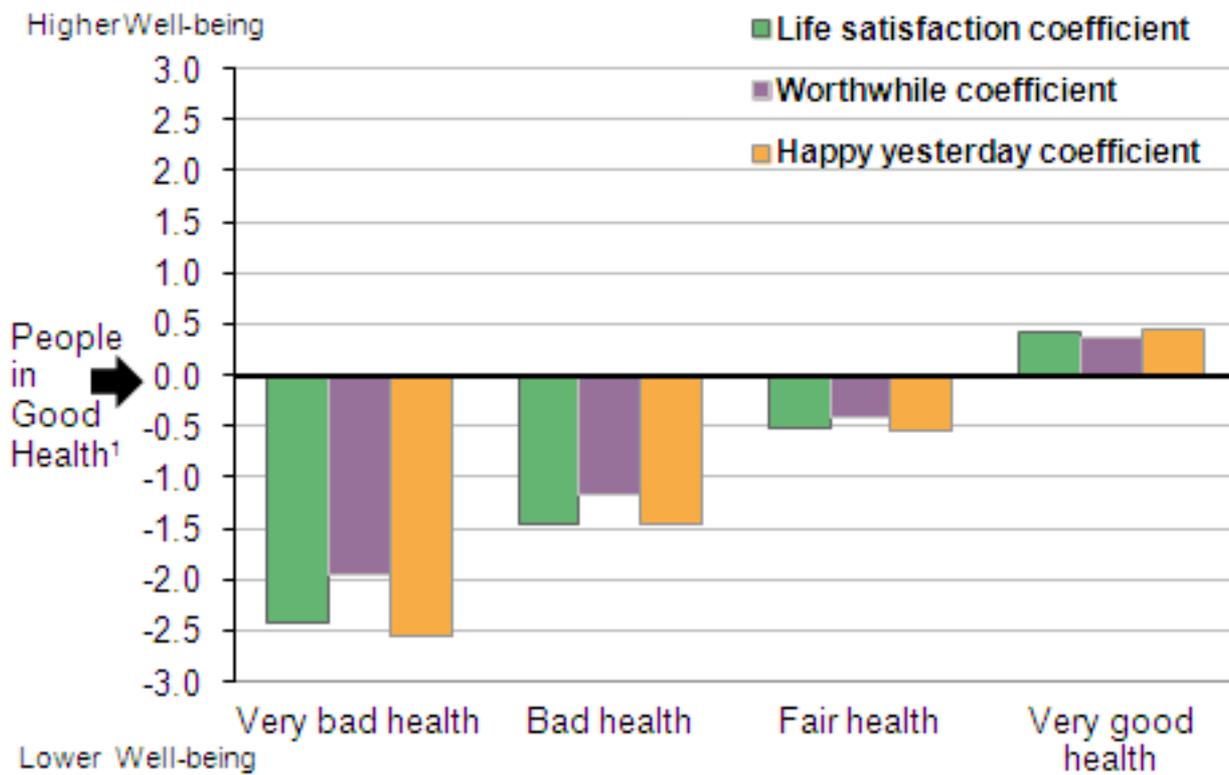
There is also a strong association between health, 'happy yesterday' and feeling that one's activities are 'worthwhile'. For example, on average, people who reported very bad health rated their 'happiness yesterday' 2.6 points lower on average than people who reported good health and 3 points lower on average than people who reported very good health.

As might be expected, bad health is related to increased anxiety. Holding all else equal, the 'anxious yesterday' ratings for people who said they have very bad health were on average around 2 points higher than people who said they have good health and 2.5 points higher than people who reported very good health. **Figure 1** illustrates the relationship between how people rate their health and how they rate each aspect of their personal well-being, after holding other variables equal.

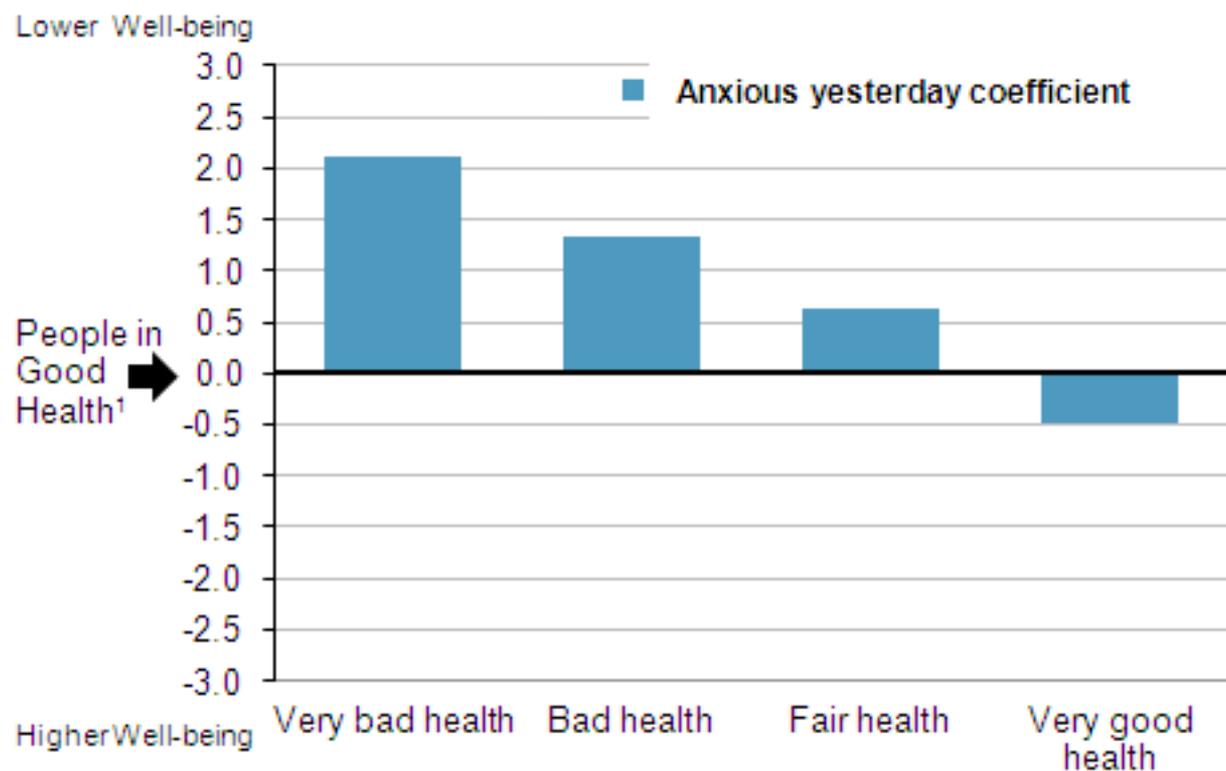
Figure 1: How self-assessed health relates to personal well-being after controlling for personal characteristics

Great Britain

Coefficients



Coefficients



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Reference group at 0 is a baseline of people who rated their health as good.

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How much difference does self-reported disability make to ratings of personal well-being?

People who said that they have a disability according to the definition of the Disability Discrimination Act (DDA) or those who said that they have a work-limiting disability are both included in this analysis of self-reported disability.

Holding other factors equal, those who said they have a disability rated their life satisfaction 0.1 points lower and their happiness yesterday 0.1 points lower than those who did not report a disability. People who reported a disability also rated their level of anxiety yesterday 0.2 points higher than those without a disability.

Based on these findings, the size of the relationship between self-reported disability and personal well-being is small.

3.2.4 Final thoughts on the relationship between self-reported health and personal well-being

Research consistently shows that both physical health and psychological health are strongly associated with well-being and that psychological health is highly correlated with personal well-being.

As Dolan et.al (2008) notes, some of the association may be caused by the impact that well-being has on health. That is, people who are in good physical and mental health may be happier, but happy people may be less likely to fall ill than unhappy people.

A significant relationship between personal well-being and health may also be due to personality differences and without controlling for these the size of the relationship between health and personal well-being may be not captured accurately.

Finally, in the absence of an 'objective' health variable, using a person's own assessment of health to control the relationship between health and personal well-being in the regression may exaggerate the apparent relationship between health and well-being. For this reason, we have been careful to refer to the relationship between self-reported health and personal well-being as we have not used an objective measure of health.

However, other research has also shown that subjective evaluations of health status matter more than objective measures in terms of the relationship with personal well-being (Brown et al., 2010; Diener et al., 1999).

3.3 How does educational attainment relate to personal well-being?

3.3.1 Key Points

Holding other factors equal:

- Those with qualifications below A level give lower ratings on average for 'worthwhile' than people with A level qualifications and above.
- People with the highest educational attainment have higher ratings of 'anxiety yesterday' on average than people with lower educational attainment. They also have lower life satisfaction ratings than those with lower educational attainment.
- There were no statistically significant differences between the average life satisfaction ratings of people with no qualifications and those with A levels.
- Overall, the findings here show that size of the relationship between educational attainment and personal well-being is either small or very small.

The analysis here suggests that the level of education we reach is related to personal well-being, but the size of the relationship is small or very small. The findings are shown in **Table 6**.

Statistically significant findings did emerge when comparing those with A level qualifications to those with lower level or no qualifications. For example, those with no qualifications rate 'worthwhile' 0.1 points lower on average than those with A level or equivalent qualifications. There were no statistically significant differences in 'worthwhile' between those with A level qualifications and those with higher level qualifications.

Additionally, those with the highest qualifications rated 'anxious yesterday' 0.1 points higher on average than those with A levels and higher than all those with lower educational attainment.

There were no statistically significant differences found between the life satisfaction ratings of those with no qualifications and those with A level qualifications.

Finally, as a word of caution, it should be noted that approximately 18% of the respondents in the Annual Population Survey have a missing value regarding their highest qualification. Most of those were among those aged 60 years and over and this is probably due to the fact that the question on highest qualification is only asked of those of working age (up to the age of 69). Beyond this age, it is only asked of those who are still in work and who have qualifications. This suggests that there may be other datasets that could provide a more comprehensive picture of the relationship between educational attainment and personal well-being.

Other studies have found a positive correlation between educational attainment and personal well-being which disappears after controlling for other factors such as income and health (Dolan et al., 2008; Brown et al., (2010). This suggests that education may not be related to personal well-being directly, but only indirectly via its relationships with other factors like income and health.

Table 6: Effects of educational attainment on ratings of personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group: GCE A-level or equivalent¹				
Degree or equivalent and higher	-0.04*	0.013	-0.025	0.116*
Higher education	-0.073*	-0.018	-0.023	0.023
GCSE grades A*-C or equivalent	-0.058*	-0.056*	-0.005	-0.059
Other qualifications	-0.024	-0.074*	0.011	-0.035
No qualification	-0.006	-0.124*	-0.02	0.055
Not stated or missing	-0.28*	-0.19*	-0.184*	0.21*

Table source: Office for National Statistics**Table notes:**

1. The reference group for educational attainment is 'GCE A-level or equivalent'.
2. * shows that the relationship is statistically significant at the 5% level.

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3.4 How are relationship status and children in the household related to personal well-being?

This section focuses on how our closest relationships, those with spouses, partners and children, relate to personal well-being. There are many other relationships that it would also be helpful to explore, such as those with friends, colleagues and neighbours, but this analysis uses the data available in the APS to take a basic look at how relationship status and children in the household relate to personal well-being.

3.4.1 Key Points

Holding other factors equal:

- People who are married or in a civil partnership gave higher ratings for 'life satisfaction', feelings that the things they do in their lives are 'worthwhile', and 'happiness yesterday' than those in the other relationship categories.
- People who are widowed, divorced, or separated gave lower ratings for 'life satisfaction', feelings that the things they do in their lives are 'worthwhile', and 'happiness yesterday' than other groups.
- People who are married or in civil partnerships rate their level of 'anxiety yesterday' lower than other groups.
- People who live with dependent children on average give higher ratings when asked if they feel that the things they do in life are 'worthwhile', compared to people who do not live with children.
- Those living in households with two or more people (including children) rate their 'life satisfaction' more highly than those living alone.
- Overall, the size of the association between relationship status and personal well-being could be described as moderate while the relationship between children in the household and personal well-being is small or very small.

3.4.2 Delving deeply into our relationships

The analysis looked at current relationship status and considered whether being married, cohabiting, divorced, separated, single or widowed is related to personal well-being when other factors are held equal.

The results of the analysis are shown in **Table 7**. Holding other factors equal, those who are single, widowed, divorced or separated all have lower average ratings for 'life satisfaction', 'worthwhile' and 'happy yesterday' than people who are married or in a civil partnership.

Looking at the scale of the differences in personal well-being associated with these different relationship situations, other things being equal, single people rate their 'life satisfaction' 0.5 points lower on average than married people or those in a civil partnership. The 'life satisfaction' scores of people who are widowed and living alone is on average 0.7 points lower than that of married people or those in a civil partnership. People who are divorced or separated and living alone similarly rate their 'life satisfaction' 0.6 points lower on average than married people or those in civil partnerships. The size of the association between relationship status and personal well-being would be considered moderate. These findings are shown graphically in **Figure 2**.

Although people who are cohabiting also give lower ratings on average than married people/civil partners for 'life satisfaction', 'worthwhile' and 'happy yesterday', the scale of the difference between their ratings and those of people in a marriage/civil partnership is much smaller than the difference between married people/civil partners and those in all the other relationship status categories.

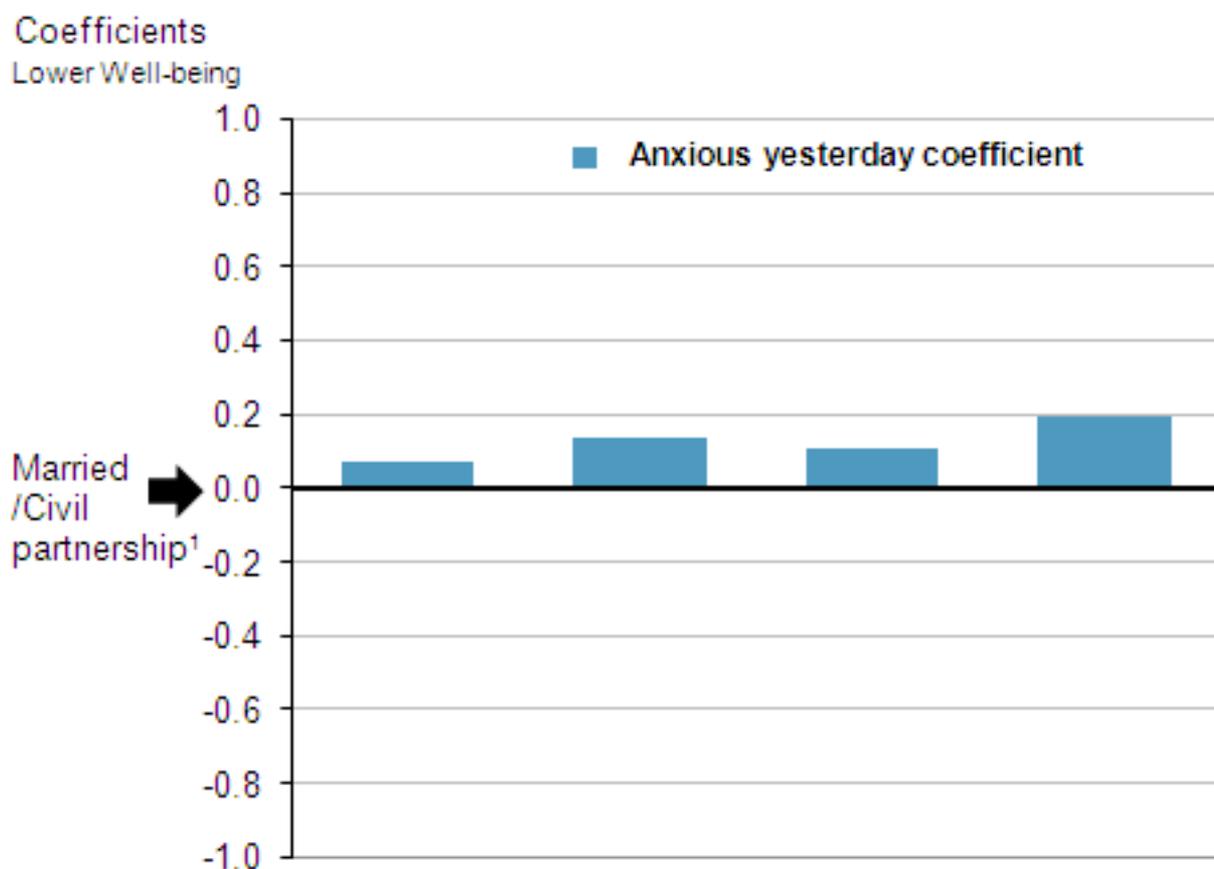
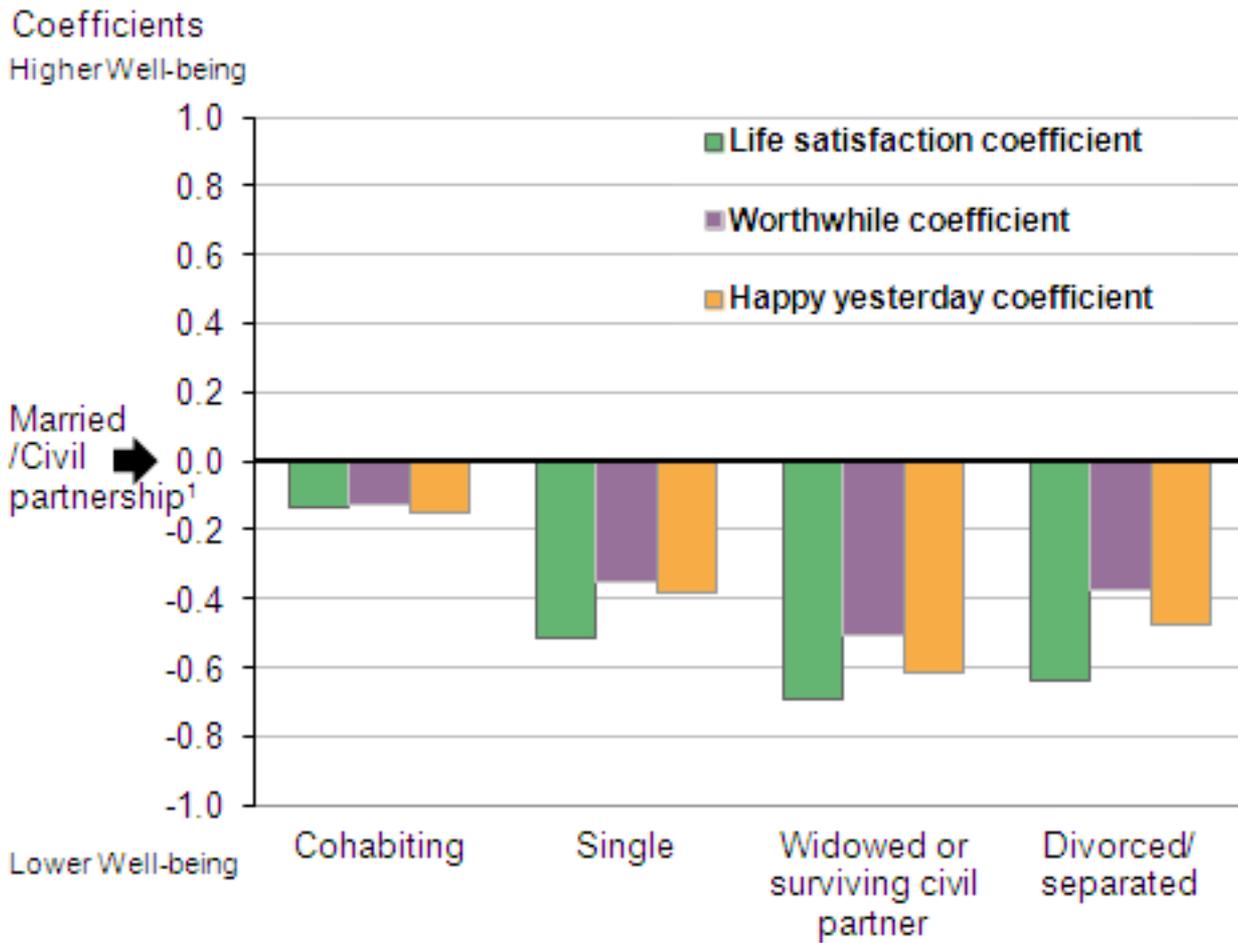
In terms of anxiety, all the relationship groups considered here report higher 'anxiety yesterday' than married people and those in civil partnerships, but size effects were small (on average, around 0.1 to 0.2 points). These findings are illustrated in Figure 2.

These results are consistent with findings from other studies and confirm that relationships are a key ingredient of personal well-being (Dolan et al., 2008). However, it is important to note that factors that are not measured here may also contribute to a person's relationship status. For example, if people who tend to be happier are also more likely to get married or to enter into a civil partnership, then the differences in personal well-being observed between those who are married or in civil partnership and those who are not may actually be a reflection of underlying personality differences rather than relationship status per se.

Although this cannot be explored fully using the data available in the Annual Population Survey, the significance and the size effects as well as evidence from other studies all suggest that our relationships are very important to personal well-being.

Figure 2: How relationship status affects personal well-being after controlling for individual characteristics

Great Britain



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Reference group at 0 is a baseline of people who are married or within a civil partnership.

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3.4.3 How's life with children?

The results are shown in Table 7 and they indicate that living with children has a small association with personal well-being which is focused primarily on the sense that our activities are worthwhile.

The analysis here makes a distinction between dependent children (defined as aged 0 to 15 or aged 16 to 18 and in full-time education) and non-dependent children (aged 16 to 18 and not in full-time education or over the age of 18).

Holding other factors equal, people who live with dependent children rate 'worthwhile' 0.2 points higher on average than those who do not live with children. This suggests that living with and looking after children is linked to an enhanced perception that what we are doing in life is 'worthwhile'. Indeed, there is evidence from other studies that the presence of young children in the household may increase parents' well-being levels, but this may reflect a temporary boost to well-being when a new child arrives which subsides with time (Dolan et al., 2008).

Holding all else equal, there was no statistically significant difference between people living in households with or without children in terms of their ratings of 'happy yesterday' or 'anxious yesterday' and there was only a very small association with 'life satisfaction'.

Table 7: Effects of relationship status and presence of children in the household on ratings of personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group: married or with civil partner¹				
Cohabiting(include all people cohabiting, different or same sex couples, whether they are separated, widowed or "single")	-0.136*	-0.13*	-0.147*	0.072*
Single, never married (and not cohabiting)	-0.518*	-0.349*	-0.386*	0.137*
Widowed or surviving civil partner(living alone, not cohabiting)	-0.691*	-0.506*	-0.613*	0.104*
Divorced/ separated, former civil partner legally dissolved, separated civil partner (living	-0.637*	-0.377*	-0.472*	0.192*

alone, not
cohabiting)

**Reference group:
no children in the
household¹**

Dependent children only	0.016	0.179*	0.025	-0.001
Non-dependent children only	-0.053*	-0.007	-0.034	-0.02
Both dependent and non-dependent children	0.052	0.132*	0.073	-0.088

Table source: Office for National Statistics

Table notes:

1. The reference group for relationship status is 'married or with civil partner' and the reference group for presence of children in the household is 'no children in the household'.
2. * shows that the relationship is statistically significant at the 5% level.

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(23.5 Kb)

3.4.4 How does who we live with affect personal well-being?

Another way to explore whether our household circumstances affect our personal well-being is to compare the well-being of people living in different situations. In addition to looking at relationship status and presence of children in the household separately, as reported above, further analysis was done using information about people living in different types of households. This is a variation on the main regression model, the details of which can be found in [Reference Table 4. \(770 Kb Excel sheet\)](#)

On the whole, this analysis shows that living alone is negatively related to our personal well-being, regardless of relationship status. For example, all the household types where two or more people live together give higher ratings than those living alone when asked if they feel the things they do in life are 'worthwhile'.

Similarly, people living in households with two or more people also rate their 'life satisfaction' more highly than those living alone.

Looking only at households where two or more people live together, married people (particularly those not living with children) and same sex couples give the highest ratings for well-being (except in the case of 'anxious yesterday').

Taken together, these results suggest that living as part of a married couple or in a civil partnership is associated with higher levels of well-being and living alone is associated with lower well-being. Living with children in the household appears to affect personal well-being only marginally.

3.5 How does employment status relate to personal well-being?

This section looks at how employment status relates to our personal well-being. The analysis also considers how satisfied people are with their employment situation as this may contribute to personal well-being.

3.5.1 Key Points

Holding other factors equal:

- People who are unemployed have significantly lower levels of 'life satisfaction', 'happy yesterday', and feelings that their activities are 'worthwhile' than those who are employed and most groups of economically inactive people. Unemployed people also have higher 'anxious yesterday' levels compared with people in other work situations.
- People who are employed but want a different or additional job have lower levels of personal well-being (including higher 'anxious yesterday' levels) on average than employed people who are not looking for another job.
- Retired people who said that they do not want to work and those who said they do not need to work have on average higher levels of well-being than people who are working and satisfied with their jobs.
- People who are economically inactive due to ill health or disability have particularly low ratings for personal well-being.
- People in higher managerial or professional occupations rate their life satisfaction higher on average than those in other occupational groups. They also give slightly higher ratings when asked if they think the things they do are 'worthwhile'. However, on average the difference in their ratings on these aspects of their well-being compared to those in other occupational groups was small or very small.
- People in higher managerial and professional occupations give higher scores for 'anxious yesterday' levels on average than those in lower supervisory and technical occupations.
- Among a sub-sample of employees only, those who earn higher wages from their job give higher ratings for 'life satisfaction' on average than those earning less, but ratings for 'worthwhile' and 'happy yesterday' and 'anxiety yesterday' were not related to earnings.

3.5.2 How do employment, unemployment and economic inactivity relate to personal well-being?

Work is an important aspect of our lives which can provide the obvious tangible benefits of income and a pension, as well as more psychological benefits such as a sense of purpose, social status, social interaction and giving structure to one's day. Employment status is generally split into employment, unemployment and economic inactivity and this section compares the well-being of people in these categories. After controlling for all the other factors included in the analysis, people who are unemployed have significantly lower levels of 'life satisfaction', 'happy yesterday', and feelings that their activities are 'worthwhile' than those who are employed or economically inactive.

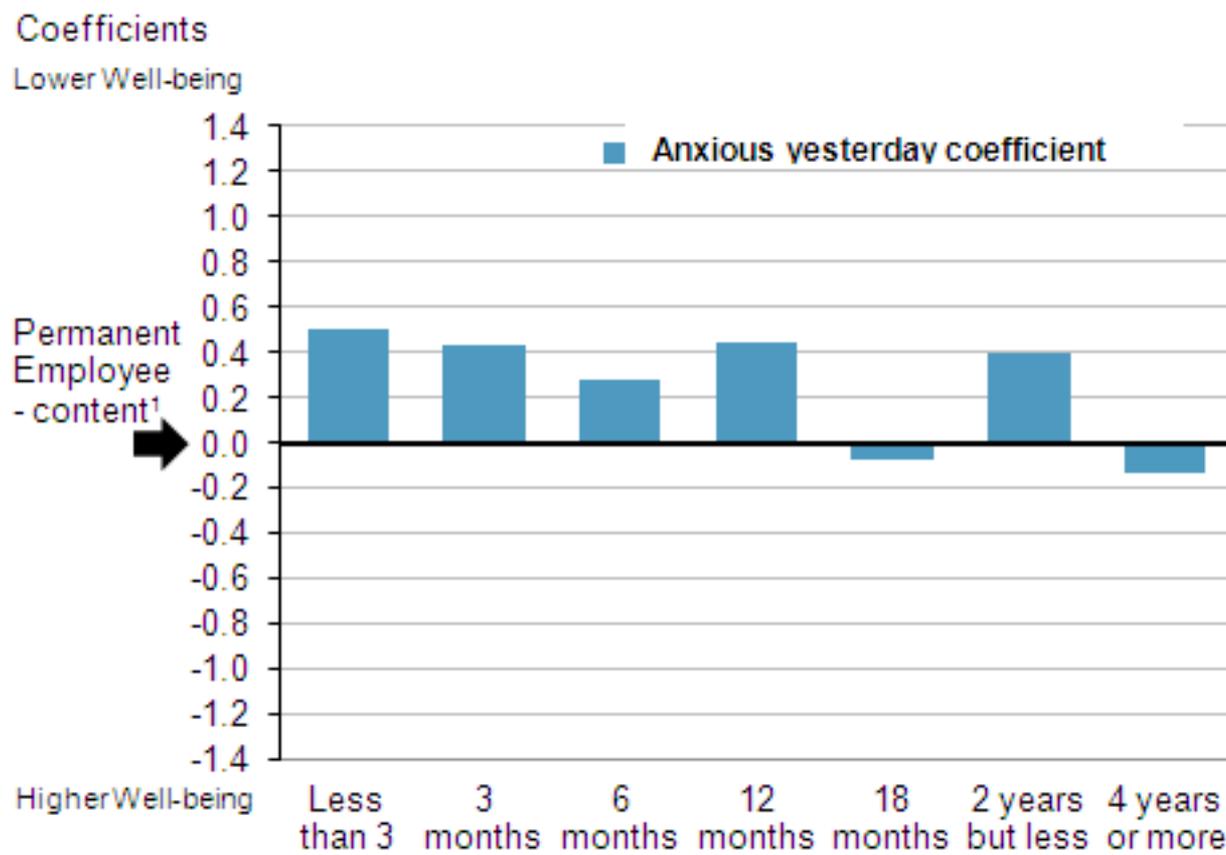
The findings here are clear and consistent with those reported elsewhere (Dolan et al., 2008; Clark 2003; Blanchflower & Oswald 1999); unemployment has a strong and negative association with well-being.

There is also an interesting finding about differences in personal well-being related to duration of unemployment. As the duration of unemployment increases, the average ratings for personal well-being decline. The lowest ratings for personal well-being are among those who have been unemployed for between two and four years. Their life satisfaction scores are 1.2 points lower on average than those of people in a permanent job with which they are content. Those who have been unemployed for four years or more have life satisfaction scores that are 1.0 point lower on average than those of people in a permanent job with which they're content. These findings are illustrated in **Figure 3**.

These findings could suggest that people adapt somewhat to their situation as time goes on, but even among those who have been unemployed for four years or more, well-being ratings are still significantly below those of employed people. Longitudinal analysis following the same people over time would be required to examine the possibility of adaption more fully.

Figure 3: How length of unemployment relates to personal well-being after controlling for personal characteristics

Great Britain



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Reference group at 0 is a baseline of people who are in permanent employment and don't want different or additional job - content in the job they have.

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3.5.3 Is it just about work or about contentment with what we are doing?

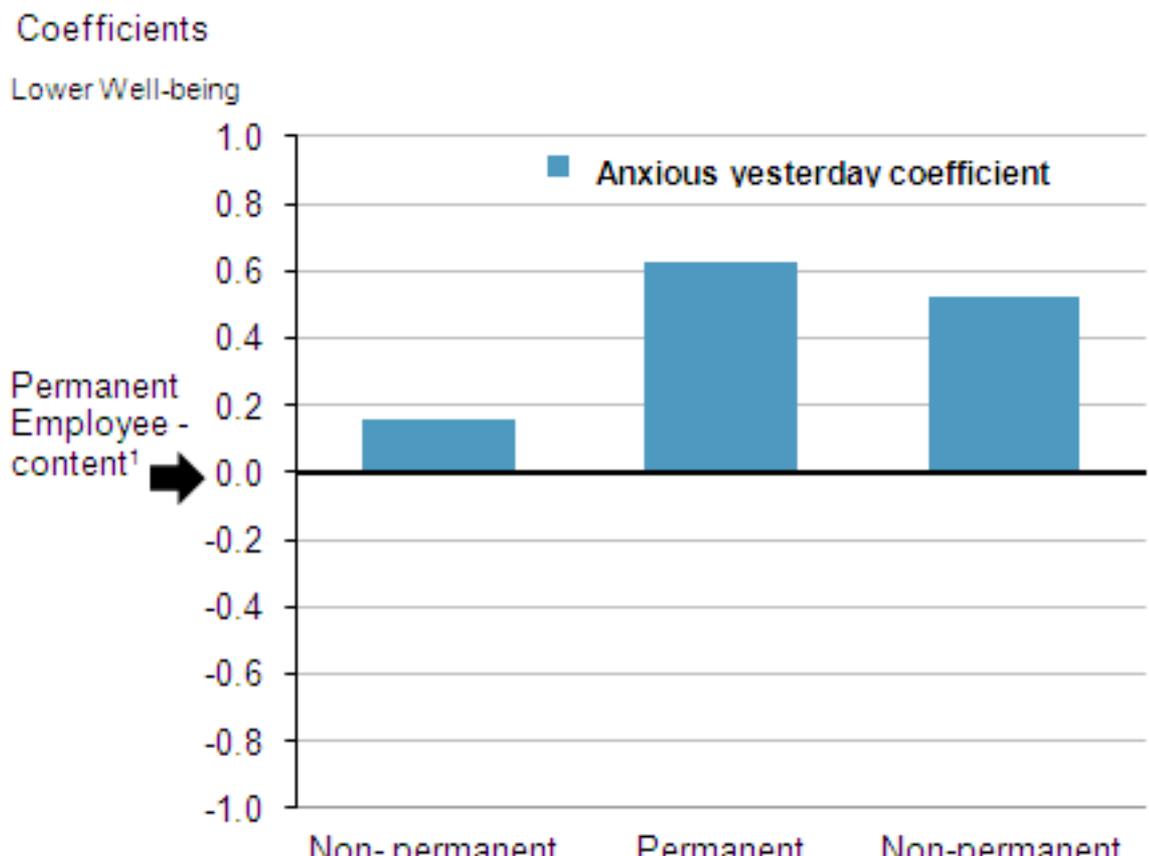
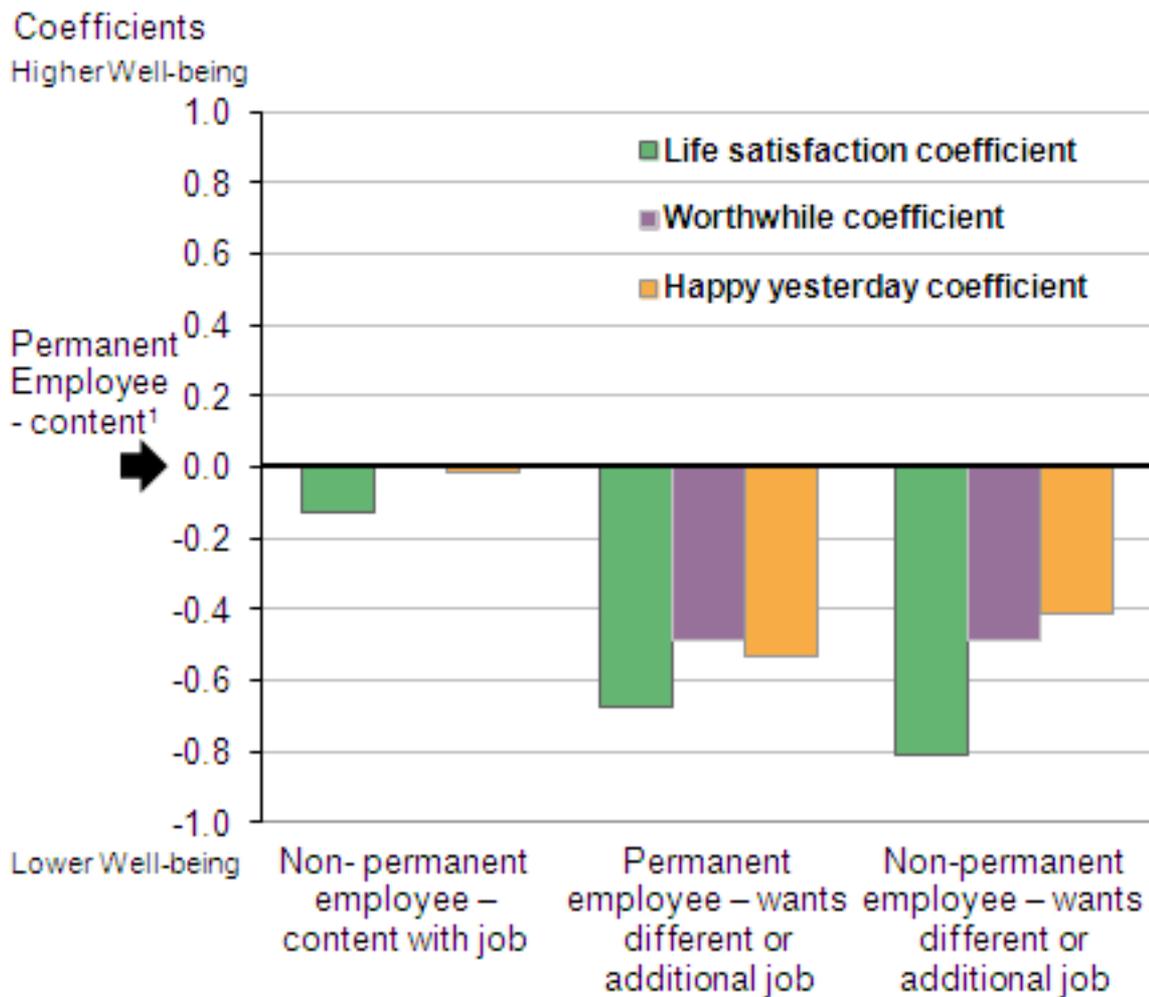
While the evidence is clear that employment is better for personal well-being than unemployment, on closer inspection it seems that people who want a different or additional job have lower levels of well-being (including more anxiety) than those who don't. This is regardless of the nature of their current work situation (e.g., full-time or part-time, permanent or non-permanent, employed or self-employed). These findings are illustrated in **Figure 4**.

When people say that they would like a different or additional job they are saying that their current situation is some way off their ideal. This 'satisfaction gap' is likely to affect personal well-being in ways which cannot be captured simply by comparing the specific circumstances of their work.

Furthermore, it is reasonable to suggest that people who express dissatisfaction with some aspect of their working lives are more likely to have experienced negative effects arising from that situation than are others in the same situation who have not said that they are dissatisfied. These negative experiences may also impact on people's sense of personal well-being.

Figure 4: How contentment with employment relates to personal well-being after controlling for individual characteristics

Great Britain



Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Reference group at 0 is a baseline of people who are in permanent employment and don't want different or additional job - content in the job they have.

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These findings are consistent with several studies which have found that there is a strong positive association between job satisfaction and 'life satisfaction' and a negative association between under-employment or over-employment and well-being (Tam 2010; Blanchflower & Oswald 1999).

3.5.4 How does well-being differ between people in employment and those who are economically inactive?

There are a number of reasons why people may not be in paid work apart from unemployment.

These include retirement, being in full-time education, being ill or disabled and unable to work, looking after a home or family, being a carer of another adult, or simply not needing to work. People in all of these situations are referred to as 'economically inactive' which means that they are not participating in the labour market, but their reasons for not doing so are quite diverse as are their circumstances.

Retired people and those who are economically inactive because they do not need to work stand out as quite different to other groups of economically inactive people. Their well-being is higher than all the other economic activity groups including those who are working and content with their jobs.

Holding other factors equal, those who are working and content with their situation generally have higher well-being than people who are working but are not content with their job. They also have higher well-being than all groups of economically inactive people apart from those who are retired and not wanting to work and those who said they don't need to work.

The importance that a sense of choice over and satisfaction with our activities has to personal well-being extends beyond contentment with a job. People looking after family or home who would like to work but were prevented by their circumstances from seeking work reported lower average levels of life satisfaction and 'happy yesterday' than similar people who were content with their situation.

3.5.5 How is personal well-being affected by inactivity in the labour market due to ill health or disability?

There were particularly low average ratings for all four well-being measures in the group who were sick or disabled. There was also a larger impact on well-being ratings among those who say they are temporarily unable to work due to ill health or disability than among those who say they have been unable to work in the longer term for these reasons. This may suggest that people adapt somewhat to ill health or disability as time goes on. As they adjust to new circumstances, their well-being may return to their more usual level. In order to establish clearly that people do adjust over time in this

way, research that follows the same people over time would be required rather than the type of data available here which provides a snapshot of a people's lives.

The findings here suggest that it is when disability or ill health is felt to limit one's activities that it affects well-being most. As work is a place where many of us have social relationships as well, an inability to work may also increase a sense of social isolation and this too could affect personal well-being.

3.5.6 How important is occupational status to personal well-being?

Occupational status may affect personal well-being for many reasons such as the link between occupation and financial circumstances, health problems that may affect people in some occupational groups more than others, and people's perceptions about their relative standing in society as reflected by their occupation. This analysis is able to hold some of those factors equal while just comparing differences in well-being associated with occupational status.

The findings are shown in **Table 8**. Other things being equal, people in higher managerial or professional occupations rate their 'life satisfaction' and 'worthwhile' higher on average than those in other occupational groups. However, on average the difference in their ratings on these aspects of their well-being compared to those in other occupational groups was small - other groups gave ratings around 0.1 to 0.2 points lower for 'life satisfaction' and just under 0.1 lower for their ratings of whether their activities are 'worthwhile'.

In relation to 'anxious yesterday', those in higher managerial and professional occupations gave slightly higher scores on average than those in lower supervisory and technical occupations and those in semi-routine occupations. It is not possible to say from the data available here whether this is because the work done by those at more senior levels involves more responsibility and stress or whether those who are more anxious (and push themselves harder) are more likely to reach this occupational level. In terms of ratings for 'happiness yesterday', after controlling for other factors, there were no statistically significant differences found between the different occupational groups.

Table 8: Differences in well-being ratings by occupational group after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group: higher managerial and professional¹				
Lower managerial or professional	-0.056*	0.026	0.002	-0.031
Intermediate occupations	-0.139*	-0.086*	-0.043	-0.071
Small employers and own account workers	-0.11*	-0.082*	-0.001	-0.08
Lower supervisory and technical	-0.087*	-0.021	0.031	-0.206*
Semi-routine occupations	-0.155*	-0.082*	-0.036	-0.091*
Routine occupations	-0.149*	-0.102*	-0.039	-0.042
Never worked, unemployed, and not elsewhere classified	0.013	0.028	-0.001	0.059

Table source: Office for National Statistics**Table notes:**

1. The reference group for occupational group is 'higher managerial and professional'.
2. * shows that the relationship is statistically significant at the 5% level.

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3.5.7 How important are earnings to the personal well-being of employees?

The Annual Population Survey does not include information on household income which would enable comparisons of the personal well-being of those in more or less favourable financial positions. However, it does contain information on earnings for people who are employees. This will

not give a clear picture of how well people are doing financially overall, but it does help to show how the financial element of our working lives relates to personal well-being.

The information on earnings is only available for those who are employees in paid jobs, so this analysis does not include those who are self-employed. Please see [Reference Table 3 \(593 Kb Excel sheet\)](#) for the full results of this analysis.

The findings show that, other things being equal, higher wages are associated with higher levels of 'life satisfaction', but not with higher levels of 'happiness yesterday' or feeling that what we do is 'worthwhile'. The level of personal earnings also does not affect 'anxious yesterday' levels.

It may seem surprising that how much we earn does not affect our level of 'anxious yesterday', but this may be because financial worries come into play only in the context of the overall financial situation of the household. If we have low wages but access to financial resources from elsewhere, then personal wage levels may not be directly related to our sense of financial security and to our level of anxiety.

In order to explore this, further analysis was carried out on the relationship between total household earnings and personal well-being. For this analysis, a new variable was created to represent 'household earnings'². The findings showed a similar picture to that for individual earnings: household earnings have a positive relationship with 'life satisfaction' but not with other measures of personal well-being. Other studies have found a well established positive correlation between life satisfaction measures and income in individual cross-sectional data (Kahneman 2010; Pishke 2011). These studies suggest that changeable, day-to-day moods (such as happiness and anxiety yesterday) are different from the deeper satisfaction you feel about the way your life is going. Higher earnings are not related to our mood, but they are associated with assessments of whether life is going well overall.

3.6 How do the circumstances of where we live affect our personal well-being?

This analysis looks at four broad aspects of where we live to see how they may be related to personal well-being. These are: housing tenure, the level of deprivation in the local area compared to other areas, the region where we live and whether it is urban or rural. As noted earlier, the APS does not include data on local area deprivation so this was added to the dataset specifically for this analysis. There are many other possible ways to look at the relationship between where we live and personal well-being, such as the sense of belonging in the community, access to green spaces, local noise and air pollution, etc. ONS intends to look in more detail at the relationship between the local area and personal well-being in future analysis.

3.6.1 Key Points

Holding other factors equal:

- People who rent and those with mortgages give lower ratings for their personal well-being on average than those who own their homes outright, but this analysis does not distinguish between private and social renters.

The region of Great Britain that people live in was found to have a small effect on people's personal well-being;

- People living in London gave similar ratings of their 'life satisfaction' as people living in other urban areas in Great Britain. The exceptions to this were among those living in urban areas in North East England and Scotland where people rated their 'life satisfaction' more highly on average than those living in London. Those living in urban areas of the West Midlands also had lower life satisfaction ratings than those in London.
- People living in the rural areas of almost all regions gave higher 'life satisfaction' ratings on average than people living in London, but the size effects were small.
- There were no statistically significant differences in ratings for 'happy yesterday' between those living in London and elsewhere, except among those in rural areas of the North West, Yorkshire and Humberside, South East, South West, Scotland and Wales. In each of these areas, people rated their 'happiness yesterday' marginally higher than people in London.
- When asked if they feel what they do in life is 'worthwhile', people living in London rated this lower on average than those living in most of the other regions. The exception to this is in the West Midlands where people rated this similarly to those in London.
- People in London also rated their 'anxiety yesterday' levels as higher than people living in the rest of the Great Britain.
- People living in the least deprived local areas reported slightly higher levels of 'anxiety yesterday' than people living in more deprived local areas.

3.6.2 Is our well-being affected by whether we rent, have a mortgage or own our home?

The findings for the analysis are shown in **Table 9**. The results show a small but statistically significant relationship between personal well-being and 'housing tenure' which is a term used to classify whether we rent, have a mortgage or own our home outright. The findings show that holding all else equal, people who rent and those with mortgages give lower ratings for personal well-being on average than those who own their homes outright. For example, people who rent and those with mortgages rated their 'life satisfaction' on average 0.2 points lower than people who own their homes outright. They also rated their 'anxiety yesterday' levels 0.1 points higher on average than those who own their homes outright.

The impact of housing tenure on personal well-being could be due to lower disposable income available to people who rent their home or are paying a mortgage and possibly a lower sense of financial security associated with this. It may also be related to perceived differences in social status in the UK among those rent or own their homes. These are issues which can be explored in more detail in future using data for example from the Wealth and Assets Survey or the Survey of English Housing. In future, it would be perhaps also be helpful to explore this further by distinguishing between those who rent from private or social landlords as their experiences may be quite different.

Table 9: Effects of housing tenure on ratings of personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group:				
owned outright¹				
Being bought with mortgage or loan	-0.17*	-0.162*	-0.136*	0.101*
Part rent, part mortgage	-0.113	-0.087	0.009	-0.066
Rented	-0.203*	-0.147*	-0.188*	0.129*
Rent free or squatting	-0.037	-0.023	0.017	0.075
Not stated or missing	-0.294	-0.211	-0.463	-0.337

Table source: Office for National Statistics**Table notes:**

1. The reference group for housing tenure is 'owned outright'.
2. * shows that the relationship is statistically significant at the 5% level.

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3.6.3 Does the place where we live affect our personal well-being?

As noted, there are many aspects of the place where we live which may potentially affect personal well-being such as whether we live near parks and other green spaces, how close we are to beaches, the types of social and cultural activities that are available, the noise and pollution levels locally and what the neighbourhood is like. Ideally, all these different characteristics of the local area would be explored in the analysis in order to hold all these things equal while looking at how each one relates to personal well-being. However in this analysis we focus only three broad aspects of the local area and how these relate to our personal well-being. These are:

- whether we live in an urban or rural area;
- the level of deprivation in the area where a person lives compared to other areas; and
- the region where we live within Great Britain.

Does living in the city or the country or the region where we live make a difference to personal well-being?

As there was an almost perfect correlation between the variable which was to be used to measure whether an area is urban or rural and the London category of the variable indicating the region where the respondent lives, it was not possible to include both as separate variables in the analysis (see section 5.3.1 for further details). The next best approach was to compare the well-being of those living in urban or rural areas within different regions of Great Britain at the same time. These findings show that generally across regions, people living in rural areas give higher ratings for their well-being than those living in urban areas when other factors have been taken into account.

However, the size of the relationship between living in an urban or rural area and personal well-being is small. These findings are shown in **Table 10**.

Table 10: Effects of region on ratings of personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group:				
London¹				
North East - Urban	0.152*	0.123*	0.024	-0.159*
North East - Rural	0.143*	0.102	-0.006	-0.182
North West (including Merseyside) - Urban	0.038	0.108*	0.007	-0.167*
North West (including Merseyside) - Rural	0.2*	0.225*	0.243*	-0.295*
Yorkshire and Humberside - Urban	0.064*	0.154*	0.025	-0.212*
Yorkshire and Humberside - Rural	0.081	0.098*	0.108*	-0.394*
East Midlands - Urban	0.058	0.104*	0.077	-0.204*
East Midlands - Rural	0.167*	0.183*	0.112	-0.234*
West Midlands - Urban	-0.083*	-0.05	-0.027	-0.319*
West Midlands - Rural	-0.024	0.029	-0.052	-0.232*
East of England - Urban	0.023	0.06	0.065	-0.259*
East of England - Rural	0.062	0.113*	0.089	-0.156*
South East - Urban	0.038	0.094*	0.023	-0.203*
South East - Rural	0.138*	0.142*	0.098*	-0.282*

South West - Urban	0.044	0.087*	0.042	-0.286*
South West - Rural	0.152*	0.18*	0.104*	-0.24*
Wales - Urban	0.034	0.116*	0.049	-0.183*
Wales - Rural	0.126*	0.189*	0.136*	-0.356*
Scotland - Urban	0.133*	0.091*	0.043	-0.216*
Scotland - Rural	0.217*	0.155*	0.159*	-0.406*

Table source: Office for National Statistics

Table notes:

1. The reference group for region is 'London'.
2. * shows that the relationship is statistically significant at the 5% level.

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Some of the more detailed results show that, other things being equal:

- Generally, people living in London gave similar ratings for their 'life satisfaction' to those living in other urban areas in Great Britain.
- People living in the rural areas of almost all regions reported higher 'life satisfaction' ratings than people living in London. This is probably more about the differences in 'life satisfaction' associated with living in rural or urban areas generally rather than a reflection of life in London per se. For example, other things being equal, the 'life satisfaction' score of a person living in a rural area of Scotland is, on average, 0.2 points higher than the 'life satisfaction' score of the person living in London.
- There were no statistically significant differences in ratings for 'happy yesterday' between those living in London and elsewhere, except among those in rural areas of the North West, Yorkshire and Humberside, South East, South West, Scotland and Wales. In each of these areas, people rated their 'happiness yesterday' marginally higher than people in London.
- When asked if they feel what they do in life is 'worthwhile', people living in London on average rated this lower than those living in most of the other regions. The exception to this is in the West Midlands (both rural and urban) where people rated this similarly to those in London.
- People in London also rated their 'anxiety yesterday' levels as higher than people living in the rest of the Great Britain.

The analysis here suggests that the region where we live and whether we live in an urban or rural area are related to personal well-being, but the relationships are small. However, it should also be noted that these results only reflect the average personal well-being ratings between the regions and countries of Great Britain. This may mask important differences between local areas within each region. Indeed, preliminary analysis of smaller local areas suggests that there may be considerable variation within the larger regions. This is an area which should be explored in future research.

How does the relative level of deprivation in the area where we live affect our personal well-being?

This question has been analysed by comparing local areas on a standard ranking system based on how deprived they are relative to other areas. The ranking system, called the Index of Multiple Deprivation, takes into account a number of different aspects of the local area including economic, social and housing issues and combines them into a single deprivation score for each area.

Table 11: Effects of relative deprivation on ratings of personal well-being after controlling for individual characteristics

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group: bottom decile (most deprived)¹				
2nd decile	0.081*	0.069*	0.112*	-0.029
3rd decile	0.056	0.062*	0.084*	0.031
4th decile	0.062*	0.092*	0.082*	0.029
5th decile	0.058	0.062*	0.097*	-0.010
6th decile	0.056	0.11*	0.145*	0.007
7th decile	0.075*	0.083*	0.104*	0.036
8th decile	0.084*	0.094*	0.092*	0.067
9th decile	0.074*	0.075*	0.072*	0.029
top decile (least deprived)	0.054	0.049	0.082*	0.161*

Table source: Office for National Statistics

Table notes:

1. The reference group for deprivation is the 'bottom decile'.
2. * shows that the relationship is statistically significant at the 5% level.

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The findings from the regression analysis show that other things being equal, those living in relatively less deprived local areas have higher levels of personal well-being on average than those living in the most deprived areas. However, the size effects are very small (less than 0.1 points). These results are shown in **Table 11**.

Contrary to expectations, other things being equal, people living in the areas in the top decile (i.e. the least deprived areas) gave higher ratings on average for 'anxious yesterday' (around 0.2 points higher) compared to people living in the areas in the bottom decile (i.e., the most deprived areas).

In summary, after controlling for individual characteristics, the relationship between region, whether we live in an urban or rural area and the relative deprivation in the area are all related to personal well-being, but the size of the relationships is small.

We suggest that the differences observed in personal well-being among those living in urban or rural areas could be re-visited in further local area analysis. Other recent evidence also suggests that parks, gardens and green spaces in urban areas enhance the well-being of people living near them (Alcock 2013). These findings, as well as our own preliminary analysis at local level suggest that a more finely grained analysis could shed more light on the relationship between where we live and personal well-being.

Notes

1. 'What is your religion?'
2. Within each household, the net earnings of all working adults who are employees are summed, but if a household contains at least one working adult who is an employee but for whom earnings information is missing, then the household is excluded from the analysis.

4. Future work

The results have confirmed much of the existing literature on the subject. As many other studies were carried out using data from much smaller samples, it is useful to have this confirmation from a much larger sample survey.

We are confident that we have been able to identify and confirm some key associations with well-being amongst factors such as health, employment status, and marital status together with some more nuanced results such as the importance of choice and control over one's activities. Throughout, we have given an indication of the relative size of the different relationships between the individual variables in the analysis and personal well-being, holding other factors equal. However, we suggest that exact size effects of these associations should be treated with caution.

Looking ahead, we have made a number of suggestions throughout the analysis as to possible future directions. Overall, it will be helpful for researchers to focus more deeply on individual

topics, either by using other more detailed datasets or by adding further data to the APS. We also suggest that further analysis using longitudinal data as this will allow researchers to follow the same individuals over time as their circumstances change.

Suggested areas for further exploration include:

- Sub-regional analysis of personal well-being;
- The relationship between household income and personal well-being;
- The relationship between objective and subjective measures of health and disability and personal well-being; and
- The age curve for personal well-being and whether this relates to cohort effects, age effects or both.

5. Technical annex

5.1 Why undertake a regression analysis?

In analysis which looks at the relationship between two variables, it can be tempting to infer that one variable is directly related to the other. For example, people in one ethnic group may have higher life satisfaction than those in another ethnic group, but can we assume that the differences observed in relation to life satisfaction ratings are primarily about ethnic differences? This conclusion would only be justified if we could show there were no other important differences between the ethnic groups which might affect the findings such as differences in health or employment status.

Regression analysis allows us to do this by holding all the variables in the model equal while measuring the size and strength of the relationship between two specific variables. If the regression results show a significant relationship between ethnicity and life satisfaction, then this means that two people who are identical in every way apart from their ethnicity would indeed rate their life satisfaction differently. This implies a direct relationship between ethnicity and life satisfaction even when the other variables included in the analysis are taken into account. Therefore, the key benefit of regression analysis is that it provides a better method than analysis looking at the relationship between only two variables at a time of indentifying those factors which matter most to personal well-being.

However, every analytical method has its limitations and regression analysis is no exception. The following sections summarise some key considerations which should be borne in mind in terms of the statistical assumptions underlying the techniques used here and the types of inference which can be drawn from the findings.

5.1.1 Using OLS for ordered responses and the robustness of the OLS estimates

A key implicit assumption in OLS regression is that the dependent variable (the outcome we are trying to explain, such as the personal well-being ratings) is continuous. Continuous data is data that can take any value (usually within a range). For example, a person's height could be any value within the range of human heights or time in a race which could even be measured to fractions of a second. The personal well-being survey responses, however, are discrete, i.e., they can only take on

a relatively small number of integer values, such as 6 or 10 with no other values such as halves in between.

OLS regression also assumes that the values of the dependent variable (e.g., personal well-being ratings) are cardinal, i.e. the interval between any pair of categories such as between 2 and 3 is of the same magnitude as the interval between any other similar pair such as between 6 and 7. As the personal well-being responses are only rankings we cannot know whether for example the distance between 2 and 3 is the same as the distance between 6 and 7. For example, it may be the case that it doesn't take much for people to move from 2 to 3 in life satisfaction ranking, but it may take a lot more for them to jump from 6 to 7.

Therefore, the OLS regression approach may not be well suited for modelling this kind of dependent variable - however see below.

There are a number of alternatives to OLS for modelling discrete response variables, such as logit or probit regression. In these models the categories of the responses are treated separately (i.e. there is no order to the categories, for example, 4 is not higher than 3). The disadvantage of these methods is that the information contained in the ordering of the personal well-being ratings is lost. However, a way of overcoming this issue is to create two categories, for example rankings below 7 and above 7, but the categories will be artificial.

An alternative method is to treat the response variable as ordinal and use regression techniques, such as ordered logit or ordered probit that are developed to deal with ordinal data. Ordinal data values can be ranked or ordered on a scale such as from 0 to 10 with each higher category representing a higher degree of personal well-being (or lower personal well-being in the case of anxiety) and unlike the OLS method, ordered probit or ordered logit regression does not assume that the differences between the ordinal categories in the personal well-being rankings are equal. They capture the qualitative differences between different scores. It is important to note that ordinal probit/logistic performs several probit/logistic regressions simultaneously, assuming that the models are identical for all scores. The latter assumption can be relaxed but the interpretation of the results becomes more difficult.

In common with much of the existing literature that models subjective well-being we have applied an **ordered probit** model to explore the factors contributing to a person's personal well-being. As Greene (2000) points out, the reasons for favouring one method over the other (such as ordered probit or ordered logit) is practical and in most applications it seems not to make much difference to the results.

The major advantage of such models is that it takes the ordinal nature of the response variable (i.e. personal well-being rankings) into account without assuming equality of distance between the scores. Similarly to OLS, it identifies statistically significant relationships between the explanatory variables (e.g. age, health, etc) and the dependent variable (personal well-being ranking); however, the estimated coefficients have no direct interpretation¹.

The existing literature also suggests that OLS may still be reasonably implemented when there are more than five levels of the ordered categorical responses, particularly when there is a clear ordering of the categories e.g. levels of happiness with 0 representing the lowest category and 10

representing the highest category (for example see Larrabee, 2009). Indeed, several studies applied both methods to personal well-being data and found that there is little difference between the OLS and the theoretically preferable methodologies such as ordered probit. For example, see Ferrer-i-Carbonell and Fritjers (2004) for a detailed discussion of this issue.

The main advantage of OLS is that the interpretation of the regression results is more simple and straightforward than in alternative methods.

So for the sake of completeness, the analysis was conducted in both OLS and probit regression methods. This also acts as a sensitivity check for the robustness of the OLS results as the key assumptions for the OLS regression may not hold for the ordered personal well-being data.

It should be noted that this does not imply that the OLS regression estimates were completely 'robust'. Post regression diagnostics identified some violations of the OLS regression assumptions such as model specification and the normality of residuals. However, as some studies (for example see Osborne and Waters, 2002), suggest that several assumptions of OLS regression are 'robust' to violation such as normal distribution of residuals and others are fulfilled in the proper design of the study such as the independence of observations. In this analysis, using the survey design controlled for the potential dependence of the individual observations with each other (see section 5.2) and applying the survey weights provided some protection against model misspecification.

As there is no formal statistical test that can be used to identify multi-collinearity when the covariates in the model are dummy variables, an informal method of cross-tabulating each pair of dummy variables can be used. When cross-tabulations showed very high correlation between the variables they were not used in the regression. An example where this was the case is between the variables "reported being a Muslim" and "reported being Pakistani"; to get around this problem in this example, the dummy variables for the individual religions from the model were replaced with a single dummy variable "reported a religion".

Stata automatically computes standard errors that are robust to heteroskedasticity when the regressions are estimated incorporating survey design.

Additionally, estimating the models using different specifications as well as two methods (OLS and ordered probit) confirmed that the magnitude and the statistical significance of the parameter estimates did not significantly change and the general inferences from the analysis remained the same.

5.1.2 The explanatory power of the models

It is important to note that the explanatory power of the main regression model used here is relatively low. Indeed, the amount of variance that has been explained by the model is similar to that of other reported regression analyses undertaken on personal well-being. For the 'happy yesterday', 'anxious yesterday' and 'worthwhile' questions, around 10% of the variation between individuals is explained by the variables included in the model. By contrast, a much higher proportion (19%) of the individual variation in ratings for life satisfaction was explained by the model.

The lower explanatory power of the model could be due to leaving out important factors which contribute to personal well-being. For example, genetic and personality factors are thought to

account for about half of the variation in personal well-being. It has not been possible to include variables relating to personality or genes in the models as the APS does not include data of this type.

The subjective nature of the outcome variable also means that it is probably measured with some imperfect reliability. The lower the reliability of the outcome variable, the more unclear its correlations with other variables will tend to be.

5.1.3 Omitted variable bias

In an ideal world, a regression model should include all the relevant variables that are associated with the outcome (i.e. variable being analysed such as personal well-being). In reality, however, we either cannot observe all the potential factors affecting well-being (such as personality) or are limited by whatever information is collected in the survey data used in the regression analysis.

If a relevant factor is not included in the model, this may result in the effects of the variables that have been included being mis-estimated. When the omitted variables are correlated with the included variables in the model, the coefficient estimates of those variables will be biased and inconsistent. However, the estimated coefficients are less affected by omitted variables when these are not correlated with the included variables (i.e. the estimates will be unbiased and consistent). In the latter case, the only problem will be an increase in the estimated standard deviations of the coefficients which are likely to give misleading conclusions about the statistical significance of the estimated parameters.

5.1.4 Causality

Regression analysis based on cross-sectional observational data cannot establish with certainty whether relationships found between the independent and dependent variables are causal. This is particularly the case in psychological contexts where there may be a reciprocal relationship between the independent and the dependent variables. For example, the usual assumption is that individual characteristics or circumstances like health or employment status are independent variables which may affect personal well-being (viewed here as a dependent variable). However, some of the association between health and well-being may be caused by the impact of personal well-being on health.

Furthermore, as the data used in the regression analysis here are collected at one point in time (i.e. cross-sectional), they are not able to capture the effect of changes over time and which event preceded another. For example, it is not possible to tell from this data whether the perception of being in bad health precedes a drop in well-being or whether a drop in well-being precedes the perception that one is in bad health. We can only definitely say that the perception of being in bad health is significantly related to lower levels of well-being compared to people who say they are in good health. Therefore, while the regression analysis here can demonstrate that a relationship between two variables exists even after holding other variables in the model constant, these findings should not be taken to infer causality.

5.1.5 Multi-collinearity- dependence (or correlations) among the variables

If two or more independent variables in the regression model are highly correlated with each other, the reliability of the model as a whole is not reduced but the individual regression coefficients cannot be estimated precisely. This means that the analysis may not give valid results either about individual independent variables, or about which independent variables are redundant with respect to others. This problem becomes increasingly important as the size of correlations between the independent variables (i.e. multi-collinearity) increases.

5.2 Taking the design of the APS sample into account in the analysis

The primary sampling unit in the Annual Population Survey is the household. That is, individuals are grouped into households and the households become units in sample selection.

Regression analysis normally assumes that each observation is independent of all the other observations in the dataset. However, members of the same household are likely to be more similar to each other on some or all of the measures of personal well-being than they are to members of different households. If the analysis ignores this within-household correlation, then the standard errors of the coefficient estimates will be biased, which in turn will make significance tests invalid.

Therefore, to correctly analyse the data and to make valid statistical inferences, the regressions are estimated in Stata with the specification of the survey design features. The survey weights were also used in the estimation of the model as these allow for more consistent estimation of the model coefficients and provide some protection against model misspecification.

5.3 Development of the regression models

Overall, eighteen regression models were constructed during this project. Each of these was analysed first using ordered probit and then using OLS. All of these results are available in the Reference Tables. To summarise:

- [Reference Table 1 \(141.5 Kb Excel sheet\)](#) contains a summary of the OLS regression coefficients and their significance for the main model.
- [Reference Table 2 \(208.5 Kb Excel sheet\)](#) contains the full results for the main regression model with the findings provided separately for each of the four personal well-being questions.
- [Reference Table 3 \(593 Kb Excel sheet\)](#) contains the results for the analysis with the employees sub-group and includes separate findings for each variation on the measurement of earnings for each of the four personal well-being questions.
- [Reference Table 4 \(770 Kb Excel sheet\)](#) contains the results for the other alternative specifications to the main model including models with the top level economic activity categories only; with household type replacing separate variables on marital status and children; with self-reported disability only (and dropping self-reported health); with self-reported health only (and dropping self-reported disability); with disability benefit receipt only (and dropping self-reported disability and self-reported health); and with country of birth only (replacing migration status and ethnic group).
- [Reference Table 5 \(58.5 Kb Excel sheet\)](#) contains a summary of sample sizes for each variable in the main model for each of the four personal well-being questions.

5.3.1 Development of the regional model

Further details of the regional analysis

The main regression model originally included Government Office Region (GOR) dummies to indicate where an individual lives and two other place related variables. The latter included a variable indicating whether the area is rural or urban and the relative deprivation of the Local Super Output Area (in terms of Index of Multiple Deprivation deciles) where the respondent lives.

However, as there was an almost perfect correlation between the variable used to indicate whether an area is urban or rural and the variable indicating London in the regional analysis, the final analysis included a dummy variable indicating whether the respondent lives in a rural or urban area within the relevant region (e.g. rural North East, or urban South West).

The analysis found a small but significant association between where people live and their levels of personal well-being. This was the case even before individual controls were introduced into the models. When all the four personal well-being variables were regressed only on GOR dummies or the place characteristics (i.e. urban/rural or relative deprivation) (without the controls for personal characteristics, both objective and subjective) there was a significant but rather small relationship between the region or place characteristics and an individual's personal well-being. After introducing all the individual controls in the models, the conclusion remains the same.

Further information about the Index of Multiple Deprivation and how it was used in this analysis

The Indices of Deprivation measure relative deprivation for small areas (LSOAs). Deprivation is a wider concept than poverty, and so the indices are constructed from a number of different types, or domains, of deprivation. These domains are combined into a single index, the Index of Multiple Deprivation (IMD), which ranks the areas in order of deprivation. A rank of 1 identifies the most deprived area.

The IMD deciles in this analysis are created by treating the most-deprived 10% of these areas as a single (non-adjacent) area, named Decile 1. The next most-deprived 10% are then grouped into a single area, named Decile 2, and so on.

Each of the four Nations of the UK produces its own Index. These Indices are not directly comparable because they use different domains and indicators, reflecting the priorities in the individual countries, and are published on different timescales covering different time periods.

However, the two domains – income and employment- are common to all four national IMDs and they contribute around half the weight of each IMD. They also use similar indicators such as simple percentage of individuals receiving one or more income or employment benefits. This implies they are relatively comparable across countries. For this analysis, the IMD deciles are created separately for each UK nation and then it is matched with the individual data. Although the values of the IMD deciles variable are not comparable across different nations, the variable can be considered a fairly good proxy for the relative deprivation of the area where an individual lives.

The deciles are based on the latest publications of the IMD Indices. These were: the [English IMD Index -2010](#), [Scottish IMD Index - 2012](#) and the [Welsh IMD Index - 2011](#).

5.3.2 Decisions about the use of the Income Domain of the Index of Multiple Deprivation as a proxy for household income

In order to address the lack of household income information in the Annual Population Survey data, a possible alternative that was considered was the Indices of Multiple Deprivation income decile. Ultimately, this was not included in the final main model for the following reasons:

- There is a very high correlation between the IMD income decile and the overall IMD rank. This implies that one is a very good substitute for the other and both cannot be used simultaneously in the analysis.
- As other alternatives were available for exploring income, the decision was taken to retain the IMD decile which could be used to consider the relationship between personal well-being and aspects of where we live.
- The income indicator of the IMD income decile is based on the percentage of individuals receiving one or more income or employment benefits. It was therefore not viewed as a good proxy of the average LSOA household or individual income.

5.3.3 Details of different models of health and disability

The regression analyses were conducted using either health or disability on its own or both together to see how the results changed. Additionally, the self-assessed disability variable was also replaced in one model by a proxy for disability based on whether the person reported receipt of any disability-related benefits. This was thought to be a more objective indication of disability that could be compared to the results obtained from using people's views about whether they have a disability. Finally, if people gave disability-related reasons for being out of work, this was also used in some of the analyses.

The justification for putting both self-reported health and disability in the model is that the two are related but do not overlap entirely. However when both are included in the model, the disability effect almost disappears (indicating strong multi-collinearity).

When self-reported disability is included on its own, it picks up some of the impacts of self reported health, but the size effects are not as big as the health variables. Also the explanatory power of the models is smaller than the models which include self-reported health.

The key findings of the alternative models are summarised below, but the overall conclusion is clear: even accounting for the problems of causality, correlations between the variables capturing health and disability and issues of self-reported versus objective data, our views about our health have a large effect on ratings of personal well-being.

Key findings from the alternative approaches tried are as follows:

- When self reported health was not included in the analysis but a variable indicating whether an individual receives a sickness or disability benefit was, the results show that those who do not receive this type of benefit have higher levels of well-being than those who do (between 0.3 and

0.6 points higher). This reinforces the findings that health is important to well-being whether it is measured by asking people their views about their health or by looking at whether they say they receive health-related benefits

- Another model was estimated using a dummy variable indicating whether an individual has reported a current disability or not to see if a self-reported measure of health would produce different results than the more objective measure of disability benefit receipt. It was found that the results were very similar regardless of the measure used. Similar to disability benefit recipients there is a significant relationship between the disability status and the four personal well-being measures.
- Analysis was also carried out including the self-reported health variable but not self-reported disability. As expected, the association between self-reported health and well-being is very strong (much more than the disability variables, even on their own) both in terms of the size and the importance.

Based on this evidence, the regression analysis has taken into account both subjective and more objective health measures found in the Annual Population Survey and a number of specifications have been estimated using these measures. The only potential 'objective' health assessment in the survey is the type of benefit an individual receives. However, it should be noted that benefit receipt is also self-reported on the Annual Population Survey so this is not truly objective data and it may not capture all the individuals in the survey who have a disability or illness. On the other hand, the APS includes two 'subjective' health measures: 'self-reported health' and self-reported 'current disability'. Several studies have used the second of those as an 'objective' variable measuring health but the justification for doing so is unclear.

How much difference does disability make to our well-being?

All other things being equal, people who said they have a disability rated their personal well-being lower than people who did not report a disability. When the models included self-reported disability only (without the self reported health), the effects were around 0.6 points for 'life satisfaction' and 'happy yesterday', and around 0.4 points for 'worthwhile', e.g., average 'life satisfaction' scores of the people who reported a disability were 0.6 points lower than people who did not report a disability. On the other hand, average 'anxious yesterday' scores of the people who reported a disability were around 0.7 points higher than the people who did not report a disability. This suggests disability is associated more with anxiety than the other measures of personal well-being.

Similarly, when the regressions were estimated using an 'objective' variable for disability/health (i.e. disability/sickness benefit claimants), the size effects for 'life satisfaction', 'happy yesterday' and doing things that are 'worthwhile' were very similar to the regressions which included self-reported disability variable. The coefficient of the 'anxious yesterday' was also around 0.6 points (a little less than the models which included self-reported disability only).

5.4 Methodological findings on mode of interview

The Annual Population Survey data is collected either by telephone interview or face to face in the respondent's home. The possibility of people giving different responses in these different interview contexts was the subject of a working paper for the National Statistician's Technical Advisory Group

on Measuring National Well-being (December 2011). The paper explored the impact of these methods on the answers to the personal well-being questions and concluded that:

“There is a trade-off between the likelihood of errors caused by the telephone method and the fact that the telephone allows more privacy and confidentiality when answering. However studies have shown substantial differences in responses to scalar questions when asked by telephone versus visual modes, in that more positive responses are given in the telephone mode (Dillman et al., 2009). In addition the evidence gathered from the present study suggests the telephone is associated with misunderstanding and decreased rapport with the interviewer along with a decreased desire to take part”. (Ralph, K., Palmer, K., Olney, J., 2011)

In order to hold constant the possible impacts of different interview modes when exploring the relationship of other variables to well-being as well as examining the possible impacts of interview mode on responses to the personal well-being questions, the regression models included method of the interview.

The findings of this analysis show that people interviewed face to face give lower well-being ratings on average than people interviewed by telephone. However, the size effects are small. For example, being interviewed face to face is associated with a reduction of about 0.2 points in ‘life satisfaction’ ratings compared to being interviewed over the telephone. The differences are similar for ratings of ‘happy yesterday’ and feelings that our activities are ‘worthwhile’. The difference in ratings for ‘anxious yesterday’ among those having a telephone or personal interview is smaller still. These findings are shown in **Table 12**.

Table 12: Effects of interview mode on ratings of personal well-being after controlling for individual factors

Great Britain

	Coefficients			
	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Reference group:				
Telephone				
Interview¹				
Face to Face Interview	-0.171*	-0.165*	-0.132*	0.054*

Table source: Office for National Statistics

Table notes:

1. The reference group for interview mode is 'telephone interviews'.
2. * shows that the relationship is statistically significant at the 5% level.

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(29.5 Kb)

Notes

1. However, they can be used to calculate probabilities which require further calculations and selecting 'representative' cases.

About the ONS Measuring National Well-being Programme

NWB logo 2



This article is published as part of the ONS Measuring National Well-being Programme.

The programme aims to produce accepted and trusted measures of the well-being of the nation - how the UK as a whole is doing.

Measuring National Well-being is about looking at 'GDP and beyond'. It includes headline indicators in areas such as health, relationships, job satisfaction, economic security, education, environmental conditions and measures of 'subjective well-being' (individuals' assessment of their own well-being).

Find out more on the [Measuring National Well-being](#) website pages.

Background notes

1. These statistics are experimental in nature and published at an early stage to gain feedback from users. Should users have comments on the ONS approach to the measurement of subjective well-being and or the presentation of the subjective well-being questions they can email ONS at national.well-being@ons.gov.uk. It is the role of the UK Statistics Authority to designate these statistics as National Statistics and this is one of the aspirations of the National Well-being programme is to see these statistics gain National Statistics status.
2. The data analysed in this report are derived from a customised weighted 12 month APS microdataset. This dataset is not part of the regularly produced APS datasets and was produced specifically for the analysis of subjective well-being data. ONS is making the experimental APS microdata available to approved researchers to allow them to undertake further analysis of these experimental questions at an early stage and to provide further feedback to ONS.
3. Details of the policy governing the release of new data are available by visiting the [UK Statistics Authority](#) or from the [Media Relations Office](#).
4. This article is published as part of the ONS [Measuring National Well-being Programme](#). The programme aims to produce accepted and trusted measures of the well-being of the nation - how the UK as a whole is doing. It is about looking at 'GDP and beyond' and includes:
 - Greater analysis of the national economic accounts, especially to understand household income, expenditure and wealth.
 - Further accounts linked to the national accounts, including the UK Environmental Accounts and valuing household production and 'human capital'.
 - Quality of life measures, looking at different areas of national well-being such as health, relationships, job satisfaction, economic security, education environmental conditions.
 - Working with others to include the measurement of the well-being of children and young people as part of national well-being.
 - Measures of 'subjective well-being' - individuals' assessment of their own well-being.
 - Headline indicators to summarise national well-being.

The programme is underpinned by links with Cabinet Office and policy departments, international developments, the public and other stakeholders. The programme is working closely with Defra on the measurement of 'sustainable development' to provide a complete picture of national well-being, progress and sustainable development.

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