department for
culture, media
and sport

Participation and engagement in cultural activities

Analysis of the Taking Part Survey

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Executive summary

Modelling participation is of key interest to decision makers as the presence of relevant models can mean better decision making and more efficient allocation of resources. Cultural activities are no exception particularly given their importance within public policy. This paper analyses two key measures of demand for cultural activities: participation and frequency of participation, otherwise referred to as engagement. With participation, attention is on the dichotomous decision to participate or not. For engagement, which is conditional on participation, demand is based on the frequency of participation. The outcomes of analyses provide insights into the propensity for participation in four cultural domains: libraries; museums and galleries; heritage sites; and archives and record offices.

The results of the analyses indicate participation in these cultural domains is influenced by sex, educational attainment, socio-economic group and economic status. Demand is further influenced by activities that respondents engaged with when growing up. Demographic, economic and personal characteristics were further supplemented by regional indicators and the indices of deprivation (2007) as covariates. In some instances, residing in a particular region had a significant role in explaining the likelihood of participation and engagement. In this context, the region is not just a geographical marker but may also reflect the relative supply of cultural activities across the country. The importance of indices of deprivation was, however, limited in that they did not have an overwhelming role in explaining variations in demand for cultural activities. This could, in part, be due to the fact that the indices are aggregated across large geographical areas and participation and behaviour in cultural activities is not likely to be homogenous among participants within the same super output areas. For this reason, the potential impact of the indices of deprivation is reduced.

Key findings

Libraries

- Participation is dominated by females
- As educational attainment increases, so too does the propensity to visit and use libraries;·there are no significant differences between the propensity to visit with respect to socio-economic groups
- Asian people have a greater propensity to participate compared with other ethnic groups
- Going to the library when growing up had a positive impact on visiting libraries as an adult, increasing the probability of attendance as an adult by 36%.

Museums and galleries

- Involvement in cultural activities at a young age influences participation and its frequency

- Black and Asian people are less likely than white people to visit museums and galleries
- Readers of broadsheet newspapers are more likely to visit museums and galleries.

Heritage sites

- Holding other factors constant, higher educational attainment results in a higher probability of participation
- Income also has a positive influence on the likelihood of participation
- Asian and Black people are 60% less likely than white people to visit heritage sites
- Engagement in cultural activities when growing up has a positive effect on visiting heritage sites as an adult.

Archive or records offices

- Age, economic status and visiting historical sites when growing up are the main predictors of visiting an archive or record office as an adult.

Section 1: Introduction

Assessing participation in cultural activities is of interest to different audiences. These range from leisure practitioners in all sectors of the economy including those directly involved in the sector, supporting businesses/activities and leisure/cultural policy makers. Understanding participation is central to successful policy initiatives and planning, particularly in relation to the use and allocation of public resources to ensure that social welfare is maximised. For leisure practitioners, managers are able to allocate resources efficiently and deliver effective services to consumers. Academics also have a keen interest in cultural participation; being able to test empirically various perspectives of culture and arts provides insight into which theoretical propositions can be substantiated and thus be used to support hypotheses and decision-making.

Consumer demand is of particular interest in cultural activities and the arts. Numerous propositions and perspectives relating to cultural demand, such as Peacock (2000) and Towse (2003) are based on both the theory and the analysis of empirical evidence. Data on participation in cultural activities in the UK has, until the advent of the DCMS Taking Part Survey, been limited. Data from this source have proven to be an invaluable addition to the body of existing evidence on cultural participation. Furthermore, the evidence it has provided offers dimensions and scope that have not previously been available to analysts and decision-makers. For example, the Taking Part Survey includes information not just on participation in cultural activities, but also on the frequency of participation in those activities. Hence, it is possible to provide empirical analyses on whether individuals participate, their likelihood of participation, and how frequently they take part.

Empirical studies of cultural activities include Forrest et al. (2000) who examine whether regional repertory theatre is worth subsidising utilising visitors' imputed cost of travel to estimate a demand curve. The basis of the analysis is whether public funds should be used to subsidise such activities. The rationale is that if consumer surplus is greater than subsidy, then there may be cause to provide public funds, over and above externality and public goods arguments; the study verified this proposition. Other studies which consider the application of public subsidy to the arts include Peacock (1994). While the study by Forrest et al. (2000) is an empirical assessment, Peacock's paper offers a theoretical model, investigating problems associated with public subsidies of the arts. A key rationale for papers such as those noted above is that considerable quantities of public subsidy are allocated to support cultural activities and the arts; their justification on welfare economic grounds is often an important factor. Hence the issues of externality, public goods and allocative efficiency are to be considered.

Maddison (2004) considers factors that may contribute to the subsidy of museums in light of government objectives to increase participation in the sector. His analysis shows that despite this widening participation objective, there are limited empirical links, using Granger causality procedure, between changes in visitor numbers and government grants. Blaug (2002) provides a review of a series of issues on cultural

economics which range from the formation of taste, supply and demand, to the economic history of the arts, and notes the theoretical and empirical developments that have occurred in the literature.

The remainder of the report is structured as follows. Section 2 considers the data used for modelling cultural activities. Section 3 models participation and engagement in cultural activities. Sections 4 to 8 provide empirical analysis of the various cultural sectors; this includes demand for libraries, museums and galleries, heritage sites, and archive centres. The final section concludes and discusses the various policy implications of the key findings.

Section 2: Data and models of cultural activities

The focus of this section is the various measures of participation in cultural activities: library; museums and galleries; heritage sites; and archives. The Taking Part Surveys provide significant advances in data collection on cultural activities and consequently, various measures of demand and participation are available. The principal measures used in the analyses of this report are the propensity of individuals to participate and their frequency of participation. Data and models based on propensity to participate provide valuable insight into cultural demand; however, this should be viewed as a start rather than an end point. Measures of propensity to participate are limited in that they only convey information on the likelihood of participation. Consequently there is no qualitative difference between an individual who participates with a high frequency and another who has a low frequency of participation. An important extension to the analysis of the propensity to participate is therefore the frequency of participation. Such a measure takes into account the degree of engagement in activities.

From an empirical perspective, the propensity to participate simply distinguishes between participants and non-participants. This can be analysed using probability (probit) or logistic (logit) models. Such models are particularly useful in instances where the dependent variable is dichotomous. In this instance cultural participation is denoted by the value 1 and non-participation by 0. Whilst it is possible to use standard regression approaches or ordinary least squares, predicted values of participation are likely to fall outside the parameters of 0 and 1. The use of a probit model confines the predicted values to the parameters of 1 and 0; this provides better estimates of the independent variables and offers a more reliable assessment of the relationship between the independent variables or determinants of demand and our measure of demand.

Modelling frequency of participation or engagement requires a more sophisticated approach. Engagement is often reported as a frequency measure, i.e., the number of times an individual participated in the previous four weeks or 12 months. Such data would be classed as ratio and this would influence the types of modelling approach applied. An essential characteristic of such data is that differences between data points can be measured. For example, one measure of frequency of participation in sport in the Taking Part Survey is the number of days in the four weeks prior to the interview; a ratio measure. In the case of cultural activities such as library, museums and galleries and archives, the measure of frequency, amongst participants, is an ordinal measure of categories as follows:

1. More often than once a week
2. At least once a week
3. Less often than once a week but at least once a month
4. Less often than once a month but at least 3-4 times a year
5. Twice in the last 12 months

6. Once in the last 12 months

Given the above options available to respondents, it is clear that option 1 has a higher frequency than option 2, that option 2 has a higher frequency that option 3 and so on. What cannot be expressed with certainty is that the quantitative difference between options 1 and 2 is the same as that between options 2 and 3. Consequently, a model specification that recognises the ordering of the data points but places limited attention on the differences between data points is appropriate; in this instance an ordered probit is adopted. While the probit make use of observations involving both participants and non-participants, the ordered probit is based on observations involving just participants and therefore uses a reduced sample of observations. More details on the modelling are provided in the following section.

With respect to data, the sample of observations comprises a series of 'batches' on a rolling basis. These batches, for convenience and robustness of analysis are aggregated into yearly surveys, each comprising of 12 months. The first of these involves interviews conducted in 2005/06 (N = 28,117). The interviews in subsequent instalments were conducted in 2006/07 (N = 24,174), 2007/08 (N = 25,720), 2008/09 (14,452 interviews), and 2009/10 (N= 6,097). There has subsequently been a sixth survey (2010/11; N= 14,102) and data for the seventh survey (2011/12) are currently being collected.

Over the various instalments, several developments in interview questions have meant not only an increase in the number of questions (and corresponding variables) but also changes in their formats and in some respects the introduction of change and new measures has led to inconsistencies. As a result the regression analyses cannot always be based on the entire sample of data across all years. As the number of covariates used in regression expands, the sample size contracts reflecting the limitation that some variables only apply to one survey year[1].

A consequence of limiting the analyses to one year's data is that they effectively become cross-sectional and panels cannot be established[2]. Estimates generated from cross-sectional analysis are often less efficient compared to those generated from panel data. A further advantage of panels is that they allow for unobserved characteristics not captured by any of the specified variables to be secured in fixed and random effect estimates. As a result, omitted variable biases are less likely to be a problem and the estimates of coefficients are more robust. These issues and others are considered in the following analyses.

[1] The regressions have generally been based on the fourth instalment of the survey (2008/09). This instalment comprises a greater number of variables, some of which are not available in previous surveys. Therefore, the use of these variables and data mean that observations from previous years are excluded from the analysis due to missing values.

[2] A panel data set consists of repeated observations across the same unit. The unit could be households, time or individuals. The use of all instalments of the Taking Part Survey would have allowed panels based on months to be established. Panel estimates generally provide more robust parameter estimates (Verbeek, 2000)

Section 3: Modelling participation and frequency of cultural engagement

Modelling the decision to participate

As noted, the decision to participate in cultural activities is observed as a dichotomous variable. With respect to the four areas under consideration (libraries, museums and galleries, heritage sites and archives) , participants were asked whether they had participated in the 12 months prior to the interview. It is worth noting that with respect to the cultural categories identified, participation is only based on the previous 12 months unlike that of sport which inquires about participation in the previous four weeks. A consequence of this is that participation in cultural activities is likely to be over-represented, in relative terms, as the data does not distinguish between frequent and non-frequent participants. For example, an individual who used a library once in the last 12 months is given equal weighting as an individual who has used the library every week in the last 12 months. Nevertheless, emphasis at this stage is on the user irrespective of frequency of usage.

To model participation, maximum likelihood regressions are preferred to ordinary least squares. The principal reason is the characteristics of the dependent variable which are constrained to the values 0 and 1 where 0 represents non-participation in the previous 12 months and 1 represents participation. The use of ordinary least squares is less likely to generate reliable estimates and the relationships between the independent variables is likely to be biased, consequently logistic (logit) and probability (probit) models are preferred. Regarding the choices of logit and probit models, there are very few qualitative differences in the results. In both cases, the coefficients are less informative and marginal effects, normally at the mean of the independent variables, are more intuitive when it comes to assessing the relationships between the variables.

To model participation in cultural activities, the dependent variable is $cul12mth_{\mathrm{i}}$ where the subscript i is used denote each of the cultural activities and takes the value 1 for participation and 0 for non-participation. In the case of a probit model, the regression estimates are determined using the following probability function:

$$\mathrm{P}(cul12mth_{\mathrm{i}} = 1|x) = F(\boldsymbol{x},\beta)$$

$$\mathrm{P}(cul12mth_{\mathrm{i}} = 0|x) = 1 - F(\boldsymbol{x},\beta)$$

where $\boldsymbol{x}$ is vector of covariates and β are the parameters that are to be estimated. This leads to the latent variable representation of the model that can be written as follows:

$$cul12mth_{\mathrm{i}}^{*} = \boldsymbol{x}'\beta + \varepsilon$$

In the model, *cul*12*mth*$_i$* is an unobserved latent variable with a value that is to be determined and ε is the disturbance term. The following is therefore observed:

$$cul12mth_i = \begin{cases} 1 & if \quad cul12mth_i^* > 0 \\ 0 & if \quad cul12mth_i^* \leq 0 \end{cases}$$

The above configuration allows for a more precise relationship between specified covariates and the demand for cultural activities as noted by the propensity to participate.

Modelling the frequency of participation

The decision to participate can be considered as part of a two-stage decision process. The first decision being to participate and the second, conditional on the first, being how often to participate. From an empirical perspective, there are two fundamental approaches from which to choose: to model first and second stages jointly or to model them separately. To model the two decisions jointly, the Heckman model might initially appear to be the most suitable approach; however, the dependent variable for the second stage of the decision-making process is an ordinal measure with a limited number of categories. Consequently, the Heckman model is unsuitable. Thus, for practical considerations, the second approach is preferred empirically. Consequently, the model is based on the explicit assumption of participation and considers the relationship between specified covariates and the dependent variable assuming participation in cultural activities.

As mentioned, the measure of frequency of participation is not ratio data but a series of ordered categories; this renders an ordered probit suitable. Like the probit, the probability of events occurring are modelled, however, as there are more than two categories which are ordered, probit estimations are not suitable. In using the ordered probit, responses to frequency of participation (five categories) are distributed across the standard normal distribution curve. Consequently the model estimates the likelihood that a response falls into one of the five portions (At least once a week; less often than once a week but at least once a month; less often than once a month but at least 3-4 times a year; twice in the last 12 months; once in the last 12 months) under the normal distribution curve[3].

Independent variables

In constructing the model of participation, the vector ***x*** represents the covariates (or independent variables). These are a set of economic and demographic factors that are likely to influence the decision to participate. In many instances, the covariates are ordinal in nature due to the data gathering instrument employed; age and income

[3] For a more detailed appraisal of ordered probit, see Greene (2003)

being the exceptions. In fact, the covariate income is itself an ordinal measure[4] and therefore the differences between ordinal points cannot be treated as being equal. For modelling purposes, however, the midpoint of each income range was used and income can in this sense be treated as a ratio measure.

For those covariates which cannot be converted into ratio data, their direct use in regression modelling is likely to produce biased estimates. Furthermore, the estimates cannot be interpreted as normal coefficients as strictly, a 'unit change' cannot be derived from these. In these instances, covariates of an ordinal nature have been converted into categorical (or nominal) data. One of the undesirable effects of this is a reduction in the degrees of freedom, however, in all cases there are sufficient observations for this not to cause empirical problems. The source of many of these covariates is the Taking Part Survey and the summary statistics for these are shown in Table 1.

In addition to the covariates that have been taken from the Taking Part Survey, additional variables are also used in the estimations. These are the relative rankings of the lower super output areas (LSOAs) across England. There are 32,482 areas with an average population of 1,500 people. Each LSOA is ranked across seven domains in relation to the Office for National Statistics' Index of Deprivation (2007):

1. Income
2. Employment
3. Health Deprivation and Disability
4. Education, Skills and Training
5. Barriers to Housing and Services
6. Crime
7. Living Environment.

In addition to the above domains, a composite index based on the seven domains is also available. For the purpose of this analysis, the ordinal rankings in each domain are used to produce deciles for each of the domains; decile 1 being the most deprived and decile 10 being the least deprived. The additional benefit of using domains is that they provide additional information about the areas in which the respondents reside and how ranked measures of deprivation influence decisions to participate and engage in sport. The data range for each index is from 1 to 10; however, as they are ordinal data[5], their inclusion in the regression analysis should be as dummy variables. For example, if two areas had income deprivations of 2 and 4, this does not mean that the later has a measure that is twice as much (or has half the level of deprivation) as the former.

[4] Participants were asked to indicate their income by selecting one of 13 options; the lowest of these was *Nothing* and the highest £50,000 or more.

[5] As ordinal data, the differences between the ordinal points are not necessarily equal. For example, the difference in deprivation between decile *n* and decile *n+1* is not necessarily the same as that between decile *m* and decile *m+1*. Consequently, if treated as ratio or interval data in regression analysis, the parameter estimates will be misleading.

Table 1: Summary statistics of covariates

COVARIATE	MEAN	STANDARD DEVIATION
Female	0.555	0.497
Male	0.445	0.497
Age	49.898	18.726
GCSE/O Level grade A* - C(< 5 A*- C) and L1 equivalents	0.072	0.258
5 or more GCSE/O Level grades A* -C and L2 equivalents	0.193	0.395
A levels, vocational level 3 & equivalents	0.205	0.404
Higher Education & professional/vocational equivalents	0.289	0.453
Other Higher Education below degree level	0.128	0.334
Other qualifications: level unknown	0.05	0.218
Trade Apprenticeships	0.063	0.243
Income (mid-point)	£19,977	£17,992
Large employers and higher managerial	0.04	0.196
Higher professional	0.052	0.222
Lower managerial and professional	0.203	0.402
Intermediate occupations	0.16	0.367
Small employers and own account workers	0.084	0.277
Lower supervisory and technical	0.1	0.3
Semi routine	0.151	0.358
Routine	0.123	0.328
Never worked or long term unemployed	0.031	0.173
Full time	0.419	0.493
Long term sick or disabled	0.044	0.205
Looking after family/home	0.068	0.251
Part time	0.153	0.36
Retired from paid work	0.282	0.45
Student	0.03	0.17
Temporarily sick or injured	0.004	0.067
Asian	0.049	0.216
Black	0.033	0.18
Mixed	0.01	0.099
Other ethnicity	0.008	0.089
White	0.899	0.301
Single, never married/registered same sex civil partnership	0.291	0.454
Married and living with husband/wife	0.458	0.498
Married and separated from husband/wife	0.033	0.179
In registered same-sex civil partnership living with partner	0.003	0.053
Separated, but still legally in a same-sex civil partnership	0.001	0.024
Surviving same-sex civil partner, partner since died	0	0.008
Widowed	0.115	0.32
Divorced	0.099	0.299
Drinking: Don't drink	0.219	0.413
Drinking: Less often than once a week	0.277	0.448
Drinking: 1-3 days a week	0.324	0.468
Drinking: 4-6 days a week	0.085	0.279
Drinking: Every day	0.095	0.293
Smoking: No	0.777	0.416
Smoking: Yes	0.223	0.416
General health: Very bad	0.016	0.127
General health: Bad	0.063	0.243
General health: Fair	0.205	0.404
General health: Good	0.401	0.49
General health: Very good	0.315	0.465

Section 4: Library visits

Key findings

- Participation is dominated by females
- As educational attainment increases, so too does the propensity to visit and use libraries
- There are no significant differences between the propensity to visit among different socio-economic groups
- Asian people have a greater propensity to participate compared with other ethnic groups
- Going to the library when growing up had a positive impact on visiting libraries as an adult, increasing the probability of attendance by 36%.

The analysis shows that library participation is dominated by females. It also shows that as educational attainment increases, so too does the propensity to visit and use libraries. There are no significant differences between the propensity to visit with respect to socio-economic group, however, ethnicity impacts on library visits with Asian people having a greater propensity to participate compared with other groups. Of more relevance is going to the library when growing up. Whilst this did not have any effect on the frequency of visits to libraries, it had a positive impact on visiting libraries, an increase in probability of attendance of 36% relative to those that did not visit libraries when growing up. Furthermore, there is a complementary impact from the variable 'write stories, poems, plays or music (when growing up)': those who engaged in these activities when growing up were 14% more likely to have visited a library in the previous 12 months. A fundamental effect on visiting libraries in adulthood is therefore access during childhood.

The empirical results for participation and engagement in libraries are shown in Table 2. The second column shows the marginal effects of the covariates with respect to participation, the probability of using a library in the last 12 months. The third column shows the marginal effects with respect to frequency of use conditional on participation.

The marginal effects across participation and engagement present some interesting results. Firstly, the use of libraries is dominated by females; they have an 11% greater propensity to use such facilities. Having made a positive decision to use libraries, there is no statistical significant difference between male and female users when it comes to frequency of use. The covariate age of respondent has no effect on either participation in the last 12 months or engagement. This shows that no particular age group has a dominant influence when it comes to participation in or on the rate of visits to libraries. Part of the reason for the lack of significance of age might be explained by educational attainment. Educational attainment is itself partially correlated with age and its significance is pronounced in the participation model. The reference group is respondents with five or more GCSE/O Levels grade A*-C. Those

with fewer qualifications than the reference group were 12% less likely to have used a library in the last 12 months. Contrastingly, all other groups with higher qualifications than our reference group were more likely to have used a library in the last 12 months. Those with A levels or equivalent were 13% more likely and those with a higher education or equivalent were 23% more likely to have used a library in the previous 12 months. For those with qualifications above A levels but below degree level, their propensity for participation was 12% higher than the reference group. For those with trade apprenticeships or other qualifications, likelihood of participation was less than that of our reference group. All these marginal effects are conditional on the control variables in the model. With reference to frequency of participation and educational attainment, conditional on visiting libraries, there are no statistical differences between the marginal effects of categories of educational attainment and that of the reference group.

Income is significant but negative when it comes to participation. As income increases by 1%, the likelihood of participation reduces by 11%. A likely explanation is that as income increases, the available substitutes for many of the services provided by libraries increase too. However, while library participation seems to be an 'inferior good', engagement is also negatively correlated with frequency of use. Using engagement as a measure of demand would confirm libraries to be inferior goods; the likelihood of a reduction in engagement rises with increases in income. On this evidence, libraries on average provide an important service to those on low income. Whilst participation reduces with income, non-users may still place value in libraries and their values should not only be defined by users or usage.

Taking socio-economic group and economic status collectively, socio-economic group has no bearing on the probability of participation or on engagement although those in the category – employers report a higher frequency of library use. A marked differences, however, is that comparisons of categories in economic activities with the reference group - full time. Apart from temporary sick or injured, all categories reported a higher probability of participation compared with the reference group; the significant values ranging from a low of 22% to a high of 46%. In all likelihood, this is capturing the availability of leisure time and relative to the category full time, other categories have higher access to leisure time. The results relating to frequency of participation, conditional on using libraries, are rather different. Those in the category full time have a higher frequency of engagement compared with the categories looking after family or home, part time and retired from paid work; the other categories have a similar frequency of participation to that of full time.

From an ethnicity point of view, library participation in the 12 months is dominated by Asian people. For other ethnic groups, participation is not statistically different to the reference group (white). With frequency of use conditional on participation, however, the categories white and Mixed dominate; other ethnic groups have a much lower frequency of participation by comparison.

Marital status does not seem to have any discernable effect; only the covariate widowed is significantly different from the reference group, single. This applies to both participation and frequency of participation. With respect to household composition, the number of adults in a household, on the one hand, has a significant and negative impact on the probability of participation. On the other hand, the impact is an increase in the frequency of visits to a library. A reverse impact is also observed in the case of the impact of the number of children in the household. For every additional child in a household, the probability of an adult visiting the library increases by some 18% whereas the frequency of participation actually declines.

In addition to the demographic and economic covariates, a set of covariates to reflect the respondent's involvement in culture when growing up is also included. The main categories are:

- Read books for pleasure/enjoyment
- Go to museums or art galleries
- Draw or paint
- Go to theatre/see dance/classical music performance
- Write stories, poems, plays or music
- Go to historic sites
- Play musical instrument(s), act, dance or sing
- Go to the library

Of all the covariates: reading books for pleasure; writing stories, poem, plays or music and going to the library had positive and significant effects; other categories were not significant when it came to library participation. For frequency of library use, only reading books for pleasure was significant; its effect was positive.

In the case of region, there was no distinct pattern to library use. For participation, only the East of England (positive) and Yorkshire and The Humber (negative) were significant. For frequency of participation, there were no significant regional effects and frequency of use across the regions was not significantly different to that of the reference group, London.

The final set of covariates is that of newspaper. With respect to these, the conjecture is not that reading a particular newspapers causes a greater use of libraries nor that it causes a greater frequency of use, the likelihood is that newspaper readership is a proxy for other measures: political preference and education are just examples. In the case of library participation, readers of Daily Telegraph, The Guardian, The Independent and The Times all had a highly significant and positive association with library participation. All these newspapers are characterised as broadsheets. For other readerships, their library participation was not significantly different from those who did not read newspapers. With respect to frequency of participation and newspaper readership, only the Daily Express and the Sun had any significant effects; both were negative implying that readership of these two, daily newspapers had a lower frequency of library use.

Table 2. Probit model of propensity for library use in the last 12 months and ordered probit model of frequency of use[6]*.*

	Probit model of library participation	Ordered probit model of frequency of library visits
	Marginal effect	*Coefficient*
Female	0.1123***	-0.0295
Age	0.0024	-0.0002
Education: reference group is 5 or more GCSE/O Level grades A*-C		
A levels, vocational level 3 & equivalents	0.1319***	-0.0441
GCSE/O Level grade A* -C(< 5 A*-C) and L1 equivalents	-0.1228*	-0.0343
Higher education & professional/vocational equivalents	0.2296***	-0.0845
Other higher education below degree level	0.1214**	0.0483
Other qualifications: level unknown	-0.2465***	-0.0411
Trade apprenticeships	-0.0846	0.1753*
Natural logarithm of income	-0.1080***	0.0451*
Socio-economic group: reference group is higher managerial		
Large employers and higher managerial	-0.1322	0.1703
Lower managerial and professional	0.0385	-0.0081
Intermediate occupations	0.0108	-0.0344
Small employers and own account workers	-0.115	0.0539
Lower supervisory and technical	-0.0897	-0.1026
Semi routine	-0.0213	-0.0306
Routine	0.0123	-0.1446
Never worked or long term unemployed	0.0414	-0.0089
Long term unemployed	-0.107	-0.1502
Economic activity: reference group is full time		
Long term sick or disabled	0.3191***	-0.1318
Looking after family/home	0.2223***	-0.2195**
Part time	0.2396***	-0.1561***
Retired from paid work	0.4648***	-0.4099***
Student	0.2737**	-0.1636
Temporarily sick or injured	0.3255	-0.1659
Ethnicity: reference group is white		
Asian	0.2200***	-0.3098***
Black	0.0963	-0.4813***
Mixed	0.1555	-0.1839
Other ethnicity	0.1421	-0.5151***

[6] A set of dichotomous variables for month are used in the estimates, however, the coefficients are not reported. The months of May, June and July were significant in the regression model for participation suggesting that participation in the summer months contributed to the likelihood of visits. For frequency of participation, the 11 months were not significantly different to the reference month January.

Marital status: reference group is single		
In registered same-sex civil partnership living with part	-0.0986	-0.1471
Married and living with husband or wife	0.0416	-0.0814
Married and separated from husband or wife	0.0477	-0.1169
Separated, but still legally in a same-sex civil partners	-0.2958	0.091
Widowed	-0.1837**	-0.1232
Divorced	-0.0413	-0.0851
Number of adults in household	-0.0601***	0.0661**
How many children under 16 live in this household?	0.1812***	-0.0419*
When growing up:		
Read books for pleasure/enjoyment	0.1409***	-0.2350***
Went to museums or art galleries	-0.0419	0.0191
Drew or painted	-0.0289	0.004
Went to theatre/dance/classical music performance	-0.0325	0.035
Wrote stories, poems, plays or music	0.1366***	-0.0634
Went to historic sites	-0.0027	0.002
Played musical instrument(s), acted, danced or sung	0.0079	0.0643
Went to the library	0.3588***	-0.0147
Region: reference group is London		
East Midlands	-0.0366	-0.0008
East of England	0.1051*	-0.0733
North East	0.0035	0.0632
North West	0.0269	-0.0035
South East	0.0391	0.0929
South West	0.0627	0.1162
West Midlands	-0.0605	0.0825
Yorkshire and The Humber	-0.1685**	0.0181
Newspaper readership		
Daily Express	0.0026	0.2816***
Daily Mail	0.0349	0.0771
Daily Mirror	-0.0548	0.0689
Daily Star	-0.035	-0.1909
Daily Telegraph	0.2672***	0.0356
Financial Times	0.0245	-0.0143
Local daily newspaper	0.0803	-0.0219
Metro	0.0859	0.0452
Other daily newspaper	-0.1159	0.0728
The Guardian	0.2062***	0.0489
The Independent	0.3223***	-0.0985
The Sun	-0.0763	0.1648**
The Times	0.1264*	-0.012
Constant	-0.0367	
N	7767	3332
Pseudo R squared	0.079171	0.024822
Log likelihood	-4.89E+03	-4.83E+03

* p<.1; ** p<.05; *** p<.01

Section 5: Museums and gallery visits

Key findings

- Involvement in cultural activities at a young age influences museum and gallery participation and its frequency in adulthood
- Black and Asian people are less likely than white people to visit museums and galleries
- Readers of broadsheet newspapers are more likely to visit museums and galleries.

For museums and galleries, the results indicate that involvement in cultural activities at a young age influence not just participation but also the frequency of participation; there are positive effects resulting from childhood museum and art gallery visits, historic site visits, involvement in stories, poems, plays, music and library visits. Any policy initiative to boost attendance should have, at its core, strategies involving schools.

Another key finding includes the lack of participation by Asian and Black people who were less likely than white people to go to museums and galleries. For museums and galleries to be socially inclusive, appropriate measures to attract such groups are necessary given the disproportionate access; Black and Asian people were 39% less likely to attend a museum or gallery.

Readers of broadsheet newspapers were more likely to attend museums and galleries (for example, Guardian readers were 75% more likely to attend). Counter to this, readers of tabloid prints were less likely to attend (readers of The Sun and Daily Star were 22% and 29% respectively less likely to attend). This is not to suggest that reading these newspapers influences participation per se, but that it captures characteristics of the participants and non-participants.

The empirical results for museum participation and frequency of visits are shown in Table 3. This shows only some of the covariates. The full table of results is displayed in Appendix 1.

In relation to museum and gallery visits (participation), there is no bias with respect to sex; however, female visitors are more likely to visit museums and galleries with greater frequency when compared to their male counterparts. Age does not seem to have any discernible impact on either participation or frequency of participation.

The impact of educational attainment on participation is, to some extent, as to be expected. Relative to the reference group (which is those individuals with five or more GCSE/O Levels Grades A*-C) participation by those with a higher educational qualification was 30% higher and for those with qualifications above than the reference group's but below higher education, participation was 16% higher. The general impact of education on participation is a positive correlation in which higher

educational attainment increases the likelihood of visits to museums and galleries; a greater level of education seems to encourage greater access. The impact of educational attainment on frequency of participation is 'ordered.' Relative to the reference group, those with higher qualifications than the reference group, conditional on participation, have a higher frequency of participation at museums. This positive impact of educational attainment on frequency of participation is as to be expected. The observed impact may be capturing a dimension of cultural literacy which one might expect to be positively correlated with educational attainment.

In the case of socio-economic group, results suggest that as we move down the socio-economic groupings, the probability of participation in museums decreases relative to those in the reference group - higher managerial. Four groups: Small employers and own account workers, Lower supervisory and technical, semi routine, and routine have a lower probability of participation of 18%, 22%, 36% and 44% respectively. Rather surprisingly, those who have never worked or are long-term unemployed had a similar probability of participation to the reference group. With respect to frequency of participation, relative to the reference group, the groups lower managerial and small employers have lower frequency of participation as does the group lower supervisory. The other groups' marginal effects are not statistically different to that of the reference group.

In relation to employment status, all groups have similar probabilities for visiting a museum or galleries, with the exception of those who work part time. Their propensity to participate is 20% higher than the other groups. For frequency of participation, however, the three groups looking after family, part time and temporary sick all have a higher frequency of participation relative to the reference group, conditional on participation; this clearly reflects relative access to leisure time.

With respect to ethnicity, the significant covariates across the two models were Asian and Black. For these covariates and across the two models, respondents categorised as Asian and Black were 39% less likely to have been to a museum in the last 12 months. For Black people who have been to a museum in this period, their frequency of participation was not significantly different to the reference group, however, those categorised as Asian had a lower frequency of participation compared with the reference group. For all other categories of ethnicity, their probability and frequency of participation were not significantly different to those of the reference group. The general reflection is that Black and minority ethnic groups are under-represented when it comes to access to museums and galleries.

The set of covariates reflecting the number of children in the household and the activities in which respondents engaged when growing up are insightful for museum and gallery visits and frequency of attendance. Firstly the number of children in a household does not impact on a respondent's participation but on the frequency of participation; participation is likely but the frequency of attendance is severely reduced.

With respect to cultural activities in which respondents were involved when growing up, the impacts, are generally significant. Reading books for pleasure, going to museums or art galleries, writing stories, poems, plays or music, visiting historic sites, and the library as a child all have a positive impact on the likelihood of participation in museums and galleries as an adult. Many of these variables also have a positive impact on frequency of attendance at museums and galleries, considering those participants who have made a positive decision to participate, the most dominant covariate being going to museums or art galleries as a child followed by going to the library.

The regional covariates shed light on propensity to participate and the frequency of participation in museums. The reference group in this instance is London. Relative to London, the regions South West, West Midlands and East Midlands have a lower propensity to participate (the former two are significant at the 99% level). In the context of participation by region, it is difficult to establish the extent to which residing in one region is a real advantage over respondents in other regions principally because the measure of participation is based on whether respondents have been to a museum in the previous 12 months prior to the interview. This long period for participation therefore does not allow for the analysis to be more discriminating amongst the respondents in the sample. Analysis of the frequency of participation offers a better insight. From this we note that those categorised as North East and Yorkshire and The Humber have a frequency of participation not significantly dissimilar from the reference group holding the model's other covariates constant, however, the regions East of England, South West, South East, North West, West Midlands and East Midlands, in this order, have a decreasing level of participation amongst those who reported attendance in the previous 12 months. It is likely that the size of the coefficients is (partly) determined by supply side issues; the (perceived and actual) supply of museums within these regions and the extent to which respondents perceive facilities outside their region to be accessible to them. In the case of London, which empirically has the greatest implied frequency of participation amongst the regions, the reason for this could be the disproportionately greater number of facilities.

The last set of covariates in the analysis is indices of deprivation. As to be expected, the deprivation indices are likely to be correlated. The results of a correlation analysis for these covariates show this to be the case. For example, the correlation coefficient between income deprivation and health deprivation is 0.84; income and employment is 0.89; and health and employment is 0.93. Consequently, multi-colinearity is likely to be problematic. In fact a formal test using variable inflation factors showed this to be the case. As a result, health and employment deprivation indices were omitted from the analysis.

We start with analysis of the income indices. Low values indicate a higher degree of deprivation, however, the data are ordinal and the absolute sizes of deprivation are unknown. In the regression analysis, the reference category is Band 1. For income deprivation, the coefficients were not significantly different from zero suggesting that the propensity to go to museums did not differ across the income bands. With respect to frequency and the impact of income deprivation, the significant coefficients are all positive suggesting that relative to Income Band 1, respondents in less deprived areas have a lower frequency of attendance at museums. This is counter intuitive as one might have expected those who reside in less deprived areas (based on income), to have a higher propensity to attend. Perhaps this reflects the availability of leisure time; whilst attendances is noted among this sample, those residing in higher income areas visit less because of the relatively higher personal cost of leisure time.

As with the impact of income deprivation, the reported impacts of education deprivation on participation was effectively zero across the bands, the exceptions being Bands 4, 7 and 10. The impact is not systematic and therefore individuals in the lower bands of education are just as likely not to attend museums as those in the higher bands. On frequency of participation, the relationships between education deprivation and museum attendances are quite systematic. As education deprivation reduces (educational attainment increases), frequency of attendance increases (given the configuration of the data, such increases are accompanied with a negative coefficient). The respective sizes of the coefficients are rather conclusive as those in higher bands have larger coefficients relative to those in the lower bands.

For the final two groups of deprivation, we note that their impact on frequency of attendance at museums is generally not significantly different from zero. There are very few statistical differences between respondents' areas with respect to crime and living deprivation and regularity of attendance. For participation, much of the empirical evidence suggests that those residing in areas that are less deprived with respect to crime and living barriers are less likely to attend; however, the magnitude of the coefficients across the various bands does not present any notable pattern.

Table 3: Probit model of propensity to visit museums in the last 12 months and ordered probit model of frequency of visits[7]

	Probit model of library participation	Ordered probit model of frequency of library visits
	Marginal effect	*Coefficient*
Female	0.0399	0.1318***
Age of respondent	0.0009	0.0003
Education: reference group is 5 or more GCSE/O Level grades A*-C		
Higher education & professional/vocational equivalents	0.3126***	-0.3175***
Other higher education below degree level	0.1581***	-0.1453*
Other qualifications: level unknown	-0.2022**	0.1180
Natural logarithm of income	0.0301	0.0185
Socio-economic group: reference group is higher managerial		
Lower managerial and professional	-0.0709	0.1673**
Small employers and own account workers	-0.1824**	0.2039**
Lower supervisory and technical	-0.2197***	0.1933*
Semi routine	-0.3550***	0.0134
Routine	-0.4374**	0.0631
Economic activity: reference group is full time		
Looking after family/home	0.1315	-0.2023*
Part time	0.1958***	-0.1385**
Temporarily sick or injured	-0.1031	-0.8953**
Ethnicity: reference group is white		
Asian	-0.3874***	0.3721***
Black	-0.3880***	0.1519
Marital status: reference group is single		
Married and living with husband or wife	0.0957**	-0.0531
Married and separated from husband or wife	0.0375	-0.2119*
How many children under 16 live in this household?	-0.0069	0.0963***
When growing up		

[7] Truncated model. See Appendix 1 for full model.

Read books for pleasure/enjoyment	0.1349***	-0.0477
Went to museums or art galleries	0.2154***	-0.1940***
Drew or painted	0.0318	-0.0841**
Went to theatre/dance/classical music performance	0.1261***	-0.1154**
Wrote stories, poems, plays or music	0.2590***	-0.0408
Went to historic sites	0.0830*	-0.1172**
Region: reference group is London		
North East	0.2325***	0.0365
Yorkshire and The Humber	0.0271	0.1382
South West	-0.1669**	0.1837**
East of England	-0.0037	0.1855**
South East	-0.0235	0.1997**
North West	0.0919	0.2033**
West Midlands	-0.1753**	0.2111**
East Midlands	-0.0957	0.2340**
Newspaper readership		
Daily Express	0.0973	0.1530
Daily Mail	0.0512	-0.0350
Daily Mirror	-0.1024	0.1874*
Daily Star	-0.2895**	-0.0847
Daily Telegraph	0.3473***	-0.0949
Financial Times	0.5205***	-0.3357*
Local daily newspaper	0.1409**	-0.0611
Metro	0.2751***	-0.0851
Other daily newspaper	0.2337	-0.4657**
The Guardian	0.7468***	-0.4412***
The Independent	0.5019***	-0.3706***
The Sun	-0.2163***	0.2658***
The Times	0.5896***	-0.3702***
Constant	-0.9694***	
Month dummies	Yes	Yes
N	7749	3100
Pseudo R squared	0.1385	0.0729
Log likelihood	-4.63e+03	-3.79e+03

* p<.1; ** p<.05; *** p<.01

Section 6: Heritage site visits

Key findings

- Holding other factors constant, higher educational attainment results in a higher probability of participation
- Income also has a positive influence on the likelihood of participation
- Asian and Black people are 60% less likely than white people to visit heritage sites
- Engagement in cultural activities when growing up has a positive effect on visiting heritage sites as an adult.

For visits to heritage sites, the effect of educational attainment is quite strong and holding other factors constant, higher educational attainment results in a higher probability of participation. Income also has a positive influence on the likelihood of participation.

The effect of ethnicity is quite striking – Asian and Black people were 60% less likely than white people to visit heritage sites. Collectively, our variables which capture the cultural activities which respondents engaged in when growing up were significantly different from zero, and from this it can be inferred that if respondents participated in these activities when growing up, there is strong likelihood that they will visit heritage sites as an adult.

The results of the regression for participation and frequency of engagement in heritage activities are presented in Table 4. Columns 2 and 3 show the marginal effects of participation and the coefficients of the ordered probit for frequency respectively. As with the previous tables, the marginal effects in column 2 can be viewed as the marginal increase in probability for a unit change in the covariate; in the case of dummies variables, this is simply a change from zero to 1. The ordered probit model shows the coefficients and emphasis should be placed in the direction of causality and the statistical significance of the coefficients; the magnitude of the coefficients cannot be viewed as marginal increases.

The coefficient of the covariate female is not statistically significant in the probit model which suggests that participation in heritage is not biased by sex. However, with respect to the ordered probit based on participants, female respondents had a higher frequency of participation relative to male participants; this is significant at the 1% level.

The covariates capturing education perform as expected in that participation in heritage is dominated by those with educational qualifications at A level and above. The magnitude of the coefficients of the probit model systematically increase: those with A level qualification have a 12% greater level of participation; those with higher education qualifications above A level but below degree level reported 22% greater level of participation; and those with higher education qualifications or above reported

a 39% greater level of participation. All these percentages are relative to the reference group 5 or more GCSE grades (A*-C). The ordered probit shows that those with higher education qualifications have a greater frequency of participation compared with all the other groups; those with less than five GCSE grades A* - C had a lower frequency of participation compared with the reference group.

Taking the covariates socio-economic groups and economic activity, the signs of the coefficients of the socio-economic group variables show that those in higher categories have a higher propensity to participate and attend heritage sites. The category employer dominates followed by the reference group higher managerial. Those in routine occupations were less likely to participate than the reference group given the negative coefficient; this was significant at the 5% level.

In relation to employment status, those who were long term sick or disabled and also temporary sick or injured were less likely than the reference group, full time, to have visited a heritage site in the last 12 months. They were 39% and 66% less likely, respectively, compared with the reference group. Those who reported their employment status to be part time were more likely than those in full time employment to have visited a heritage site in the last 12 months. With respect to frequency of visits, the categories looking after family or home, part time and retired from paid work all had a higher frequency of participation relative to the reference group; those looking after family or home dominating.

The pattern noted in other cultural sectors with regard to ethnicity is also repeated for heritage sites. Asian and Black people were approximately 60% less likely to have visited a heritage site in the previous 12 months. For those who had visited, their frequency was also lower than the reference group. All these negative impacts were significant at the 1% level. The cultural impetus to engage in heritage is significantly lower among these two ethnic groups. The participation and engagement of other ethnic groups in our categories were not significantly different from those in the category white.

Household composition also has an impact on participation and engagement. Those who are divorced or married have a higher likelihood of participation relative to those who are single. Besides those who are widowed, marital status does not have a discernible influence on the frequency of participation in heritage. The number of adults in a household seems to have a negative impact on frequency of participation. The impact of children is marked; as the number of children in a household increases, participation as well as frequency of visits, for those likely to participate, reduces. The reductions are significant at the 1% level.

For the covariates pertaining to what respondents did when growing up and their impact on visits to heritage sites, visiting historic sites when young has a positive and strong impact at the 1% level indicating that those who visited historic sites as children were 37% more likely to do so in the previous 12 months compared with those who did not visit such sites as children. This positive impact also featured in the frequency of visits to such sites. Other notable impacts on participation influenced by childhood included: going to museums or art galleries; going to theatres, seeing dance or classical music performance; and playing musical instruments, acting, dancing or singing. All these had a positive influence on the likelihood of participation in the previous 12 months.

With respect to the frequency of participation, a theme emerges. For those who visited heritage sites in the previous 12 months, the frequency of visits is higher among those who read books for enjoyment, wrote stories, poems, plays or music; and/or went to

the library during their childhood. It would seem that participation and visits to heritage sites are influenced by cultural literacy developed during childhood.

Visits to heritage sites seem to be dominated by those residing in Yorkshire and the Humber. This is followed by those in the North East, then by those in the South West, North West and East and West Midlands. Londoners have the lowest participation rate in heritage sites. With respect to frequency of visits to sites amongst participants, there were no discernible differences between all the groups with the exception of those in the Yorkshire and The Humber region. It could well be that those resident in this region have disproportionate access to heritage sites. In essence, regions are likely to capture both the demand for heritage site and their supply; supply can thus induce demand.

As with our appraisal of museums and galleries, newspaper readership affects the likelihood of participation. This is not to suggest that newspapers readerships per se are influencing demand but it is more likely that they capture the characteristics of those respondents who do and do not visit heritage sites. For participation in the previous 12 months, positive effects are noted among those who read the Daily Telegraph, Financial Times, The Guardian, The Independent, The Times and the Daily Express. Readers of the Daily Star and The Sun were less likely to have visited a heritage site in the previous 12 months. For frequency of participation among those who visited sites, these were dominated by readers of The Guardian and The Times with statistically negative effects among those who read the Daily Mirror and The Sun.

Unlike the results of the analysis of museum and galleries in which there were impacts related to the various indices of deprivation, the impact of the various deprivation indices on participation and engagement at heritage sites is limited. The only indices of deprivation that influence heritage demand are income and education. The impact of income deprivation is over and above that of personal income. In this case, the impact reflects the additional constraints that may emerge from the area in which the respondents reside. The results show that as the level of income deprivation reduces, there is a greater likelihood of participation or visits to heritage sites. The increase in the marginal effects are systematic with the probability increasing from under 20% for the lower band (high deprivation) to just under 30% for the highest bands (low deprivation). With respect to frequency of engagement in heritage amongst participants, there is very little to report as the coefficients of the different income bands were generally not statistically different from that of the reference group.
With respect to education, the impact on participation is not significantly different from that of the reference group, therefore, the average level of educational attainment within an area did not influence whether respondents participated in heritage activities. With respect to frequency of participation, conditional on participation itself, those in Education bands 2 to 4 had a higher frequency of participation relative to Band 1, the reference group; this is not surprising if frequency of participation is positively correlated with educational attainment. What are surprising, however, are the impacts of the higher educational bands; their coefficients were not statistically different from the reference band.

Overall, some degree of caution must be exercised when making inferences on the impact of indices of deprivation on the various measures of demand for not only heritage but also the other cultural activities. One might assume (logically) that there should be a negative relationship between demand and the degree of deprivation, however, this would be based on the assumption that all those who reside in an area, in this case a super-output area, behave in a similar manner and in reality, this will not be the case as individual behaviours are not likely to be homogenous.

Table 4: Probit model of propensity to visit heritage sites in the last 12 months and ordered probit model of frequency of visits [8]

	Probit model of heritage participation	Ordered Probit model of heritage visits
	Marginal effect	*Coefficient*
Female	-0.0196	0.2070***
Age of respondent	0.0008	-0.0007
Education: reference group is 5 or more GCSE/O Level grades A*-C		
A levels, vocational level 3 & equivalents	0.1219**	0.0254
GCSE/O Level grade A* -C(< 5 A*-C) and L1 equivalents	-0.0776	0.1477*
Higher education & professional/vocational equivalents	0.3863***	-0.1394***
Other higher education below degree level	0.216***	-0.0277
Natural logarithm of income	0.0541**	-0.0141
Socio-economic group: reference group is higher managerial		
Employer	0.2078*	0.1796**
Intermediate occupations	-0.0305	0.1482**
Routine	-0.2282**	0.0342
Never worked or long term unemployed	-0.3568*	0.5078**
Economic activity: reference group is full time		
Long term sick or disabled	-0.3867***	-0.1280
Looking after family/home	0.0119	-0.2902***
Part time	0.1706***	-0.1172**
Retired from paid work	-0.1125	-0.1580**
Temporarily sick or injured	-0.6619**	-0.4609
Ethnicity: reference group is white	0.0000	0.0000
Asian	-0.5981***	0.4174***
Black	-0.6053***	0.4685***
Marital status: reference group is Single		
Widowed	0.0654	0.1752**
Divorced	0.1132*	-0.0926
Married and living with husband (or wife)	0.2616***	-0.0511
Number of adults in household	-0.0038	0.0515**
How many children under 16 live in this household?	-0.0768***	0.0637***
When growing up:		
Read books for pleasure/enjoyment	0.0360	-0.0795*
Went to museums or art galleries	0.0829*	-0.0515
Drew or painted	0.0977**	-0.0316
Went to theatre/dance/classical music performance	0.0252	-0.0820**
Wrote stories, poems, plays or music	0.3649***	-0.1846***
Went to historic sites	0.0827**	-0.015
Went to the library	0.0659	-0.0795*
Region: reference group is London		
East of England	0.1460*	-0.0566
South East	0.2053***	0.0001
East Midlands	0.2209***	-0.0741
West Midlands	0.2650***	-0.0667

[8] Truncated model. See Appendix 2 for full model.

North West	0.2762***	0.0171
South West	0.2922***	-0.0868
North East	0.3245***	-0.0091
Yorkshire and the Humber	0.4007***	-0.1440*
Newspaper readership		
Daily Express	0.3582***	0.1126
Daily Mail	0.0664	0.0053
Daily Mirror	0.0539	0.1608**
Daily Star	-0.3072***	-0.0372
Daily Telegraph	0.2811***	-0.0821
Financial Times	0.6674***	-0.2123
Local daily newspaper	0.0633	0.0273
Metro	0.0719	-0.1092
Other daily newspaper	0.3099*	-0.1651
The Guardian	0.3578***	-0.2950***
The Independent	0.4012***	-0.1256
The Sun	-0.1502***	0.1451**
The Times	0.5589***	-0.2100***
Constant	-0.0196	0.2070***
Month dummies	Yes	Yes
N	7764	4759
Pseudo R squared	0.1385	0.0378
Log likelihood	-3.61e+03	-6.36e+03

* p<.1; ** p<.05; *** p<.01

Section 7: Archive visits

Key findings

Archive or records offices

- Age, economic status and visiting historical sites when growing up are the main predictors of visiting an archive or record office as an adult.

For visits to archive centres, the headlines results are limited to age, economic status and visiting historical sites when growing up. In the case of age, the effect is positive. Similarly, visiting historical sites when growing up has a positive impact on the probability of visiting archive centres once in adulthood.

The results of the regression analyses with respect to participation and engagement in archives are presented in Table 5. Relative to other cultural categories, fewer independent variables are significantly different from 0. The first of these is the category female and the covariate age. Relative to male, female respondents were 10% less likely to have visited an archive or records centre in the previous 12 months. Similarly, females' frequency of participation is less given the coefficient of the variable in the third column of Table 5. The impact of age on participation is positive and the marginal effect is unity; for every additional year beyond 16, the likelihood of participation increases by 1%. For those who visited in the previous 12 months, age does not seem to have an effect on frequency of visits to archive centres.

The effects of educational attainment confirm prior expectations but few categories are significant. Those with less than five GCSE/O Levels at grade A* - C and on a trade apprenticeship were less likely to have visited an archive or records office in the previous 12 months. The summary of effects of educational attainment is that those with five or more GCSE/O Levels of grade A* - C or higher educational attainment were more likely to have visited an archive centre in the previous 12 months relative to those with lower educational attainment. The effect of education on visit frequency is limited and conditional on having visited in the last 12 months. There is little difference in frequency of participation given the various categories of educational attainment. The only category whose coefficient for frequency of participation was significantly different (lower) than other categories was other higher education below degree level.

For socio-economic groups and economic activity, the significant effects are limited to a small number of categories within these covariates. Small employers and own account workers were 24% more likely than other socio-economic groups to have visited an archive centre. The reasons underlying this significant difference are not theoretically obvious. Those in lower managerial and professional, and semi-routine occupations were likely to have a higher frequency of participation relative to other socio-economic groups.

For employment status, people who were long term sick or disabled, employed part time and retired from paid work were more likely, relative to those whose status is full time, to have visited an archive centre in the previous 12 months. The respective likelihoods are 36%, 18% and 21%. The ordered probit shows that, conditional on having participated, employment status does not influence the frequency of visits.

On household composition, those married and living with their husband or wife were 13% more likely than other marital status groups to have visited an archive centre in the previous 12 months. Those separated were likely to have the lowest frequency of visits amongst those who had been to an archive in the previous 12 months.
Those who reported to have written stories, poems, plays or music, or to have gone to historical sites as children had a higher propensity to visit archive centres (significant at the 10% and 5% levels).

There are some regional effects. For example those in the East Midland were the least likely to have visited an archive centre in the last 12 months relative to all the other groups; 33% less. For those that have attended in the last 12 months, those from the North East, West Midland, and Yorkshire and the Humber all had a lower visit frequency.

The final set of covariates is indices of deprivation. As with participation and engagement in heritage, only a very small number of these covariates' coefficients were significantly different from those of the reference group. These differences offer very little by way of a critical perspective on the impact of deprivation on the consumption of archives.

Table 5: Probit model of propensity to visit heritage sites in the last 12 months and ordered probit model of frequency of visits[9]

	Probit model of archive participation	Ordered Probit model of engagement
	Marginal effect	*Coefficient*
Female	-0.1018*	0.3808**
Age of respondent	0.0096***	0.0027
Education: reference group is 5 or more GCSE/O Level grades A*-C		
GCSE/O Level grade A* -C(< 5 A*-C) and L1 equivalents	-0.3573**	-0.0249
Other higher education below degree level	-0.0025	0.6359**
Trade apprenticeships	-0.4782***	0.0587
Socio-economic group: reference group is Higher managerial		
Lower managerial and professional	0.1032	-0.5598*
Small employers and own account workers	0.2415*	0.2332
Semi routine	0.1171	-0.6594*
Economic activity: reference group is fFull time		
Long term sick or disabled	0.3562**	0.5035
Part time	0.1758**	0.0776
Retired from paid work	0.2073**	-0.2327

[9] Truncated model. See Appendix 3 for full model.

Marital status: reference group is Single		
Married and living with husband (or wife)	0.1310*	0.1808
Married and separated from husband (or wife)	0.1210	0.9760**
Separated, but still legally in a same-sex civil partners	1.0232	-10.3434
When growing up:		
Wrote stories, poems, plays or music	0.1187*	-0.0065
Went to historic sites	0.1687**	-0.2235
Region: reference group is London		
East Midlands	-0.3339**	0.3495
North East	0.2170	0.7848**
West Midlands	-0.0997	0.6631**
Yorkshire and The Humber	0.1897	0.5822*
Constant	-2.3593***	
N	7725	364
Pseudo R squared	0.0884	0.1635
Log likelihood	-1.36e+03	-3.99.0262

* p<.1; ** p<.05; *** p<.01

Section 8: Conclusion

This paper presents a series of models on the participation and frequency of participation (engagement) of respondents to the DCMS Taking Part Survey in the cultural sectors of libraries, museums and galleries, heritage sites and archives. In assessing the likelihood of participation, a probit model is used and the covariates provide insight into the likelihood of participation, controlling for other factors. Given the nature of the covariates across the various years of the survey, only data from the 2008-09 period is used. This provides a sufficiently large number of observations for a robust analysis of participation.

In the case of libraries, we find that female participation is higher than that of their male counterparts; however, there was no significant difference with respect to frequency of participation. The covariates for educational attainment, economic activity, ethnicity and a range of cultural activities that the respondents did when growing up have causal effects on participation and frequency of participation. While there was no regional dimension of note, newspaper readership had a direct association inasmuch as; those who read broadsheet newspapers are more likely to use libraries.

In the case of museums and galleries, and heritage centres, the dominant covariates are sex, educational attainment, socio-economic group, ethnicity and newspaper readership. Many of these covariates, where significant, have the appropriate correlation. One of the key covariates is again, newspaper readership and those who read broadsheets dominate attendance at museums and galleries. Newspaper readership captures a series of characteristics that determine demand at museums and galleries. The impact of regions is also caught in the regression with London, the North East, and Yorkshire and The Humber having the highest frequencies of participation. While the index of deprivation has a role to play, the results are not as systematic as might be anticipated. One of the reasons for this is that, while SOAs can be ranked in order of deprivation based on various criteria, there is likely to be considerable variance within areas in terms of public behaviour. This heterogeneity is likely to reduce the correlation between deprivation and measures of participation, however, analysis of the indices' coefficients are still insightful when considering cultural demand.

Our models of demand for archive centres have the lowest explanatory measures of all those presented. With respect to individual covariates, many of those that are significant fall into the groups for education and economic activity. The roles of other covariates (indices of deprivation, region and socio-economic groups) are secondary. With respect to modelling the frequency of participation at archive centres, the relatively small number of valid observations, given the large number of covariates, means that caution should be exercised in viewing the results. Overall, the results of the analyses provide useful insights into the determinants of both participation and engagement in various cultural activities.

The results can be used to formulate policy with respect to widening participation in the area of arts and culture. On the whole, participation by some ethnic groups is substantively lower than the reference group white. This is a potentially sensitive area for policy makers. In attracting participants from non-white ethnic background, the positive values of consumption and participation in the various cultural domains need to be promoted. This is important in both the short and long term.

In the long term, policies around children's consumption also need to be formulated and implemented. The empirical evidence overwhelmingly implies that those who engage in cultural activities when growing up have a greater likelihood of participation in adulthood. A contributory factor to low participation in cultural activities is therefore likely to be lack exposure and involvement during childhood. Any strategy to engage children in culture and arts is likely to be effective if it involve the major stakeholders, some of which include the various culture and arts agencies and schools.

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Appendix 1: Full regression estimates for museum and gallery participation and engagement.

	Probit model of museum participation	Ordered Probit model of frequency of museum visits
	Marginal effect	*Coefficient*
Female	0.0399	0.1318***
Age of respondent	0.0009	0.0003
Education: reference group is 5 or more GCSE/O Level grades A*-C		
A levels, vocational level 3 & equivalents	0.0745	-0.0711
GCSE/O Level grade A* -C(< 5 A*-C) and L1 equivalents	-0.0540	-0.0396
Higher Education & professional/vocational equivalents	0.3126***	-0.3175***
Other Higher Education below degree level	0.1581***	-0.1453*
Other qualifications: level unknown	-0.2022**	0.1180
Trade Apprenticeships	0.0132	-0.0223
Natural logarithm of income	0.0301	0.0185
Socio-economic group: reference group is Higher managerial		
Employer	-0.0299	0.0510
Lower managerial and professional	-0.0709	0.1673**
Intermediate occupations	-0.1142	-0.0086
Small employers and own account workers	-0.1824**	0.2039**
Lower supervisory and technical	-0.2197***	0.1933*
Semi routine	-0.3550***	0.0134
Routine	-0.4374**	0.0631
Never worked or long term unemployed	-0.1805	-0.1101
Long term unemployed	0.0133	0.0078
Economic activity: reference group is Full time		
Long term sick or disabled	-0.0964	-0.1287
Looking after family/home	0.1315	-0.2023*
Part time	0.1958***	-0.1385**
Retired from paid work	0.0437	-0.1147
Student	0.2206	-0.0633
Temporarily sick or injured	-0.1031	-0.8953**
Ethnicity: reference group is white		
Asian	-0.3874***	0.3721***
Black	-0.3880***	0.1519
Mixed	0.0134	-0.2633
Other	0.0202	-0.1112
Marital status: reference group is Single		
Widowed	-0.0155	-0.0222
Divorced	0.0436	-0.0620
In registered same-sex civil partnership living with	0.1330	0.0400

part		
Married and living with husband (or wife)	0.0957**	-0.0531
Married and separated from husband (or wife)	0.0375	-0.2119*
Separated, but still legally in a same-sex civil partners	-0.5922	0.3634
Number of adults in household	-0.0078	0.0441
How many children under 16 live in this household?	-0.0069	0.0963***
When growing up:		
Read books for pleasure/enjoyment	0.1349***	-0.0477
Go to museums or art galleries	0.2154***	-0.1940***
Draw or paint	0.0318	-0.0841**
Go to theatre/see dance/classical music performance	0.0501	0.0356
Write stories, poems, plays or music	0.1261***	-0.1154**
Go to historic sites	0.2590***	-0.0408
Play musical instrument(s), act, dance or sing	0.0202	0.0618
Go to the library	0.0830*	-0.1172**
Region: reference group is London		
North East	0.2325***	0.0365
Yorkshire and The Humber	0.0271	0.1382
South West	-0.1669**	0.1837**
East of England	-0.0037	0.1855**
South East	-0.0235	0.1997**
North West	0.0919	0.2033**
West Midlands	-0.1753**	0.2111**
East Midlands	-0.0957	0.2340**
Newspaper readership		
Daily Express	0.0973	0.1530
Daily Mail	0.0512	-0.0350
Daily Mirror	-0.1024	0.1874*
Daily Star	-0.2895**	-0.0847
Daily Telegraph	0.3473***	-0.0949
Financial Times	0.5205***	-0.3357*
Local daily newspaper	0.1409**	-0.0611
Metro	0.2751***	-0.0851
Other daily newspaper	0.2337	-0.4657**
The Guardian	0.7468***	-0.4412***
The Independent	0.5019***	-0.3706***
The Sun	-0.2163***	0.2658***
The Times	0.5896***	-0.3702***
Income deprivation: reference group is Income Band 1		
Income Band 2	-0.0175	0.1122
Income Band 3	-0.0053	0.2415*
Income Band 4	0.1085	0.2596**
Income Band 5	0.0811	0.3090**
Income Band 6	0.0477	0.3329**
Income Band 7	0.1110	0.3399**
Income Band 8	0.1161	0.2329
Income Band 9	0.0853	0.2770*
Income Band 10	0.1116	0.3302**
Education deprivation: reference group Education Band 1		
Education Band 2	0.1059	-0.2456*
Education Band 3	0.0042	-0.2118
Education Band 4	0.2119**	-0.3357**
Education Band 5	0.1341	-0.3566**
Education Band 6	0.1417	-0.3160**
Education Band 7	0.1964*	-0.4713***
Education Band 8	0.1342	-0.4018***
Education Band 9	0.1668	-0.4319***
Education Band 10	0.2054*	-0.4161***

Crime deprivation: reference group is Crime Band 1		
Crime Band 2	-0.0789	0.2822***
Crime Band 3	-0.1327*	0.0222
Crime Band 4	-0.2040***	0.1236
Crime Band 5	-0.1219	0.1750*
Crime Band 6	0.0393	0.0723
Crime Band 7	-0.2075***	0.1689
Crime Band 8	-0.2037**	0.1187
Crime Band 9	-0.1785**	0.1132
Crime Band 10	-0.1796**	0.1490
Living deprivation: reference group is Living Band 1		
Living Band 2	-0.0298	-0.0447
Living Band 3	-0.0809	0.0297
Living Band 4	-0.0476	-0.0210
Living Band 5	-0.1327*	0.0092
Living Band 6	-0.2168***	0.1260
Living Band 7	-0.1460*	0.0927
Living Band 8	-0.2255***	0.0321
Living Band 9	-0.1131	0.1614
Living Band 10	-0.2127**	0.2830***
Constant	-0.9694***	
Month dummies	Yes	Yes
N	7749	3100
Pseudo R squared	0.1385	0.0729
Log likelihood	-4.63e+03	-3.79e+03

* p<.1; ** p<.05; *** p<.01

Appendix 2: Full regression estimates for heritage participation and engagement.

	Probit model of heritage participation	Ordered Probit model of frequency of heritage engagement
	Marginal effect	*Coefficient*
Female	-0.0196	0.2070***
Age of respondent	0.0008	-0.0007
Education: reference group is 5 or more GCSE/O Level grades A*-C		
A levels, vocational level 3 & equivalents	0.1219**	0.0254
GCSE/O Level grade A* -C(< 5 A*-C) and L1 equivalents	-0.0776	0.1477*
Higher Education & professional/vocational equivalents	0.3863***	-0.1394***
Other Higher Education below degree level	0.2162***	-0.0277
Other qualifications: level unknown		-0.0274
Trade Apprenticeships	0.0769	0.0529
Natural logarithm of income	0.0541**	-0.0141
Socio-economic group: reference group is Higher managerial		
Employer	0.2078*	0.1796**
Lower managerial and professional	0.0567	0.0566
Intermediate occupations	-0.0305	0.1482**
Small employers and own account workers	-0.0370	0.0685
Lower supervisory and technical	-0.0527	-0.0171
Semi routine	-0.1214	0.1325
Routine	-0.2282**	0.0342
Never worked or long term unemployed	-0.3568*	0.5078**
Long term unemployed	-0.0785	0.0363
Economic activity: reference group is Full time		
Long term sick or disabled	-0.3867***	-0.1280
Looking after family/home	0.0119	-0.2902***
Part time	0.1706***	-0.1172**
Retired from paid work	-0.1125	-0.1580**
Student	0.0766	-0.0290
Temporarily sick or injured	-0.6619**	-0.4609
Ethnicity: reference group is white		
Asian	-0.5981***	0.4174***
Black	-0.6053***	0.4685***
Mixed	0.0181	0.1726
Other	-0.0551	0.2496
Marital status: reference group is Single		
Widowed	0.0654	0.1752**
Divorced	0.1132*	-0.0926
In registered same-sex civil partnership living with	-0.0173	0.2867

part		
Married and living with husband (or wife)	0.2616***	-0.0511
Married and separated from husband (or wife)	0.0731	0.0081
Separated, but still legally in a same-sex civil partners	0.0355	0.6486
Number of adults in household	-0.0038	0.0515**
How many children under 16 live in this household?	-0.0768***	0.0637***
When growing up:		
Read books for pleasure/enjoyment	0.0360	-0.0795*
Go to museums or art galleries	0.0829*	-0.0515
Draw or paint	0.0125	-0.0040
Go to theatre/see dance/classical music performance	0.0977**	-0.0316
Write stories, poems, plays or music	0.0252	-0.0820**
Go to historic sites	0.3649***	-0.1846***
Play musical instrument(s), act, dance or sing	0.0827**	-0.0158
Go to the library	0.0659	-0.0795*
Region: reference group is London		
East Midlands	0.2209***	-0.0741
East of England	0.1460*	-0.0566
North East	0.3245***	-0.0091
North West	0.2762***	0.0171
South East	0.2053***	0.0001
South West	0.2922***	-0.0868
West Midlands	0.2650***	-0.0667
Yorkshire and The Humber	0.4007***	-0.1440*
Newspaper readership		
Daily Express	0.3582***	0.1126
Daily Mail	0.0664	0.0053
Daily Mirror	0.0539	0.1608**
Daily Star	-0.3072***	-0.0372
Daily Telegraph	0.2811***	-0.0821
Financial Times	0.6674***	-0.2123
Local daily newspaper	0.0633	0.0273
Metro	0.0719	-0.1092
Other daily newspaper	0.3099*	-0.1651
The Guardian	0.3578***	-0.2950***
The Independent	0.4012***	-0.1256
The Sun	-0.1502***	0.1451**
The Times	0.5589***	-0.2100***
Income deprivation: reference group is Income Band 1		
Income Band 2	-0.0997	0.0278
Income Band 3	0.1982**	0.2283**
Income Band 4	0.1560*	0.1182
Income Band 5	0.1213	0.0544
Income Band 6	0.2624**	0.0806
Income Band 7	0.2612**	0.0462
Income Band 8	0.2255**	-0.0235
Income Band 9	0.2985**	-0.0748
Income Band 10	0.2870**	-0.0171
Education deprivation: reference group Education Band 1		
Education Band 2	0.0669	-0.2120**
Education Band 3	-0.0319	-0.2188**
Education Band 4	0.1437	-0.2156**
Education Band 5	0.1986**	-0.1531
Education Band 6	0.1458	-0.1450
Education Band 7	0.1752	-0.1426
Education Band 8	0.1603	-0.1640
Education Band 9	0.1188	-0.1040
Education Band 10	0.1676	-0.1783

Crime deprivation: reference group is Crime Band 1		
Crime Band 2	-0.0183	-0.0259
Crime Band 3	0.0359	0.0571
Crime Band 4	-0.1216	0.0724
Crime Band 5	-0.0946	0.0132
Crime Band 6	-0.0857	-0.0313
Crime Band 7	-0.0553	0.0576
Crime Band 8	-0.1338	0.0389
Crime Band 9	-0.0061	-0.1346
Crime Band 10	-0.0343	-0.0172
Living deprivation: reference group is Living Band 1		
Living Band 2	0.0266	0.0148
Living Band 3	-0.1038	0.0425
Living Band 4	-0.0127	-0.1013
Living Band 5	0.0599	-0.0532
Living Band 6	-0.0539	-0.0362
Living Band 7	-0.0343	0.0350
Living Band 8	0.0152	0.0374
Living Band 9	-0.0269	0.1053
Living Band 10	-0.0936	0.1413*
Enjoy visiting place of heritage (1: awful – 10 brilliant)		
2		-0.0934
3		0.5281
4		0.5700
5		0.2839
6		0.4205
7		0.3548
8		0.2967
9		0.2663
10		0.2135
Constant	-0.0196	0.2070***
N	7764	4759
Pseudo R squared	0.1385	0.0378
Log likelihood	-3.61e+03	-6.36e+03

* p<.1; ** p<.05; *** p<.01

Appendix 3. Full regression estimates for archive participation and engagement.

	Probit model of archive participation	Ordered Probit model of engagement
	Marginal effect	*Coefficient*
Female	-0.1018*	0.3808**
Age of respondent	0.0096***	0.0027
Education: reference group is 5 or more GCSE/O Level grades A*-C		
A levels, vocational level 3 & equivalents	-0.0905	0.0730
GCSE/O Level grade A* -C(< 5 A*-C) and L1 equivalents	-0.3573**	-0.0249
Higher Education & professional/vocational equivalents	0.1013	0.0961
Other Higher Education below degree level	-0.0025	0.6359**
Other qualifications: level unknown	-0.0035	0.5150
Trade Apprenticeships	-0.4782***	0.0587
Natural logarithm of income	0.0057	0.0925
Socio-economic group: reference group is Higher managerial		
Employer	-0.0712	-0.0081
Lower managerial and professional	0.1032	-0.5598*
Intermediate occupations	0.0978	-0.3298
Small employers and own account workers	0.2415*	0.2332
Lower supervisory and technical	0.0858	-0.2205
Semi routine	0.1171	-0.6594*
Routine	-0.0652	-0.0946
Never worked or long term unemployed	-0.3117	7.1381
Long term unemployed	0.1095	-0.5096
Economic activity: reference group is Full time		
Long term sick or disabled	0.3562**	0.5035
Looking after family/home	0.0258	0.2393
Part time	0.1758**	0.0776
Retired from paid work	0.2073**	-0.2327
Student	0.0306	-0.3245
Ethnicity: reference group is white		
Asian	-0.2396	0.6138
Black	-0.2055	-0.5225
Mixed	0.1010	-0.7131
Other	-0.1288	8.2136
Marital status: reference group is Single		
Widowed	-0.1065	0.4800
Divorced	0.0492	-0.3033
In registered same-sex civil partnership living with part	-0.1746	7.9246
Married and living with husband (or wife)	0.1310*	0.1808
Married and separated from husband (or wife)	0.1210	0.9760**
Separated, but still legally in a same-sex civil partners	1.0232	-10.3434

Number of adults in household	-0.0221	0.0157
How many children under 16 live in this household?	-0.0277	0.1455
When growing up:		
Read books for pleasure/enjoyment	-0.0272	-0.2971
Go to museums or art galleries	-0.0216	0.1316
Draw or paint	-0.0462	-0.0491
Go to theatre/see dance/classical music performance	0.0373	0.0668
Write stories, poems, plays or music	0.1187*	-0.0065
Go to historic sites	0.1687**	-0.2235
Play musical instrument(s), act, dance or sing	-0.0272	0.2495
Go to the library	0.0239	0.0795
Region: reference group is London		
East Midlands	-0.3339**	0.3495
East of England	0.0458	0.0479
North East	0.2170	0.7848**
North West	-0.0693	0.2288
South East	0.0260	-0.1363
South West	0.0520	0.3892
West Midlands	-0.0997	0.6631**
Yorkshire and The Humber	0.1897	0.5822*
Newspaper readership		
Daily Express	-0.0605	0.1600
Daily Mail	0.0569	0.5887**
Daily Mirror	-0.1277	0.4800
Daily Star	-0.2943	0.2891
Daily Telegraph	0.1962*	0.6571**
Financial Times	-0.0559	0.6580
Local daily newspaper	0.1561	0.2803
Metro	0.0269	0.2957
Other daily newspaper	-0.0414	2.0314**
The Guardian	0.0772	0.8348**
The Independent	0.2149	0.9418**
The Sun	-0.0923	0.5754*
The Times	0.1283	0.5412*
Income deprivation: reference group is Income Band 1		
Income Band 2	-0.2747**	0.3743
Income Band 3	-0.0830	-0.7940**
Income Band 4	-0.3350**	-0.0167
Income Band 5	-0.0834	-0.2282
Income Band 6	-0.2450	-0.3790
Income Band 7	-0.1396	0.2365
Income Band 8	-0.0159	0.3963
Income Band 9	-0.0177	-0.1537
Income Band 10	-0.1932	-0.0292
Education deprivation: reference group is Education Band 1		
Education Band 2	0.2757*	-0.1381
Education Band 3	0.1215	-1.1293**
Education Band 4	-0.0015	-0.8134
Education Band 5	0.0518	-0.3200
Education Band 6	-0.1919	-0.6707
Education Band 7	-0.0291	-0.3373
Education Band 8	-0.0225	-0.5836
Education Band 9	0.1193	-0.1773
Education Band 10	-0.0463	-0.5132
Crime deprivation: reference group is Crime Band 1		
Crime Band 2	0.2141*	-0.4715
Crime Band 3	0.1042	0.0015
Crime Band 4	0.0776	0.9081**
Crime Band 5	0.1290	-0.1629

Crime Band 6	-0.0972	-0.4562
Crime Band 7	0.1303	0.1529
Crime Band 8	0.1648	-0.3876
Crime Band 9	0.1098	-0.1254
Crime Band 10	-0.0393	-0.0613
Living deprivation: reference group is Living Band 1		
Living Band 2	0.3333***	0.0196
Living Band 3	0.0776	-0.2316
Living Band 4	0.0504	-0.3820
Living Band 5	-0.1432	-0.5569
Living Band 6	-0.0543	-0.1830
Living Band 7	-0.0460	-0.5881
Living Band 8	0.0122	-0.4518
Living Band 9	-0.1045	-0.2303
Living Band 10	-0.0326	-0.0624
Constant	-2.3593***	
N	7725	364
Pseudo R squared	0.0884	0.1635
Log likelihood	-1.36e+03	-3.99.0262

* p<.1; ** p<.05; *** p<.01

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