

Do the arts make you happy? A quantile regression approach

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Abstract Compared to other leisure time activities, the effect of arts attendance on happiness has received less attention and studies of related topics have produced mixed results, identifying either no effect or very small effects. We investigate this issue using a large ($N = 7753$) sample from the UK. In contrast to earlier studies, quantile regression is used to allow the relationship between arts attendance and other controls and happiness to vary across different levels of happiness. The relationship found in prior studies is confirmed, but the quantile regression results show that the nature of the relationship varies across the distribution of the happiness variable. A significant relationship is found at the lower quartile, and a moderate relationship (significant at the 10% level) is found at the median level.

Keywords Arts · Happiness · Quantile regression

1 Introduction

Interest in happiness in economics arguably dates back to Francis Edgeworth's description of a hedonimeter to measure pleasure as a form of utility (Edgeworth 1881; Colander 2007). Recently, happiness has gained increased importance in both psychology and economics (e.g. Diener 2000; Di Tella and MacCulloch 2006; Frey and Stutzer 2002) and in terms of impact on public policy (as elucidated by, e.g., Layard 2007). This research has aimed both to increase understanding of the influences on happiness at the individual level and to develop measures of welfare at national level that go beyond the purely economic (such as GDP). As a result of this,

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questions on happiness have started to appear more widely on national, international and government surveys (for example, the *European Social Survey* and the *Understanding Society* and *Taking Part* surveys commissioned by the UK government) and in official statistics. Much research effort has gone into exploring how individual differences in psychological variables, economic situation (such as income and employment status) and personal situation (such as marital status) relate to happiness. For reviews see, e.g., Diener and Seligman (2004) and Dolan et al. (2008) or the collection of studies assembled by van Praag and Ferrer-i-Carbonell (2004).

Consumption patterns, and in particular hedonic consumption, also appear to have an influence. Van Boven (2005) argues that investing discretionary resources (such as income and time) in life experiences has a greater impact on happiness than an equal investment in material possessions; this argument is echoed in more recent studies in consumer psychology (e.g. Aaker et al. 2011; Dunn et al. 2011 and Gilovich et al. 2015).

This paper addresses the effect of attendance at arts events on reported happiness, building on previous studies by *inter alia* Michalos (2005), Ateca-Amestoy et al. (2008), Michalos and Kahle (2010) and Wheatley and Bickerton (2017). The key contribution of the paper though is to re-investigate relationship between arts and happiness using quantile regression. In doing so the paper draws on findings by Binder and Coad (2011) which illustrate that the effects of predictors of happiness vary when evaluated at the different percentiles of the happiness distribution.

2 Happiness and leisure

Arguably, leisure activities are archetypal experience generating activities. In an early study which approached the topic from a psychological standpoint, Hills and Argyle (1998) suggest that leisure activities are undertaken voluntarily for enjoyment and that enjoyment is generated by positive moods or affect. Ateca-Amestoy (2011) suggests a definition of leisure as identifiable activities, occurring at given times, which produce pleasant experiences for those taking part. Caldwell (2001) argues that pleasurable experiences are sought when attending arts performances, so a relationship between leisure participation and happiness might be expected. However, there are conflicting findings regarding the impact of leisure pursuits on happiness.

Hills and Argyle (1998) found that, out of sport and exercise, listening to music, church-going and watching TV soap operas, only sport and exercise was associated with an increase in happiness (when the Oxford Happiness Inventory is used to measure happiness). However, all of the leisure activities examined were found to have a positive impact on mood. That this did not seem to translate to increased happiness may, as Hills and Argyle (1998) note, be attributed to the breadth of the happiness measure used.

A relationship between sports and exercise and happiness has also been found in more recent studies which employ different measures of happiness. Rasciute and Downward (2010), Downward and Rasciute (2011), Huang and Humphreys (2012)

and Dolan et al. (2014) drew similar conclusions regarding sport and exercise. When other factors are controlled for, participation in sports is found to be a predictor of happiness and (less surprisingly) of general health, which is itself a predictor of happiness. Hence for sports and exercise, the effect is likely to be (partially) mediated via the effect on health. Wheatley and Bickerton (2017) also found evidence that both moderate and mild intensity sport were associated with satisfaction with life; however, they only had an effect on happiness at higher frequencies of engagement (three times a week or more).

Counter-intuitively, not all leisure activities are associated with increased happiness. Frey, Benesch and Stutzer (2007) find a negative effect of television viewing on happiness—heavy TV viewers report lower life satisfaction, and this is particularly the case where the opportunity cost of time is high. As Bruni and Stanca (2008) show, happiness is positively affected by relational (social) activity. However, time spent watching television crowds out other relational activities which may reduce happiness indirectly. Conversely, allocating time to (out of home) leisure or arts events with other people or events which allow for social interaction may increase happiness.

2.1 Happiness and arts

The effects of arts attendance (as opposed to leisure activities more broadly) on happiness and related constructs such as health have been investigated. There is some evidence of a relationship between arts and longevity (e.g. Bygren et al. 1996) and between arts and health (e.g. Cohen 2009; Daykin et al. 2008). McCarthy et al. (2004) review the evidence on the benefits of the arts (community benefits, economic benefits, cognitive benefits and intrinsic benefits) and argue that compared to the others, intrinsic benefits such as captivation, expanded capacity for empathy and the creation of social bonds, had been largely overlooked. However, it is these intrinsic benefits which would seem to most closely relate to happiness.

Michalos (2005) investigated the relationship between leisure activities and life satisfaction measures, finding that arts had a very limited effect on subjective well-being, increasing the explanatory power of a regression by a single percentage point. However, this was based on a sample who were already positively disposed towards the arts. More recently, Michalos and Kahlke (2010) found an association between theatre and life satisfaction and a weak association between frequency of engagement with arts and satisfaction with quality of life. Grossi et al. (2012) found a strong association between cultural access and psychological well-being in an Italian sample. Along with cultural access, well-being was associated with being male and being healthy in their artificial neural network results. However, their results are based on the upper and lower tertiles of the well-being variable only.

Ateca-Amestoy et al. (2008) investigate satisfaction with leisure (as a predictor of overall happiness) and conclude that social variables have a greater effect on satisfaction than economic ones do. In particular, they found that contact with known people was associated with increased leisure satisfaction, whilst the presence of children in the household decreased it. A detailed overview of leisure satisfaction and well-being is given by Ateca-Amestoy (2011).

Zhong and Mitchell (2010) investigate the impact of leisure consumption on subjective well-being, satisfaction with social life and satisfaction with use of leisure time using data from the British Household Panel Survey. They found leisure consumption, measured by average monthly expenditure on leisure activities, to be a significant predictor of subjective well-being. However, when measures of satisfaction with leisure and with social life were included in their model, leisure expenditure became non-significant. This seems to imply that the benefit of hedonic or leisure consumption is associated with its reinforcing effect on social life.

More recently, Wheatley and Bickerton (2017) investigated the relationship between engaging in arts and sports and four well-being measures: happiness, satisfaction with life, satisfaction with the amount of leisure and job satisfaction. In particular, they found that higher frequency of attendance at arts events was associated with greater happiness; the ‘at least once a week’ and ‘limited weekly but at least monthly’ dummy variables had significant coefficients. Furthermore, attendance at arts events at all levels of frequency except weekly seem have a significant effect on life satisfaction. Participation (as opposed to attendance) in arts activities had a significant effect to on life satisfaction only at higher frequencies and no significant effect on happiness.

Most studies have employed survey-based measures of happiness and recalled attendance at arts performances. Bryson and MacKerron (2017) adopted a different approach, experience sampling (discussed in Sect. 2.2 below), to identify the relationship between 39 activities including attending theatre, dance or concert performances, going to exhibitions or museums and happiness. This method allows them to capture data closer to the time of the experience, thus reducing recall bias. Their results suggest that arts activities are strongly, positively related to happiness and have a stronger effect than all other activities included except one (intimacy with a romantic partner). Work, the focus of their study, however, was ranked lower than any of the other activities except for being sick in bed. However, as Bryson and MacKerron (2017) note, their sample is not representative of the UK population. However, although the magnitude of the effects may change, it seems unlikely that the results would be overturned if a more representative sample had been employed.

2.2 Measuring happiness

There are a number of approaches to measuring happiness. Survey measures include using direct questions at the aggregate level and at a disaggregated level. At the aggregate level, direct (often single) questions are used to capture respondents’ evaluations of their well-being, positive emotional experiences and negative experiences. Such measures have also been disaggregated into different domains of life satisfaction, for example satisfaction with leisure, with level of income and with work life. Whilst there are inherent biases in any self-report measure, there is evidence to suggest that such measures do capture meaningful data. For example, Oswald and Wu (2010) found a significant, moderately strong correlation ($r = 0.6$) between objective and subjective measures of happiness in US data.

An alternative approach which largely avoids issues of judgement and recall is experience sampling which collects data on reported feelings at selected times

during a day. Participants report their activities and feelings when prompted by the data collection instrument (e.g. a smartphone app). However, as Kahneman and Krueger (2004) note, it is difficult to implement in large surveys. The day reconstruction method (DRM) combines elements of both diary studies and experience sampling to capture recalled emotions (see Kahneman et al. 2004). The development and robustness of these different measures and approaches are discussed by Helliwell and Wang (2012).

The importance attached to capturing happiness data is reflected in the establishment of measurement guidelines for surveys, such as those published by the OECD (2013). These advocate the use of a measure of life evaluation supplemented by a series of affect (emotion) questions and a question about life purpose. These are similar to the set of four core questions to measure happiness developed by the UK Office for National Statistics: a life satisfaction question, a life purpose question and two affect questions.

2.3 Modelling happiness

Ferrer-i-Carbonell and Frijters (2004) note that different disciplines have tended to adopt different approaches to estimating model parameters; psychological studies have predominantly (but not exclusively) adopted OLS whilst economic studies have tended to adopt ordinal regression. The decision in part rests on whether happiness is viewed as a cardinal or an ordinal variable, but is also influenced by the nature of the measurement scale used capture happiness. For example, the UK *Understanding Society* survey used by Wheatley and Bickerton (2017) measures happiness on a four-point scale, whilst the UK *Taking Part* survey employs a 10-point scale. Studies which report both types of regression tend to show few differences in the relationships identified (Ferrer-i-Carbonell and Frijters 2004; Powdthavee 2015).

To date, standard linear and ordinal regression techniques have largely (but not exclusively) been used to identify relationships between happiness and other variables. However, such methods may not tell the whole story. As Binder and Coad (2011) note, methods such as OLS average over the whole distribution of the dependent variable; in other words, they identify average effects. In contrast, quantile regression allows researchers to investigate whether and how the relationship between dependent and independent variables differs for different values of the dependent variable. When quantile regression was employed to estimate a model to explain the variation in happiness, Binder and Coad (2011) found that the effects of variables which have been consistently found to be associated with happiness differ across quantiles. In particular, the importance of income and health decreases in the upper quantiles of happiness, whilst education was found to have a positive association at lower quantiles but negative at the higher quantiles. This suggests that standard OLS results do not fully capture or explain the relationship between happiness and its proposed predictors—a small regression coefficient might arise from the averaging of larger but opposite underlying relationships. The current study investigates whether such differences arise in the

effect of arts attendance on happiness, when factors such as age, marital status, employment status, health and region are controlled for.

3 Data and method

The data for the study were obtained from the 2012–2013 wave of the *Taking Part* survey commissioned by the UK government and undertaken by TNS-BMRB, a market research agency (Department for Culture, Media and Sport 2013). The survey was designed to produce a representative sample of the UK population aged 16 and over. Approximately half of the respondents were interviewed in the previous wave of the survey, with the other half selected from the Postal Address File (which lists every residential postal address in the UK). The data were collected by computer aided personal interviewing (for details of the sample design see TNS-BMRB 2012).

Happiness was measured on a 10-point (1 = very unhappy, 10 = very happy) single-item scale which asked ‘Taking all things together, how happy would you say you are?’. This is a standard question employed on some UK government surveys and also the European Social Survey. There is a long-established debate over the relative merits of single-item scales against multi-item scales to measure phenomena which are not directly observable (e.g. Gardner et al. 1998; Diamantopulos et al. 2012). However, similar single-item happiness scales have been used on the *General Social Survey* in the USA and the *World Values Survey* and have been found to demonstrate both convergent and divergent validity (e.g. Abdel-Khalek 2006).

Arts attendance was measured in two different ways. The survey asked whether respondents had attended any of 21 arts events in the past 12 months (see Table 5 in the Appendix for the full list). From this, the number of events attended was calculated and transformed into four dummy variables: attended 1, attended 2, attended 3 attended 4 or more with attended none as the base category. Hence, it is the effect of arts in general that is tested for here, rather than the effect of attendance at particular types of arts. A frequency of attendance measure was also derived from the survey identifying those respondents who had attended at least one art form at least once a month (a similar frequency measure is used by Dolan et al. 2014, to capture the effect of exercise on happiness).

Information on the respondents’ age, general health, marital status, sex, employment status and region of the country was also extracted from the *Taking Part* data. General health was measured on a single-item six-point scale, ranging from very bad (1) to very good (6). Employment status was measured using a series of dummy variables denoting that the respondent was a student, looking after the family or the home, sick or injured or retired, with full-time employment as the base category. Although the survey included an income question, a large proportion of respondents chose not to answer. Furthermore, it can be inferred by cross-tabulating responses and non-response to the income question and measures of social status in the survey that the majority of missing responses are from higher-income respondents. Respondents’ marital status was defined according to five categories

(single, married, separated and divorced with widowed as the base category). Region of the country (North, Midlands, South and East, with London as the base category) was also extracted from the survey data set to capture potential variations in happiness across regions. Such spatial effects have been identified before; Piper (2015) identified a happiness penalty to living in European capital cities compared to other regions.

Analysis of the data was undertaken in two stages. First, the relationships between happiness and the independent variables arts attendance and the control variables were estimated using OLS. Here, OLS is used for easier comparison with the estimates obtained in the second stage of analysis using quantile regression. An equivalent approach if ordinal regression is used would be to test the assumption of parallel lines, also known as the proportional odds assumption (see e.g. Long 1997). If the assumption does not hold, then it implies that the effects of independent variables on the outcome variable vary with the level of the dependent variable. If that were the case, a multinomial logit or probit model could be used or a generalized ordered logit (see e.g. Williams 2016) as a more parsimonious alternative.

OLS estimates the average effect of the explanatory variables. As Mosteller and Tukey (1977) put it: ‘...regression often gives a rather incomplete picture. Just as the mean gives an incomplete picture of a single distribution, so the regression curve gives a correspondingly incomplete picture for a set of distributions.’ (p.266). The quantile regression model introduced by Koenker and Bassett (1978) allows these different relationships to be identified by allowing the regression coefficients to vary at different quantiles of the dependent variable (conditional on the independent variables); for overviews of the quantile regression approach see, e.g., Koenker and Hallock (2001) or Angrist and Pischke (2009).

The extent to which the association between happiness and demographic and arts attendance measures differs for high and low levels of happiness could be assessed by splitting the sample and estimating two (or more) separate regressions. This has two disadvantages, however. First it reduces the number of observations available to estimate each model. Second, it requires an arbitrary decision regarding the boundary between high and low happiness. Quantile regression by contrast allows the full data set to be used and specify a number of points across the range of the dependent variable at which to estimate the regression coefficients. It should be noted that irrespective of whether OLS or quantile regression is used, cross-section regressions will only identify associations, rather than causal relationships. Hence, the objective here (as with the majority of studies on this subject) is to identify descriptive associations between variables.

4 Results

Descriptive statistics for the sample are given in Table 1. As is frequently found (e.g. Diener and Diener 1996), the happiness variable is skewed towards the extremely happy end of the scale. The mean is 7.8, and the mode is 8 on a 1–10 scale. A total of 65.9% of respondents placed themselves at 8 or higher on the scale.

Table 1 Sample descriptive statistics

Continuous variables	Mean	SD
Happiness	7.8	1.7
Age	51.8	18.7
Age squared	3034.6	1970.9
General health	3.9	0.9
Discrete variables	%	
Arts attendance		
Art repertoire = 1	20.5	
Art repertoire = 2	16.5	
Art repertoire = 3	12.6	
Art repertoire = 4 or more	27.7	
Monthly attendance	37.5	
Demographics		
Female	55.5	
Marital status (base = widowed)		
Single	28.1	
Married	46.4	
Separated	2.9	
Divorced	11.3	
Employment status (base = retired)		
Employed	51.9	
Student or in training	2.9	
Unemployed	4.1	
Home maker	5.4	
Ill or injured	4.3	
Education (base = other qualifications)		
University level education	34.8	
A level*	16.5	
Region (base = London)		
North	34.7	
Midlands	20.7	
South	24.4	
East	11.0	
<i>N</i>	7756	

* A levels are school leaving qualifications in the UK taken at the age of 18

The variables listed in Table 1 are used as independent variables to explain the variation in happiness. Standard OLS results are reported in Table 2.

In model 1, the number of types of arts attended is used to measure arts attendance and in model 2 arts attendance is measured via frequency. Both models 1 and 2 reached statistical significance: $F(23,7710) = 66.67, p < 0.001, R^2 = 0.17$

Table 2 OLS estimates

	Model 1		Model 2	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Attended one type of art event	0.085	1.43		
Attended two types of art event	0.214**	3.48		
Attended three types of art event	0.161**	2.46		
Attended four or more types of art event	0.191**	3.37		
Monthly attendance			0.077*	1.78
Age	-0.047**	-7.85	-0.046**	-7.60
Age squared	0.001**	8.18	0.001**	7.93
Sex	0.097**	2.67	0.110**	3.05
Single	0.424**	4.73	0.417**	4.65
Married	0.972**	11.95	0.973**	11.96
Separated	0.302**	2.35	0.294**	2.29
Divorced	0.466**	5.01	0.460**	4.95
Employed	-0.190**	-2.79	-0.190**	-2.79
Student or in training	-0.352**	-2.79	-0.351**	-2.79
Unemployed	-0.692**	-6.36	-0.706**	-6.49
Home maker	-0.320**	-3.16	-0.337**	-3.32
Ill or injured	-0.913**	-7.85	-0.935**	-8.04
North	0.270**	4.30	0.275**	4.38
Midlands	0.237**	3.54	0.248**	3.71
South	0.134**	2.07	0.150**	2.31
East	0.102	1.34	0.119	1.58
General health	0.580**	26.61	0.589**	27.17
Higher education	-0.151**	-3.57	-0.126**	-3.06
A level	-0.026	-0.53	-0.013	-0.28
Constant	5.649**	28.61	5.678**	29.07
N	7734		7734	
R ²	0.170		0.168	
F	F(23, 7710) = 68.67**		F(20, 7734) = 78.18**	

** $p < 0.05$, * $p < 0.10$

and $F(20, 7734) = 78.18, p < 0.001, R^2 = 0.168$, respectively. Attending only one type of arts event does not influence happiness (the estimated coefficient is not significant). However, attending two, three and four or more types of arts events is significantly associated with increased happiness with happiness, when other factors are controlled for. Monthly attendance in contrast does not show a significant association at the 5% level (but would at the 10% level). This would suggest that, other things being equal, breadth of arts attendance is associated with higher levels of happiness; the effect of frequency of attendance is less clear cut. This seems

inconsistent—frequency of attendance might be expected to have as much of an effect as breadth of attendance and does not reflect prior findings regarding frequency of activity and happiness (e.g. Mochon et al. 2008; Wheatley and Bickerton 2017). Attendance increases happiness by around 0.2 units, which is about the same as the happiness premium from being outside London (the region coefficients range between 0.150 and 0.275) and is slightly smaller than the effect of being separated compared to being widowed. The other variables show the expected relationships with happiness (e.g. a significant curvilinear relationship between age and happiness and general health is positively related to happiness). These results are in line with previously reported estimates.

However, a different picture emerges from the quantile regression results, shown in Table 3 for model 1 and Table 4 for model 2. The same arts attendance and

Table 3 Quantile regression results for model 1

	q25		q50		q75	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Attended 1 type of art event	0.048	0.54	0.018	0.28	0.026	0.30
Attended 2 types	0.245**	2.66	0.129	1.54	0.066	0.81
Attended 3 types	0.178*	1.85	0.078	1.06	−0.032	−0.36
Attended 4 or more types	0.270**	3.12	0.105	1.65	−0.046	−0.6
Age	−0.052**	−5.36	−0.046**	−4.25	−0.039**	−4.7
Age squared	0.001**	5.26	0.001**	4.42	0.001**	5.27
Sex	0.106**	2.46	0.067*	1.66	0.121**	2.45
Single	0.587**	3.73	0.372**	3.29	0.298**	2.18
Married	1.115**	8.15	0.926**	8.22	0.857**	6.88
Separated	0.346	1.49	0.325*	1.93	0.267	1.42
Divorced	0.496**	2.84	0.417**	3.28	0.400**	2.87
Employed	−0.246*	−1.77	−0.179*	−1.71	−0.132	−1.51
Student/in training	−0.334**	−2.01	−0.276*	−1.68	−0.336**	−1.97
Unemployed	−1.063**	−5.03	−0.510**	−3.47	−0.327**	−2.06
Home maker	−0.468**	−2.45	−0.139	−1.00	0.035	0.24
Ill or injured	−1.414**	−7.48	−1.090**	−4.74	−0.537**	−2.67
North	0.168*	1.87	0.118*	1.90	0.186*	1.7
Midlands	0.145	1.51	0.119	1.55	0.138	1.22
South	0.081	0.85	0.067	1.25	0.090	0.82
East	0.126	1.21	0.028	0.44	0.037	0.28
General health	0.717**	13.67	0.536**	17.92	0.551**	19.05
Higher education	−0.110*	−1.88	−0.128**	−2.13	−0.221**	−3.33
A level	−0.002	−0.04	−0.058	−1.00	−0.125	−1.63
Constant	4.307	13.46	6.029	25.13	6.866	25.31
Pseudo R^2	0.100		0.040		0.047	

** $p < 0.05$, * $p < 0.10$ SE are bootstrapped using 400 replications

Table 4 Quantile regression results for model 2

	q25		q50		q75	
	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>	<i>B</i>	<i>t</i>
Monthly attendance	0.119**	2.02	0.091*	1.68	−0.017	−0.37
Age	−0.046**	−3.55	−0.045**	−4.04	−0.040**	−4.87
Age squared	0.001**	3.63	0.001**	4.05	0.000**	5.36
Sex	0.132**	2.41	0.080**	1.98	0.108**	2.26
Single	0.687**	4.16	0.323**	2.88	0.267*	1.95
Married	1.171**	8.17	0.889**	7.64	0.813**	6.36
Separated	0.323	1.41	0.283*	1.90	0.226	1.22
Divorced	0.568**	2.78	0.375**	2.88	0.332**	2.36
Employed	−0.299	−1.59	−0.201*	−1.92	−0.096	−1.03
Student/in training	−0.357*	−1.85	−0.306*	−1.94	−0.264	−1.65
Unemployed	−1.165**	−4.44	−0.537**	−3.67	−0.300	−1.74
Home maker	−0.546**	−2.80	−0.208	−1.45	0.074	0.49
Ill or injured	−1.479**	−7.17	−1.093**	−4.70	−0.510**	−2.42
North	0.161	1.60	0.136**	2.02	0.194*	1.78
Midlands	0.142	1.40	0.144*	1.81	0.138	1.20
South	0.103	1.07	0.081	1.36	0.098	0.86
East	0.142	1.29	0.041	0.67	0.019	0.14
General health	0.757**	10.57	0.543**	19.68	0.551**	19.95
Higher education	−0.071	−1.40	−0.098*	−1.70	−0.250**	−3.69
A level	0.018	0.34	−0.053	−0.90	−0.136	−1.78
Constant	4.075	10.48	6.069	29.49	6.902	25.75
Pseudo R^2	0.099		0.004		0.046	

** $p < 0.05$, * $p < 0.10$ SE are bootstrapped using 400 replications

control variables were included in the regressions. Coefficients were obtained for the 25, 50 and 75% quantiles of the distribution, along with pseudo R squareds.

As shown in Tables 3 and 4, the effect of arts attendance on happiness varies with the level of reported happiness. At the lower conditional quantile (25%), the pattern of results is similar to those obtained using OLS. Attending only one type of art event has no significant effect on happiness (compared to the base category of non-attendance); attending two or more is associated with increased happiness (although attending three types of arts event is significant only at the 10% level). At the median (50 percent quantile), none of the attendance dummies are significant, suggesting that the arts have an effect only at the lower end of the distribution of happiness. At the higher (75%) quantile, all four attendance dummies remain non-significant.

A similar pattern is seen when frequency is used as the arts attendance measure. Attending arts at least once a month is significantly associated with increased happiness in the lowest quantile. However, unlike when attendance is used, an effect

is found in the 50% quantile; however, the regression coefficient is smaller and is significant only at the 10% level. In the 75% quantile, monthly attendance is not significant.

5 Discussion

The impact of hedonic consumption on happiness has received attention from researchers in psychology, economics and consumer research, and the effect of arts attendance on happiness is increasingly attracting attention. The relationships found though are largely based on standard regression models. Such methods may not fully identify effects of independent variables on dependent variables where the effect is not uniform across values of the dependent variable. This would appear to be the case with the effect of arts on happiness—rather than there being a uniform relationship between the two, an association is found at lower levels of happiness when arts engagement is measured by the number of arts events attended and at the lower end of the distribution and at the median when frequency of attendance is used.

The results presented here show a comparatively modest, but still significant, effect of arts on happiness, which accords with the results obtained by Michalos (2005). The coefficients in the OLS regressions echo the findings presented by Wheatley and Bickerton (2017) with higher frequency of attendance being associated with greater happiness. Given the different estimation methods used (ordered probit and OLS regression), the magnitudes of the effects identified cannot be directly compared. In the quantile regression, the effects of arts attendance on happiness are somewhat more marked in the lower quantile but they decrease in the upper quantile of happiness.

The effect of arts on happiness might arise from two from two possible sources. The first is the inherent effects of arts attendance, such as pleasure and a sense of escape, as identified by McCarthy et al. (2004). This effect need not be constant—a sense of escape may well have a smaller effect on someone who is already happy than on someone who is not. In other words, the effect may be expected to tail off. The second is that attending arts events can foster social contact, itself a determinant of happiness. Binder and Coad's (2011) results showing a decrease in the effect of social relations at higher quantiles offer a partial explanation for the arts results obtained here. Additionally, both of these mechanisms are likely to be subject to decreasing returns, particularly if such attendance is concentrated in a short space of time, resulting in 'arts fatigue'. Disaggregating the arts attendance measures to distinguish between attendances at different art forms and different attendance frequencies might help to untangle the source of the effect.

The effect of arts attendance seems to endure over time; the arts attendance measures employed here capture monthly attendance and breadth of attendance over the 12 months prior to the survey. That the breadth of attendance measures is significant would seem to suggest that the effect of the arts on happiness goes beyond mere escapism or temporary relief and may imply that it is variety of attendance which is important. This would accord with recent findings that variety

of experiences is associated with increased happiness, as long as those experience are not compressed into a short span of time (e.g. Etkin and Mogilner 2016). If anything, the immediate effects of arts attendance on happiness are likely to be larger than the effects identified here—Bryson and MacKerron’s (2017) found that live arts and sports had the largest effect on happiness of any activity bar one. Future work might seek to identify whether the impact of arts activities measured retrospectively matches the order identified by Bryson and MacKerron (2017), or whether the effect of some art forms are more long lasting than others.

Hence, there appears to be an upper limit to which happiness can be influenced by external factors, including arts. The results also suggest that there is a minimum level of attendance required before an effect on happiness is seen. Experience diary data or day reconstruction data would help in further untangling the effects of arts attendance, arts enjoyment and social engagement on happiness.

There are a few notes of caution which should be sounded regarding the interpretation of the findings presented here. As is common in studies of happiness, the results presented here cannot be taken to imply a directional causal relationship; rather a significant result should be interpreted as indicating an association between the two variables. Indeed, the direction of the relationship between arts attendance and happiness is an avenue for further study. Furthermore, the happiness measure used, whilst a standard one that conforms to OECD recommendations, is subject to the potential biases inherent in all self-reported measures. That the results presented here accord with other regression-based studies, and those using other methods suggest that such a bias may be limited. Finally, the results presented here are based on aggregate measures of attendance at arts events. Future studies might explore if or how far these findings change either across types of arts event (e.g. theatre as opposed to cinema) or by separating those which would allow for more social contact than others.

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Appendix

See Table 5.

Table 5 Arts events included in the survey

Film at cinema or other venue	Circus	Classical music performance
Exhibition or collection of art, photography or sculpture	Carnival	Jazz performance
Craft exhibition	Culturally specific festival	Other live music
Event which included electronic art	Play/drama	Ballet
Event connected with books or writing	Pantomime	Contemporary dance
Street arts	Musical	African people's or South Asian and Chinese dance
Public art display or installation	Opera/operetta	Other live dance event

References

- Aaker, J., Rudd, M., & Mogilner, C. (2011). If money does not make you happy, consider time. *Journal of Consumer Psychology*, 21(2), 126–130.
- Abdel-Khalek, A. M. (2006). Measuring happiness with a single item scale. *Social Behavior and Personality*, 34(2), 139–150.
- Angrist, J., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton: Princeton University Press.
- Ateca-Amestoy, V. (2011). Leisure and subjective well-being. In S. Cameron (Ed.), *Handbook on the Economics of Leisure*. Cheltenham: Edward Elgar.
- Ateca-Amestoy, V., Serrano-del-Rosal, R., & Vera-Toscano, E. (2008). The leisure experience. *The Journal of Socio-Economics*, 37(1), 64–78.
- Binder, M., & Coad, A. (2011). From Average Joe's happiness to Miserable Jane and Cheerful John: Using quantile regressions to analyze the full subjective well-being distribution. *Journal of Economic Behavior and Organization*, 79(3), 275–290.
- Bruni, L., & Stanca, L. (2008). Watching alone: Relational goods, television and happiness. *Journal of Economic Behavior and Organization*, 65(3–4), 506–528.
- Bryson, A., & MacKerron, G. (2017). Are you happy while you work? *The Economic Journal*, 127(599), 106–125.
- Bygren, L., Konlaan, B., & Johannsson, S.-E. (1996). Unequal in death. Attendance at cultural events, reading books or periodicals and making music or singing in a choir as determinants for survival; Swedish interview of living conditions. *British Medical Journal*, 313, 1577–1580.
- Caldwell, M. (2001). Applying general living systems theory to learn consumers' sense making in attending performing arts. *Psychology and Marketing*, 18(5), 497–511.
- Cohen, D. (2009). New theories and research findings on the positive influence of music and art on health with ageing. *Arts and Health*, 1(1), 48–63.
- Colander, D. (2007). Edgeworth's hedonimeter and the quest to measure utility. *Journal of Economic Perspectives*, 21(2), 215–225.
- Daykin, N., Orme, J., Evans, D., Salmon, D., McEachran, M., & Brain, S. (2008). The impact of participation in the performing arts on adolescent health and behavior: A systematic review of the literature. *Journal of Health Psychology*, 13(2), 251–264.
- Department for Culture Media and Sport (2013). *Taking part: The National Survey of Culture, Leisure and Sport; Adult and Child Data* [computer file]. Colchester, Essex, UK: UK Data Archive. SN:7371, <http://dx.doi.org/10.5255/UKDA-SN-7371-1>.
- Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, 55(1), 34–43.
- Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science*, 7(3), 181–185.
- Di Tella, R., & MacCulloch, R. (2006). Some uses of happiness data in economics. *Journal of Economic Perspectives*, 20(1), 25–46.

- Diener, E., & Seligman, M. E. P. (2004). Beyond money: Toward an economy of well-being. *Psychological Science in the Public Interest*, 5(1), 1–31.
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single item scales for construct measurement: A predictive validity approach. *Journal of the Academy of Marketing Science*, 40(3), 434–449.
- Dolan, P., Kavetsos, G., & Vlaev, I. (2014). The happiness workout. *Social Indicators Research*, 119(3), 1363–1377.
- Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economics literature on the factors associated with subjective well-being. *Journal of Economic Psychology*, 29(1), 94–122.
- Downward, P., & Rasciute, S. (2011). Does sport make you happy? An analysis of the well-being derived from sports participation. *International Review of Applied Economics*, 25(3), 331–348.
- Dunn, E., Gilbert, D., & Wilson, T. (2011). If money doesn't make you happy then you probably aren't spending it right. *Journal of Consumer Psychology*, 21(2), 115–121.
- Edgeworth, F. (1881). *Mathematical psychics: An essay on the application of mathematics to the moral sciences*. New York: Augustus M. Kelly.
- Etkin, J., & Mogilner, C. (2016). Does variety among activities increase happiness? *Journal of Consumer Research*, 43(2), 210–229.
- Ferrer-i-Carbonell, I., & Frijters, P. (2004). How important is methodology for the estimates of the determinants of happiness? *Economic Journal*, 114(497), 641–659.
- Frey, B. S., Benesch, C., & Stutzer, A. (2007). Does watching TV make us happy? *Journal of Economic Psychology*, 28(3), 283–313.
- Frey, B. S., & Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature*, 40(2), 402–435.
- Gardner, D., Cummings, L., & Pierce, J. (1998). Single-item versus multiple-item measurement scales: An empirical comparison. *Educational and Psychological Measurement*, 58(6), 898–915.
- Gilovich, T., Kumar, A., & Jampol, L. (2015). A wonderful life: Experiential consumption and the pursuit of happiness. *Journal of Consumer Psychology*, 25(1), 152–169.
- Grossi, E., Blessi, G. T., Sacco, P. L., & Buscema, M. (2012). The interaction between culture, health and psychological well-being: Data mining from the Italian culture and well-being project. *Journal of Happiness Studies*, 13(1), 129–148.
- Helliwell, J.F. & Wang, S. (2012). The State of World Happiness, In J. Helliwell, R. Layard & J. Sachs (Eds.), World Happiness Report, Sustainable Development Solutions Network, <http://www.worldhappiness.report/ed/2012>.
- Hills, P., & Argyle, M. (1998). Positive moods derived from leisure and their relationship to happiness and personality. *Personality and Individual Differences*, 25(3), 523–535.
- Huang, H., & Humphreys, B. (2012). Sports participation and happiness: Evidence from US microdata. *Journal of Economic Psychology*, 33(4), 776–793.
- Kahneman, D., & Krueger, A. (2004). Developments in the measurement of subjective well-being. *Journal of Economic Perspectives*, 20(1), 3–24.
- Kahneman, D., Krueger, A., Schkade, D., Schwarz, N., & Stone, A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science*, 306(5702), 1776–1780.
- Koenker, R., & Bassett, G. (1978). Regression quantiles. *Econometrica*, 46(1), 33–50.
- Koenker, R., & Hallock, K. (2001). Quantile regression. *Journal of Economic Perspectives*, 15(4), 143–156.
- Layard, R. (2007). Happiness and public policy: A challenge to the profession. In B. Frey & A. Stutzer (Eds.), *Economics and Psychology: A promising new cross-disciplinary field*. Cambridge, Mass: MIT Press.
- Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. London: Sage.
- McCarthy, K., Ondaatje, E., Zakaras, L., & Brooks, A. (2004). *Gifts of the muse: Reframing the debate about the benefits of the arts*. Santa Monica, CA: RAND Corporation.
- Michalos, A. (2005). Arts and the quality of life: An exploratory study. *Social Indicators Research*, 71(1), 11–59.
- Michalos, A., & Kahlke, P. M. (2010). Arts and the perceived quality of life in British Columbia. *Social Indicators Research*, 96(1), 1–39.

- Mochon, D., Norton, M., & Ariely, D. (2008). Getting off the hedonic treadmill one step at a time: The impact of regular religious practice and exercise on well-being. *Journal of Economic Psychology*, 29(5), 632–642.
- Mosteller, F., & Tukey, J. W. (1977). *Data analysis and regression*. Reading, MA: Addison-Wesley.
- Oswald, A., & Wu, S. (2010). Objective confirmation of subjective measures of human well-being: Evidence from the USA. *Science*, 327(5965), 576–579.
- Piper, A. (2015). Europe's capital cities and the happiness penalty: An investigation using the European social survey. *Social Indicators Research*, 123(1), 103–126.
- Powdthavee, N. (2015). Would you like to know what makes people happy? An overview of the datasets on subjective well-being. *Australian Economic Review*, 48(3), 314–320.
- Rasciute, S., & Downward, P. (2010). Health or happiness? What is the impact of physical activity on the individual? *Kyklos*, 63(2), 256–270.
- TNS BMRB (2012) 2012/13 *Taking part survey technical report*. Accessed December 12, 2016, http://doc.ukdataservice.ac.uk/doc/7371/mrdoc/pdf/7371_taking_part_y8_technical_report.pdf.
- Van Boven, L. (2005). Experientialism, materialism and the pursuit of happiness. *Review of General Psychology*, 9(2), 132–142.
- Van Praag, B., & Ferrer-i-Carbonell, I. (2004). *Happiness quantified: A satisfaction calculus approach*. Oxford: Oxford University Press.
- Wheatley, D., & Bickerton, C. (2017). Subjective well-being and engagement in arts, culture and sport. *Journal of Cultural Economics*, 41(1), 23–45.
- Williams, R. (2016). Understanding and interpreting generalized ordered logit models. *Journal of Mathematical Sociology*, 40(1), 7–20.
- Zhong, J. Y., & Mitchell, V. W. (2010). A mechanism model of the effect of hedonic product consumption on well-being. *Journal of Consumer Psychology*, 20(2), 152–162.