Spatial Equity and Cultural Participation: How Access Influences Attendance at Museums and Galleries in London

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Abstract

This paper addresses how neighbourhoods operate as opportunity structures in enabling cultural participation, and therefore how unequal access to cultural facilities might affect differences in levels of participation and profiles of participants. There is an extensive literature on neighbourhood effects which identifies how where people live can affect their life chances, including their participation in a range of activities, but this has not been applied to cultural participation. Sociological theory explores the importance of social stratification of cultural consumption, but has largely ignored the role of place. In this paper the explanations of cultural participation offered by the existing sociological literature are extended to incorporate the influence of access to cultural infrastructure.

An innovative accessibility index for museums and galleries in London, using online searches to account for their attractiveness, is linked to the Taking Part Survey, and used in a logistic regression model predicting attendance. Alongside social stratification, the model identifies characteristics of the neighbourhood that are significant, including deprivation, access to public transport, and, importantly, access to museums and galleries. Improved access has a strong positive relationship with

attendance, which varies according to the qualifications and ethnic group of the respondent: those with degrees are most likely to attend, but the relationship with access also operates for those with fewer qualifications, who according to dominant explanations have little disposition to attend. The implications of the substantial spatial inequity in investment in museums and galleries is discussed.

Introduction

Explanations of whether or not people participate in culture in the UK are dominated by sociological theory, especially Bourdieu's theorisation of how cultural tastes originate in and perpetuate social stratification. Bourdieu argues that cultural tastes and practices are socially constructed and performed: higher status groups differentiate themselves – or gain "distinction" (Bourdieu 1984) – by consuming "legitimated" culture. Thus cultural consumption is thought to play an important role in reinforcing social hierarchies.

However, this literature has largely ignored the influence of place on cultural participation, both theoretically and empirically (Widdop 2010, Gibson 2010). Studies that have included some measure of place have concluded that different levels of participation are driven by different local populations (Chan and Goldthorpe 2005) or do not discuss the implications of their findings (Gayo-Cal, Savage and Warde 2006, Savage 2006). There are more recent empirical studies which are explicitly interested in geography (Cunningham and Savage (2015), Widdop and Cutts (2012) as well as the AHRC-funded Understanding Everyday Participation project) but they do not examine the effect of supply of local opportunities for cultural consumption.

The key argument of mainstream sociological literature on cultural consumption is that aesthetic judgements are socially constructed rather than a matter of objective fact, and cultural engagement is less a matter of personal taste, rather, "subjects...internalize objective structures and rearticulate them as free choices" (Wilson 1988). However, social hierarchies are not the only structure that might affect cultural participation. The geographical literature on accessibility addresses "the freedom of individuals to decide whether or not to participate in different activities" (Burns 1979). Both these literatures might be said to discuss how apparent personal choices are in fact proscribed, one by social processes and the other by the characteristics of the places that we live.

The analysis of accessibility is bound up with considerations of spatial equity, comparing the distribution of public services to perceived need, with a concern that "policies and programmes should be judged on the extent to which they serve to eliminate or at least reduce (rather than increase or create) such inequities" (Hay 1995). However, cultural policymakers have neglected to consider, or perhaps been chosen to avert their gaze from, the effect on participation of the geography of their funding decisions, which has meant that in 2012/2013 London received 15 times as much central government funding per head as the rest of England (Stark, Gordon and Powell 2013). The only policy analysis which attempted to assess the impact of supply of cultural infrastructure on participation levels concluded that changes in supply had only a limited effect on participation, despite acknowledging that their measure of supply was weak (Marsh et al. 2010). This inattentiveness to the spatial equity of cultural funding has been put under the spotlight by the recent Culture, Media and Sport Select Committee enquiry into the work of Arts Council England which

criticised the "unfair geographical distribution of arts funding" and concluded that "more needs to be done" to address this imbalance (Culture Media and Sport Select Committee 2014).

There has been some empirical analysis, however, which suggests that supply of cultural infrastructure is indeed influential on attendance (Houston and Ong 2013, Brook 2013, Brook, Boyle and Flowerdew 2010, de Graaf, Boter and Rouwendal 2009), but these are ecological analyses using box office data, so they assume that attenders from an area are representative of that area, which may vary by area, and can't account for individuals' socio-demographic characteristics or behaviour.

There are established methodologies in human geography for analysing the characteristics of different areas, including their access to services such as health centres or green spaces, and the impact that these have on the life chances of residents. Access is a multidimensional concept – a facility can be accessible spatially, financially, culturally or physically. Nonetheless, spatial accessibility alone is a meaningful measure of local provision which interacts with other factors to provide information on enabling resources or "opportunity structures" (Apparicio et al. 2008), "socially constructed and socially patterned features of the physical and social environment which may promote or damage" the lives of residents "either directly, or indirectly through the possibilities they provide" (Macintyre, Ellaway and Cummins 2002).

These neighbourhood effects are often discussed as being either compositional (ie due to the socio-demographic characteristics of the population) or contextual (due to other characteristics of an area, such as levels of pollution, or access to jobs, transport

or other services) (Galster 2011). The tendency to conceptualise these causal explanations separately implies that they are mutually exclusive or in opposition to one another, whereas in many cases they are likely to be reinforcing and interacting with one another (Macintyre et al. 2002).

People's lives (their health, family breakdown or educational outcomes) are shaped by the area that they live in. In the case of arts attendance, a person living in an area might be more likely to attend both because there is a good level of local provision and because friends and neighbours are attending, which builds a social norm of doing so and makes it more likely that this behaviour is passed on to children. Thus it is evident that theories of neighbourhood effects do not contradict or replace sociological theories of social stratification, but rather explore how they operate in space, and how access to services and other spatial factors interact with them.

Drawing on these theories, and attendance to museums and galleries in London as a case study, this paper asks: can a neighbourhood effect be identified beyond the compositional effect of the spatial distribution of different population groups? Does good access to museums and galleries increase the probability of attendance, once other factors, such as age and education, are accounted for? Is this effect found in all population groups, or are there some groups for whom cultural facilities are an opportunity to engage, and others for whom lack of cultural capital means that spatial accessibility does not overcome their lack of disposition, in sociological terms?

Data and Methods

Attendance data

The most comprehensive data available on arts attendance in England is the Taking Part survey, a continuous survey commissioned by the Department for Culture, Media and Sport (DCMS). Since 2006 the total number of respondents has reached over 100,000. As there have not been significant movements in the supply of museums and galleries in London in that time, four years' worth of data, to 2009, is used for analysis here. The main sample was designed to be representative for each English region, but additional data collection was carried out in London in order to boost the number of ethnic minority respondents: this makes the sample from London particularly rich[1].

In relation to museums and galleries, the survey asks whether the respondent has attended in the last 12 months (not for work or study), and if so, how frequently they have done so. They are also asked whether they were taken to museums and galleries as a child, which has been found to be independently significant in predicting attendance, although the characteristics of the parents taking the children are themselves highly correlated with other characteristics of attendance (Oskala et al. 2009). The sample from the four-years-worth of data from London is 12,100 respondents, and the proportion attending a museum or gallery in the past 12 months is 50% (having accounted for the population weighting applied to the sample), of whom 53% had attended more than once in the given year.

[1] As ethnicity is one of the independent variables to be controlled for in the regression model, this oversampling need not create problems in the analysis. This was tested by running the models with and without the population weighting: the differences in the results were trivial. In addition, the number of respondents in different years varied: to test whether the larger sample in 2005-2006 was skewing the results a fixed effect for each year was added to the model but this was not significant.

In order to incorporate access to cultural facilities in modelling this survey data, special access was given to the 2001 Census Output Area (OA) of each respondent. This small geographic unit is designed to contain a comparable number of households: in London there are approximately 125 households per OA. It is of course possible that people who like to attend museums and galleries choose to live in areas with good access to the, i.e. this is a selection effect of people moving to areas with good access, rather than an effect of the access provided by the area. While this cannot be ignored, respondents are asked what they liked about their neighbourhood, and only 8% spontaneously mentioned access to museums and galleries. Moreover, this answer was not strongly determinant off whether or not respondents attended: 47.4% % of those who did not mention it still attendant museums or galleries, compared to 62.9% of those who did mention it. Furthermore, as approximately half of those that attended did so only once a year this is a relatively infrequent activity to determine choice of neighbourhood.

Other data about the area was appended which represented two important factors that might affect the accessibility of a local cultural facility, as well as its proximity. Access to public transport was incorporated using Transport for London's Public Transport Accessibility Index (Transport for London 2010) which calculates the access that residents have to train, tube, tram, DLR and bus stops within the capital, aggregated to OA (access to a car is accounted for within the survey). Also, area deprivation could mean that it is less attractive to go out for leisure visits, or that it has few other facilities which might contribute to accessibility in a broader sense. This

was accounted for using the 2007 Indices of Multiple Deprivation (IMD) (Noble et al. 2008)[2].

Accessibility index

In order to account for cultural opportunities available to respondents an accessibility index was created for museums and galleries in London. As discussed in Brook (2013) information on cultural infrastructure has not been collected by cultural policymakers, which made the calculation of an accessibility index more challenging: innovative methods were applied in order to attempt to measure the spatial distribution of museums and galleries.

There are a number of approaches calculating accessibility indices (Talen and Anselin 1998, Handy and Niemeier 1997). The "container" approach, which counts the number of facilities within a given geographic area, was used by the DCMS in attempting to model supply in Culture and Sport Evidence programme (Marsh et al. 2010). However, it assumes that all facilities within an area are equally accessible and can only be used by residents of the same area, which is not true of cultural facilities. Here we used a gravity measure, which calculates the distance between each facility and residential area, and weights this according to the facility's size or attractiveness. Formally this is expressed as (Plane and Rogerson 1994):

$$A_i = \sum_j (W_j / d_{ij})$$

[2] The IMD are commonly used to summarise a basket of measures of the poverty, crime rates, health problems and so on encountered in each area. While each measure, and others, could be used individually, they tend to correlate with one another, as well as with social status and education, which means it necessary only to include the measures expected to have the greatest explanatory power.

where A_i is the accessibility index for OA *i*, d_{ij} is a function of the cost of travel or distance from the population centroid of OA *i* to the postcode of venue *j*, and W*j* is a weighting for venue *j*, normally a measure of the size of the venue. Size is found to relate to the attractiveness of the destination, which relates it to Newton's theory of gravity. This type of index is continuous over space so it is not affected by artificial administrative boundaries, and it allows us to account for access to a larger number of facilities over a greater spatial range: we know that distance is important in deciding whether to visit a museum, but people will not necessarily visit the closest facility (Morris Hargreaves Mcintyre 2007). The Euclidian or as-the-crow-flies distance is used, as in metropolitan areas this has a strong correlation with network (road) distance (Apparicio et al. 2008).

A list of museums and galleries was created by combining and geocoding the accredited museums supplied by ACE (2011) with a list of members from the Museums and Galleries Yearbook. The accredited list in London provided 134 facilities, including most of the larger sites, but with some important omissions. Incorporating the yearbook data extended the list to 205 facilities: the additional sites were mostly small but included a few larger omissions from the accredited list. The definition of what constitutes a museum or gallery is not specified – each list includes some sites that are primarily heritage destinations, such as the Hampton Court, but which have some significant museum or gallery function. It does not include entirely commercial galleries, even from the Museums and Galleries Yearbook (where membership is self-selecting).

More complicated was to measure each facility's size/attractiveness. The obvious metric to use would be visitor numbers. However, such figures are only published for

a few, larger sites: 38 in London in 2013, compared to the total of 205 sites. Moreover the variation in collection methods and quality of data collection for these means that they can be unreliable (Creigh-Tyte and Selwood 1998). Financial turnover measures from Companies House or Charity Commission were considered, but were not available for many facilities, and they would penalise smaller galleries relying on volunteers.

The solution was to use the number of times a facility was searched for on Google. This has been validated against survey data and media analysis as being strongly related to public attention and private consumption (Ripberger 2011, Vosen and Schmidt 2011, Choi and Varian 2012). Google helps potential advertisers to estimate the amount of traffic they might receive for particular search terms. It returns, for a given search term (for example "National Portrait Gallery") the average number of times per month that term has been searched for over the past year, from within the UK (as it is attractiveness to UK residents rather than tourists that interests us here – although we cannot exclude searches carried out by tourists after they arrive here). This metric has not to our knowledge been used previously in assessing the attractiveness of public facilities, but it is being used in the tourism literature to understand search strategies (Pan and Li 2011). Moreover, Google Trends, which presents changes in these search frequencies over time, is being used to track disease outbreaks (Ginsberg et al. 2008) and public opinion trends (Mellon 2013, Mccallum and Bury 2013). While internet access is not universal, variations are mostly related to age, so that by 2013 95% of the working age population in the UK had used the internet, compared to 39% of those aged 75 or more (Greater London Authority 2013).

While this is not a perfect measure of attractiveness, it has the advantage of consistency and is theoretically justifiable as a proxy for the attractiveness of facilities, as it relates to the level of interest in a museum or gallery, and to an intention to attend. It was validated by comparing the mean Google searches to the partial visitor number data available, which found that the top 10 museums according to this metric are also the top ten museums and galleries visited in London (Association of Leading Visitor Attractions 2012). Google searches have been found to generate similar accessibility indices to visitor figures for museums and galleries in Scotland (Brook 2015).

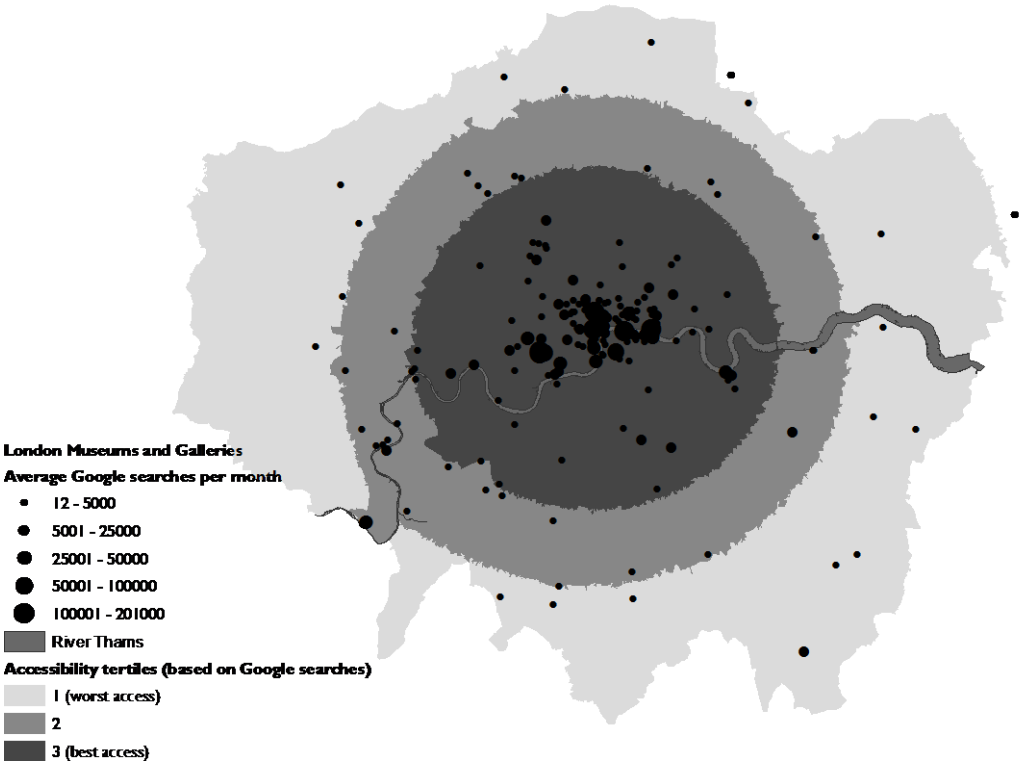
In a few cases it was necessary to aggregate searches for more than one term, for example "Victoria and Albert Museum" and "V&A". Where there were too few searches per month for Google to provide an average, the facility was assigned the minimum number, or deleted if it proved to be not open to the public (for example a university collection where access is gained by writing to the curator).

Calculating the sum for each OA of the attractiveness of each facility divided by the log of the distance[3] to that facility, as represented above, gives the accessibility index mapped in Figure 1, which also shows the size and attractiveness of each facility as point data. The OAs have been assigned to tertiles, so that the 33% of OAs in London with the best access to museums and galleries are in the highest tertile, and the 33% with the worst are in the lowest. This in part aids visualisation and analysis, but also, as will be discussed, the effect of access is not linear. The concentration of the best

[3] The distance is usually logged as the distance decay of use of facilities is not linear – the further away someone lives from a facility, the less of a difference them living an extra 1km makes. In this case both logged and untransformed distance were compared, with little difference to the model.

access to museums and galleries within inner London has two causes. First, there are some exceptionally large museums and galleries based in central London, and few large ones outside that area. Second, the same patterning would be seen if the museums and galleries were of a similar size, due to central London being the geographical centre of the museums and galleries. When we include the accessibility index in a regression model, below, it is in fact significantly better at predicting attendance than a simple measure of distance from central London, which was also the case with a similar index of access to performing arts venues in London (Brook et al. 2010).

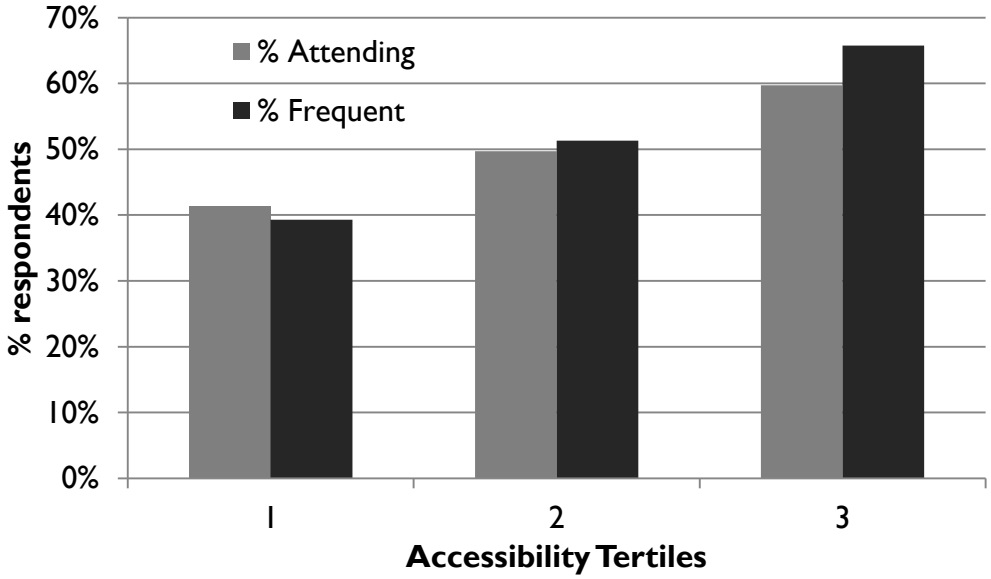
Figure 1: London Museums and Galleries, and Accessibility Index



These accessibility tertiles were appended to the Taking Part survey responses. For each accessibility tertile the percentage of residents attending was calculated, shown in Figure 2. This simple cross-tabulation suggests that access to facilities indeed has a strong impact on attendance: people living in the highest tertile are almost 50% more

likely to attend than those in the lowest tertile (41% vs. 60%) and over 60% more likely to attend more than once (39% vs. 66%). However, the populations of the areas in each tertile will be different, which needs to be controlled for using a multivariate regression model.

Figure 2: Percentage attending museums and galleries in London



Logistic Regression

As the outcome of interest, having attending a museum/gallery or not in the last 12 months, is binary, the appropriate approach is a logistic regression, which models the probability of a positive outcome, and for each independent variable reports their statistical significance in predicting the outcome (how reliably changes in their value match with changes in the behaviour of interest) as well as the strength of the relationship between the variable and the outcome– how much more or less likely a positive outcome is.

The model for attendance to museums and galleries is shown in Table 1. Not all 12,100 observations were included because of missing values. These particularly affected the question on whether respondents were taken to museums and galleries as a child, which was only asked of part of the sample, but was retained because of its hypothetical contribution to attendance, its strong effect in previous research (Widdop and Cutts 2012, Oskala et al. 2009) and because it was found to be highly independently significant in this model . By contrast, income level was not retained as it had a high level of missing values, was not significant, and was highly correlated with other measures.

Other relevant variables are: highest educational qualification, which is used in three categories: none, covering those with no qualifications up to those with fewer than 5 GCSEs, the least standard which 16-year-olds are expected to have reached in England; the medium, reference category, covering those with 5 GCSEs or any higher level of secondary school qualifications; and degree or above, covering those with at least an undergraduate degree. Social status is incorporated using the National Statistics Socio-economic Classification (NS-SEC), which categorises the social status of people according to their occupations: levels 1 and 2 of NS-SEC encompass managerial and professional occupations, and levels 7 and 8 represent unskilled labour and those in long term unemployment: there are separate categories for full-time students and those who have never worked, also incorporated here (Rose, Pevalin and O'Reilly 2005).

The model demonstrates, as expected from the literature, that the variable with the strongest effect on museum and gallery attendance is having a degree-level qualification (which increases the odds of attending more than three times, compared to having

secondary school level qualifications). Having been taken as a child is also very strongly predictive of attendance, even having controlled for educational attainment and social status, both of which have a strong generational transfer. Social status/occupational status is also itself significant, agreeing with the social cleavages identified in the sociological literature. Area deprivation does indeed have a significantly negative effect on attendance, and access to transport a positive one, although access to a car is not quite statistically significant.

A very strong negative effect is found for Black and minority ethnic respondents, consistent with the findings of Widdop and Cutts (2012), and with a qualitative study of BME communities in Liverpool they cite, which found that many did not expect that exhibitions would reflect their culture, and if they did, they would be presented to attract a white middle class clientele (Smith, 2006).

Table 1: Logistic regression model results, attending a museum/gallery in London

Log likelihood = -3646.72 Pseudo R^2= 0.178 n=6411

Independent variable	Coefficient	Std.Err.	OR[4]
Occupational group (base: NS-SEC 3-6)			
NS-SEC 1-2	0.339***	0.071	1.40
NS-SEC 7-8	-0.266*	0.111	0.77
Full Time Student	0.196	0.105	1.22
Never Worked	-0.627***	0.129	0.53
Highest Educational Qualification (base: GCSE/A levels)			
No qualifications	-0.783***	0.162	0.46
Degree or above	1.136***	0.137	3.11
Black, Asian and Minority Ethnicity (BAME)	-0.552***	0.085	0.58
BAME x No quals	0.202	0.175	1.22
BAME x Degree	-0.517***	0.134	0.60
Accessibility Tertile (base: med. Access)			
1 (worse access)	-0.434***	0.099	0.65
3 (best access)	0.311**	0.102	1.37
1 x No qualifications	0.181	0.195	1.20
1 x Degree	-0.347*	0.160	0.71
3 x No qualifications	-0.085	0.197	0.92
3 x Degree	0.216	0.163	1.24
Indices of Multiple Deprivation[5]	-1.159***	0.167	0.56
Public Transport Accessibility Index[4]	0.532*	0.217	1.30
Female[6]	0.216***	0.059	1.24
Aged 65 plus	-0.259**	0.089	0.77
Has access to a car	0.121	0.066	1.13
Has Children	0.108	0.063	1.11
Taken to museums as a child	0.647***	0.059	1.91
Constant	-0.980***	0.141	0.38

[4] Odds Ratio: the difference that a respondent being in this category compared to the reference category makes to their odds of attending, if all other values stay the same.

[5] Rescaled so that the mean value was 0 and the range was 1 (from -.5 to .5). In this case the odds ratio is the difference that living in the middle vs. at the top of the range makes to the odds of attendance.

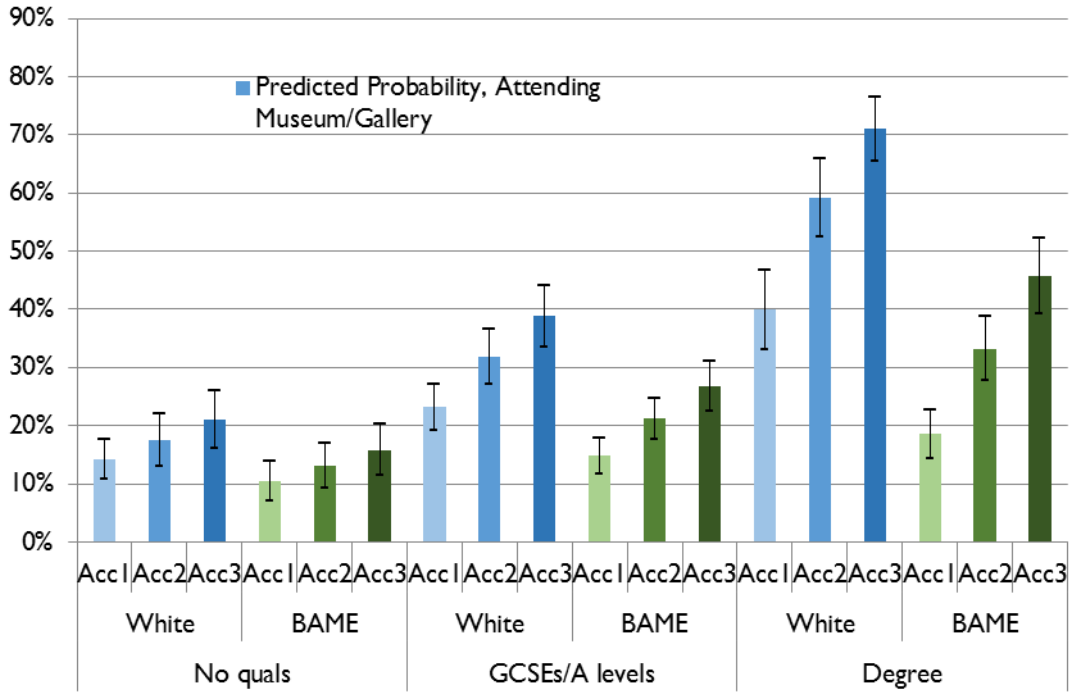
[6] These are binary variables with the reference category being their reciprocal: Male, Aged 18-54, no access to a car, no dependent children in the household, and not taken to museums as a child.

* significant at p=.05, ** significant at p=.01, *** significant at p=.001

In addition to the expected social stratification, a new and important contribution in this model is supplied by the accessibility index[7]. The significant effect of accessibility can be seen in the coefficients for each tertile. Moreover, a significant interaction between access and education was also found: the strength of the effect of access was dependent on the educational qualifications of the respondents. There was also a significant relationship between ethnic minority membership and qualification levels. Such interactions are most easily interpreted by using the model parameters to predict each group's probability of attending a museum or gallery in London. These estimates are shown in Figure 3, along with the 95% confidence intervals for the predictions.

[7] Given that the accessibility index is similar to a measure of distance from central London there may be a concern that it is correlated with other socio-economic factors. However, area deprivation and social status are both accounted for in the model, as is access to public transport. Income is not included as it was not significant, has only a correlation of .02 with the accessibility tertiles.

Figure 3: Predicted probabilities for attending museums and galleries in London



As would be expected from Figure 3, the black and minority ethnic respondents have a lower predicted probability of attendance compared to white respondents; those in the lowest accessibility tertile have a lower likelihood of attendance than those in the highest; and the probability of attending increases with the level of qualifications. The effect of the interactions can be seen in the differences in predicted probabilities for those with no qualifications (both black and white respondents) compared with the much steeper (and more statistically significant) gradient for those with a degree. The greatest difference is found for black and minority ethnic respondents with a degree, where those with the best access are almost 2.5 times more likely to attend compared to those with the worst (46% vs. 19%).

Given this important finding, to further understand the effect of access to a venue, as well as other socio-economic variables a second model was created which predicted

those attending a museum or gallery more than once in the given year, compared to one-time attenders. The results are shown in Table 2.

Table 2: Logistic regression model, attending museums in London > once a year

Log likelihood = -1923.7935	Pseudo R^2=	0.082	n=3025
Independent variable	**Coefficient**	**Std.Err.**	**OR**
Occupational group (base: NS-SEC 3-6)			
NS-SEC 1-2	0.062	0.092	1.06
NS-SEC 7-8	-0.170	0.186	0.84
Full Time Student	0.159	0.146	1.17
Never Worked	-0.666**	0.245	0.51
Highest Qualification (base: GCSE/A levels)			
No qualifications	-0.319*	0.147	0.73
Degree or above	0.628***	0.090	1.87
Accessibility Tertile (base: med. Access)			
1 (worse access)	-0.365***	0.106	0.69
3 (best access)	0.404***	0.098	1.50
BAME (ref: White)	-0.650***	0.091	0.52
Indices of Multiple Deprivation	-0.122	0.227	0.94
Public Transport Accessibility	0.243	0.293	1.13
Has access to a car	-0.211*	0.091	0.81
Female	0.202*	0.079	1.22
Aged 65 Plus	0.120	0.133	1.13
Taken as a child	0.309***	0.087	1.36
Has children	-0.238**	0.084	0.79
Constant	-0.211	0.144	0.81

Table 2 shows that many of the cleavages that explain museums and galleries attendance as a binary outcome are less salient in explaining frequency of attendance: occupational status is not significant in distinguishing frequent attendance, neither is age. The relationships with educational attainment and having been taken as a child in are still significant though less strongly predictive of frequent attendance, compared to

the prediction of attendance per se. The area-level variables of deprivation and access to public transport are not significant in this model. There are no interactions included in this model, as in this case they were not significant. However, the significant relationship with the accessibility measure remains strong: using the model to predict frequent attendance as we did for Figure 3, those with best access to venues are 1.5 times as likely to attend frequently as those with worst access, holding all other variables equal.

It should be acknowledged that in neither case is the explanatory power of the models especially high, with pseudo-R^2 of .178 and .082 predictions respectively. To some extent, this is to be expected with individual-level models, where there is a great deal of random variance associated with personal preference and chance events, rather than the structural factors that we are modelling. In a model aggregated to geographic areas, for example, such differences are averaged out, so that "population-level differences … can be entirely explicable by causal factors that appear to account for only a small proportion of individual-level risk" (Smith 2011). Moreover, the failure of the model to explain a higher proportion of attendance behaviour is important in itself: the sociological theories relating to social stratification, in academic terms, or the popular discourse of culture being "not for the likes of me"(Morton Smyth 2004), on the other, have become dominant discourses. These findings remind us that social class has always been cross-cut with other socio-demographic factors, at least, in influencing cultural participation (Gayo-Cal et al. 2006) and that neither socio-economic, nor indeed geographical, position are highly deterministic of cultural behaviour.

Discussion and Conclusion

This analysis draws on the well-established theories and analytical practices found in the literatures on neighbourhood effects and spatial equity, which have not been applied to the issue of cultural participation: where relevant analysis was carried out, i.e. those that uncovered significant spatial effects, the significance of this finding in relation to the spatial equity of the distribution of cultural subsidy, or to understanding cultural participation, was not considered. Moreover, previous relevant studies have almost all been based on administrative data, with socio-economic factors implied from area-level measures, so the uncovering of these significant spatial effects using individual survey data is an important finding.

This analysis uncovers that, in the case of museums and galleries attendance within London, and according to the Taking Part Survey data, the existing sociological and policy models which explain cultural participation based on class and education are capturing only part of the story. The failure to consider the characteristics of the neighbourhoods in which people live, understood as an element of habitus for Bourdieu, but not generally explored empirically by sociologists, is a highly significant omission. Alongside socio-demographic factors, most of all qualifications and ethnicity in this study, improved access to museums and galleries has a significant and powerfully positive relationship with the probability of, and frequency of, attendance.

Relating these findings to the literature on neighbourhood effects, it seems to be the case that the differences in levels of attendance from different neighbourhoods cannot be described as simply a compositional effect: they are not explained purely by the differences in the characteristics of the residents, as Chan and Goldthorpe maintained (2005). It seems that there are geographical and institutional effects, that is, the areas

in which people live operate as "opportunity structures" for attendance. This is demonstrated by the significant effects not only of access to museums and galleries, but also of deprivation and access to public transport. Relating this finding to the complexity of the neighbourhood effects literature, it should be remembered that the increased attendance by residents of areas with better access may be caused both by the improved cultural opportunity structures and also increased social norms of attendance in areas with better access.

The significance of the interaction effects between access and qualifications seems to indicate that people have a disposition to attend, influenced by their education, class, ethnicity and other factors, which then is acted on, or not, according to their surroundings. That is, the level of supply does not entirely determine whether or not people attend, and this analysis does not support an argument that low cultural participation is simply remedied by greater availability of cultural opportunities. However, importantly, better access to museums and galleries does significantly increase the probability of attendance from many population groups, not only elites. Moreover, along with education and ethnicity, having improved access to cultural facilities seems to be one of the strongest predictors for increased frequency of attendance.

The highest levels of attendance are found in the educated white respondents in areas with good access (recalling Bourdieu's statements about Paris), and the high probability of attendance from all accessibility tertiles, as well as strong increase in probability with increases in access, draws the eye in figure three. What may be less immediately obvious is the important finding that the group which has the strongest positive relationship between access and the probability of attendance is the educated ethnic

minority respondents[8]. Their probability of attendance more than doubles between accessibility tertile 1 and 3 (from 18% to 45%) whereas the educated whites' probability of attendance less than doubles, (from 40% to 75%). So it can be argued that poor access disproportionately affects those with less disposition to attend.

These findings have important implications for the spatial distribution of funding as a policy lever. In general, they challenge the ACE and DCMS denials that inequity in distribution of their funding has any important impact. Specifically, they indicate that improving the access to cultural opportunities in the areas where it is worst can be an important way of addressing the reduced levels of attendance by members of ethnic minorities, especially where programming can improve the representation of histories and cultural artefacts with resonance for these groups.

A further consideration is the potential effect of spatial inequity in distribution of cultural funding over long periods of time. The highly significant effect of being taken to a museum or gallery as a child (not only having been taken by one's parents) will have a very long time lag, so that policy changes that affect the use of museums and galleries by children within an area will see their effects some decades later. There is also evidence that an important motivating factor for attendance by those least likely to do so is to take their children, to give them an experience (and, perhaps, cultural capital) that they have not themselves benefitted from (The Social Marketing Gateway 2014). This further weakens the claim that supply of cultural opportunities has little impact on cultural participation (Marsh et al. 2010).

[8] While accessibility was not interacted with ethnicity, the multiple effects of access, education and ethnicity do produce significantly different predicted probabilities of attendance

It also brings a new perspective on the closure of some high-profile cultural investments outside London, such as The Public in West Bromwich: given theories about neighbourhood effects and opportunity structures, and the importance of generational transfer of cultural capital in general, and museum and galleries attendance in particular, it is clear that the time such an investment might take to change local behaviour would be considerable and this should be built into expectations about the time such venues will take to thrive. Moreover, if individuals "internalize objective structures and rearticulate them as free choices" (Wilson 1988)then what does a lack of cultural opportunities in an area say to its residents about what they should find relevant?

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