

Examining participation in sporting and cultural activities:

Analysis of the UK 2000 Time Use Survey

PHASE 2

Commissioned by the Department for Culture, Media and Sport

**Dr Patrick Sturgis, University of Surrey
Dr Jonathan Jackson, London School of Economics**

November 2003

TABLE OF CONTENTS

Executive Summary	3
Introduction	5
<i>Data and Population of inference</i>	5
<i>Re-running models from report 1 on corrected data set</i>	6
Examining sporting and cultural activities using Latent Class Analysis	7
<i>The structure of the analysis</i>	7
Sporting activities	8
Cultural activities	11
CHAID modelling of latent class membership	14
Predicting Sport Latent Classes	15
<i>Factors Associated with being a 'fit non-competitor'</i>	15
<i>Factors Associated with being a 'sedate competitor'</i>	17
<i>Factors Associated with being a 'couch potato'</i>	19
<i>Factors Associated with being an 'active competitor'</i>	21
<i>Factors Associated with being an 'sport crazy'</i>	23
Predicting Cultural Latent Classes	25
<i>Factors Associated with being 'family day trippers'</i>	25
<i>Factors Associated with being a 'Cultural slouch'</i>	27
<i>Factors Associated with being a 'Cultural consumers'</i>	29
<i>Factors Associated with being a 'Highbrow'</i>	31
<i>Factors Associated with being a 'Heritage seeker'</i>	33
Examining sporting and cultural activities using Cluster Analysis	35
Predicting Sporting Activity Cluster	37
<i>Predicting 'Active Aerobic' Activities</i>	37
<i>Predicting 'Non-active competitive' Activities</i>	39
<i>Predicting 'Outdoor competitive' Activities</i>	40
<i>Predicting 'Outdoor non-competitive' Activities</i>	40
Predicting Cultural Activity Cluster	43
<i>Predicting 'Lowbrow and consumer activities'</i>	44
<i>Predicting High-brow Activities</i>	46
<i>Predicting 'Heritage' Activities</i>	46
<i>Predicting 'Family Outdoors' Activities</i>	48
Integration and Overview	51
Possibilities for Future Extensions of this Work	54
<i>Household Influence on Individual Activity</i>	54
<i>Focussing on the Activities of Children</i>	54
<i>Asking 'What if' Questions</i>	54
<i>What are people doing if they're not doing sport/culture?</i>	55
Appendix	56

Executive Summary

In the previous report in this programme of work on the UK Time Use Survey 2000, we examined cultural and sporting sectors as homogeneous sets of activities. This is not entirely realistic, as activities are likely to form distinct clusters within each domain, with different social and individual characteristics associated with participation in each cluster. In this report we use Latent Class Analysis (LCA) and Cluster Analysis (CA) to examine the way in which individuals and activities can be parcelled together into more fine-grained activity domains.

The Latent Class Analysis showed that grouping respondents on the basis of their pattern of activity had a sound empirical basis in the data. The latent class analysis grouped the population of Great Britain into five distinct cultural classes:

- **The 'family day trippers'**
- **The 'cultural slouches'**
- **The 'Cultural consumers'**
- **The 'high culture vultures'**
- **The 'heritage seekers'**

For sporting activities, a five class model also provided the best fit to the data.

The five classes produced were labelled:

- **The 'fit non-competitors'**
- **The 'sedate competitors'**
- **The 'couch potatoes'**
- **The 'active competitors'**
- **The 'sport crazies'**

Similarly, the cluster analysis, which grouped activities as opposed to respondents, also provided an intuitively meaningful cluster pattern within each domain. For cultural activities, a four cluster solution was obtained:

- **'Cultural consumer activities'**
- **'Arts and related activities'**
- **'Heritage activities'**
- **'Family outdoors'**

For sporting activities, a four cluster solution was also found to be the best fitting model, with clusters labelled:

- **'Active Aerobic' Activities**
- **'Non-active competitive' Activities**
- **'Outdoor competitive' Activities**
- **'Outdoor non-competitive' Activities**

In both the sporting and cultural latent classes, the biggest single groups by far were formed of people who tend to do very little of anything.

Having grouped respondents and activities together in this way, we next looked at the characteristics of individuals that were associated with

membership of each class or group. For the Latent Classes, this was done using CHAID analysis, for the activity clusters we used logistic regression.

Age, sex, income, social class, educational level, household access to a car and region of residence were the most consistent and powerful predictors of activity. Mostly, these variables were related to participation in predictable ways, with older people less likely to participate in the more vigorous physical activity and more likely to visit sites of national heritage and 'highbrow' cultural events such as theatre, concerts and the opera.

Household income, education and social class, were generally related to higher rates of participation in most cultural and sporting activities, underlining the fact that there seems to be a general participation effect as opposed to a neat division within society, with different groups simply doing different things. Some people just seem to do more of whatever is on offer and there is little doubt that this is related to economic, social and cultural capital.

Introduction

Previously we considered sporting and cultural activities as single, homogenous groupings; simple counts were computed across all the different activities recorded in the questionnaires and diaries. We then examined how participation at this quite aggregated level was related to the individual and social characteristics of respondents. While such analyses are valuable in many ways, it is also useful to examine the factors associated with *different types* of activity within the sporting and cultural realms respectively.

For instance, it is likely that the characteristics of those participating in physically demanding, or competitive sports are quite different from those associated with non-competitive or more sedentary activities. We adopt two different analytical strategies to gain an understanding of the factors associated with (non)participation at this more fine-grained level.

First, we use a technique called **latent class analysis** to give us a picture of the principle dimensions underlying sporting and cultural participation and to classify respondents into more or less homogenous groups on the basis of the types of activity they tend to participate (or not participate!) in. Having divided respondents into these natural groupings, we again examine the socio-demographic characteristics associated with each, using **CHAID analysis**.

Second, we use a similar technique to latent class analysis, **cluster analysis**, to examine how activities (as opposed to respondents) tend to group together on the basis of their similarity to one another. Similarity, here, is defined as the probability of their co-occurrence within individuals over a defined reference period. Having clustered activities together in this way, we then use **logistic regression** to examine the factors associated with participation in any of the activities falling within a particular grouping.

Data and Population of inference

All analyses in this report are conducted using a combined household and individual questionnaire data set. Analyses include all respondents in UK households, aged eight years or above. Data are weighted for unequal selection probabilities, seasonality and nonresponse¹.

The analyses in this report rely on the questionnaire rather than the diary data, despite the greater validity and reliability of the latter data source. This is because the analyses that form the major part of the report – CHAID and cluster analysis – are based on identifying patterns of covariation between variables, in the current instance, patterns of covariation between sporting and cultural ‘behaviours’.

¹ The CHAID analyses are not weighted, as it is not possible to include a weight variable in the software application used for the analysis (SPSS Answer Tree).

Because the sporting and cultural behaviours in question are not practised very frequently by most individuals in the course of an average day, using the diary data – which samples just two days within a single week for each individual – does not provide a sufficiently long time period to realistically capture covariation between these comparatively rare events. The questionnaire data, on the other hand, samples a full 4 weeks (28 days as compared to 2). This means that, despite the undoubted superior quality of the diary data in capturing the timing and other aspects of daily activities, the reference period of activity recording is too brief to warrant the sorts of analyses we wished to conduct. Question wordings for the items used in the analyses are included in the Appendix. Also included in the Appendix is a table showing the average minutes per day spent on and participation rates in each of the sporting and cultural activity codes from the Time Use Survey diary (Table A8).

Re-running models from report 1 on corrected data set

Analyses conducted for the first phase of this work were fitted to data that included proxy respondents as non-participants in the questions analysed from the individual questionnaire. As these should technically have been declared ‘missing’, the stage 1 analyses were re-run where appropriate. In the event, this coding error proved not to affect the majority of previous analyses which, in the most part, were performed on diary rather than questionnaire data anyway. Analyses that did make use of the problematic questions were affected in only trivial ways and had no impact on the interpretations and conclusions drawn.

Examining sporting and cultural activities using Latent Class Analysis

In this section of the report we use Latent Class Analysis (LCA) to examine which activities can be meaningfully grouped together on an empirical basis. In other words, we assess whether subgroups of respondents can be identified on the basis of their tending to do more or less of different types of activity in a given period of time.

For example, individuals who tend to play competitive ball games such as football or rugby, may also take part in racket sports such as tennis or squash. These individuals may also be quite unlikely to participate in more sedentary sports such as indoor bowls or non-competitive activities such as climbing. It is likely that a group of such people fall into a 'natural cluster' of participation. Another group might be more disposed to walking, horse riding and skiing; a cluster of activities perhaps best characterised as 'outdoorsy'. Similar classes or categories of individual are likely to exist for cultural as well as sporting activities.

It would, of course, be easy to sit down and place one's own subjective groupings on to any list of activities (as we have done above!). What is of greater benefit for understanding the dynamics of sporting and cultural participation, however, is to base such a classification on empirical data rather than personal experience.

LCA allows the analyst to assess whether cases (respondents in this instance) fall in to a number of basic groups or subtypes. In essence, it reduces a large number of observations to a smaller number of classes or categories on the basis of responses to a vector of variables – in this case a series of sporting and cultural activities. How do we know how many classes should be formed? Well, LCA compares the statistical fit of models with differing numbers of classes and selects the one which provides the best account of the observed data.

Having established the most likely number of activity classes, we assign each respondent to a particular class on the basis of their scores on the individual activity variables. We can then use regression-based modeling to examine the factors associated with membership of each class. In the appendix we provide additional technical information on the basic assumptions and estimation of LCA.

The structure of the analysis

We analyse sporting and cultural activities separately. To begin with, a series of models with different numbers of classes are tested. We then compare the fit of each, in order to identify the 'best' model. What follows is an outline of the results of the best model for sporting and cultural activities respectively.

Specifically, we present the classes identified, our interpretation of what they mean, how many respondents fall into each class and the probabilities of doing different activities, given membership of each latent class. More technical information on how the analyses were conducted is presented in the Appendix.

Sporting activities

For sporting activities, the best fitting model has **5 classes**. On the basis of the different types of activity that these groups tend to participate in and how likely they are to do each one, we have named them:

- The 'fit non-competitors'²
- The 'sedate competitors'
- The 'couch potatoes'
- The 'active competitors'
- The 'sport crazies'

Class 1 - 'fit non-competitors'

Overall, 15% of the sample fall into the class of respondents most likely to do physically demanding activities that tend to be without a team or competitive element. These individuals, on average, have a 0.33 to 0.50 probability of doing the following activities:

- Swimming
- Cycling
- Gym
- Walking

Of course, this does not mean that these individuals do no other sporting activities, just that as a group, this type of activity appears definitional.

Class 2 - 'sedate competitors'

This class make up 5% of the total sample. Respondents in this class tend to do the majority of the activities that also attract the 'fit non-competitors', but with a slightly lower frequency. However, they also do a range of activities that we have labelled 'sedate competitive' such as golf, bowls and pub games. On average, they have a 0.2 to 0.25 probability of doing the following activities, with the exception of pub games, which was by far the highest at .54:

- Swimming
- Cycling
- Walking
- Ballgames

² Estimated probabilities of activity participation for each latent class are provided in the appendix.

- Golf
- Bowls
- Pub games

Class 3 – ‘couch potatoes’

If one is concerned about the lack of exercise among certain sections of the population, this is the class to focus upon. Two-thirds of the sample (66%) do very little sporting activity at all; the only probability of any magnitude for any of the activities examined is that for walking, at 0.16.

Class 4 – ‘active competitors’

In contrast to the couch potatoes, the ‘active competitors’, who make up 10% of the sample, engage in competitive and non-competitive activities in equal measure. They appear to have a particular penchant for ball games such as football and rugby, where the probability of participation is extremely high, at .93. The probability of this class of respondent participating in the following definitional activities ranges from 0.23 to 0.39:

- Swimming
- Cycling
- Gym
- Racket sports
- Athletics
- Ball games

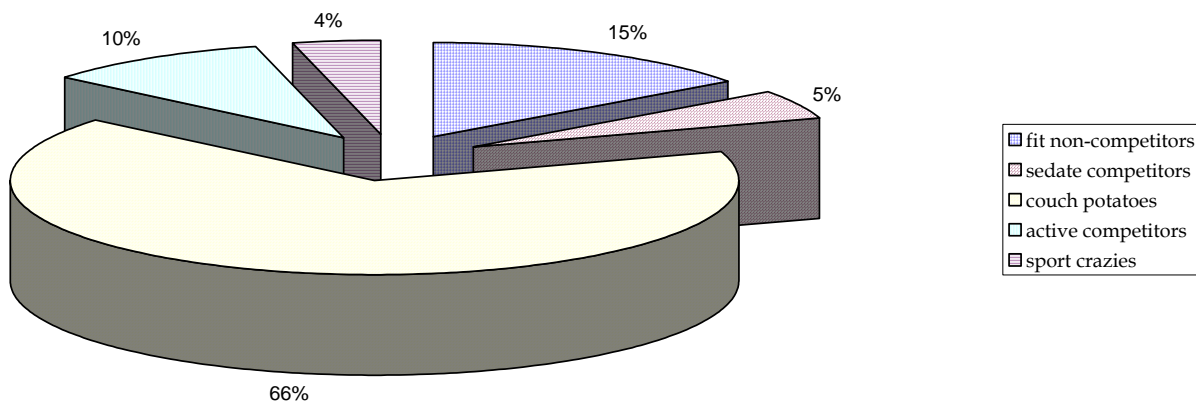
Class 5 – ‘sport crazies’

The final group are the most active and engage in the most and most varied sporting activity. They constitute only 4% of all respondents. The probability of doing the following sports ranges from 0.48 to 0.75, with the exception of golf, which has a slightly lower probability, at 0.28:

- Swimming
- Cycling
- Gym
- Racket sports
- Ball games
- Athletics
- Walking
- Golf

A pie chart, showing the distribution of sporting class membership within the total population is shown in Figure 1, overleaf.

Figure 1 Sporting Latent Classes as % of Total Population



Cultural activities

As with sporting activities, the best fitting model for cultural participation also has 5 classes. We have named these:

- ❑ The 'family day trippers'
- ❑ The 'cultural slouches'
- ❑ The 'Cultural consumers'
- ❑ The 'high culture vultures'
- ❑ The 'heritage seekers'

Class 1 - 'family day trippers'

This group comprise 9% of the sample, and have high probabilities of doing a very varied range of activities:

- Pub/café (0.99)
- Shopping (0.90)
- Library (0.48)
- Cinema (0.46)
- Theme-park (0.45)
- Stately home (0.43)
- Zoo (0.37)
- Museum (0.37)
- Car-boot sale (0.30)
- Sports as spectator (0.29)
- Play (0.16).

Class 2 - 'cultural slouches'

Like the 'couch potatoes', making up 24% of the sample, the cultural slouches participate in very few activities at all. The only activities that this group participate in with any regularity at all are:

- Pub/café (0.37)
- Shopping (0.23)
- Library (0.18)

Class 3 - 'Cultural consumers'

Making up 54% of the sample, the cultural consumers are very likely to go to the pub or a café or shopping. They are also likely to be consumers of more popular cultural activities such as attending the cinema and sports events as a spectator:

- Pub/café (0.91)
- Shopping (0.71)
- Library (0.32)
- Cinema (0.20);

- Sports event as spectator (0.18)

Class 4 - 'high culture vultures'

5% of the sample are assigned as 'high culture vultures'. The definitional cultural activities of this group are visits to museums, the theatre, stately homes and concerts. Although the probability is low (0.07), this group are more likely than any of the others to visit the opera:

- Pub/café (0.92);
- Stately home (0.71);
- Shopping (0.70);
- Play (0.54);
- Library (0.52)
- Cinema (0.38);
- Museum (0.33);
- Concert (0.27)
- Sports event as spectator (0.22).

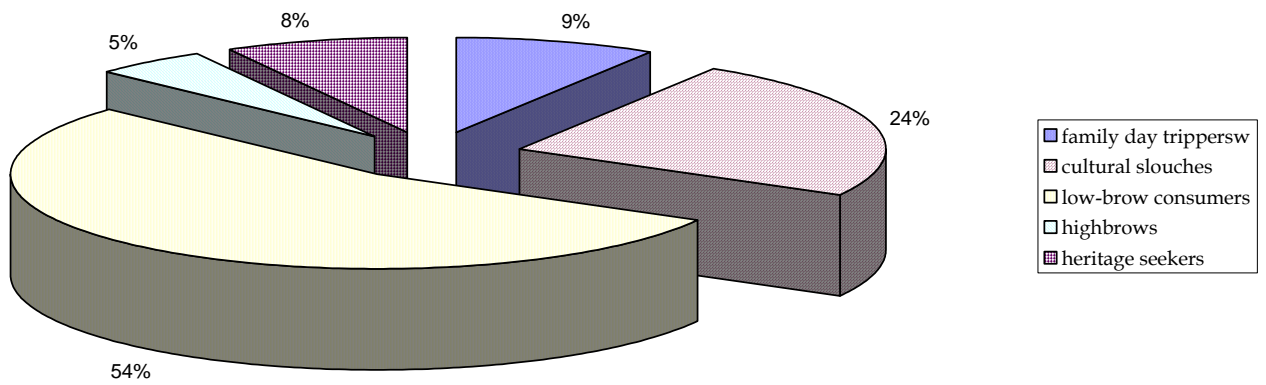
Class 5 - 'heritage seekers'

The final group, making up 8% of the sample, have a similar, though somewhat less varied array of cultural activities than the 'high culture vultures'. As the name we have applied to this group implies, they are less likely to go to the performing arts but are more likely to visit stately homes, libraries and museums:

- Pub/café (0.92)
- Other #2 (0.80)
- Stately home (0.71)
- Shopping (0.61)
- Library (0.42)
- Museum (0.45)
- Car boot sale (0.27)

A pie chart, showing the distribution of cultural class membership within the total population is shown in Figure 1, overleaf.

Figure 2 Cultural Latent Classes as % of Total Population



CHAID modelling of latent class membership

We now turn to a consideration of the social characteristics that typify the members of each of the latent classes identified in the previous section, predicting membership of each latent class for sporting and cultural activities using Chi-Squared Automatic Interaction Detector (CHAID). As was described in detail in the first report, this technique builds a tree-like model based on a series of analyses that segment the population according to: (a) the probability of membership in a given class; and (b) a set of interacting categorical predictor variables.

In contrast to the CHAID models described in the first report, the following analyses are of the latent class membership variables, derived from the individual questionnaire data. The following independent (predictor) variables were used to form the participation likelihood groups. Again, some of the more interesting findings often involve the absence of variables that one might have intuitively anticipated would be important.

Independent variables included in the CHAID analyses

- Age
- Sex
- Ethnicity
- Socio-economic classification
- Marital status
- Employment status
- Highest educational qualification
- Living arrangements
- Self-reported health
- Household income
- Car availability
- Number of adults in household
- Number of children in household
- Housing tenure
- Geographical region
- Unemployment rate
- Population density
- Voluntary work
- Looking after people

Predicting Sport Latent Classes

Factors Associated with being a 'fit non-competitor'

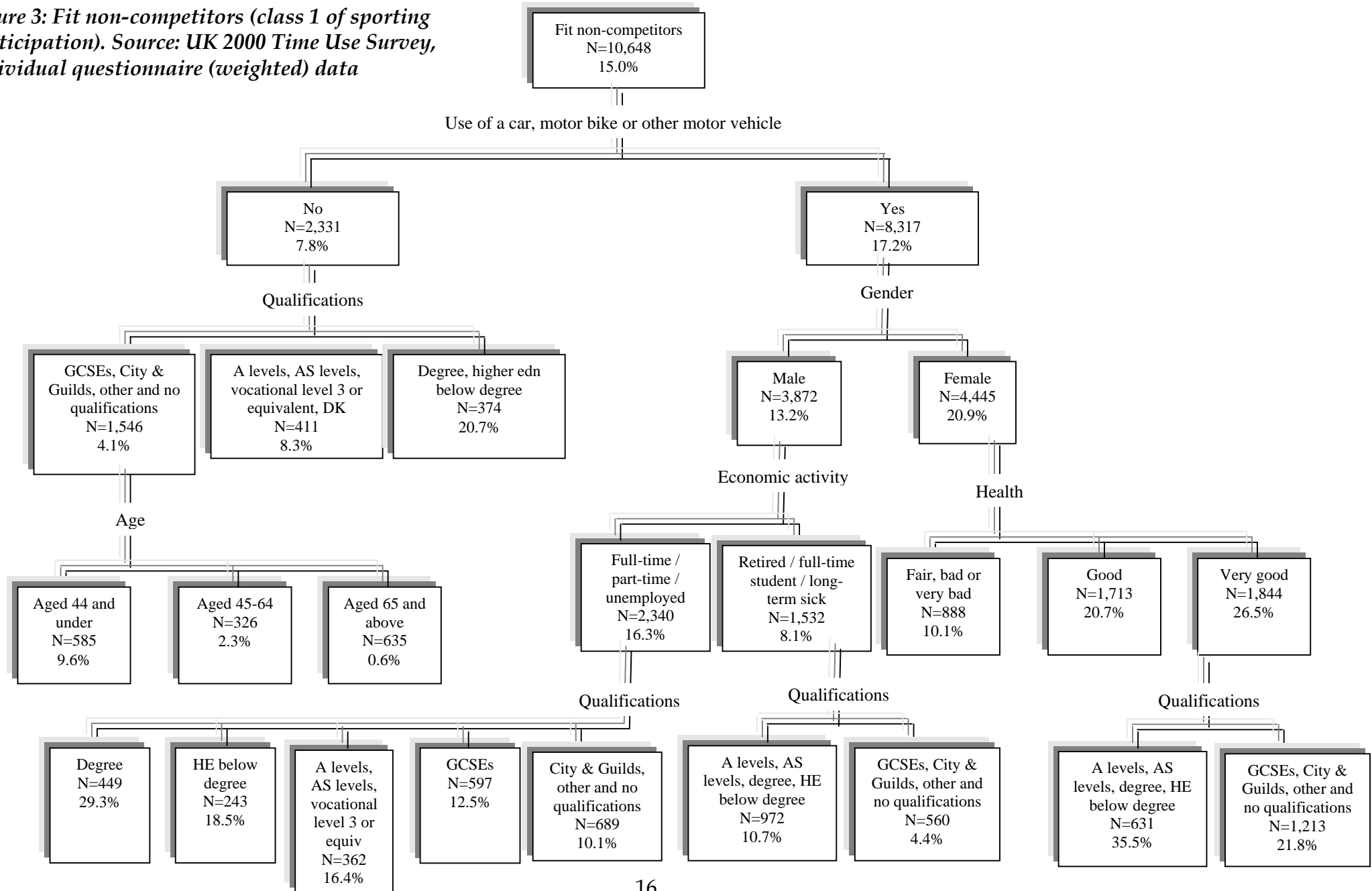
The first latent class is the 'fit non-competitor' group, the CHAID tree diagram for which is shown in Figure 3, overleaf. The single most important factor is, perhaps surprisingly, whether the household has access to a car, motor bike or other motor vehicle. Of those with such access, 17% are 'fit-competitors', while those with no such access have an 8% probability of belonging to this class overall.

Looking first at those with access to a vehicle (the right-hand set of branches in Figure 3), women are slightly more likely to be fit non-competitors than men (21% versus 13%). Among women, health has an impact (very good 27%; good 21%; fair, bad or very bad 10%), and among those with very good health, qualifications further discriminate: the single biggest group of 'fit non-competitors' are those with A or AS levels, a higher education qualification below a degree, or a degree (36% versus all other typed 21%).

For men, economic activity is a significant predictor, dividing the respondents into two further sub-groups: those working or unemployed (16%), and those retired, studying full-time or long-term sick (8%). Again, there are further sub-groupings within employment status; among those working or unemployed, the higher the qualifications the higher the chances of being a 'fit non-competitor' - these range from 29% for those who hold a University degree to 10% for those without qualifications or with 'other' or 'City & Guilds'. A similar but less differentiated pattern can be seen among those who are retired, studying full-time, or long-term sick.

On the left-hand side of the tree, qualifications are also an important discriminator. Having a degree is associated with a comparatively high likelihood of being a 'fit-competitor' (21%). For those with GCSEs or qualifications below GCSE (4%), age is an additional factor, with the older the respondent the lower the probability of membership of this latent class (10% compared to 1%).

Figure 3: Fit non-competitors (class 1 of sporting participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data

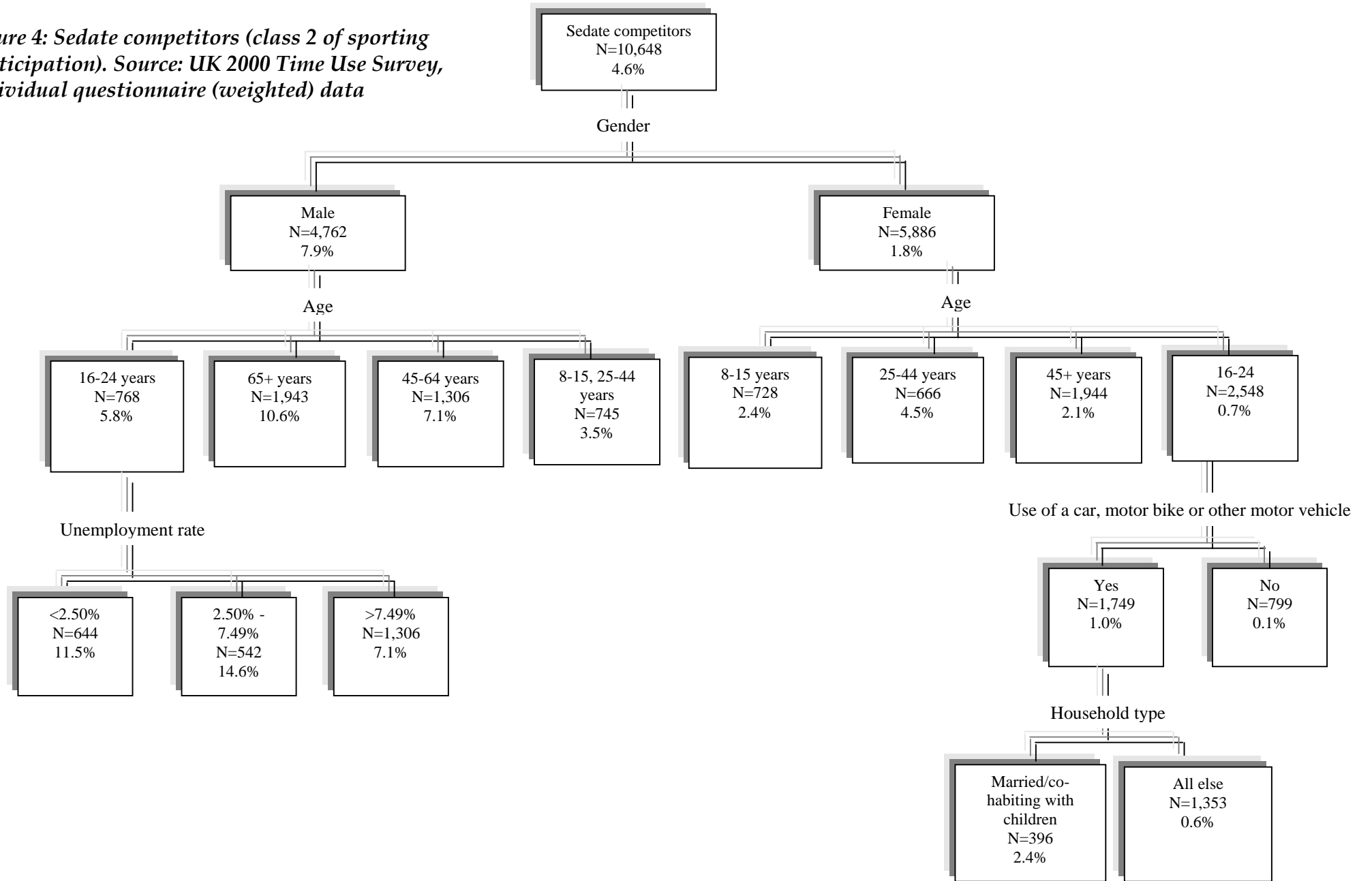


Factors Associated with being a 'sedate competitor'

Having considered which groups are most likely to be 'fit non-competitors', we now turn our attention to the latent class that includes respondents most likely to participate in the more competitive but less physically demanding activities such as golf, bowls and pub games. Remember, though, that sedate competitors are also likely to report activities such as swimming, cycling and walking, which are all capable of being either very sedate or extremely physically demanding, depending on how they are approached!

Figure 4 (overleaf) shows that men are more likely than women to be 'sedate-competitors' (8% versus 2%). For both men and women, age is the next most important factor. The older the men are, the more likely they are to be in this class (aged 65 and over: 11%). Of note is the fact that area unemployment rate is a further discriminator among younger individuals, with intermediate unemployment rates associated with highest class membership rates. For women there is a peak of membership among the 25-44 year olds (5%). Like men, 16-24 year old women can be further divided, but this time by having access to a motor vehicle (having access increases the probability of class membership). Among those 16-24 year olds with access to a vehicle, being married or cohabiting with children increases the chances of being a sedate competitor (24% versus 1%).

Figure 4: Sedate competitors (class 2 of sporting participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



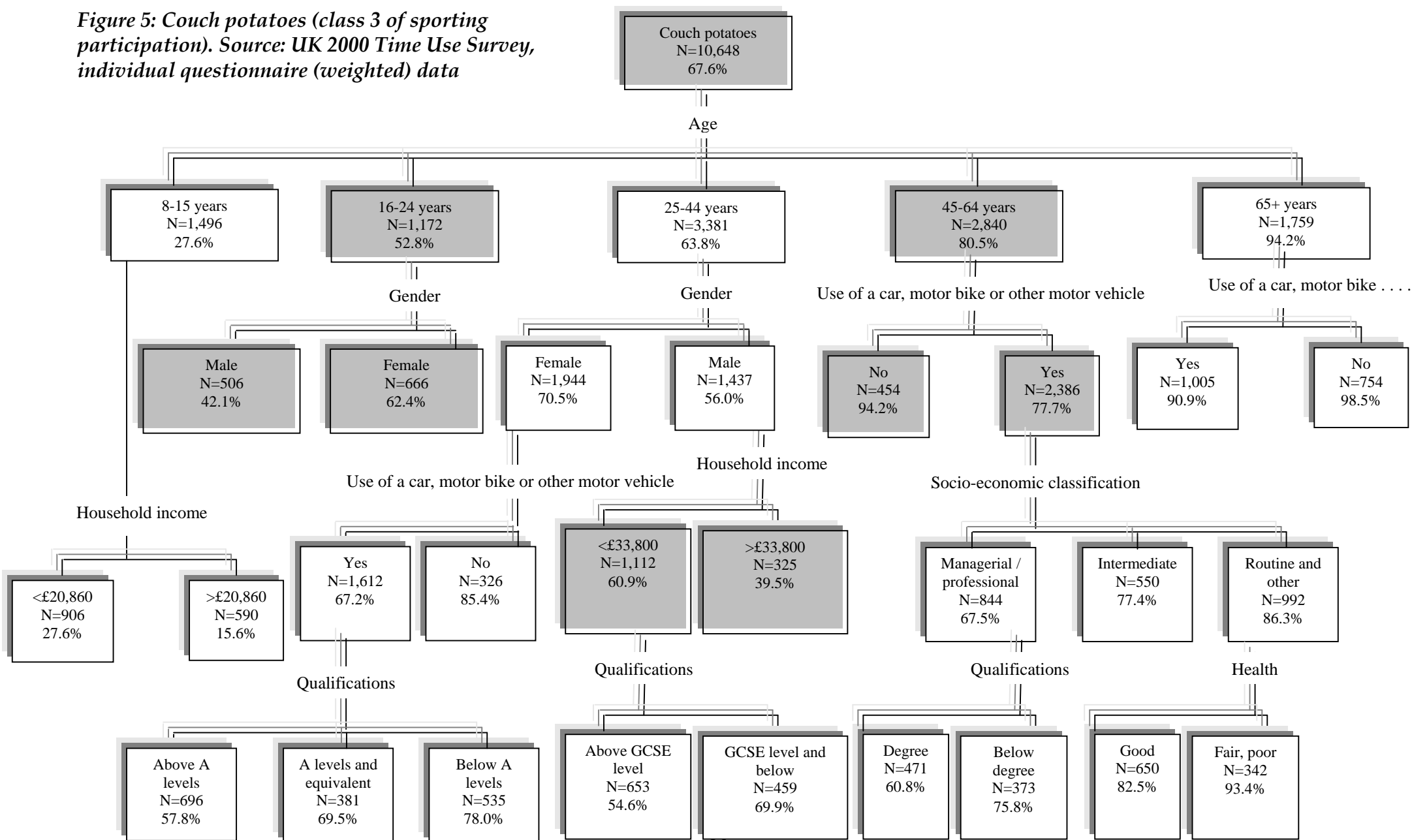
Factors Associated with being a 'couch potato'

Perhaps the moniker is rather harsh, but 'couch potatoes' do have the lowest probabilities of doing just about all of the sporting activities. Figure 5 (overleaf) shows that age is the single biggest factor. Those aged between 8 and 15 have the lowest chance of belonging to this inactive group (28%) compared to each of the older age brackets: 16-24 (53%); 25-44 (64%); 45-64 (81%); and, 65+ (94%). Clearly, then, much of the apparent inactivity in the population as a whole is concentrated amongst the elderly, whose inactivity is largely unrelated to issues of lifestyle and personal choice.

For the youngest age group, those from households with higher income further are less likely to be in this class. Among the second and third youngest age group, men also have a lower probability. Access to a motor vehicle (access = lower chance), household income (over £33,800/annum = 40% versus 61%) and educational qualifications (above GCSE level = 55%; below = 70%) are further differentiators within these age bands.

A similarly complex tree structure is found for those aged 45-64. Again, access to a motor vehicle and qualifications are important, but so also are social class (managerial and professional = lower probability) and self-reported health status (good = lower probability). Finally, the sub-group with the highest membership probability is those aged 65 and above (94%), and particularly the further sub-group within this age band who have no household access to a motor vehicle and are pretty well certain to belong to this class (99%).

Figure 5: Couch potatoes (class 3 of sporting participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



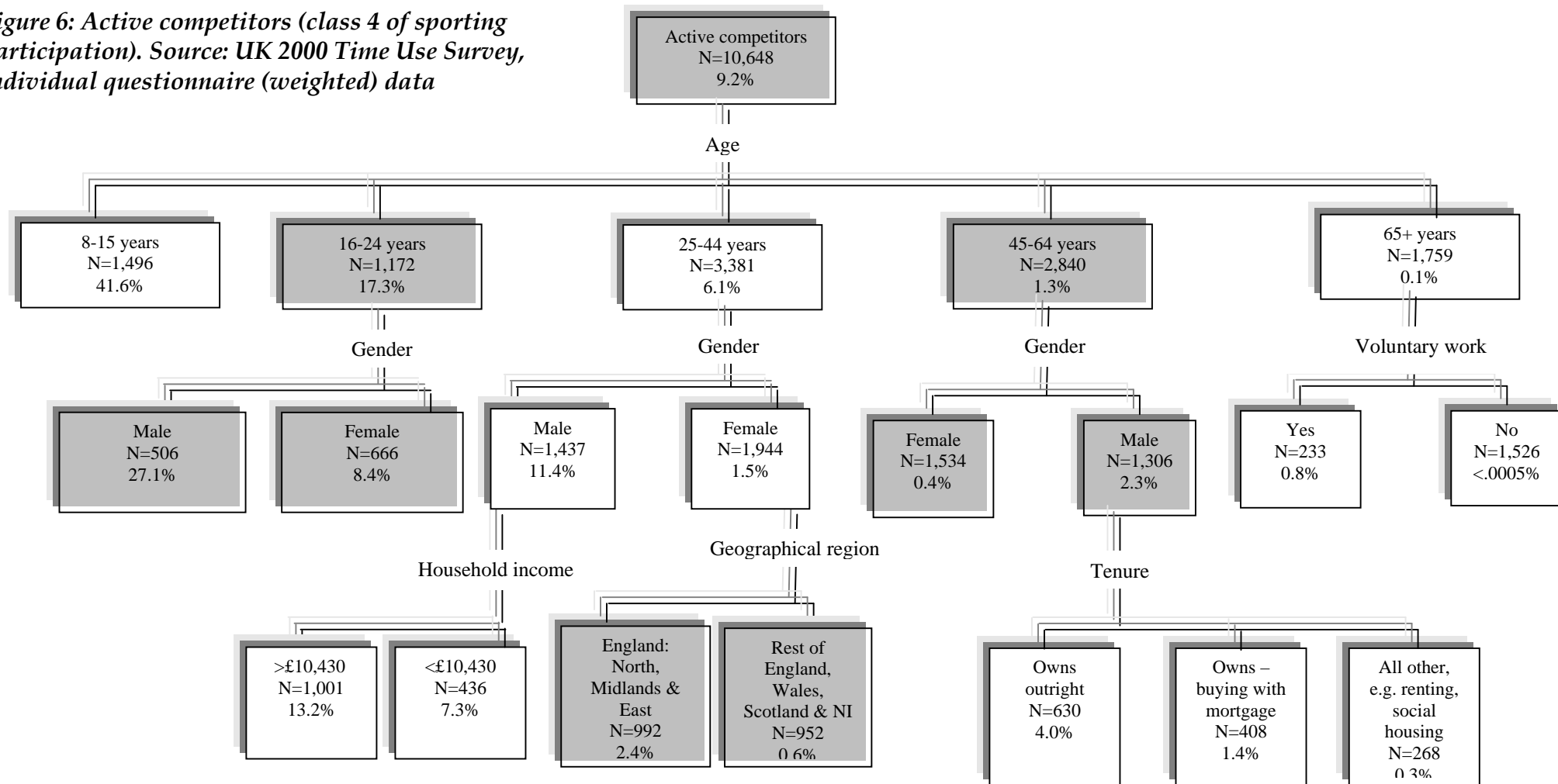
Factors Associated with being an 'active competitor'

Relative to couch potatoes, fewer variables discriminate those who belong to the 'active competitors' class (Figure 6), the group who are most likely to take part in racket sports, athletics and particularly ball games such as football and rugby.

Unsurprisingly, age is the single most powerful predictor of membership of this class, with the sharpness of the contrast between the youngest and oldest age groups being of particular note (42% for 8-15 year olds compared to 0.1% for those 65+).

Within age groups, gender is the next most important discriminator; men are more likely than women to be 'active competitors', with household income (higher probability), region of residence (higher numbers in this class among women aged 25-44 in the North, Midlands and Eastern England relative to the rest of the UK) and tenure (home ownership associated with higher probability of membership of this class) further dividing gender sub-groups.

Figure 6: Active competitors (class 4 of sporting participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



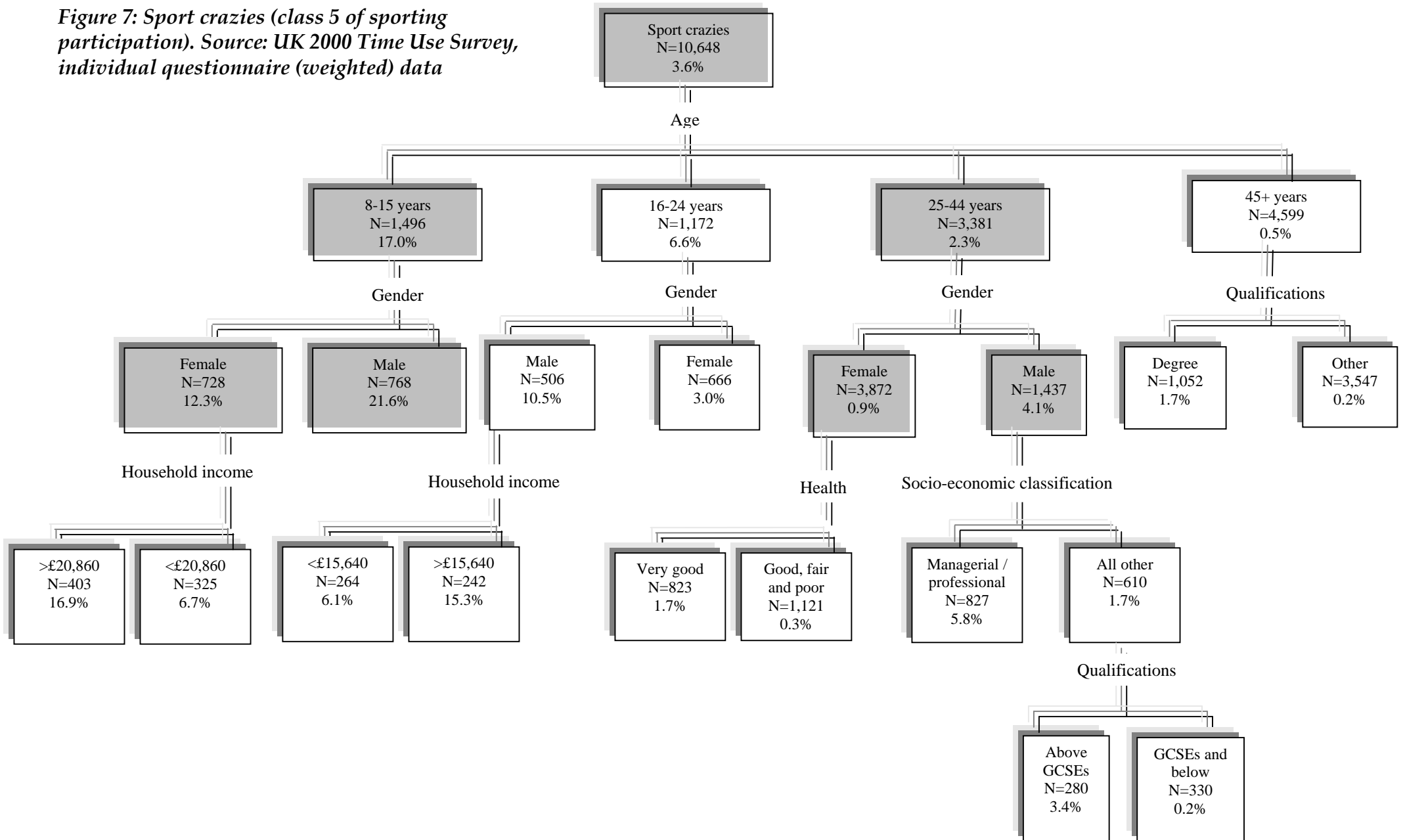
Factors Associated with being a 'sport crazy'

The final latent class is the 'sport crazies'. Again, age is the single most important predictor (see Figure 7), with 8-15 year olds having the greatest probability (17%) and 45+ year olds having the lowest probability (0.5%) of class membership. Similarly, men have a higher rate of class membership, with the largest single group comprising men aged 8-15 (22%), a figure which contrasts sharply with women aged 16-24 (3%).

Household income and social class further divide the sample within age and gender - income among women aged 8-15 and men aged 16-24, and socio-economic group among men aged 25-44. Higher income and professional/managerial social classes are more likely to belong to the 'sport crazy' latent class.

Within social class, educational qualifications further predict membership, with those individuals with few formal qualifications being even less likely to be sports crazy. Finally, self-reported health status is a factor among women aged 25-44, with poorer health status reducing the probability of class membership.

Figure 7: Sport crazies (class 5 of sporting participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



Predicting Cultural Latent Classes

Factors Associated with being 'family day trippers'

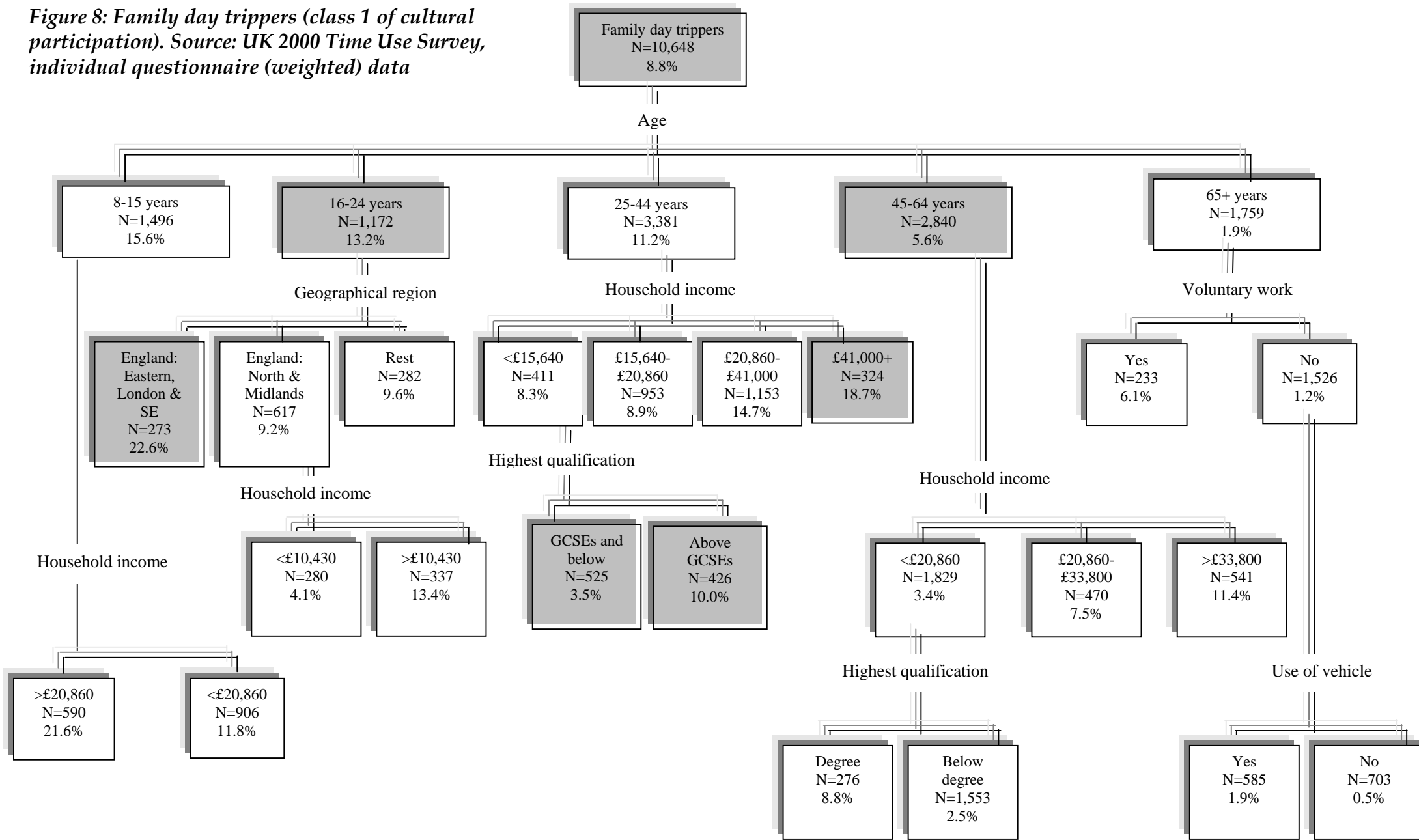
Not only do 'family day trippers' enjoy shopping and going to pubs and cafes, they are also likely to go to theme-parks, zoos, museums, car-boot sales, sporting events and stately homes, activities that might be most attractive to younger people and families.

This is reflected in age being the most important factor in predicting membership of this class, the younger the respondent the greater the chance of class membership (Figure 8). Furthermore, a higher household income seems to facilitate such activities, this being applicable across most age groups.

Higher educational qualifications are also associated with membership of this class for several age bands in Figure 6. Also of note is an apparent regional difference; for those aged 16-24 years, living in Eastern England, London and the South East is associated with a higher probability of being in this latent class compared to all other UK regions.

Interestingly, given the nature of the activities this class are most likely to enjoy, marital status and number of children in the household are not significant predictors.

Figure 8: Family day trippers (class 1 of cultural participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



Factors Associated with being a 'Cultural slouch'

'Cultural slouches' have low cultural participation rates apart from shopping and going to a pub or café, which many would perhaps not count as cultural activities in the first place (Figure 9). Lacking household access to a motor vehicle has a strong impact on the chances of being a 'cultural slouch' (42% versus 19%).

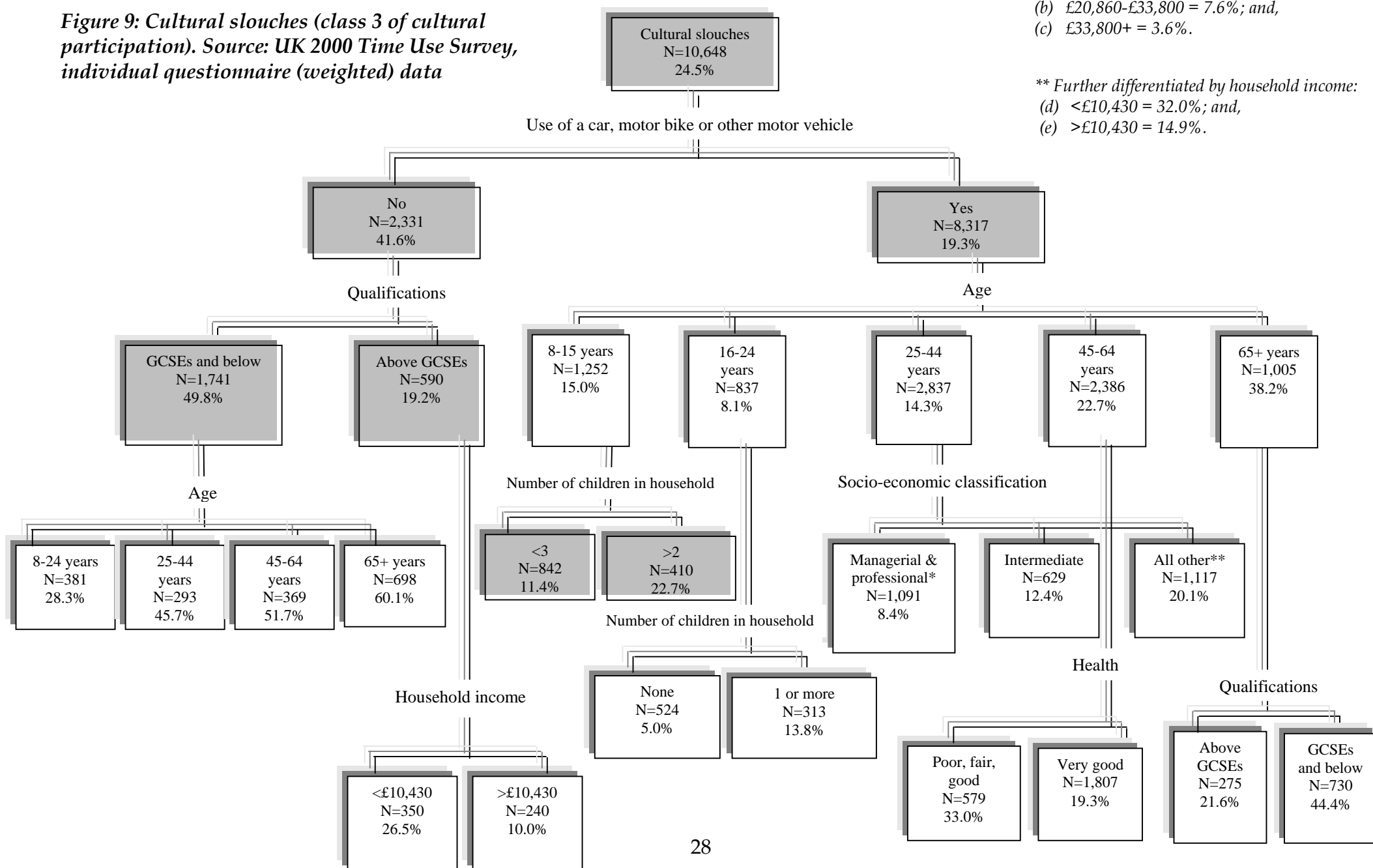
Among those without access to a vehicle, educational qualifications, age and household income are also strong determinants of membership of this class. The single biggest sub-group of cultural slouches are those without vehicle access, with qualifications no higher than GCSE and aged 65+ (62%). For better qualified individuals who have no access to a vehicle, higher household income is associated with a reduced probability of being a cultural slouch.

Turning to the right-hand side of the tree - those in households with access to a vehicle - age is again a significant predictor: the older people are, the more likely they are to be a 'slouch'. Interestingly, the number of children in the household is a factor among the 8-15 and the 16-24 age bands, households with fewer children having lower rates of class membership.

For the older groups, socio-economic classification, health and qualifications define further sub-groups - those with good health, holding a managerial/professional job and having qualifications above the GCSE level are less likely to be 'cultural slouches'.

Finally, household income is a predictor of class membership among the 25-44 age group in the top and bottom socio-economic groups: higher incomes are associated with lower rates of membership of this latent class.

Figure 9: Cultural slouches (class 3 of cultural participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



* Further differentiated by household income:
(a) <£20,860 = 15.2%;
(b) £20,860-£33,800 = 7.6%; and,
(c) £33,800+ = 3.6%.

** Further differentiated by household income:
(d) <£10,430 = 32.0%; and,
(e) >£10,430 = 14.9%.

Factors Associated with being a 'Cultural consumers'

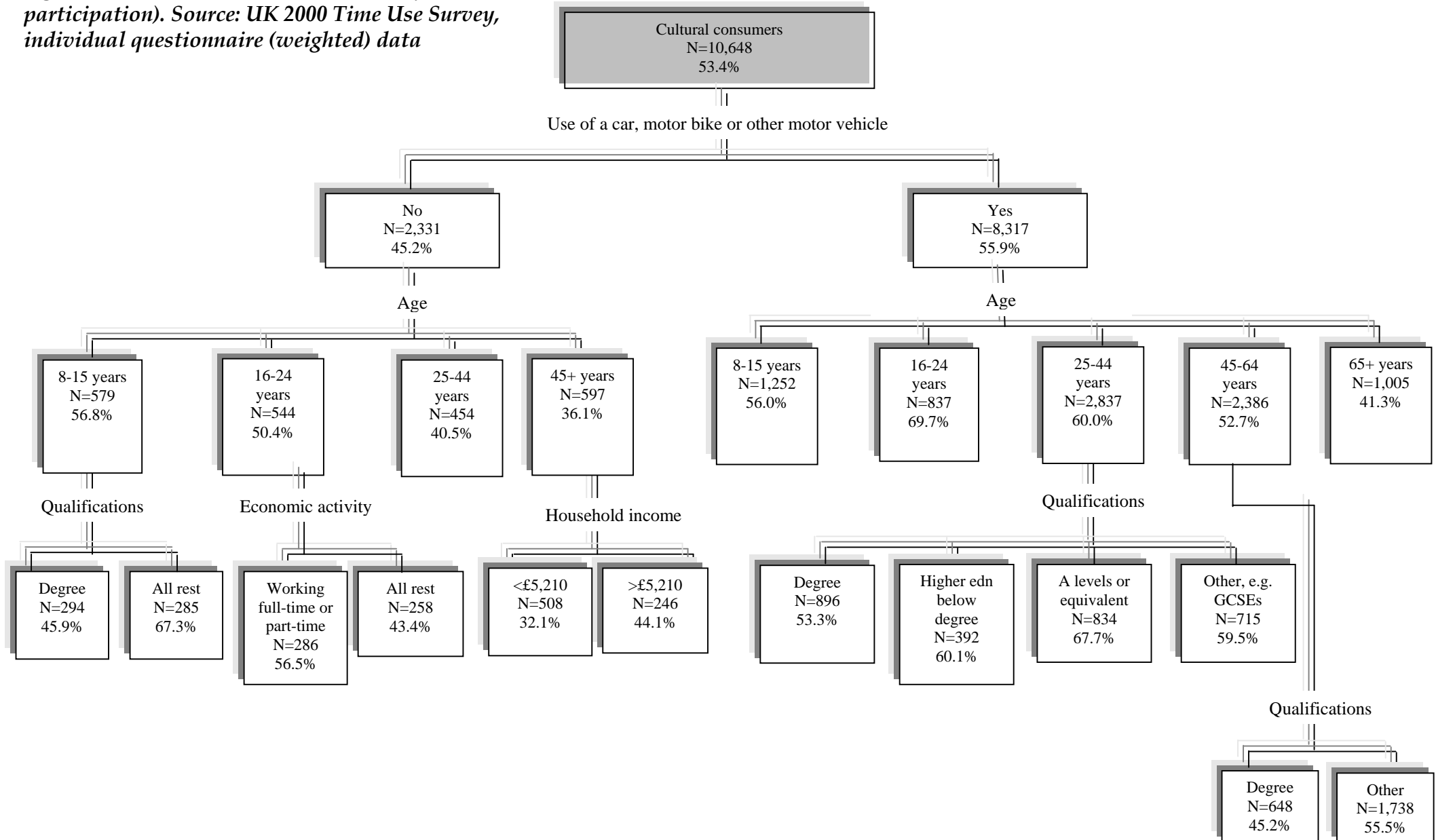
For 'cultural consumers', household access to a motor vehicle and age are the most important predicting factors (Figure 10, overleaf); having access to a vehicle and being from one of the younger groups are both associated with a higher class membership probability.

For those without a vehicle, age is a very important predictor; note the steep gradient in class membership, for example, between those aged 8-15 (57%) and those aged 45 and over (36%).

Further sub-groups within vehicle access and age are defined by educational qualifications, economic activity and household income. On the left-hand side of the CHAID tree, having higher educational qualifications reduces the probability of belonging to this class, while amongst those with vehicle access (the right-hand side of the tree), the effect of education varies by age. For younger respondents without access to a vehicle, higher qualifications decrease the probability of class memberships, while for older respondents the direction of this education effect is reversed.

Working full or part-time increases the likelihood of being a cultural consumer amongst those with access to a vehicle, as does having a higher household income.

Figure 10: 'Cultural consumers' (class 3 of cultural participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



Factors Associated with being a 'High Culture Vulture'

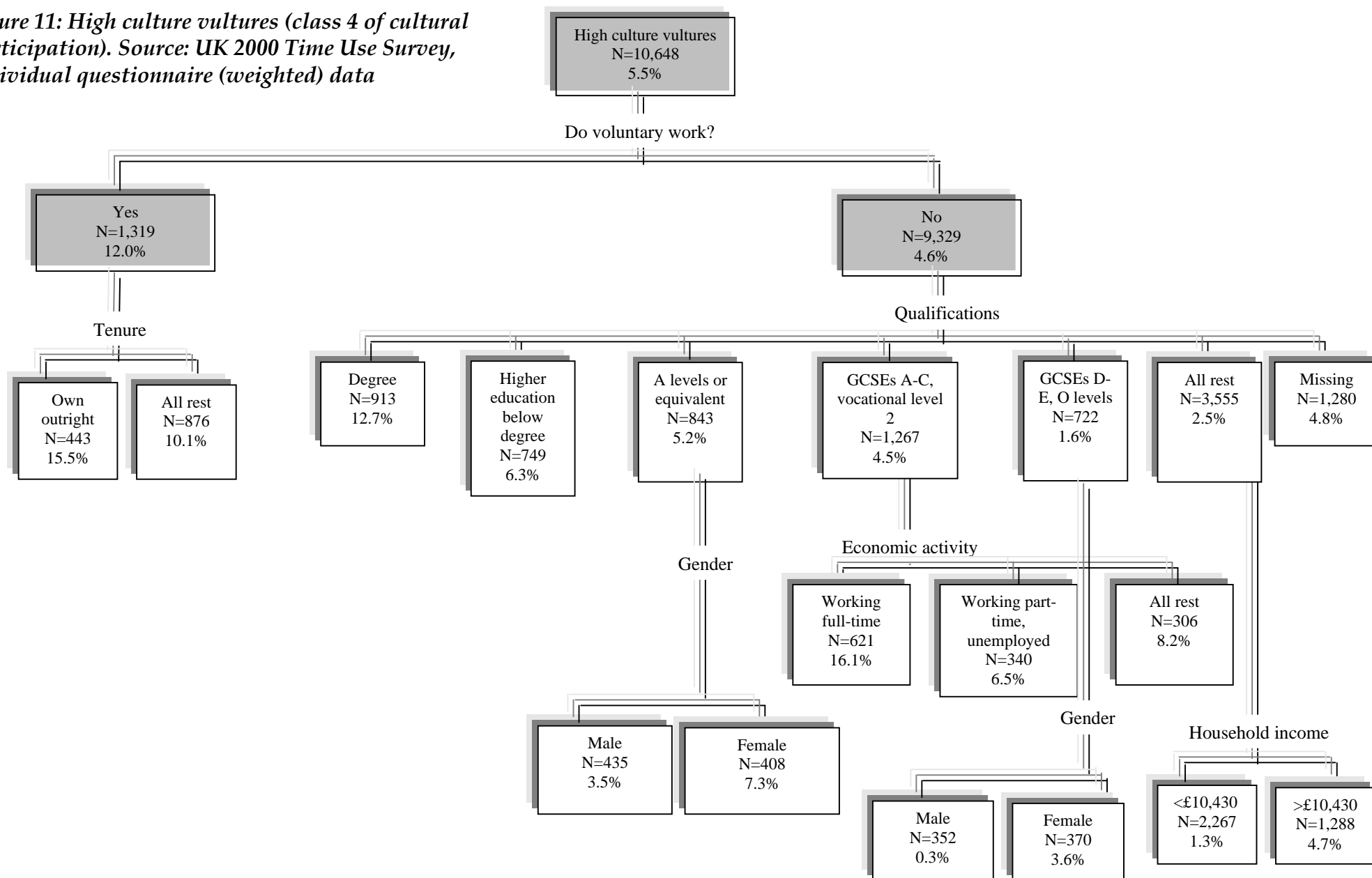
The 'high culture vultures' are more likely than those in other classes to go to plays, concerts, the opera, stately homes and museums. With only 5% of the UK population falling into this class, it is perhaps not surprising that fewer factors predict membership of this group than we have seen in other CHAID diagrams.

Figure 11 shows that, perhaps surprisingly, doing voluntary work is the strongest differentiating factor (12% for yes versus 5% for no), and among those whom do voluntary work, owning a home outright increases the probability of class membership relative to other tenure groups (16% versus 10%).

For those who do no voluntary work, educational level is a predictor; the higher the qualification the higher the probability of being a 'highbrow'. Within two of the qualification sub-groups, women have a higher probability of being in this class than men.

Similarly, economic activity (working full-time increases the probability of class membership) and household income (higher income means larger group membership probability) are significant factors in two other qualification sub-groups. Perhaps surprisingly, social class does not emerge as a predictive of being 'highbrow' in this analysis.

Figure 11: High culture vultures (class 4 of cultural participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



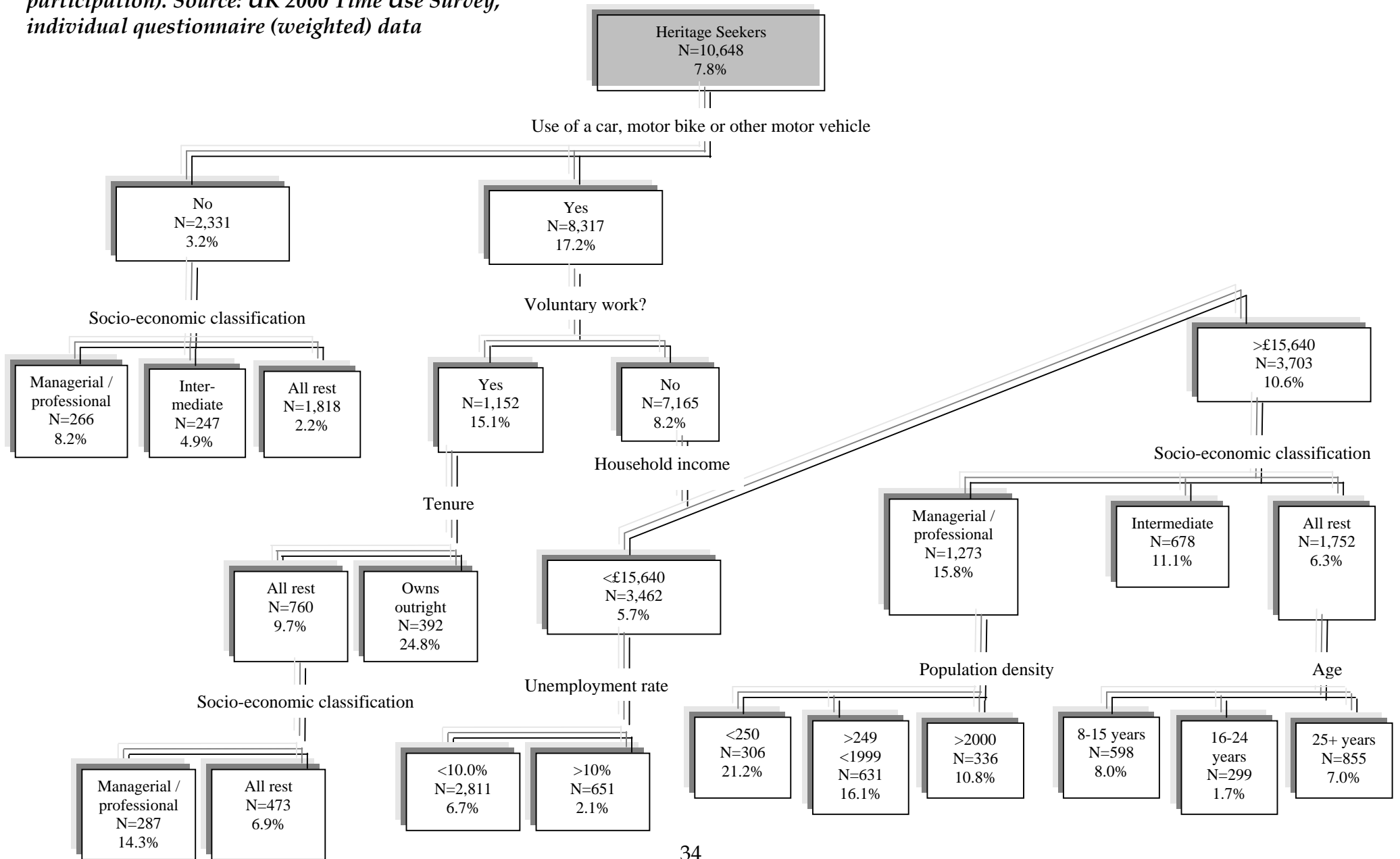
Factors Associated with being a 'Heritage seeker'

The final category of cultural participation is the 'heritage seeker'. This class is primarily defined by its predilection for visiting sites of cultural heritage such as stately homes and museums. Figure 12 suggests that household access to a motor vehicle facilitates access to the stately homes, museums and libraries favoured by this group (17% versus 3%). Of those with no access to a vehicle, social class further differentiates respondents, with managers and professional groups having higher probabilities of being in this group than other occupational groups (8% versus 4% and 2%).

Turning next to those with vehicle access, doing voluntary work is again a somewhat surprisingly powerful factor (yes 15% versus no 8%). The single largest sub-group of heritage seekers in Figure 12 is those who do voluntary work and own their home outright (25%, versus all other tenure groups 10%). Among the latter group, being in a managerial or professional occupation increases the probability of class membership (14%), versus all other occupational groups (7%).

Of those who do no voluntary work, household income, social class, area unemployment rate, area population density and age are further predictive factors. On average, a higher probability of class membership is associated with: (a) a higher income; (b) managerial and professional occupations; (c) areas with a relatively high unemployment rate; (d) areas with a relatively low population density; and, (e) not being between 16 and 25 years of age.

Figure 12: Heritage seekers (class 5 of cultural participation). Source: UK 2000 Time Use Survey, individual questionnaire (weighted) data



Examining sporting and cultural activities using Cluster Analysis

In this section of the report we apply cluster analysis to the list of sporting and cultural activities reported by respondents in the individual questionnaire. The cluster analysis forms groups of activities that are relatively homogenous in terms of their patterns of covariance. Once the activities have been clustered in this way, we examine the characteristics associated with individuals participating in each different type of activity using logistic regression analysis. This approach should overcome some of the interpretational difficulties that arise from having a dependent variable comprised of a very heterogeneous range of activities, as was the case in the models presented in the previous report.

Cluster analysis seeks to identify groups of cases or variables, such that within-group variation is minimized and between-group variation is maximized. In our case, we are interested in forming **groups of activities** on the basis of their co-occurrence over a 4 week period. That is, we aim to group activities together to the extent that the same people are likely to do them within a specified reference period.

This is a slightly different approach to that adopted in the latent class analysis reported in the previous section of this report. In latent class analysis, we are **grouping respondents** on the basis of their overall pattern of activity. In cluster analysis, we are **grouping activities** on the basis of their co-occurrence within individuals over time. It is also important to note that in the latent class analysis, classes are **mutually exclusive**, while in the cluster analysis, the same respondent can participate in several different activity clusters.

The first step in cluster analysis is to establish the **similarity** or **distance** matrix. This matrix is a table in which both the rows and columns are the units of analysis (activities) and the cell entries are a measure of similarity or distance for any pair of cases. There are many different ways of assessing similarity but, in this instance, we have used the **Pearson correlation coefficient**.

Once the similarity matrix has been computed, the next step is to iteratively group variables together into homogenous groups or clusters. Again, there are a vast array of different variable linkage algorithms for cluster formation. Mostly, these provide the same end solution, but sometimes we will prefer particular linkage methods for certain types of data. In this analysis, we have linked activity variables using 'centroid clustering'.

A **dendrogram** is a *tree diagram* often used to represent the results of a cluster analysis. Trees are usually depicted horizontally, not vertically, with each row representing a case or variable. Variables with high similarity are adjacent. Lines indicate the degree of similarity or dissimilarity between cases and the

point at which variables are linked to existing clusters. Dendograms for both the cluster analyses are included in the Appendix.

We begin by presenting the results of the cluster analysis fitted to the sporting activity variables in the individual questionnaire. As with the latent class analysis, it was not possible to use the diary data for this analysis because the period of time sampled in the diaries was too short, at just 2 days within the same week, to capture the true degree of covariation between these cultural activities.

The analysis produced a 4 cluster solution, with activities grouped in an intuitively meaningful manner. These are set out in detail below.

Cluster 1 'Active Aerobic' Activities

Activities in this cluster were primarily characterized by being physically demanding, often, though not always, containing a competitive element:

- Swimming or diving indoors
- Swimming or diving outdoors
- Cycling
- Gymnastics
- Rugby Union or league
- American football
- Football indoors & outdoors
- Keepfit, aerobics, yoga, dance exercise
- Tennis, Badminton, Squash
- Track and field athletics
- Jogging, cross country, road running
- Cricket
- Hockey
- Netball
- Basketball
- Table tennis
- Weight training
- Volleyball

Cluster 2 'Non-active competitive' Activities

This cluster comprised sports and games which, while often highly competitive in nature, could scarcely be described as physically demanding:

- Indoor bowls
- Outdoor (lawn) bowls
- Tenpin bowling
- Snooker, pool, billiards
- Darts

- Golf, pitch and putt, putting

Cluster 3 'Outdoor competitive' Activities

This cluster of activities was a mix of water/aquatic sports such as fishing and sailing other 'outdoor' activities with a competitive element such as motor sports and shooting:

- Angling/fishing
- Yachting or dinghy sailing
- Canoeing
- Windsurfing/boardsailing
- Climbing/mountaineering
- Motor sports
- Shooting

Cluster 4 'Outdoor non-competitive' Activities

The final cluster we have labeled 'outdoor non-competitive' comprised as it is by winter sports, equestrianism and recreational walking:

- Ice skating
- Skiing (on snow /artificial, slopes/grass)
- Horse riding
- Walking (recreational) or hiking for 2 miles or more

Predicting Sporting Activity Cluster

Having used cluster analysis to form these natural groupings of sporting activities, we next turn our attention to the characteristics that predict participation in each cluster. We use logistic regression for this purpose, forming dependent variables by counting across each of the activities in each cluster.

If a respondent reported doing any of the activities in a cluster, they were coded 1, zero otherwise. These dichotomous dependent variables were subsequently regressed on to the same socio-demographic variables as are used in the CHAID analyses and set out on p12.

Predicting 'Active Aerobic' Activities

The results of the logistic regression analysis predicting 'active aerobic' activities are set out in table 1. Active aerobic activities decline in frequency with age but are more common in single person households and households with higher gross annual income. Men are more likely to do this type of activity than women, as are people from unclassifiable occupational groups (mainly students).

People living in the south east of England (including London) are more likely to do 'active aerobic' activities than any other UK region. Home ownership and graduate status both increase the probability of doing this type of more vigorous physical activity.

Table 1 Logistic Regression predicting participation in 'Active Aerobic' Sporting Activity

	Logit	Std. Error	p value	O.R.
Intercept	0.35	0.30	0.240	
AGE IN YEARS	-0.02	0.01	0.033	0.98
AGE (QUADRATIC)	-0.00	0.00	0.050	1.00
# ADULTS IN HOUSEHOLD	-0.13	0.03	0.000	0.88
# CHILDREN IN HOUSEHOLD	0.01	0.03	0.817	1.01
GROSS HH INCOME	0.12	0.02	0.000	1.13
MALE	0.16	0.06	0.004	1.18
<i>(REF=FEMALE)</i>	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.13	0.11	0.246	1.13
INTERMEDIATE	0.09	0.12	0.442	1.10
SMALL EMPLOYERS/SELF EMP	0.12	0.14	0.389	1.13
ROUTINE	-0.18	0.11	0.081	0.83
NEVER WORKED	-0.28	0.15	0.069	0.76
UNCLASSIFIABLE	0.30	0.15	0.039	1.35
<i>REF =LOWER SUPERVISORY/TECHNICAL</i>	0.00	.	.	.
CAR AVAILABLE	0.14	0.08	0.081	1.15
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	0.10	0.09	0.284	1.10
MIDLANDS	0.11	0.10	0.274	1.11
EAST	0.15	0.11	0.199	1.16
LONDON & S.E.	0.19	0.09	0.046	1.21
SOUTH WEST	0.01	0.11	0.931	1.01
WALES	-0.08	0.15	0.572	0.92
<i>REF=SCOTLAN & NORTHERN IRELAND</i>	0.00	.	.	.
CARER= YES	0.08	0.08	0.294	1.08
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.47	0.09	0.000	1.60
OWNS WITH MORTGAGE	0.29	0.07	0.000	1.34
<i>REF=RENTS</i>	0.00	.	.	.
DEGREE	0.27	0.07	0.000	1.31
NO QUALIFICATIONS	-0.37	0.07	0.000	0.69
<i>FEF=INTERMEDIATE QUALS</i>	0.00	.	.	.
MARRIED	-0.18	0.10	0.088	0.84
COHABITING	-0.24	0.14	0.075	0.78
SINGLE	0.07	0.13	0.593	1.07
SEPARATED	0.02	0.19	0.921	1.02
REF=DIVORCED&WIDOWED	0.00	.	.	.

Table 2 Logistic Regression predicting participation in 'Non-active competitive' Sporting Activity

	Logit	Std. Error	p value	O.R.
Intercept	-0.28	0.35	0.419	
AGE IN YEARS	-0.06	0.01	0.000	0.94
AGE (QUADRATIC)	0.00	0.00	0.015	1.00
# ADULTS IN HOUSEHOLD	0.02	0.04	0.571	1.02
# CHILDREN IN HOUSEHOLD	-0.06	0.04	0.106	0.94
GROSS HH INCOME	0.06	0.02	0.001	1.06
MALE	1.31	0.07	0.000	3.71
(REF=FEMALE)	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.09	0.12	0.480	1.09
INTERMEDIATE	-0.01	0.15	0.935	0.99
SMALL EMPLOYERS/SELF EMP	-0.08	0.16	0.627	0.92
ROUTINE	-0.13	0.12	0.272	0.88
NEVER WORKED	-0.26	0.19	0.167	0.77
UNCLASSIFIABLE	-0.01	0.16	0.934	0.99
REF =LOWER SUPERVISORY/TECHNICAL	0.00	.	.	.
CAR AVAILABLE	0.27	0.10	0.007	1.30
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	-0.23	0.11	0.039	0.80
MIDLANDS	-0.10	0.12	0.391	0.90
EAST	0.02	0.13	0.874	1.02
LONDON & S.E.	-0.11	0.11	0.305	0.89
SOUTH WEST	-0.06	0.14	0.637	0.94
WALES	-0.26	0.18	0.150	0.77
REF=SCOTLAN & NORTHERN IRELAND	0.00	.	.	.
CARER= YES	0.10	0.09	0.280	1.11
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.08	0.11	0.490	1.08
OWNS WITH MORTGAGE	-0.07	0.09	0.428	0.93
REF=RENTS	0.00	.	.	.
DEGREE	-0.25	0.09	0.006	0.78
NO QUALIFICATIONS	-0.07	0.08	0.383	0.93
FEF=INTERMEDIATE QUALS	0.00	.	.	.
MARRIED	-0.38	0.13	0.003	0.68
COHABITING	-0.46	0.17	0.007	0.63
SINGLE	-0.09	0.15	0.555	0.91
SEPARATED	0.24	0.24	0.315	1.27
REF=DIVORCED&WIDOWED	0.00	.	.	.

Predicting 'Non-active competitive' Activities

The results of this model are shown in table 2. Men are nearly 300% more likely than women to do this type of activity, making it an almost entirely

male preserve. Age has a moderate negative relationship with participation in this class of activity, though this effect diminishes toward the top end of the age range.

Having a car available in the household is associated with higher levels of this type of activity, while living in the North of England, having a university degree and being married or living as married are all predictive of lower rates of 'non-active competitive' activities.

Predicting 'Outdoor competitive' Activities

Participation in 'outdoor competitive' activities is highest in households containing fewer adults and with higher gross annual income (see table 3). As with 'non-active competitive' activities, this cluster of sports and games is done almost entirely by men, who are almost 500% more likely to do this type of activity than women.

Car availability, a variable that has been consistently predictive of both cultural and sports participation, is again significant in this analysis, with car availability increasing the odds of doing 'outdoor competitive' activities' by nearly 70%.

The only other significant predictor of participation in 'outdoor competitive' activities is marital status, with people who are separated being the most likely participants.

Predicting 'Outdoor non-competitive' Activities

Our final analysis examines the factors associated with doing what we have termed 'outdoor non-competitive' activities. The results are presented in table 4.

People are more likely to do this type of activity as they grow older, although the quadratic term shows that this positive relationship declines amongst the oldest members of the public. Larger households, both in terms of the number of adults and the number of children, are less likely to do this type of activity, while more affluent households have an increased probability.

In contrast to the previous two clusters of activity, 'outdoor non-competitive' activities are more likely to be done by women, home-owners and carers. Similarly, this type of activity is done more frequently by 'higher' occupational groups and students and by households with access to a car or other motor vehicle.

Educational qualifications increase the probability of doing 'outdoor non-competitive' activities, with graduates considerably more likely to do at least one of the activities in this cluster than those with no formal qualifications.

Table 3 Logistic Regression predicting participation in 'Outdoor competitive' Sporting Activity

	Logit	Std. Error	p value	O.R.
Intercept	-4.30	0.72	0.000	
AGE IN YEARS	0.01	0.03	0.620	1.01
AGE (QUADRATIC)	0.00	0.00	0.071	1.00
# ADULTS IN HOUSEHOLD	-0.23	0.08	0.003	0.79
# CHILDREN IN HOUSEHOLD	-0.06	0.07	0.337	0.94
GROSS HH INCOME	0.11	0.03	0.000	1.12
MALE	1.73	0.15	0.000	5.65
(REF=FEMALE)	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.11	0.22	0.611	1.12
INTERMEDIATE	-0.03	0.28	0.908	0.97
SMALL EMPLOYERS/SELF EMP	0.19	0.27	0.499	1.20
ROUTINE	-0.05	0.23	0.823	0.95
NEVER WORKED	-0.34	0.46	0.459	0.71
UNCLASSIFIABLE	0.04	0.30	0.885	1.04
REF=LOWER SUPERVISORY/TECHNICAL	0.00	.	.	.
CAR AVAILABLE	0.51	0.21	0.016	1.67
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	-0.18	0.21	0.370	0.83
MIDLANDS	-0.33	0.23	0.138	0.72
EAST	0.33	0.22	0.144	1.39
LONDON & S.E.	-0.11	0.21	0.601	0.90
SOUTH WEST	0.17	0.24	0.483	1.18
WALES	-0.58	0.38	0.126	0.56
REF=SCOTLAN & NORTHERN IRELAND	0.00	.	.	.
CARER= YES	0.04	0.18	0.831	1.04
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.30	0.21	0.148	1.35
OWNS WITH MORTGAGE	-0.05	0.16	0.735	0.95
REF=RENTS	0.00	.	.	.
DEGREE	-0.04	0.16	0.786	0.96
NO QUALIFICATIONS	-0.03	0.15	0.849	0.97
REF=INTERMEDIATE QUALS	0.00	.	.	.
MARRIED	0.11	0.28	0.705	1.11
COHABITING	0.33	0.33	0.310	1.39
SINGLE	0.27	0.32	0.397	1.31
SEPARATED	0.86	0.44	0.051	2.36
REF=DIVORCED&WIDOWED	0.00	.	.	.

Table 4 Logistic Regression predicting participation in 'Outdoor non-competitive' Sporting Activity

	Logit	Std. Error	p value	O.R.
Intercept	-2.75	0.32	0.000	
AGE IN YEARS	0.06	0.01	0.000	1.07
AGE (QUADRATIC)	-0.00	0.00	0.000	1.00
# ADULTS IN HOUSEHOLD	-0.08	0.04	0.021	0.92
# CHILDREN IN HOUSEHOLD	-0.08	0.03	0.016	0.93
GROSS HH INCOME	0.06	0.02	0.000	1.07
MALE	-0.24	0.06	0.000	0.79
<i>(REF=FEMALE)</i>	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.32	0.12	0.007	1.37
INTERMEDIATE	0.29	0.13	0.023	1.34
SMALL EMPLOYERS/SELF EMP	0.28	0.15	0.055	1.33
ROUTINE	0.05	0.12	0.660	1.05
NEVER WORKED	-0.05	0.16	0.759	0.95
UNCLASSIFIABLE	0.54	0.16	0.000	1.72
<i>REF =LOWER SUPERVISORY/TECHNICAL</i>	0.00	.	.	.
CAR AVAILABLE	0.19	0.09	0.034	1.21
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	-0.13	0.10	0.169	0.88
MIDLANDS	-0.11	0.10	0.284	0.90
EAST	-0.25	0.12	0.035	0.78
LONDON & S.E.	0.04	0.10	0.687	1.04
SOUTH WEST	0.07	0.11	0.569	1.07
WALES	-0.27	0.16	0.085	0.76
<i>REF=SCOTLAN & NORTHERN IRELAND</i>	0.00	.	.	.
CARER= YES	0.26	0.08	0.001	1.29
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.45	0.09	0.000	1.56
OWNS WITH MORTGAGE	0.18	0.08	0.022	1.20
<i>REF=RENTS</i>	0.00	.	.	.
DEGREE	0.22	0.07	0.003	1.25
NO QUALIFICATIONS	-0.37	0.07	0.000	0.69
<i>FEF=INTERMEDIATE QUALS</i>	0.00	.	.	.
MARRIED	0.01	0.10	0.913	1.01
COHABITING	0.23	0.14	0.099	1.26
SINGLE	0.15	0.13	0.262	1.16
SEPARATED	-0.03	0.21	0.874	0.97
REF=DIVORCED&WIDOWED	0.00	.	.	.

Predicting Cultural Activity Cluster

The cluster analysis for cultural activities also produced a 4 cluster solution. The dendrogram for this analysis is shown in the appendix.

Cluster 1 'Cultural consumer activities'

This cluster grouped together the following activities. Visiting:

- the cinema (or Film Society or film club)
- a sports event as a spectator
- gig or other live music performance (e.g. pop, rock or jazz concert, blues or folk club)
- a library
- eating or drinking out at a café, restaurant, pub or wine bar
- a shopping centre, or mall, apart from regular shopping for food and household items
- some other place of entertainment (e.g. dance, club, bingo, casino)

we have labeled this cluster of activities 'low brow and consumer' as the entertainment activities are primarily relating to popular culture and the remaining activities relate to shopping and eating and drinking out.

Cluster 2 'Arts and related activities'

As the name suggests, highbrow activities constitute those cultural practices traditionally regarded as 'high' cultural. The cluster analysis placed visits to the following events in this category:

- a play, musical or pantomime
- the opera
- a concert or performance of classical music of any kind
- the ballet or to a modern /contemporary dance performance

Cluster 3 'Heritage activities'

The third cluster of cultural activities formed in the analysis involved visits to the primary repositories of the nations cultural heritage:

- a museum or an art gallery,
- a historic house, castle or other heritage site or building

Cluster 4 'Family outdoors'

Lastly, the fourth cultural cluster was somewhat more heterogeneous in the range of activities grouped together. The activities in this group, however, seemed to mainly involve day long visits to outdoor areas of recreation, the sorts of activity one would mostly associate with young families. This cluster grouped together visits to:

- car-boot sale, antiques fair or craft market or similar **apart** from regular shopping for food and household items
- a theme park, fairground, fair or carnival
- zoo, wildlife reserve, aquarium, or farm park
- any other outdoor trips (including going to places of natural beauty, picnics, going for a drive or going to the beach)

Predicting 'Cultural consumer activities'

Table 5 shows the estimated coefficients for the model predicting whether people had participated in 'lowbrow and consumer' activities. In total, eight variables were significant predictors of this type of activity at the 95% level of confidence: age; number of adults and number of children in the household; gross household income; gender; social class; car availability; and educational qualifications.

This type of activity is, then associated, with being younger, having fewer adults and children in the household, being from a higher income bracket, having a higher degree, being female and having a car or other motor vehicle available. Having never worked also significantly reduces the probability of doing cultural and consumer activities.

Table 5 Logistic Regression predicting participation in 'Cultural consumer activities'

	Logit	Std. Error	p value	O.R.
Intercept	3.41	0.50	0.000	
AGE IN YEARS	-0.03	0.02	0.044	0.97
AGE (QUADRATIC)	0.00	0.00	0.828	1.00
# ADULTS IN HOUSEHOLD	-0.17	0.06	0.006	0.84
# CHILDREN IN HOUSEHOLD	-0.21	0.05	0.000	0.81
GROSS HH INCOME	0.25	0.03	0.000	1.28
MALE	-0.22	0.09	0.020	0.80
(REF=FEMALE)	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.20	0.19	0.304	1.22
INTERMEDIATE	0.38	0.22	0.080	1.47
SMALL EMPLOYERS/SELF EMP	-0.04	0.22	0.865	0.96
ROUTINE	-0.12	0.16	0.436	0.89
NEVER WORKED	-0.44	0.18	0.015	0.64
UNCLASSIFIABLE	0.22	0.28	0.420	1.25
REF=LOWER SUPERVISORY/TECHNICAL	0.00	.	.	.
CAR AVAILABLE	0.28	0.11	0.009	1.33
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	-0.08	0.14	0.577	0.92
MIDLANDS	-0.10	0.15	0.505	0.90
EAST	0.16	0.19	0.412	1.17
LONDON & S.E.	0.08	0.16	0.588	1.09
SOUTH WEST	0.20	0.19	0.296	1.22
WALES	-0.08	0.21	0.721	0.93
REF=SCOTLAN & NORTHERN IRELAND	0.00	.	.	.
CARER= YES	0.22	0.12	0.075	1.25
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.16	0.12	0.168	1.17
OWNS WITH MORTGAGE	0.21	0.13	0.099	1.24
REF=RENTS	0.00	.	.	.
DEGREE	0.16	0.18	0.389	1.17
NO QUALIFICATIONS	-0.61	0.12	0.000	0.54
REF=INTERMEDIATE QUALS	0.00	.	.	.
MARRIED	0.01	0.13	0.918	1.01
COHABITING	-0.21	0.23	0.353	0.81
SINGLE	-0.10	0.18	0.563	0.90
SEPARATED	-0.01	0.29	0.959	0.99
REF=DIVORCED&WIDOWED	0.00	.	.	.

Predicting Arts and Related Activities

Next we look at those factors predicting whether people participate in 'high-brow' cultural activities. Table 6 shows that similar variables were significant predictors in this analysis, although often in different ways.

Highbrow activities are more likely as people get older, though the significant negative quadratic term for age shows that this effect has a tendency to diminish amongst the youngest and oldest members of society. Highbrow activities are also less likely in larger households, with the odds of going to this type of event declining by around 10% for each additional adult in the household.

Income and social class are associated in ways we would probably expect; higher income and being from managerial and professional classes increases the odds of attending a high brow cultural event. Interestingly, the 'unclassifiable' and 'never worked' occupational groups are also more likely to do this sort of activity, an effect probably attributable to the fact that students make up large proportions of these groups.

Being a carer increases the odds of doing this type of activity by around 23%, while owning your own home makes you around 75% more likely still. University graduates are 41% more likely to attend this type of event than those with no qualifications at all and single people have the highest probability of attending of all marital status groups.

Predicting 'Heritage' Activities

As we would no doubt expect, visiting sites of cultural heritage is more common as people get older though, as with high-brow activities, this effect diminishes at the top and bottom of the age range (Table 7). Larger households and households containing children are also less likely to participate in this type of activity, though again, having a higher income increases the probability of a visit.

'Higher' occupational groups are considerably more likely to be heritage visitors, as are 'unclassifiable' individuals - again, probably a 'student' and young people effect. Region appears as a significant predictor for the first time in this model, with people living in the south east (including London) and the south west around 40-45% more likely to visit than those in other UK regions.

Housing tenure and educational level are again strong predictors of visiting behaviour; owning your own home and being a university graduate increase the probability of a visit by 57% and 75% respectively.

Table 6 Logistic Regression predicting participation in 'Arts and Related activities'

	Logit	Std. Error	p value	O.R.
Intercept	-4.48	0.45	0.000	
AGE IN YEARS	0.05	0.01	0.001	1.05
AGE (QUADRATIC)	-0.00	0.00	0.012	1.00
# ADULTS IN HOUSEHOLD	-0.09	0.05	0.050	0.91
# CHILDREN IN HOUSEHOLD	0.01	0.04	0.805	1.01
GROSS HH INCOME	0.14	0.02	0.000	1.15
MALE	-0.52	0.08	0.000	0.60
<i>(REF=FEMALE)</i>	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.60	0.18	0.001	1.83
INTERMEDIATE	0.35	0.19	0.074	1.41
SMALL EMPLOYERS/SELF EMP	0.30	0.23	0.190	1.34
ROUTINE	0.12	0.18	0.518	1.13
NEVER WORKED	0.22	0.23	0.334	1.25
UNCLASSIFIABLE	1.02	0.22	0.000	2.77
<i>REF =LOWER SUPERVISORY/TECHNICAL</i>	0.00	.	.	.
CAR AVAILABLE	0.23	0.12	0.060	1.26
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	-0.21	0.13	0.120	0.81
MIDLANDS	-0.15	0.14	0.293	0.86
EAST	-0.19	0.16	0.229	0.83
LONDON & S.E.	0.03	0.13	0.842	1.03
SOUTH WEST	-0.03	0.16	0.851	0.97
WALES	-0.34	0.23	0.131	0.71
REF=SCOTLAN & NORTHERN IRELAND	0.00	.	.	.
CARER= YES	0.21	0.10	0.035	1.23
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.55	0.13	0.000	1.73
OWNS WITH MORTGAGE	0.18	0.12	0.117	1.20
<i>REF=RENTS</i>	0.00	.	.	.
DEGREE	0.35	0.10	0.000	1.41
NO QUALIFICATIONS	-0.15	0.10	0.134	0.86
<i>FEF=INTERMEDIATE QUALS</i>	0.00	.	.	.
MARRIED	-0.13	0.13	0.350	0.88
COHABITING	-0.30	0.20	0.139	0.74
SINGLE	0.38	0.17	0.025	1.46
SEPARATED	-0.26	0.32	0.410	0.77
REF=DIVORCED&WIDOWED	0.00	.	.	.

Table 7 Logistic Regression predicting participation in 'Heritage activities'

	Logit	Std. Error	p value	O.R.
Intercept	-2.96	0.36	0.000	
AGE IN YEARS	0.03	0.01	0.010	1.03
AGE (QUADRATIC)	0.00	0.00	0.003	1.00
# ADULTS IN HOUSEHOLD	-0.14	0.04	0.001	0.87
# CHILDREN IN HOUSEHOLD	-0.12	0.04	0.002	0.89
GROSS HH INCOME	0.12	0.02	0.000	1.12
MALE	-0.10	0.07	0.124	0.90
(REF=FEMALE)	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	0.59	0.13	0.000	1.80
INTERMEDIATE	0.30	0.15	0.039	1.35
SMALL EMPLOYERS/SELF EMP	0.34	0.17	0.043	1.40
ROUTINE	-0.13	0.14	0.364	0.88
NEVER WORKED	-0.39	0.20	0.053	0.68
UNCLASSIFIABLE	0.56	0.18	0.001	1.75
REF =LOWER SUPERVISORY/TECHNICAL	0.00	.	.	.
CAR AVAILABLE	-0.05	0.10	0.586	0.95
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	0.22	0.11	0.057	1.24
MIDLANDS	0.20	0.12	0.096	1.22
EAST	0.17	0.14	0.213	1.18
LONDON & S.E.	0.37	0.11	0.001	1.45
SOUTH WEST	0.36	0.13	0.007	1.43
WALES	0.13	0.18	0.471	1.14
REF=SCOTLAN & NORTHERN IRELAND	0.00	.	.	.
CARER= YES	0.16	0.08	0.061	1.17
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.45	0.10	0.000	1.57
OWNS WITH MORTGAGE	-0.10	0.09	0.278	0.91
REF=RENTS	0.00	.	.	.
DEGREE	0.56	0.08	0.000	1.75
NO QUALIFICATIONS	-0.22	0.08	0.009	0.80
FEF=INTERMEDIATE QUALS	0.00	.	.	.
MARRIED	0.15	0.12	0.193	1.16
COHABITING	0.20	0.16	0.208	1.22
SINGLE	0.26	0.14	0.069	1.30
SEPARATED	0.08	0.24	0.751	1.08
REF=DIVORCED&WIDOWED	-1.09	0.31	0.001	

Predicting 'Family Outdoors' Activities

Lastly, participating in the type of activity we have labelled 'family outdoors' is related to many of the same variables we have found to be significant predictors in the previous analysis (Table 8); this type of activity is least likely

amongst the oldest members of society and in households with larger numbers of adults in them.

Table 8 Logistic Regression predicting participation in 'Family outdoors'

	Logit	Std. Error	p value	O.R.
Intercept	-1.09	0.31	0.001	
AGE IN YEARS	0.00	0.01	0.769	1.00
AGE (QUADRATIC)	0.00	0.00	0.030	1.00
# ADULTS IN HOUSEHOLD	-0.14	0.04	0.000	0.87
# CHILDREN IN HOUSEHOLD	0.05	0.03	0.075	1.06
GROSS HH INCOME	0.04	0.02	0.005	1.05
MALE	-0.19	0.06	0.001	0.83
(REF=FEMALE)	0.00	.	.	.
MANAGERIAL/PROFESSIONAL	-0.13	0.11	0.271	0.88
INTERMEDIATE	-0.12	0.12	0.321	0.88
SMALL EMPLOYERS/SELF EMP	0.08	0.14	0.558	1.09
ROUTINE	-0.18	0.11	0.092	0.83
NEVER WORKED	-0.50	0.16	0.002	0.61
UNCLASSIFIABLE	-0.21	0.16	0.182	0.81
REF=LOWER SUPERVISORY/TECHNICAL	0.00	.	.	.
CAR AVAILABLE	0.32	0.09	0.000	1.38
REF= NO CAR AVAILABLE	0.00	.	.	.
NORTH	0.27	0.10	0.008	1.31
MIDLANDS	0.21	0.11	0.056	1.23
EAST	0.28	0.12	0.022	1.32
LONDON & S.E.	0.37	0.10	0.000	1.44
SOUTH WEST	0.07	0.13	0.603	1.07
WALES	0.27	0.15	0.075	1.32
REF=SCOTLAN & NORTHERN IRELAND	0.00	.	.	.
CARER= YES	0.25	0.08	0.001	1.28
REF= CARER=NO	0.00	.	.	.
OWNS OUTRIGHT	0.03	0.10	0.776	1.03
OWNS WITH MORTGAGE	-0.01	0.08	0.894	0.99
REF=RENTS	0.00	.	.	.
DEGREE	-0.02	0.08	0.755	0.98
NO QUALIFICATIONS	-0.05	0.07	0.486	0.95
REF=INTERMEDIATE QUALS	0.00	.	.	.
MARRIED	0.13	0.11	0.235	1.14
COHABITING	0.20	0.14	0.163	1.22
SINGLE	-0.07	0.14	0.628	0.94
SEPARATED	0.10	0.20	0.619	1.11
REF=DIVORCED&WIDOWED	0.00	.	.	.

Households from lower income brackets, men and those who have never worked are all less likely to do this type of activity. Having a car available in the household makes visits more likely, as does living in the North or the

South East (including London). Carers were, again, more likely to visit this type of event. With regard to education, this type of activity was most common amongst those with intermediate level qualifications.

Integration and Overview

This phase of the work has adopted two distinct analytical strategies to address essentially the same questions – can we sub-divide members of the UK public on the basis of the types of sporting and cultural activities they tend to do (or not do)? If this proves possible, what are the characteristics of individuals and households that lead them to fall into one class rather than another?

In the first section, we used latent class analysis with CHAID modeling to address this question. In the second section we used cluster analysis with binary logistic regression. The most important distinction between the two approaches is that latent class analysis groups **respondents** on the basis of covariance between activities, while the cluster analysis groups activities on the basis of their co-occurrence within individuals over a given reference period.

Using more than one analytical approach to the same empirical question(s) is generally regarded as useful in ensuring the **robustness** of results³. What general patterns have emerged from these two analyses, then, that shed light on the key issue of cultural and sporting participation in Great Britain and how it is segmented within society as a whole?

Well, firstly, both analyses showed that the idea of segmenting the population into different activity types gained sound empirical support. Although there were some differences in the ways that activities were grouped together by the two statistical techniques, there were also a great many similarities. In both the sporting and cultural domains, two large groups emerged from the data that were predominantly defined by their **non-participation**. As was also found in the previous report, it seems non-participation is, sadly, the norm. Certain characteristics seem reliably related to non-participation, although not uniformly across the different sub-groupings examined.

Age emerged as one of the most consistent effects, though the direction and magnitude varied as we might expect *a priori*. For instance, age appears negatively related to more physically demanding sports such as ball games, racket sports and exercise in a gymnasium. Age is positively related, however, to participation in recreational walking and hiking. Similarly, while older people are less likely to participate in what we have termed ‘low brow and consumer’ cultural activities, they are more likely to visit plays, concerts and the opera. So, while age is clearly important as a determinant of the type of cultural activity people do, it does not look a strong candidate for understanding factors which serve to exclude sections of society from participation *per se*.

³ A table detailing the key differences between the statistical techniques used in this report is included in the Appendix.

Similarly, many cultural and, particularly, sporting activities are strongly **gendered**. Gender contrasts are most marked in the sporting activity domain. Men, for instance, are considerably more likely to participate in 'active aerobic' exercise and be 'sports crazy' while women make up the larger part of the groups we have termed 'couch potatoes'. Even in sporting activity, however, the effect is not uni-directional, with women making up the largest section of the group we have labelled 'fit non-competitors'. In terms of cultural activities, gender proved less divisive, though there was some evidence from the logistic regression models to suggest that women had higher levels of participation in at least three of the activity clusters examined.

One of the most consistent, yet unexpected, findings from both sets of analyses was the impact on sporting and cultural participation of households **having access to a car or other motor vehicle**. This was strongly related to participation in the majority of analyses in this report. It would be tempting to conclude that it is not car use *per se* that is causing this effect but that, rather, car ownership is indicative of broader social and economic affluence. However, such a conclusion is not really tenable, as all analyses control for social class, education and household income. It would seem, then, that not having access to a car in the household serves to inhibit the amount of cultural and sporting activity individuals are able to participate in.

Turning to the more socio-economic variables of **household income** and **social class**, both these variables were predictive, in theoretically expected ways, of cultural and sporting participation. In all but one instance, more affluent households (as measured by gross household income) were more likely to participate in most social and cultural activities.

Similarly, social class was a strong indicator of participation in both domains of activity, though not in such a consistent manner. Higher occupational status groups were, for instance, more likely to do 'heritage' and 'highbrow' cultural activities and 'outdoor non-competitive' sporting activities. They were also more likely to be 'sport crazies' and less likely to be 'couch potatoes' and 'cultural slouches'.

Housing tenure appeared to largely mirror the general direction of the effects found for household income, with owner occupiers having generally higher rates of participation than renters.

Education was also a strong predictor of both types of activity, with higher rates of participation generally associated with higher educational attainment. Having a **degree** was associated with higher rates of participation in all the logistic regression models, apart from those predicting 'family outdoor' cultural and 'non-active competitive' sporting activity, where the direction of the relationship was reversed. Similarly, having a degree was associated with

being a 'fit non-competitor', 'sports crazy', a 'family day tripper', 'highbrow' and **not** being a 'couch potato', a 'low brow consumer' or a 'cultural slouch'.

There were some **regional** differences in patterns of sporting and cultural participation, though these were not especially strong. For instance, those living in the North, Midlands and Eastern counties were slightly more likely to be 'active competitors', while those in Eastern Counties and the South East were more likely to be 'family day trippers'. In the logistic regression models, those living in the South were more likely to do 'heritage activities'. London and the South East also had the highest rates of participation in 'family outdoors' 'active aerobic' activity, while those living in the North were significantly less likely to participate in 'non-active competitive' sporting activity.

In addition to considering which characteristics proved to be significant influences on sporting and cultural participation, it is also important to highlight those factors which were *predominantly unrelated* to these activity domains. Although most variables were related to at least some form of activity type across all the analyses conducted, several did turn out to be less powerful influences than we may have anticipated.

Marital status, for example, was not related to activity patterns in most of the analyses in this report. We believe this is likely to be at least partially related to the inclusion of similar variables such as 'household type' and number of children and adults in the household in the models. Because these variables are all correlated and are themselves quite strongly related to participation, marital status *per se* appears to exert only a very marginal influence on patterns of cultural and sporting participation. Similarly, **social class** did not exert as strong an influence as one might intuitively expect; where social class did make a difference, the pattern was often just one class varying from all the others, as opposed to observing a great deal of variation between all the different social classifications.

Tables summarising the pattern of effects from the logistic regression models are provided in the Appendix (Tables A6 and A7).

Possibilities for Future Extensions of this Work

The analyses conducted in this and the previous report for DCMS certainly do not exhaust the questions that the Time Use Survey can usefully shed light on. In this final section, we consider some possible extensions of this programme of research.

Household Influence on Individual Activity

One area that was touched upon in the first report, though not in any great depth, is the issue of how household characteristics influence the activity patterns of individuals within those same households. The Time Use Survey affords a particularly useful insight into how the *activity patterns* of the household as a whole affect the probability, timing and duration of different activities at the individual level. For instance, does the average amount of time spent on sporting activities by parents influence the amount of time children spend on these or other activities? Does having a partner or sibling who is physically inactive increase the probability that an individual will be inactive themselves?

To properly address such questions, a statistical technique called *multi-level modeling*, which explicitly takes into account the hierarchical nature of the survey design (individuals clustered within households) is required. We believe that approaching these questions from a multi-level perspective would be a fruitful avenue for research for future analysis of the Time Use Survey.

Focussing on the Activities of Children

One of the most interesting and, perhaps unique, aspects of the UKTUS is its inclusion of all household members aged 8 years and above. This clearly allows an excellent opportunity for focusing specifically on the activities of young people and how these are related to the characteristics of their households and the activity patterns of other household members. In particular, there is increasing concern within government over the physical activity levels of young people and their apparent decline in recent years.

Asking 'What if' Questions

Many of the analyses in this and the previous report have identified factors associated with participation in different areas of physical and cultural activity. A question that this throws up, from a policy perspective, is 'what would activity rates be like if we could modify characteristic X or Y in the population'. For example, we might wish to estimate the likely levels of physical activity if everyone in the UK had access to a car or motor vehicle. Similarly, we might wish to estimate how much more exercise children would likely take if their parents spent an extra hour a week doing physical activities themselves.

Such questions can be addressed using a relatively straightforward regression-based simulation technique (Bartels 1996; Sturgis 2003⁴). Although there are clearly limitations on the extent to which these sorts of characteristics are actually amenable to government modification, they would undoubtedly be of great value from the perspective of public information campaigns.

What are people doing if they're not doing sport/culture?

Another possible avenue of analytical potential is to investigate how non-sporting/cultural activity patterns differ amongst different participation groups. This would address the question of what people are doing if they aren't doing the things we are interested in. This would not necessarily be limited to simply studying how broad patterns of activity vary across these groups but could also examine how episode durations and timing during the diary day differ too. This could perhaps shed some light on the question of how people might be encouraged – by flexible working hours, for example – to spend more time in sporting or cultural pastimes.

⁴ Bartels L. (1996) Uninformed Votes: Information Effects in Presidential Elections. *American Journal of Political Science* 40(1), 194-230; Sturgis, P. (2003) Knowledge and Collective Preferences: A Comparison of Two Approaches to Estimating the Opinions of a Better Informed Public *Sociological Methods and Research*, 31(4).

Appendix

Latent class analysis (LCA)

LCA is a form of factor analysis for dichotomous variables. As with other types of factor analysis, the technique models relationships between variables on the basis of a series of unobserved, latent variables. Observed variables are seen to be indicators of these hypothesised underlying classes and are conditionally independent given scores on these underlying variables. Unlike factor analysis however, LCA explains associations between categorical variables in terms of membership of a small number of classes that are themselves categorical. The technique allows one to estimate the probabilities that an individual belongs to each class that is identified, or to allocate an individual to one of these classes, on the basis of the values of the observed variables.

One begins by ascertaining the most parsimonious model that provides an adequate fit to the observed data. Put another way, one establishes how many latent classes are needed in the model. The goodness of fit is tested using the chi-square, the likelihood ratio chi-square, and more ad hoc statistics such as BIC and the index of dissimilarity. One also inspects the chi-square residuals to see where exactly the model performs poorly – it is common practice to treat residuals above 4 as indicative of poor fit. The usual model building strategy is to start with a specification of two latent classes and then increase this by one incrementally until one arrives at an acceptable model – unless of course one is testing an *a priori* hypothesis about the model.

Table A1 shows the goodness of fit statistics for four latent class models of the sporting activity data. While none of the models fit the data according to the chi square and likelihood ratio chi-square statistics, inspection of the chi square residuals indicates very few problems. Furthermore, the ratio of chi square statistic to degrees of freedom is close to two. Given the large sample size, one can conclude that the fit of the 5 class model is acceptable.

Table A1: Goodness of fit statistics for the four latent class models of cultural participation

Number of latent classes	Chi square	Likelihood ratio chi square	Degrees of freedom	<i>p</i> (for chi square)
2	2,503,545	6771	131,037	<.00005
3	508,981	6280	131,020	<.00005
4	469,409	5956	131,003	<.00005
5 ¹	267,530	4482	130,982	<.00005

¹Additional classes showed no significant improvement in model fit

Table A2 shows the goodness of fit statistics for four latent class models of the cultural activity data. This time, the 5 class model fits the data according to the chi square and likelihood ratio chi-square tests.

Table A2: Goodness of fit statistics for the four latent class models of cultural participation

Number of latent classes	Chi square	Likelihood ratio chi square	Degrees of freedom	<i>p</i> (for chi square)
2	1,710,778	11,185	524,248	<0.00005
3	595,146	9911	524,228	<0.00005
4	541,749	9461	524,208	<0.00005
5 ¹	372,023	9087	524,188	>0.99995

¹Additional classes showed no significant improvement in model fit

Having established the correct model, the next step is to inspect two pieces of information that LCA yields that are most important. The first is the relative size of each class, or the prior probability of an individual being in that class. The second is the conditional probability that an individual being in a given category of an observed variable given that he or she is has each latent class membership.

Table A3 shows the prior and conditional probabilities for the sports activity model involving 5 latent classes.

Table A3: Prior and conditional probabilities for the five class latent class model of sporting participation

Manifest variables	Latent class 1	Latent class 2	Latent class 3	Latent class 4	Latent class 5
Swim	0.223	0.684	0.075	0.482	0.390
Cycle	0.227	0.747	0.023	0.302	0.321
Bowls	0.225	0.256	0.025	0.090	0.100
Gym	0.115	0.589	0.086	0.443	0.364
Pubgame	0.524	0.636	0.033	0.09	0.257
Ballgame	0.206	0.819	0.023	0.06	0.926
Rackets	0.128	0.665	0.014	0.117	0.298
Athletic	0.017	0.580	0.002	0.135	0.233
Fish	0.120	0.132	0.005	0.011	0.020
Water	0.009	0.140	0.002	0.029	0
Winter	0	0.125	0.002	0.036	0.032
Golf	0.230	0.279	0.016	0.05	0.083
Horse	0	0.087	0.004	0.041	0.023
Climb	0.001	0.126	0	0.023	0.002
Motor	0.036	0.113	0.002	0.005	0.004
Shoot	0.032	0.114	0.002	0.004	0.002
Walk	0.217	0.485	0.159	0.436	0.124
Prior probability	0.076	0.040	0.600	0.190	0.090

Similarly, table A4 shows the prior and conditional probabilities for the cultural activity model involving 5 latent classes.

Table A4: Prior and conditional probabilities for the five class latent class model of sporting participation

Manifest variables	Latent class 1	Latent class 2	Latent class 3	Latent class 4	Latent class 5
Cinema	0.459	0.023	0.204	0.379	0.109
Dome	0.025	0.006	0.004	0.029	0.011
Millen	0.064	0.003	0.006	0.073	0.025
Sports	0.295	0.041	0.182	0.215	0.137
Play	0.168	0.024	0.049	0.545	0.083
Opera	0.004	0.003	0	0.065	0.011
Concert	0.053	0.007	0.009	0.270	0.043
Gig	0.251	0.005	0.074	0.252	0.060
Ballet	0.034	0.002	0.003	0.085	0
Museum	0.366	0.013	0.035	0.329	0.454
Statly	0.433	0.006	0.029	0.180	0.708
Library	0.477	0.180	0.317	0.521	0.421
Pubcafe	0.986	0.374	0.909	0.956	0.921
Mall	0.903	0.230	0.714	0.695	0.606
Carboot	0.303	0.037	0.126	0.090	0.277
Themepark	0.454	0.012	0.085	0.035	0.107
Zoo	0.373	0.006	0.035	0.022	0.144
Othent	0.445	0.079	0.258	0.219	0.143
Othout	0.885	0.075	0.379	0.474	0.799
Prior probability	0.101	0.248	0.491	0.073	0.86

Distinguishing between Statistical Techniques used in this Report

Table A5 sets out the key definitional attributes of each of the four statistical techniques used in this report in order to clarify their distinctive characteristics.

Table A5 Distinctions between Statistical Techniques used in this Report

<i>Aim of Analysis</i>	<i>Cluster Analysis</i>	<i>Latent Class Analysis (LCA)</i>
Create groups of activities which are similar in the sense that the same people are likely to do them.	Cluster analysis identifies clusters of similar activities, so participation in activity A means that individuals are more likely to participate in activities B and C but not D. Respondents are assigned to activity clusters if they have participated in any of the activities in the cluster during the last 4 weeks. This means the same respondent can belong to more than one activity group.	LCA identifies groups or classes of respondents who tend to take part in the same sort of activities. Respondents are divided into separate, mutually exclusive groups, based on their predicted probabilities of membership of each identified group. Respondents are assigned to the group to which they have the highest probability of membership. Note: each respondent belongs to one and only be in one class.
<i>Aim of Analysis</i>	<i>Logistic regression</i>	<i>CHAID</i>
Predict category membership from range of individual and group characteristics.	Logistic regression identifies respondent characteristics associated with participating in any of the activities in each cluster, or group, of activities. It focuses on the main effects of these characteristics. For example, we can say that people with a car are X% more likely than those without a car to have done at least one activity in a cluster. Effects are independent and additive, meaning that the effect of car ownership is the same at all levels of the other variables in the model.	CHAID identifies respondent characteristics associated with each respondent group. It focuses on interactions between categorical variables. For example, we may find that education interacts with gender in predicting sports participation; better qualified men are more likely than better qualified women to participate. This may be further delineated to find that older, better educated men are less likely than younger, better educated men to participate in sport, and so on.

Cultural Activity Question (from individual questionnaire)

I am now going to ask some questions about things that some people do in their spare time. For each activity that I mention could you please tell me whether or not you have done that in the 4 weeks ending yesterday. In the last 4 weeks, have you been to ...

the cinema (or Film Society or film club)?

the Millennium Dome?

any other special Millennium event or activity (e.g. the BA London Eye) ?

a sports event as a spectator?

a play, musical or pantomime?

the opera?

a concert or performance of classical music of any kind?

other gig or other live music performance (e.g. pop, rock or jazz concert, blues or folk

club?)

the ballet or to a modern /contemporary dance performance?

a museum or an art gallery,

a historic house, castle or other heritage site or building?

a library? 1 2

eat or drink out at a café, restaurant, pub or wine bar? 1 2

a shopping centre, or mall, **apart** from regular shopping for food and household items? 1 2

car-boot sale, antiques fair or craft market or similar **apart** from regular shopping for food

and household items?

a theme park, fairground, fair or carnival?

zoo, wildlife reserve, aquarium, or farm park ?

some other place of entertainment (eg dance, club, bingo, casino)?

any other outdoor trips (including going to places of natural beauty, picnics, going for a

drive or going to the beach)?

Sporting Activity Question (from individual questionnaire)

On these cards is a list of sports and physical activities. Could you please tell me whether or not you took part in any of them in the 4 weeks up until yesterday? That is since (DATE FOR 4 WEEKS AGO). Do not count any teaching, coaching, refereeing you may have done.

Swimming or diving indoors
Swimming or diving outdoors
Cycling
Indoor bowls
Outdoor (lawn) bowls
Tenpin bowling
Keepfit, aerobics, yoga, dance exercise (INCLUDE EXERCISE BIKE)
Martial Arts (INCLUDE SELF DEFENCE)
Weight training (INCLUDE BODY BUILDING.)
Weightlifting
Gymnastics
Snooker, pool, billiards (EXCLUDE BAR BILLIARDS)
Darts
Rugby Union or league
American football
Football indoors (INCLUDE 5-A-SIDE)
Football outdoors (INCLUDE 5-A-SIDE)
Gaelic sports (eg camogie, Gaelic football, hurling, Irish handball and shinty)
Cricket
Hockey (DO NOT INCLUDE ICE, ROLLER OR STREET HOCKEY BUT DO INCLUDE THESE IN 'OTHER' BELOW)
Netball
Tennis
Badminton
Squash
Basketball
Table tennis
Track and field athletics
Jogging, cross country, road running
Angling/fishing
Yachting or dinghy sailing
Canoeing
Windsurfing/boardsailing
Ice skating (DO NOT INCLUDE ROLLER SKATING BUT DO INCLUDE THIS IN 'OTHER' BELOW)
Curling
Golf, pitch and putt, putting (EXCLUDE CRAZY/MINIATURE GOLF)
Skiing (on snow /artificial, slopes/grass)

Horse riding (DO NOT INCLUDE POLO BUT DO INCLUDE THIS IN 'OTHER' BELOW)

Climbing/mountaineering (INCLUDE 'INDOORS')

Motor sports

Shooting

Walking (recreational) or hiking for 2 miles or more

Volleyball

Other

Table A6 Summary of Logistic Regression Models of Sport Clusters

	Active Aerobic	Non-active competitive	Outdoor competitive	Outdoor non- competitive
AGE IN YEARS	-	-		+
AGE (QUADRATIC)	+	+		+
# ADULTS IN HOUSEHOLD	-		+	-
# CHILDREN IN HOUSEHOLD				-
GROSS HH INCOME	+	+	+	+
MALE	+	+	+	-
MANAGERIAL/PROFESSIONAL				+
INTERMEDIATE				+
SMALL EMPLOYERS/SELF EMP				
ROUTINE				
NEVER WORKED				
UNCLASSIFIABLE	+			+
<i>REF =LOWER</i>				
<i>SUPERVISORY/TECHNICAL</i>				
CAR AVAILABLE		+	+	+
NORTH		-		
MIDLANDS				
EAST				-
LONDON & S.E.	+			
SOUTH WEST				
WALES				
<i>REF=SCOTLAN & NORTHERN</i>				
<i>IRELAND</i>				
CARER= YES				+
OWNS OUTRIGHT	+			+
OWNS WITH MORTGAGE	+			+
<i>REF=RENTS</i>				
DEGREE	+	-		+
NO QUALIFICATIONS	-			-
<i>FEF=INTERMEDIATE QUALS</i>				
MARRIED		-		
COHABITING		-		
SINGLE				
SEPARATED			+	
<i>REF=DIVORCED&WIDOWED</i>				

Table A7 Summary of Logistic Regression Models of Cultural Clusters

	consumer activities	Arts and Related activities	Heritage activities	Family outdoors
AGE IN YEARS	-	+	+	
AGE (QUADRATIC)		+	+	+
# ADULTS IN HOUSEHOLD	-	-	-	-
# CHILDREN IN HOUSEHOLD	-		-	
GROSS HH INCOME	-	+	+	+
MALE	-	-		-
MANAGERIAL/PROFESSIONAL		+	+	
INTERMEDIATE			+	
SMALL EMPLOYERS/SELF EMP ROUTINE			+	
NEVER WORKED	-			-
UNCLASSIFIABLE		+	+	
<i>REF =LOWER SUPERVISORY/TECHNICAL</i>			+	
CAR AVAILABLE	+			+
NORTH				+
MIDLANDS				
EAST				+
LONDON & S.E.			+	+
SOUTH WEST			+	
WALES				
<i>REF=SCOTLAN & NORTHERN IRELAND</i>				
CARER= YES		+		+
OWNS OUTRIGHT		+	+	
OWNS WITH MORTGAGE				
<i>REF=RENTS</i>				
DEGREE	+	+	+	-
NO QUALIFICATIONS	-		-	-
<i>FEF=INTERMEDIATE QUALS</i>				
MARRIED				
COHABITING				
SINGLE		+		
SEPARATED				
<i>REF=DIVORCED&WIDOWED</i>				

Table A8 Sport and culture activities - Average minutes per day and participation rate by adults

	Males		Females		All	
	Minutes	% Participation	Minutes	% Participation	Minutes	% Participation
Sports and Outdoor Activities						
Unspecified physical exercise	0.04	0.1	0.02	0.0	0.03	0.0
Walking and hiking	3.99	5.2	3.52	5.0	3.75	5.1
Jogging and running	0.31	0.6	0.15	0.3	0.23	0.5
Biking, skiing and skating	1.13	0.9	0.42	0.3	0.76	0.6
Ball games	6.95	5.0	1.70	1.3	4.22	3.1
Gymnastics	0.47	1.4	0.66	1.7	0.57	1.6
Fitness	1.82	2.5	1.56	2.7	1.69	2.6
Water sports	0.99	1.3	0.86	1.6	0.92	1.5
Other specified physical exercise	0.75	0.6	1.38	1.2	1.08	0.9
Unspecified productive exercise	0.00	0.0	0.00	0.0	0.00	0.0
Hunting and fishing	1.19	0.3	0.00	0.0	0.57	0.2
Picking berries, mushroom and herbs	0.02	0.1	0.02	0.1	0.02	0.1
Other specified productive exercise	0.00	0.0	0.00	0.0	0.00	0.0
Sports related activities	0.73	2.2	0.46	1.6	0.59	1.9
Total	18.38	16.8	10.76	13.1	14.41	14.9
Entertainment and Culture						
Unspecified entertainment and culture	0.07	0.0	0.06	0.0	0.06	0.0
Cinema	0.94	0.7	1.05	0.8	1.00	0.7
Theatre and concerts	0.86	0.6	1.30	0.9	1.09	0.8
Art exhibitions and museums	0.22	0.2	0.28	0.2	0.25	0.2
Library	0.66	1.0	0.58	1.2	0.62	1.1
Sports events	1.73	1.4	0.72	0.6	1.20	1.0
Other specified entertainment and culture	1.95	1.7	2.37	2.4	2.17	2.1
Total	6.44	5.5	6.35	5.9	6.39	5.7
N	8409		9128		17537	

Source: UK 2000 TUS diary, all respondents aged 16 and over