



Arts Council England

Cultural activities,  
artforms and wellbeing

Daniel Fujiwara and George MacKerron

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# About the authors

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**Daniel Fujiwara** is Director of SImetrica and a member of the Centre for Economic Performance at the London School of Economics and Political Science. His research focuses on policy evaluation methods and techniques for valuing non-market goods. He has recently published guidelines on non-market valuation and subjective wellbeing analysis for the UK Government, including an update to the HM Treasury Green Book manual. Daniel previously led on cost-benefit analysis at the Department for Work and Pensions and was senior economist at the Cabinet Office. He is currently scientific advisor to the SROI Network and works with a number of OECD governments and public sector organisations on policy evaluation.

**George MacKerron** lectures in environmental and behavioural economics at the University of Sussex, with additional affiliations to UCL and LSE. His research covers areas including subjective wellbeing, environmental quality, spatial analysis and crowdsourcing. George leads the Mappiness study, providing new and unique evidence on how our happiness is linked to our location and environment. He is Head of Research Technology for SImetrica.

# 1 Introduction

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## 1. Background

Over the past decade interest in subjective wellbeing (SWB) has significantly increased among policy makers and in academia. The number of journal publications using SWB data has increased rapidly and SWB is now recognised as an important measure of social progress in a large number of countries and international organisations (eg, the Organisation for Economic Co-operation and Development (OECD) and the United Nations). The *National Wellbeing Programme* in the UK is at the forefront of policy developments in this area and it has resulted in an ambitious programme of data collection on SWB by the Office for National Statistics (ONS). The UK Government and the OECD have developed guidance on methods for analysing and using SWB data in policy evaluation (OECD, 2013).

This trend has been reflected in the cultural sector. Wellbeing is a key aspect of policy making in the Department for Culture Media and Sport (DCMS)<sup>1</sup> and various toolkits for measuring wellbeing in the cultural sector have been developed by the Happy Museum project (the LIFE survey)<sup>2</sup> and University College London (UCL Museum Wellbeing Measures Toolkit)<sup>3</sup> There is a growing body of evidence made up of both qualitative and quantitative data on the relationship between the arts and culture, and wellbeing (for reviews of the literature see Fujiwara et al., 2014a, Fujiwara et al., 2014b).

SWB can be measured in a number of different ways. The academic literature on has tended to focus on two broad categories of wellbeing:

### i). Evaluative wellbeing

Evaluative SWB measures tap into a cognitive assessment of one's life, which incorporate an assessment of how well one's life measures up to aspirations, goals and peers as well as a reflection on how one feels now (Diener, 1984, Kahneman and Krueger, 2006). Evaluative SWB data, such as life satisfaction, are usually measured in annual national surveys, such as the ONS Annual Population Survey and Understanding Society.

### ii). Affective wellbeing

Affective SWB is concerned with a person's feelings 'in the moment' and can encompass both positive and negative feelings. Positive feelings are often measured in terms of happiness and negative feelings could ask about stress, anxiety, misery and so on. Affective wellbeing is typically measured on a more frequent basis than evaluative measures. The Experience Sampling Method (ESM) (Csikszentmihalyi, 1990) collects information on people's reported feelings in real-time during selected moments of the day using a Personal Digital Assistant (PDA). Respondents report their activity at the time and their subjective experiences, such as anger, happiness and fatigue. The Day Reconstruction Method (DRM) (Kahneman et al., 2004) uses a diary-based approach whereby respondents are asked to rate their feelings at different points during the day retrospectively at the end of the day.

Studies using evaluative SWB measures are more prevalent in academic and policy research because of data collection issues with affective wellbeing.

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<sup>1</sup> [http://blogs.culture.gov.uk/main/2014/04/what\\_makes\\_a\\_community\\_theatre.html](http://blogs.culture.gov.uk/main/2014/04/what_makes_a_community_theatre.html)  
Also see recent publications (Fujiwara et al. 2014a, 2014b)

<sup>2</sup> <http://www.happymuseumproject.org/?p=1988>

<sup>3</sup> <http://www.ucl.ac.uk/museums/research/touch/museumwellbeingmeasures/wellbeing-measures>

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Evaluative SWB data are readily available from national survey data, whereas affective SWB measures require primary data collection and are a lot more costly due to the frequency of the data. ESM datasets, therefore, are rarer and tend to be based on much smaller sample sizes and collected over shorter time periods.

Quantitative research on wellbeing in the cultural sector has predominantly relied upon evaluative measures of SWB. But most studies in the cultural sector have tended to use qualitative survey approaches with small focus groups to assess the links between culture and a wide range of both evaluative and affective wellbeing measures. For example, Packer (2008) uses a qualitative approach to survey people about their experiences and perceptions regarding museums and finds that museums are important because of the experiences they create and because they provide a restorative environment for people where they can relax and unwind. Similarly, Binnie (2010) uses a qualitative approach and finds that people report reduced levels of anxiety and increased wellbeing after viewing art. Viewing art has also been found to impact on physical sensations (Berleant, 1990), such as reductions in perceived intensity of pain (De Tommaso, Sardaro & Livrea, 2008). And hospital patients report higher life satisfaction scores and health status after participating in handling sessions with museum objects (Chatterjee, Vreeland & Noble, 2009) (see Binnie (2010) for all of these references).

Recent work by psychologists and economists has drawn attention to affective wellbeing measures, which can be likened to “a continuous *hedonic* flow of pleasure or pain” (Kahneman and Krueger, 2006: p.4). This hedonic or momentary component of wellbeing is important since expectations regarding the “flow” of pleasure and pain may partially determine the choices that individuals make and affective SWB data can lead to a fuller appreciation of the feelings that people experience during different activities and episodes in their lives. This movement is also

partly motivated by the findings that evaluative measures, that rely on a retrospective and cognitive assessment of one’s life, can be biased by a number of survey anomalies (Schwarz and Strack, 1999). For example, evaluative measures can be biased by the question ordering, the characteristics of the interviewer and the pleasantness of the room. Furthermore people often struggle to accurately remember their evaluations of past experiences (Kahneman et al., 1993, Schwarz, 2010).

We aim to contribute to the literature on culture and wellbeing by establishing the relationship between cultural engagement and momentary wellbeing using a new and large ESM dataset for the UK called Mappiness. We look at people’s self-reported happiness and feelings of relaxation during cultural activities. Unlike the DRM which asks individuals about their feelings yesterday – a procedure which can require a degree of retrospection, with potential for retrospective distortion (Stone et al., 2010) – we obtain instantaneous responses so that individuals report their feelings at the time they are undertaking the activity. To our knowledge this is the first study specifically on culture and affective wellbeing using ESM wellbeing data.

# 2 Research questions

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## **Cultural activities and wellbeing**

We look at the effects of the following cultural activities on happiness and relaxation.

### *Activities at an institution*

- Being at theatre, dance, or concert
- Being at an exhibition, museum, or library

### *Activity only*

- Listening to music
- Reading
- Doing hobbies, arts, or crafts
- Singing, or performing

We assess how the impacts of these activities compare with other popular non-cultural activities.

We also look at how the impacts of these cultural activities differ depending on whom you attend and/or engage in the activities with.

## **Art forms and wellbeing**

The second aspect of the research looks at the wellbeing impacts of the different types of art-forms being experienced, categorised as:

- i. Performing Arts (PA)
- ii. Visual Arts (VA)
- iii. Combined Arts (CA)
- iv. Museums (M)
- v. Libraries (L)

This is based on looking at people's experiences at specific institutions (eg, the British Museum or British Library) and categorising those institutes based on the Arts Council England (ACE) definitions. This is possible because we have data on people's geographic location when they respond to the Mappiness survey.

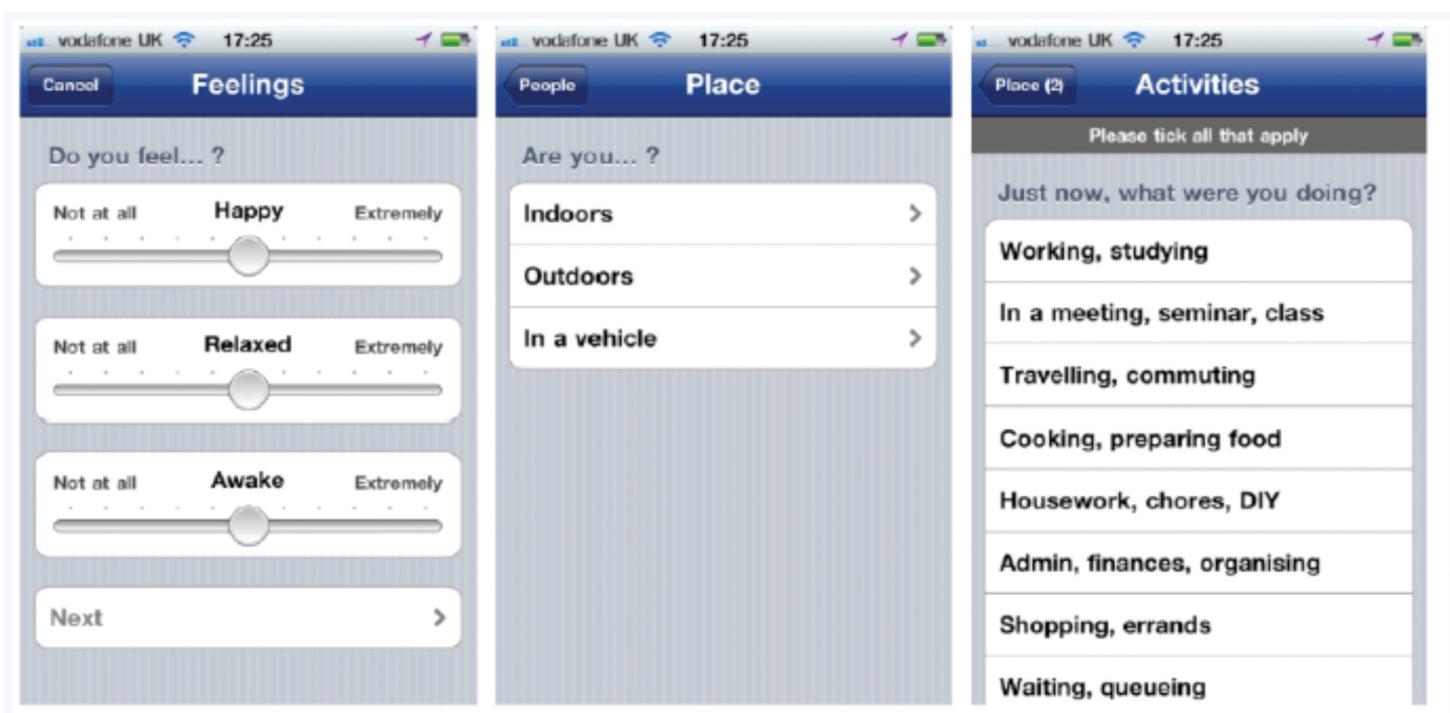
# 3 Data and methodology

Mappiness is an iPhone application that permits individuals to record their wellbeing scores via their phone. The data contain more than one million observations on tens of thousands of individuals in the UK, collected since August 2010. Individuals who have downloaded the app receive randomly timed “dings” on their phone to request that they complete a very short survey.

The survey asks individuals to rate themselves on three dimensions of momentary wellbeing, stating how happy, how relaxed, and how awake they feel. In this paper we focus on happiness and relaxation. Each score is elicited by means

of a continuous slider (a form of visual analogue scale — see Couper et al. 2006). The ends of each scale are labelled “Not at all” and “Extremely”, and an individual positions himself/herself on the scale by drawing a fingertip across the screen. Having completed this phase the individual is asked whether they are alone and, if not, whom they are with. They are then asked whether they are indoors, outdoors, or in a vehicle, and whether they are at home, at work, or elsewhere. Finally, they are asked what they were doing “just now”. The respondent chooses all that apply out of 40 response options, which include a range of cultural activities.

Figure 1. The Mappiness survey instrument on iPhone



Together with the responses to the survey, the app transmits the satellite positioning (GPS) location of the individual and the precise time at which the survey was completed. It also records the time elapsed between the random “ding” and response, thus allowing analysts to distinguish between immediate responses and delayed responses. Individuals complete a short survey about their personal circumstances, work status and household characteristics when registering for Mappiness.

The population of Mappiness respondents differs in a number of ways from the population at large; wealthier people, young people and employed people are over-represented relative to the UK adult population. Therefore, when interpreting and extrapolating the results from this study it should be acknowledged that the results may not necessarily be directly applicable to other socioeconomic groups.

Regression analysis is used to estimate the effect of cultural activities on wellbeing by estimating the association between cultural activities and wellbeing after controlling for a range of other determinants of wellbeing.

# 4 Results

## Cultural activities and wellbeing

All arts and culture activities are significantly associated with happiness and relaxation after controlling for a range of other factors.

The ranking of cultural activities in terms of positive effects on happiness is as follows<sup>4</sup>:

1. Theatre, dance, concerts
2. Singing, performing
3. Exhibitions, museums, libraries
4. Hobbies, arts, crafts
5. Listening to music
6. Reading

The ranking of cultural activities in terms of positive effects on feeling relaxed is as follows<sup>5</sup>:

1. Exhibitions, museums, libraries
2. Hobbies, arts, crafts
3. Theatre, dance, concerts
4. Singing, performing
5. Reading
6. Listening to music

Note that these rankings are purely in terms of coefficient size, which is our best estimate of the magnitude of impact for these activities. Since the coefficients are estimates based on the available data there is a level of uncertainty about the 'true' estimate that is acknowledged in the standard errors (SE) for the coefficients in Tables 1 and 2. The standard errors can be used to produce a confidence interval within which we can be reasonably confident that the true coefficient lies. In comparing these confidence intervals not all of the estimated impacts of the activities are

statistically significantly different from each other (see footnote 10 for additional information about statistical terms).

In comparison to all of the 40 activities that people report in Mappiness, 'theatre, dance, concerts' ranks second for happiness and 'exhibitions, museums, libraries' ranks third for relaxation. Tables 1 and 2 show the rankings of cultural activities in terms of their impacts on happiness and relaxation relative to the five other most popular or frequent activities in the Mappiness data. Cultural activities tend to rank very highly in terms of impacts on happiness and relaxation.

Activity	Coefficient
Theatre, dance, concert	8.735
Singing, performing	7.731
Exhibition, museum, library	7.457
Hobbies, arts, crafts	5.737
Talking, chatting, socialising	3.789
Drinking alcohol	3.646
Listening to music	3.518
Childcare, playing with children	2.888
Reading	2.331
Watching TV, film	2.084
Housework, chores, DIY	-0.651

*Notes: Cultural activities are highlighted in pink text. The coefficient shows the size of the impact on happiness from doing the activity (where happiness is measured on a scale of 0-100). All variables were statistically significant.*

<sup>4</sup> 'Intimacy, making love' was the highest ranking activity for happiness. 'Sick in bed' was the lowest ranking activity.

<sup>5</sup> 'Intimacy, making love' was the highest ranking activity for relaxation followed by 'Birdwatching, nature watching'. 'Sick in bed' was the lowest ranking activity.

**Table 2. Relaxation activities rankings**

Activity	Coefficient
Exhibition, museum, library	6.017
Hobbies, arts, crafts	4.618
Theatre, dance, concert	4.483
Singing, performing	4.171
Reading	4.124
Drinking alcohol	4.045
Watching TV, film	3.562
Listening to music	3.027
Talking, chatting, socialising	2.859
Childcare, playing with children	0.877
Housework, chores, DIY	-3.668

Notes: Cultural activities are highlighted in pink text. The coefficient shows the size of the impact on relaxation from doing the activity (where relaxation is measured on a scale of 0-100). All variables were statistically significant.

Again, we note that these rankings are purely in terms of coefficient size, which is our best estimate of the magnitude of impact. The impact sizes themselves may not all be statistically different from each other.

### Cultural activities with people

We assess whether the impact of arts and cultural activities differ depending on whom the individual is with. In the Mappiness survey respondents are asked whom they are with and can choose either 'alone' or as many as apply out of seven other categories:

- i. Partner
- ii. Child(ren)
- iii. Relative(s)
- iv. Peer(s)
- v. Work client(s)
- vi. Friend(s)
- vii. Other

We find that in general, arts and cultural activities are associated with a larger increase in people's happiness when they are alone than when they are with other people, but if we look at the *level* of wellbeing for people at, say, theatre/dance/concert it is higher for people who are not alone. However, in large part this is being driven by the benefits of being with others which would be experienced by people regardless of what they are doing. There is very little previous research on the differential effects of cultural activities when done alone or with others. The only relevant study we found was by Valentine and Evans (2001) who found no differences in terms of impacts on mood and physiological responses for people doing solo or group singing. Therefore, future research should aim to explore this issue in more detail. Interestingly, the only two occasions when the impact of cultural activities with someone else is larger is when singing with clients (for happiness) and when singing with children (for relaxation). These are interesting cases highlighted by the data, however we are not aware of anything in the existing literature to help explain why this may be the case.

## Art-forms and wellbeing

We use the GPS signals from people's responses to Mappiness to estimate which cultural institution they were in when responding that they were doing a cultural activity. We look at responses from 75 different cultural institutions (shown in the Annex of the main paper) and categorise the institutions into different art-forms using the ACE art-form definitions as follows:

- i. Performing Arts (PA)
- ii. Visual Arts (VA)
- iii. Combined Arts (CA)
- iv. Museums (M)
- v. Libraries (L)

Tables 3 and 4 show the impacts of visits to institutes of different art-forms on happiness and relaxation. Sample sizes were too low for looking at the impacts of libraries so they are excluded in the results.

**Table 3. Impact of visits to institutes of different art-forms on happiness**

Art-form	Coefficient
Combined Arts	6.116
Museums	6.282
Performing Arts	6.28
Visual Arts	6.115

*Notes: The coefficient shows the size of the impact on happiness (where happiness is measured on a scale of 0-100). All variables were statistically significant.*

**Table 4. Impact of visits to institutes of different art-forms on relaxation**

Art-form	Coefficient
Combined Arts	4.619
Museums	3.947
Performing Arts	4.988
Visual Arts	3.893

*Notes: The coefficient shows the size of the impact on happiness (where happiness is measured on a scale of 0-100). All variables were statistically significant.*

All art-form types are statistically significant for **happiness** and all have a positive effect. All art-forms have a similar positive impact of about 6 index points and impact sizes are not significantly different from each other. All art-form types are statistically significant for **relaxation** and all have a positive effect. The magnitude of the effects are smaller and more varied than for happiness impacts (ranging between about 4 to 5 index points), but none are significantly different from each other.

# 5 Conclusion and discussion

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Subjective wellbeing data are taking an increasingly prominent and important role in policy analysis and academic research. Research on the relationship between culture and wellbeing is growing and we aim to contribute to this literature by establishing the relationship between cultural engagement and momentary wellbeing using a new and large experience sampling method dataset for the UK called Mappiness.

We acknowledge the fact that the Mappiness sample is not fully representative of the UK, but we find a number of interesting results. We find that all forms of cultural engagement and all art forms are positively associated with happiness and relaxation after controlling for a range of other determinants of wellbeing. Cultural activities rank very highly in terms of impacts on happiness and relaxation in comparison to the other activities reported in the dataset. We also find that doing cultural activities alone generally has the greatest positive effect on happiness and relaxation and it would be interesting to explore why this might be the case in future research.

It should be noted that the analysis, as with most studies in this area, is based on observational data (ie, where people have not been assigned to different conditions in a controlled experimental setting). Here cause and effect relationships are approximated using statistical methods like regression analysis. Causation cannot be directly inferred (and this should be noted when reading and interpreting the results), but in line with best-practice in wellbeing analysis, we control for the main determinants of wellbeing in regression analysis in order to get a better understanding of cause and effect relationships. Since (i) we are able to control for a wide range of factors and (ii) in the Mappiness survey wellbeing responses are made in close time proximity to the activity of interest we believe that the results are informative.

Going forward there are two important areas of research and work that can be developed from this study. First, the findings here would

suggest that it is important and fruitful for cultural institutions to collect data on momentary wellbeing and experience from their visitors and participants. This data can be linked with specific interventions and activities to provide a more fine-grained level of analysis on the drivers of affective wellbeing in the cultural sector.

Second, given the growing role of wellbeing data and analysis in policy making in the UK and other OECD countries an important next stage would be to reflect on how the findings from this study could be used to inform policy and investment decisions in the cultural sector. One possible approach would be to monetise the wellbeing benefits of cultural activities using the wellbeing valuation approach (Fujiwara and Campbell, 2011) so that the value of the benefits can be compared against the costs of the investments and programmes. With more fine-grained data we could also look at how different cultural activities impact on wellbeing. This will provide a further avenue for evidence-based policy making in the cultural sector.

# 1 Introduction

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Over the past decade interest in subjective wellbeing (SWB) has significantly increased among policy makers and in academia. The number of journal publications using SWB data has increased rapidly and SWB is now recognised as an important measure of social progress in a large number of countries and international organisations (eg, the Organisation for Economic Co-operation and Development and the United Nations). The *National Wellbeing Programme* in the UK is at the forefront of policy developments in this area and it has resulted in an ambitious programme of data collection on SWB by the Office for National Statistics (ONS). The UK Government and the OECD have developed guidance on methods for analysing and using SWB data in policy evaluation (OECD, 2013).

This trend has been reflected in the cultural sector. Data on wellbeing can highlight how cultural engagement impacts on the experiences and quality of our lives and this represents important information in policy analysis and in decisions regarding the allocation of public resources. Wellbeing is a key aspect of policy making in the Department for Culture Media and Sport (DCMS)<sup>6</sup> and various toolkits for measuring wellbeing in the cultural sector have been developed by the Happy Museum project (the LIFE survey)<sup>7</sup> and University College London (UCL Museum Wellbeing Measures Toolkit)<sup>8</sup>. There is a growing body of evidence made up of both qualitative and quantitative data on the relationship between the arts and wellbeing (for reviews of the literature see Fujiwara et al., 2014a, Fujiwara et al., 2014b).

SWB can be measured in a number of different ways. The academic literature on has tended to focus on two broad categories of wellbeing:

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Studies using evaluative SWB measures are more prevalent in academic and policy research because of data collection issues with affective wellbeing. Evaluative SWB data are readily available from national survey data, whereas affective SWB measures require primary data collection and are

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a lot more costly due the frequency of the data. ESM datasets, therefore, are rarer and tend to be based on much smaller sample sizes and collected over shorter time periods.

Quantitative research on wellbeing in the cultural sector has predominantly relied upon evaluative measures of SWB. Most studies in the cultural sector have tended to use qualitative survey approaches with small focus groups to assess the links between culture and a wide range of both evaluative and affective wellbeing measures. For example, Packer (2008) uses a qualitative approach to survey people about their experiences and perceptions regarding museums and finds that museums are important because of the experiences they create and because they provide a restorative environment for people where they can relax and unwind. Similarly, Binnie (2010) uses a qualitative approach and finds that people report reduced levels of anxiety and increased wellbeing after viewing art. Viewing art has also been found to impact on physical sensations (Berleant, 1990), such as reductions in perceived intensity of pain (De Tommaso, Sardaro & Livrea, 2008). And hospital patients report higher life satisfaction scores and health status after participating in handling sessions with museum objects (Chatterjee, Vreeland & Noble, 2009) (see Binnie (2010) for these references).

Recent work by psychologists and economists has drawn attention to affective wellbeing measures, which can be likened to “a continuous *hedonic* flow of pleasure or pain” (Kahneman and Krueger, 2006: p.4). This hedonic or momentary component of wellbeing is important since expectations regarding the “flow” of pleasure and pain may partially determine the choices that individuals make and affective SWB data can lead to a fuller appreciation of the feelings that people experience during different activities and episodes in their lives. This movement is also partly motivated by the findings that evaluative measures, that rely on a retrospective and cognitive assessment of one’s life, can be biased

by a number of survey anomalies (Schwarz and Strack, 1999). For example, evaluative measures can be biased by the question ordering, the characteristics of the interviewer and the pleasantness of the room. Furthermore people often struggle to accurately remember their evaluations of past experiences (Kahneman et al., 1993; Schwarz, 2010).

We aim to contribute to the literature on culture and wellbeing by establishing the relationship between cultural engagement and momentary wellbeing using a new and large ESM dataset for the UK called Mappiness. We look at people’s self-reported happiness and feelings of relaxation during cultural activities. Unlike the DRM which asks individuals about their feelings yesterday – a procedure which can require a degree of retrospection, with potential for retrospective distortion (Stone et al., 2010) – we obtain instantaneous responses so that individuals report their feelings at the time they are undertaking the activity. To our knowledge this is the first study specifically on culture and affective wellbeing using ESM wellbeing data.

# 2 Research questions

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## 2.1. Cultural activities and wellbeing

We look at the effects of the following cultural activities on happiness and relaxation.

### *Activities at an institution*

- Being at theatre, dance, or concert
- Being at an exhibition, museum, or library

### *Activity only*

- Listening to music
- Reading
- Doing hobbies, arts, or crafts
- Singing, or performing

We assess how the impacts of these activities compare with other popular non-cultural activities.

We also look at how the impacts of these cultural activities differ depending on whom you attend and/or engage in the activities with.

## 2.2. Art forms and wellbeing

The second aspect of the research looks at the wellbeing impacts of the different types of art-forms being experienced, categorised as:

- i. Performing Arts (PA)
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This is based on looking at people's experiences at specific institutions (eg, the British Museum or British Library) and categorising those institutes based on the Arts Council England (ACE) definitions. As discussed in more detail in the data section below, this is possible because we have data on people's geographic location when they respond to the Mappiness survey.

# 3 Data and methodology

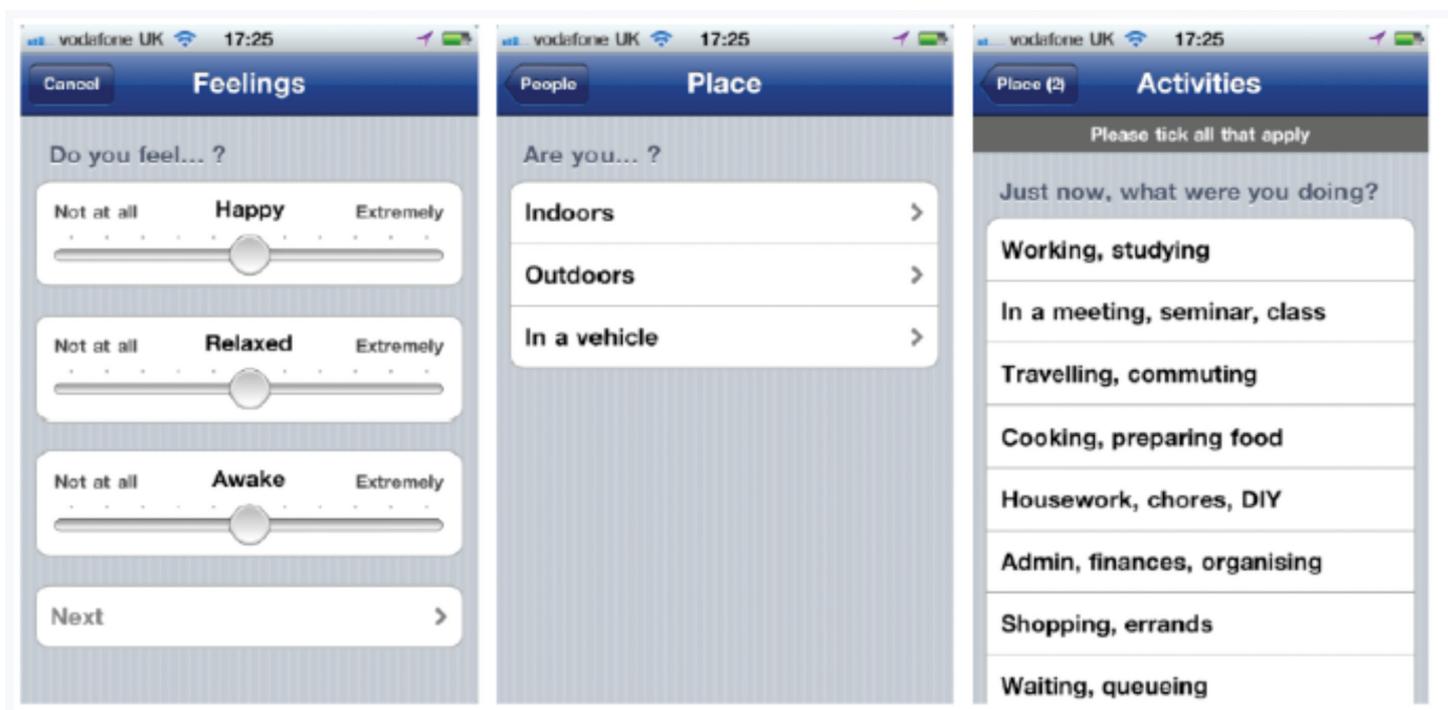
## 3.1. Data collection

Mappiness is an iPhone application that permits individuals to record their wellbeing scores via their phone. The data contain more than one million observations on tens of thousands of individuals in the UK, collected since August 2010. Individuals who have downloaded the app receive randomly timed “dings” on their phone to request that they complete a very short survey.

The survey asks individuals to rate themselves on three dimensions of momentary wellbeing, stating how happy, how relaxed, and how awake they feel. In this paper we focus on happiness

and relaxation. Each score is elicited by means of a continuous slider (a form of visual analogue scale – see Couper et al. 2006). The ends of each scale are labelled “Not at all” and “Extremely”, and an individual positions himself/herself on the scale by drawing a fingertip across the screen. Having completed this phase the individual is asked whether they are alone and, if not, whom they are with. They are then asked whether they are indoors, outdoors, or in a vehicle, and whether they are at home, at work, or elsewhere. Finally, they are asked what they were doing “just now”. The respondent chooses all that apply out of 40 response options, which include a range of cultural activities.

Figure 1. The Mappiness survey instrument on iPhone



Together with the responses to the survey, the app transmits the satellite positioning (GPS) location of the individual and the precise time at which the survey was completed. It also records the time elapsed between the random “ding” and response, thus allowing analysts to distinguish between immediate responses and delayed responses. Individuals complete a short survey about their personal circumstances, work status and household characteristics when registering for Mappiness.

The population of Mappiness respondents differs in a number of ways from the population at large. As one might expect from a survey conducted with smartphones, respondents are wealthier than the population at large: the median household income category is £40,000 – £56,000, and the midpoint of this range is approximately double the figure for the UK as a whole. They are also relatively young: 66% are aged 35 or under, and 95% are aged 50 or under, compared to 29% and 56% respectively in the UK adult population. Seventy-seven per cent of participants are in employment and 14% are in full-time education. These groups are over-represented relative to the UK adult population, in which the proportions are respectively 57% and 4%, primarily at the expense of retired people, who constitute 1% of Mappiness participants but 22% of the population. Participants’ sex ratio is nearly balanced, at 53% male, compared to 49% in the UK adult population (MacKerron, 2012).

It should be noted, however, that even if the Mappiness survey had been available to a more representative sample of the UK (if, say, it could be used on any type of mobile phone and be completed using other modes for people that don’t have a mobile phone), responses to the survey from people doing the activities of

interest to this paper (ie, arts and cultural activities) would still likely be from an unrepresentative sample of the UK – ie, one that is richer and more likely to be in work or studying as per the Mappiness sample composition<sup>9</sup>. If anything, for the current research on arts and cultural activities the skewed Mappiness survey composition allows for greater initial matching between the activity group (ie, the ‘treatment’ group) and the control group (because both groups will be richer, more likely to be in employment and more educated and so on than the UK population average), which allows for better precision in our causal estimates. That said, these issues regarding sample composition in Mappiness should still be taken into account when interpreting and extrapolating the results from this study.

### 3.2. Statistical methods

We run the following regression models using Ordinary Least Squares (OLS). Ferrer-i-Carbonell & Frijters (2004) have shown that it makes no difference whether cardinality or ordinality is assumed for wellbeing measures in regression analysis and hence wellbeing models are usually run assuming cardinality using OLS for ease of interpretation.

$$W_{it} = \alpha_{it} + \beta_1 CA_{it} + \beta_2 OA_{it} + \beta_3 P_{it} + \beta_4 CA_{it} \cdot P_{it} + \beta_5 X_{it} + \varepsilon_{it} \quad (1)$$

where  $W$  is wellbeing (happiness or relaxation) measured on a scale of 0-100; the subscripts  $i$  and  $t$  respectively denote the individual and time period;  $CA$  is a vector of cultural activities;  $OA$  is a vector of other (non-cultural) activities<sup>10</sup>;  $P$  is a vector denoting which person(s) the individual is with;  $X$  is a vector of control variables that is made up of location dummies, time indicators (month,

<sup>9</sup> For example, Fujiwara (2013) finds that higher income and education have positive effects on the likelihood of visiting museums.

<sup>10</sup> Since we are looking at impacts from visiting a cultural institution or doing a cultural activity we exclude people who report ‘being at work’ or ‘doing work’ in order to exclude employees at arts institutions from the analysis.

day of week, time of day), weather conditions at time of survey and the number of responses an individual has given previously. Note that in the results tables for presentational purposes we do not show the impacts for the vector of control variables ( $X$ ). Equation (1) is estimated using individual fixed effects (hence the time subscript  $t$  is dropped from  $a_i$ ). Given the short time periods in the data socio-demographic variables that are collected from respondents on registration are in effect time-invariant and hence controlled for in the individual fixed effects. Standard errors are clustered at the person level to account for non-independent repeat observations and a robust standard error estimator is deployed to account for heteroskedasticity.

It should be noted that the analysis, as with most studies in this area, is based on observational data (ie, where people have not been assigned to different conditions in a controlled experimental setting). Here cause and effect relationships are approximated using statistical methods. Causation cannot be directly inferred (and this should be noted when reading and interpreting the results), but in line with best-practice in wellbeing analysis, we control for the main determinants of wellbeing in regression analysis in order to get a better understanding of cause and effect relationships. Multiple regression analysis of the type used here is one of the optimal statistical strategies for identifying causal relationships in instances like this, where interventions have not been randomised, and this or similar types of methodologies have been used extensively in the policy evaluation literature.

In our analysis we control for a wide range of factors that may impact on a person's affective wellbeing responses at the time of the survey (eg, weather, location, what they are doing and whom they are with) and the fixed effects estimation allows us to control for all time invariant factors specific to the individual, which in the case of the Mappiness study (which is predominantly taken over the short/medium term)

will include nearly all socio-demographic factors, including income, gender, employment status, health status and so on.

Since (i) we are able to control for a wide range of factors and (ii) in the Mappiness survey wellbeing responses are made in close time proximity to the activity of interest we believe that the results are informative.

# 4 Results

## 4.1. Cultural activities and wellbeing

We show the results of the impacts of different types of cultural activities on happiness and relaxation and compare them to the effects of other non-cultural leisure activities.

### 4.1.1. Activities and wellbeing

**Table 1. Happiness and arts and culture<sup>11 12</sup>**

Dependent variable: Happiness (0-100)	Coefficient	SE
<i>Activities</i>		
In a meeting, seminar, class	-0.747***	0.226
Travelling, commuting	-2.473***	0.1
Cooking, preparing food	2.224***	0.077
Housework, chores, DIY	-0.651***	0.086
Waiting, queuing	-4.188***	0.137
Shopping, errands	0.381***	0.095
Admin, finances, organising	-1.417***	0.13
Childcare, playing with children	2.888***	0.13
Pet care, playing with pets	3.178***	0.147
Care or help for adults	-6.482***	0.527
Sleeping, resting, relaxing	0.793***	0.069
Sick in bed	-19.435***	0.289
Meditating, religious activities	3.640***	0.443
Washing, dressing, grooming	2.066***	0.085
Talking, chatting, socialising	3.789***	0.07
Intimacy, making love	12.664***	0.255
Eating, snacking	1.997***	0.055

<sup>11</sup> All activities variables are coded as '1 if doing the activity; =0 otherwise'. All 'With whom' variables are coded as '1 if with that person; =0 otherwise'.

<sup>12</sup> **Coefficients** indicate a positive or negative relationship with happiness (relaxation) and the variable in question. The size of the coefficient represents the impact in absolute terms on happiness (relaxation). For example, Table 1 shows that 'waiting/queuing' decreases happiness by 4.2 points (on a scale of 0-100). The **standard error** is a measure of the precision of the coefficient estimate. **Statistical significance** uses information on the standard error to assess whether the observed association between the variable of interest and happiness (as demonstrated by the size of the coefficient) is not just purely down to chance. The significance test assesses the likelihood of observing the reported relationship between the two variables if no relationship actually existed (known as the null hypothesis). The lower the probability, the more confident we are that a relationship actually exists. In Tables 1 and 2 we show when a coefficient has a probability of less than 1%, 5% and 10% of being observed if there were actually no relationship between the variables.

Dependent variable: Happiness (0-100)	Coefficient	SE
<b>Activities Continued</b>		
Drinking tea/coffee	1.342***	0.076
Drinking alcohol	3.646***	0.087
Smoking	0.635***	0.183
Texting, email, social media	0.731***	0.094
Browsing the Internet	0.509***	0.084
Watching TV, film	2.084***	0.058
Listening to speech/podcast	1.864***	0.131
Match, sporting event	1.992***	0.237
Walking, hiking	2.380***	0.138
Sports, running, exercise	6.426***	0.158
Gardening, allotment	4.899***	0.243
Birdwatching, nature watching	5.060***	0.369
Computer games, iPhone games	2.568***	0.109
Hunting, fishing	3.679***	0.932
Other games, puzzles	2.461***	0.246
Gambling, betting	1.508**	0.696
Something else (version < 1.0.2)	-1.569***	0.178
Something else (version >= 1.0.2)	-3.465***	0.159

<b>Arts &amp; culture activities</b>		
Theatre, dance, concert	8.735***	0.492
Exhibition, museum, library	7.457***	0.569
Listening to music	3.518***	0.103
Reading	2.331***	0.119
Hobbies, arts, crafts	5.737***	0.244
Singing, performing	7.731***	0.36

<b>With whom</b>		
Spouse, partner, girl/boyfriend	3.676***	0.093
Children	0.787***	0.12
Other family members	0.781***	0.085
Colleagues, classmates	0.300*	0.157
Clients, customers	0.657	0.406
Friends	4.258***	0.084
Other people participant knows	-0.588***	0.155

Dependent variable: Happiness (0-100)	Coefficient	SE
<i>Arts &amp; culture activities with people (interactions)</i>		
theatre with partner	-1.800***	0.483
theatre with children	-1.751***	0.646
theatre with relatives	-0.161	0.622
theatre with peers	-2.074*	1.133
theatre with clients	-1.639	1.804
theatre with friends	-2.867***	0.499
theatre with 'other'	-1.179	0.723
museum with partner	-2.294***	0.561
museum with children	0.196	0.623
museum with relatives	-1.129	0.701
museum with peers	-4.292**	1.774
museum with clients	-0.689	2.86
museum with friends	-3.275***	0.643
museum with 'other'	-1.039	1.405
music with partner	-0.167	0.163
music with children	-0.148	0.219
music with relatives	-0.741***	0.217
music with peers	-1.407**	0.664
music with clients	-1.407	1.26
music with friends	-0.722***	0.19
music with 'other'	-1.922***	0.731
reading with partner	-0.427**	0.174
reading with children	0.372	0.233
reading with relatives	-1.517***	0.291
reading with peers	-3.235**	1.3
reading with clients	-4.345	2.739
reading with friends	-2.842***	0.403
reading with 'other'	0.037	0.899
art with partner	-2.041***	0.339
art with children	-0.115	0.447
art with relatives	-1.424***	0.544
art with peers	0.322	1.176
art with clients	-3.790**	1.586
art with friends	-2.723***	0.444
art with 'other'	0.099	0.764

Dependent variable: Happiness (0-100)	Coefficient	SE
<i>Arts &amp; culture activities with people (interactions) Continued</i>		
singing with partner	-1.342**	0.569
singing with children	-0.162	0.727
singing with relatives	-2.179***	0.777
singing with peers	-0.697	1.198
singing with clients	4.274*	2.549
singing with friends	-2.176***	0.553
singing with 'other'	-1.098	0.788
Constant	58.238***	0.872
Observations	1,253,572	
R-sq	0.118	

Notes: \* <0.10 significance; \*\* <0.05 significance; \*\*\* <0.01 significance. Fixed effects OLS regression model. Arts and culture activities in green highlight. 'Peers' = colleagues or classmates. We control for (but for conciseness do not show) location dummies, time indicators (month, day of week, time of day), weather conditions at time of survey and the number of responses an individual has given previously and individual fixed effects. The interaction variable names have taken a keyword for each of the cultural activities – they still represent the same activities, ie, theatre = theatre, dance, concert. The coefficients for arts and culture activities represent the impact of doing these activities alone (see section 4.1.2. for more details).

All arts and culture activities are statistically significantly associated with happiness after controlling for a range of other factors. They all have a positive effect on happiness and the ranking in terms of positive effects on happiness are as follows:

1. Theatre, dance, concerts
2. Singing, performing
3. Exhibitions, museums, libraries
4. Hobbies, arts, crafts
5. Listening to music
6. Reading

Note that these rankings are purely in terms of coefficient size, which is our best estimate of the magnitude of impact for these activities. Since the coefficients are estimates based on the available data there is a level of uncertainty about the 'true' estimate that is acknowledged in the standard errors (SE) for the coefficients in Tables 1 and 2. The standard errors can be used to produce a confidence interval within which we can be reasonably confident that the true coefficient lies. In comparing these confidence intervals not all of the estimated impacts of the activities are statistically significantly different from each other (see footnote 10 for additional information about statistical terms).

**Table 2. Relaxation and arts and culture<sup>13</sup>**

Dependent variable: Feeling relaxed (0-100)	Coefficient	SE
<i>Activities</i>		
In a meeting, seminar, class	-3.645***	0.272
Travelling, commuting	-5.132***	0.125
Cooking, preparing food	0.593***	0.087
Housework, chores, DIY	-3.668***	0.105
Waiting, queuing	-6.216***	0.163
Shopping, errands	-1.966***	0.115
Admin, finances, organising	-3.309***	0.153
Childcare, playing with children	0.877***	0.143
Pet care, playing with pets	2.366***	0.171
Care or help for adults	-7.073***	0.573
Sleeping, resting, relaxing	5.509***	0.09
Sick in bed	-14.335***	0.294
Meditating, religious activities	4.937***	0.441
Washing, dressing, grooming	-0.116	0.098
Talking, chatting, socialising	2.859***	0.068
Intimacy, making love	9.877***	0.249
Eating, snacking	1.616***	0.057
Drinking tea/coffee	1.188***	0.079
Drinking alcohol	4.045***	0.091
Smoking	0.221	0.19
Texting, email, social media	0.468***	0.091
Browsing the Internet	1.171***	0.085
Watching TV, film	3.562***	0.063
Listening to speech/podcast	2.091***	0.153
Match, sporting event	-0.969***	0.258
Walking, hiking	2.063***	0.166
Sports, running, exercise	0.35	0.243
Gardening, allotment	3.180***	0.289
Birdwatching, nature watching	6.176***	0.421
Computer games, iPhone games	3.199***	0.113
Hunting, fishing	3.666***	1.107

<sup>13</sup> All activities variables are coded as '1 if doing the activity; =0 otherwise'. All 'With whom' variables are coded as '1 if with that person; =0 otherwise'.

Dependent variable: Feeling relaxed (0-100)	Coefficient	SE
<i>Activities Continued</i>		
Other games, puzzles	2.426***	0.265
Gambling, betting	-0.406	0.847
Something else (version < 1.0.2)	-3.014***	0.188
Something else (version > = 1.0.2)	-4.652***	0.154
Something else (version < 1.0.2)	-1.569***	0.178
Something else (version > = 1.0.2)	-3.465***	0.159

<i>Arts &amp; culture activities</i>		
Theatre, dance, concert	4.483***	0.534
Exhibition, museum, library	6.017***	0.634
Listening to music	3.027***	0.108
Reading	4.124***	0.137
Hobbies, arts, crafts	4.618***	0.261
Singing, performing	4.171***	0.397

<i>With whom</i>		
Spouse, partner, girl/boyfriend	2.325***	0.085
Children	-0.565***	0.116
Other family members	0.224***	0.085
Colleagues, classmates	-0.144	0.18
Clients, customers	-0.659	0.526
Friends	2.887***	0.087
Other people participant knows	-1.378***	0.176

Dependent variable: Feeling relaxed (0-100)	Coefficient	SE
<i>Arts &amp; culture activities with people (interactions)</i>		
theatre with partner	0.024	0.557
theatre with children	0.558	0.818
theatre with relatives	-0.743	0.744
theatre with peers	-2.383	1.588
theatre with clients	-4.276	2.82
theatre with friends	-2.510***	0.593
theatre with 'other'	-1.112	0.862
museum with partner	-1.773***	0.685
museum with children	0.391	0.751
museum with relatives	-1.165	0.807
museum with peers	-5.008**	2.064
museum with clients	0.314	3.655
museum with friends	-2.713***	0.787
museum with 'other'	-3.038**	1.521
music with partner	0.189	0.181
music with children	0.318	0.25
music with relatives	-0.450*	0.245
music with peers	-0.263	0.759
music with clients	-2.354	1.808
music with friends	-0.988***	0.211
music with 'other'	-1.867***	0.638
reading with partner	-1.036***	0.201
reading with children	0.352	0.275
reading with relatives	-0.903***	0.3
reading with peers	-2.368*	1.398
reading with clients	-2.085	3.957
reading with friends	-2.417***	0.49
reading with 'other'	-0.528	0.919
art with partner	-1.820***	0.382
art with children	0.870*	0.487
art with relatives	-1.433***	0.538
art with peers	-0.498	1.329
art with clients	-3.045	2.849
art with friends	-2.286***	0.473
art with 'other'	0.35	0.95

Dependent variable: Happiness (0-100)	Coefficient	SE
<i>Arts &amp; culture activities with people (interactions) Continued</i>		
singing with partner	-0.598	0.691
singing with children	2.074**	0.895
singing with relatives	-1.036	0.908
singing with peers	-5.193*	2.869
singing with clients	-0.238	4.539
singing with friends	-3.303***	0.647
singing with 'other'	-1.4	0.972
Constant	61.484***	1.026
Observations	1,253,572	
R-sq	0.10	

Notes: \* <0.10 significance; \*\* <0.05 significance; \*\*\* <0.01 significance. Fixed effects OLS regression model. Arts and culture activities in green highlight. 'Peers' = colleagues or classmates. We control for (but for conciseness do not show) location dummies, time indicators (month, day of week, time of day), weather conditions at time of survey and the number of responses an individual has given previously and individual fixed effects. The interaction variable names have taken a keyword for each of the cultural activities – they still represent the same activities, ie, theatre = theatre, dance, concert. The coefficients for arts and culture activities represent the impact of doing these activities alone (see section 4.1.2. for more details).

All arts and culture activities are statistically significantly associated with feeling relaxed after controlling for a range of other factors. The ranking in terms of positive effects on feeling relaxed are as follows:

1. Exhibitions, museums, libraries
2. Hobbies, arts, crafts
3. Theatre, dance, concerts
4. Singing, performing
5. Reading
6. Listening to music

Note that this is a ranking purely in terms of coefficient size which is our best estimate of the magnitude of impact. The impact sizes themselves may not all be statistically different from each other.

#### 4.1.2. Comparing arts and culture with other activities

Table 3 lists the top five most frequent activities in the Mappiness data (from the list of the 40 possible activities). Note that reading was one of the top five but is dropped here as it is one of the arts and culture variables that we will compare the activities in Table 3 against.

**Table 3. Top five most frequent leisure activities in Mappiness responses**

<i>Activities</i>
Watching TV/Film
Talking, chatting, socialising
Housework, chores, DIY
Drinking alcohol
Childcare, playing with children

*Note: Excluding reading.*

**Table 4. Happiness activities rankings**

<i>Activities</i>	<i>Coefficient</i>
Theatre, dance, concert	8.735***
Singing, performing	7.731***
Exhibition, museum, library	7.457***
Hobbies, arts, crafts	5.737***
Talking, chatting, socialising	3.789***
Drinking alcohol	3.646***
Listening to music	3.518***
Childcare, playing with children	2.888***
Reading	2.331***
Watching TV, film	2.084***
Housework, chores, DIY	-0.651***

**Table 5. Relaxation activities rankings**

Activities	Coefficient
Exhibition, museum, library	6.017***
Hobbies, arts, crafts	4.618***
Theatre, dance, concert	4.483***
Singing, performing	4.171***
Reading	4.124***
Drinking alcohol	4.045***
Watching TV, film	3.562***
Listening to music	3.027***
Talking, chatting, socialising	2.859***
Childcare, playing with children	0.877***
Housework, chores, DIY	-3.668***

Compared to the five top uses of leisure time in the Mappiness data cultural activities rank very highly in terms of impacts on happiness and relaxation.

In fact, a comparison of all 40 activities reported in the Mappiness data shows that for effects on happiness<sup>14</sup>:

**Theatre, dance, concert = 2nd**  
**Singing, performing = 3rd**  
**Exhibition, museum, library = 4th**  
**Hobbies, arts, crafts = 6th**  
**Listening to music = 13th**  
**Reading = 19th**

And for effects on relaxation<sup>15</sup>:

**Exhibition, museum, library = 3rd**  
**Hobbies, arts, crafts = 6th**  
**Theatre, dance, concert = 7th**  
**Singing, performing = 8th**  
**Reading = 9th**  
**Listening to music = 15th**

Again we note that these rankings are purely in terms of coefficient size, which is our best estimate of the magnitude of impact. The impact sizes themselves may not all be statistically different from each other.

<sup>14</sup> 'Intimacy, making love' was the highest ranking activity for happiness. 'Sick in bed' was the lowest ranking activity.

<sup>15</sup> 'Intimacy, making love' was the highest ranking activity for relaxation followed by 'Birdwatching, nature watching'. 'Sick in bed' was the lowest ranking activity.

### 4.1.3. Cultural activities with other people

We assess whether the impact of arts and cultural activities differ depending on whom the individual is with. This is assessed through the use of interactive variables in the happiness and relaxation models.

In the Mappiness survey respondents are asked whom they are with and can choose either 'alone' or as many as apply out of seven other categories:

- i. Partner
- ii. Child(ren)
- iii. Relative(s)
- iv. Peer(s)
- v. Work client(s)
- vi. Friend(s)
- vii. Other

In the interactive variables we use 'alone' as the reference category. Interaction terms in the models have important implications for how we interpret all of the model's coefficients. Technically speaking, the coefficients for the cultural activities under the heading '**Arts & culture activities**' in Tables 1 and 2 represent impacts for doing these activities *alone*. And therefore the coefficients for cultural activities under the section '**Arts & culture activities with people (interactions)**' represent any *additional* effect of partaking in these activities with other people. For example, the happiness impact of going to theatre/dance/concert alone = +8.735. The impact of theatre/dance/concert with a partner =  $8.735 - 1.8 = +6.575$ . With children the happiness effect =  $8.735 - 1.751 = +6.624$ . In each case the effect of the cultural activity alone forms the base case. Where the interaction term is statistically insignificant it can be assumed that the effect is no different to the impact for partaking in the cultural activity alone – for example the happiness impact of theatre/dance/concert is the same for people alone and for people who are with relatives.

Most of the statistically significant interactive variable coefficients in Tables 1 and 2 are negative. This implies that in general, arts and cultural activities are associated with a larger increase in people's happiness when they are alone than when they are with other people (but note that people are generally happier with others than alone, and this remains true in most arts and cultural activities). The only two occasions when impacts are larger for cultural activities with someone else is when singing with clients (for happiness) and when singing with children (for relaxation). There are a number of statistically insignificant interaction terms, which as discussed above, suggests that the effect is the same as doing the activity alone.

It is important to interpret the interaction terms correctly and in a bit more depth to avoid confusion. The negative effects of being with people when doing cultural activities are **marginal effects**. For example, if we look at happiness, this is the finding that the effect of going to theatre/dance/concert alone = +8.735 and the effect of going to theatre/dance/concert with friends = +5.868. But if instead we look at people's actual **level** of wellbeing when they are doing a cultural activity it is greater for people who are *not* alone. Following the same example, all else equal, people at theatre/dance/concert with friends have +1.391 higher level of happiness than people at theatre/dance/concert alone. On first impression this seems like a contradiction, but it is actually being driven by the fact that there is a benefit (positive effect on happiness) from being with people *per se* regardless of whether you're at theatre/dance/concert or not and this *general* benefit offsets the reduced marginal effect of theatre/dance/concert for people who are with friends.

In sum, the (marginal) effect of partaking in cultural activities is nearly always larger for happiness and relaxation when done alone, but if we look at the level of wellbeing for people at, say, theatre/dance/concert it is higher for people who are not alone. But in large part this is being

driven by the benefits of being with others which would be experienced by people regardless of what they are doing. There is very little previous research on the effect of cultural activities when done alone or with others. The only relevant study we found was (Valentine and Evans, 2001) who found no differences in terms of impacts on mood and physiological responses for people doing solo or group singing. Therefore, future research should aim to explore this issue in more detail.

Since it is the isolated effect of cultural activities (done alone or with others) that we are interested in, the focus should be on the marginal effects because it would be inaccurate to claim that the higher *levels* of wellbeing experienced by people who are not alone during cultural activities, like theatre/dance/concert, are *solely* due to the cultural activity.

## 4.2. Art-forms and wellbeing

We use a list of 75 different cultural institutions (shown in the Annex), which we join with the Mappiness responses using a Geographical Information System (GIS).

Mappiness responses include satellite positioning (GPS) coordinates as reported by the respondent's iPhone, alongside an estimated accuracy expressed as +/- a number of metres. We discard responses where the estimated accuracy is worse than +/- 250m. We then use the following method for identifying people responding from the 75 institutions:

1. Using satellite imagery, create a polygon that matches each institution's geographical extent. This polygon encloses all points within that institution.
2. For each response, create a circle centred on its GPS coordinates, with a radius that matches the coordinates' estimated accuracy. This circle encloses our best estimate of all locations from which the response might have been sent.
3. For each response where the individual says they are at Theatre/Dance/Concert or at Exhibition/Museum/Library, we check whether the response circle touches or overlaps any institution's polygon. If so, we assign that response to that institution.
3. If a response ends up being assigned to more than one institution by this criterion (this could happen where institutes are in close proximity – eg, Natural History Museum, Science Museum and V&A) we do not assign that response to any institution, and drop it from the regression model.
4. The regression models exclude all people that respond saying that they are at Theatre/Dance/Concert or at Exhibition/Museum/Library **and** who are not assigned to one of the geocoded institutions. Therefore, the estimated effects for institutions and institution types are the 'complete' effects, as it were; effectively, the control group does not include people who are at other cultural institutions not on the list.
5. Geocoded institutions are categorised using the ACE art-form definitions<sup>16</sup> in to the following five categories:
  - i. Performing Arts (PA)
  - ii. Visual Arts (VA)
  - iii. Combined Arts (CA)
  - iv. Museums (M)
  - v. Libraries (L)

<sup>16</sup> In order to give the best chance of identifying Mappiness users for the sample, cultural organisations were selected based on numbers of visitors and identifiable physical locations. The sample contained, ACE National Portfolio Organisations with the high attendances (2012/13 NPO survey data), DCMS National Museums and Sponsored Museums, and public libraries with high numbers of visitors (CIPFA Library Statistics 2012/13).

**Figure 2. Example of a polygon with matched responses (British Museum)**



*Note: Yellow pins depict the location of the people who responded to Mappiness and who are assumed to be or have just been in the British Museum.*

Table 6 presents the results from the happiness and relaxation models. They are based on equation (1) but now CA is a vector of cultural institutions defined by art-form type. The other difference is that we do not include interactive terms in the art-form models. The table presents just the coefficients for the different art-forms. Apart from the interactive terms the models use the same set of control variables as Tables 1 and 2. Overall there are 797 valid responses for the geocoded institutions.

**Table 6. Different art-form institutes and happiness and relaxation**

**Table 6a. Happiness**

<i>Art-form</i>	Coefficient	SE	Sample size
Combined Arts	6.116***	1.066	148
Libraries	6.231**	2.437	10
Museums	6.282***	0.738	299
Performing Arts	6.280***	1.009	135
Visual Arts	6.115***	1.061	205

*Notes: \* <0.10 significance; \*\* <0.05 significance; \*\*\* <0.01 significance. Fixed effects OLS regression model. Sample size shows the number responses to Mappiness survey from institutes in each type of category.*

**Table 6b. Relaxation**

<i>Art-form</i>	Coefficient	SE	Sample size
Combined Arts	4.619***	1.064	148
Libraries	5.443	4.43	10
Museums	3.947***	0.956	299
Performing Arts	4.988***	1.267	135
Visual Arts	3.893***	1.068	205

*Notes: \* <0.10 significance; \*\* <0.05 significance; \*\*\* <0.01 significance. Fixed effects OLS regression model. Sample size shows the number responses to Mappiness survey from institutes in each type of category.*

Sample sizes are too low for libraries to attach confidence to the results and so we do not use or discuss the results here but present them in Table 6 for informational purposes.

All art-form types are statistically significant for **happiness** and all have a positive effect. All art-forms have a similar positive impact of about 6 index points and impact sizes are not significantly different from each other.

All art-form types are statistically significant for **relaxation** and all have a positive effect. The magnitude of the effects are smaller and more varied than for happiness impacts (ranging from between about 4 to 5 index points), but none are significantly different from each other.

In sum, all art-forms are good for people's happiness and relaxation and there are no statistical differences between the art-form categories. Although we should acknowledge the fact that the Mappiness sample is not fully representative of the UK, at an individual level this suggests that a visit to any type of institute is equally rewarding and beneficial. An important area of future research would be to examine how these results could be used in policy analysis and decisions.

# 5 Conclusion and discussion

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Subjective wellbeing data are taking an increasingly prominent and important role in policy analysis and academic research. Research on the relationship between culture and wellbeing is growing and we aim to contribute to this literature by establishing the relationship between cultural engagement and momentary wellbeing using a new and large experience sampling method dataset for the UK called Mappiness.

We acknowledge the fact that the Mappiness sample is not fully representative of the UK, but we find a number of interesting results. We find that all forms of cultural engagement and all art forms are positively associated with happiness and relaxation after controlling for a range of other determinants of wellbeing. Cultural activities rank very highly in terms of impacts on happiness and relaxation in comparison to the other activities reported in the dataset. We also find that doing cultural activities alone generally has the greatest positive effect on happiness and relaxation and it would be interesting to explore why this might be the case in future research.

Going forward there are two important areas of research and work that can develop out of this study. First, the findings here would suggest that it is important and fruitful for cultural institutions to collect data on momentary wellbeing and experience from their visitors and participants. This data can be linked with specific interventions and activities to provide a more fine-grained level of analysis on the drivers of affective wellbeing in the cultural sector.

Second, given the growing role of wellbeing data and analysis in policy making in the UK and other OECD countries an important next stage would be to reflect on how the findings from this study could be used to inform policy and investment decisions in the cultural sector. One possible approach would be to monetise the wellbeing benefits of cultural activities using the wellbeing valuation approach (Fujiwara and Campbell, 2011) so that the value of the benefits can be

compared against the costs of the investments and programmes. With more fine-grained data we could also look at how different cultural activities impact on wellbeing. This will provide a further avenue for evidence-based policy making in the cultural sector.

# Annex

**Table A1. The 75 cultural institutions used in the analysis**

	Institution name	Art-form category
1	Arnolfini Gallery Ltd	PA
2	Aspex Visual Arts Trust	CA
3	Baltic Centre For Contemporary Arts	PA
4	Barbican Centre	PA
5	British Museum	PA
6	Chesterfield Library	PA
7	Cornerhouse	PA
8	De La Warr Pavilion	CA
9	Derby Quad Limited	VA
10	Devon Guild Of Craftsmen (The)	VA
11	Geffrye Museum	VA
12	Grizedale Arts	CA
13	Horniman Museum	PA
14	Ikon Gallery Limited	PA
15	Imperial War Museum: IWM	VA
16	Imperial War Museum: IWM North	VA
17	Institute of Contemporary Arts	VA
18	International Slavery Museum & Merseyside Maritime Museum (Liverpool)	VA
19	Leeds Central Library	VA
20	Midlands Arts Centre	VA
21	Modern Art Oxford	VA
22	National Gallery & National Portrait Gallery	VA
23	National Glass Centre	PA
24	National Maritime Museum	VA
25	Natural History Museum	VA
26	Newcastle-upon-Tyne City Library	VA
27	Norfolk & Norwich Millennium	VA
28	North Music Trust (Sage, Gateshead)	CA
29	Oldham Library	VA
30	Oxford Central Library	PA
31	Rich Mix	CA
32	Royal Armouries: Fort Nelson	CA
33	Royal Armouries: Leeds	VA

Institution name	Art-form category
34 Royal Armouries: London	PA
35 Royal National Theatre	VA
36 Royal Opera House	VA
37 Sadler's Wells Trust Ltd: Peacock Theatre	VA
38 Sadler's Wells Trust Ltd: Sadler's Wells Theatre & Lilian Baylis Studio	VA
39 Science Museum Group: MOSI	VA
40 Science Museum Group: National Railway Museum	M
41 Science Museum Group: Science Museum London	M
42 Serpentine Gallery	M
43 Sheffield Theatres (Crucible Theatre)	M
44 Sir John Soane's Museum	M
45 Southbank Centre Limited	M
46 Stoke-On-Trent and North Staffordshire Theatre Trust Limited (The New Vic)	M
47 Tate Gallery Group: Barbara Hepworth Museum & Sculpture Garden	M
48 Tate Gallery Group: Tate Britain	M
49 Tate Gallery Group: Tate Liverpool	M
50 Tate Gallery Group: Tate Modern	M
51 Tate Gallery Group: Tate St Ives	M
52 The Hepworth Wakefield	M
53 The Lowry Centre Limited	M
54 The Roundhouse	M
55 The Royal Shakespeare Company: Courtyard Theatre	M
56 The Royal Shakespeare Company: Dell Open Air Theatre	M
57 The Royal Shakespeare Company: Royal Shakespeare Theatre & Swan Theatre	M
58 Theatre Royal Plymouth	M
59 Truro Library	M
60 Turner Contemporary	M
61 Tyne and Wear Museums: Arbeia Roman Fort & Museum	M
62 Tyne and Wear Museums: Discovery Museum and Tyne & Wear Archives	M
63 Tyne and Wear Museums: Great North Museum: Hancock	M
64 Tyne and Wear Museums: Hatton Gallery	M
65 Tyne and Wear Museums: Laing Art Gallery	M
66 Tyne and Wear Museums: Segedunum Roman Fort, Baths & Museum	M
67 Tyne and Wear Museums: Shipley Art Gallery	L
68 Tyne and Wear Museums: South Shields Museum and Art Gallery	L

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Institution name	Art-form category
69 Tyne and Wear Museums: Stephenson Railway Museum	L
70 Victoria and Albert Museum	L
71 Wallace Collection	L
72 Whitechapel Gallery	L
73 Woolwich Centre	L
74 Worcester – The Hive	L
75 Yorkshire Sculpture Park	L

*Notes: Art-form categories are based on Arts Council England groupings. PA = Performing Arts; VA = Visual Arts; CA = Combined Arts; M = Museum; L = Library.*

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