



Assessing the relationship between subjective wellbeing and spending time with family in the outdoors



secondary analysis

Paul Dolan and Stefano Testoni

In partnership with:



HM Government



University of Brighton



THE UNIVERSITY OF
WINCHESTER



Brunel
University
London



the LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE

Culture and Sport Evidence Programme
What Works Centre for Wellbeing
www.whatworkswellbeing.org
@whatworksWB

Contents

Executive summary	3
1. Introduction	5
2. Methodology	8
3. Summary of results	16
4. Discussion	23
5. Future research	27
A1. Literature review	29
A2 Statistical analysis	31
A3. Regression tables	34
A4. References	46

Executive summary

This report examines the relationship between subjective wellbeing (SWB) and spending time with family members in the outdoors (i.e., in “green” and “blue” spaces, such as countryside, lakes, parks, seaside, etc.). Current evidence suggests that each of spending time with family and being in the outdoors are associated with higher levels of SWB. Irrespective of where we are, we are happier when we are with relatives than on our own – though we are sometimes happiest of all with friends; and irrespective of who we are with, we are happier when we are outdoors than at home, in the workplace or in other indoor or urban locations. We though have limited understanding of how we feel when both with family and outdoors, and in particular of whether spending time outdoors with family makes us more or less happy than spending time outdoors with friends. Against a background of policies for making outdoor spaces more accessible to citizens, addressing these questions can inform decisions about who the best people to be with in the outdoors are.

We analysed two large datasets on how people use their time and feel during a typical day in their lives: the UK Time Use Survey (UKTUS) and the American Time Use Survey (ATUS), which enquire into the daily experiences of residents in the UK and in the USA, respectively. Both datasets contain information on what people do throughout the day, where, and with whom. In the UKTUS, SWB is measured by self-reports about how much people enjoyed doing a given activity, while in the ATUS it is variously measured as self-reported levels of happiness, stress and meaning experienced during an activity (we considered all these measures on a scale ranging from 0 to 10 points). We estimated the separate effects on SWB of being with family (which we compared to the effect of being with friends) and that of being outdoors, as well as the total effect of being with family (or friends) and outdoors simultaneously. In addition, we estimated the same effects in relation to specific family members (i.e., partner, children, parents and other members), as well as to time spent doing activities within either of the following domains: 1) culture and entertainment; 2) eating; 3) socialising; 4) sport and physical activity; 5) walking and biking.

In the UKTUS, we found that spending time with family was on average linked to an increase in enjoyment of 0.48 points, as opposed to spending time by oneself. We also found that the average gain in enjoyment associated with spending time with friends was of similar magnitude (+0.49; again, compared with being alone). Time outdoors was associated with a rise in enjoyment of 1.04 points, as opposed to being elsewhere. We found no further gain or loss in enjoyment when people reported being both outdoors and with family, whereby the total effect was simply the sum of the “family effect” and the “outdoors effect”, i.e. +1.52 points. Conversely, we found that the total effect of time outdoors with friends was less than the sum of the separate “friends effect” and “outdoors effect”, amounting to +1.28 points only. On average, therefore, our sample of UK residents reported enjoying their time outdoors with relatives more than their time outdoors with friends.

Getting into the specifics, we found that, among all the relatives considered, being with one’s partner was associated with by far the largest rise in enjoyment (+0.47 points). Time spent with young children entailed the smallest rise (+0.05), while the company of parents and that of other family members lay in between (+0.17 and +0.24, respectively). The “partner effect” is similar to the average “family effect” because there were more reports of time spent with partners than with any other relative in the UKTUS. There were no occasions where the total effect of being outdoors with a particular family member differed from the sum of the separate effects. Effectively, then, partners are the only family members the Brits enjoy spending time with as much as or more than their friends, outdoors or elsewhere. In terms of activities, doing sport was the activity people reported enjoying the most when they were outdoors with their family, followed by eating and activities connected with culture and entertainment. With the notable exception of socialising, all activities considered were associated with higher enjoyment when performed outdoors in presence of family than in presence of friends.

In the ATUS, we found that the “family effect” amounted, on average, to an increase in happiness of 0.78 points, a reduction in stress of 0.32, and a rise in meaning of 1.06, relatively to being alone. When people were with friends, the average gain in happiness rose to 1.10 points, and the loss in stress to 0.51, again compared to being alone (the increase in meaning was similar to that linked to family: +1.02). The “outdoors effect”, in contrast, consisted of a gain in happiness of 0.52 points, a decrease in stress of 0.42, and an increase in meaning of 0.81. The total effects equalled the sum of the independent effects in all cases except for the reduction in stress linked to time spent outdoors with friends, which was less than the sum of the independent effects. Comparing the effect of time outdoors with family with that of time outdoors with friends, Americans thus feel less happy (+1.30 vs. +1.62) but also less stressed (-0.74 vs. -0.19), while experiencing similar gains in meaning (+1.87 vs. +1.83).

For all family members, the average rise in SWB was generally inferior to the “friends effect”. The largest gains in happiness and in meaning were associated with family members other than partners, children and parents (+1.05 and +1.39), whilst the largest reduction in stress was connected with the company of parents (-0.44). We did find, however, that the total effect of being outdoors with one’s partner on happiness and on meaning were greater than the sum of the independent effects, amounting to +1.64 and +2.13 points, respectively. Also from the ATUS, we may thus infer that people are best off together with their partners when outdoors, even compared with when they are with friends. Looking at the activities performed outdoors with family members, people felt the happiest during culture and entertainment, the least stressed during sport and physical activity, and found socialising to be the most meaningful. Except for eating, performing all the considered activities is consistently linked to higher levels of SWB when people are outdoors with family than when they are outdoors with friends.

Our findings cannot be interpreted causally, and they point out sizeable differences across the UK and the USA (e.g., the “family effects” are larger among Americans, whilst the “outdoors effect” is larger in the UK). Nonetheless, they provide insight into the benefits of being with family in the outdoors, improving on the current evidence base. We conclude that, in general, time spent with relatives in outdoor spaces is positively correlated to SWB. In particular, while on average spending time with friends is coupled with higher SWB as compared with spending time with family, this trend is often reversed in the outdoors. We recommend that current policies promoting access to the outdoors be supplemented by interventions that encourage people to bring over at least their partners when visiting outdoor spaces, and to engage in activities related to culture and sport with them. Future research should investigate outdoor spaces and other family members (e.g., siblings, grandparents, grandchildren) in more detail, and attempt to establish causal links.

Introduction

Spending time outdoors in “green” spaces (countryside, parks, woodland, etc.) and in “blue” spaces (coastline, lakes, rivers, etc.) is widely recognised as entailing benefits for wellbeing. The better quality of air, reduced exposure to urban crowds and traffic, and the amenities of natural sceneries that one can find in these spaces favour relief from stress, enhanced mood and a range of positive health outcomes (see the literature review in the appendix for more details). For this reason, a lot of attention has been lately devoted to preserving and further developing outdoor environments, and to facilitating people’s access to them. In the UK, these are now chief goals in national and local environmental, health and planning policy agendas. Public Health England has recently reviewed some of the most effective initiatives currently in action.¹ In 2013, the Landscape Institute published an influential position statement where they set out guidelines on how to use outdoor spaces to improve health and wellbeing.²

Outdoor spaces are ideal locations for people to spend time with their close kin and reinforce familial bonds. In general, according to existing evidence, being in company of family members is positively correlated with wellbeing, regardless of whether people find themselves outdoors or in other places (at home, at work, in cafes or restaurants, urban areas, etc.). More specifically, although people often report feeling better when they are with their best friends than when they are with their relatives, time spent with family is still more beneficial than time spent alone or with someone unrelated other than one’s friends, such as work colleagues and neighbours (see the literature review for more details).

Given the gain in wellbeing that the outdoors and the family generate on their own, spending time both with one’s family and in the outdoors should give rise to even greater benefits. On the basis of current evidence, however, what the benefits of this joint experience amount to remains unclear. In particular, it is unclear how the total effect of the joint experience compares with the benefits that time outdoors and time with family entail independently. This is a question of whether combining time outdoors and time with family entails increasing, decreasing or constant marginal returns to wellbeing: that is, whether the total effect is greater, smaller or equal to the sum of the independent effects. It may be that the joint experience makes people fare better, or perhaps worse, than the mere addition of the separate effects suggests. If this were the case, the independent effects would either be boosted or reduced when they occur together. To clarify this matter, one would need to compare the total effect of spending time with family in the outdoors with the sum of, on the one hand, the average effect of spending time with family anywhere and, on the other hand, the average effect of spending time outdoors with anyone.

Besides the lack of evidence in regard to the overall benefits of time outdoors with family, there is limited evidence in relation to how time spent outdoors with family compares to time spent outdoors with friends. While on average being in company of friends has been shown to be better than being together with relatives, it might still be that, in outdoor environments, being with family is better than being with friends. Perhaps the company of friends is most enjoyable in places such as bars and cafes, but not as much in the outdoors, where instead people might be most comfortable with their relatives.

¹https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/357411/Review8_Green_spaces_health_inequalities.pdf

² https://www.landscapeinstitute.org/PDF/Contribute/PublicHealthandLandscape_CreatingHealthyPlaces_FINAL.pdf

Another outstanding matter is *which* family members people have the best time in the outdoors. The family includes a variety of relatives, and not all relatives are the same. It is natural to think that, on average, people enjoy spending time with their next of kin (partners, parents and own children) more than with the extended family (e.g., cousins, grandparents, uncles and aunts), outdoors or elsewhere. Yet there is little evidence in this respect, especially as far as spending time in outdoor spaces is concerned. Moreover, that time spent with close kin is better is by no means granted. The company of close kin may also have some adverse effects on wellbeing in certain cases: for example, spending time with young children or older parents, while enjoyable, may also involve a lot of effort and strain.

An understanding of the above issues would be valuable within a policy context where promoting engagement with the outdoors is a chief goal. It would inform about what the benefits of visiting outdoor environments in company of different people are, and whom one should be accompanied by – family or friends? And, if family, which family members? This information would in turn help policymakers to maximise the improvement in wellbeing that is expected from “green” and “blue” policy interventions.

The aim of this report is therefore to fill the voids left by previous research so as to gain a better understanding of how spending time outdoors with family impacts upon people’s wellbeing. This aim was achieved by analysing large-scale datasets from the UK and the USA, both of which include information on how people spend their time, where and with whom they spend it, and how they feel meanwhile. The analysis primarily enquired into the total benefits of being with family and in the outdoors, comparing these to the wellbeing gains typically arising when people spend time outdoors in company of their friends. Besides probing average trends, the analysis also gauged the wellbeing gains associated with time outdoors in presence of specific family members (partner, children, parents and other relatives), as well as those associated with performing a selected set of recreational activities in outdoor environments and in presence of family members, in order to gain insight into which activities enhance wellbeing the most in the outdoor context.

Wellbeing may be conceptualised in various ways. In this report, it is understood as subjective wellbeing (SWB), in the wake of recent developments in academic research and policymaking paying more attention to the subjective experience of the individual rather than to ‘objective’ appraisals about what is good for people based on experts’ judgements or on people’s own preferences. SWB conceives wellbeing in terms of the feelings arising from what people do and think, and it is measured by directly asking people to rate how they feel (see Dolan, 2014; Kahneman et al., 1997).

Two types of SWB measures can be distinguished: evaluative and experiential (see Dolan, 2014; Dolan & Kudrna, 2016). Evaluative measures of SWB consist of people’s summary assessments of how they feel, of which the most known example is life-satisfaction (*Overall, how satisfied are you with your life nowadays?*). In contrast, experiential measures of SWB capture how people feel on a moment-to-moment basis; this type of measure requires a direct assessment of how people spend their time and how they feel meanwhile. This report considers the latter type of measure only, because the focus is on how people feel in specific instances of their use of time – namely, when they are outdoors in company of their family.

It is important to note that the findings of this report do not necessarily imply a causal link between SWB and time spent outdoors with family. This is because the data used to extrapolate the findings suffer from “simultaneity bias” (i.e., the fact that SWB and

time use are measured at the same time), whereby it is impossible to ascertain “which caused which” – provided there be any causal link. While it may be that spending time outdoors with relatives makes people feel better, it may also be that people who feel better (for whatever reason) tend to spend more time with their family in the outdoors. Therefore, the findings presented and discussed below should only be interpreted as correlations, despite the frequent use to the word “effect” in these lines (mainly for convenience). Correlations are nonetheless interesting and informative by themselves, because they may indicate the presence of causal relationships, and because they at least reveal who feels better between those who do and do not spend some time outdoors with family.

As a secondary remark, it must be pointed out that this report is concerned with *average* associations between SWB and time outdoors with family in the populations being studied. Any differences in these associations across socio-demographic groups are not explored. As it often happens, however, socio-demographics may moderate average trends: young people, for example, may consistently feel better when spending time with their friends, outdoors or elsewhere, while the company of family members may be more appreciated among older adults. The results presented in this report should therefore be read bearing in mind that they are average trends and that they may not apply to all segments of the population. Although not very specific, average trends can still be a good starting point for investigating the effect of spending time outdoors with family on SWB.

Finally, another limitation of the findings of this report lies in how the outdoors was conceptualised in the data analysis. Due to lack of information in the data, a distinction among different outdoor environments (e.g., blue and green spaces, and types of each) was not attainable. All varieties of outdoor spaces could only be considered within a single, all-encompassing category, whereby any effect of spending time outdoors is only an average across different kinds of outdoor space. This notwithstanding, the findings do provide some basic insights into the relationship between spending time outdoors and SWB.

The remainder of this report is organised as follows. The next section (2) describes the data, measures and analytical methods used to produce evidence. The following section (3) outlines the results of the analysis. The last two sections discuss the results and their policy implications (4) and conclude by providing recommendations for future research (5). The appendix to the report contains: a brief review of the relevant literature (A1); a more detailed description of the analytical methods (A2); tables with full results from the analysis (A3); the list of references (A4).

2. Methodology

2.1. Data sources

To match the goal of this report, the data had to include information about what people do in their day-to-day lives, and how they feel during each activity they engage in. More specifically, the data had to inform on where people find themselves during the time they spend doing the activities that they do, in order to distinguish between outdoor spaces and other locations, as well as information on the people they are with, so as to distinguish among spending time alone, with family members, with friends or with other people. Only time-use databases contain so detailed information, whereby the search for datasets was limited to these kinds of dataset. In particular, the following two datasets were appointed for their ease of accessibility and their relevance to a UK audience: the United Kingdom Time Use Survey (UKTUS) and the American Time Use Survey (ATUS).

The UKTUS is a study of how people living in the UK spend time in their daily lives. It was conducted by the Centre for Time Use Research at the University of Oxford during 2014-2015. The data are freely accessible via the UK Data Service. The core of the UKTUS is a day-reconstruction type of study (see Kahneman et al., 2004). Specifically, respondents were asked to report what they did in every ten-minute slot of a given day. Each respondent was asked to do so for two selected days: one weekday and a weekend day. A subset of respondents was also asked to rate how they felt during each time slot they reported on. The analysis was therefore limited to this subset of respondents only.

The ATUS is a study of how American people allocate their time in a typical day of their lives. The survey is sponsored by the US Bureau of Labor Statistics, and it has been conducted by the US Census Bureau on a yearly basis since 2003. The data are publicly available for download from the survey website.³ Also the ATUS follows the day-reconstruction paradigm. Respondents are asked to report the main activities they have engaged in throughout the day prior to the survey. In addition to surveying time use, the 2010, 2012 and 2013 waves include the ‘Well-being Modules’, which measures the feelings each respondent experienced during three activities randomly selected from the set of activities he or she reported doing. The analysis was thus restricted to these waves and to the reports that included the assessment of feelings.

2.2. Measures

Subjective wellbeing

Both the UKTUS and the ATUS measure experienced SWB, i.e. how people felt during the activities they reported doing.

In the UKTUS, SWB is measured as the level of **enjoyment** – namely, how much people enjoyed a given time slot. Specifically, respondents were asked the following question: “How much did you enjoy this time?”. Responses were taken on a 1-7 scale, where 1 meant “not at all” and 7 meant “very much”.

³ http://www.bls.gov/tus/datafiles_0315.htm

In the ATUS, SWB is variously measured as the levels of **happiness**, **stress** and **meaning** experienced during the time they spent doing an activity. To measure happiness and stress, respondents were asked the following question: “From 0 to 6, where a 0 means you were not happy/stressed at all and a 6 means you were very happy/stressed, how happy/stressed did you feel during this time?”. To measure meaning, respondents were instead asked: “From 0 to 6, how meaningful did you consider what you were doing? 0 means it was not meaningful at all to you and 6 means it was very meaningful to you”. As clear from the wording of the questions, all feelings were assessed on a 0-6 scale.

For ease of interpretation, all the measures of SWB in the UKTUS and in the ATUS were converted on a scale from 0 to 10.

Where

Both in the UKTUS and in the ATUS, respondents were asked where they were during the time they spent doing the activities they reported.

In the UKTUS, respondents were asked: “Where were you?” and could report their location (or mode of transport if they were travelling) in an open-ended format. The survey designers subsequently coded such reports in various categories of location. One of these was “**Parks, countryside, beach, seaside or coast**”. This was the only location category that could be considered as representing outdoor spaces (i.e., “green” and “blue” spaces). Therefore, time spent in places falling within this category was considered as time outdoors.

In the ATUS, respondents were asked: “Where were you during the activity?”. To respond, they could choose one of an array of locations specified by the interviewer. One of these was “**Outdoors away from home**”. Although this location may also designate spaces that are not classifiable as “green” and “blue”, this was the only option available to respondents to report they were in outdoor spaces as intended in this report. Therefore, whenever respondents selected this kind of location, they were considering as spending time outdoors in that instance.

With whom

Both in the UKTUS and in the ATUS, respondents were asked with whom they were spending time.

In the UKTUS, respondents were asked: “Were you alone or with somebody you know?”. To respond, people could select one or more options.⁴ The categories of people respondents spent time with that were considered for the analysis were:

- **Alone**
- **Partner**
- **Parents**
- **Children aged 0-7**

⁴ These were: “alone”, “spouse/partner”, “mother”, “father”, “child aged 0-7”, “others living with you (including children aged 8 or over)” and “others you know”. For the analysis, the options “mother” and “father” were grouped in a single category labelled “parents” (mainly for the sake of consistency with the categories available in the ATUS: see below). The category “others living with you” does not designate family members necessarily; however, for the present purposes, it was considered as designating family members other than the ones mentioned in the other categories. Because people were not asked whom they were with when they were at work, the category “others you know” is likely to comprise of friends and acquaintances mainly. For the present purposes, it was thus relabelled “friends and acquaintances”.

- **Other family members (including children aged 8 or over)**
- **Friends/acquaintances**

In the ATUS, respondents were asked “Who was in the room with you / Who accompanied you?”. Respondents could select only one of various options.⁵ The following categories of people to spend time with were considered:

- **Alone**
- **Partner**
- **Parents**
- **Children**
- **Other family members**
- **Friends**
- **Someone else unrelated**

Notice that the categories have been chosen in order to be as similar as possible across the UKTUS and the ATUS in the analysis. The only differences are that, in the UKTUS, children had to be divided into two categories, and friends had to be merged with acquaintances, due to the way this survey was designed.

Doing what

As specified in the introduction, in addition to investigating average trends, the way people feel when they are outdoors with family doing specific activities was also studied. Rather than considering specific activities, domains that subsume a variety of activities sharing common features were chosen (often, there were insufficient observations for studying more specific activities, especially when considering combinations with being in the outdoors and with family).

Both in the UKTUS and in the ATUS, the following activity domains were considered:

- **Culture and entertainment** (e.g., attending concerts, attending sport events, playing games, visiting historical site, visiting playground)
- **Eating** (including picnics)
- **Socialising** (e.g., chatting, attending to parties)
- **Sport and physical activity** (e.g., basketball, equestrian sports, football, running, swimming, tennis)
- **Walking and biking** (including hiking)

These categories were chosen for their recreational valence. Moreover, they are all likely to be performed in the outdoors as well as elsewhere, which allows comparing how people feel when performing them outdoors with how they feel when performing them in other locations.

Socio-demographics

Both the UKTUS and the ATUS collected information about respondents’ socio-demographic status. This information was employed as control in the analysis. Socio-

⁵ These included “alone”, “spouse”, “unmarried partner”, “child”, “parent”, “grandchild”, “brother/sister”, “friends”, “co-workers”, “customers”, “neighbour”, etc. The categories “spouse” and “unmarried partner” were grouped in a single category. Because respondents reported spending time with grandchildren, siblings and other members of the extended family in few instances (especially when in the outdoors), these were all grouped in a single category labelled “other family members”. All the non-relatives aside from friends were grouped in a single category called “someone else unrelated”.

demographics should ideally be controlled for when studying the relationship between SWB and some other variable (in this case, spending time outdoors with family), because they can be correlated with both SWB and the variable of interest; otherwise, results would reflect the actual relationship studied less accurately.

The following socio-demographic variables have been taken into account in the analysis that follows, based on recommendations from previous SWB research (see Fujiwara & Campbell, 2011).

- **Gender:** male, female.
- **Age** (both actual and squared, to capture nonlinear trends).
- **Region:** in the UKTUS, England, London, Wales, Scotland, Northern Ireland; in the ATUS, Northeast, Midwest, South, West.
- **Education:** in the UKTUS, degree or higher, higher education, A-levels or equivalent, secondary, other; in the ATUS, higher education, professional qualification, high-school diploma or no qualification.
- **Marital status:** single or never married; cohabiting with partner, married or in civil partnership; separated divorced or widowed.
- **Number of children:** none, one, two, three or more.
- **Employment status:** employed, unemployed, inactive (i.e., outside the labour market).
- **Household income:** in the UKTUS, this is measured as reported total monthly household income on a logarithmic scale, to capture nonlinearity; in the ATUS, this is measured in bands of total annual household income.
- **House tenure:** house owned, house not owned
- **Self-rated general health:** excellent, very good, good, fair, poor.

Data on ethnicity were not collected in the UKTUS, and therefore this variable was not considered. In addition to controlling for the above socio-demographics, the analysis also controlled for the day of the week reports refer to.

2.3. Sample statistics

After eliminating missing or invalid observations, two samples made of 278,542 and 91,091 time-use reports (and annexed SWB self-reports) were obtained from the UKTUS and from the ATUS, respectively. These amount to 4,587 and 30,948 people, respectively.

Table 1 and Table 2 summarise the sample statistics (SWB and socio-demographics) for the UKTUS and for the ATUS, respectively (percentage out of the total number of observations for categorical variables; minimum, maximum, mean, median values and standard deviation for ordinal variables). The samples may not be entirely representative of the UK and American populations. Yet both the UKTUS and the ATUS datasets included weights to increase the importance of observations relative to groups that are underrepresented. These weights were used in the analysis to ensure the results could be generalised to the UK and American populations.

Table 1. SWB and socio-demographic statistics in the UKTUS.

	% obs. (N = 4,587)	Min	Max	Mean	Median	Sd
Subjective wellbeing						
Enjoyment		1 (0)	7 (10)	5.44 (7.4)	6 (8.33)	1.48 (2.47)
Gender						
Male	46.3%					
Female	53.7%					
Age		16	99	47.54	48	18.25
Region						
England	76.7%					
London	8.0%					
Wales	5.6%					
Scotland	6.9%					
Northern Ireland	2.8%					
Education						
Degree or higher	26.0%					
Higher education	17.0%					
A-level or equivalent	19.3%					
Secondary	26.7%					
Other	11.0%					
Marital status						
Never married	22.5%					
Married, cohabiting or in civil partnership	61.5%					
Separated, divorced or widowed	16.0%					
Number of children aged 16 or less						
Zero	66.0%					
One	15.3%					
Two	14.0%					
Three or more	4.7%					
Employment status						
Employed	59.5%					
Unemployed	3.1%					
Inactive	37.4%					
Monthly household income		£0	£13,820	£7,686	£7,783	£956
House tenure						
Owned	67.7%					
Not owned	32.3%					
Self-rated general health		Poor (5)	Excellent (1)	1.97	Very good (2)	0.91

To get a hint of how many observations related to the main variables of interest were available, Table 3 reports the number of reports relative to time spent outdoors, time spent with family (including for specific family members) or with friends, time doing the five activities considered, and the various interactions. As the table shows, the number of observations is not very large in some cases, especially those related to performing specific activities in the outdoors with family. The results concerning these cases are therefore unlikely to be statistically significant. Notice also that, in the UKTUS, the number of observations related to spending time with at least one of the family members considered is less than the sum of the number of observations related to spending time with each of the family members considered. This is because respondents could select more than one family member when reporting who was with them.

Table 2. SWB and socio-demographic statistics in the ATUS.

	% obs. (N = 30,948)	Min	Max	Mean	Median	Sd
Subjective wellbeing						
Happiness		0 (0)	6 (10)	4.39 (7.31)	6 (8.33)	1.62 (2.69)
Stress		0 (0)	6 (10)	1.27 (2.11)	0 (0)	1.73 (2.88)
Meaning		0 (0)	6 (10)	4.27 (7.12)	5 (8.33)	1.93 (3.21)
Gender						
Male	44.3%					
Female	55.7%					
Age		15	85	47.49	47	17.73
Region						
North East	16.8%					
Midwest	24.4%					
South	36.6%					
West	22.2%					
Education						
Higher education	39.7%					
Professional qualification	27.3%					
High-school diploma or no qualification	33.0%					
Marital status						
Never married	25.5%					
Married, cohabiting or in civil partnership	48.7%					
Separated, divorced or widowed	25.8%					
Number of children aged 16 or less						
Zero	55.4%					
One	18.4%					
Two	17.1%					
Three or more	9.1%					
Employment status						
Employed	60.6%					
Unemployed	5.8%					
Inactive	33.6%					
Yearly household income						
< \$5,000	2.6%					
\$5,000 - \$19,999	16.6%					
\$20,000 - \$39,999	23.1%					
\$40,000 - \$74,999	27.1%					
\$75,000 - \$99,999	11.8%					
\$100,000 - \$150,000	11.0%					
> \$150,000	7.8%					
House tenure						
Owned	70.9%					
Not owned	29.1%					
Self-rated general health		Poor (5)	Excellent (1)	2.52	Very good (2)	1.07

2.4. Analysis

For both the UKTUS and the ATUS, three types of analysis were conducted, each of which served to shed light on different aspects related to spending time with family in the outdoors. All the analyses were based on linear regression (for more details on the statistical methods, see the appendix).

The first type of analysis focused on the average relationship between SWB and time outdoors with family. Specifically, the analysis estimated: 1) the “family effect”, i.e. the average difference in SWB between spending time with some family member (regardless of whom) and spending time alone; 2) the “outdoors effect”, i.e., the average difference in SWB between spending time outdoors and spending time

elsewhere; 3) the “interaction effect”, i.e. any further difference in SWB between spending time with family outdoors and spending time alone elsewhere. The total

Table 3. Number of reports (based on location, presence of family/friends, activity and their interactions).

	Number of reports	
	UKTUS (N=278,542)	ATUS (N=91,091)
Where		
Outdoors	1,459	1,591
With whom		
With family	138,646	34,960
With partner	98,837	15,756
With parents	10,895	3,021
With children		8,965
With children aged 0-7	34,917	
With other family members (incl. child aged 8 or more)	34,666	
With other family members		7,218
With someone unrelated	50,377	13,742
With friends/acquaintances	50,377	
With friends		5,145
With someone else unrelated		8,597
Doing what		
Culture and entertainment	11,943	11,860
Eating	29,064	19,536
Socialising	7,561	4,114
Sport and physical activity	1,397	462
Walking and biking	1,559	494
Where & with whom		
Outdoors & with family members	820	533
Outdoors & with partner	543	226
Outdoors & with parents	43	36
Outdoors & children		128
Outdoors & children aged 0-7	419	
Outdoors & other family members (incl. child aged 8 or more)	254	
Outdoors & other family members		143
Outdoors & with someone unrelated	482	328
Outdoors & with friends/acquaintances	482	
Outdoors & with friends		194
Outdoors & with someone else unrelated		134
Outdoors & doing what		
Outdoors & culture and entertainment	353	89
Outdoors & eating	68	66
Outdoors & socialising	86	92
Outdoors & sport and physical activity	77	144
Outdoors & walking and biking	247	283
With whom & doing what		
With family members & culture and entertainment	6,427	4,332
With family member & eating	17,899	8,784
With family members & socialising	5,674	2,658
With family members & sport and physical activity	417	165
With family members & walking and biking	884	163
With friends & culture and entertainment	1,725	861
With friends & eating	6,084	2,294
With friends & socialising	2,790	1,398
With friends & sport and physical activity	621	189
With friends & walking and biking	444	63
Where & with whom & doing what		
Outdoors & with family members & culture and entertainment	275	43
Outdoors & with family members & eating	49	36
Outdoors & with family members & socialising	68	46
Outdoors & with family members & sport and physical activity	27	39
Outdoors & with family members & walking and biking	152	95
Outdoors & with friends & culture and entertainment	150	25
Outdoors & with friends & eating	33	22
Outdoors & with friends & socialising	54	44
Outdoors & with friends & sport and physical activity	41	52
Outdoors & with friends & walking and biking	63	26

effect of spending time with family outdoors would be the sum of the “family effect”, the “outdoors effect” and the “interaction effect”. Depending on whether the “interaction effect” is positive, negative or null, time outdoors with family entails increasing, decreasing or constant marginal returns to SWB. The “friends effect” (i.e., the average difference in SWB between spending time with friends and spending time alone) and its interaction with the “outdoors effect” were also estimated so as to gauge the total effect of spending time outdoors with friends and compare this to the one of spending time outdoors with family.

The second type of analysis investigated the average relationships between SWB and time outdoors with specific family members. This type of analysis is equivalent to the first, except that the “family effect” and its interaction with the “outdoors effect” were estimated for each of the family members considered (i.e., partner, children, parents, other family member).

The third type of analysis explored the average relationships between SWB and time outdoors with family while doing specific activities. This type of analysis was equivalent to the first in that only the average “family effect” was estimated. It differed from it, however, because it looked at how people felt when they were outdoors with their family doing the recreational activities mentioned above. This entails estimating “activity effects” (i.e. the difference between the level of SWB when people spend time doing each of the activities considered and the average level of SWB when people spend time in other ways) and the interactions among each “activity effect”, the “family effect” and the “outdoors effect”. The total effect of doing each activity with family in the outdoors is the sum of the corresponding “activity effect”, the “family effect”, the “outdoors effect” and all their interactions.

3. Summary of results

This section presents the results from the analysis. The findings are divided in three sections, which reflects the three types of analysis conducted: basic model, model with specific family members, and model with activity domains.

3.1. Basic model

Table 4 and Table 5 below include the key findings from the first analysis, for UKTUS and ATUS respectively. Specifically, the tables show the “outdoors effect”, the “family effect”, the “friends effect”, and the “interaction effects” for both family and friends. The reference groups are shown in parenthesis (for the “interaction effect”, this is the sum of the independent effects). Asterisks denote the extent to which the estimated effects are statistically different from zero. The full regression results, including the change in SWB associated with membership to different socio-demographic groups, are shown in Tables A1-A4 in the appendix, first column in each table.

UKTUS

Table 4. Basic model, UKTUS.	Change in enjoyment
Outdoors (ref.: elsewhere)	+1.04***
With family (ref.: alone)	+0.48***
With friends (ref.: alone)	+0.49***
Outdoors & with family (ref.: outdoors + with family)	-0.01
Outdoors & with friends (ref.: outdoors + with friends)	-0.24*
*: p-value < .05 **: p-value < .01 ***: p-value < .001	Observations: 278,542 Respondents: 4,581

On average, people reported enjoying their time outdoors more than their time in other locations. The “outdoors effect” was estimated to be +1.04 points.

On average, people reported enjoying their time with family more than their time alone. The “family effect” was estimated to be +0.48 points.

On average, people reported enjoying their time with friends/acquaintances more than their time alone. The “friends effect” was estimated to be +0.49 points.

The “interaction effect” between time outdoors and time with family was not statistically significant.

The “interaction effect” between time outdoors and time with friends was estimated to be -0.24 points.

The total effects of spending time with family or with friends in the outdoors are thus:

- **Family:** +1.52 enjoyment ($= 1.04 + 0.48$).
- **Friends:** +1.29 enjoyment ($= 1.04 + 0.49 - 0.24$).

ATUS

Table 5. Basic model, ATUS.

	Change in happiness	Change in stress	Change in meaning
Outdoors (ref.: elsewhere)	+0.52***	-0.42***	+0.81***
With family (ref.: alone)	+0.78***	-0.32***	+1.06***
With friends (ref.: alone)	+1.10***	-0.51***	+1.02***
Outdoors & with family (ref.: outdoors + with family)	+0.26	+0.12	+0.26
Outdoors & with friends (ref.: outdoors + with friends)	-0.15	+0.74***	-0.41

*: p-value < .05
 **: p-value < .01
 ***: p-value < .001

Observations: 91,091
 Respondents: 30,948

On average, people reported feeling happier, less stressed and more meaning during their time outdoors than during their time in other locations. The “outdoors effects” on happiness, stress and meaning were estimated to be +0.52, -0.42, and +0.81 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with family than during their time alone. The “family effects” on happiness, stress and meaning were estimated to be +0.78, -0.32, and +1.06 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with friends than during their time alone. The “friends effects” on happiness, stress and meaning were estimated to be +1.10, -0.51, and +1.02 points, respectively.

The “interaction effects” on happiness, stress and meaning between time outdoors and time with family were not statistically significant.

The “interaction effects” on happiness and meaning between time outdoors and time with friends were not statistically significant. The “interaction effect” on stress was estimated to be +0.74 points.

The total effects of spending time with family or with friends outdoors are thus:

- **Family:** +1.30 happiness ($= 0.52 + 0.78$), -0.74 stress ($= -0.42 - 0.32$), and +1.87 meaning ($= 0.81 + 1.06$).
- **Friends:** +1.62 happiness ($= 0.52 + 1.10$), -0.19 stress ($= -0.42 - 0.51 + 0.74$), and +1.83 meaning ($= 0.81 + 1.02$).

3.2. Model with specific family members

Table 6 and Table 7 below illustrate the key findings from the second analysis, for UKTUS and ATUS respectively. The tables show the “outdoors effect”, the “family effect” for each family member, the “friends effect”, and the “interaction effects” between time outdoors and time with each family member or with friends. As before, the reference groups are shown in parenthesis, and asterisks denote the extent to which the estimated effects are statistically different from zero. The full regression results, including the change in SWB associated with membership to different socio-demographic groups, are shown in Tables A1-A4 in the appendix, second column in each table.

UKTUS

Table 6. Model with specific family members, UKTUS.

	Change in enjoyment
Outdoors (ref.: elsewhere)	+1.02***
With partner (ref.: alone)	+0.47***
With parents (ref.: alone)	+0.17***
With children aged 0-7 (ref.: alone)	+0.05***
With other family members (ref.: alone)	+0.24***
With friends (ref.: alone)	+0.47***
Outdoors & with partner (ref.: outdoors + with partner)	-0.09
Outdoors & with parents (ref.: outdoors + with parents)	+0.13
Outdoors & with children aged 0-7 (ref.: outdoors + with children aged 0-7)	+0.12
Outdoors & with other family members (ref.: outdoors + with other family members)	+0.13
Outdoors & with friends (ref.: outdoors + with friends)	-0.24*
*: p-value < .05 **: p-value < .01 ***: p-value < .001	
Observations: 278,542 Respondents: 4,581	

On average, people reported enjoying their time outdoors more than their time in other locations. The “outdoors effect” was estimated to be +1.02 points.

On average, people reported enjoying their time with partners more than their time alone. The “partner effect” was estimated to be +0.47 points.

On average, people reported enjoying their time with parents more than their time alone. The “parents effect” was estimated to be +0.17 points.

On average, people reported enjoying their time with children aged 0-7 more than their time alone. The “young children effect” was estimated to be +0.05 points.

On average, people reported enjoying their time with other family members (including children aged 8 or over) more than their time alone. The “other relatives effect” was estimated to be +0.24 points.

On average, people reported enjoying their time with friends/acquaintances more than their time alone. The “friends effect” was estimated to be +0.47 points.

The “interaction effect” between time outdoors and time with family was not statistically significant for any family member.

The “interaction effect” between time outdoors and time with friends was estimated to be -0.24 points.

The total effects of spending time with each family member or with friends outdoors are thus:

- **Partner:** +1.49 enjoyment (= 1.02 + 0.47).
- **Parents:** +1.19 enjoyment (= 1.02 + 0.17).
- **Children aged 0-7:** +1.07 enjoyment (= 1.02 + 0.05).
- **Other relatives (incl. children aged 8 or over):** +1.26 enjoyment (= 1.02 + 0.24).
- **Friends:** +1.25 enjoyment (= 1.02 + 0.47 – 0.24).

ATUS

Table 7. Model with specific family members, ATUS.

	Change in happiness	Change in stress	Change in meaning
Outdoors (ref.: elsewhere)	+0.52***	-0.43***	+0.81***
With partner (ref.: alone)	+0.69***	-0.36***	+0.83***
With parents (ref.: alone)	+0.65***	-0.44***	+1.04***
With children (ref.: alone)	+0.75***	-0.17***	+1.20***
With other family members (ref.: alone)	+1.05***	-0.34***	+1.39***
With friends (ref.: alone)	+1.1***	-0.51***	+1.03***
Outdoors & with partner (ref.: outdoors + with partner)	+0.43*	-0.13	+0.49*
Outdoors & with parents (ref.: outdoors + with parents)	+0.55	-0.40	+0.27
Outdoors & with children (ref.: outdoors + with children)	+0.20	+0.42	+0.31

Outdoors & with other family members (ref.: outdoors + with other family members)	-0.13	+0.41	-0.20
Outdoors & with friends (ref.: outdoors + with friends)	-0.14	+0.74***	-0.39
*: p-value < .05 **: p-value < .01 ***: p-value < .001			Observations: 278,542 Respondents: 4,581

On average, people reported feeling happier, less stressed and more meaning during their time outdoors than during their time in other locations. The “outdoors effects” on happiness, stress and meaning were estimated to be +0.52, -0.43, and +0.81 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with their partners than during their time alone. The “partner effects” on happiness, stress and meaning were estimated to be +0.69, -0.36, and +0.83 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with their parents than during their time alone. The “parents effects” on happiness, stress and meaning were estimated to be +0.65, -0.44, and +1.04 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with their children than during their time alone. The “children effects” on happiness, stress and meaning were estimated to be +0.75, -0.17, and +1.20 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with other family members than during their time alone. The “other relatives effects” on happiness, stress and meaning were estimated to be +1.05, -0.34, and +1.39 points, respectively.

On average, people reported feeling happier, less stressed and more meaning during their time with their friends than during their time alone. The “friends effects” on happiness, stress and meaning were estimated to be +1.10, -0.51, and +1.03 points, respectively.

The “interaction effects” on happiness and on meaning between time outdoors and time with partner were estimated to be +0.43 and +0.49. The “interaction effects” between time outdoors and time with partner was not statistically significant. The “interaction effects” between time outdoors and time with other specific family members were not statistically significant.

The “interaction effects” on happiness and meaning between time outdoors and time with friends were not statistically significant. The “interaction effect” on stress was estimated to be +0.74 points.

The total effects of spending time with each family member or with friends outdoors are thus:

- **Partner:** +1.64 happiness (= 0.52 + 0.69 + 0.43), -0.79 stress (= -0.43 – 0.36), and +2.13 meaning (= 0.81 + 0.83 + 0.49).

- **Parents:** +1.17 happiness ($= 0.52 + 0.65$), -0.87 stress ($= -0.43 - 0.44$), and +1.85 meaning ($= 0.81 + 1.04$).
- **Children:** +1.27 happiness ($= 0.52 + 0.75$), -0.60 stress ($= -0.43 - 0.17$), and +2.01 meaning ($= 0.81 + 1.20$).
- **Other family members:** +1.57 happiness ($= 0.52 + 1.05$), -0.77 stress ($= -0.43 - 0.34$), and +2.20 meaning ($= 0.81 + 1.39$).
- **Friends:** +1.62 happiness ($= 0.52 + 1.10$), -0.20 stress ($= -0.43 - 0.51 + 0.74$), and +1.84 meaning ($= 0.81 + 1.03$).

3.3. Model with activity domains

For brevity, below are listed only the total effects of doing each of the activities considered with family or with friends in the outdoors. These were obtained by summing the “outdoors effect”, the “family effect” or the “friends effect”, the “activity effects”, and their interactions, even though some were statistically insignificant (this was due to the small sample size for some interactions: see Table 3 in the previous section). The full results are shown in Tables A1-A4 in the appendix, third column in each table.⁶

UKTUS

The total effects of performing the activities considered in the outdoors and in presence of family members were estimated to be:

- **Culture and entertainment:** +2.04 enjoyment
- **Eating:** +2.26 enjoyment
- **Socialising:** +1.70 enjoyment
- **Sport and physical activity:** +2.47 enjoyment
- **Walking and biking:** +1.95 enjoyment

The total effects of performing the activities considered in the outdoors and in presence of family members were estimated to be:

- **Culture and entertainment:** +1.91 enjoyment
- **Eating:** +1.97 enjoyment
- **Socialising:** +1.89 enjoyment
- **Sport and physical activity:** +2.13 enjoyment
- **Walking and biking:** +1.78 enjoyment

ATUS

The total effects of performing the activities considered outdoors in presence of family members were estimated to be:

- **Culture and entertainment:** +2.12 happiness; -1.47 stress; +2.26 meaning
- **Eating:** +1.84 happiness; -0.92 stress; +1.68 meaning

⁶ Note: the “outdoors effect”, the “family effect” and the “friends effect” are different from those emerged in earlier analyses. This is because the activity variables were added to the regression. In previous analyses, the “activity effects” were partly captured by the “outdoors effect”, by the “family effect” and by the “friends effect”, because people may perform the activities considered while outdoors, or when they are with family or with friends. Now that activities are controlled for, the changes in SWB associated with time outdoors, time with family and time with friends are altered as a result.

- **Socialising:** +1.79 happiness; -1.23 stress; +2.45 meaning
- **Sport and physical activity:** +2.02 happiness; -1.59 stress; +2.17 meaning
- **Walking and biking:** +1.95 happiness; -1.24 stress; +1.97 meaning

The total effects of performing the activities considered outdoors in presence of family members were estimated to be:

- **Culture and entertainment:** +2.02 happiness; -0.81 stress; +2.00 meaning
- **Eating:** +2.47 happiness; -2.32 stress; +2.48 meaning
- **Socialising:** +1.45 happiness; +0.43 stress; -0.49 meaning
- **Sport and physical activity:** +1.40 happiness; -1.12 stress; +2.27 meaning
- **Walking and biking:** +1.36 happiness; -0.06 stress; +1.36 meaning

4. Discussion

Although the findings presented in the previous section may not be interpreted causally, they can still inform about how people's SWB is correlated with their spending time with family in the outdoor spaces. Three main conclusions can be extrapolated from the above results.

1. **The SWB benefits related to spending time outdoors with family are the sum of the benefits of spending time outdoors and those of spending time with family. Moreover, such benefits are generally higher than those of spending time outdoors with friends.**

The first analysis revealed trends that are consistent with those that previous research identified. Specifically, spending time with one's family (either outdoors or somewhere else) is on average associated with a rise in SWB relatively to spending time alone. In addition, time spent outdoors is significantly better than time spent elsewhere (in presence of family, friends, or by oneself). Lastly, when people spend time with their family (outdoors or elsewhere), they do not report feeling better than when they spend time with friends, and sometimes they report feeling worse.

In addition, thought, the findings presented above bring new insight to add to the existing evidence base. First, it was shown how the total effect of spending time outdoors with family does not differ from the sum of the effects on SWB that time outdoors and time with family have on their own. This result demonstrates that, while there does not seem to be anything peculiar to the experience of spending time outdoors with family that amplifies either or both the "family effect" and the "outdoors effect", there is either no evidence suggesting that either or both independent effects have a smaller impact on SWB when they occur together. In other words, when they are both part of the context surrounding people's experiences, family members and outdoor spaces continue to have the same positive influence on SWB that they have when one is present without the other.

This appears to be case of constant marginal returns to SWB: there is no extra or reduced benefit associated with spending time in outdoor spaces and with time with family when they are both part of people's experiences. Why this is so is unclear, however, and based on the available evidence one can only speculate about the underlying reasons. Constant marginal returns may simply be a characteristic of the experience of spending time in the outdoors with relatives. Alternatively, this trend might simply be an average of different patterns across different groups in the population: for example, for younger people, the benefits of time outdoors with family may be less than the sum of the separate benefits, while for older people they may be greater than the independent effects summed together. Without further analysis, favouring one explanation over another would be unjustified.

All the same, the existing evidence base is significantly enriched by the finding that time outdoors with family is coupled with higher levels of SWB than time outdoors with friends. Thus, although on average people feel better in presence of their friends, in the particular context of outdoor environments people feel better in presence of their family. This trend is most evident in the UKTUS, in which respondents have clearly reported enjoying their time outdoors more in company of their relatives. It is somewhat less evident in the ATUS, since respondents reported feeling both less happy and less stressed with their family than with their friends when they were outdoors, and the overall impact depends on the relative importance of happiness and stress to

SWB. Insofar as they both have similar importance, however, one could conclude that, overall, SWB is higher in presence of family for Americans as well, because the reduction in stress is greater than the reduction in happiness.

A further lesson to draw from the first analysis is that there seem to be considerable differences between the UKTUS and the ATUS, in terms of how the outdoors and the family impact on SWB. The “outdoors effect” was found to be larger in the UK, while the “family effect” (as well as the “friends effect”) was found to be larger in the USA, at least based on the associated changes in happiness and on meaning. The reasons behind such differences are not clear. They might be due to, in the first place, different characteristics of British and American people. The fact that different feelings were assessed across the two surveys might have played a role, too, whereby the differences may be partly capturing different effects that the outdoors and the family have on different aspects of SWB.

What are the policy implications? Two lessons for policymakers can be taken from the above conclusion. Firstly, current policies geared towards developing outdoor spaces and easing people’s access to them should be supplemented by interventions to get people to spend time with their family in such spaces. In other words, people should be encouraged to bring their relatives when going outdoors, as opposed to going alone or with their friends. Secondly, when designing such interventions, policymakers should expect to measure benefits that are on average equal to the sum of those arising from interventions to get people to spend time outdoors and those from interventions to get people to spend time with family.

2. **The SWB benefits of spending time outdoors with family vary depending on which family members are present. In particular, time spent outdoors with one’s partner is generally associated with higher benefits than time spent outdoors with other relatives or with friends.**

The second analysis demonstrated, first, that not all family members are associated with the same rise in SWB when people spend time with them relatively to when they are alone, outdoors or elsewhere. The two datasets considered though provided different insights into which family members are on average associated with the highest gain in SWB. As noted above, such discrepancy may be partly due to characteristics of the populations from where the samples are taken, and partly to the different measures of SWB present in the two datasets.

Consistently with previous research, the UKTUS data revealed that people enjoy spending time with their partners the most, and with young children the least (even though time spent with children is still better than time spent alone). Parents ranked higher than children in enjoyment but still far below partners, whilst other family members were the second-best. In no case, moreover, time spent with any particular relative entailed higher benefits than time spent with friends, although time with partners was linked to a similar level of enjoyment to time with friends on average. The gain in enjoyment associated with partners is also similar to the gain observed in the first analysis, where no distinction was made among family members. This suggests that the “family effect” estimated in the first analysis was largely driven by the “partner effect”, presumably because most reports of time with family involve the presence of one’s partner (see Table 3 above).

The analysis of the ATUS showed quite different patterns. Relatives other than partners, children and parents seem to be those associated with the largest gain in SWB, as time spent with them scores the highest in happiness and in meaning. People reported feeling the least stressed in company of their parents, but other family

members come just below them. Children are the “second-best” in terms of happiness and meaning, but they are nonetheless the family members with whom people felt the most stressed (although still less than when they were alone). Time with partners is coupled with comparatively modest gains in happiness and meaning, though partners rank close to the top in terms of reduced stress. In light of these trends, partners may be regarded as being associated with the smallest gain in SWB, on average. Compared with every particular relative, friends are linked to higher gains in happiness and reduced stress, but to a lower increase in meaning (in fact preceding only partners).

In spite of such differences across datasets, both the UKTUS and the ATUS agree upon one fact: that, in the outdoors, SWB is the highest when people are with their partners. In the UKTUS, this happens because there is negative interaction between the “friends effect” and the “outdoors effect” (meaning that one or both of these effects are reduced when people are outdoors with their friends), whereas people enjoy the time they spend with their partners in outdoor spaces as much as the sum of the “partner effect” and the “outdoors effect” indicate. In other words, there are decreasing marginal returns to SWB in the case of friends, and constant marginal returns in the case of partners. As a result, the total effect of spending time outdoors with partners is larger than the total effect of spending time outdoors with friends. Because the “interaction effect” was not significant for any other relative, partners continue to rank above all other family members even in the outdoors in the UKTUS.

In the ATUS, instead, a dual mechanism is at play. On the one hand, a negative interaction between the “friends effect” and the “outdoors effect” on reduced stress is observed, which lowers the magnitude of either or both these effects. Put differently, for Americans, spending time outdoors with friends entails decreasing marginal returns to SWB, at least as far as stress is concerned. On the other hand, there is positive interaction between the “partner effect” and the “outdoors effect” on happiness and meaning, which amplifies either or both these effects. This reflects increasing marginal returns to SWB in terms of happiness and meaning. The result is that time spent outdoors with partners ranks similarly to time spent outdoors with friends in terms of happiness, but a lot higher in terms of reduced stress and meaning. Partners surpass all other relatives except family members other than children and parents, who score similarly to partners in all three measures of SWB and thus higher than friends.

In sum, whilst on average time spent with partners may not be coupled with the highest rise in SWB compared with being alone, partners are the best people to spend time with in the outdoors among all family members and even compared with friends. Spending time with relatives other than partners, children and parents may also yield similar benefits, but this is not a pervasive result. As far as it holds, though, the company of some next of kin is not necessarily better than that of the extended family.

What are the policy implications? The message for policymakers is that, should they aim at implementing interventions geared towards getting people to spend time with their family in the outdoors, they would have to encourage people to bring over their partners in order to maximise the improvement in SWB. Surely, the addition of children, parents and other family members would help to yield even higher benefits, but the presence of partners seems necessary to achieve benefits that are higher than those linked to alternative policies that instead encourage to spend time outdoors with friends.

3. **Some activities are linked to higher SWB benefits than others when people engage in them outdoors with family. In particular, activities in the domain of culture and sport are associated with the highest benefits.**

The third analysis revealed that the activity domains that were considered (culture and entertainment, eating, socialising, sport and physical activity, walking and biking) are generally associated with higher levels of SWB, compared to the average SWB experienced when people spend time doing activities that lie within other domains. All “activity effects” were found to be significantly positive, with only a few exceptions in the ATUS – namely, the effects of culture and entertainment on happiness and meaning, which are null and negative, respectively; and the effect of eating on meaning, which is zero. Some effects are larger than others: in the UKTUS, people enjoy socialising the most on average, and eating the least, while in the ATUS, people felt the happiest during sport and physical activity, the least stressed during socialising, and experienced the highest meaning during walking and biking.

New patterns emerge when considering the interactions among the various “activity effects”, the “family effect” and the “outdoors effect”. When performed outdoors with family, all activities considered are associated with higher SWB compared to how people feel on average when spending time in other ways alone. This is clearly because being outdoors and with family members boosts the effect that these activities independently have on SWB. It is also interesting to note that, aside from a few exceptions (namely, socialising in the UKTUS and eating in the ATUS), performing the activities outdoors with family is better than performing them outdoors with friends. This finding corroborates what was observed in the first analysis: that spending time outdoors with family is on average better than spending time outdoors with friends.

Importantly, performing the activities in the outdoors in presence of family members considerably changes the ranking the corresponding effects on SWB recorded on average. Specifically, in the UKTUS, socialising turns out to be the activity people enjoy the least when outdoors with their family, whereas the activities they enjoy the most become those related to sport and physical activity. Interestingly, eating now ranks second, whilst it was last based on the average gain in enjoyment, and it is followed by culture and entertainment (which is on average fourth) immediately after. In the ATUS, it was found that, when people were outdoors with family, they felt the happiest during culture and entertainment, which remarkably ranks last on average; they felt the least stressed during sport and physical activity (which ranks second on average) and the highest meaning during socialising (which ranks third on average). Overall, based on both datasets, it appears that activities connected with culture and sport are those associated with the highest rise in SWB when performed outdoors with family.

What are the policy implications? The message for policymakers is straightforward. When implementing interventions in order to get people to spend time outdoors with their family, people should be encouraged to perform certain activities in preference to others. The above findings suggest that activities connected with culture and sport are likely to be among those that maximise the benefits of spending time outdoors with family.

5. Future research

The aim of this report was to improve our understanding of how spending time with family in outdoor spaces impacts upon people's SWB. In particular, the report sought to gauge the independent "family effect" and "outdoors effect" and how these effects interact, so as to clarify what the total benefits of spending time outdoors with family amount to. In addition, the report intended to shed light on how time with family in the outdoors compares with time with friends in the outdoors, as well as the benefits associated with the company of different family members, in order to ascertain which experience entails higher benefits and should thus be promoted at a policy level. The findings presented above fill the voids left by previous research on these matters, and they thus improve upon the existing evidence base. Nonetheless, more research is needed to obtain a more complete picture.

To begin with, future research should aim to investigate more specifically how people feel when they spend time with their family members in specific outdoor spaces. As mentioned in the introduction, this report considered the "outdoors" as a generic category subsuming a variety of spaces, which included both "green" and "blue" spaces. Yet it is important to understand how time spent with family in "green" as opposed to "blue" spaces makes people feel, as well as how specific varieties of "green" and "blue" spaces differ in their implications for SWB. Preferably, future research should dig into these specifics following the same approach adopted in this report – namely, disentangling the "family effect", the "outdoors effect" (in this case, specific spaces) and their interactions, as well as comparing family with friends – in order to gain a comprehensive understanding of how time spent outdoors with family in different outdoor spaces affects SWB.

Another concern for research to come should be to investigate more in detail how people feel when they spend time outdoors with different family members, as well as whether or not there is any interaction effect when more than one relative are present concurrently. In regard to the first aspect, this report did make a basic differentiation of relatives by considering partners, children, parents and other family members separately. One could however get into a deeper level of detail by breaking the "other family members" category into sub-categories, which would include siblings, cousins, grandchildren, grandparents, uncles and aunts. In regard to the second aspect, instead, this report could not contribute much due to the nature of the data, which did not make clear whether more than one family member were present during the activities people reported. Based on the analysis carried out for this report, one must sum the "family effects" relative to different family members in order to ascertain how people felt in presence of many based on the above results. Yet, just as there could be interaction between the "family effect" and the "outdoors effect", being in company of more than one relative could give rise to a total effect that differs from the sum of the separate effects of spending time with each relative. Again, future research should ideally investigate these two aspects related to particular family members using the approach adopted in this report.

Future research should also assess which activities entail the highest benefits for people's SWB when they spend time outdoors with their family. This report attempted to clarify this by investigating five activity domains and classifying them based on the associated gains in SWB. Clearly, however, this sort of analysis presents limitations, the main one being that some of the domains considered subsumed activities that, despite sharing common features, are nonetheless heterogeneous and would deserve to be studied separately (this applies especially to the domain "culture and

entertainment”, but also to “sport and physical activity” and to “walking and biking). Therefore, future research should aim to dig into these domains and investigate activities individually, so as to gain a detailed understanding of what rises people’s SWB the most when they spend time outdoors with their family.

Exploring socio-demographic differences should be another concern for future research. This report did not explore such differences at all, and this is arguably an important limitation. As noted earlier, the effect of spending time outdoors with family (and how this compares with the one of time outdoors with friends) might vary considerably across gender, age, ethnicity, and income groups, among others. Evidence is needed in order to determine whether or not such variability exists, and what the effects across difference socio-demographic groups amount to.

Lastly, but not less importantly, future research should try to establish causality. There is a lot of causal research in regard to how spending time outdoors affects wellbeing (see the literature review in the appendix); somewhat less in regard to how spending time with family does; virtually none in relation to spending time outdoors with family, not to mention how this compares with time outdoors with friends. For the endogeneity bias affecting the data at hand, this report could not help but give rise to findings that are only correlational in character. Yet it is only by establishing causality that the benefits of spending time outdoors with family can be properly gauged, and policy decisions in regard be effectively made.

A1. Literature review

SWB and time in the outdoors

A vast amount of research has probed the implications of spending time in “green” and “blue” spaces for SWB. Evidence from clinical psychology and medicine documents how regularly spending time in these environments promotes positive health outcomes, ensuing from the better air quality and reduced exposure to urban pollution, traffic and crowds, as well as from the fact that people tend to do sport and physical activity when attending these spaces. Such outcomes include: reduced blood pressure and cholesterol levels, lower risk of obesity, relief from stress, restoration of mental capacities, improvements in mood, and fewer mental health problems. Brymer et al. (2010), Godbey (2009), McCurdy et al. (2010), Munoz (2009), and Romagosa et al. (2015) provide surveys of the relevant literature. Gesler (1992) coined the notion of “therapeutic landscape” to underscore the role that contact and interaction with outdoors spaces could have in healthcare. Marcus and Sachs (2013) provide an overview of theory, evidence and examples of implementations of outdoor-based therapy.

Because health is an important correlate of SWB, the benefits of the outdoors should also emerge from the analysis of SWB data. The studies that analysed large-scale survey data indeed consistently reported a positive correlation between SWB and engaging with the outdoors. The people who live in rural areas or in cities with more “green” and “blue” spaces tend to report higher life-satisfaction (e.g., Biedenweg et al., 2017; Graham & Fleton, 2006; Hudson, 2006). More generally, living in less polluted areas is linked to higher scores in evaluative measures of SWB (e.g., Ferrer-i-Carbonell & Gowdy, 2007; Welsch, 2006).

Such positive correlations also emerge from time-use data when looking at how people feel when they actually spend time in the outdoors. White and Dolan (2009), for example, analysed time use data from Germany, finding that time spent outdoors ranked above average in terms of ratings of pleasure and purpose. MacKerron and Mourato (2013) used a mobile app to collect mood reports of a sample of UK residents, tracking their geographical location via GPS, and they found that people were on average happier in outdoors spaces compared to other locations.

A large body of previous research focused on the benefits for SWB of doing sport and physical activity outdoors – “green exercising”, as this practice has been labelled (Barton et al., 2016). Exercising is known to be beneficial to health and SWB in and of itself, but various experiments documented how exercising outdoors is more beneficial than exercising indoors or in urban areas. Pretty et al. (2005), for example, conducted a laboratory experiment where they had subjects run on a treadmill while being exposed to several natural and urban sceneries. Their findings indicated that exercising under exposure to pleasant natural sceneries led to higher increments in post-exercise mood as opposed to unpleasant natural sceneries and urban sceneries. In other experiments, Focht (2009) and Barton et al. (2009) provided evidence that walking outdoors was linked to more positive affective responses than walking indoors, while Turner and Stevinson (2017) provided similar evidence in relation to running.

SWB and time with family

There is little experimental research concerning the effect of spending time with family members on SWB. Evidence from survey data though attests that spending time with family members is associated with higher levels of SWB as compared with spending time alone. For instance, some studies show that regular contact with relatives is coupled with a rise in life-satisfaction and similar evaluative measures of SWB (e.g., Lelkes, 2006; Martin & Westerhof, 2003; Pichler, 2006).

When looking at experienced SWB during time actually spent with family members (whether one is directly interacting with them or is simply engaged in other activities in their presence), similar positive links arise. In a seminal study, Kahneman et al. (2004) found that American women reported higher positive affect in presence of their partners, of their relatives or (to a somewhat lesser degree) of their children, relatively to when they were alone. Krueger et al. (2009) observed that both men and women in the USA felt better when their time was spent together with their partners and children. In the UK, Fujiwara and MacKerron (2015) also recorded higher happiness levels when people spent time with their partners and, even though less so, with their children and with other relatives, again compared with time spent alone.

All the above studies on time-use also show that time spent with family is frequently linked to higher levels of SWB even in relation to time spent with someone unrelated, such as colleagues, boss at work, neighbours. Nevertheless, time spent with friends is found to be consistently associated with higher SWB even compared to time spent with family members. It appears, thus, that friends are those in people's social networks whom they generally feel best with.

SWB and time outdoors with family

Not many studies (whether experimental or based on survey data) have looked at the nexus between SWB and spending time both outdoors and with family, and the few that did focused on correlates of SWB rather than on SWB itself. Mulholland and Williams (1998) studied the effect of implementing family therapy interventions outdoors, showing that interventions led family members in conflict to hold better feelings towards each other and to increase their sense of confidence. The extent to which such improvements were due to being outdoors as opposed to the interaction with family members cannot be inferred, however, because there was no comparison group that received the “outdoors treatment” or the “family treatment” only. Freeman and Zabriskie (2002) found that participation in outdoor recreational activities with family was coupled with stronger family cohesion (which in turn affects SWB, as noted above), and so did Lehto et al. (2012) and Jirasek et al. (2017) in similar studies. Yet, again, it is unclear whether performing the same activities together with family members indoors rather than outdoors would have resulted in stronger, weaker or the same correlation with family cohesion.

More generally, previous research failed to provide comprehensive evidence about the benefits of spending time outdoors with family members on SWB. Specifically, it is unclear how much of the total effect is due to the “outdoors effect” and to the “family effect”, as well as whether such independent effects are amplified or reduced when they occur simultaneously, or whether instead the total effect simply equals the sum of the separate effects. In addition, previous research failed to draw a systematic comparison between time outdoors with family and time outdoors with friends, so as to ascertain whether or not the relatively higher gain in SWB emerging in the latter case on average is also manifest in the outdoors.

A2. Statistical analysis

The data analysis was based on linear regression modelling, which is regular practice in SWB research (see Ferrer-i-Carbonell & Frijters, 2004 for guidance on methodology in SWB research). Specifically, linear regression models with random effects by respondent and by activity were used (i.e., two extra terms, one specific to each respondent and one to each activity, both drawn at random from a normal distribution, with mean 0 and variance to be estimated from the data).

The reason for using random effects is to control for correlations within the data due to repeated observations for the same respondent and for the same activity (observations should be independent from one another in order to meet the assumptions underlying linear regression). The function of random effects is also to control for unobserved differences in SWB across different respondents and across different activities, so as to obtain better estimates for the regression coefficients, while also accounting for the random nature of the samples of respondents and activities at hand.

The following equation describes the model for the first and the second types of analysis. Each observation refers to respondent i during activity j at time t (time is to be accounted for because each respondent may have reported the same activity more than once).

$$SWB_{i,j,t} = \beta_0 + \beta_1 Out_{i,j,t} \times Fam_{i,j,t} + \beta_2 Out_{i,j,t} \times Friends_{i,j,t} + \beta_3 X_i + \rho_i + \alpha_j + \epsilon_{i,j,t},$$

where:

$$\beta_1 Out_{i,j,t} \times Family_{i,j,t} = b_1 Out_{i,j,t} + b_2 Fam_{i,j,t} + b_3 Out_{i,j,t} \& Fam_{i,j,t}$$

and

$$\beta_2 Out_{i,j,t} \times Friends_{i,j,t} = b_1 Out_{i,j,t} + b_4 Friends_{i,j,t} + b_5 Out_{i,j,t} \& Friends_{i,j,t}$$

$SWB_{i,j,t}$ is the level of SWB for respondent i during activity j at time t (enjoyment in UKTUS; happiness, stress or meaning in ATUS). β_0 is the grand intercept (measuring the average level of SWB across all respondents in the reference groups of the explanatory variables, across all activities, and over time). $Out_{i,j,t}$ is an indicator of whether respondent i was outdoors during activity j at time t , and $Fam_{i,j,t}$ is an indicator of whether respondent i was with a family member during activity j at time t (this takes on multiple values in the second type of analysis depending on which family member was with the respondent). β_1 is thus the coefficient (or coefficients, in the second analysis) representing the total effect of spending time outdoors with family. This is such that $\beta_1 = b_1 + b_2 + b_3$, where b_1 is the coefficient representing the “outdoors effect”, b_2 is the coefficient representing the “family effect”, and b_3 is the coefficient representing the “interaction effect” linked to $Out_{i,j,t} \& Fam_{i,j,t}$, the indicator of whether respondent i was both outdoors and with family during activity j at time t .

$Friends_{i,j,t}$ is an indicator of whether respondent i was with friends during activity j at time t . β_2 is the coefficient representing the total effect of spending time outdoors with friends, which is the sum of b_1 , b_4 , i.e. the coefficient representing the “friends effect”, and b_5 , i.e. the coefficient representing the corresponding “interaction effect” linked to $Out_{i,j,t} \& Friends_{i,j,t}$, the indicator of whether respondent i was both outdoors and with friends during activity j at time t .

X_i is the vector of socio-demographic variables specific to respondent i (independent of activity and time) and β_3 is the vector of coefficients representing the effect of each socio-demographic variable. Lastly, ρ_i is a random intercept specific to respondent i (capturing unobserved factors related to the SWB of respondent i , independent of activity and time); α_j is a random intercept specific to activity j (capturing the association between SWB activity j independent of respondent and time); and $\epsilon_{i,j,t}$ is the error term specific to each observation.

The model for the third type of analysis is instead described by the following equation.

$$SWB_{i,j,t} = \beta_0 + \beta_4 Out_{i,j,t} \times Fam_{i,j,t} \times Act_j + \beta_5 Out_{i,j,t} \times Friends_{i,j,t} \times Act_j + \beta_3 X_i + \rho_i + \alpha_j + \epsilon_{i,j,t},$$

where:

$$\begin{aligned} \beta_4 Out_{i,j,t} \times Fam_{i,j,t} \times Act_j &= \\ &= b_1 Out_{i,j,t} + b_2 Fam_{i,j,t} + b_6 Act_j + b_3 Out_{i,j,t} \& Fam_{i,j,t} + b_7 Out_{i,j,t} \& Act_j \\ &+ b_8 Fam_{i,j,t} \& Act_j + b_9 Out_{i,j,t} \& Fam_{i,j,t} \& Act_j \end{aligned}$$

and

$$\begin{aligned} \beta_5 Out_{i,j,t} \times Friends_{i,j,t} \times Act_j &= \\ &= b_1 Out_{i,j,t} + b_4 Friends_{i,j,t} + b_6 Act_j + b_5 Out_{i,j,t} \& Friends_{i,j,t} + b_7 Out_{i,j,t} \& Act_j \\ &+ 10 Friends_{i,j,t} \& Act_j + b_{11} Out_{i,j,t} \& Friends_{i,j,t} \& Act_j \end{aligned}$$

Act_j is a vector of indicators of whether activity j fell within one of the following domains: culture and entertainment, eating, socialising, sport and physical activity, walking and biking. β_4 is the vector of coefficients representing the total effects of doing one of those activities in the outdoors with family. This is equal to the sum of b_1, b_2, b_3, b_6 (the vector of coefficients representing the various “activity effects”), b_7 (the vector of coefficients representing the “interaction effects” linked to $Out_{i,j,t} \& Act_j$, a vector of indicators of whether respondent i was outdoors during activity j at time t while doing each of the activities considered), b_8 (the vector of coefficients representing the “interaction effects” linked to $Fam_{i,j,t} \& Act_j$, a vector of indicators of whether respondent i was with family during activity j at time t while doing each of the activities considered), and b_9 (the vector of coefficients representing the “interaction effects” linked to $Out_{i,j,t} \& Fam_{i,j,t} \& Act_j$, a vector of indicators of whether respondent i was outdoors with family during activity j at time t while doing each of the activities considered).

In a similar fashion, β_5 is the vector of coefficients representing the total effects of doing one of the activities considered in the outdoors with friends. This is equal to the sum of $b_1, b_4, b_5, b_6, b_7, b_{10}$ (the vector of coefficients representing the “interaction effects” linked to $Friends_{i,j,t} \& Act_j$, a vector of indicators of whether respondent i was with friends during activity j at time t while doing each of the activities considered), and b_{11} (the vector of coefficients representing the “interaction effects” linked to $Out_{i,j,t} \& Out_{i,j,t} \& Act_j$, a vector of indicators of whether respondent i was outdoors with friends during activity j at time t while doing each of the activities considered). All other variables have the same meaning as the one they have in the equation describing the model for the first and second type of analysis.

In all analyses, each observation was weighed by survey weights (which correct for the fact that certain groups or respondents are underrepresented) and by activity duration (which corrects for the fact that activities that last longer have a greater impact

on SWB). In all cases, regression coefficients representing correlations between SWB and explanatory variables were considered statistically significant if their p -value was at most less than 0.05 (i.e., if there is a probability of error equal to at most 5% when evaluating whether a coefficient is different from zero).

A.3. Regression tables

Table A1. United Kingdom Time Use Survey

Dependent variable: enjoyment	Basic model	With specific family members	With activity domains
Outdoors	1.0441*** (0.0975)	1.0168*** (0.0902)	0.9937*** (0.1191)
With family	0.475*** (0.0091)		0.4297*** (0.0098)
With partner		0.4743*** (0.0097)	
With parents		0.1669*** (0.0274)	
With children aged 0-7		0.0526** (0.018)	
With other family members (including children aged 8 or more)		0.2437*** (0.0139)	
With friends/acquaintances	0.4853*** (0.011)	0.4728*** (0.011)	0.3889*** (0.0125)
Culture and entertainment			1.0643*** (0.038)
Eating			0.7075*** (0.0322)
Socialising			1.5038*** (0.0853)
Sport and physical activity			1.2841*** (0.1019)
Walking and biking			1.2481*** (0.1105)
Outdoors & with family	-0.0089 (0.1115)		0.0233 (0.1586)
Outdoors & with partner		-0.0871 (0.1173)	
Outdoors & with parents		0.1325 (0.4346)	
Outdoors & with children aged 0-7		0.1188 (0.134)	
Outdoors & with other family members (including children aged 8 or more)		0.1337 (0.1546)	
Outdoors & with friends/acquaintances	-0.2358* (0.1196)	-0.2418* (0.1196)	-0.1749 (0.1862)
Outdoors & culture and entertainment			-0.6472 (0.3829)
Outdoors & eating			1.0082* (0.474)
Outdoors & socialising			-1.2279 (0.663)
Outdoors & sport and physical activity			-0.5433 (0.453)
Outdoors & walking and biking			-0.5616* (0.2894)
With family & culture and entertainment			-0.0973* (0.0434)
With family & eating			0.235*** (0.028)
With family & socialising			-0.2738*** (0.0807)
With family & sport and physical activity			-0.1781 (0.1376)
With family & walking and biking			-0.1238 (0.1307)
With friends/acquaintances & culture and entertainment			-0.0374 (0.0621)
With friends/acquaintances & eating			0.343*** (0.0293)
With friends/acquaintances & socialising			-0.194** (0.0722)
With friends/acquaintances & sport and physical activity			0.32* (0.1258)

With friends/acquaintances & walking and biking			0.0322 (0.143)
Outdoors & with family & culture and entertainment			0.3311 (0.3949)
Outdoors & with family & eating			-1.0929* (0.4626)
Outdoors & with family & socialising			0.2976 (0.6067)
Outdoors & with family & sport and physical activity			0.5087 (0.5592)
Outdoors & with family & walking and biking			-0.0193 (0.3346)
Outdoors & with friends/acquaintances & culture and entertainment			0.3268 (0.3545)
Outdoors & with friends/acquaintances & eating			-1.287** (0.45)
Outdoors & with friends/acquaintances & socialising			0.6052 (0.4833)
Outdoors & with friends/acquaintances & sport and physical activity			-0.1438 (0.5621)
Outdoors & with friends/acquaintances & walking and biking			-0.15 (0.3924)
Gender (ref: male)			
Female	0.0782* (0.0394)	0.0999* (0.0395)	0.0941* (0.0393)
Age	-0.0153* (0.0067)	-0.0164* (0.0067)	-0.0136* (0.0066)
Age squared	2e-04** (1e-04)	2e-04** (1e-04)	2e-04** (1e-04)
Region (ref: England)			
London	0.0259 (0.0734)	0.0271 (0.0735)	0.0189 (0.0731)
Wales	0.0874 (0.0852)	0.0919 (0.0853)	0.09 (0.0849)
Scotland	0.4732*** (0.0769)	0.471*** (0.0771)	0.4666*** (0.0767)
Northern Ireland	0.4921*** (0.1167)	0.4867*** (0.1169)	0.4988*** (0.1163)
Education (ref: degree or higher)			
Higher education	0.2234*** (0.0611)	0.2237*** (0.0612)	0.249*** (0.0609)
A-level or equivalent	0.2077*** (0.0597)	0.2073*** (0.0598)	0.2315*** (0.0595)
Secondary	0.2976*** (0.0553)	0.2924*** (0.0554)	0.3191*** (0.0551)
Other	0.36*** (0.0775)	0.3582*** (0.0776)	0.3834*** (0.0772)
Marital status (ref: single or never married)			
Married, cohabiting or in civil partnership	0.111 (0.0621)	0.0739 (0.0623)	0.112 (0.0618)
Separated, divorced or widowed	0.1278 (0.0786)	0.1181 (0.0787)	0.127 (0.0783)
Number of children aged 0-16 (ref: zero)			
One	-0.0423 (0.0589)	-0.01 (0.0591)	-0.0437 (0.0587)
Two	-0.0178 (0.0618)	0.0162 (0.0622)	-0.0195 (0.0616)
Three or more	0.0271 (0.0977)	0.048 (0.0981)	0.0401 (0.0974)
Labour force status (ref: employed)			
Unemployed	0.0054 (0.1158)	0.0135 (0.116)	-0.011 (0.1154)
Inactive	0.0237 (0.0529)	0.0401 (0.053)	0.0066 (0.0527)
Log monthly household income	-0.0807*** (0.0235)	-0.0809*** (0.0235)	-0.0827*** (0.0234)
House owned	-0.1202 (0.047)	-0.1199* (0.0471)	-0.1198* (0.0468)
Self-rated health (ref: Excellent)			
Very good	-0.1363** (0.0452)	-0.1299** (0.0453)	-0.1305** (0.0451)
Good	-0.2718*** (0.0597)	-0.2663*** (0.0598)	-0.2581*** (0.0594)
Fair	-0.7122*** (0.0976)	-0.7084*** (0.0978)	-0.7071*** (0.0973)

Poor	-1.0569*** (0.1811)	-1.0532*** (0.1813)	-1.0438*** (0.1803)
Day of the week (ref: Sunday)			
Monday	-0.0717*** (0.0134)	-0.068*** (0.0134)	-0.0681*** (0.0134)
Tuesday	-0.0628*** (0.0132)	-0.0546*** (0.0132)	-0.0575*** (0.0132)
Wednesday	-0.0471*** (0.0139)	-0.0418** (0.0139)	-0.0439** (0.0138)
Thursday	-0.0372** (0.0134)	-0.0249 (0.0134)	-0.0348** (0.0133)
Friday	-0.0706*** (0.0136)	-0.0662*** (0.0136)	-0.0688*** (0.0135)
Saturday	0.0419*** (0.011)	0.0431*** (0.011)	0.0415*** (0.011)
Intercept	7.7814*** (0.2467)	7.8416*** (0.2471)	7.6041*** (0.2458)
*: p-value < .05	Obs: 278,542	Obs: 278,542	Obs: 278,542
** : p-value < .01	Resp: 4,581	Resp: 4,581	Resp: 4,581
***: p-value < .001			

Table A2. American Time Use Survey

Dependent variable: happiness	Basic model	With specific family members	With activity domains
Outdoors	0.5172*** (0.0888)	0.5183*** (0.0887)	0.3664*** (0.1087)
With family	0.7838*** (0.0205)		0.6615*** (0.0266)
With partner		0.6921*** (0.0263)	
With parents		0.6508*** (0.0494)	
With children		0.7516*** (0.0346)	
With other family members		1.0535*** (0.0343)	
With friends	1.0985*** (0.0401)	1.1*** (0.0402)	0.9552*** (0.0549)
With someone else unrelated	0.2797*** (0.03)	0.2753*** (0.03)	0.2444*** (0.0308)
Culture and entertainment			0.0603 (0.035)
Eating			0.2456*** (0.032)
Socialising			0.8301*** (0.1098)
Sport and physical activity			1.0932*** (0.2583)
Walking and biking			0.8807*** (0.2411)
Outdoors & with family	0.2567 (0.1439)		0.2583 (0.1929)
Outdoors & with partner		0.4273* (0.1958)	
Outdoors & with parents		0.5535 (0.4364)	
Outdoors & with children		0.2029 (0.2522)	
Outdoors & with other family members		-0.127 (0.2343)	
Outdoors & with friends	-0.1535 (0.2)	-0.1425 (0.1999)	0.2079 (0.2922)
Outdoors & culture and entertainment			0.8367 (0.4935)
Outdoors & eating			-0.4802 (0.709)
Outdoors & socialising			-0.0155 (0.6212)
Outdoors & sport and physical activity			-0.5752 (0.4079)
Outdoors & walking and biking			-0.1705 (0.3336)
With family & culture and entertainment			-0.0763 (0.0534)
With family & eating			0.1782*** (0.0456)
With family & socialising			0.0947 (0.1216)
With family & sport and physical activity			0.2699 (0.3504)
With family & walking and biking			-0.0106 (0.4011)
With friends & culture and entertainment			0.1568 (0.1413)
With friends & eating			0.2159* (0.1015)
With friends & socialising			-0.3138* (0.151)
With friends & sport and physical activity			-0.5574 (0.364)
With friends & walking and biking			-0.0877 (0.6284)

Outdoors & with family & culture and entertainment			0.0121 (0.6366)
Outdoors & with family & eating			0.602 (0.8614)
Outdoors & with family & socialising			-0.4066 (0.7402)
Outdoors & with family & sport and physical activity			-0.0548 (0.636)
Outdoors & with family & walking and biking			0.0444 (0.5539)
Outdoors & friends & culture and entertainment			-0.5838 (0.8321)
Outdoors & friends & eating			0.9352 (1.0446)
Outdoors & friends & socialising			-0.5934 (0.7852)
Outdoors & friends & sport and physical activity			-0.0891 (0.7042)
Outdoors & friends & walking and biking			-0.7985 (1.0181)
Gender (ref: male)			
Female	0.2022*** (0.0189)	0.1957*** (0.0189)	0.2088*** (0.0188)
Age	0.0057 (0.0032)	0.0054 (0.0033)	0.0059 (0.0032)
Age squared	1e-04** (1e-04)	1e-04** (1e-04)	1e-04** (1e-04)
Region (ref: North East)			
Midwest	0.0239 (0.0291)	0.0221 (0.0291)	0.0291 (0.029)
South	0.2357*** (0.0271)	0.2329*** (0.027)	0.24*** (0.027)
West	0.0828** (0.0296)	0.0831** (0.0296)	0.0834** (0.0295)
Education (ref: high-school or no qualification)			
Professional qualification	-0.2041*** (0.0235)	-0.2012*** (0.0235)	-0.1998*** (0.0235)
Higher education	-0.4211*** (0.0246)	-0.4135*** (0.0246)	-0.4197*** (0.0245)
Marital status (ref: single or never married)			
Married, cohabiting or in civil partnership	0.2734*** (0.0294)	0.3017*** (0.03)	0.2775*** (0.0293)
Separated, divorced or widowed	0.0854** (0.0327)	0.085** (0.0327)	0.0792* (0.0326)
Number of children aged 0-16 (ref: zero)			
One	0.0632* (0.0278)	0.0652* (0.0281)	0.0694* (0.0277)
Two	0.0707* (0.0298)	0.0742* (0.0303)	0.0804** (0.0297)
Three or more	0.0978*** (0.0366)	0.1011** (0.0371)	0.1146** (0.0365)
Labour force status (ref: employed)			
Unemployed	-0.1436*** (0.0403)	-0.1493*** (0.0403)	-0.1466*** (0.0402)
Inactive	-0.0242 (0.0246)	-0.0243 (0.0246)	-0.0366 (0.0245)
Yearly household income (ref: < \$5,000)			
\$5,000 - \$19,999	-0.0288 (0.0633)	-0.0316 (0.0632)	-0.0265 (0.063)
\$20,000 - \$39,999	-0.0623 (0.0623)	-0.063 (0.0623)	-0.057 (0.0621)
\$40,000 - \$74,999	-0.1441* (0.0628)	-0.1456* (0.0628)	-0.1405* (0.0626)
\$75,000 - \$99,999	-0.1695* (0.0666)	-0.1709* (0.0666)	-0.1622* (0.0664)
\$100,000 - \$150,000	-0.2654*** (0.0678)	-0.2692*** (0.0678)	-0.2599*** (0.0676)
> \$150,000	-0.3331*** (0.0704)	-0.3353*** (0.0705)	-0.325*** (0.0702)
House owned	-0.1713*** (0.0233)	-0.1713*** (0.0233)	-0.1703*** (0.0232)
Self-rated health (ref: Excellent)			
Very good	-0.411***	-0.4114***	-0.4061***

	(0.0266)	(0.0266)	(0.0265)
Good	-0.7637***	-0.7652***	-0.7595***
	(0.0276)	(0.0276)	(0.0275)
Fair	-1.2506***	-1.2527***	-1.2459***
	(0.0342)	(0.0342)	(0.0341)
Poor	-2.1602***	-2.1656***	-2.1632***
	(0.0527)	(0.0526)	(0.0525)
Day of the week (ref: Sunday)			
Monday	-0.1897***	-0.1898***	-0.1776***
	(0.0337)	(0.0337)	(0.0336)
Tuesday	-0.1761***	-0.1751***	-0.1666***
	(0.0339)	(0.0339)	(0.0338)
Wednesday	-0.2245***	-0.2243***	-0.2137***
	(0.0334)	(0.0334)	(0.0333)
Thursday	-0.2003***	-0.1994***	-0.1881***
	(0.0336)	(0.0336)	(0.0335)
Friday	-0.103**	-0.1053**	-0.0904**
	(0.0336)	(0.0336)	(0.0335)
Saturday	0.0017	6e-04	0.0073
	(0.0278)	(0.0278)	(0.0277)
Intercept	7.1862***	7.1935***	7.0984***
	(0.1003)	(0.1011)	(0.1005)
*: p-value < .05	Obs: 91,091	Obs: 91,091	Obs: 91,091
** : p-value < .01	Resp: 30,948	Resp: 30,948	Resp: 30,948
***: p-value < .001			

Table A3. American Time Use Survey

Dependent variable: stress	Basic model	With specific family members	With activity domains
Outdoors	-0.4233*** (0.0936)	-0.4275*** (0.0936)	-0.4589*** (0.1141)
With family	-0.3248*** (0.0217)		-0.2478*** (0.0282)
With partner		-0.3615*** (0.0278)	
With parents		-0.444*** (0.0522)	
With children		-0.1687*** (0.0365)	
With other family members		-0.3404*** (0.0363)	
With friends	-0.5055*** (0.0425)	-0.5107*** (0.0425)	-0.415*** (0.0581)
With someone else unrelated	0.5856*** (0.0318)	0.5883*** (0.0318)	0.6004*** (0.0326)
Culture and entertainment			-0.5388*** (0.0373)
Eating			-0.4553*** (0.0338)
Socialising			-1.1805*** (0.1164)
Sport and physical activity			-0.8442*** (0.2762)
Walking and biking			-0.6695** (0.2565)
Outdoors & with family	0.1231 (0.1519)		0.3914 (0.2031)
Outdoors & with partner		-0.1256 (0.2073)	
Outdoors & with parents		-0.4025 (0.4637)	
Outdoors & with children		0.4202 (0.2658)	
Outdoors & with other family members		0.4051 (0.2475)	
Outdoors & with friends	0.7411*** (0.2109)	0.7423*** (0.2108)	0.6552* (0.3071)
Outdoors & culture and entertainment			0.1095 (0.5204)
Outdoors & eating			-0.5958 (0.7463)
Outdoors & socialising			-0.341 (0.6611)
Outdoors & sport and physical activity			0.7624 (0.4332)
Outdoors & walking and biking			0.3242 (0.3542)
With family & culture and entertainment			-0.0202 (0.0565)
With family & eating			-0.0364 (0.0479)
With family & socialising			0.6125*** (0.1289)
With family & sport and physical activity			0.0839 (0.3739)
With family & walking and biking			-0.1808 (0.4266)
With friends & culture and entertainment			-0.0722 (0.1497)
With friends & eating			-0.122 (0.1067)
With friends & socialising			0.6237*** (0.1602)
With friends & sport and physical activity			0.3619 (0.3898)
With friends & walking and biking			-0.3033 (0.6711)

Outdoors & with family & culture and entertainment			-0.6953 (0.6702)
Outdoors & with family & eating			0.0023 (0.7862)
Outdoors & with family & socialising			0.4961 (0.9049)
Outdoors & with family & sport and physical activity			-1.2745 (0.6725)
Outdoors & with family & walking and biking			-0.3871 (0.5882)
Outdoors & friends & culture and entertainment			-0.0883 (0.8807)
Outdoors & friends & eating			-0.9195 (1.0974)
Outdoors & friends & socialising			1.551 (0.8297)
Outdoors & friends & sport and physical activity			-1.1775 (0.7509)
Outdoors & friends & walking and biking			0.8118 (1.0824)
Gender (ref: male)			
Female	0.3127*** (0.0201)	0.3039*** (0.0202)	0.2933*** (0.0201)
Age	0.0274*** (0.0035)	0.0252*** (0.0035)	0.0272*** (0.0034)
Age squared	-4e-04*** (1e-04)	-4e-04*** (1e-04)	-4e-04*** (1e-04)
Region (ref: North East)			
Midwest	-0.0183 (0.031)	-0.0177 (0.031)	-0.023 (0.0309)
South	-0.0243 (0.0289)	-0.0222 (0.0289)	-0.0238 (0.0287)
West	0.0097 (0.0316)	0.0116 (0.0316)	0.0074 (0.0314)
Education (ref: high-school or no qualification)			
Professional qualification	0.1613*** (0.0251)	0.1563*** (0.0251)	0.1506*** (0.025)
Higher education	0.3906*** (0.0262)	0.384*** (0.0263)	0.3769*** (0.0261)
Marital status (ref: single or never married)			
Married, cohabiting or in civil partnership	-0.001 (0.0313)	0.0015 (0.032)	-0.0167 (0.0312)
Separated, divorced or widowed	0.0925** (0.0348)	0.083* (0.0348)	0.0906** (0.0347)
Number of children aged 0-16 (ref: zero)			
One	0.0771** (0.0297)	0.0536 (0.03)	0.0635* (0.0295)
Two	0.1579*** (0.0318)	0.1245*** (0.0324)	0.1351*** (0.0317)
Three or more	0.2797*** (0.039)	0.2428*** (0.0396)	0.2483*** (0.0389)
Labour force status (ref: employed)			
Unemployed	0.1943*** (0.0431)	0.1938*** (0.0431)	0.2042*** (0.0429)
Inactive	-0.1413*** (0.0262)	-0.1407*** (0.0262)	-0.1067*** (0.0261)
Yearly household income (ref: < \$5,000)			
\$5,000 - \$19,999	-0.0306 (0.0673)	-0.0236 (0.0673)	-0.0285 (0.0671)
\$20,000 - \$39,999	-0.1865** (0.0664)	-0.1771** (0.0664)	-0.1963** (0.0661)
\$40,000 - \$74,999	-0.1838** (0.0669)	-0.1713* (0.0669)	-0.1919** (0.0666)
\$75,000 - \$99,999	-0.104 (0.071)	-0.0905 (0.071)	-0.1149 (0.0707)
\$100,000 - \$150,000	-0.1326 (0.0723)	-0.1192 (0.0723)	-0.1441* (0.0719)
> \$150,000	0.0958 (0.0751)	0.1128 (0.0751)	0.081 (0.0748)
House owned	-0.0644** (0.0248)	-0.0583* (0.0248)	-0.0729** (0.0247)
Self-rated health (ref: Excellent)			
Very good	0.3396***	0.3383***	0.3384***

	(0.0284)	(0.0284)	(0.0282)
Good	0.7598***	0.7578***	0.7641***
	(0.0294)	(0.0294)	(0.0293)
Fair	1.5519***	1.5521***	1.5613***
	(0.0365)	(0.0365)	(0.0364)
Poor	3.02***	3.0221***	3.0521***
	(0.0561)	(0.0561)	(0.0559)
Day of the week (ref: Sunday)			
Monday	0.3394***	0.3292***	0.3088***
	(0.036)	(0.036)	(0.0358)
Tuesday	0.4529***	0.4428***	0.4213***
	(0.0362)	(0.0362)	(0.036)
Wednesday	0.4508***	0.4415***	0.4222***
	(0.0357)	(0.0357)	(0.0355)
Thursday	0.4805***	0.4707***	0.4471***
	(0.0359)	(0.0359)	(0.0358)
Friday	0.2444***	0.2366***	0.2118***
	(0.0359)	(0.0359)	(0.0357)
Saturday	-0.0039	-0.0071	-0.017
	(0.0294)	(0.0294)	(0.0293)
Intercept	0.9244***	0.9853***	1.1393***
	(0.107)	(0.1078)	(0.1071)
*: p-value < .05	Obs: 91,091	Obs: 91,091	Obs: 91,091
** : p-value < .01	Resp: 30,948	Resp: 30,948	Resp: 30,948
***: p-value < .001			

Table A4. American Time Use Survey

Dependent variable: meaning	Basic model	With specific family members	With activity domains
Outdoors	0.81*** (0.1045)	0.8091*** (0.1044)	0.4499*** (0.127)
With family	1.0589*** (0.0242)		0.8615*** (0.0313)
With partner		0.8293*** (0.031)	
With parents		1.0424*** (0.0582)	
With children		1.202*** (0.0407)	
With other family members		1.3905*** (0.0404)	
With friends	1.0155*** (0.0474)	1.0278*** (0.0474)	0.7119*** (0.0645)
With someone else unrelated	0.9045*** (0.0355)	0.9045*** (0.0354)	0.8267*** (0.0362)
Culture and entertainment			-0.8038*** (0.0413)
Eating			-0.0467 (0.0375)
Socialising			0.2567* (0.1292)
Sport and physical activity			0.948** (0.3058)
Walking and biking			1.1242*** (0.2845)
Outdoors & with family	0.2644 (0.1695)		0.6554** (0.2258)
Outdoors & with partner		0.4882* (0.231)	
Outdoors & with parents		0.2658 (0.5164)	
Outdoors & with children		0.3141 (0.2965)	
Outdoors & with other family members		-0.203 (0.276)	
Outdoors & with friends	-0.4096 (0.2354)	-0.3899 (0.2352)	0.5667 (0.3416)
Outdoors & culture and entertainment			1.5346** (0.5785)
Outdoors & eating			0.5437 (0.8299)
Outdoors & socialising			-0.2892 (0.733)
Outdoors & sport and physical activity			0.2904 (0.4806)
Outdoors & walking and biking			-0.4487 (0.393)
With family & culture and entertainment			-0.1053 (0.0627)
With family & eating			0.3935*** (0.0533)
With family & socialising			1.0579*** (0.1431)
With family & sport and physical activity			0.5198 (0.4143)
With family & walking and biking			-0.3243 (0.473)
With friends & culture and entertainment			0.1262 (0.1662)
With friends & eating			0.3849** (0.1187)
With friends & socialising			0.6694*** (0.1778)
With friends & sport and physical activity			-0.5244 (0.4315)
With friends & walking and biking			0.2656 (0.7434)

Outdoors & with family & culture and entertainment			-0.3227 (0.7453)
Outdoors & with family & eating			-1.1568 (1.0069)
Outdoors & with family & socialising			-0.5445 (0.8722)
Outdoors & with family & sport and physical activity			-1.5508* (0.7469)
Outdoors & with family & walking and biking			-0.3434 (0.6526)
Outdoors & friends & culture and entertainment			-0.5915 (0.978)
Outdoors & friends & eating			-0.1187 (1.2211)
Outdoors & friends & socialising			-2.8567** (0.9217)
Outdoors & friends & sport and physical activity			-0.183 (0.8321)
Outdoors & friends & walking and biking			-1.3069 (1.2004)
Gender (ref: male)			
Female	0.2742*** (0.0224)	0.2537*** (0.0225)	0.2576*** (0.0222)
Age	0.0933*** (0.0038)	0.0925*** (0.0039)	0.094*** (0.0038)
Age squared	-7e-04*** (1e-04)	-7e-04*** (1e-04)	-7e-04*** (1e-04)
Region (ref: North East)			
Midwest	-0.1158*** (0.0346)	-0.1171*** (0.0345)	-0.1076** (0.0343)
South	0.2292*** (0.0321)	0.227*** (0.0321)	0.2421*** (0.0319)
West	-0.0275 (0.0351)	-0.0252 (0.0351)	-0.028 (0.0348)
Education (ref: high-school or no qualification)			
Professional qualification	-0.445*** (0.0292)	-0.0955*** (0.0279)	-0.1046*** (0.0277)
Higher education	0.1973*** (0.0349)	-0.4368*** (0.0292)	-0.465*** (0.029)
Marital status (ref: single or never married)			
Married, cohabiting or in civil partnership	0.1973*** (0.0349)	0.2693*** (0.0356)	0.1798*** (0.0346)
Separated, divorced or widowed	0.1098** (0.0388)	0.1043** (0.0388)	0.0914* (0.0384)
Number of children aged 0-16 (ref: zero)			
One	0.2181*** (0.033)	0.1914*** (0.0333)	0.2142*** (0.0327)
Two	0.3192*** (0.0354)	0.2846*** (0.036)	0.31*** (0.0351)
Three or more	0.4634*** (0.0434)	0.4241*** (0.044)	0.4569*** (0.0431)
Labour force status (ref: employed)			
Unemployed	0.0777 (0.0479)	0.0691 (0.0479)	0.0884 (0.0475)
Inactive	-0.1266*** (0.0292)	-0.1315*** (0.0292)	-0.0986*** (0.029)
Yearly household income (ref: < \$5,000)			
\$5,000 - \$19,999	-0.1376 (0.075)	-0.1348 (0.0749)	-0.1269 (0.0744)
\$20,000 - \$39,999	-0.2041** (0.0739)	-0.1979** (0.0739)	-0.2035** (0.0733)
\$40,000 - \$74,999	-0.3539*** (0.0745)	-0.3474*** (0.0744)	-0.3558*** (0.0738)
\$75,000 - \$99,999	-0.4098*** (0.0791)	-0.4027*** (0.079)	-0.4058*** (0.0784)
\$100,000 - \$150,000	-0.5608*** (0.0805)	-0.558*** (0.0804)	-0.5617*** (0.0798)
> \$150,000	-0.6846*** (0.0836)	-0.6785*** (0.0836)	-0.6837*** (0.0829)
House owned	-0.2508*** (0.0276)	-0.2534*** (0.0276)	-0.264*** (0.0274)
Self-rated health (ref: Excellent)			
Very good	-0.3198***	-0.3204***	-0.3083***

	(0.0316)	(0.0315)	(0.0313)
Good	-0.4509***	-0.4538***	-0.4325***
	(0.0327)	(0.0327)	(0.0325)
Fair	-0.573***	-0.5749***	-0.5447***
	(0.0407)	(0.0406)	(0.0403)
Poor	-0.9315***	-0.9348***	-0.8874***
	(0.0625)	(0.0624)	(0.062)
Day of the week (ref: Sunday)			
Monday	-0.0047	-0.017	-0.0267
	(0.04)	(0.04)	(0.0397)
Tuesday	0.0886*	0.0785	0.0568
	(0.0402)	(0.0402)	(0.0399)
Wednesday	0.029	0.0181	0.007
	(0.0397)	(0.0397)	(0.0394)
Thursday	0.0461	0.0353	0.0171
	(0.0399)	(0.04)	(0.0396)
Friday	0.0706	0.0586	0.0478
	(0.0399)	(0.0399)	(0.0396)
Saturday	-0.0552	-0.0597	-0.065*
	(0.0328)	(0.0328)	(0.0326)
Intercept	4.443***	4.4562***	4.5616***
	(0.1192)	(0.1199)	(0.1187)
*: p-value < .05	Obs: 91,091	Obs: 91,091	Obs: 91,091
** : p-value < .01	Resp: 30,948	Resp: 30,948	Resp: 30,948
***: p-value < .001			

A4. References

- Barton, J., Bragg, R., Wood, C., & Pretty, J. (Eds.). (2016). *Green exercise: Linking nature, health and well-being*. Routledge.
- Barton, J., Hine, R., & Pretty, J. (2009). The health benefits of walking in greenspaces of high natural and heritage value. *Journal of Integrative Environmental Sciences*, 6(4), 261-278.
- Biedenweg, K., Scott, R. P., & Scott, T. A. (2017). How does engaging with nature relate to life satisfaction? Demonstrating the link between environment-specific social experiences and life satisfaction. *Journal of Environmental Psychology*, 50, 112-124.
- Brymer, E., Cuddihy, T. F., & Sharma-Brymer, V. (2010). The role of nature-based experiences in the development and maintenance of wellness. *Asia-Pacific Journal of Health, Sport and Physical Education*, 1(2), 21-27.
- Dolan, P. (2014). *Happiness by design: Finding pleasure and purpose in everyday life*. Penguin UK.
- Dolan, P., & Kudrna, L. (2016). Sentimental Hedonism: Pleasure, Purpose, and Public Policy. In *Handbook of Eudaimonic Well-Being* (pp. 437-452). Springer International Publishing.
- Dolan, P., Layard, R., & Metcalfe, R. (2011). Measuring subjective well-being for public policy.
- Ferrer-i-Carbonell, A., & Frijters, P. (2004). How important is methodology for the estimates of the determinants of happiness?. *The Economic Journal*, 114(497), 641-659.
- Ferrer-i-Carbonell, A., & Gowdy, J. M. (2007). Environmental degradation and happiness. *Ecological economics*, 60(3), 509-516.
- Focht, B. C. (2009). Brief walks in outdoor and laboratory environments: effects on affective responses, enjoyment, and intentions to walk for exercise. *Research quarterly for exercise and sport*, 80(3), 611-620.
- Freeman, P. A., & Zabriskie, R. B. (2002). The role of outdoor recreation in family enrichment. *Journal of Adventure Education & Outdoor Learning*, 2(2), 131-145.
- Fujiwara, D., & Campbell, R. (2011). Valuation techniques for social cost-benefit analysis: stated preference, revealed preference and subjective well-being approaches: a discussion of the current issues. HM Treasury.
- Fujiwara, D., & MacKerron, G. (2015). Cultural activities, artforms and wellbeing. *Arts Council England*.
- Gesler, W. M. (1992). Therapeutic landscapes: medical issues in light of the new cultural geography. *Social science & medicine*, 34(7), 735-746.
- Godbey, G. (2009). Outdoor recreation, health, and wellness: Understanding and enhancing the relationship.
- Graham, C., & Felton, A. (2006). Inequality and happiness: insights from Latin America. *The Journal of Economic Inequality*, 4(1), 107-122.
- Hudson, J. (2006). Institutional trust and subjective well-being across the EU. *Kyklos*, 59(1), 43-62.
- Jirásek, I., Roberson, D. N., & Jirásková, M. (2017). The Impact of Families Camping Together: Opportunities for Personal and Social Development. *Leisure Sciences*, 39(1), 79-93.
- Kahneman, D., Krueger, A. B., Schkade, D. A., Schwarz, N., & Stone, A. A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science*, 306(5702), 1776-1780.
- Kahneman, D., Wakker, P. P., & Sarin, R. (1997). Back to Bentham? Explorations of experienced utility. *The quarterly journal of economics*, 112(2), 375-406.

- Krueger, A. B., Kahneman, D., Schkade, D., Schwarz, N., & Stone, A. A. (2009). National time accounting: The currency of life. In *Measuring the subjective well-being of nations: National accounts of time use and well-being* (pp. 9-86). University of Chicago Press.
- Lehto, X. Y., Lin, Y. C., Chen, Y., & Choi, S. (2012). Family vacation activities and family cohesion. *Journal of Travel & Tourism Marketing*, 29(8), 835-850.
- Lelkes, O. (2006). Tasting freedom: Happiness, religion and economic transition. *Journal of Economic Behavior & Organization*, 59(2), 173-194.
- Marcus, C. C., & Sachs, N. A. (2013). *Therapeutic landscapes: An evidence-based approach to designing healing gardens and restorative outdoor spaces*. John Wiley & Sons.
- MacKerron, G., & Mourato, S. (2013). Happiness is greater in natural environments. *Global Environmental Change*, 23(5), 992-1000.
- Martin, M., & Westerhof, G. J. (2003). Do you need to have them or should you believe you have them? Resources, their appraisal, and well-being in adulthood. *Journal of Adult Development*, 10(2), 99-112.
- McCurdy, L. E., Winterbottom, K. E., Mehta, S. S., & Roberts, J. R. (2010). Using nature and outdoor activity to improve children's health. *Current problems in pediatric and adolescent health care*, 40(5), 102-117.
- Muñoz, S. A. (2009). *Children in the Outdoors*. London: Sustainable Development Research Centre.
- Mulholland, R., & Williams, A. (1998). Exploring Together Outdoors: A Family Therapy Approach Based in the Outdoors.
- Pichler, F. (2006). Subjective quality of life of young Europeans. Feeling happy but who knows why?. *Social Indicators Research*, 75(3), 419-444.
- Pretty, J., Peacock, J., Sellens, M., & Griffin, M. (2005). The mental and physical health outcomes of green exercise. *International journal of environmental health research*, 15(5), 319-337.
- Romagosa, F., Eagles, P. F., & Lemieux, C. J. (2015). From the inside out to the outside in: Exploring the role of parks and protected areas as providers of human health and well-being. *Journal of Outdoor Recreation and Tourism*, 10, 70-77.
- Turner, T. L., & Stevinson, C. (2017). Affective outcomes during and after high-intensity exercise in outdoor green and indoor gym settings. *International journal of environmental health research*, 27(2), 106-116.
- Welsch, H. (2006). Environment and happiness: Valuation of air pollution using life satisfaction data. *Ecological economics*, 58(4), 801-813.
- White, M. P., & Dolan, P. (2009). Accounting for the richness of daily activities. *Psychological Science*, 20(8), 1000-1008.

August 2018

secondary analysis | family and outdoor recreation



In partnership with:



HM Government



University of Brighton



THE UNIVERSITY OF
WINCHESTER



Brunel
University
London



THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE

Culture and Sport Evidence Programme
What Works Centre for Wellbeing
www.whatworkswellbeing.org
@whatworksWB