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# ***Quality of Life: leisure impacts*** **Airports Commission**

June 2015

# Contents

<b>1. Executive summary .....</b>	<b>i</b>
1.1. Background .....	i
1.2. Objectives and scope .....	i
1.3. Literature review .....	i
1.3.1. Approach .....	ii
1.3.2. Key findings .....	ii
1.4. Empirical analysis .....	iii
1.5. Conclusions .....	iv
<b>2. Introduction.....</b>	<b>1</b>
2.1. Background .....	1
2.2. Objectives and scope .....	1
<b>3. Literature review .....</b>	<b>2</b>
3.1. Introduction .....	2
3.2. Approach.....	2
3.3. Key definitions .....	3
3.3.1. Defining quality of life .....	3
3.3.2. Defining holidays.....	4
3.4. Key findings .....	5
3.4.1. Impact of holidays on quality of life.....	5
3.4.2. Impact of holidays on different socio-economic groups .....	10
3.4.3. Impact of holidays on health.....	13
3.4.4. Impact of holidays on work outcomes.....	13
3.5. Conclusions .....	14
<b>4. Empirical analysis.....</b>	<b>16</b>
4.1. Introduction .....	16
4.2. Methodology .....	16
4.2.1. Data.....	16
4.2.2. Descriptive statistics.....	18
4.2.3. Statistical methods .....	19
4.3. Results .....	21
4.3.1. Understanding Society.....	22
4.3.2. BHPS .....	23
4.3.3. Taking Part.....	24
<b>5. Summary &amp; conclusions.....</b>	<b>26</b>
5.1. Introduction .....	26
5.2. Literature review - summary .....	26
5.3. Empirical analysis - summary .....	27
5.4. Conclusions .....	28

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<b>Appendix A. - Bibliography .....</b>	<b>29</b>
A.1. Literature review .....	29
A.2. Other references .....	30
<b>Appendix B. - Statistical analysis .....</b>	<b>31</b>
B.1. Example questionnaires .....	31
B.2. Variables used in statistical analysis .....	31
B.3. Results of statistical analysis .....	36

# *Important notice*

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# 1. Executive summary

## 1.1. Background

The Airports Commission Appraisal Framework<sup>1</sup> provides a structure of 16 Modules which the Commission has used to appraise the three airport schemes that it has shortlisted: the Gatwick Airport Second Runway, the Heathrow Airport Northwest Runway and the Heathrow Airport Extended Northern Runway. One of these is concerned with quality of life.

PricewaterhouseCoopers LLP ('PwC') was commissioned by the Airports Commission to undertake research specifically around the role of leisure travel in shaping quality of life. PwC has been supported in delivering this work by SImetrica Ltd.

## 1.2. Objectives and scope

The aim of this report is to enable the Commission to better understand the links between leisure and quality of life. It is designed to help the Commission assess the impacts that a change in aviation capacity could have on those passengers travelling for leisure purposes, including those travelling for a holiday or visiting friends & relatives (VFR). They comprise the majority of the total UK airport passenger mix. The Commission wishes to understand how important these trips are for wellbeing and quality of life at a national level. The project is, therefore, designed to enable the Commission to understand the effects that changes in connectivity/cost can have on the quality of life of leisure passengers. It involves two elements:

- A selective review of existing literature on the relationship between aviation, holidays and wellbeing; and
- Analysis of existing UK data sets to investigate the empirical link between holidays and flights and wellbeing.

## 1.3. Literature review

Our review of the literature has examined published work on the relationship between air travel and the quality of life of those travelling, with a particular focus on the value of holidays and VFR. It focuses on how publications which consider peoples' quality of life is affected by:

- Taking holidays abroad;
- Having access to family and friends in foreign countries with available flights (connectivity) to visit them; and
- The affordability of holidays and leisure associated with air travel.

It also considers the available evidence on:

- The importance of holidays to different socio-economic groups (particularly those in low-income groups and social housing etc.);
- The direct impact of holidays and leisure on health (physical and mental); and

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<sup>1</sup> Airports Commission, 'Appraisal Framework', 2014 (accessible at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/300223/airports-commission-appraisalframework.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300223/airports-commission-appraisalframework.pdf)).

- How absence from work is related to holiday and leisure opportunities.

### **1.3.1. Approach**

We have reviewed 29 papers that test the association between tourism and aspects of wellbeing (life satisfaction, happiness, subjective wellbeing and quality of life). Most of this literature is based on analysis of surveys of small groups of people with specific characteristics or small samples designed to be representative of large populations<sup>2</sup>. None of the studies has conducted empirical analysis using datasets similar to those we have used in our empirical analysis.

### **1.3.2. Key findings**

Based on our literature review, we can draw several key conclusions:

#### ***Overall impact of holidays on quality of life***

- Individuals report that holidays affect their quality of life<sup>3</sup>.
- Some studies show that individuals who go on holidays report a higher quality of life than those who do not<sup>4</sup>, but other evidence suggests no difference in the quality of life<sup>5</sup>.
- Individuals report higher quality of life after going on holiday compared to before<sup>6</sup> and when they are on holiday compared to when they are not on holiday<sup>7</sup>.
- There is a positive anticipation effect of going on holiday: individuals anticipating a holiday are happier than those who are not anticipating one<sup>8</sup>.

#### ***Variations in impact of holidays on quality of life by demographic group***

- For those from lower socio-economic groups, being able to travel is associated with an increase in quality of life primarily due to the opportunity to gain positive emotional experiences such as being able to spend time with family and away from a stressful routine<sup>9</sup>. Importantly, however, the size of this effect has not been compared to that for other socio-economic groups which limits the conclusions that can be drawn about how the impact of holidays on quality of life differs between socio-economic groups.
- Those who are married and retired place the most importance on holidays whilst younger age groups place the least emphasis on them<sup>10</sup>. Those who are younger, have never been married and are career driven place an average amount of importance on holiday taking as a determinant of their quality of life.
- Those who have recently suffered from financial distress report holidays as having less (positive) influence on their quality of life than those who have not been in financial distress; instead, they place more emphasis on other domains of life satisfaction such as money<sup>11</sup>.

<sup>2</sup> The sample sizes are typically less than 1,000 observations.

<sup>3</sup> Dolnicar et al. (2012).

<sup>4</sup> Gilbert and Abdullah (2004) and Nawijn (2011).

<sup>5</sup> Nawijn (2010a) and Nawijn et. al (2010).

<sup>6</sup> Gilbert and Abdullah (2004), Nawijn et. al (2010).

<sup>7</sup> Nawijn (2011),

<sup>8</sup> Gilbert and Abdullah (2004).

<sup>9</sup> McCabe and Johnson (2013) and McCabe et al. (2010) who use responses to questions that ask respondents what they felt the most important benefits of going on holiday would be to determine the quality of life impact of going on holiday.

<sup>10</sup> Dolnicar et al. (2012).

- We found only limited evidence as to whether the impact of holidays on quality of life varies by the type of holiday.

### ***Other findings***

- Few studies assessed the direct link between holidays and health: one study based on a very small sample of cancer patients reports improved personal health (physical and psychological), increased social effectiveness, personal identity and regained independence as the key health benefits of going on holiday.

## ***1.4. Empirical analysis***

### ***1.4.1. Approach***

Our empirical analysis has examined the statistical association between taking holidays and international flights and health and wellbeing outcomes using three UK datasets that include questions on health and wellbeing as well as holidays and international flights:

- Understanding Society;
- The British Household Panel Survey (BHPS); and
- Taking Part Survey.

We have used the data from the surveys to assess the association of holidays and travel with five health and wellbeing outcomes: life satisfaction, self-reported general health, happiness, mental health (measured through the 12-item General Health Questionnaire (GHQ) - see Appendix B.1) and depression (measured through individual self-reports of feeling depressed). Our focus has been on mental health, but physical health is also captured in the self-reported general health measure.

We have assessed both the adult (15+) and the youth (11-16 year olds) populations.

### ***1.4.2. Key findings***

The key findings from our analysis are as follows:

- Taking holidays and flights are associated with improvements in health and wellbeing as measured through all of the indicators we use in all three datasets.
- Using the Understanding Society dataset we find that:
  - Among the adult sample, having at least one holiday per year that lasts for a minimum of one week is associated with higher levels of life satisfaction, general health and mental health and with a lower probability of reporting feeling depressed.
  - Within the youth sample, having at least one family holiday per year that lasts for a minimum of one week is associated with higher levels of happiness.
- This analysis controls for time-invariant individual fixed effects by using the panel aspect of the data. We conclude, therefore, that the results from Understanding Society are more robust to the problem of selection bias than those from the other datasets used here (BHPS and Taking Part) which are analysed as cross-sectional data rather than panel data.

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<sup>11</sup> Dolnicar et al. (2012).

- In the BHPS data, having flown to Europe and the rest of the world during the past year is associated with higher levels of life satisfaction, general health and mental health and with a lower probability of reporting feeling depressed. Flights to the rest of the world have a systematically larger association than flights to Europe with all four health and wellbeing variables.
- Having had a holiday outside the UK in the past year is associated with higher levels of happiness and general health in the Taking Part Survey.
- The results for flying abroad in the BHPS are similar to those for having holidays in Understanding Society for all four health and wellbeing outcomes (and very similar for life satisfaction). This suggests that there is some underlying positive relationship between health, wellbeing and holidays, however we measure the latter variable.
- When we look at different socio-demographic groups in the UK, we find that the relationships between holidays and health and wellbeing are constant across the different groups in all cases except for when assessing by employment status. The association between holidays, flights and improvements in mental health is stronger for unemployed people than it is for employed people.

## ***1.5. Conclusions***

The key conclusions that emerge from our literature review and empirical analysis are as follows:

- Our empirical analysis of the UK using three large datasets consistently finds that taking holidays and flights is associated with improvements in health and wellbeing as measured through various indicators of health and wellbeing. The evidence based on the Understanding Society dataset is stronger than that based on BHPS and Taking Part since the former controls for time-invariant individual fixed effects by using the panel aspect of the data whereas the other two datasets are analysed as cross-sectional data.
- This contrasts with the picture from the literature review where the evidence from smaller studies is more ambiguous, although the majority of the literature reviewed finds a positive relationship between taking holidays and health and wellbeing.
- Evidence from the literature review suggests that individuals report higher quality of life after going on holiday compared to before and when they are on holiday compared to when they are not on holiday. It also suggests a positive anticipation effect of going on holiday.
- Using the BHPS data, we find that flights to the rest of the world have a systematically larger effect than flights to Europe using all four health and wellbeing variables. In contrast, the studies covered by the literature review find only limited evidence as to whether the impact of holidays on quality of life varies by the type of holiday.
- When we look at different socio-demographic groups in the UK using the three datasets, we find that the associations between holidays and health and wellbeing are consistent across different groups except when assessing by employment status. The association between holidays, flights and improvements in mental health is stronger for unemployed people than it is for employed people. Few of the studies considered as part of the literature review find that the relationship varies according to the characteristics of the individuals, perhaps because they rely upon much smaller samples.

## 2. Introduction

### 2.1. Background

The Airports Commission Appraisal Framework<sup>12</sup> provides a framework of 16 Modules (each with associated criteria) which the Commission expects to use to appraise the three airport schemes that it has shortlisted: the Gatwick Airport Second Runway, the Heathrow Airport Northwest Runway and the Heathrow Airport Extended Northern Runway.

In November 2014, the Airports Commission published research undertaken by PricewaterhouseCoopers LLP ('PwC'), with the support of SImetrica Ltd, which examined the relationship between aviation and quality of life. This work focused on the impact on those living near to airports.

PwC was subsequently commissioned by the Airports Commission to undertake further research specifically around the role of leisure travel in shaping quality of life. Again, PwC has been supported in delivering this work by SImetrica Ltd.

### 2.2. Objectives and scope

The aim of this project is to enable the Commission to better understand the links between leisure and quality of life, with a particular focus on the value of holidays and visiting friends and relatives. As such, it is designed to help the Commission assess the impacts that a change in aviation capacity could have on those passengers travelling for leisure. These passengers include those travelling for a holiday or visiting friends & relatives (VFR). They comprise the majority of the total UK airport passenger mix. The Commission wishes to develop a view on how important the trips made by these passengers are for their wellbeing and quality of life at a national level. The project is, therefore, designed to enable the Commission to form a narrative around these passengers by understanding the effects that changes in connectivity/cost can have on the quality of life of leisure passengers.

The work involves two elements which are reported separately in subsequent sections:

- A selective review of existing literature on the relationship between aviation, holidays and wellbeing – **Section 3**; and
- Analysis of existing UK data sets to investigate the empirical link between holidays and wellbeing – **Section 4**.

In addition, a final section (**Section 5**) draws together the key conclusions emerging from our analysis.

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<sup>12</sup> Airports Commission, 'Appraisal Framework', 2014 (accessible at [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/300223/airports-commission-appraisalframework.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300223/airports-commission-appraisalframework.pdf)).

## ***3. Literature review***

### ***3.1. Introduction***

In this section, we summarise the results of our review of the literature on the relationship between air travel and the quality of life of those travelling, with a particular focus on the value of holidays and VFR.

The literature review focuses on the evidence of how peoples' quality of life is affected by:

- Taking holidays abroad;
- Having access to family and friends in foreign countries with available flights (connectivity) to visit them; and
- The affordability of holidays and leisure associated with air travel.

It also considers the available evidence on:

- The importance of holidays to different socio-economic groups (particularly those in low-income groups and social housing etc.);
- The direct impact of holidays and leisure on health (physical and mental); and
- How absence from work is related to holiday and leisure opportunities.

### ***3.2. Approach***

Our first step was to identify potentially relevant literature.

We performed a search using the key words <holidays/foreign holidays/vacation/tourism/tourists> and <subjective wellbeing/life satisfaction/happiness>. We excluded those studies related to tourist satisfaction and tourist impacts on local residents. Using the abstracts, we sifted the identified studies on the basis of their relevance to the Airports Commission context and classified them on the basis of:

- How quality of life is measured in the analysis (i.e. life satisfaction, happiness etc.);
- The type of population; and
- The sample size.

On this basis, we identified 29 papers (see Appendix A). These were divided between those testing associations between foreign tourism and:

- Life satisfaction (six papers);
- Happiness (ten papers);
- Subjective wellbeing (seven papers); and
- Quality of life (six papers).

Many of the studies relate to individuals resident outside the UK: some care is, therefore, needed in extrapolating the results to the UK context.

We found that some of the studies focused on the effects of holidays on the subjective wellbeing of marginalised groups, like the old and those with debilitating illnesses (seven papers) and expectation and needs fulfilment in the leisure satisfaction domain (four papers).

Table 1 summarises the most relevant literature we have drawn on to address each of the key issues highlighted above.

*Table 1: Key articles used in literature review*

Key impact area/issue	Key articles
Holidays abroad and their value from a wellbeing perspective	Dolnicar, S., Yanamandram, V., & Cliff, K. (2012). The contribution of vacations to quality of life Gilbert, D., & Abdullah, J. (2004). Holiday taking and the sense of well-being Kruger, P. S. (Stefan). (2012). Perceptions of Tourism Impacts and Satisfaction with Particular Life Domains Lounsbury, J. W., & Hoopes, L. L. (1986). A vacation from work: Changes in work and non-work outcomes Lounsbury, J. W., & Polik, J. R. (1992). Leisure needs and vacation satisfaction Michalkó, G., & Rátz, T. (2010). Measurement of Tourism-oriented Aspects of Quality of Life Nawijn, J. (2010b). The holiday happiness curve: a preliminary investigation into mood during a holiday abroad Nawijn, J. (2011). Determinants of Daily Happiness on Vacation Nawijn, J., Marchand, M. A., Veenhoven, R., & Vingerhoets, A. J. (2010). Vacationers Happier, but Most not Happier After a Holiday. Applied Nawijn, J., Mitas, O., Lin, Y., & Kerstetter, D. (2013). How do we feel on vacation? A closer look at how emotions change over the course of a trip Puczko, L., & Smith, M. (2012). An Analysis of Tourism QOL Domains from the Demand Side
Having access to family and friends in foreign countries with available flights (connectivity) to visit them	No significant studies identified
Affordability of holidays and leisure associated with air travel	Dolnicar, S., Yanamandram, V., & Cliff, K. (2012). The contribution of vacations to quality of life McCabe, S., Joldersma, T., & Li, C. (2010). Understanding the benefits of social tourism: Linking participation to subjective well-being and quality of life
Importance of holidays to different socio-economic groups (particularly those in low-income qualities and social housing etc.)	Dolnicar, S., Yanamandram, V., & Cliff, K. (2012). The contribution of vacations to quality of life McCabe, S., Joldersma, T., & Li, C. (2010). Understanding the benefits of social tourism: Linking participation to subjective well-being and quality of life Nawijn, J. (2010b). The holiday happiness curve: a preliminary investigation into mood during a holiday abroad
Direct impact of holidays and leisure on health (physical and mental)	Hunter-Jones, P. (2003). The perceived effects of holiday-taking upon the health and wellbeing of patients treated for cancer
Absence from work related holiday and leisure opportunities	Puczko, L., & Smith, M. (2012). An Analysis of Tourism QOL Domains from the Demand Side

### 3.3. Key definitions

#### 3.3.1. Defining quality of life

Recent decades have seen more wellbeing research, partly in response to a strong drive to account more explicitly for wellbeing in policy decisions. This work has defined peoples' wellbeing in three main ways<sup>13</sup>:

<sup>13</sup> For a more detailed discussion of the issues related to the definition of wellbeing, please see our earlier report on the impact of airports on quality of life:  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/372165/11-Quality\\_of\\_life--quality-of-life-assessment.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/372165/11-Quality_of_life--quality-of-life-assessment.pdf)

- The desire satisfaction account is based on the premise that wellbeing can be inferred from peoples' actual choices (and preferences);
- The objective list account is based on assumptions about peoples' basic human needs: wellbeing is measured in terms of a set of pre-determined indicators such as mortality rates, health, and literacy rates; and
- The mental state account refers to peoples' subjective experiences of their own wellbeing based on how they feel and think about their lives and is often referred to as subjective wellbeing.

Academic and policy research have tended to focus on the first two of these (i.e. the desire satisfaction and objective list accounts) but there has been less research on the mental state account (i.e. subjective wellbeing).

Subjective wellbeing can be measured in three main ways based on:

- Peoples' overall assessment of their life (life satisfaction) or of domains of their life (such as job satisfaction) – this is known as evaluative subjective wellbeing;
- Peoples' experiences at a specific time – this is known as affective subjective wellbeing; and
- How far peoples' underlying psychological needs are met (e.g. meaning, autonomy, control and connectedness) which contributes towards their wellbeing independent of any pleasure they may bring – this is known as eudemonic subjective wellbeing.

The literature we have reviewed has defined subjective wellbeing using a number of alternative methodologies which broadly fit into the categories above. In some instances, respondents were asked directly how satisfied they are with their life. In other instances, they were asked how frequently they felt positive/negative emotions in the recent past. In yet other instances they were asked how they feel about their working life, how they feel towards their friends/families and so on. By measuring subjective wellbeing in different ways, these alternative methods point to whether an individual's quality of life has increased or decreased.

In this paper, the terms quality of life, subjective wellbeing and happiness are used interchangeably.

### ***3.3.2. Defining holidays***

A key issue for the analysis is the relationship between leisure, holidays and quality of life. In practice, however, many of the studies reviewed do not distinguish clearly between leisure and holidays. In addition, they do not separately identify the role played by aviation as a means of enabling holidays to be taken.

As Dolnicar et al (2012) note, "The contribution of vacations to peoples' life satisfaction and Quality of Life (QOL) has recently attracted substantial attention among tourism researchers. Yet, most QOL scales do not include vacations: 7% explicitly measure vacations whereas 42% only include items relating to vacations within the broader Leisure domain. Leisure and vacations, however, differ substantially in nature with leisure referring to regular home-based activities and vacations being infrequent leisure activities away from home. As a consequence of the common amalgamation of vacations with leisure, there is limited knowledge about the specific contribution of vacations to peoples' QOL."

In this literature review, we focus on the contribution of vacations that are taken on an infrequent basis and, in particular, those that involve the use of aviation to reach the holiday destination (although sometimes the studies do not distinguish these). We use the terms holidays and vacations interchangeably.

## 3.4. Key findings

### 3.4.1. Impact of holidays on quality of life

Several studies have looked at whether holidays affect quality of life and, if so, by how much. Gilbert and Abdullah (2004), Nawijn (2011) and Dolnicar et al. (2012) all find positive effects of holidays on individuals' quality of life:

- Gilbert and Abdullah (2004) find that holiday takers report higher life satisfaction and subjective wellbeing after their holidays (compared to before). In addition, they report higher life satisfaction and subjective wellbeing for holiday takers relative to non-holiday takers both prior to and after their holidays.
- Nawijn (2011), after surveying international visitors at tourist hotspots in the Netherlands, finds that both life satisfaction on the day and happiness (which compares reported positive emotions to reported negative emotions) are higher for individuals on holiday compared to the population in general.
- Dolnicar et al. (2012), through a similar survey methodology, find that holidays affect individuals' quality of life and that this effect is of comparable importance to the domains of leisure and people.
- Nawijn (2010a) and Nawijn et al (2010) also find that holidays have a positive impact on the quality of life of individuals although they are more sceptical about the duration and size of this positive effect. Nawijn (2010a), using data from an online panel survey of a representative sample of the Dutch speaking people, finds that those who had been on holiday reported more positive emotions (daily happiness) than those who had not. They also find that life satisfaction is not statistically significantly higher for those who had gone on holidays and that these results are the same for those who value holidays as a key factor affecting their happiness. Nawijn et al (2010) find that, whilst pre-trip, holiday takers report greater happiness than non-holiday takers, post-trip there is no difference in the level of happiness between the two groups. Nonetheless, experience during the trip affects post-trip reported happiness as those holiday takers that report having had a relaxed trip are happier after the trip than those who had a stressful/neutral trip.
- Sirgy et al. (2011), using two studies, build a model describing the mechanisms through which holidays affect quality of life. They describe holidays as affecting satisfaction through different aspects of individuals' lives such as their social life and work life and, subsequently, satisfaction with these different components of individuals' life affecting their overall satisfaction with life.

Further details of each of the key studies are summarised below.

#### ***Gilbert and Abdullah (2004)***

Gilbert and Abdullah (2004) selected a random sample of 3,541 households in the Guilford area in the United Kingdom. These households were given questionnaires and responses were provided by 355 in the holiday taking group and 249 in the non-holiday taking group. The criteria for being identified in the holiday taking group were that the respondent had spent four nights or more outside the country. Two surveys were conducted with each person. For the holiday taking group, these were a pre-holiday and post-holiday survey<sup>14</sup>.

A number of different measures of quality of life were used including:

- Affect balances: 10 questions for positive feelings and 10 for negative feelings, with the amount by which the positive effect outweighs the negative effect forming the overall score;

<sup>14</sup> The surveys took account of instances where a major incident had taken place and where this had had an impact on reported life satisfaction. The data were not included in the analysis. In addition, the population of holiday takers and non-holiday takers did not match (in terms of gender and age) and, therefore, only matched data were used.

- Life satisfaction:
  - Global: This was measured with the question ‘How do you feel about your life as a whole’ (life3) which was asked twice in the survey, and with a satisfaction with life scale made up of five items; and
  - Specific: This was made up of 12 domains: family, friends, home, inter-personal relationships, economic situation, job, leisure, neighbourhood, self, services and infrastructure, health, and nation.

The key results include:

- Pre-trip v post-trip: Post-trip, individuals reported a statistically significant increase in reported satisfaction with life, no change in the life3 measure, more positive feelings, no change in negative feeling and an increase in eight of the twelve specific life satisfaction domains.
- Pre-trip (holiday takers vs. non-holiday takers): Pre-trip, holiday takers reported a higher global life satisfaction (life and satisfaction with life). This resulted from those going on holiday experiencing less negative feelings and more positive experiences than those not going on holiday. In addition, those taking holidays experienced statistically significantly higher satisfaction with their economic situation, family and health as well.
- Post-trip (holiday takers vs. non-holiday takers): Global life satisfaction is reported higher for individuals who have been on holiday compared to those who have not. Furthermore, affect balance is found to improve post-trip for holiday takers (relative to non-holiday takers) with an increase in positive feelings and a decrease in negative feelings. This indicates that after going on holiday, there is a significant increase in both life satisfaction measures and affect balance measures.

### ***Nawijn (2010a)***

The starting point for Narwijn (2010a) was the conclusion of previous literature that holidays have a positive impact on quality of life prior to the holiday, during the holiday and immediately after the holiday. The study looked to identify whether there was a longer term effect on quality of life resulting from holiday taking. It used panel data with two time periods (2007 and 2008):

- The 2007 data covered 5,700 individuals who were representative of the Dutch speaking population; and
- The 2008 data covered 3,650 individuals and comprised only those who had gone on vacations<sup>15</sup>.

Several measures of quality of life were used:

- Life satisfaction was measured by responses on a five point scale based on responses to the statement “I am satisfied with my life”; and
- Hedonic level (daily happiness) was measured by the frequency an individual felt positive emotions less the frequency an individual felt negative emotions.

Importantly, the study defined a holiday trip as “traveling to and staying in places outside their usual environment for more than one night, but not more than one consecutive year, for leisure purposes”. It did not distinguish whether this holiday involved the use of aviation.

A number of analyses were calculated as part of this study. The key findings included:

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<sup>15</sup> The final data sample with all individuals from the 2008 study was over representative of females so the data was weighted for gender representation.

- Those who took holidays in the 2007 cross-section reported, on average, higher daily happiness but no statistically significantly higher life satisfaction than those who did not take holidays (in the 2007 cross section);
- Happiness was not a predictor of whether or not an individual would take a holiday and neither daily happiness nor life satisfaction in 2007 predicted the number of holidays or number of days spent on holidays in 2008; and
- Using covariates to estimate how much an individual values holidays, Nawijn (2010a) estimated whether those who value holidays more were affected differently by changes in trip frequency and length of trip. Neither the effect of these on life satisfaction or on daily happiness was found to be statistically significant.

### ***Nawijn et al (2010)***

In their paper, Nawijn et al (2010) set out to assess whether there is a positive effect of going on holiday on self-reported quality of life. The data used comprised 1,530 respondents replying at 8 week intervals during a one year period. Of these, 556 did not go on holiday and 974 did go on holiday during the 8 weeks prior to the study in 2006. The sample used is representative of the Dutch speaking population.

Quality of life or happiness, in this instance, is measured by the frequency of a positive emotion (enjoyed their daily tasks) and the frequency of two negative emotions (felt 'unhappy' and 'gloomy and dejected'). In this instance, a holiday is defined as "a trip where people are traveling to and staying in places outside their usual environment for no longer than one year and specifically for leisure purposes". Again, it did not distinguish whether the holiday involved the use of aviation.

The key results to emerge from this study include:

- Comparing data from previous weeks in the year to responses to the week before the 8 week period in which individuals went on holiday, it was found that individuals who go on holiday have higher self-reported happiness than those who do not go on holiday; and
- There was no statistically significant difference in the post-trip happiness of individuals who had gone on holiday compared to those who had not gone on holiday.

However, post-trip, those who stated that they had had a relaxed or very relaxed holiday reported higher happiness scores than those who had a stressful or neutral holiday trip. This shows that experience during a trip does affect post-trip happiness.

### ***Nawijn (2011)***

The focus of Nawijn (2011) is on whether individuals are happier on holiday and what the key determinants of this are. Data were collected by asking 466 international tourists visiting the Netherlands for leisure purposes to complete a self-report questionnaire. The sample of respondents was younger than the average population.

Happiness was defined as an individual's mood on a particular day and was recorded by asking respondents about 12 effects: four positive effects (happy, competent/capable, warm/ friendly, and enjoying myself) and eight negative ones (impatient, frustrated/annoyed, depressed/blue, hassled/pushed around, angry/hostile, worried/anxious, criticized/put down, and tired). In addition to this, respondents were asked to state their life satisfaction at the time of completing the questionnaire and in general on an 11 point scale.

The results showed that individuals who went on holiday reported higher happiness (more positive effects and less negative effects) compared to happiness scores reported on a global basis (using the same measures as

Nawijn (2011)). This result was statistically significant. In addition, the study compared general life satisfaction scores to those of life satisfaction on the day. It found that the two were not statistically significantly different. The study also found that individuals' happiness was linked to whether or not they reported being stressed on the holiday. A significant inverse correlation was found between reported happiness scores and reported stress. In addition, the size of the group that the individual was travelling with was found to be positively correlated with how many positive experiences an individual reported having.

### ***Sirgy et al. (2011)***

In their study, Sirgy et al. (2011) conducted their analysis in two stages. The first involved 40 in-depth interviews with staff aged from 21 to 52 at a university in South Africa. These individuals participated as a result of a personal appeal. The research was used to establish the positive and negative effects associated with 13 different life domains namely social life, leisure and recreation, family life, love life, arts and culture, work life, health and safety, financial life, spiritual life, intellectual life, self, culinary life, and travel life. For each domain, the research was used to identify a set of positive effects of going on holiday such as the ability to "enjoy good tasting food" as well as negative ones such as "not having the variety of food items to choose from".

The second stage involved participation from 264 adults who were interviewed at five shopping malls/centres in South Africa. Respondents were asked to respond to questions in relation to their most recent holiday. Firstly, respondents were asked to agree or disagree (on a scale of 1 to 7) with statements related to the sources of positive and negative affects established in the first stage. Next, respondents were asked (on a scale of 1 to 7) to indicate their satisfaction or dissatisfaction with each of the 13 life domains. Finally, respondents stated their satisfaction with life overall. This was measured by responses to agreement with the statement "My life overall (how I feel about my life overall, my happiness, how satisfied I am with life, the quality of my life, etc.)" and four other statements adapted from Diener et al's (1993) study.

The key finding was that: "positive and negative memories generated from the most recent trip do not contribute only to overall satisfaction in leisure life but also satisfaction in other life domains, such as social life, family life, love life, arts and culture, work life, health and safety, financial life, spiritual life, intellectual life, self, culinary life, and travel life"

### ***Dolnicar et al. (2012)***

Dolnicar et al. (2012) conducted their study in two stages.

The first stage involved a small survey designed to identify whether or not holidays affected quality of life and, therefore, whether the second stage of the study which was intended to define empirically the effect of holidays on quality of life should be carried out. It involved interviews with 20 individuals all of whom were known to the authors (such as their friends, family members or students).

The second stage was a survey undertaken in 2010 which involved an online questionnaire of 1,000 individuals from an international panel which was representative of Australia's demographics in terms of gender, age and other criteria. The survey asked respondents to:

- Rank eight quality of life domains (family, work, people, leisure, money, health, vacations and spirituality) in order of importance from one to eight (1 = most, 8 = least); and
- Allocate 100 points among the domains (family, work, people, leisure, money, health, vacations and spirituality) to reflect their relative importance.

The authors found that:

“Vacations have a role to play in contributing to peoples’ QOL; this domain’s mean rank indicates that it is of comparable importance to the domains of leisure and people”

“... the average number of points allocated to the vacation domain is 6 out of 100, indicating that, assuming market homogeneity, vacations make a 6% contribution to peoples’ QOL.”

### *3.4.1.1. Length and duration of holidays*

Evidence on whether shorter stays or longer stays lead to higher quality of life is inconclusive as different studies report different results:

- Kemp et al. (2008) found that the length of stay does not play a role.
- An earlier study by Neal (1999) found that a length of stay of seven days or fewer (indirectly) negatively affects happiness, and a stay of eight days or more positively affects happiness afterwards.”
- In Nawijn (2010b), those on short holidays (three-to-six days) report higher quality of life scores than those on very short holidays (less than 2 days) and those on longer holidays (over seven days).
- In contrast, in a following study, Nawijn (2011) finds these effects to be statistically insignificant and other papers also report finding no correlation between the length of trip and quality of life (Nawijn et al (2010)).

Nawijn (2010b) asked 481 international tourists in the Netherlands to complete a self-reported happiness questionnaire. Quality of life was measured in two ways:

- Mood was measured through the question ‘How are you feeling today?’ with respondents given a scale of 1 to 10; and
- Life satisfaction was assessed through the question ‘On a scale of 1 to 10, how do you rate your life as a whole?’

Responses to these questions and others asking how long the trip was and which day of the trip the tourist was on were used to assess the impacts of holidays on life satisfaction.

The study found that mean mood scores are higher for those on short trips (three-to-six days) than on very short trips (two days or less) or those on longer holidays (seven days). In addition, this study looked at whether it is possible to predict during which part of a holiday individuals are most happy. It found that there are a number of different phases associated with high or low mood scores during a holiday:

- Travel phase (0% – 10%): Holidaymakers have low mood scores which are associated with having to travel to the holiday destination;
- Core phase (10% – 80%): High mood levels during what is the majority of the holiday;
- Decline phase (80% - 90%): Lower mood levels associated with thoughts about going home and how short the trip was; and
- Rejuvenation phase (90% - 100%): Higher mood levels that may be associated with looking forward to going home again.

Using a self-reported questionnaire completed by international tourists in the Netherlands, Nawijn (2011)<sup>16</sup> found that those on three-to-six day trips reported a higher life satisfaction score than those on shorter trips

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<sup>16</sup> Data and methodology for Nawijn (2011) is explained further in Section 3.4.1.

(two days or less) or those on longer days (seven days). The differences, however, are not statistically significant.

### ***3.4.1.2. Type of holidays***

As part of their studies which focused on answering other questions on the impact of holidays on quality of life, Nawijn (2010b)<sup>17</sup> and Nawijn (2011)<sup>18</sup> asked, as part of his survey to determine whether self-reported happiness is higher when on holiday, what type of holiday the individual was on. Options for responses included “a cultural holiday, a nature holiday, a city trip, a beach holiday, a cruise, an event holiday, a tour, or some other type of holiday”. Results from both of these papers were that there is no statistically significant difference in self-reported happiness based on the type of holiday.

### ***3.4.1.3. Affordability of holidays***

Two of the key long-term trends in the aviation sector have been the falling real cost of air travel and the widening route choices available to air travellers. This has made air travel potentially more affordable and more convenient. The growth of low cost airlines has played an important role underlying both of these trends<sup>19</sup>.

Our literature review has identified only very limited evidence that has directly considered the impact of affordability on travellers’ subjective wellbeing. For example, Dolnicar et al. (2012)<sup>20</sup> find that those who have been experiencing financial distress over the 12 months prior to completing the questionnaire place less emphasis on the importance of holidays in achieving a good quality of life. Furthermore, they identify that those who are married and have children over 18 place less emphasis on holidays as contributing to quality of life than the oldest individuals who are post-retirement age.

Based on the wider evidence on the relationship between the use of air travel, the frequency with which holidays are taken and subjective wellbeing, however, it is possible to draw out the potential implications of the increased affordability of air travel on subjective wellbeing.

On the one hand, if more people can afford air travel for leisure purposes (i.e. to take holidays), then their subjective wellbeing is likely to be improved. This is most likely on short haul routes where the low cost airlines have the biggest presence. Whilst some of this enhanced wellbeing will be reflected in the fares paid directly or indirectly to the airlines, some will not.

On the other hand, to the extent that lower air fares mean that leisure air travellers take holidays by air rather than other modes of transport, the net impact on their wellbeing will be mitigated. This effect will need to be factored into any overall assessment of the impact on subjective wellbeing.

## ***3.4.2. Impact of holidays on different socio-economic groups***

Two studies assess the impact of holidays on the quality of life for social tourists who are defined by McCabe et al. (2010) as “groups in society who are economically weak or otherwise disadvantaged in tourism participation.”

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<sup>17</sup> Data and methodology for Nawijn (2010b) is explained further in Section 3.4.1.

<sup>18</sup> Data and methodology for Nawijn (2011) is explained further in Section 3.4.1.

<sup>19</sup> Airports Commission, Interim Report.

<sup>20</sup> Data and methodology for Dolnicar et al. (2012) is explained further in Section 3.4.1.

McCabe et al. (2010), using data from completed application forms for the Family Holiday Association (FHA), a charity that provides financial and other assistance for individuals for social tourists, found that the key benefits of social tourism are:

- The chance to spend quality time together as a family;
- The opportunity for fun and happy memories; and
- The opportunity to spend time away from difficulty and/or stressful routines or circumstances.

McCabe et al (2013) collect data from individuals who complete application forms for assistance from the FHA. They asked these individuals a series of questions before and after their holiday to establish whether the holiday had a positive impact on their quality of life. The key finding from this study is that the benefits of social tourism focus on the areas of psychological resources, leisure and family time.

In addition, Dolnicar et al. (2012) look at whether there is a difference in how much emphasis different groups of individuals place on holiday, that is, whether there is a difference in the domains which affect the quality of life of different individuals. These authors find that those who are married and retired place the most emphasis whilst those of an age group younger than this but who still have children over 18 years old place the least amount of emphasis on the impact holidays can have on increasing quality of life.

### ***McCabe et al. (2010)***

McCabe et al. (2010) selected 1,600 successful applicants for assistance with the FHA and randomly selected 300 of them to use for their study. The applications included data on family and financial circumstances. A second stage of data collection was undertaken four weeks after the individuals returned from their holiday however the response rate was low (only 39 replies) of which only 21 could be reconciled with the initial analysis (as a result of the others not having a required reference number). Analysis of the 300 applications found that the most common issues facing applicants were mental health issues, unemployment and financial debt. In addition, respondents suggested that these problems faced all individuals in the household including partners and children rather than just themselves. The key results were established from six questions that asked respondents to rank from 'very high' to 'no benefit' the perceived benefits of the grant:

- Spend time as a family;
- Spend time away from a stressful routine;
- Cope with our situation and look forward to the future;
- Opportunity for fun and happy memories;
- Experience new places and different activities; and
- Contribute to social or educational development.

The first four of these were termed emotional benefits whilst the last three were termed situational benefits. Opportunity for fun and happy memories fell in both categories. The results suggest that social tourism was considered by participants to be most important in delivering emotional benefits (rather than situation benefits). These emotional benefits were found to be statistically significant whilst situational benefits were not. Further analysis found that those who suggested they required assistance as a result of financial debt perceived less benefit from the opportunity for fun and happy memories from the holiday. The second stage of the study that collated data from respondents that had been on holiday found that individuals' experiences of benefits from the holiday were similar to those that had been expected prior to going on holiday.

### ***Dolnicar et al. (2012)***

Dolnicar et al. (2012), using data gathered from the second survey discussed in Section 3.4.1, use two methods to identify whether there is heterogeneity in how much emphasis is placed on the impact holidays have on quality of life:

- They split consumers by income or other socio-economic factor; and
- They used a data driven approach to identify typical combinations of scores and used this to identify whether distinct groups have these sets of combinations.

The key finding, as discussed above, is that those who report having suffered financial distress over the past 12 months tend to place more emphasis on work and money and less on holidays as contributors to quality of life. In addition, the data driven methodology identified three segments:

- Segment 1 (20% of respondents) places more emphasis on family, health and spiritual life and less emphasis on work, leisure, money and vacations - these tend to be individuals who are married and have children over 18;
- Segment 2 (43% of respondents) places more emphasis on family, health, vacations and leisure and less emphasis on work and spiritual life - these tend to be individuals who are married and retired; and
- Segment 3 (36% of respondents) places more emphasis on work and money, placing less emphasis on family and an average amount of emphasis on vacations - these tend to be younger people who have never been married and are career driven.

### ***McCabe and Johnson (2013)***

Like McCabe et al. (2010), McCabe and Johnson (2013) use data from applicants for the FHA in their study. In 2011, these authors contacted 642 applicants for assistance by telephone prior to their holiday and received a total of 168 responses. The resulting data were used for the pre-trip analysis. The authors then contacted the 168 respondents four to eight weeks after their travel. They received 127 responses which constituted their post-holiday data set. The authors asked respondents about their quality of life prior to and after their holiday.

The measures of quality of life used were:

- The British Household Panel Survey (BHPS) method, which asked respondents to state their 'satisfaction with health' (and seven other variables) on a scale of not satisfied to completely satisfied;
- The New Economics Foundation method, which asked respondents to state how frequently they had felt four emotions (two positive and two negative) on a scale of none or almost none of the time to all or almost all of the time;
- Satisfaction with life scale that asked respondents to state whether they strongly agreed or strongly disagreed that 'in most ways my life is close to ideal' and four other measures of the quality of their life; and
- A scale adapted from the New Economics Foundation that asked individuals to state on a scale of 'None of the time' to 'All of the time' 'how much time spent with your family that is enjoyable' (and five other measures) as well as 'In general I feel very positive about myself' (and three other emotions) on a scale of 'Strongly disagree' to 'Strongly agree'.

Conducting an empirical test to measure the reliability of their methodology, the authors found all measures to be internally consistent. The authors found eight of the 27 dimensions assessed initially to (statistically significantly) increase after the holiday. These included family, social life, amount of leisure time, the way leisure time is spent, time spent with family that is enjoyable, loneliness, resilience and changing nothing in life.

Two of the dimensions were found to decrease satisfaction with employment status and time spent with family that is stressful. Whilst the latter paints the same positive picture of holiday taking as McCabe et al (2010), the former is explained by the authors as likely to result from the fact that a large proportion of those interviewed were unemployed and, therefore, the results show that more individuals are discontent with their unemployment status.

In addition to this analysis, the authors asked respondents in the post-holiday interview whether they felt that the holiday had had a direct impact on aspects of their well-being such as their happiness, their optimism and their general outlook on life. They find that 83.7% of respondents reported that the holiday had improved their quality of life from moderately to extremely. In addition to this, the authors state that “similar levels of improvement in each domain were recorded in the general levels of wellbeing to those attributed directly to the holiday. This suggests that improvements in aspects of well-being can be directly linked to the holiday.”

### ***3.4.3. Impact of holidays on health***

We found few studies that assessed the direct link between holidays and health.

One study by Hunter-Jones (2003) interviewed 16 cancer patients to assess the effects that holidays have on the health of individuals. The sample of individuals chosen for the study was self-selective and despite the sample having an equal number of males and females, the author recognises that it is not necessarily representative of the population. The study found the following positive effects:

- Personal health: physical and psychological: ‘Feel good’ factor that resulted from being on holiday in a warm/sunny place (even if the person does not sunbathe) as well as relieving of stress and a break from the diagnosis/treatment regime;
- Social effectiveness: The ability to meet and interact with new people and give loved ones who were caring for the patient a chance to take a break from caring responsibilities;
- Personal identity: Regaining confidence and inner strength, which empowered individuals to take control of their lives again (when recovering from illness); and
- Regaining independence: Regaining confidence led to patients thinking about how they can take more control of dealing with their illness such as physical therapies and psychological therapies.

As part of their study, McCabe et al (2010)<sup>21</sup> asked social tourists whether they perceived a health benefit from going on holiday. The authors find that “although respondent’s circumstances were often very difficult and challenging, after the holiday, their rating of their quality of life was relatively good overall.” Importantly however, these results are based on a sample of only 21 respondents. They are, therefore, not statistically reliable.

### ***3.4.4. Impact of holidays on work outcomes***

Sirgy et al. (2011)<sup>22</sup> uses survey results to estimate how holidays affect satisfaction with a number of life domains such as satisfaction with work life and, subsequently, how satisfaction with work life affects satisfaction with life overall.

The key positive effects of holidays on work life are found to be:

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<sup>21</sup> An explanation of the data and the methodology used in McCabe et al (2010) is provided in Section 3.4.2.

<sup>22</sup> An explanation of the data and the methodology used in Sirgy et al. (2011) is provided in Section 3.4.1.

- Feeling good to break away from the work routine;
- Feeling good escaping the demands and constraints of the workplace;
- Coming back to work feeling refreshed and energised; and
- Getting a chance to do some strategic thinking and planning about work during trip.

The key negative effects of holidays on work life are found to be:

- Feeling forced to work during the trip, which detracts from leisure time;
- Not having any time during the trip to do some work;
- Feeling stressed because the trip was interfering with work and deadlines;
- Being forced to work during the trip and make money to finance the trip;
- Feeling of not wanting to go back to work and missing the fun; and
- Feeling tired and exhausted coming back to work because the trip was tiring and exhausting.

Overall, both the positive and negative effects of holidays on work life are statistically significant. Furthermore, work life is also found to have a statistically significant effect on overall satisfaction with life. Together, these findings show that there is a positive effect of holidays on overall satisfaction with life through the impact holidays have on work life.

### **3.5. Conclusions**

Based on our literature review, we can draw several key conclusions:

#### ***Overall impact of holidays on quality of life***

- Individuals report that holidays affect their quality of life (Dolnicar et al. (2012)).
- Some studies show that individuals who go on holidays report a higher quality of life than individuals who do not go on holiday (Gilbert and Abdullah (2004), Nawijn (2011)) but other evidence suggests no difference in the quality of life of individuals who go on holiday compared to those who do not (Nawijn (2010a) and Nawijn et. al (2010)). This creates ambiguity over whether those who go on holiday have, on average, a higher quality of life than those who do not go on holiday.
- Individuals report a statistically significant higher quality of life after going on holiday compared to before (Gilbert and Abdullah (2004), Nawijn et. al (2010)) and when they are on holiday compared to when they are not on holiday (Nawijn (2011)).
- There is a positive anticipation effect of going on holiday, leading to higher reported happiness amongst individuals prior to going on holiday than those who are not anticipating an upcoming holiday (Gilbert and Abdullah (2004)).

#### ***Variations in impact of holidays on quality of life by demographic group***

- For those from lower socio-economic groups, being able to travel is associated with an increase in quality of life (McCabe and Johnson (2013)) which primarily results from the opportunity to gain positive emotional experiences such as being able to spend time with family and away from a stressful routine (McCabe et al. (2010)<sup>23</sup>). Importantly, neither of these studies compares the size of the effects to that on other socio-economic groups which limits the conclusions that can be drawn about how the impact of holidays on quality of life differs between socio-economic groups.

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<sup>23</sup> McCabe et al. (2010) use responses to questions that ask respondents what they felt the most important benefits of going on holiday would be to determine the quality of life impact of going on holiday.

- We reviewed a study by Dolnicar et al. (2012) which examined how much importance different groups of individuals attach to different factors that potentially affect their quality of life including holidays. Those who are married and retired place the most emphasis on the impact of holidays on quality of life, whilst younger age groups (but still those who have children over 18 years old) place the least emphasis on this. Meanwhile, those who are younger, have never been married and are career driven place an average amount of importance on holiday taking as a quality of life domain. Whilst these data identify several distinct groups, they do not show whether the importance of holiday taking decreases or increases with age.
- Dolnicar et al. (2012) also find that those who have recently suffered from financial distress report holidays as having a less important (positive) influence on their quality of life than those who have not been in financial distress; instead, they place more emphasis on other domains of life satisfaction such as money.
- We found only limited evidence as to whether the impact of holidays on quality of life varies by type of holiday that an individual goes on. However, Nawijn (2010b and 2011) does report very briefly as part of his studies that there is no statistically significant difference in the effect of holidays on quality of life depending on the type of holiday the individual is on.
- We found few studies that assessed the direct link between holidays and health. One study by Hunter-Jones (2003) based on a very small sample (20 individuals) of cancer patients reports improved personal health (physical and psychological), increased social effectiveness, personal identity and regained independence as the key health benefits of going on holiday.

### ***Other findings***

- We reviewed a limited amount of work focusing purely on the effect that holidays have on work outcomes. One study by Sirgy et al. (2011) which asked respondents how their holiday affected their work life (and other factors) and then how their work life and other factors have affected their overall quality of life found that holidays induce have positive and negative effects on work life.

## 4. Empirical analysis

### 4.1. Introduction

In this section, we build on the results of our review of the literature by reporting our empirical analysis to examine the relationship between air travel and the quality of life of those travelling. Specifically, the empirical analysis assesses the statistical association between taking holidays and international flights and health and wellbeing outcomes. All of the main national datasets that include questions on health and wellbeing were explored and the following three datasets were found to have variables covering health and wellbeing outcomes as well as questions on holidays and international flights:

- Understanding Society;
- The British Household Panel Survey; and
- Taking Part Survey.

We use the data from these surveys to assess the association between holidays and flights and the following health and wellbeing outcomes:

- Life satisfaction;
- Self-reported general health;
- Happiness;
- Mental health – measured through the 12-item General Health Questionnaire (GHQ) (see Appendix B.1); and
- Depression – measured through individual self-reports of feeling depressed.

These outcome measures capture a wide range of health and wellbeing outcomes. Within the health outcomes the focus is on mental health, but physical health is also captured in the self-reported general health measure. We assessed both the adult (15+) and the youth (11-16 year olds) populations in these data.

### 4.2. Methodology

#### 4.2.1. Data

##### 4.2.1.1. Understanding Society

Understanding Society is an annual nationally representative longitudinal panel survey conducted at the household level. Every individual within each household is interviewed each year. The survey is administered by the Institute for Social and Economic Research at the University of Essex. Since 2010 Understanding Society has built on the British Household Panel Survey, adding important information about peoples' social and economic circumstances, attitudes, behaviours and health.

This study examines the following holiday-related variables from Understanding Society:

- Do you (and your family partner) have a holiday away from home for at least one week a year, whilst not staying with relatives at their home?
- Does your child have/do your children have a family holiday away from home for at least one week a year?

We restrict our analysis only to those waves of the survey that include the two holiday variables (Waves 1, 2, and 4, which cover the years 2009-2011 and 2012-2013). This gives a total sample of 121,684 for the adult

population (15+ years) and 46,344 for the youth population (11-16 year olds). These are large samples when used for the purpose of econometric analysis.

#### 4.2.1.2. *British Household Panel Survey*

The British Household Panel Survey (BHPS) is an annual nationally representative longitudinal panel survey conducted at the household level since 1991. The survey is administered by the Institute for Social and Economic Research at the University of Essex. Every individual within each household is interviewed each year. The BHPS is the precursor to Understanding Society<sup>24</sup>.

This study examines the following holiday-related flights variables from the BHPS:

- How many flights to other European countries did you take in the last twelve months?
- How many flights to countries outside Europe did you take in the last twelve months?

The analysis is restricted to Wave R of the BHPS (the final wave of the BHPS collected in 2008) because this is the only wave that includes these variables on flights. Although this still gives a sizeable total sample of 26,870 which is sufficient for cross-sectional analysis, it means that we are unable to run panel data models that allow us to control for time-invariant factors because we do not have a longitudinal aspect to the data.

#### 4.2.1.3. *Taking Part*

Taking Part is an annual survey of cultural and sport participation in England commissioned by the Department for Culture, Media and Sport in partnership with Arts Council England, Sport England and English Heritage. It contains data on attendance and participation in a range of arts, culture and sporting activities, as well as barriers to engagement.

This study examines the following holiday-related variable from Taking Part:

- Have you had a holiday in the last 12 months that lasted at least a week?

The analysis uses five waves of Taking Part, which gives a total sample size of 98,560<sup>25</sup>.

Table 2 summarises the health and wellbeing variables that are used in the analysis from these datasets.

*Table 2 Health and wellbeing variables used in the analysis*

Variable	Question wording	Scale	Dataset
<b>Life satisfaction</b>	Please choose the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: Your life overall.	1-7 scale: 1= Not at all satisfied, 7= Completely satisfied	BHPS; Understanding Society
<b>General health</b>	In general, would you say your health is:	5-point scale: 1= Poor, and 5= Excellent	BHPS; Understanding Society; Taking Part <sup>26</sup>

<sup>24</sup> Understanding Society replaced the BHPS in 2009. The original BHPS sample makes up part of the (larger) Understanding Society sample.

<sup>25</sup> We note that across the three datasets we use different survey years. For the BHPS and Understanding Society analysis this is unavoidable because the BHPS was converted into Understanding Society and hence there are no years of overlap between the two survey datasets. The data are representative of the UK and there is no a-priori reason to believe that the effects of taking holidays on individual health and wellbeing would differ significantly across the years sampled, since the basic holidaying experience is expected to be unchanged.

Variable	Question wording	Scale	Dataset
<b>GHQ36</b>	General Health Questionnaire (GHQ): The questions are about how you have been feeling recently. For example, have you recently been able to concentrate on whatever you're doing?	36 item scale: 0= No mental health problems; 36= High mental health problems	BHPS; Understanding Society
<b>Depression</b>	Have you recently been feeling unhappy or depressed?	GHQ: unhappy or depressed: 1= (Rather or Much more depressed than usual); 0= (Not at all or No more depressed than usual)	BHPS; Understanding Society
<b>Happiness (youth)</b>	How do you feel about your life as a whole?	7-point scale: 1= Completely unhappy, 7= Completely happy	Understanding Society (Youth dataset)
<b>Happiness</b>	Taking all things together, how happy would you say you are?	10-point scale: 1= Extremely unhappy, 10= Extremely happy	Taking Part

### 4.2.2. Descriptive statistics

We provide descriptive statistics for the main holiday variable of interest (having a holiday away from home for at least one week a year in the Understanding Society dataset), divided between key demographic groups (Table 3). As we would expect, those with no dependent children on average take holidays more often than those with children. Those with above average income, higher levels of educational attainment, and good or excellent health take more holidays than those with lower income, education, and health levels. Those around retirement age (over 60) take more holidays on average than those between 30-60 years old, while those under 30 take on average fewest holidays. People who live in rural areas take on average more holidays than those in urban areas, likely due to the higher incomes associated with rural residents. These differences are all significant at the 99.5% probability level. All results are weighted using 2013 population weightings.

We provide full descriptive statistics for all variables in the Understanding Society model in Table 13 of Appendix A.

*Table 3: Percentage of people having a holiday away from home for at least one week a year by socio-demographic group (Understanding Society) (%)*

Variable	Mean %
Dependent children*	64
No dependent children*	72
Income above median*	85
Income below median*	56
Education degree or above*	81
Education below degree*	64
Health good or better*	74
Health fair or worse*	51

<sup>26</sup> Note that the wording on the five-point general health scale is slightly different in Taking Part (1= 'Very bad'; and 5= 'Very good').

Variable	Mean %
Married*	79
Other*	62
Age: Over 60*	78
Age: 30-60*	72
Age: Under 30*	64
Urban*	69
Rural*	76

*Legend: \*  $p < 0.05$  significant difference between populations (t-test)*

### 4.2.3. Statistical methods

#### 4.2.3.1. General statistical model

The following regression model is used as the base for all of the analyses:

$$WB_{it} = \alpha + \beta_1 H_{it} + \beta_2 X_{it} + \varepsilon_{it} \quad (1)$$

where  $WB_{it}$  is the measure of health or wellbeing for individual  $i$  at time  $t$ ;  $H_{it}$  is the holiday-related variable of interest;  $X_{it}$  is a vector of the other main determinants of health and wellbeing; and  $\varepsilon_{it}$  is the error term. Where panel data are available for the analysis using Understanding Society, we use fixed effects regression, which assumes that the error term is composed of time-variant and time-invariant elements<sup>27</sup>. The time subscript is dropped for the analysis of the BHPS and Taking Part since these are cross-sectional models.

The benefit of this model is that fixed-effects modelling allows us to focus on within-person changes (i.e. to see how health and wellbeing change in response to people changing their holidaying habits). This allows us to control for (or filter out) the effect of factors that do not change over time, such as personality characteristics and preferences for travel. For example, more ‘adventurous’ people may be more likely to take holidays and more ‘adventurous’ people may also be happier anyway. This personality trait is a confounding factor and it could potentially bias the results if it were not controlled for, but we are able to control for these types of personality traits in fixed effects modelling.

In contrast, cross-sectional models, such as those used with the BHPS and Taking Part datasets (in which time subscripts are dropped from equation (1)), only allow analysis of data collected from a population at one specific point in time. This means that we can only control for observable factors in the dataset. This means that there is generally (but not always) a greater risk of endogeneity bias due to confounding factors in cross-sectional models.

Equation (1) is run once for each health and wellbeing outcome (dependent variable) and for each health and wellbeing outcome the model is run once for each holiday-related variable. We do not include all of the holiday-related variables together in one model in the analysis due to the risk of multicollinearity (where two or more independent (predictor) variables are highly correlated, meaning that one can be linearly predicted from the others, invalidating results for individual predictors and inflating standard errors).

<sup>27</sup> Fixed effects regression methods are used to analyse longitudinal data with repeated measures on independent and dependent variables. This allows us to control for all stable characteristics of individuals across the sequential waves of data. This is accomplished by using only within-individual variation (the changing states of an individual’s life over time) to estimate the regression coefficients.

All health and wellbeing models, except the depression model, are run using ordinary least squares (OLS) regression analysis (fixed effects OLS for Understanding Society data), which is typical in the literature. As feeling depressed has been coded as a binary variable, this model is run using logit regression analysis (fixed effects logit model for Understanding Society data).

In vector  $X_{it}$  we control for as many of the main determinants of subjective wellbeing as possible as set out in Fujiwara and Campbell (2011)<sup>28</sup>. We are limited by the availability of the various variables in the data but can generally control for a wide range of factors. Table 4 summarises the control variables we use in each dataset. Full variable descriptions can be found Appendix B.

*Table 4: Control variables used in different data sets*

Understanding Society – adult	Understanding Society – youth	BHPS	Taking Part
• Household income	• Age	• Household income	• Income
• Marital status	• Youth smoker	• Marital status	• Marital status
• Parental status	• Playing truant	• Parental status	• Parental status
• Employment status	• Number of close friends	• Employment status	• Employment status
• Health	• Number hours watching TV	• Health	• Health
• Age	• Number hours playing sport	• Gender	• Gender
• Geographic region	• Household income	• Age	• Age
• Education	• Geographic region	• Geographic region	• Ethnicity
• Household size		• Education	• Religious belief
		• Socialising	• Geographic region
		• Housing status and neighbourhood safety	• Education
			• Socialising
			• Housing status

Multivariate regression analysis is used to control for these potentially confounding factors. As an example, richer people are more likely to go on holiday and because they are richer they will also generally tend to have a higher level of health and wellbeing anyway. Any differences in the health and wellbeing outcomes between those who take holidays and those that do not will, therefore, be partly due to differences in income. Hence, it is important to control for these types of confounding factors.

In line with best-practice, we control for all of the main determinants of health and wellbeing in our models. This increases our ability to infer causal relationships, but there is always the possibility that some important confounding factor(s) has not been controlled for because data were not available for this variable. If so the results may be biased to a certain extent. In sum, due to the observational nature of the data (i.e., the study is not based on data from experiments like randomised trials), causation cannot be directly inferred. However, the statistical techniques and models used here are in line with the methodology applied in much of the related academic and policy literature; regression analysis is the most frequently employed statistical approach in both the academic and policy-related health and wellbeing literature. It is one of the optimal approaches to use in observational datasets (such as the BHPS, Understanding Society, and Taking Part) where the treatment or

<sup>28</sup> These are income; age; gender; marital status; education; employment status; health; social relationships; religious affiliation; housing; local area issues such as environmental conditions and crime levels; parental status; dependents and caring duties; region; personality traits and characteristics.

intervention has not been randomly assigned. We further note that the panel data models employed with the Understanding Society dataset, in which individual fixed effects are controlled for, are also able to control for time-invariant unobservable factors, such as the individual's general preference for taking holidays and their personality characteristics, which are unlikely to vary over this short period of time. This provides further confidence in the results from this dataset especially.

#### 4.2.3.2. *Heterogeneous effects models*

The study also looks at the effect of holidays by different socio-demographic groups. This is done by adding an interactive term to the base model in equation (1):

$$WB_{it} = \alpha + \beta_1 H_{it} + \beta_2 H_{it} \cdot D_{it} + \beta_3 X_{it} + \varepsilon_{it} \quad (2)$$

where  $D_{it}$  is the socio-demographic factor of interest and it is interacted with the holiday-related variables. The coefficient of interest here is  $\beta_2$ . If it is statistically significant, it shows that there is a different association between holidays and health and wellbeing in different population groups.

This model is run for all health and wellbeing outcomes in the Understanding Society adult sample (15+). We only look at this dataset because:

- It has the largest sample size for this analysis (and hence is most likely to show any significant differences if they do actually exist); and
- Use of fixed effects provides more robust models.

As interactive factors (variable  $D_{it}$  in equation (2)), we look at the follow categories:

- Age (binary variable created at respondents aged under and over 40);
- Income (binary variable created at income threshold of £40,000 per year gross household income);
- Parental status (binary variable created for respondents with and without dependent children aged under 18);
- Employment status (binary variable created differentiating between employed/self-employed and unemployed); and
- Education (binary variable created differentiating between respondents with and without university-level education).

### 4.3. *Results*

The general finding across all three datasets is that **taking holidays and flights is associated with improvements in health and wellbeing** as measured through all of the indicators we use. After controlling for the main determinants of health and wellbeing, people who take holidays and flights have higher life satisfaction and happiness, better levels of self-reported general health and better mental health (measured as lower GHQ36 scores and a lower probability of reporting feeling depressed).

When we look at different socio-demographic groups in the UK, we find that the relationship is constant across the groups in all cases except for when assessing by employment status. The association between holidays, flights and improvements in mental health is stronger for unemployed people than it is for employed people. The data do not give any clues as to why this is the case and nor does the literature in this area. Intuitively, however, it may be that it is because the break from day to day life that holidays provide is more greatly appreciated by the unemployed.

Below, we summarise the main findings from our analysis: the full results can be found in Appendix B.

### 4.3.1. Understanding Society

#### 4.3.1.1. Adult sample general population models

In the adult sample (aged 15+) we find that having at least one holiday per year that lasts for a minimum of one week is associated with higher levels of life satisfaction and general health, better GHQ36 scores (i.e. a lower GHQ36 score because a lower score indicates that an individual has fewer mental health problems) and with a lower probability of reporting feeling depressed. This is after controlling for the main confounding factors. The results for the other variables in the models are in line with the literature (where comparable models have been employed). The full results can be found in Table 15 in Appendix B.

*Table 5: Association between regular holidays and health and wellbeing controlling for background variables*

Holidays every year	Coefficient	Standard Error	P> t
<b>Life satisfaction</b>	0.106***	0.019	0.000
<b>GHQ36</b>	-0.426***	0.067	0.000
<b>General health</b>	0.045***	0.01	0.000
<b>Depression</b>	-0.181***	0.046	0.000

*Notes: Coefficient shows the association between the holiday-related variable and the health and wellbeing outcomes listed in the table. \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. Adult sample (15+). Fixed effects OLS model for life satisfaction, GHQ36 and General health. Fixed effects logit model for Depression. Coefficient in depression model shows impact on log odds ratio (probability impacts not calculable in fixed effects logit models). All models control for main determinants of health and wellbeing.*

It is useful to compare these results against other variables in the model. A good comparator is unemployment as it is in all of the models and it is easy to interpret. The association between taking holidays and life satisfaction is about half the effect of unemployment on life satisfaction in absolute terms. The association between taking holidays and GHQ36 and depression is about one third of the impact of unemployment on these outcomes (in absolute terms). For general health, taking holidays has a higher impact than unemployment in absolute terms.

#### 4.3.1.2. Adult sample heterogeneous effects models

When assessing whether these effects differ across socio-demographic groups as classified by age, income, parental status, employment status and education, we find that only employment status seems to matter (see results in Table 6). The positive associations between holidays and health and wellbeing are the same for parents as they are for non-parents; for people over 40 as they are for people under the age of 40; for higher earners as they are for lower earners (defined by an income threshold of £40,000); and for people with university education as they are for people without university education. This was demonstrated by a statistically insignificant interactive term in these models.

But the positive association between holidays and mental health (measured through GHQ36 and the likelihood of reporting feeling depressed) differs by employment status. The association between having holidays and GHQ36 is stronger for unemployed people. In the interactive effects models the coefficient on the base variable ('Has family holidays every year') shows the association between holidays and the health outcomes for unemployed people only. The coefficient for the variable 'Has family holidays every year\*employed' shows any

additional effect for employed people, which could be negative or positive. The association between holidays and the health outcomes for employed people is calculated as the sum of these two coefficients. For both employed (-0.286) and unemployed (-0.898) people, having holidays is associated with improved GHQ36 scores, but the improvement is higher for unemployed people. The coefficient sizes are shown in brackets, where a negative coefficient shows an improvement in GHQ36 scores.

There is a similar result for the depression outcome. The association between having holidays and self-reported depression is stronger for unemployed people. For both employed (-0.083) and unemployed (-0.362) people having holidays is associated with a lower probability of reporting feeling depressed, but the probability is even lower for unemployed people. The coefficient sizes are shown in brackets shown as the impact on the log odds ratio<sup>29</sup>.

In summary, the evidence suggests that having holidays is associated with improved mental health and that this positive effect is greater for unemployed people than it is for employed people.

*Table 6: Association between holidays and mental health by employment status*

	Coefficient	Standard Error	P> t
<i>GHQ36</i>			
Has family holidays every year	-0.898***	0.224	0.000
Has family holidays every year * employed	0.612***	0.229	0.008
<i>Depression</i>			
Has family holidays every year	-0.362**	0.162	0.026
Has family holidays every year * employed	0.279*	0.167	0.095

*Notes: \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS fixed effects regression model for GHQ36. Logit fixed effects model for Depression. Coefficient in depression model shows impact on log odds ratio. All models control for main determinants of health and wellbeing.*

### 4.3.1.3. Youth sample general population model

In the youth sample (11-16 year olds), we find that having at least one family holiday per year that lasts for a minimum of one week is associated with higher levels of happiness among children aged 11-16. This is after controlling for a wide range of confounding factors. The full results can be found in Table 16 of Appendix B.

*Table 7: Association between regular holidays and happiness for 11-16 year olds controlling for background variables*

Child has family holidays every year	Coefficient	Standard Error	P> t
<b>Happiness</b>	0.119***	0.036	0.001

*Notes: Coefficient shows the association between the holiday-related variable and the health and wellbeing outcomes listed in the table. \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. Fixed effects OLS model.*

### 4.3.2. BHPS

We find that having flown to Europe and the rest of the world during the past year is associated with higher levels of life satisfaction, general health and mental health (measured through the GHQ36) and with a lower

<sup>29</sup> The full regression tables for these models are not included in Appendix 2 because the results are very similar to those of other models.

probability of reporting feeling depressed. This is after controlling for a wide range of confounding factors. The results for the other variables in the models are in line with the literature. The full results can be found in Table 17 and Table 18 of Appendix B.

Flights to the rest of the world have a consistently larger association than flights to Europe with all four health and wellbeing variables.

*Table 8: Association between flights to Europe in the past year and health and wellbeing*

Flights in past year to Europe	Coefficient	Standard Error	P> t
<b>Life satisfaction</b>	0.100***	0.015	0.000
<b>GHQ36</b>	-0.095*	0.057	0.098
<b>General health</b>	0.142***	0.011	0.000
<b>Depression</b>	-0.108***	0.046	0.000

*Notes: Coefficient shows the association between the holiday-related variable and the health and wellbeing outcomes listed in the table. \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS regression model for Life satisfaction, GHQ36 and General health. Logit model for Depression. Coefficient in depression model shows impact on log odds ratio. All models control for main determinants of health and wellbeing. Heteroscedasticity-robust standard errors.*

*Table 9: Association between flights to the rest of the world in the past year and health and wellbeing*

Flights in past year to rest of world	Coefficient	Standard Error	P> t
<b>Life satisfaction</b>	0.127***	0.018	0.000
<b>GHQ36</b>	-0.341***	0.068	0.000
<b>General health</b>	0.170***	0.014	0.000
<b>Depression</b>	-0.237***	0.048	0.000

*Notes: Coefficient shows the association between the holiday-related variable and the health and wellbeing outcomes listed in the table. \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS regression model for Life satisfaction, GHQ36 and General health. Logit model for Depression. Coefficient in depression model shows impact on log odds ratio. All models control for main determinants of health and wellbeing. Heteroscedasticity-robust standard errors.*

Compared to the results from the Understanding Society analysis, the results need to take account of potential selection bias within the BHPS since we are unable to control for time-invariant unobservable factors in the single wave for which we have data (i.e. those collected in 2008). The regression methods applied, however, are in line with best-practice in the academic and policy literatures on health and wellbeing. We note that although the variables are not the same, the results for flying abroad in the BHPS are similar to those for having holidays in Understanding Society for all four health and wellbeing outcomes (and very similar for life satisfaction). This suggests the existence of some underlying positive relationship between health, wellbeing and holidays regardless of how we measure the latter variable.

### 4.3.3. Taking Part

We find that having a holiday in the past year that lasted for at least one week is associated with higher levels of happiness and self-reported general health. This is after controlling for a wide range of confounding factors. The full results can be found in Table 19 of Appendix B.

For happiness, the size of the coefficient on holidays is quite large relative to the other determinants in the model. For example, the association between holidays in the past year and happiness is about the size of the

impact of employment on happiness. The association between holidays in the past year and general health is about two-thirds of the size of the impact of employment on general health.

Again, we need to be aware of the risk of bias due to selection in these models. Unlike in the Understanding Society analysis, we are unable to control for time-invariant unobservable factors in the Taking Part Survey because it is not a panel dataset (each wave interviews a different set of individuals as a repeated cross-sectional survey).

*Table 10: Association between holidays in the past year and happiness and health controlling for background variables*

<b>Holiday in past 12 months</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>P&gt; t </b>
<b>Happiness</b>	0.290***	0.042	0.000
<b>General health</b>	0.203***	0.021	0.000

*Notes: Coefficient shows the association between the holiday-related variable and the health and wellbeing outcomes listed in the table. \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS regression models with heteroskedasticity-robust standard errors.*

# 5. Summary & conclusions

## 5.1. Introduction

In this final section we summarise the key findings from the literature review and the empirical analysis. Finally, we identify the key conclusions.

## 5.2. Literature review - summary

We have reviewed 29 studies which examine the relationship between air travel and holidays and quality of life. Most of them are based on analysis of surveys of small groups of people with specific characteristics or small samples designed to be representative of large populations. The sample sizes are typically less than 1,000 observations, although there are exceptions. None of the studies has conducted empirical analysis using datasets similar to those we have used in our empirical analysis reported in Section 4. Furthermore, many studies relate to groups of people from outside the UK.

Based on our literature review, we can draw several key conclusions:

### *Overall impact of holidays on quality of life*

- Individuals report that holidays affect their quality of life<sup>30</sup>.
- Some studies show that individuals who go on holidays report a higher quality of life than those who do not<sup>31</sup> but other evidence suggests no difference in the quality of life<sup>32</sup>.
- Individuals report higher quality of life after going on holiday compared to before<sup>33</sup> and when they are on holiday compared to when they are not on holiday<sup>34</sup>.
- There is a positive anticipation effect of going on holiday: individuals anticipating a holiday are happier than those who are not anticipating one<sup>35</sup>.

### *Variations in impact of holidays on quality of life by demographic group*

- For those from lower socio-economic groups, being able to travel is associated with an increase in quality of life which primarily results from the opportunity to gain positive emotional experiences such as being able to spend time with family and away from a stressful routine<sup>36</sup>. Importantly, neither study compares the size of the effect to that on other socio-economic groups which limits the conclusions that can be drawn about how the impact of holidays on quality of life differs between socio-economic groups.
- One study examined the importance attached to different factors that affect quality of life including holidays amongst different groups. Those who are married and retired place the most importance on holidays whilst younger age groups place the least emphasis on them. Those who are younger, have never

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<sup>30</sup> Dolnicar et al. (2012).

<sup>31</sup> Gilbert and Abdullah (2004) and Nawijn (2011).

<sup>32</sup> Nawijn (2010a) and Nawijn et. al (2010).

<sup>33</sup> Gilbert and Abdullah (2004) and Nawijn et. al (2010).

<sup>34</sup> Nawijn (2011).

<sup>35</sup> Gilbert and Abdullah (2004).

<sup>36</sup> See McCabe and Johnson (2013) and McCabe et al. (2010): the latter uses responses to questions that ask respondents what they felt the most important benefits of going on holiday would be to determine the quality of life impact of going on holiday.

been married and are career driven place an average amount of importance on holiday taking as a quality of life domain<sup>37</sup>.

- The same study also finds that those who have recently suffered from financial distress report holidays as having a less important (positive) influence on their quality of life than those who have not been in financial distress; instead, they place more emphasis on other domains of life satisfaction such as money.
- We found only limited evidence as to whether the impact of holidays on quality of life varies by type of holiday that an individual goes on.
- Few studies assessed the direct link between holidays and health: one study based on a very small sample of cancer patients reports improved personal health (physical and psychological), increased social effectiveness, personal identity and regained independence as the key health benefits of going on holiday.

### ***Other findings***

- A limited number of studies focus purely on the effect that holidays have on work outcomes: one study found that holidays induce both positive and negative effects on work life.

## ***5.3. Empirical analysis - summary***

We use three large UK national datasets to assess how holidays and flights abroad impact on health and wellbeing. The British Household Panel Survey (BHPS) allows us to look at the health and wellbeing effects of taking flights to Europe and the rest of the world (in the past 12 months). The Understanding Society and Taking Part Surveys provide information on the health and wellbeing effects of having holidays (either inside or outside the UK) regularly and in the last 12 months. The Understanding Society dataset also provides data on holidays among those under 16.

We look at the following health and wellbeing outcome measures: life satisfaction, happiness, self-reported general health, mental health measured as the General Health Questionnaire (36-item) scores and depression.

- The general finding across all three datasets is that taking holidays and flights is associated with improvements in health and wellbeing as measured through all of the indicators we use.
- Using the Understanding Society dataset we find that:
  - Among the adult sample having at least one holiday per year that lasts for a minimum of one week is associated with higher levels of life satisfaction, general health and mental health (measured through the GHQ36) and with a lower probability of reporting feeling depressed.
  - Within the youth sample having at least one family holiday per year that lasts for a minimum of one week is associated with higher levels of happiness.

This analysis is able to control for time-invariant individual fixed effects by using the panel aspect of the data. We conclude, therefore, that the results from Understanding Society are more robust to the problem of selection bias than the analysis of the other datasets used here (BHPS and Taking Part) since the latter two datasets are analysed as cross-sectional data.

- In the BHPS data having flown to Europe and the rest of the world during the past year is associated with higher levels of life satisfaction, general health and mental health (measured through the GHQ36) and with a lower probability of reporting feeling depressed. Flights to the rest of the world have a systematically larger association than flights to Europe with all four health and wellbeing variables.

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<sup>37</sup> Dolnicar et al. (2012).

- Having had a holiday outside of the UK in the past year is associated with higher levels of happiness and general health in the Taking Part Survey.
- We note that the results for flying abroad in the BHPS are similar to the results for having holidays in Understanding Society for all four health and wellbeing outcomes (and very similar for life satisfaction). This suggests that there is some underlying positive relationship between health, wellbeing and holidays however we measure the latter variable.
- When we look at different socio-demographic groups in the UK, we find that the relationships between holidays and health and wellbeing are constant across the different groups in all cases except for when assessing by employment status. The association between holidays, flights and improvements in mental health is stronger for unemployed people than it is for employed people.

## ***5.4. Conclusions***

Below, we draw together the key conclusions from our research:

- Our empirical analysis of the UK using three large datasets consistently finds that taking holidays and flights is associated with improvements in health and wellbeing as measured through various indicators of health and wellbeing. The evidence based on the Understanding Society dataset is stronger than that based on BHPS and Taking Part since the former allows us to control for time-invariant individual fixed effects by using the panel aspect of the data whereas the other two datasets are analysed as cross-sectional data.
- This contrasts with the picture from the literature review where the evidence from smaller studies is more ambiguous, although the majority finds a positive relationship between taking holidays and health and wellbeing.
- Evidence from the literature review suggests that individuals report higher quality of life after going on holiday compared to before and when they are on holiday compared to when they are not on holiday. It also suggests a positive anticipation effect of going on holiday: individuals anticipating a holiday are happier than those who are not anticipating one.
- Using the BHPS data, we find that flights to the rest of the world have a systematically larger effect than flights to Europe using all four health and wellbeing variables. In contrast, the studies covered by the literature review found only limited evidence as to whether the impact of holidays on quality of life varies by type of holiday that an individual goes on.
- When we look at different socio-demographic groups in the UK using the three datasets, we find that the relationships between holidays and health and wellbeing are constant across different groups except when assessing by employment status. The association between holidays, flights and improvements in mental health is stronger for unemployed people than it is for employed people. Few of the studies considered as part of the literature review find that the relationships vary according to the characteristics of the individuals, perhaps because they rely upon much smaller samples.

# Appendix A. - Bibliography

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# Appendix B. - Statistical analysis

## B.1. Example questionnaires

Table 11: Self-completion GHQ module (BHPS, Understanding Society)

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The next questions are about how you have been feeling recently.

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Have you recently been able to concentrate on whatever you're doing?

Have you recently lost much sleep over worry?

Have you recently felt that you were playing a useful part in things?

Have you recently felt capable of making decisions about things?

Have you recently felt constantly under strain?

Have you recently felt you couldn't overcome your difficulties?

Have you recently been able to enjoy your normal day-to-day activities?

Have you recently been able to face up to problems?

Have you recently been feeling unhappy or depressed?

Have you recently been losing confidence in yourself?

Have you recently been thinking of yourself as a worthless person?

Have you recently been feeling reasonably happy, all things considered?

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## B.2. Variables used in statistical analysis

Table 12: Descriptions of variables used from the Understanding Society dataset

Variable	Description
<i>Dependent variables</i>	
Life satisfaction	Satisfaction with life overall: 7-point scale, where 1= Completely dissatisfied, and 7= Completely satisfied
General health	General health (self-reported) on a 5-point scale: 1= Poor, and 5= Excellent
GHQ36	General Health Questionnaire (GHQ) 36 item scale: 0= No health problems; 36= High health problems
Depressed	GHQ: unhappy or depressed: 1= Rather or much more depressed than usual; 0= Not at all or no more depressed than usual
Happiness (youth)	How individual feels about life as a whole: 7= Completely happy, and 1= Completely unhappy (for 11-16 year olds)
<i>Holiday variables</i>	
Family holidays every year	Individual/family has a holiday away from home for at least one week a year, whilst not staying with relatives at their home: 1=Yes; 0=Would like to have this but can't afford it at the moment (reference case)
Child has family holiday every year	Child has a family holiday away from home for at least one week a year: 1=Yes; 0=Would like to have this but can't afford it at the moment (reference case)
<i>Control variable</i>	
Age	Age of respondent as continuous variable
Age Squared	Non-linear function of age

Variable	Description
Dependent children	Dependent children: 1= One dependent child or more; 0= No children
Good health	General health (self-reported) on a 5-point scale: 1= Good or better (3-5); 0= Fair to poor (1-2)
Log household income	Gross household income before tax for month before interview as log continuous variable
Household size	Number of people in household
Single	Marital status: 1=Single; 0=Otherwise
Civil_Partner	Marital status: 1=Civil partner; 0= Otherwise
Separated	Marital status: 1=Separated; 0= Otherwise
Divorced	Marital status: 1=Divorced; 0= Otherwise
Widowed	Marital status: 1=Widowed; 0= Otherwise
Higher_Ed	Education: 1=Higher education; 0= Otherwise
Alevel	Education: 1=A-level; 0= Otherwise
GCSE	Education: 1=GCSE; 0= Otherwise
Other qualification	Education: 1=Other qualification; 0= Otherwise
Unemployed	Employment: 1=Unemployed; 0= Otherwise
Retired	Employment: 1=Retired; 0= Otherwise
Student	Employment: 1=Student; 0= Otherwise
Long-term sick	Employment: 1=Inactive, long-term sick; 0=Otherwise
Urban area	Resides in urban area: 1= Yes; 0=Otherwise
East England	1 = East England resident; 0 = Otherwise
East Midlands	1 = East Midlands resident; 0 = Otherwise
Northeast	1 = North East resident; 0 = Otherwise
Northwest	1 = North West resident; 0 = Otherwise
Southeast	1 = South East resident; 0 = Otherwise
Southwest	1 = South West resident; 0 = Otherwise
West Midlands	1 = West Midlands resident; 0 = Otherwise
Yorkshire & Humber	1 = Yorkshire & Humber resident; 0 = Otherwise
Wales	1 = Wales resident; 0 = Otherwise
Scotland	1 = Scotland resident; 0 = Otherwise
Northern Ireland	1 = Northern Ireland resident; 0 = Otherwise
<i>Additional youth sample control variables</i>	
Youth smoker	Currently smokes: 1=Yes; 0= No
Playing truant	<i>Ever played truant: 1=Yes; 0= No</i>
Number of close friends	<i>Number of close friends (self-reported) as continuous variable</i>
Number hours watch TV	<i>Number of hours watching TV (self-reported) as continuous variable</i>
Number hours play sport	<i>Number of hours playing sport (self-reported) as continuous variable</i>

Table 13: Descriptions of variables used from the BHPS dataset

Variable	Description
<i>Dependent variables</i>	
Life satisfaction	Self-reported life satisfaction on 1-7 scale
General health	General health (self-reported) on a 5-point scale: 1= Poor, and 5= Excellent
GHQ36	General Health Questionnaire (GHQ) 36 item scale: 0= No health problems; 36= High health problems
Depression	GHQ: unhappy or depressed: 1= Rather or much more depressed than usual; 0= Not at all or no more depressed than usual
<i>Holiday variables</i>	
Flight to Europe	1= Flight within Europe in past 12 months, 0=Otherwise
Flight to rest of the world	1= Flight outside of Europe in past 12 months, 0=Otherwise
<i>Control variables</i>	
Log Household Income	Log. annual household income
Age	Age of respondent as continuous variable
agesq	Non-linear function of age
Male	Gender: 1= Male, 0= Otherwise
Married	Marital status: 1= Married, 0=Otherwise
Separated	Marital status: 1= Separated, 0=Otherwise
Divorced	Marital status: 1= Divorced, 0=Otherwise
Widowed	Marital status: 1= Widowed, 0=Otherwise
Employment	Marital status: 1= Employed, 0=Otherwise
Degree	Education: 1= Has a degree, 0=Otherwise
Children	Number of children as continuous variable
Talk to neighbours	1= Talk to neighbours on most days, 0=Otherwise
Meet people	1= Meet people on most days, 0=Otherwise
Social housing	1= Lives in social housing, 0=Otherwise
Scotland	1= Scotland resident, 0=Otherwise
Wales	1= Wales resident, 0+otherwise
Northern Ireland	1= Northern Ireland resident, 0=Otherwise
North East	1= North East resident, 0=Otherwise
North West	1= North West resident, 0=Otherwise
Yorkshire & Humber	1= Yorkshire and Humber resident, 0=Otherwise
East Midlands	1= East Midlands resident, 0=Otherwise
West Midlands	1= West Midlands resident, 0=Otherwise
East England	1= East England resident, 0=Otherwise
Safe area	1= No vandalism/crime problems in area, 0=Otherwise

*Table 14: Descriptions of variables used from the Taking Part dataset*

Variable	Description
<i>Dependent variables</i>	
Happy	Taken all things together how happy are you? (on a 1-10 scale)
General health	General health (self-reported) on a 5-point scale: 1= Poor, and 5= Excellent
<i>Holiday variables</i>	
Holiday in past 12 months	1= Had holiday outside UK in past 12 months (that lasted for at least 1 week), 0=Otherwise
<i>Control variable</i>	
Income	Personal earnings scale in £5,000 increments
Age	Age of respondent as continuous variable
Agesq	Non-linear function of age
Male	Gender: 1= Male, 0=Otherwise
White	Ethnicity: 1= White, 0=Otherwise
Married	Marital status: 1= Married, 0=Otherwise
Separated	Marital status: 1= Separated, 0=Otherwise
Divorced	Marital status: 1= Divorced, 0=Otherwise
Widowed	Marital status: 1= Widowed, 0=Otherwise
Religious	1= Religious, 0=Otherwise
Higher education	Education: 1 = Higher education qualification (degree or higher), 0=Otherwise
Employed	Employment: 1= Employed, 0=Otherwise
Dependent children	1= Has dependent children, 0=Otherwise
North West	1= North West resident, 0=Otherwise
Yorkshire & Humber	1= Yorkshire and Humber resident, 0=Otherwise
East Midlands	1= East Midlands resident, 0=Otherwise
West Midlands	1= West Midlands resident, 0=Otherwise
East England	1= East England resident, 0=Otherwise
South East	1= South East resident, 0=Otherwise
South West	1= South West resident, 0=Otherwise
Social housing	1= Lives in social housing, 0=Otherwise
Spend time with friends/family	1= Spends free time with friends/family, 0=Otherwise

*Table 13: Descriptive statistics of variables used from the Understanding Society dataset*

Variable	Mean
Life satisfaction	5.00
General health	3.56
GHQ36	10.59
Depressed	0.21

Variable	Mean
Happiness (youth)	5.88
Family holidays every year	0.70
Child has family holiday every year	0.73
Age	39.02
Age Squared	1698.40
Dependent children	0.23
Good health	0.85
Household income	4273.31
Log household income	8.14
Household size	3.21
Married	0.48
Single	0.40
Civil_Partner	0.00
Separated	0.02
Divorced	0.08
Widowed	0.01
Degree	0.27
Higher_Ed	0.12
Alevel	0.24
GCSE	0.23
Other qualification	0.07
No qualification	0.06
Employed	0.71
Unemployed	0.06
Retired	0.03
Student	0.09
Long-term sick	0.04
Urban area	0.79
London	0.13
East England	0.09
East Midlands	0.08
Northeast	0.11
Northwest	0.04
Southeast	0.14
Southwest	0.08
West Midlands	0.09
Yorkshire & Humber	0.09

Variable	Mean
Wales	0.05
Scotland	0.08
Northern Ireland	0.03
Youth smoker	0.02
Playing truant	0.08
Number of close friends	6.46
Number hours watch TV	1.95
Number hours play sport	3.99

### ***B.3. Results of statistical analysis***

*Table 15: Association between regular holidays and health and wellbeing - Understanding Society*

	Life satisfaction		GHQ36		General health		Depression	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Age	-0.104***	0.014	0.211***	0.048	0.035***	0.007	-0.027	0.035
Agesq	0.000***	0.000	-0.003***	0.001	-0.001***	0.000	0.000	0.000
Dependent children	0.096***	0.037	-0.039	0.13	-0.004	0.02	0.032	0.091
Log household income	0.038***	0.012	-0.152***	0.044	0.002	0.006	-0.106***	0.032
Household size	0.004	0.011	-0.032	0.04	-0.002	0.006	-0.017	0.029
Single	0.016	0.047	0.036	0.166	0.031	0.025	-0.12	0.118
CivilPartner	0.301	0.217	0.041	0.78	-0.014	0.117	0.313	0.522
Separated	-0.149**	0.063	0.980***	0.222	-0.023	0.032	0.300**	0.141
Divorced	0.045	0.061	0.002	0.214	0.014	0.031	-0.047	0.144
Widowed	-0.089	0.129	0.122	0.456	-0.058	0.064	0.436	0.279
Higher Degree	-0.062	0.082	-0.428	0.29	-0.031	0.043	-0.063	0.204
Alevel	-0.012	0.06	-0.187	0.213	-0.042	0.032	-0.048	0.148
GCSE	-0.019	0.068	-0.096	0.24	-0.038	0.036	0.024	0.171
Other qualification	0.145	0.093	-0.052	0.329	-0.047	0.048	-0.075	0.249
Unemployed	-0.233***	0.031	1.755***	0.109	-0.038**	0.016	0.698***	0.074
Retired	0.07	0.051	0.206	0.178	-0.037	0.026	0.049	0.15
Student	0.075*	0.043	0.225	0.151	-0.009	0.022	-0.046	0.103
Longterm sick	-0.412***	0.055	3.109***	0.192	-0.461***	0.027	0.887***	0.122
Urban area	-0.023	0.058	0.174	0.204	-0.034	0.032	-0.197	0.152
North East	0.092	0.287	0.1	1.015	0.169	0.152	0.167	0.83
North West	0.163	0.183	-1.913***	0.65	-0.026	0.095	-0.993*	0.554
Yorkshire & Humber	0.061	0.193	-0.494	0.686	-0.086	0.104	-0.512	0.568
East England	-0.127	0.175	0.228	0.623	-0.188**	0.093	0.612	0.484
West Midlands	-0.138	0.192	-0.682	0.683	0.06	0.102	-0.075	0.48

	Life satisfaction		GHQ36		General health		Depression	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
East Midlands	-0.291*	0.157	1.639***	0.557	-0.133	0.082	1.168***	0.396
South East	-0.087	0.127	0.073	0.448	-0.042	0.068	0.281	0.309
South West	-0.032	0.171	0.184	0.607	-0.098	0.092	0.13	0.448
Wales	-0.083	0.237	-1.423*	0.844	0.034	0.13	-0.526	0.639
Scotland	-0.351	0.251	0.316	0.889	0.05	0.139	0.161	0.728
Northern Ireland	0.636	0.595	-1.562	2.103	-0.013	0.344	-0.808	1.354
Good health	0.322***	0.021	N/A	N/A	N/A	N/A	N/A	N/A
Holidays every year	0.106***	0.019	-0.426***	0.067	0.045***	0.01	-0.181***	0.046
Constant	8.218***	0.334	8.360***	1.175	3.257***	0.174	N/A	N/A
Observations	96,007		96,177		110,395		21,473	

Notes: \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. Fixed effects OLS model for life satisfaction, GHQ36 and General health. Fixed effects logit model for Depression. Coefficient in depression model shows impact on log odds ratio (probability impacts not calculable in fixed effects logit models). Reference case for region = London. Reference case for marital status = married. Reference case for employment status = employed or self-employed. Reference case for educational status = no qualifications. The variable 'Good health' is dropped from the health outcomes models.

Table 16: Association between regular holidays and happiness for youth sample (11-16 year olds) - Understanding Society

	Happiness	
	Coefficient	SE
Age	-0.044	0.034
Agesq	0.000	0.000
Youth smoker	-0.300***	0.093
Plays truant	-0.363***	0.05
Number of close friends	0.006***	0.002
Number hours watch TV	0.002	0.019
Number hours play sport	0.080***	0.011
Log household income	-0.026	0.034
Urban	0.268	0.215
North East	-0.776	1.143
North West	-1.244	1.021
Yorkshire & Humber	0.289	1.054
East England	-0.053	1.431
West Midlands	0.258	1.058
East Midlands	-0.183	0.57
South East	-0.852	0.837
South West	-0.038	1.185
Wales	-1.799	1.373
Scotland	0.696	1.081
<b>Child has family holidays every year</b>	<b>0.119***</b>	<b>0.036</b>
Constant	7.406***	0.915
Observations	18,297	

Notes: \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. Fixed effects OLS model. Reference case for region = London. Northern Ireland was dropped from the region variables due to small sample sizes for that region.

*Table 17: Association between flights to Europe in the past year and health and wellbeing - BHPS*

	Life satisfaction		GHQ36		General health		Depression	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Log Income	0.030***	0.011	-0.036	0.043	0.039***	0.009	-0.032	0.026
Age	-0.039***	0.003	0.098***	0.01	-0.028***	0.002	0.023***	0.006
Agesq	0.000***	0.000	-0.001***	0.000	0.000***	0.000	-0.000***	0.000
Male	-0.034**	0.014	-0.867***	0.055	0.038***	0.01	-0.327***	0.034
Married	0.166***	0.021	0.191**	0.08	0.027*	0.016	0.015	0.049
Separated	-0.321***	0.067	1.470***	0.028	-0.186***	0.053	0.583***	0.128
Divorced	-0.293***	0.039	0.367**	0.143	-0.105***	0.029	0.045	0.079
Widowed	-0.180***	0.043	0.906***	0.157	-0.049	0.031	0.278***	0.089
Employment	0.106***	0.019	-0.554***	0.074	0.324***	0.014	-0.242***	0.041
Degree	-0.040**	0.019	0.028	0.076	0.128***	0.014	0.07	0.048
Health	0.478***	0.009	-1.782***	0.037	N/A	N/A	-0.668***	0.019
Children	-0.029***	0.009	0.106***	0.06	0.019***	0.007	-0.036*	0.021
Talk Neighbours	0.154***	0.016	-0.405***	0.058	0.054***	0.012	-0.182***	0.036
Meet People	0.111***	0.015	-0.157***	0.092	0.024**	0.011	-0.05	0.035
Social Housing	-0.132***	0.025	0.177*	0.097	-0.273***	0.017	0.146***	0.047
Scotland	0.068***	0.025	-0.530***	0.101	0.005	0.019	-0.234***	0.06
Wales	0.098***	0.026	-0.037	0.106	-0.069***	0.02	-0.078	0.059
Northern Ireland	0.180***	0.028	-0.169	0.186	-0.032*	0.019	-0.329***	0.066
North East	0.079	0.049	-0.357*	0.128	-0.235***	0.038	-0.099	0.106
North West	0.03	0.032	-0.262**	0.129	-0.077***	0.025	-0.1	0.074
Yorkshire & Humber	0.131***	0.034	-0.640***	0.145	-0.086***	0.026	-0.289***	0.082
East Midlands	0.128***	0.037	-0.510***	0.143	-0.121***	0.028	-0.203**	0.084
West Midlands	0.088**	0.036	-0.259*	0.126	-0.114***	0.028	-0.059	0.084
East England	0.081**	0.034	-0.486***	0.126	0.03	0.026	-0.286***	0.084
South West	0.062*	0.034	-0.18	0.137	-0.014	0.026	-0.145*	0.082
Safe Area	0.148***	0.024	-0.617***	0.092	0.191***	0.017	0.317***	0.046
<b>Flights to Europe</b>	<b>0.100***</b>	<b>0.015</b>	<b>-0.095*</b>	<b>0.057</b>	<b>0.142***</b>	<b>0.011</b>	<b>0.108***</b>	0.036
Constant	3.382***	0.131	19.830***	0.508	3.946***	0.098	1.900***	0.302
Observations	24,586		24,492		26,050		24,644	0.000
r2	0.185		0.165		0.124		0.085	

Notes: \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS regression with heteroscedasticity robust standard errors. Reference group for regions = London and South East. Reference group for marital status = single/co-habiting.

*Table 18: Association between flights to rest of the world (ROW) in the past year and health and wellbeing - BHPS*

Life satisfaction	GHQ36	General health	Depression
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	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Log income	0.031***	0.011	-0.029	0.043	0.042***	0.009	-0.03	0.025
Age	-0.039***	0.003	0.099***	0.01	-0.028***	0.002	0.024***	0.006
Agesq	0.000***	0.000	-0.001***	0.000	0.000***	0.000	-0.000***	0.000
Male	-0.034**	0.014	-0.869***	0.055	0.038***	0.011	-0.329***	0.034
Married	0.168***	0.021	0.196**	0.08	0.029*	0.016	0.015	0.049
Separated	-0.314***	0.067	1.453***	0.284	-0.176***	0.053	0.570***	0.128
Divorced	-0.293***	0.039	0.371***	0.143	-0.107***	0.029	0.045	0.079
Widowed	-0.179***	0.043	0.908***	0.157	-0.048	0.031	0.279***	0.089
Employment	0.110***	0.019	-0.560***	0.074	0.330***	0.014	-0.247***	0.041
Degree	-0.037**	0.019	0.033	0.076	0.134***	0.014	0.071	0.048
Health	0.478***	0.009	-1.775***	0.037	NA	NA	-0.665***	0.019
Children	-0.031***	0.009	0.098***	0.034	0.017**	0.007	-0.038*	0.021
Talk Neighbours	0.154***	0.016	-0.411***	0.06	0.054***	0.012	-0.184***	0.036
Meet People	0.112***	0.015	-0.156***	0.058	0.026**	0.011	-0.05	0.035
Social Housing	-0.137***	0.025	0.164*	0.092	-0.281***	0.018	0.145***	0.047
Scotland	0.071***	0.025	-0.544***	0.097	0.009	0.019	-0.243***	0.06
Wales	0.100***	0.026	-0.058	0.1	-0.067***	0.02	-0.087	0.059
Northern Ireland	0.183***	0.028	-0.182*	0.106	-0.03	0.02	-0.335***	0.066
North East	0.087*	0.049	-0.378**	0.187	-0.224***	0.038	-0.115	0.106
North West	0.034	0.032	-0.272**	0.128	-0.071***	0.025	-0.109	0.074
Yorkshire & Humber	0.137***	0.033	-0.661***	0.129	-0.078***	0.026	-0.302***	0.082
East Midlands	0.129***	0.037	-0.526***	0.145	-0.120***	0.028	-0.211**	0.084
West Midlands	0.091**	0.036	-0.277*	0.143	-0.109***	0.028	-0.066	0.083
East England	0.074**	0.033	-0.482***	0.126	0.021	0.026	-0.280***	0.082
South West	0.062*	0.034	-0.195	0.137	-0.015	0.026	-0.150*	0.082
Safe Area	0.148***	0.024	-0.616***	0.092	0.193***	0.017	0.317***	0.046
<b>Flights to ROW</b>	<b>0.127***</b>	<b>0.018</b>	<b>-0.341***</b>	<b>0.068</b>	<b>0.170***</b>	<b>0.014</b>	<b>-0.237***</b>	<b>0.048</b>
Constant	3.374***	0.131	19.753***	0.507	3.932***	0.099	1.873***	0.000
Observations	24,586		24,492		26,050		24,644	
r2	0.185		0.165		0.124		0.09	

Notes: \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS regression with heteroscedasticity robust standard errors. Reference group for regions = London and South East. Reference group for marital status = single/co-habiting.

Table 19: Association between holidays in the past year, happiness and general health -Taking Part

	Happiness		Health	
	Coefficient	SE	Coefficient	SE
Income	-0.001	0.009	0.019***	0.004
Age	-0.084***	0.008	-0.034***	0.004
Agesq	0.001***	0.000	0.000***	0.000
Male	-0.031	0.042	0.023	0.021
White	0.108*	0.059	-0.051*	0.028
Married	0.631***	0.061	0.079***	0.028
Separated	-0.049	0.098	0.013	0.046
Divorced	0.018	0.079	-0.018	0.039
Widowed	-0.133	0.147	-0.014	0.072
Health	0.587***	0.027	N/A	N/A

	Happiness		Health	
	Coefficient	SE	Coefficient	SE
Employed	0.300***	0.049	0.323***	0.024
Higher Education	0.058	0.051	0.109***	0.025
Religious	0.100**	0.046	0.008	0.023
Dependent children	0.124***	0.047	0.124***	0.023
North East	0.033	0.085	-0.033	0.042
North West	-0.058	0.082	-0.034	0.04
Yorkshire & Humber	0.027	0.078	0	0.04
East Midlands	-0.052	0.086	0	0.041
West Midlands	-0.066	0.081	-0.014	0.038
East England	-0.064	0.081	0.009	0.04
South East	-0.116	0.073	0.039	0.036
South West	0.045	0.078	0.029	0.038
Social Housing	0.03	0.049	-0.081***	0.024
Spend time with friends/family	0.147***	0.052	0.032	0.025
<b>Holiday in past 12 months</b>	<b>0.290***</b>	<b>0.042</b>	<b>0.203***</b>	<b>0.021</b>
Constant	5.831***	0.199	4.411***	0.076
Observations	7,516		7,534	
r2	0.151		0.166	

Notes: \*\*\* significant at 0.01 level; \*\* significant at 0.05 level; \* significant at 0.10 level. OLS regression with heteroscedasticity robust standard errors. Reference group for regions = London. Reference group for marital status = single/co-habiting.

