Disability, Care and Participation: secondary analysis of the Life Opportunities Survey

ESRC: Secondary Data Analysis Initiative

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Contents

List of Tables

List of figures

Chapter 1: Introduction

This report is one of the outputs from an ESRC funded project on disability, care and participation. It explores different barriers to participation for individuals with and without impairment, by using secondary analysis of the Life Opportunities Survey (ONS, 2016). It examines the role of individual, household and locality factors on the experience of barriers in different areas of life. This report presents the results of different Work Packages (1-5) derived from the analysis of Wave 1 of the Life Opportunities Survey (LOS). The methods section of the report gives an overview of the sample, participation restrictions and the variables included in the subsequent analysis. The results section outlines the outcomes of the five different work packages.

The Life Opportunities Survey (LOS) is a longitudinal survey of disability that covers Great Britain. It explores the influence of the environment in which people live on their experience of restrictions to participation and, thereby, to disability. It takes into account the social dimension of disability by collecting information about the social barriers to participation that disabled and non-disabled people may experience. The first main advantage of the survey is, thus, its basis in a social model of disability, which allows exploration of the ways in which the organisation of society interacts with impairment to create (or not) the experience of disability. The second main advantage is the LOS's longitudinal design that offers the possibility of tracking individuals over time and monitoring their transitions across key life stages.

The first work package in this project (WP1) was an initial exploratory analysis that aimed to develop cumulative measures of barriers to participation. Cluster and factor analysis were used to identify potential patterns of restrictions on a range of activities. The second work package (WP2) used bivariate analysis and explored the socio-economic and demographic differences between impaired and non-impaired respondents in relation to different barriers to participation. Additional household composition and contextual (rurality, deprivation) attributes were also explored. These individual, household and geographical characteristics were then used in the subsequent statistical analysis of the final work package (WP5). Similar bivariate analysis is conducted in the third work package (WP3) concentrating this time only on children and young adults (aged 11 to 18). The fourth work package (WP4) explored the restrictions reported by households, where at least one member reported impairment. This analysis was confined to a bivariate exploration of the household level barriers for household with or without members who reported impairment.

The final work package (WP5) implemented two statistical models - logistic and multilevel analyses. Logistic analysis explored the likelihood of impaired adults experiencing different

barriers to participation associated with demographic and socio-economic attributes. It tested the hypothesis that certain factors might mitigate the probability of certain restrictions among adults. Likewise, the multilevel analysis took into account not only individual level attributes but also household and area characteristics. It was expected that household composition and contextual effects would contribute distinctively to the experience of barriers to participation. The report concludes with a summary of the main results and suggestions for future research.

Methods

This section summarises the methods used to analyse the data sets. A detailed technical report is also available (Kampanellou, 2017).

For the following analysis, the Wave 1 dataset was used throughout.

The sample

The LOS (Wave 1) began in 2009, using a random, single-stage, non-clustered sample of addresses drawn from the Postcode Address File (PAF). The initial number of households was 37,500. From June 2009 - March 2011, 19,951 households responded to the questionnaire. All adults aged 16 and over living in an eligible household were interviewed, whereas for children aged 11-15 parental proxy interviews were taken. Proxy interviews were also used for adults unable to be interviewed. The starting number of individuals was 46800. This included all adults who gave full or partial interviews, children, as well as individuals who refused, were not eligible for interview or where no contact was made. The sample for the subsequent analysis included only the adults 16 and over, who had given a full interview, plus the children with proxy data. The final sample included in our analysis was 31914 adults and 9222 children aged under-16 in 19885 households.

Barriers to participation

There LOS covers eight main areas of participation for adults: learning, work, economic life, civic life, social life, transport and accessibility in and out of home.

There were two versions of participation restrictions in the dataset. The first and shorter version appeared in an initial participation restriction module (ICF Participation Restriction) and formed a single question: *There are many reasons why people can't take part in activities as much as they would like to. Are you limited in the following areas of life for any reason?* The respondent could select one or more of the following options: education, work, transport, personal relationships and leisure.

The second and more detailed version was in the subsequent parts of the questionnaire where every participation restriction was a stand-alone chapter containing a set of questions. For our subsequent analysis, we mainly used the detailed version of participation restrictions, but sometimes also data that derived from the first version. So, for example, the work restriction question in the first version was asked of every adult; it was more inclusive and did not impose restrictions in response options. More information on the areas of restrictions is available in the LOS technical report (Kampanellou, 2017).

Impairment

We created a single variable to summarise both the presence or absence of any reported impairment and the overall level of severity of impairment. We first used data from the reporting of 14 different types of impairment; a simple summary variable thus counted the number of impairments reported. The LOS data set included an overall severity of impairment variable, which ran from 1 (lowest) to 4 (highest). For our work, we created a single variable that multiplied the number of impairments reported by this overall severity score. This was then recoded into four categories: no impairment; mild impairment; moderate impairment and severe impairment. The detailed description of the derivation of this variable is in the technical report (Kampanellou, 2017).

Individual, household composition and contextual variables included in the multi-variate analysis

The main objective of the analysis was to explore the relationship between impairment status and the likelihood of reporting restrictions in different areas of life, taking into account demographic and socio-economic individual attributes as well as household composition and contextual factors. The variables included were selected after initial univariate analysis and discussion in the research team, informed by their knowledge of the pre-existing literature. This analysis was also restricted to adults, as the number of children with reported impairments was too small to allow a multi-variate approach (see Chapter 4).

We included individual variables such educational qualifications and economic activity as commonly used measures of socio-economic status. Gender, ethnicity and marital status might also be significant since impairment increases with age, and the experience of barriers to participation might differ between men and women, different ethnic groups and individuals with different marital statuses. The individual variables and their categories included in the analysis are in Table 1.

Table 1: Individual variables and categories (adults)

Indicators	Categories
Impairment Status	
Impairment Status	Yes-No
Severity of Impairment	No Impairment-Mild-Moderate-Severe
Demographic and Socio-economic status	
Age	16 to 24-25 to3 4-35to 44-45 to54 -55 to 64
Gender	Male-Female
Marital Status	Single-Married-Divorced-Widowed
Ethnicity	White-Non white
Highest Educational Qualifications	No qualifications-Basic-Degree or Higher-Other non-degree
Economic Activity	Employed-Unemployed-Retired-Inactive

We also selected household composition and contextual factors that might have an impact on different participation restrictions (see Table 2). Household economic status is described by two indicators: ownership of a property (tenure) and whether the household has difficulties in making ends meet financially. Household size, the presence or absence of dependent children, and the number of people in a household reporting impairment were included for their potentially modifying impact on the individual level experience of barriers to participation.

Where someone lives might also play a role in the experience of barriers to participation. Therefore, a locality deprivation index (index of multiple deprivation) and a rurality indicator were also included in the analysis.

Table 2: Household composition and contextual indicators

Indicators	Categories
Household	
Tenure	Owner (outright/mortgage)-Rent/rent free
Economic difficulties	Yes-No
Household Impairment Level	No impairment- At least one mild/moderate- At least one severe
Household Size	One-More than one
Children <16 in Household	No children-; Up to 11 years; 12 to 15 years
Geographical	
Index of Multiple Deprivation	1 Most Deprived to 5 Least Deprived
Rurality	Urban-Rural

The indicator 'economic difficulties' represents the participation restriction Economic Life

Chapter 2: Measures of barriers to participation

In order to create cumulative measures of barriers to participation, in WP1 we first used two methods of identifying the ways in which different participation restrictions were experienced (or not) in combination: factor and cluster analysis. The overall purpose of both methods is data reduction and identification of patterns between variables/cases. Factor analysis determines the underlying structure of the data, since it creates latent variables that simplify the data based on the relationship between variables. It generates indexes with variables that measure similar things. Cluster analysis, however, aims to identify smaller groups of cases or variables that represent the data. It creates categories or clusters of cases/variables that are either more or less similar to one another. Although they are different methods, they are often used in a complementary fashion to enhance data interpretation and results derived from other methods.

Factor analysis

Exploratory factor analysis was performed by using the principal-components factor method, a commonly used method and including all participation restrictions. There were three different versions of the analysis. The first one was based on the whole sample, the second one on a sub-sample of adults who reported impairment and the third one on a sub-sample of adults who did not report impairment. The reason for this was to examine whether different patterns of participation restrictions existed within different samples.

One of the prerequisites of a reliable factor analysis is a sample size big enough to extract factors. The Kaiser-Meyer-Okin measure of sampling adequacy (KMO) can detect whether this is the case. The closer the KMO it is to 1 the better, and as rule of thumb, a result larger than 0.6 is looked for (Field, 2009. p. 647).

It is also important that the variables do not correlate too much or too little. A very high correlation cannot determine a unique distribution, whereas a low correlation indicates that the variables do not measure the same underlying concept. Bartlett's test can detect low correlations. If the test is significant we can assume that there is an appropriate level of correlation between variables.

Testing the sample and correlations

Our sample was 31,914 individuals aged 16 and older. The Bartlett's test[1] suggests that there was some correlation between variables and the KMO[2] measure that the sample was adequate for factor analysis.

[1]Bartlett test of sphericity: Chi-square = 12967.390, df=28, p= 0.000

Factor analysis of participation restrictions in the whole sample

The first tranche of analysis included the whole sample and Table 3 indicates that there are two main factors (Kaiser criterion >1). The eigenvalues describe the variance accounted for by each factor together with the difference between the previous one and the next, whereas the proportion indicates the importance of each factor in relation to variance. Here, the first factor explains 23 per cent of the variance. Orthogonal rotation is used, where factors are not correlated to each other, in order to get a clearer pattern. This way we can create new variables or indexes without inter-correlated elements (Table 4).

Table 3: Whole sample-Principal Components factor method

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.86934	0.69566	0.2337	0.2337
Factor2	1.17368	0.18748	0.1467	0.3804
Factor3	0.98620	0.07051	0.1233	0.5037

Only the first 3 factors included Factors retained: 2 Obs: 31740-Results are weighted

Table 4: Whole sample – Rotated Principal Components factor method

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.55056	0.05810	0.1938	0.1938
Factor2	1.49247	.	0.1866	0.3804

Factors retained: 2 Obs: 31740 Rotation: Orthogonal-Varimax

Table 5 shows the contribution of each variable in the structure of the factor. The higher the load of a variable then the higher is its relevance in defining the factor. Uniqueness refers to the variance not shared with other variables, thus the higher the uniqueness the lower the relevance of the variable in the factor. The first factor includes the variables Learning, Work, Economic, Civic, Social and Transport. All these components are related to working and social life. However, the uniqueness is quite high for learning, social life and transport, suggesting that they might not fit very well with factor 1. Work appears to exist in both factors and be a better fit in factor 2. Factor 2 includes accessibility in and out of home, together with work. This indicates that it is a stand-alone dimension, probably representing individuals with impairments reporting feeling restricted in terms of accessibility.

H0: variables are not inter-correlated. We reject the null hypothesis

[2] Kaiser-Meyer-Olkin Measure of Sampling Adequacy: KMO = 0.677

Table 5: Loadings- Whole Sample -Rotated-Principal Components factor method

Factor	Factor1	Factor2	Uniqueness
Learning	0.5241		0.7001
Work	0.3896	0.4641	0.6328
Economic	0.4964		0.7142
Civic	0.6317		0.5958
Accessibility In the Home		0.7681	0.4054
Accessibility Outside Home		0.7393	0.4450
Social	0.5137		0.7107
Transport	0.4492		0.7530

Factors retained: 2 Obs: 31740 Rotation: Orthogonal-Varimax – Blanks loading <0.3

Factor analysis of participation restrictions in the sub-sample of adults not reporting impairment

The sub-sample for this part of the analysis comprises 19957 individuals, who did not report impairment but did report participation restrictions. As in the previous sub-section the first two tables (6 and 7) report the factor findings without and with rotation, with Table 7 showing a four factor solution.

Table 8 shows these four distinct factors after the rotation (see Table 8). Factor 1 includes learning, work and economic life - all the barriers associated with working life. The second factor includes accessibility in and out of home, with transport and civic participation in factor 3, and social life in factor 4.

Table 6: Not impaired sub-sample - Principal Components factor method

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.43549	0.33346	0.1794	0.1794
Factor2	1.10202	0.06476	0.1378	0.3172
Factor3	1.03726	0.02448	0.1297	0.4468
Factor4	1.01278	0.12337	0.1266	0.5734
Factor5	0.88941	0.01718	0.1112	0.6846

Only the first 5 factors included. Factors retained: 4 Obs: 19957 Results are weighted

Table 7: Not impaired sub-sample –Rotated Principal Components factor method

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.33427	0.22435	0.1668	0.1668
Factor2	1.10992	0.02423	0.1387	0.3055
Factor3	1.08569	0.02802	0.1357	0.4412
Factor4	1.05767	.	0.1322	0.5734

Factors retained: 4 Obs: 19957 Rotation: Orthogonal-Varimax

Table 8: Loadings-Not impaired sub-sample -Rotated Principal Components factor method

Factor	Factor1	Factor2	Factor3	Factor 4	Uniqueness
Learning	0.6112				0.5649
Work	0.6698				0.5437
Economic	0.6663				0.4755
Civic			-0.7053		0.3971
Accessibility In the Home		0.8087			0.3137
Accessibility Outside Home		0.6680			0.4906
Social				0.8557	0.2662
Transport			0.7553		0.3609

Factors retained: 4 Obs: 19957 Rotation: Orthogonal-Varimax – Blanks loading <0.3

Factor analysis of participation restrictions in a sub-sample of individuals reporting impairment

This sub-sample comprises 9354 individuals, who reported at least one impairment, and at least one participation restriction. As before the first two tables (9 and 10) show the factor solutions without and with rotation. Table 11 shows details of the three factors after rotation. Factor 1 includes accessibility in and out of the home and transport, and factor 2 includes learning, work, economic and civic participation. The final factor includes social, civic and learning, although learning restrictions do not have high loadings on the third factor.

Table 9: Sub-sample reporting impairment - Principal Components factor method

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.67803	0.44241	0.2098	0.2098
Factor2	1.23563	0.22751	0.1545	0.3642
Factor3	1.00812	0.05713	0.1260	0.4902
Factor4	0.95099	0.06437	0.1189	0.6091

Only the first 4 factors included Factors retained: 3 Obs: 9354- Results are weighted

Table 10: Sub-sample reporting impairment – Rotated Principal Components factor method

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	1.42347	0.05842	0.1779	0.1779
Factor2	1.36505	0.23180	0.1706	0.3486
Factor3	1.13325	.	0.1417	0.4902

Factors retained: 3 Obs: 9354 Rotation: Orthogonal-Varimax

Table 11: Sub–sample reporting impairment - Rotated Principal Components factor method

Factor	Factor1	Factor2	Factor 3	Uniqueness
Learning		0.5115	0.3699	0.5966
Work		0.6411		0.5157
Economic		0.7499		0.4342
Civic		0.3104	0.4594	0.6726
Accessibility In the Home	0.7028			0.4539
Accessibility Outside Home	0.7732			0.3964
Social			0.8161	0.3156
Transport	0.4769			0.6932

Factors retained: 3 Obs: 9354 Rotation: Orthogonal-Varimax – Blanks loading <0.3

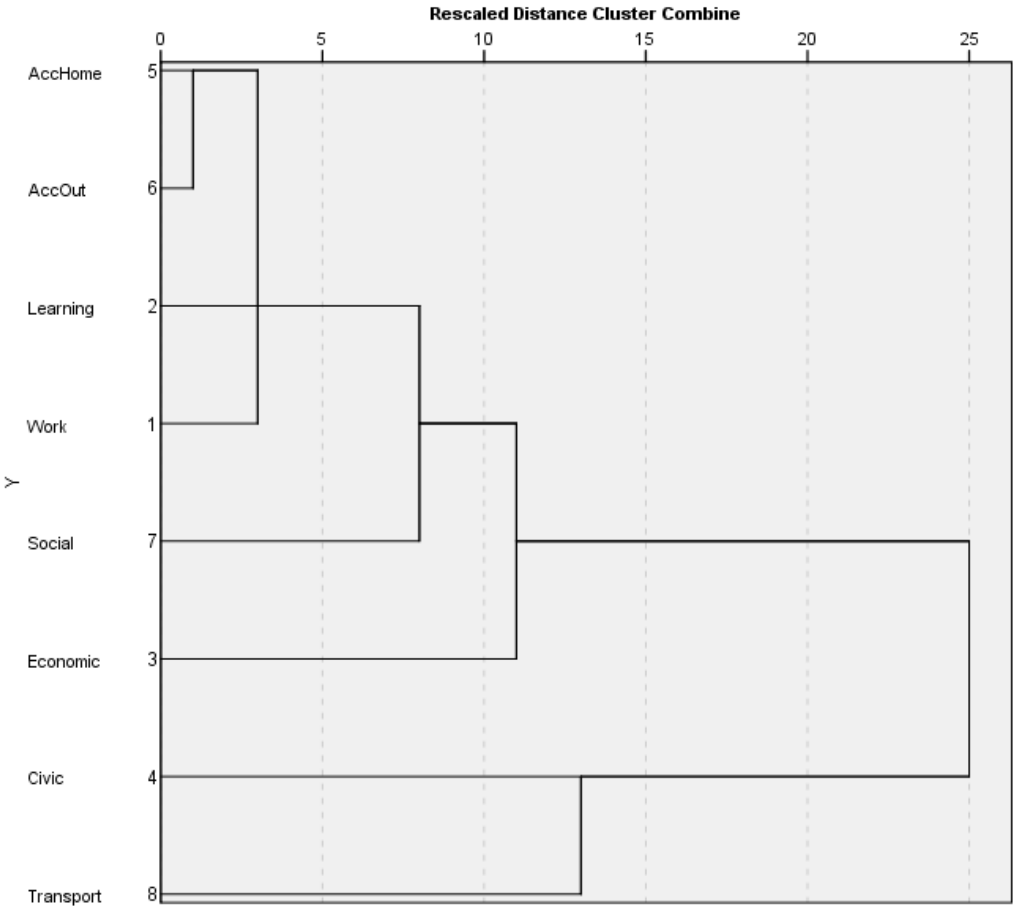
Cluster analysis

Given the mixed results of the factor analysis, we supplemented the factor analysis with cluster analysis to explore further if and how certain participation restrictions might cluster together. The first step was an hierarchical cluster analysis with a simple matching method for binary variables on the whole sample (Costello and Osborne 2005). As with the factor analysis the analysis was then repeated on sub-samples of those who did and did not report impairment.

Cluster analysis of participation restrictions in the whole sample

The dendogram (Figure 1) is used to visualize cluster membership. It displays the distance between a combination of variables and clusters. Reading from left to right we can visualize at which distance objects have been combined. The first vertical line is the smallest distance between our variables. Figure 1 thus suggests that accessibility in and out of the home cluster together and then the same variables cluster with work, whereas social and learning participation are combined together at a much later stage. The final three variables – economic, civic participation and transport are the last to be combined. Table A1 (Appendix A) gives more information on the level of similarity between variables.

Figure 1: Cluster Membership – whole sample

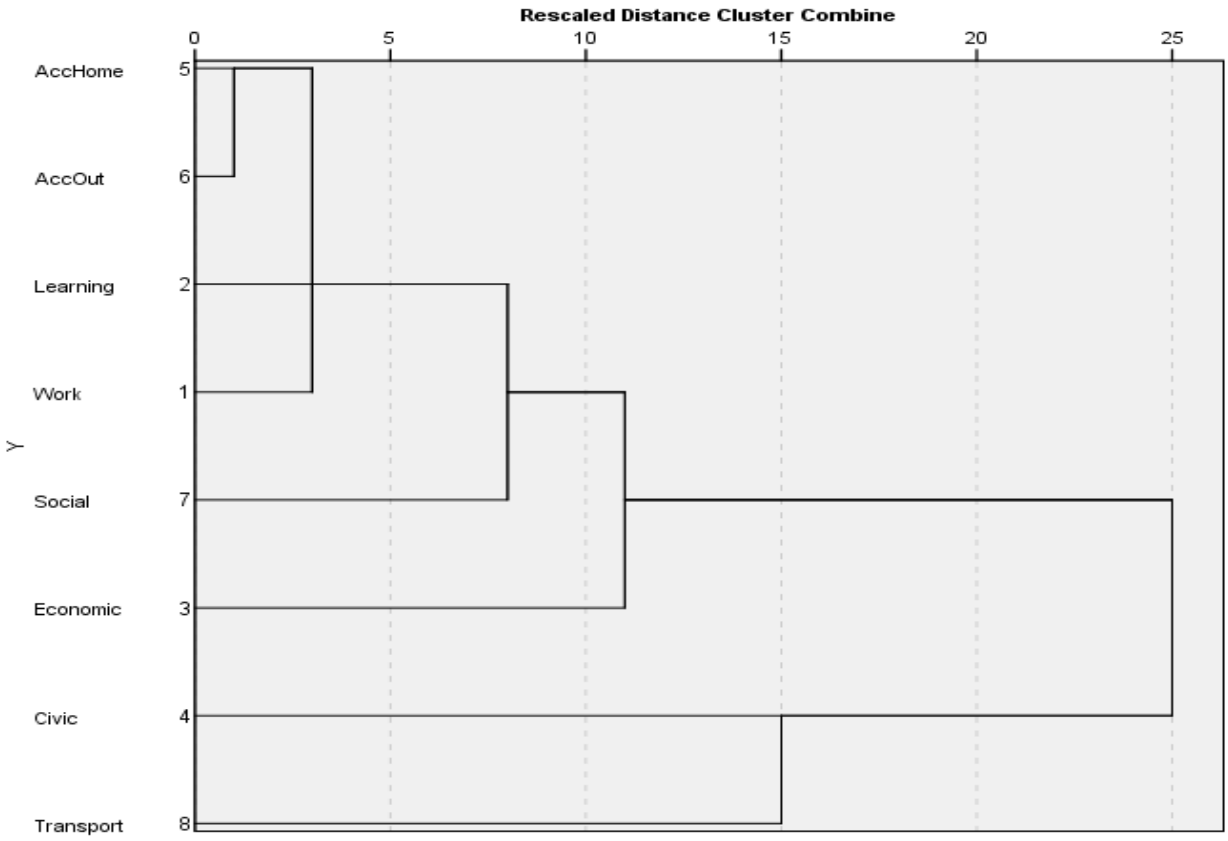


Cluster analysis of participation restrictions in sub-sample not reporting impairment

In the second version of the cluster analysis, that includes only the non-impaired population, it is obvious that the cluster membership is similar to that for the sample as a whole. Accessibility is a stand-alone cluster that then merges with work. Learning, social and economic restrictions are combined together with civic and transport.

The similarity is largely due to that fact that the non-impaired population is much larger than the impaired one in the dataset. Minor changes in the association of variables can be seen in the proximity matrix (Table A2, Appendix A).

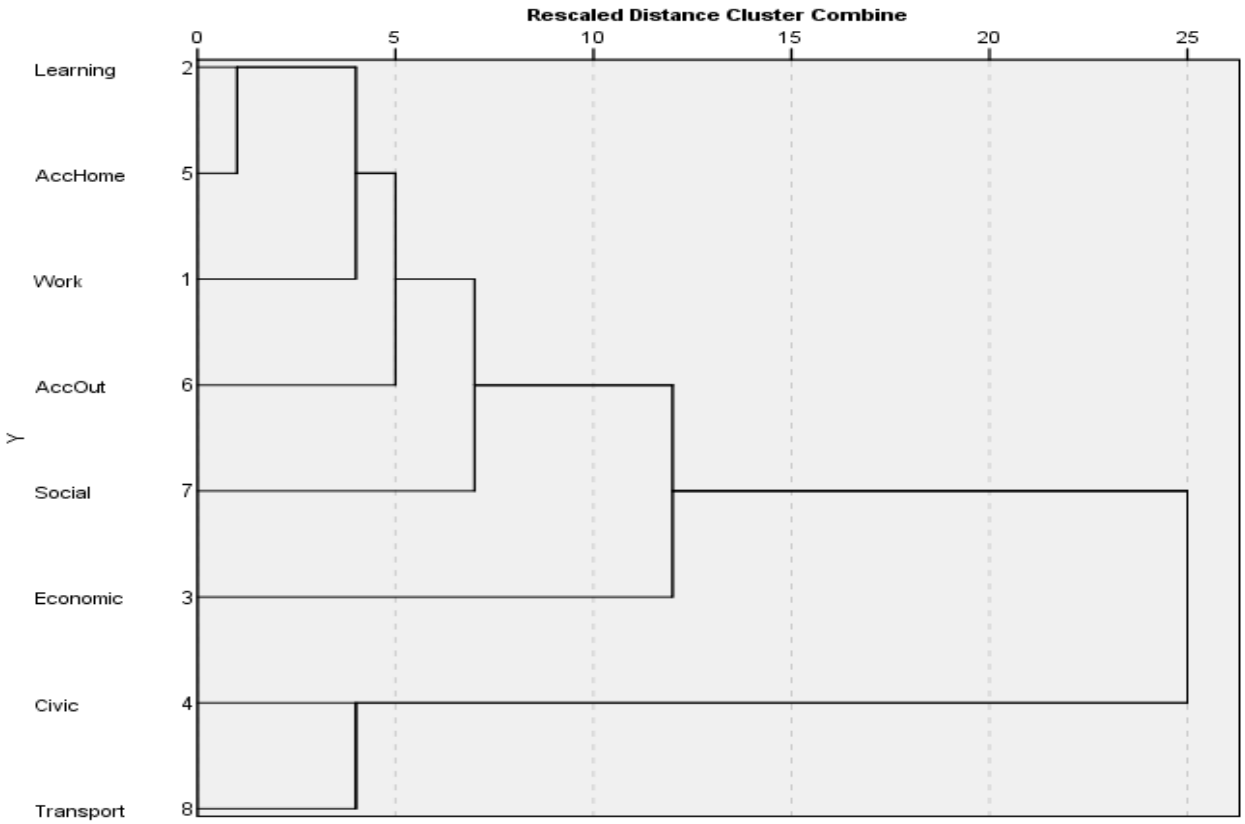
Figure 2: Cluster Membership – sub-sample not reporting impairment



Cluster analysis in sub-sample reporting impairment

The final version of the cluster analysis includes only those reporting impairment. Here the outcome is different, with learning and accessibility at home clustered together first and then further combined with work and accessibility outside of the home. Civic and transport restrictions form a separate cluster, whereas social and economic life do not merge until much later. The main difference from the prior analyses is thus that the learning, accessibility (home and out) and work restrictions are merged in a different order.

Figure 3: Cluster Membership – Impaired



Conclusions

Both factor and cluster analysis have exploratory purposes and both have shown similar but mixed results. In all versions of the analysis it appears that accessibility in and out of the home can be either a stand-alone factor or cluster, since it represents the different dimensions of physical restrictions inside or outside home. The restriction of accessibility is related to further learning, work and, thereby, economic restrictions. This was more evident in the cluster than factor analysis, where people who report accessibility restrictions might also feel restricted in additional areas related to their working life. Regarding the remaining restrictions - transport, civic and social life - it appears that in some analyses they are grouped together and in others apart. Therefore they are more likely to behave as independent clusters or factors.

In conclusion, both factor and cluster analyses have given an overview of some possible patterns of proximity of participation restrictions. However, it has not been possible to identify distinct factors or clusters on which we could have based the creation of cumulative measures. We highlighted in our original proposal for the work reported here that, while we would not have time for a full programme of scale development, we would explore how LOS data might be used for such development in subsequent secondary analysis. WP1 has

shown that this work is necessary. More modern approaches to scale development (Rasch analysis) will be necessary in order to identify possible cumulative barriers to participation. This would be entirely possible in future work, given the development stages that preceded design of the LOS, including extensive consultation, qualitative work and cognitive testing.

Chapter 3: Adults, impairment and participation restrictions

The bivariate, descriptive analysis that we carried out in work package 2 of our project focused on adults, exploring differences in demographic and socio-economic characteristics between those reporting and not reporting impairments. This step was essential for subsequent multi-variate analysis, since important socio-economic and demographic attributes need to be taken into account in order to examine the association between participation restrictions and impairment. In addition, visualizing bivariate associations assists in understanding which factors are important in reporting barriers in different areas of life. The bivariate analysis that follows is at three different levels: individual, household and geographical.

Individual characteristics

The following tables and figures show the demographic and socio-economic attributes of people with and without impairments and also compare those who report participation restrictions to those who do not. Additional tables regarding these attributes in relation to restrictions are presented in Appendix B.

Age

Age is one of the leading factors related to impairment, since the likelihood of impairment increases with age. Table 12 shows, thus, that the incidence of impairment is higher among older groups.

Table 12: Age of those with and without impairment (all adults)

Age	Impairment		
	% of those reporting impairment	*% of those not reporting impairment*	*% of total*
16-24	5	14	11
25-34	8	18	15
35-44	15	20	18
45-54	17	17	17
55-64	19	15	16
65-74	16	10	12
75+	19	6	10
N (100%)	9,832	22,080	31,912

Missing: 2 cases- Weighted %- chi2(6) = 2.2e+03, $p < 0.05$, C= 0.26

Table 13: Percentages of adults in different age groups reporting participation restrictions

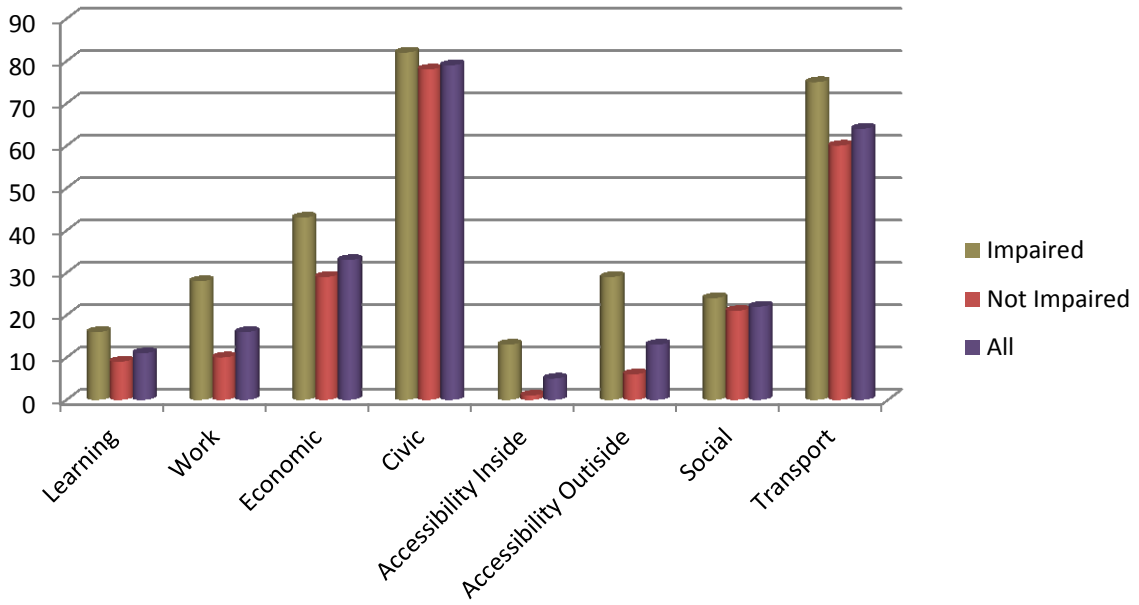
Participation restriction	% of those in each age group reporting restriction (all adults)							
	16-24	***25-34***	***35-44***	***45-54***	***55-64***	***65-74***	***75+***	***All adults***
Learning	11	16	15	13	9	6	6	11
Employment	13	17	20	19	17	9	9	16
Economic	43	39	39	36	27	24	19	33
Civic	84	88	86	83	75	65	64	79
Accessibility in the home	2	2	2	4	5	7	13	5
Accessibility outside the home	8	11	11	11	13	15	27	13
Social	24	27	27	27	20	13	12	22
Transport	63	65	65	65	63	64	67	64
N (100%)	2954	4041	5282	5263	4947	3915	3070	29472

Table 13 shows that there were large differences in the types of restrictions reported by all adults (16 years and above). Civic restrictions were those most often reported (by almost 80% of the total), while restricted accessibility at home was the least often reported (by 5% of the total). Reporting of restrictions in accessibility in the home and outside the home increased with age, while those related to employment, economics (financial restrictions) and social aspects of life decreased with age.

Impairment

Overall, some 31 per cent of those surveyed reported at least one impairment. Both individuals with impairment and those without reported broadly similar levels of restrictions in the areas of transport, civic and social life (Figure 4). However, restrictions in learning, work, economic life and accessibility were more evident among those who reported impairment.

Figure 4: Participation restrictions and impairment (all adults)



Sex

The percentage of females reporting impairment was higher than that of males (Table 14). However, both males and females reported similar types of participation restrictions, with the most frequent being transport, economic and civic life (Figure 5).

Table 14: Sex of those with and without impairment (all adults)

Sex	**Impairment**		
	% of those reporting impairment	***% of those not reporting impairment***	***% of total***
Males	43	47	46
Females	57	53	54
Total	9,832	22,080	31,912

Missing: 2 cases- Weighted %- chi2(1) = 47.5944, $p < 0.05$, C= 0.04

Figure 5: Percentage of individuals reporting participation restriction by sex (all adults)

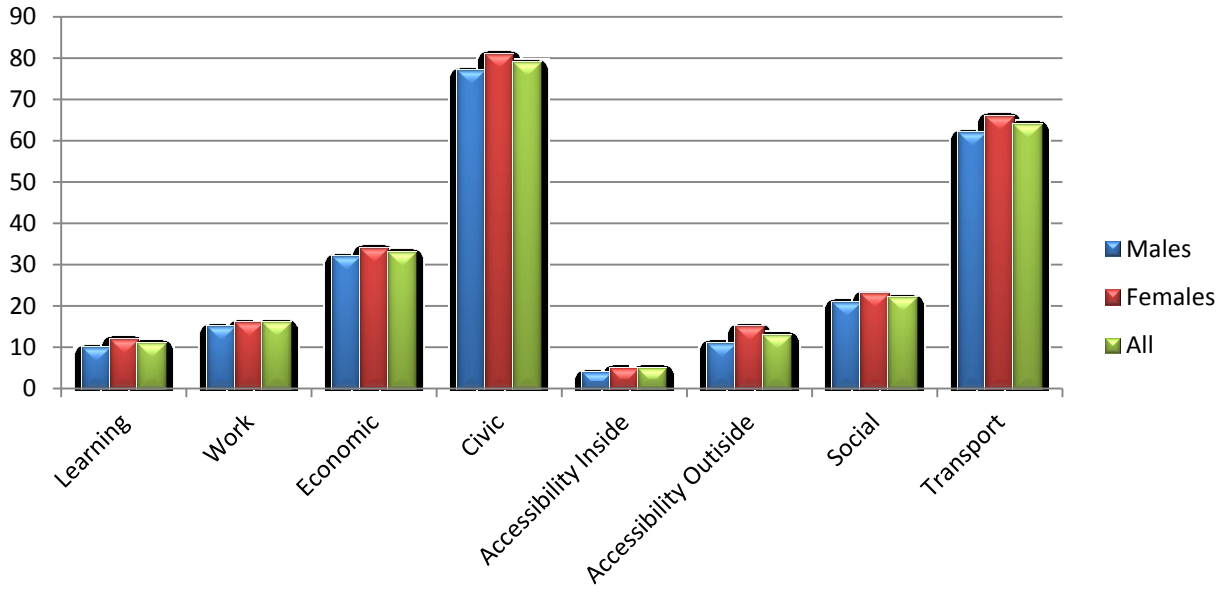


Table 15 examines both impairment and gender in relation to restrictions (Table 15).

It is obvious, first, that the higher the level of severity, the higher the reporting of certain restrictions. For example, reporting of restrictions in transport, work, economic and civic life was higher among individuals who reported the highest level of severity. Secondly, barriers in learning and economic life appeared evenly distributed across males and females, whereas work restrictions were slightly higher among men with severe impairments. There were no major differences in reporting of social or civic life barriers among groups with different levels of impairment or between males and females. However, accessibility and transport restrictions were more common among the more severely impaired groups, especially females.

Table 15: Participation restrictions, impairment and sex (all adults)

Participation Restrictions	% of women with impairments reporting restrictions			% of men with impairments reporting restrictions			% reporting restrictions in whole sample	
	Severity of impairment			*Severity of impairment*				
	Mild	*Moderate*	*Severe*	*Mild*	*Moderate*	*Severe*	*Impaired*	*Not impaired*
Learning	14	16	21	12	12	22	16	9
Work	17	25	47	17	33	56	28	10
Economic	37	42	54	35	44	56	43	29
Civic	81	85	88	79	80	87	82	78
Accessibility In Home	4	11	36	3	12	20	12	1
Accessibility Out Home	14	32	61	11	29	53	29	6
Social	25	24	25	25	23	22	24	21
Transport	69	75	89	68	76	86	75	60
N (100%)	2,317	1,955	1,209	1,661	1,351	928	9,421	20,050

Marital status

Those reporting impairment were less likely than those not to be single or married and more likely to be divorced/separated or widowed (Table 16), again probably reflecting age differences between those with and without impairment.

Restrictions in civic and economic life were higher among the single and divorced, while accessibility in and outside home was higher among the widowed (Table 17). This latter difference is likely explained by age and possibly living alone, both of which may hinder accessibility.

Table 16: Marital status and impairment (all adults)

Marital status	Impairment		
	% of those reporting impairment	*% of those not reporting impairment*	*% of total*
Single	21	33	30
Married	49	52	51
Divorced/Separated	15	10	11
Widowed	14	5	8
N (100%)	9,832	22,078	31,910

Missing: 4 cases
Weighted %
chi2(3) = 987.8948, $p < 0.05$, C= 0.18

Table 17: Participation restrictions and marital status (all adults)

Participation restrictions	Marital Status				
	Single	***Married***	***Divorced Separated***	***Widowed***	***All***
	% reporting restrictions				
Learning	13	10	15	6	11
Work	17	13	24	13	16
Economic	40	27	48	27	33
Civic	84	78	83	65	79
Accessibility In Home	3	4	7	13	5
Accessibility Out Home	10	12	16	25	13
Social	25	22	25	13	22
Transport	63	64	69	65	64
N (100%)	7,758	15,914	3,482	2,318	29,472

Ethnicity

Ethnic groups in the LOS were broadly defined, due to small numbers. The 'white' population group was the largest, making up 93 and 89 per cent respectively of those with and without impairment (Table 18). This difference was, again, likely driven by age differences in the white compared to non-white populations, with the former tending to be older on average.

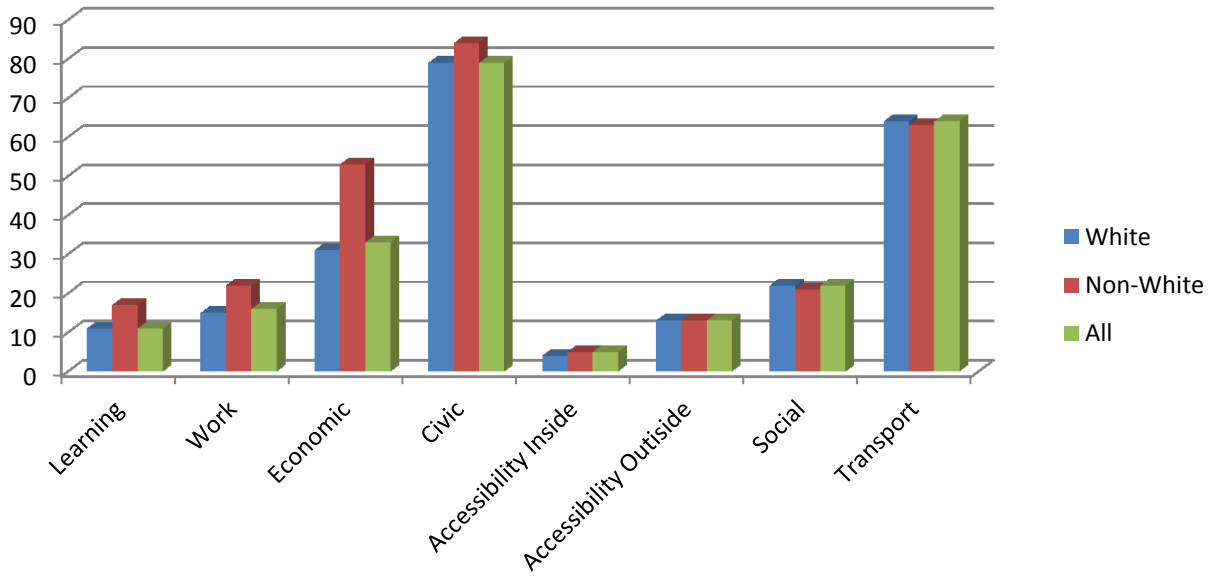
Barriers towards work, economic life and learning were higher among those in 'non-white' groups (Figure 6). More information on different types of restrictions is in Appendix B (Table B5).

Table 18: Ethnicity and impairment (all adults)

Ethnicity	Impairment		
	% of those reporting impairment	***% of those not reporting impairment***	***% of whole sample***
White	93	89	90
Mixed	1	1	1
Asian Asian British	3	5	5
Black Black British	2	2	2
Chinese/Other	1	2	2
N (100%)	9,826	22,068	31,894

Missing: 20 cases- Weighted %- chi2(4) = 95.2335, $p < 0.05$, C= -0.05

Figure 6: Percentage of individuals reporting restrictions by ethnicity (all adults)



Educational qualification level

Individuals reporting impairment were less likely than those not to report having some form of higher education qualification (Table 19). Age may be a factor here, as it has been in other variables examined so far, given that levels of participation in higher education have risen dramatically since the 1960s.

Table 19: Educational qualifications and impairment (all adults)

Educational qualifications	**Impairment**		
	% of those reporting impairment	***% of those not reporting impairment***	***% of whole sample***
Basic	31	35	34
Higher	15	26	23
Other	29	26	27
None	25	12	15
N (100%)	6,986	19,336	26,322

Missing: 5592 cases- Weighted %- chi2(3) = 844.1452, $p < 0.05$, C= 0.13

Table 20: Participation restrictions and education (all adults)

	Educational qualification level				
Participation Restrictions	***Basic qualifications***	***Higher qualifications***	***Other qualifications***	***No qualifications***	***Whole sample***
	% reporting restrictions				
Learning	12	12	14	11	12
Work	16	13	18	22	17
Economic	39	21	36	50	35
Civic	83	85	82	76	82
Accessibility In Home	3	2	3	7	3
Accessibility Out Home	10	10	12	15	11
Social	24	29	25	16	24
Transport	64	62	65	65	64
N (100%)	8,308	5,492	6,834	3,939	24,573

Recoded up to 69 years old

Overall, differences in restrictions between people with different levels of qualifications were not as great as might have been expected. However, there was a clear advantage for those with higher qualifications in relation to lower reporting of work and particularly economic restrictions (Table 20). Civic and transport restrictions were the most commonly reported across all sub-groups.

Economic activity

The last individual level confounding factor that we explored was economic activity. There was a stark difference between those reporting impairment and those not in terms of their economic activity (Table 21) but, of course, age plays a large role here.

As might be expected, economic and work restrictions were most often reported by those who were unemployed or economically inactive (Table 22). Those who were retired were less likely than other sub-groups to report civic or social restrictions, while restrictions associated with accessibility outside the home were more evident among both those who were economically inactive and those who were retired.

Table 21: Economic activity and impairment (all adults)

Economic Activity	Impairment		
	% of those reporting impairment	*% of those not reporting impairment*	*% of total*
Employed	35	65	56
Unemployed	5	5	5
Retired	38	18	24
Inactive	22	13	15
N (100%)	9,826	22,065	31,891

Missing: 23 cases

Weighted %- chi2(4) = 2.4e+03, $p < 0.05$, C= 0.24

Table 22: Participation restrictions and economic activity (all adults)

Participation Restrictions	Economic Activity				
	Employed	*Unemployed*	*Retired*	*Inactive*	*Whole sample*
	% reporting restrictions				
Learning	11	21	6	16	11
Work	11	33	9	38	16
Economic	30	67	21	54	33
Civic	83	89	64	85	79
Accessibility In Home	1	2	9	9	5
Accessibility Out Home	8	10	20	23	13
Social	27	23	13	21	22
Transport	62	73	65	71	64
N (100%)	16,114	1,326	7,519	4,492	29,451

Household characteristic

The analysis presented here is based on households, not individuals within households; it thus explores whether *anyone* in a given household reported any of the participation restrictions.

Tenure

Table 23 presents the frequencies of ownership in relation to different restrictions. As this shows, there were several and varied differences in reported restrictions. Reporting of restrictions in accessibility inside and outside the home and social barriers was slightly more frequent in households were the property was owned outright or rented. Households that were renting were substantially more likely to report work and economic restrictions.

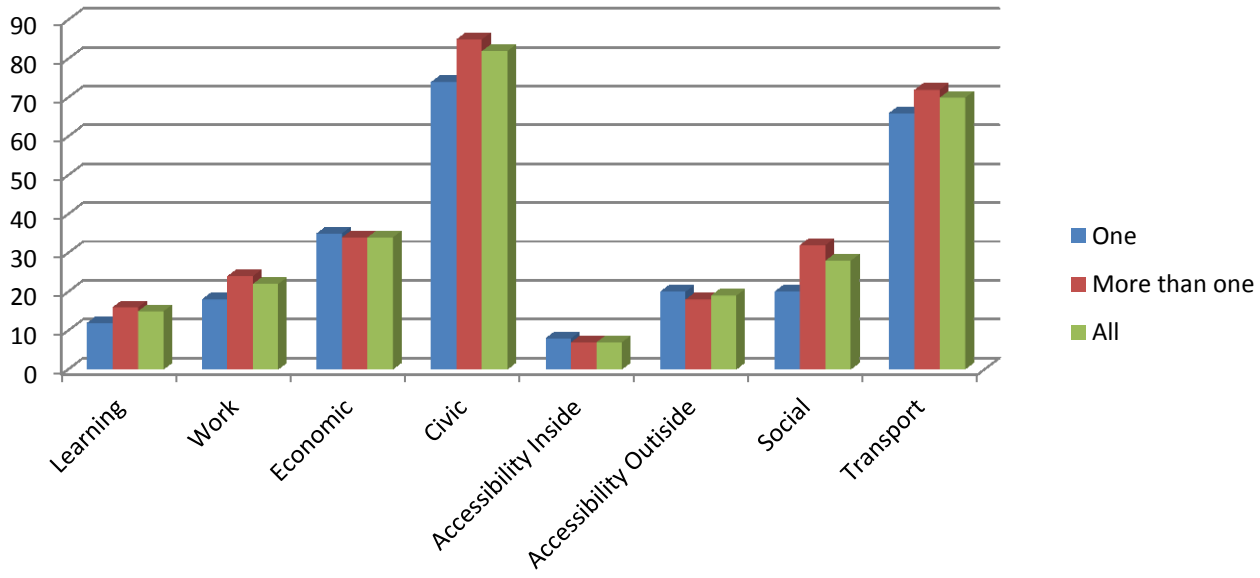
Table 23: Household tenure and participation restrictions (all households)

Participation restrictions	Household tenure			
	Owner	***Owner mortgage Owner shared***	***Rent/Rent free***	***Whole sample***
	% reporting restriction			
Learning	9	16	20	15
Work	15	21	31	22
Economic	17	31	53	34
Civic	73	87	86	82
Accessibility In Home	8	4	10	7
Accessibility Out Home	20	15	22	19
Social	21	34	28	28
Transport	66	71	72	70
N (100%)	6,333	6,468	5,878	18,679

Household size

Looking at the size of the household, Figure 7 shows that single households were slightly more likely to report civic and transport restrictions. Households with more than one person reported barriers to accessibility in and outside of home slightly more frequently than those in single person households. Work and social restrictions were also more evident among larger households. By contrast there were only very small variations in the reporting of work restrictions. Some of those variations are possibly also influenced by the composition of the households. Therefore, the next analysis presented looks at the presence and age of children in households.

Figure 7: Number of people in household and participation restrictions (all households)



Children in the household

Table 24 shows that in all areas except accessibility outside the home, households without children were less likely to report restrictions than households with children. Further, households with young children were more likely to report most restrictions than households with older children. In households with children of *any* age, economic and social restrictions were reported more often than in households without children.

Table 24: Presence and age of children and participation restrictions (all households)

Participation Restrictions	**Presence and age of children in households**			
	Up to 11	***12-15 only***	***No children <15***	***Whole sample***
	% reporting restrictions			
Learning	21	17	13	15
Work	31	28	20	22
Economic	48	46	29	34
Civic	91	88	79	82
Accessibility In Home	4	6	8	7
Accessibility Out Home	20	16	19	19
Social	33	35	26	28
Transport	73	74	69	70
N (100%)	4,116	1,050	13,526	18,692

Regional characteristics

We now turn to participation restrictions for households living in urban and rural areas as well as in areas with different levels of deprivation.

Most households in the sample were located in urban areas and impairment levels did not differ significantly across households in relation to urban versus rural localities (Table 25). Overall, it appears that households where all residents reported impairment were more likely to be in urban areas.

As one might expect, households in rural areas were slightly more likely to report transport restrictions than those in urban areas (Figure 8). By contrast, civic, economic and work restrictions were more frequently reported by households in urban areas. There were no major differences in the remaining restrictions.

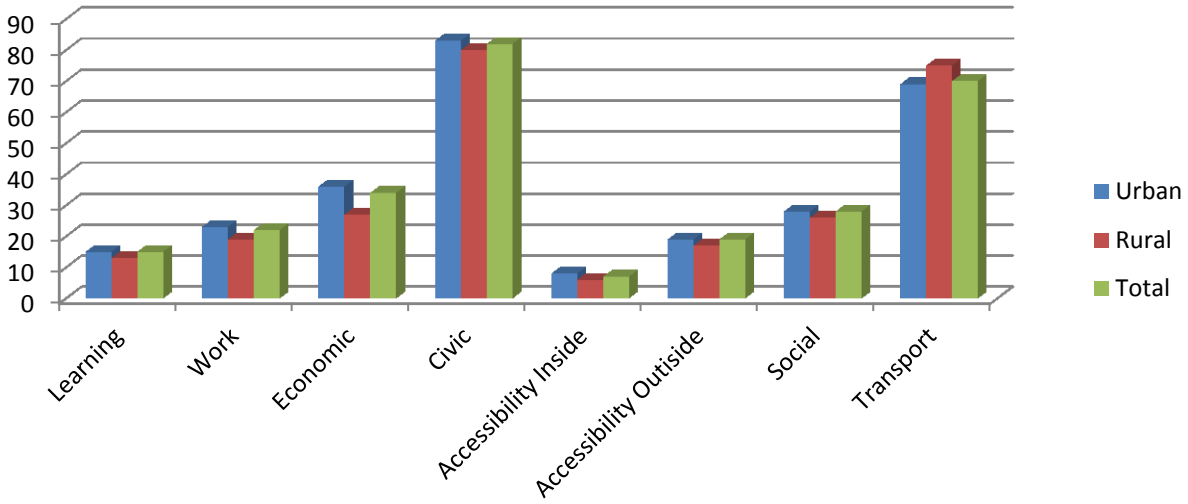
Table 25: Urban/rural area and impairment status (all households)

Urban/Rural	**Household Impairment Status**			
	No adults with impairment	***At least one adult with impairment***	***All adults with impairment***	***Whole sample***
	% in urban or rural area			
Urban	80	78	82	80
Rural	20	22	18	20
N (100%)	11,222	4,980	3,670	19,872

Missing: 12

Weighted % - chi2(2) = 15.0822, $p < 0.27$, C= -0.0077 (not significant)

Figure 8: Urban/rural areas and participation restrictions (all households)



The last two tables in this chapter (tables 26-27) show the deprivation levels for the areas in which households lived, by impairment and by participation restrictions. Deprivation was defined using the Indices of Multiple Deprivation for England, Wales and Scotland, which define area deprivation on a ten-point scale. We grouped the first five categories (most deprived) and the last five (least deprived), and analysed the data separately for each country.

Table 26: Deprivation and impairment (all households)

Deprivation/Country	**Household impairment status**			
	No adults impaired	***At least one impaired adult***	***All adults impaired***	***Whole sample***
	% in each level of deprivation			
Most Deprived England	41	46	50	44
Most Deprived Wales	2	3	3	3
Most Deprived Scotland	5	4	8	5
Least Deprived England	44	41	34	41
Least Deprived Wales	2	2	2	2
Least Deprived Scotland	5	4	4	5
N (100%)	11,227	4,985	3,672	19,884

Missing: 1- Weighted % - chi2(10) = 229.4392, $p < 0.05$, C= -0.08

Table 26 shows that in England there is a clear relationship between deprivation and higher proportions of households with at least one person who reported impairment. Further, the most deprived areas include a higher percentage of households where all adults reported impairment. The numbers for Wales and Scotland are small but suggest a similar pattern.

The patterning of reported restrictions is less clear in relation to area deprivation, suggesting that other factors are at play that influence household members' experiences of restrictions. This is not unexpected, given the danger of the ecological fallacy, whereby it is assumed (usually wrongly) that 'relationships [between variables] observed for groups necessarily hold for individuals' (Freedman, 199, p.1). This is as true for membership of a household as it is for location of households in given areas.

Table 27: Deprivation and participation restrictions (all households)

Participation Restrictions	**Deprivation**						
	Most Deprived England	***Most Deprived Wales***	***Most Deprived Scotland***	***Least Deprived England***	***Least Deprived Wales***	***Least Deprived Scotland***	***Whole sample***
	% reporting restrictions						
Learning	18	14	14	13	13	8	15
Work	28	28	21	18	19	14	21
Economic	43	47	44	25	31	18	34
Civic	84	81	77	82	81	70	82
Accessibility In Home	9	11	9	5	6	5	7
Accessibility Out Home	21	19	19	17	19	13	19
Social	29	23	19	30	30	20	28
Transport	71	65	74	69	66	71	70
N (100%)	7,837	485	820	8,249	469	831	18,691

Multiple responses: sums to more than 100%

Conclusions

We have seen in this chapter that that there are important variations in reporting participation restrictions among and between different population groups; demographic and socio-economic indicators together with household and locality characteristics all seem to have a part to play. Although we cannot make definitive statements, due to the exploratory nature of bivariate analysis, certain patterns of barriers across population groups have emerged. First, civic and transport participation barriers seemed to be shared across groups and, by and large, appeared uniformly regardless of any individual level, demographic or socio-economic, attributes. The same pattern occurred among households

with different compositional characteristics and in areas with different deprivation levels. By contrast, economic, learning and work barriers were more commonly reported by disadvantaged groups and accessibility barriers appeared mainly among older and among financially disadvantaged individuals.

The interactions between many of the variables explored in this chapter underline the importance carrying out multi-variate analysis, the results of which are presented in Chapter 5.

Chapter 3: Children, impairment and participation restrictions

The third work package in the programme of analysis of the LOS involved bivariate analysis of data from children and young adults with and without impairment. In order to allow this comparison in relation to participation restrictions we again used data from the first chapter of the survey that outlined the basic areas of barriers to participation.

Children were defined as those aged 11 to 15 years and young adults as those aged 16-18 years. In total there were 2,193 children and 1,062 young adults included in the LOS analysis (Table 28). As Table 28 shows, the numbers of children and young people with impairment was very small in the context of the overall LOS, restricting the secondary analysis that was possible.

This chapter focuses on basic demographic characteristics and outlines participation restrictions in relation to gender and impairment. Among the group reporting impairment, 57 per cent were males and 43 per cent female, whereas the non-impaired population was equally distributed between males and females (Table 29).

Table 28: Age and impairment (all children and young adults)

Age	**Impairment**		
	Impaired	***Not impaired***	***All children***
	% in age group		
11-15	69	71	70
16-18	31	29	30
N (100%)	456	3,519	3,975

Weighted %

Table 29: Sex and impairment (all children and young adults)

Sex	**Impairment**		
	Impaired	***Not impaired***	***All children***
	% in each sex		
Males	57	50	51
Females	43	50	49
N (100%)	456	3,519	3,975

Weighted %

The following figures show the different areas of participation restrictions reported by or on behalf of children and young adults. The restrictions that all children and young adults were asked about were both more limited than those asked of people over the age of 18 and

slightly different in their focus: education, leisure, transport and personal relationship. Young adults were also asked questions about work restrictions, as they had been surveyed with the adults' questionnaire.

Age and sex

For those aged 11 to 15, both boys and girls experienced restrictions, in particular in relation to leisure and transport, but boys appeared more restricted in every area compared to girls (Figure 9). Among young adults (Figure 10), transport became the most important area of restriction with leisure and work being the next most frequent. Males felt more restricted in the areas of education, work and personal relationships, while young women reported more restrictions than young men in relation to transport. No differences were evident in relation to leisure restrictions.

Figure 9: Participation restrictions and sex: all children aged 11-15 years

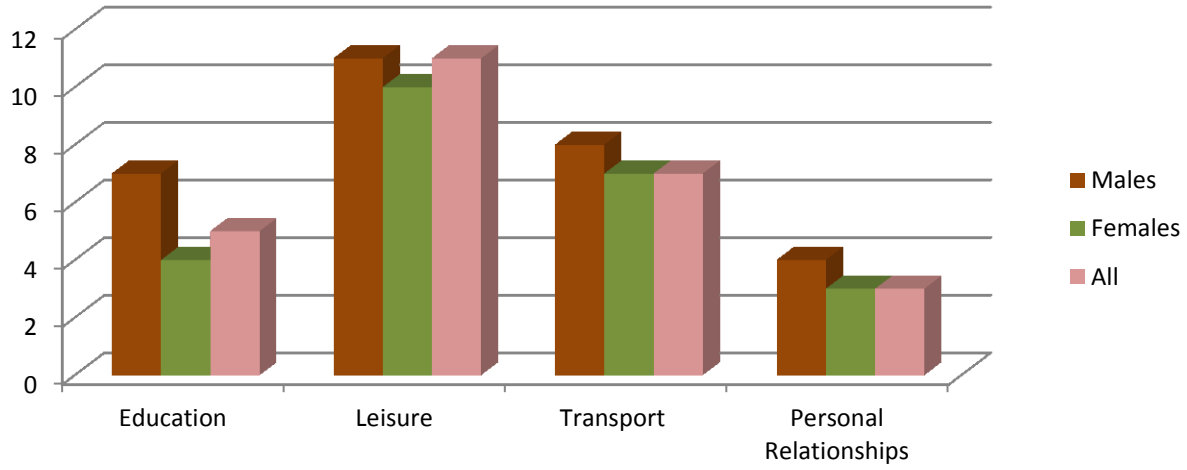
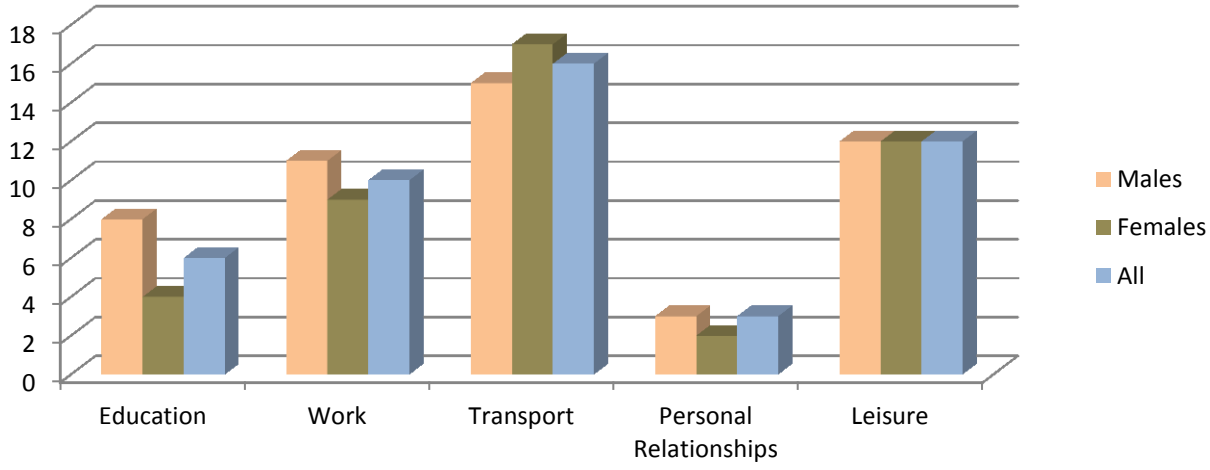


Figure 10: Participation restrictions and sex: all young adults aged 16-18 years

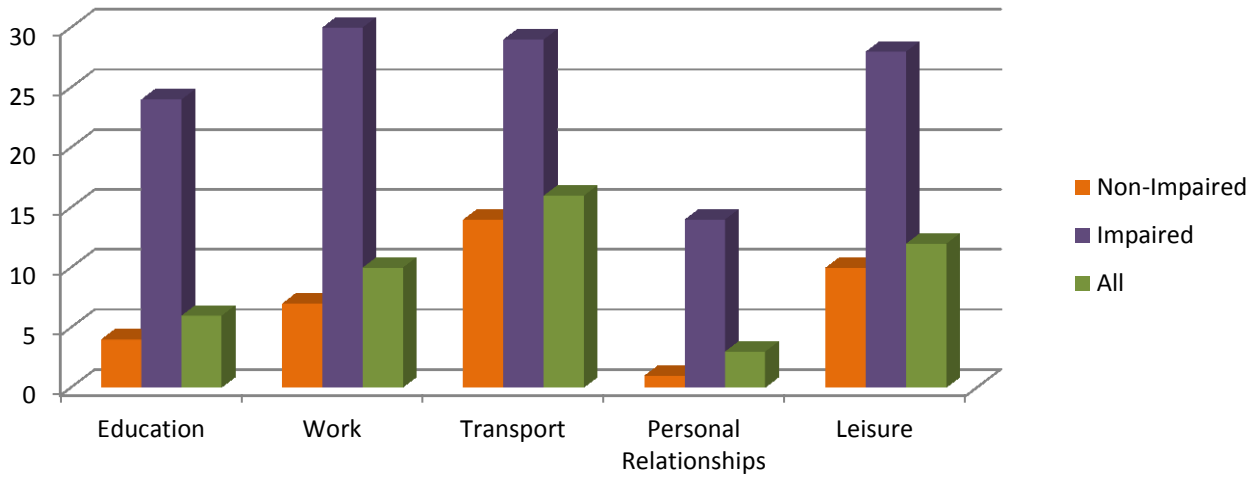


Impairment

Figures 11 and 12 display participation restrictions for children and young adults, related to impairment. Children aged 11 to 15 with impairments more often reported restrictions in every area compared to children without (Figure 11). The difference between children with and without impairment was particularly striking for education and leisure. For young adults, too, there were large differences between those with and without impairment in the proportions reporting restrictions. This was true across all areas, but with work, education and personal relationships showing the most striking differences.

Figure 11: Participation restrictions and impairment: % of all children aged 11-15 reporting restrictions

Figure 12: Participation restrictions and impairment: % of young adults aged 16-18 reporting restrictions



Conclusions

Although the scope for additional analysis was restricted in this work package because of the more limited information collected about children and young adults and the small numbers of those with impairment, certain patterns have emerged.

Unlike in the bivariate analysis of data for adults, the analysis in this chapter, to some degree, is controlled for age. Thus one of the most important confounders in the adult bivariate analysis is not at play here. We can therefore say, with more confidence, that the higher levels of participation restrictions reported for children and young adults with impairments are real ones.

There is scope for further exploration of these data on children and young adults with impairments, but this will, of necessity, be largely descriptive. However, the availability of data from the subsequent waves of the LOS opens up opportunities for exploration of transitions over time. It may also be possible, by combining data sets, to obtain sufficient numbers to allow some multi-variate analysis.

Chapter 4: Bivariate analysis of barriers to participation in households where at least one person has an impairment

This fourth chapter briefly explores descriptively the barriers experienced in households where at least one individual (whether adult or child) was reported to have an impairment compared to households where no one had an impairment.

Presence and severity of impairment within the household

First, Table 30 illustrates the presence and level of severity of impairment in different households and the extent to which anyone in those households reported participation restrictions.

As we saw in Chapter 2, civic and transport barriers are widely reported across all households regardless of the presence or severity of impairment in the household. However, across all types of restrictions there is a clear gradient, with households where no one has an impairment being less likely to report restrictions, followed by households with at least one person with a mild or moderate impairment, and then those where at least one person has a severe impairment. Some restrictions show much steeper gradients than do others; for example, households where at least one person has a severe impairment are more than three times as likely to report work restrictions as households where no one has an impairment. Accessibility both in and out of the home is also substantially more restricted when someone in the household has an impairment compared to those where no one has an impairment; and, again, where there is someone with a severe impairment the differences are extremely large.

Table 30: Presence and severity of impairment in households: % of different types of households reporting participation restrictions

Participation Restrictions	Presence and severity of impairment in households			
	No one in household with impairment	***At least one person in household with mild or moderate impairment***	***At least one person in household with severe impairment***	***All household types***
	% of type of household reporting restrictions			
Learning	11	17	25	15
Work	14	27	54	22
Economic	28	38	53	34
Civic	80	84	90	82
Accessibility In Home	1	8	36	7
Accessibility Out Home	9	24	56	19
Social	26	31	29	28
Transport	63	76	88	70
N (100%)	10,177	6,290	2,225	18,692

Carers in households

Table 31 and Table 32 explore impairment and severity of impairment in households in relation to the existence or absence of informal carers in those households.

We created a variable, derived from questions asked in the LOS about individuals' caring roles that defined four possible carer categories: no carer in the household; presence of carer for someone in this household only; presence of carer for someone in another household only; and presence of a carer for people both in this household and in another household. It should be borne in mind when interpreting these analyses that they include one-person households. So households where 'everyone' has an impairment or where 'everyone' is a carer may, in fact, contain only one person.

Even in households where none of the members had an impairment, 19 per cent of respondents reported that someone in the household was a carer. Among the households with at least one adult with an impairment (Table 31), 26 per cent contained a carer who was supporting someone in the same household and a 13 per cent in a different household. Where all adults in the household had an impairment, the presence of 'in-household' carers was lower.

Table 31: Presence of carers by presence of impairment in the household

Presence or absence of carers in household	Presence of impairment in household			
	At least one person with impairment	***All people have impairment***	***No one has impairment***	***All adults***
	% reporting household with or without carers			
No carers	56	73	81	74
At least one carer for someone in same household	26	12	3	10
At least one carer for someone in different household	13	2	9	9
Everyone in household is a carer	4	14	7	8
N (100%)	4,985	3,672	11,228	19,885

Weighted %

Table 32 explores whether the severity of impairment was related to the presence of carers in the household. Among households containing at least one person with a mild or moderate impairment, 68 per cent reported that there was no carer in the household, 23 per cent that there was at least one carer (supporting someone in or out of the same household), and nine per cent that everyone in the household was involved in caring activities. By contrast, in households in with at least one severely impaired member only 47 per cent reported having no carer and 46 per cent that there was at least one carer. It is interesting to see, although difficult to interpret, that the proportion of households reporting that everyone in the household was a carer varied little depending on presence or severity of impairment.

Table 32: Presence of carers by presence and severity of impairment in the household

Presence or absence of carers in household	Presence and severity of impairment in household			
	No one has impairment	***At least one person has mild or moderate impairment***	***At least one person has severe impairment***	***All***
	% reporting household with or without carers			
No carers	81	68	47	74
At least one carer	11	23	46	19
Everyone in the household is a carer	7	9	7	8
N (100%)	11,098	6,542	2,245	19,885

Weighted %

The last table of this chapter (Table 33) looks at the household participation barriers in relation to the existence or absence of informal carers. On the face of it, it seems that households with at least one carer experience a higher level of all restrictions than do households where everyone is a carer. Further, the levels of reported restrictions for households with no carers and households where everyone is a carer are similar. This seems a paradoxical finding and one that clearly requires further examination in multivariate analysis.

Table 33: Participation restrictions and carers in households

Participation restrictions	Carers in Households			
	No carers in household	***At least one carer in household***	***Everyone in household is a carer***	***Total***
	% of households reporting restrictions			
Learning	14	20	14	15
Work	19	37	20	22
Economic	33	39	31	34
Civic	81	89	80	82
Accessibility In Home	5	17	6	7
Accessibility Out Home	16	32	19	19
Social	26	35	26	28
Transport	67	79	72	70
N (100%)	13,376	3,822	1,494	18,692

Multiple responses: sums to more than 100%

Conclusions

This chapter briefly illustrates the barriers experienced by households where at least one member reported impairment (and different levels of impairments), compared with households where no member did. It has also shown the barriers experienced by households where members are involved in informal caring.

The patterns of barriers to participation in relation to the presence of a household member with an impairment in the household are similar to those reported in Chapter 2.

The reporting of participation barriers in households with and without carers appears, in some places paradoxical, or difficult to explain. However, this is likely due to interactions between the presence within households of individuals with and without impairment, and of individuals with or without caring responsibilities. Future analysis that explores individual characteristics and experiences of restrictions within the context of household composition would help to establish further the extent to which, if at all, individuals share restrictions.

Chapter 5: Logistic and multilevel modelling

This final chapter explores the probability of people with impairments experiencing participation restrictions, controlling for a range of demographic and socio-economic characteristics that might also be associated with these restrictions. The analysis thus identifies factors that might mitigate barriers to participation for some groups compared to others. In particular it explores participation restrictions taking into account different levels of severity.

Reporting in this chapter follows a gradual model composition. The first model controls for impairment and demographic factors (age and gender), the second model controls for socio-economic factors such as ethnicity, education and economic activity, and the final model includes household economic factors associated with affluence, such as economic restrictions and ownership. Economic restriction is one of the barriers to participation and has been explored as an outcome variable in previous chapters. Here, by contrast, it functions as a proxy of economic affluence and is thus treated as an explanatory variable.

The analysis explores individual participation restrictions: work, accessibility at home, transport, civic and social life. The choice of these barriers was determined by two factors. First, there were the findings of the bivariate analysis that had revealed the most frequent restrictions reported by all adults. Secondly, we were influenced by the interests of our project partners (DWP, SCOPE, and Carers UK) who were keen to explore specific topics.

This chapter is in two main sections. The first explores the probability of participation restrictions being reported in relation to impairment, taking into account individual demographic and socio-economic factors. The second section examines the same factors but it also takes into account the role of household composition and place. It is hypothesized that household composition and contextual characteristics influence the likelihood of certain individuals being more susceptible to the experience of restrictions. Consequently, the analysis in the first section used logistic regression, whereas the second section used multilevel modelling in order to disentangle the role of the household and place of residence.

Logistic regression: exploring the influence of impairment on restrictions, controlling for individual factors

Here we explore the association between different barriers to participation and impairment by controlling for different socio-economic and demographic factors. Due to the binary form (yes/no) of every restriction a logistic regression model was chosen to explore the likelihood of an individual feeling restricted in different areas of life.

There are two versions of logistic models for every barrier to participation. The first version includes the whole sample (adults with and without impairment) and the second version includes only adults with impairment, by level of severity. Both versions include three different models. The first model controls for age and gender, the second model controls, in addition, for marital status, ethnicity and economic activity, and the final model controls, in addition, for economic restrictions and home ownership.

Presence of impairment

The existence of impairment (Table 34) increases the probability of individuals reporting restrictions in every area of life. This occurs even after controlling for different demographic, socio-economic and household factors.

All other things being equal, being younger increases the likelihood of reporting barriers in work, transport and civic life, whereas older age groups tend to report mainly accessibility restrictions and experience low likelihood of social barriers (see detailed tables in Appendix C). Sex also plays a role, with men feeling less restricted in every area of life with the exception of work, where they report higher participation restrictions. Overall, being married has a protective effect against different barriers, although not always at a statistically significant level, whereas being divorced or widowed significantly increases the probability of restrictions such as accessibility. Belonging to a non-white population group shows mixed effects, with increasing probability of restrictions in work and accessibility at home, but apparently reduced probabilities of experiencing the remaining restrictions. Being economically inactive or unemployed, and having lower than degree-level qualifications. All increase the probability of work-related barriers. Unemployment and economic inactivity increase the probability of all participation restrictions, with the exception of social aspects of life. Finally, living in a rental property and experiencing economic restrictions (difficulty making ends meet) are associated with an increased risk of restrictions in almost every area of life.

Table 34: Logistic regression of participation restrictions and impairment: probability (95% CI) of reporting restriction (all adults)

	Work	Accessibility	Transport	Civic	Social
Not having impairment (base)	1.00	1.00	1.00	1.00	1.00
Impaired					
Model 1: controlling for age and sex	4.70 (4.36 to 5.07)**	12.07 (10.31 to 14.13)**	2.12 (2.00 to 2.25)**	1.89 (1.76 to 2.04)**	1.43 (1.34 to 1.52)**
Model 2: controlling also for marital status, ethnicity and economic activity	3.46 (3.20 to 3.75)**	9.47 (8.11 to 11.06)**	2.02 (1.90 to 2.15)**	1.92 (1.78 to 2.06)**	1.54 (1.45 to 1.65)**
Model 3: controlling also for economic restrictions and home ownership	3.17 (2.92 to 3.45)**	8.46 (7.25 to 9.88)**	1.90 (1.79 to 2.02)**	1.75 (1.62 to 1.88)**	1.52 (1.43 to 1.63)**

Work: model 2 includes education and all models include individuals <65

** statistically significant

Severity of impairment

Table 35 explores the level of severity and the probability of reporting any of the participation restrictions of interest, all other things being equal. This analysis thus includes only adults reporting impairment.

Overall, severe impairment was associated with the highest probability of an individual reporting any restrictions, compared to those with mild or moderate levels of impairment. This is evident across all models after controlling for demographic, socio-economic and household factors.

For some specific barriers, such as work and transport, age had a significant positive effect for middle-aged individuals. Accessibility restrictions at home affect mainly older individuals, whereas social and civic life barriers are not evident in these older age groups. Being male decreased the probability of any restrictions with the exception of work.

Table 35: Logistic regression of participation restrictions and severity of impairment: probability (95% CI) of reporting restriction (all adults reporting impairment)

	Work	Accessibility	Transport	Civic	Social
Mild impairment (base)	1.00	1.00	1.00	1.00	1.00
Severity of Impairment- Model 1 controlling for age and sex					
Moderate	2.58 (2.25 to 2.95)**	3.07 (2.42 to 3.90)**	1.45 (1.30 to 1.61)**	1.52 (1.31to 1.76)**	1.05 (0.94 to 1.18)
Severe	11.53 (9.75 to 13.64)**	11.80 (9.69 to 14.37)**	3.29 (2.80 to 3.86)**	2.36 (2.02 to 2.75)**	1.11 (0.97 to 1.27)
Severity of Impairment- Model 2 controlling also for marital status, ethnicity and economic activity					
Moderate	1.96 (1.70 to 2.27)**	2.68 (2.12 to 3.39)**	1.40 (1.25 to 1.57)**	1.56 (1.36 to 1.80)**	1.18 (1.05 to 1.33)**
Severe	5.91 (4.90 to 7.13)**	8.93 (7.29 to 10.94)**	3.07 (2.59 to 3.64)**	2.46 (2.09 to 2.90)**	1.43 (1.24 to 1.65)**
Severity of Impairment- Model 3 controlling also for economic restrictions and home ownership					
Moderate	1.92 (1.66 to 2.23)**	2.59 (2.07 to 3.25)**	1.35 (1.21 to 1.51)**	1.51 (1.31 to 1.74)**	1.18 (1.05 to 1.32)**
Severe	5.57 (4.61 to 6.74)**	8.36 (6.79 to 10.29)**	2.85 (2.39 to 3.38)**	2.27 (1.91 to 2.69)**	1.42 (1.23 to 1.64)**

Work: model 2 includes education and all models include individuals <65

** statistically significant

In relation to marital status, being separated/divorced increased the probability of barriers across every area of life, however being widowed intensified the likelihood of barriers in accessibility at home. Being married had generally a protective effect against work-related restrictions, while 'non-white' adults were more likely to experience different restrictions from 'white' adults, with the exception of transport and social life. Non-degree qualifications contributed to the likelihood of work-related barriers, and being inactive or unemployed contributed to every type of restriction. As with the analysis of data from all adults, renting and economic hardship increases the probability of all restrictions, except in relation to social life. (For all the above, see the detailed tables in Appendix C).

Multilevel modelling: exploring the influence of impairment on restrictions, controlling for household and area level factors

The second part of this chapter takes into account the multilevel nature of the relationship between impairment and barriers to participation. Exploring the same barriers, this next stage includes explanatory variables at household and local levels. The aim here is to explore whether not only individual but also household and local characteristics influence the likelihood of participation restrictions in different areas of life. The hypothesis is that individuals living in similar households and areas are likely to report similar restrictions.

As with the previous analysis there are three different models. The first one includes *all* the individual level indicators (age, gender, marital status, ethnicity and economic activity), the second one includes, in addition, a number of household level indicators (home ownership, economic restrictions, household size, children in household and severity of impairment in the household) and local indicators (deprivation index and urban/rural descriptor). The main objective is an exploration of the variation in restrictions controlling for three-level covariates. The multilevel analysis is thus a three level random intercept model, where individuals are nested within households and households within areas (for more details see Appendix D).

Table 36 shows the association between having impairment and experiencing different barriers to participation after controlling for all the three-level indicators. As with the previous modelling, the association between impairment and different restrictions is positive and statistically significant even after controlling for these different barriers. Therefore, reporting impairment increases the likelihood of facing any of these restrictions in life, regardless of whether or not the individual also experiences a range of other factors that also increase the probability of restrictions. However, some restrictions are more related to impairment than are others. This is particularly the case for accessibility in the home, where people with impairments are almost 19 times more likely to report restrictions than those without impairments, even when all the other individual, socio-economic, household and area factors have been taken into account.

Table 36: Multi-level modelling of participation restrictions and impairment: probability (95% CI) of reporting restriction (all adults)

	Work	Accessibility	Transport	Civic	Social
Not having impairment (base)	1.00	1.00	1.00	1.00	1.00
Impaired					
Model 1: controlling for age, gender, marital status, ethnicity and economic activity	5.19 (4.59 to 5.88)**	20.43 (14.47 to 28.84)**	3.37 (2.98 to 3.81)**	3.22 (2.70 to 3.83)**	1.84 (1.67 to 2.03)**
Model 2: controlling also for home ownership, economic restrictions, household size, children in household and severity of impairment in the household	3.70 (3.12 to 4.38)**	18.78 (12.19 to 28.92)**	1.96 (1.70 to 2.27)**	1.86 (1.52 to 2.27)**	1.51 (1.32 to 1.72)**
Model 3: controlling also for deprivation and urban/rural descriptor	3.69 (3.12 to 4.37)**	18.80 (12.19 to 29.00)**	2.00 (1.73 to 2.31)**	1.85 (1.51 to 2.25)**	1.50 (1.32 to 1.71)**

Work: individuals <65

** Statistically significant

Tables in Appendix D show that, at an individual level, being middle-aged, male, divorced, non-white, and with non-degree qualifications are additional contributory factors in experiencing barriers to work. Also, as would be expected reporting being unemployed or economically inactive contribute to this restriction.

Accessibility at home is further restricted for those who are older, widowed, non-white and economically inactive. However, there is a protective effect against transport restrictions for older and male individuals, while those who are unemployed or economically inactive and divorced individuals appear to have further increases in their chances of experiencing transport restrictions

Restrictions in civic life appear mainly among younger ages and divorced individuals, while older groups, male, non-white origin individuals or even individuals who are unemployed or inactive do not experience any additional restrictions in social life. Divorced individuals face social barriers that might be better explained by psychological factors than socio-economic or demographic ones.

At a household level, property rental, economic difficulties, living in a household where at least one person is severely impaired and having young children add to the restrictions experienced in relation to work. Economic difficulties and household impairment severity add to transport restrictions too. Civic life is hindered by economic restrictions, property

rental, household impairment severity and the presence of young children. Economic restrictions and household impairment severity influence social restrictions.

At an area level, deprivation and rurality do not seem to add further to restrictions in work. Rurality decreases the likelihood of restrictions in accessibility at home and individuals in more deprived areas also face increased likelihood of such accessibility restrictions. The opposite occurs for transport, where rurality and being in the least deprived areas (which may be inter-related) increase the likelihood of transport restrictions.

Looking at the random part (intercept) of the model (Appendix D, Tables D6-D10), for work barriers there was a reduction in between-household variance after adding the household level indicators. This is not the case for the level-three variance since locality indicators did not make any significant contribution to the third model. For accessibility at home, household factors contributed to the decrease of between-household variance, however the variance between localities was small and did not change after controlling for deprivation and rurality. In the case of transport, household indicators reduced between-household variance while local indicators reduced between-area variance. For civic and social barriers, household indicators contributed to the reduction of between household variance mainly for civic life. There was a slight increase in the variance of between areas for civic barriers, however this is probably due to suppression effects of level three indicators. Overall, level three indicators for social and civic life did not contribute to the reduction of variance. This is not unexpected since social and civil barriers are more likely to vary at an individual level due to differences in expectations among individuals.

Conclusions

Both logistic and multilevel analyses have shown similar results, with impairment being the most important contributory factor for barriers to participation in different areas of life. Even after controlling for individual, household and locality factors impairment, especially severe impairment, increases the likelihood of every restriction included in the models. Middle-aged people suffer from work-related barriers, whereas older groups face restrictions in accessibility at home barriers but not in social and civic life. Males mainly experience work-related barriers, whereas individuals from 'non-white' groups experience additional accessibility barriers together with work restrictions. Overall, being married and employed offers protection against barriers in every area of life compared to being divorced /widowed or out of employment (economically inactive and unemployed).

Transport barriers are mainly explained by the common individual demographic and socio-economic indicators as well as household and local level indicators. In particular, severe household level impairment increases the likelihood of every barrier to participation with high deprivation levels affecting mainly accessibility barriers. Social and civic barriers are

associated with household level factors like economic restrictions, property rental, severity and the existence of young children in the household. Living in rural areas reduces the likelihood of social and civic restrictions, perhaps suggesting that the sense of community in rural areas mitigates the experience of restrictions.

Chapter 6: Discussion

The Life Opportunities Survey is a comprehensive survey that measures barriers to participation in different areas of life. This report explored the demographic and socio-economic variations in the experience of barriers between adults, children and young adults with and without impairments, as well as variations between households. An initial exploratory analysis of patterns of restrictions showed mixed results, where economic, work and learning barriers are grouped together, whereas accessibility (in and out of home), transport, social and civic life form distinctive areas of restrictions. Although further analysis is necessary, subsequent descriptive and statistical analyses support the initial findings.

In particular, the most commonly reported barriers, across all groups, are those in civic life and transport. These, together with social barriers, are shared across different socio-economic groups, households with different compositional attributes and areas with different deprivations levels. Nevertheless, economic, learning and work barriers are more frequently reported among disadvantaged groups with accessibility (in and out of home) being evident among older age groups. In relation to children and young adults, similar patterns have emerged, with leisure and transport barriers being the most important. Household level descriptive analysis has shown similar restriction patterns, where civic and transport barriers were most frequently reported regardless of impairment levels. Households with high levels of impairment suffer largely from economic, work and social barriers.

The statistical analyses have shown that impairment, and especially severe impairment, is the main contributory factor to restrictions in all areas of life. Individual level socio-economic and demographic factors influence restrictions in the areas of work, accessibility and transport. However, civic and especially social barriers may also depend on individual expectations and psychological conditions and are not necessarily totally shaped by common individual level and socio-economic factors. Their occurrence may be more likely to increase with household composition effects, such as living with a severely impaired household member, the age of children living in the household, property rental or having difficulty in making ends meet. Deprivation and rurality make their own contribution, especially to transport, civic and social restrictions. Deprivation does not appear to raise the likelihood of other barriers, while rurality appears to protect against civic and social restrictions probably due to the sense of community in those areas. However, this is not the case for transport barriers, where living in rural areas increases the probability of this barrier.

In conclusion, the exploratory, bivariate and statistical analyses suggest that certain barriers like transport, civic and social are distinctive and influenced by contextual and compositional attributes beyond the individual characteristics. The distinctive nature of

these restrictions was also evident in the initial exploratory analysis. Work-related and accessibility barriers are more likely to be influenced by individual level demographic and socio-economic characteristics. However, impairment is the common factor that is mutually shared over and above any individual, compositional or contextual effects.

These mixed results suggest that different restrictions need different policy approached. In particular, certain barriers like transport and restrictions in civic life are experienced at a high level by both those with and those without impairment. Therefore, policy could focus on the improvement of transport links especially across rural areas and the reinforcement of the sense of community in more urban areas.

Accessibility at home is mainly reported by older individuals with impairment, who may be unable to meet the economic demands of creating an accessible property. The role of income levels after retirement and that of local authorities in subsidising home adaptations and equipment are both crucial here.

Labour market policies need to concentrate on the employment of individuals who might have impairment but who are able to work as well as individuals who have caring responsibilities.

There is a shared experience for members of households where there is at least one person with severe impairment. Consequently, policies need not only to consider individuals with impairment but also develop a more collective approach where the compositional attributes of the household are also taken into account.

This has been the first study to explore in detail different areas of barriers to participation among impaired and non-impaired individuals. The availability of the LOS, and its basis in a social model of disability has enabled this. Our work has shown both the strengths of the LOS for this type of analysis and the need for further analysis in order to examine in detail the causes of restrictions. Using the very rich and detailed data that the LOS contains, and exploiting the recent availability of second and third wave data, would allow us to explore the reasons why individuals report certain barriers when others, who are similar in other respects, do not.

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Appendix A: Cluster analysis

Table A1: Average Linkage (Between Groups)-Simple Matching/Proximity Matrix-Everyone

	Matrix File Input							
	Work	Learning	Economic	Civic	Accessibility Home	Accessibility Outside	Social	Transport
Work	1.000	.820	.696	.339	.841	.807	.716	.440
Learning	.820	1.000	.689	.310	.864	.812	.747	.422
Economic	.696	.689	1.000	.461	.681	.661	.620	.504
Civic	.339	.310	.461	1.000	.252	.317	.391	.645
Accessibility Home	.841	.864	.681	.252	1.000	.878	.758	.386
Accessibility Outside	.807	.812	.661	.317	.878	1.000	.723	.445
Social	.716	.747	.620	.391	.758	.723	1.000	.454
Transport	.440	.422	.504	.645	.386	.445	.454	1.000

Note: The higher the correlation between two variables the higher the similarity

Table A2: Average Linkage (Between Groups)-Simple Matching/Proximity Matrix-Non-Impaired

	Matrix File Input							
Variable	Work	Learning	Economic	Civic	Accessibility Home	Accessibility Outside	Social	Transport
Work	1.000	.864	.722	.314	.897	.866	.751	.446
Learning	.864	1.000	.718	.308	.906	.872	.761	.449
Economic	.722	.718	1.000	.441	.719	.704	.642	.503
Civic	.314	.308	.441	1.000	.243	.284	.397	.614
Accessibility Home	.897	.906	.719	.243	1.000	.933	.786	.407
Accessibility Outside	.866	.872	.704	.284	.933	1.000	.765	.437
Social	.751	.761	.642	.397	.786	.765	1.000	.480
Transport	.446	.449	.503	.614	.407	.437	.480	1.000

Table A3: Average Linkage (Between Groups)-Simple Matching/Proximity Matrix-Impaired

	Matrix File Input							
Variable	Work	Learning	Economic	Civic	Accessibility Home	Accessibility Outside	Social	Transport
Work	1.000	.720	.638	.397	.715	.674	.638	.427
Learning	.720	1.000	.623	.314	.769	.679	.715	.361
Economic	.638	.623	1.000	.506	.594	.564	.568	.506
Civic	.397	.314	.506	1.000	.272	.391	.379	.714
Accessibility Home	.715	.769	.594	.272	1.000	.754	.694	.340
Accessibility Outside	.674	.679	.564	.391	.754	1.000	.627	.462
Social	.638	.715	.568	.379	.694	.627	1.000	.396
Transport	.427	.361	.506	.714	.340	.462	.396	1.000

Appendix B: Tabulations

Table B1: Age Distribution- Feeling Restricted - col %

Age	Feeling Restricted		
	Restricted	Not Restricted	Total
16-24	2,954-12%	160-8%	3,114-11%
25-34	4,041-16%	169-8%	4,210-15%
35-44	5,282-19%	225-10%	5,507-18%
45-54	5,263-17%	336-14%	5,599-17%
55-64	4,946-16%	541-22%	5,487-16%
65-74	3,915-11%	589-21%	4,504-12%
75+	3,070-10%	421-16%	3,491-10%
Total	29,471	2,441	31,912

Missing: 2 cases- Weighted %- chi2(6) = 549.0070, p < 0.05, C= 0.11

Table B2: Participation Restrictions and Impairment, col %

Participation Restrictions	Impairment		
	Impaired	Not-impaired	All
Learning	1,483-16%	1,955-9%	3,438-11%
Work	2,661-28%	2,163-10%	4,824-16%
Economic	4,025-43%	6,188-29%	10,213-33%
Civic	8,033-82%	16,837-78%	24,870-79%
Accessibility In Home	1,219-13%	204-1%	1,423-5%
Accessibility Out Home	2,816-29%	1,409-6%	4,225-13%
Social	2,342-24%	4,622-21%	6,964-22%
Transport	7,393-75%	13,200-60%	20,593-64%
Sample size (=100%)	9,421	20,050	29,472

Multiple responses: sums to more than 100%

Table B3: Participation Restrictions Score and Impairment, col %

Participation Score	Impairment		
	Impaired	Not Impaired	All
0	411-4%	2,030-9%	2,441-7%
1	1,220-12%	5,353-24%	6,573-20%
2	2,180-22%	7,022-32%	9,202-29%
3	2,402-25%	4,751-22%	7,153-23%
4	1,835-19%	1,983-9%	3,818-12%
5 +	1,784-19%	941-4%	2,725-9%
Total	9,832	22,080	31,912

Missing: 2- Weighted %- chi2(5) = 3.0e+03, p < 0.05, C= 0.2

Table B4: Participation Restrictions and Gender, col %

Participation Restrictions	Gender		
	Males	Females	All
Learning	1,401-10%	2,037-12%	3,438-11%
Work	2,100-15%	2,724-16%	4,824-16%
Economic	4,354-32%	5,859-34%	10,213-33%
Civic	10,933-77%	13,938-81%	24,871-79%
Accessibility In Home	539-4%	884-5%	1,423-5%
Accessibility Out Home	1,541-11%	2,684-15%	4,225-13%
Social	2,988-21%	3,976-23%	6,964-22%
Transport	9,019-62%	11,575-66%	20,594-64%
Sample size (=100%)	13,123	16,349	29,472

Multiple responses: sums to more than 100%

Table B5: Participation Restrictions and Ethnicity, col %

Participation Restrictions	Ethnicity		
	White	Non-white	All
Learning	3,012-11%	422-17%	3,434-11%
Work	4,252-15%	571-22%	4,823-16%
Economic	8,868-31%	1,340-53%	10,208-33%
Civic	22,721-79%	2,135-84%	24,856-79%
Accessibility In Home	1,301-4%	122-5%	1,423-5%
Accessibility Out Home	3,883-13%	340-13%	4,223-13%
Social	6,421-22%	538-21%	6,959-22%
Transport	18,957-64%	1,627-63%	20,584-64%
Sample size (=100%)	27,011	2,446	29,457

Multiple responses: sums to more than 100%. Categories merged due to small numbers.

Table B6: Household Size- Participation Restrictions- col%

Participation Restrictions	Household Size		
	One	More than one	All
Learning	633-12%	2,209-16%	2,842-15%
Work	974-18%	3,369-24%	4,343-22%
Economic	1,883-35%	4,643-34%	6,526-34%
Civic	4,155-74%	12,007-85%	16,162-82%
Accessibility In Home	426-8%	1,025-7%	1,451-7%
Accessibility Out Home	1,097-20%	2,690-18%	3,787-19%
Social	1,102-20%	4,387-32%	5,489-28%
Transport	3,715-66%	10,206-72%	13,921-70%
Sample size (=100%)	5,161	13,531	18,692

Multiple responses: sums to more than 100%

Table B7: Urban/Rural – Participation Restrictions- col%

Participation Restrictions	Urban/Rural		
	Urban	Rural	Total
Learning	2,256-15%	582-13%	2,838-15%
Work	3,512-23%	827-19%	4,339-22%
Economic	5,347-36%	1,173-27%	6,520-34%
Civic	12,607-83%	3,542-80%	16,149-82%
Accessibility In Home	1,176-8%	274-6%	1,450-7%
Accessibility Out Home	3,011-19%	776-17%	3,787-19%
Social	4,324-28%	1,161-26%	5,485-28%
Transport	10,573-69%	3,341-75%	13,914-70%
Sample size (=100%)	14,495	4,184	18,679

Multiple responses: sums to more than 100%

Appendix C: Logistic regression

Table C1: Participation Restriction: Work <65- Everyone

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Not having impairment (base)				
Impaired	4.54(4.21 to 4.89)**	4.70(4.36 to 5.07)**	3.46(3.20 to 3.75)**	3.17(2.92 to 3.45)**
		Age		
16-24 (base)				
25-34		1.39(1.20 to 1.61)**	2.39(2.03 to 2.82)**	2.21(1.87 to 2.62)**
35-44		1.45(1.26 to 1.66)**	2.72(2.29 to 3.23)**	2.63(2.21 to 3.13)**
45-54		1.21(1.05 to 1.38)**	2.28(1.91 to 2.73)**	2.32(1.94 to 2.77)**
55-64		0.91(0.80 to 1.05)	1.93(1.60 to 2.33)**	2.14(1.77 to 2.58)**
		Sex		
Female (base)				
Male		0.94(0.87 to 1.01)	1.02(0.94 to 1.11)	1.03 (0.94 to 1.11)
		Marital Status		
Single (base)				
Married			0.78(0.70 to 0.87)**	0.87(0.77 to 0.97)*
Separated/Divorced			1.23(1.07 to 1.41)**	1.12(0.98 to 1.29)
Widowed			0.95(0.71 to 1.27)	1.00(0.74 to 1.35)
		Ethnicity		
White(base)				
Non-white			1.37(1.20 to 1.55)**	1.21(1.07 to 1.38)**
		Education		
No(base)				
Basic			0.91(0.81 to 1.03)	1.03(0.91 to 1.16)
Degree			0.88(0.77 to 1.01)	1.15(1.00 to 1.33)*
Other non-degree			1.06(0.94 to 1.20)	1.20(1.06 to 1.35)**
		Economic Activity		
Employed (base)				
Unemployed			3.75(3.23 to 4.35)**	2.98(2.55 to 3.47)**
Retired			0.69(0.56 to 0.85)**	0.71(0.57 to 0.87)**
Inactive			4.31(3.93 to 4.73)**	3.75(3.41 to 4.13)**
		Tenure		
Owner (base)				
Rent/rent free				1.28(1.17 to 1.41)**
		Economic		
No (base)				
Yes				1.96(1.79 to 2.13)**

Table C2: Participation Restriction: Work <65- Impaired

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Mild (base)				
Moderate	2.45(2.14 to 2.80)**	2.58(2.25 to 2.95)**	1.96(1.70 to 2.27)**	1.92 (1.66 to 2.23)**
Severe	10.51(8.92 to 12.39)**	11.53(9.75 to 13.64)**	5.91(4.90 to 7.13)**	5.57 (4.61 to 6.74)**
		Age		
16-24 (base)				
25-34		1.47(1.10 to 1.97)**	2.14(1.57 to 2.92)**	2.07(1.51 to 2.82)**
35-44		1.66(1.28 to 2.16)**	2.76(2.04 to 3.73)**	2.73(2.02 to 3.69)**
45-54		1.43(1.10 to 1.85)**	2.54(1.87 to 3.46)**	2.54(1.87 to 3.46)**
55-64		0.88(0.68 to 1.14)	1.79(1.30 to 2.46)**	1.89(1.37 to 2.61)**
		Sex		
Female (base)				
Male		1.21(1.07 to 1.36)**	1.25(1.09 to 1.43)**	1.25(1.09 to 1.43)**
		Marital Status		
Single (base)				
Married			0.68(0.57 to 0.82)**	0.72(0.60 to 0.86)**
Separated/Divorced			0.96(0.77 to 1.20)	0.90(0.72 to 1.13)
Widowed			0.78(0.52 to 1.17)	0.80(0.53 to 1.20)
		Ethnicity		
White(base)				
Non-white			1.17(0.92 to 1.48)	1.12(0.88 to 1.42)
		Education		
No(base)				
Basic			1.09(0.90 to 1.31)	1.13(0.93 to 1.36)
Degree			1.11(0.88 to 1.39)	1.25(0.99 to 1.59)
Other non-degree			1.26(1.05 to 1.52)*	1.32(1.10 to 1.59)**
		Economic Activity		
Employed (base)				
Unemployed			2.80(2.18 to 3.59)**	2.46(1.90 to 3.18)**
Retired			0.84(0.63 to 1.11)	0.85(0.63 to 1.13)
Inactive			4.61(3.95 to 5.37)**	4.32(3.69 to 5.06)**
		Tenure		
Owner (base)				
Rent/rent free				1.06(0.91 to 1.23)
		Economic		
No (base)				
Yes				1.50(1.31 to 1.72)**

Table C3: Participation Restriction: Accessibility (Home) – Everyone

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Not having impairment (base)				
Impaired	14.93(12.69 to 17.55)**	12.07(10.31 to 14.13)**	9.47(8.11 to 11.06)**	8.46(7.25 to 9.88)**
		Age		
16-24 (base)				
25-34		0.89(0.60 to 1.30)	1.16(0.77 to 1.75)	1.07(0.71 to 1.62)
35-44		0.99(0.70 to 1.40)	1.30(0.88 to 1.92)	1.23(0.83 to 1.82)
45-54		1.32(0.93 to 1.85)	1.65(1.11 to 2.45)*	1.63(1.10 to 2.41)*
55-64		1.65(1.20 to 2.28)**	1.86(1.25 to 2.75)**	2.00(1.35 to 2.96)**
65+		2.57(1.88 to 3.50)**	2.86(1.89 to 4.34)**	3.22(2.12 to 4.87)**
		Sex		
Female (base)				
Male		0.79(0.68 to 0.92)**	0.90(0.76 to 1.06)	0.88(0.75 to 1.03)
		Marital Status		
Single (base)				
Married			0.96(0.78 to 1.19)	1.09(0.88 to 1.36)
Separated/Divorced			1.28(0.99 to 1.65)	1.17(0.90 to 1.51)
Widowed			1.59(1.15 to 2.19)**	1.63(1.19 to 2.23)**
		Ethnicity		
White(base)				
Non-white			1.62(1.30 to 2.03)**	1.45(1.16 to 1.82)**
		Economic Activity		
Employed (base)				
Unemployed			1.31(0.87 to 1.98)	1.03(0.68 to 1.56)
Retired			1.98(1.59 to 2.46)**	1.87(1.50 to 2.34)**
Inactive			4.25(3.53 to 5.10)**	3.43(2.82 to 4.18)**
		Tenure		
Owner (base)				
Rent/rent free				1.35(1.14 to 1.59)**
		Economic		
No (base)				
Yes				1.81(1.55 to 2.11)**

Table C4: Participation Restriction: Accessibility (Home) – Impaired

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Mild (base)				
Moderate	3.42(2.67 to 4.37)**	3.07(2.42 to 3.90)**	2.68(2.12 to 3.39)**	2.59(2.07 to 3.25)**
Severe	13.27(10.92 to 16.14)**	11.80(9.69 to 14.37)**	8.93(7.29 to 10.94)**	8.36(6.79 to 10.29)**
		Age		
16-24 (base)				
25-34		0.91(0.51 to 1.65)	0.92(0.50 to 1.71)	0.88(0.47 to 1.63)
35-44		1.22(0.72 to 2.04)	1.19(0.68 to 2.06)	1.17(0.67 to 2.04)
45-54		1.60(0.97 to 2.64)	1.50(0.86 to 2.60)	1.50(0.86 to 2.61)
55-64		1.75(1.07 to 2.86)*	1.54(0.89 to 2.69)	1.64(0.94 to 2.86)
65+		2.55(1.57 to 4.16)**	2.26(1.27 to 4.03)**	2.51(1.40 to 4.50)**
		Sex		
Female (base)				
Male		0.86(0.71 to 1.03)	0.92(0.74 to 1.14)	0.91(0.74 to 1.11)
		Marital Status		
Single (base)				
Married			1.11(0.87 to 1.42)	1.19(0.92 to 1.53)
Separated/Divorced			1.17(0.88 to 1.56)	1.10(0.83 to 1.47)
Widowed			1.55(1.05 to 2.28)*	1.57(1.07 to 2.31)*
		Ethnicity		
White(base)				
Non-white			1.68(1.27 to 2.24)**	1.56(1.17 to 2.09)**
		Economic Activity		
Employed (base)				
Unemployed			1.08(0.65 to 1.80)	0.94(0.56 to 1.58)
Retired			1.67(1.26 to 2.20)**	1.61(1.22 to 2.13)**
Inactive			2.47(1.95 to 3.13)**	2.21(1.72 to 2.82)**
		Tenure		
Owner (base)				
Rent/rent free				1.15(0.94 to 1.40)
		Economic		
No (base)				
Yes				1.51(1.24 to 1.84)**

Table C5: Participation Restriction: Transport – Everyone

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Not having impairment (base)				
Impaired	2.05(1.93 to 2.17)**	2.12(2.00 to 2.25)**	2.02(1.90 to 2.15)**	1.90(1.79 to 2.02)**
		Age		
16-24 (base)				
25-34		1.07(0.96 to 1.19)	1.14(1.01 to 1.29)*	1.13(1.00-1.27)*
35-44		1.02(0.92 to 1.13)	1.06(0.94 to 1.19)	1.05(0.93 to 1.18)
45-54		0.99(0.90 to 1.10)	1.01(0.90 to 1.15)	1.02(0.90 to 1.15)
55-64		0.87(0.79 to 0.96)**	0.89(0.78 to 1.02)	0.92(0.81 to 1.06)
65+		0.87(0.78 to 0.96)**	0.92(0.75 to 1.12)	0.96(0.79 to 1.16)
		Sex		
Female (base)				
Male		0.88(0.83 to 0.92)**	0.89(0.84 to 0.93)**	0.89(0.84 to 0.94)**
		Marital Status		
Single (base)				
Married			1.06(0.98 to 1.16)	1.10(1.01 to 1.20)*
Separated/Divorced			1.21(1.08 to 1.35)**	1.15(1.03 to 1.28)*
Widowed			1.00(0.87 to 1.14)	0.99(0.87 to 1.13)
		Ethnicity		
White(base)				
Non-white			0.92(0.84 to 1.01)	0.84(0.77 to 0.93)**
		Economic Activity		
Employed (base)				
Unemployed			1.66(1.44 to 1.92)**	1.44(1.25 to 1.67)**
Retired			1.05(0.93 to 1.19)	1.06(0.94 to 1.21)
Inactive			1.30(1.20 to 1.40)**	1.19(1.10 to 1.29)**
		Tenure		
Owner (base)				
Rent/rent free				1.00(0.94 to 1.07)
		Economic		
No (base)				
Yes				1.61(1.52 to 1.72)**

Table C6: Participation Restriction: Transport – Impaired

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Mild (base)				
Moderate	1.42(1.27 to 1.58)**	1.45(1.30 to 1.61)**	1.40(1.25 to 1.57)**	1.35(1.21 to 1.51)**
Severe	3.19(2.72 to 3.73)**	3.29(2.80 to 3.86)**	3.07(2.59 to 3.64)**	2.85(2.39 to 3.38)**
		Age		
16-24 (base)				
25-34		1.20(0.90 to 1.59)	1.34(1.00 to 1.80)*	1.33(0.98 to 1.79)
35-44		1.02(0.79 to 1.33)	1.17(0.88 to 1.54)	1.16(0.88 to 1.54)
45-54		1.01(0.78 to 1.29)	1.18 (0.89 to 1.56)	1.20(0.90 to 1.59)
55-64		0.90(0.71 to 1.15)	1.09(0.81 to 1.45)	1.17(0.88 to 1.57)
65+		0.93(0.74 to 1.18)	1.23 (0.89 to 1.71)	1.37(0.99 to 1.89)
		Sex		
Female (base)				
Male		0.96(0.86 to 1.06)	0.94(0.85 to 1.05)	0.93(0.84 to 1.04)
		Marital Status		
Single (base)				
Married			0.85(0.72 to 1.00)	0.91(0.77 to 1.07)
Separated/Divorced			0.95(0.76 to 1.17	0.88(0.71 to 1.09)
Widowed			0.78(0.62 to 0.98)*	0.79(0.63 to 0.99)*
		Ethnicity		
White(base)				
Non-white			0.99(0.80 to 1.22)	0.92(0.75 to 1.14)
		Economic Activity		
Employed (base)				
Unemployed			1.31(0.94 to 1.81)	1.10(0.79 to 1.53)
Retired			1.00(0.83 to 1.21)	0.98(0.81 to 1.18)
Inactive			1.20(1.03 to 1.39)*	1.05(0.90 to 1.23)
		Tenure		
Owner (base)				
Rent/rent free				1.14(1.01 to 1.29)*
		Economic		
No (base)				
Yes				1.61(1.43 to 1.80)**

Table C7: Participation Restriction: Civic – Everyone

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Not having impairment (base)				
Impaired	1.34(1.25 to 1.44)**	1.89(1.76 to 2.04)**	1.92(1.78 to 2.06)**	1.75(1.62 to 1.88)**
		Age		
16-24 (base)				
25-34		1.40(1.22 to 1.62)**	1.40(1.20 to 1.63)**	1.37(1.17 to 1.59)**
35-44		1.09(0.96 to 1.24)	1.07(0.92 to 1.24)	1.05(0.90 to 1.23)
45-54		0.82(0.73 to 0.93)**	0.80(0.69 to 0.93)**	0.81(0.69 to 0.94)**
55-64		0.50(0.44 to 0.56)**	0.57(0.49 to 0.67)**	0.61(0.51 to 0.72)**
65+		0.27(0.24 to 0.30)**	0.46 (0.38 to 0.56)**	0.49(0.40 to 0.60)**
		Sex		
Female (base)				
Male		0.82(0.77 to 0.87)**	0.79(0.74 to 0.84)**	0.79(0.74 to 0.84)**
		Marital Status		
Single (base)				
Married			1.01(0.91 to 1.12)	1.07(0.96 to 1.20)
Separated/Divorced			1.29(1.13 to 1.47)**	1.20(1.05 to 1.37)**
Widowed			0.85(0.73 to 1.00)	0.85(0.72 to 1.00)
		Ethnicity		
White(base)				
Non-white			1.07(0.95 to 1.20)	0.94(0.83 to 1.06)
		Economic Activity		
Employed (base)				
Unemployed			1.41(1.18 to 1.69)**	1.14(0.95 to 1.37)
Retired			0.58(0.51 to 0.65)**	0.58(0.51 to 0.66) **
Inactive			0.98(0.89 to 1.09)	0.86(0.77 to 0.95) **
		Tenure		
Owner (base)				
Rent/rent free				1.14(1.05 to 1.24)**
		Economic		
No (base)				
Yes				1.88(1.73 to 2.05)**

Table C8: Participation Restriction: Civic – Impaired

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Mild (base)				
Moderate	1.21(1.04 to 1.41)*	1.52(1.31to 1.76)**	1.56(1.36 to 1.80)**	1.51(1.31 to 1.74)**
Severe	1.76(1.52 to 2.04)**	2.36(2.02 to 2.75)**	2.46(2.09 to 2.90)**	2.27(1.91 to 2.69)**
		Age		
16-24 (base)				
25-34		1.27(0.82 to 1.98)	1.31(0.84 to 2.05)	1.30(0.83 to 2.04)
35-44		0.85(0.58 to1.25)	0.87(0.58 to 1.31)	0.87(0.58 to 1.31)
45-54		0.65(0.45-0.95)*	0.67(0.45 to 1.01)	0.68(0.45 to 1.03)
55-64		0.37(0.26-0.52)**	0.46(0.31 to 0.70)**	0.50(0.33 to 0.75)**
65+		0.21(0.15-0.30)**	0.43(0.28 to 0.66)**	0.48(0.31 to 0.74)**
		Sex		
Female (base)				
Male		0.80(0.70 to 0.91)**	0.74(0.64 to 0.85)**	0.72(0.62 to 0.84)**
		Marital Status		
Single (base)				
Married			0.94(0.77 to 1.16)	0.99(0.80 to 1.22)
Separated/Divorced			1.34(1.04 to 1.73)*	1.23(0.95 to 1.59)
Widowed			0.69(0.52 to 0.92)*	0.69(0.51 to 0.93)*
		Ethnicity		
White(base)				
Non-white			1.19(0.89 to 1.58)	1.06(0.80 to 1.42)
		Economic Activity		
Employed (base)				
Unemployed			1.90(1.23 to 2.95)**	1.56(1.00 to 2.44)*
Retired			0.56(0.45 to 0.70)**	0.55(0.45 to 0.68)**
Inactive			0.86(0.71 to 1.03)	0.75(0.61 to 0.91)**
		Tenure		
Owner (base)				
Rent/rent free				1.09(0.93 to 1.29)
		Economic		
No (base)				
Yes				1.78(1.50 to 2.12)**

Table C9: Participation Restriction: Social – Everyone

	Model 1	*Model 2*	*Model 3*	*Model 4*
		Impairment		
Not having impairment (base)				
Impaired	1.17(1.10 to1.24)**	1.43(1.34 to 1.52)**	1.54(1.45 to 1.65)**	1.52(1.43 to 1.63)**
		Age		
16-24 (base)				
25-34		1.15(1.02 to 1.29)*	1.02(0.90 to 1.16)	1.02(0.90 to 1.16)
35-44		1.08(0.97 to 1.20)	0.94(0.83 to 1.06)	0.94(0.83 to 1.06)
45-54		1.06(0.95 to 1.18)	0.90(0.79 to 1.03)	0.91(0.80 to 1.03)
55-64		0.70(0.63 to 0.79)**	0.67(0.58 to 0.77)**	0.68(0.59 to 0.78)**
65+		0.38(0.34 to 0.43)**	0.49(0.41 to 0.59)**	0.50(0.41 to 0.59)**
		Sex		
Female (base)				
Male		0.89(0.84 to 0.94)**	0.85(0.80 to 0.90)**	0.85(0.80 to 0.90)**
		Marital Status		
Single (base)				
Married			1.00(0.92 to 1.09)	1.01(0.92 to 1.10)
Separated/Divorced			1.13(1.01 to 1.26)*	1.12(1.00 to 1.25)*
Widowed			0.87(0.74 to 1.02)	0.87(0.74 to 1.02)
		Ethnicity		
White(base)				
Non-white			0.85(0.76 to 0.95)**	0.84(0.75 to 0.93)**
		Economic Activity		
Employed (base)				
Unemployed			0.76(0.66 to 0.87)**	0.73(0.63 to 0.85)**
Retired			0.59(0.52 to 0.68)**	0.59(0.52 to 0.68)**
Inactive			0.65(0.60 to 0.71)**	0.64(0.58 to 0.70)**
		Tenure		
Owner (base)				
Rent/rent free				1.00(0.93 to 1.08)
		Economic		
No (base)				
Yes				1.09(1.02 to 1.17)**

Table C10: Participation Restriction: Social – Impaired

	Model 1	*Model 2*	*Model 3*	*Model 4*
			Impairment	
Mild (base)				
Moderate	0.91(0.81 to 1.02)	1.05(0.94 to 1.18)	1.18(1.05 to 1.33)**	1.18(1.05 to 1.32)**
Severe	0.92(0.81 to 1.04)	1.11(0.97 to 1.27)	1.43(1.24 to 1.65)**	1.42(1.23 to 1.64)**
			Age	
16-24 (base)				
25-34		0.96(0.74 to 1.25)	0.86(0.66 to 1.12)	0.86(0.66 to 1.13)
35-44		0.85(0.67 to 1.08)	0.74(0.57 to 0.95)*	0.74(0.57 to 0.95)*
45-54		0.79(0.62 to 0.99)*	0.67(0.52 to 0.88)**	0.68(0.52 to 0.88)**
55-64		0.56(0.45 to 0.71)**	0.54(0.41 to 0.71)**	0.54(0.41 to 0.71)**
65+		0.31(0.25 to 0.39)**	0.39(0.28 to 0.53)**	0.39(0.29 to 0.54)**
			Sex	
Female (base)				
Male		0.93(0.84 to 1.03)	0.90(0.81 to 1.00)	0.90(0.81 to 1.00)
			Marital Status	
Single (base)				
Married			1.02(0.87 to 1.19)	1.00(0.86 to 1.17)
Separated/Divorced			1.11(0.92 to 1.35)	1.11(0.91 to 1.34)
Widowed			0.95(0.75 to 1.21)	0.94(0.74 to 1.19)
			Ethnicity	
White(base)				
Non-white			0.87(0.71 to 1.07)	0.86(0.70 to 1.06)
			Economic Activity	
Employed (base)				
Unemployed			0.64(0.49 to 0.82)**	0.64(0.49 to 0.82)**
Retired			0.52(0.42 to 0.64)**	0.52(0.43 to 0.64)**
Inactive			0.53(0.46 to 0.61)**	0.54(0.46 to 0.62)**
			Tenure	
Owner (base)				
Rent/rent free				0.96(0.85 to 1.08)
			Economic	
No (base)				
Yes				1.03(0.92 to 1.15)

Appendix D: Multilevel modelling

Table D1: Participation Restriction: Work <65- Everyone

	Model 1	*Model 2*	*Model 3*
Impairment			
Not having impairment (base)			
Impaired	5.19(4.59 to 5.88)**	3.70(3.12 to 4.38)**	3.69(3.12 to 4.37)**
Age			
16-24 (base)			
25-34	3.19(2.56 to 3.96)**	2.51(2.01 to 3.14)**	2.49(2.00 to 3.11)**
35-44	3.57(2.87 to 4.43)**	2.84(2.28 to 3.54)**	2.82(2.26 to 3.51)**
45-54	2.83(2.26 to 3.55)**	2.78(2.20 to 3.51)**	2.76(2.19 to 3.49)**
55-64	2.26(1.76 to 2.89)**	2.59(1.99 to 3.38)**	2.57(1.97 to 3.35)**
65+	NA	NA	NA
Sex			
Female (base)			
Male	1.04(0.94 to 1.14)	1.03(0.93 to 1.14)	1.02(0.93 to 1.13)
Marital Status			
Single (base)			
Married	0.70(0.61 to 0.81)**	0.77(0.66 to 0.91)**	0.77(0.66 to 0.91)**
Separated/Divorced	1.36(1.15 to 1.61)**	1.15(0.97 to 1.37)	1.15(0.97 to 1.37)
Widowed	0.93(0.65 to 1.34)	0.91(0.62 to 1.32)	0.91(0.62 to 1.32)
Ethnicity			
White(base)			
Non-white	1.48(1.23 to 1.78)**	1.26(1.04 to 1.51)*	1.26(1.05 to 1.52)*
Education			
No(base)			
Basic	0.88(0.75 to 1.03)	1.06(0.90 to 1.25)	1.06(0.90 to 1.26)
Degree	0.88(0.73 to 1.05)	1.30(1.07 to 1.57)**	1.30(1.07 to 1.58)**
Other non-degree	1.08(0.92 to 1.26)	1.30(1.10 to 1.52)**	1.30(1.10 to 1.53)**
Economic Activity			
Employed (base)			
Unemployed	6.26(5.08 to 7.70)**	4.59(3.72 to 5.67)**	4.56(3.70 to 5.64)**
Retired	0.63(0.48 to 0.82)**	0.61(0.46 to 0.80)**	0.61(0.46 to 0.80)**
Inactive	7.75(6.69 to 8.98)**	5.16(4.45 to 5.98)**	5.14(4.44 to 5.96)**
Tenure			
Owner (base)			
Rent/rent free		1.39(1.21 to 1.58)**	1.39(1.21 to 1.59)**
Economic			
No (base)			
Yes		2.13(1.87 to 2.42)**	2.12(1.86 to 2.41)**
Household Impairment Level			
No impairment (base)			
At least one mild/moderate		1.09(0.92 to 1.30)	1.09(0.92 to 1.30)
At least one severe		4.14(3.34 to 5.13)**	4.15(3.35 to 5.14)**
Household Size			
One (base)			
More than one		0.71(0.60 to 0.85)**	0.71(0.59 to 0.85)**
Children <16 in Household			
No children			
Up to 11		1.94(1.67 to 2.26)**	1.95(1.68 to 2.27)**
12-15		1.12(0.90 to 1.39)	1.12(0.90 to 1.39)
Deprivation Index Quintiles			
5(Least Deprived)			
4			1.07(0.88 to 1.29)
3			1.07(0.88 to 1.29)
2			1.16(0.96 to 1.41)
1 (Most Deprived)			1.01(0.83 to 1.24)
Rurality			
Urban			
Rural			1.01(0.88 to 1.17)

Table D2: Participation Restriction: Accessibility Home- Everyone

	Model 1	*Model 2*	*Model 3*
Impairment			
Not having impairment (base)			
Impaired	20.43(14.47 to 28.84)**	18.78(12.19 to 28.92)**	18.80(12.19 to 29.00)**
Age			
16-24 (base)			
25-34	1.27(0.74 to 2.17)	1.05(0.60 to 1.82)	1.01(0.58 to 1.76)
35-44	1.42(0.85 to 2.35)	1.12(0.66 to 1.88)	1.09(0.65 to 1.84)
45-54	1.90(1.13 to 3.17)*	1.62(0.97 to 2.70)	1.58 (0.95 to 2.64)
55-64	2.36(1.39 to 3.99)**	2.32(1.36 to 3.98)**	2.27 (1.33 to 3.88)**
65+	4.45(2.56 to 7.73)**	4.45(2.53 to 7.82)**	4.47(2.55 to 7.85)**
Sex			
Female (base)			
Male	0.81(0.69 to 0.94)**	0.78(0.66 to 0.91)**	0.77(0.66 to 0.90)**
Marital Status			
Single (base)			
Married	0.91(0.68 to 1.21)	0.94(0.68 to 1.31)	0.98(0.70 to 1.35)
Separated/Divorced	1.31(0.94 to 1.83)	1.13(0.81 to 1.58)	1.14(0.81 to 1.59)
Widowed	1.57(1.09 to 2.27)*	1.58(1.08 to 2.33)*	1.59(1.08 to 2.34)*
Ethnicity			
White(base)			
Non-white	2.07(1.41 to 3.05)**	1.93(1.34 to 2.78)**	1.77(1.23 to 2.54)**
Economic Activity			
Employed (base)			
Unemployed	1.43(0.85 to 2.41)	0.99(0.59 to 1.67)	0.97(0.58 to 1.64)
Retired	2.32(1.75 to 3.09)**	1.91(1.43 to 2.54)**	1.87(1.40 to 2.49)**
Inactive	6.77(5.11 to 8.98)**	3.20(2.46 to 4.16)**	3.14(2.41 to 4.08)**
Tenure			
Owner (base)			
Rent/rent free		1.37(1.11 to 1.68)**	1.26(1.02 to 1.55)*
Economic			
No (base)			
Yes		1.78(1.45 to 2.20)**	1.73(1.41 to 2.13)**
Household Impairment Level			
No impairment (base)			
At least one mild/moderate		0.46(0.29 to 0.73)**	0.45(0.28 to 0.72)**
At least one severe		3.21(2.02 to 5.11)**	3.10(1.95 to 4.94)**
Household Size			
One (base)			
More than one		1.02(0.78 to 1.35)	1.03(0.79 to 1.36)
Children <16 in Household			
No children			
Up to 11		1.68(1.20 to 2.35)**	1.67(1.20 to 2.34)**
12-15		1.28(0.85 to 1.92)	1.28(0.85 to 1.92)
Deprivation Index Quintiles			
5(Least Deprived)			
4			1.15(0.85 to 1.57)
3			1.31(0.97 to 1.77)
2			1.55(1.14 to 2.09)**
1 (Most Deprived)			1.45(1.07 to 1.96)*
Rurality			
Urban (base)			
Rural			0.78(0.63 to 0.98)*

Table D3: Participation Restriction: Transport – Everyone

	Model 1	*Model 2*	*Model 3*
Impairment			
Not having impairment (base)			
Impaired	3.37(2.98 to 3.81)**	1.96(1.70 to 2.27)**	2.00(1.73 to 2.31)**
Age			
16-24 (base)			
25-34	1.04(0.83 to 1.30)	1.05(0.83 to 1.32)	1.06(0.84 to 1.33)
35-44	0.96(0.76 to 1.22)	0.91(0.71 to 1.16)	0.90(0.70 to 1.15)
45-54	0.88(0.68 to 1.12)	0.85(0.66 to 1.10)	0.84(0.65 to 1.09)
55-64	0.68(0.52 to 0.89)**	0.69(0.52 to 0.92)*	0.67(0.50 to 0.89)**
65+	0.83(0.60 to 1.13)	0.82(0.59 to 1.14)	0.78(0.56 to 1.08)
Sex			
Female (base)			
Male	0.79(0.73 to 0.86)**	0.78(0.72 to 0.85)**	0.78(0.72 to 0.85)**
Marital Status			
Single (base)			
Married	1.09(0.92 to 1.30)	1.19(0.98 to 1.45)	1.17(0.97 to 1.42)
Separated/Divorced	1.35(1.09 to 1.69)**	1.26(1.00 to 1.58)*	1.25(1.00 to 1.57)*
Widowed	1.03(0.78 to 1.35)	1.05(0.79 to 1.40)	1.04(0.78 to 1.39)
Ethnicity			
White(base)			
Non-white	1.13(0.90 to 1.42)	0.99(0.78 to 1.25)	1.08(0.86 to 1.37)
Economic Activity			
Employed (base)			
Unemployed	2.31(1.78 to 3.00)**	1.86(1.43 to 2.42)**	1.84(1.41 to 2.40)**
Retired	1.11(0.91 to 1.36)	1.10(0.90 to 1.35)	1.11(0.91 to 1.36)
Inactive	1.96(1.66 to 2.31)**	1.56(1.32 to 1.84)**	1.54(1.31 to 1.82)**
Tenure			
Owner (base)			
Rent/rent free		0.97(0.83 to 1.13)	0.98(0.84 to 1.15)
Economic			
No (base)			
Yes		2.98(2.55 to 3.47)**	2.97(2.55 to 3.47)**
Household Impairment Level			
No impairment (base)			
At least one mild/moderate		1.93(1.63 to 2.29)**	1.92(1.62 to 2.28)**
At least one severe		6.62(5.15 to 8.53)**	6.62(5.14 to 8.53)**
Household Size			
One (base)			
More than one		0.85(0.68 to 1.05)	0.82(0.66 to 1.02)
Children <16 in Household			
No children			
Up to 11		1.19(0.99 to 1.44)	1.21(1.00 to 1.45)*
12-15		1.09(0.82 to 1.44)	1.08(0.82 to 1.43)
Deprivation Index Quintiles			
5(Least Deprived)			
4			1.33(1.05 to 1.68)*
3			1.17(0.92 to 1.49)
2			1.27(0.99 to 1.62)
1 (Most Deprived)			1.27(0.97 to 1.66)
Rurality			
Urban (base)			
Rural			2.54(2.13 to 3.03)**

Table D4: Participation Restriction: Civic – Everyone

	Model 1	*Model 2*	*Model 3*
Impairment			
Not having impairment (base)			
Impaired	3.22(2.70 to 3.83)**	1.86(1.52 to 2.27)**	1.85(1.51 to 2.25)**
Age			
16-24 (base)			
25-34	1.98(1.48 to 2.65)**	1.90(1.40 to 2.57)**	1.90(1.40 to 2.57)**
35-44	1.47(1.09 to 1.98)**	1.36(1.00 to 1.85)*	1.36(1.00 to 1.86)*
45-54	0.81(0.61 to 1.08)	0.96(0.70 to 1.29)	0.95(0.70 to 1.29)
55-64	0.38(0.28 to 0.52)**	0.54(0.39 to 0.76)**	0.54(0.39 to 0.76)**
65+	0.17(0.11 to 0.26)**	0.26(0.17 to 0.40)**	0.26(0.17 to 0.40)**
Sex			
Female (base)			
Male	0.71(0.64 to 0.79)**	0.72(0.64 to 0.80)**	0.71(0.64 to 0.80)**
Marital Status			
Single (base)			
Married	1.15(0.95 to 1.40)	1.06 (0.84 to 1.32)	1.05(0.84 to 1.32)
Separated/Divorced	2.10(1.58 to 2.78)**	1.64 (1.23 to 2.19)**	1.65(1.24 to 2.20)**
Widowed	0.84(0.61 to 1.14)	0.76(0.55 to 1.06)	0.76(0.55 to 1.06)
Ethnicity			
White(base)			
Non-white	1.42(1.13 to 1.79)**	0.99(0.78 to 1.25)	1.03(0.81 to 1.32)
Economic Activity			
Employed (base)			
Unemployed	1.55(1.14 to 2.11)**	1.10(0.79 to 1.53)	1.10(0.79 to 1.53)
Retired	0.35(0.26 to 0.46)**	0.36(0.27 to 0.47)**	0.36(0.27 to 0.47)**
Inactive	0.91(0.75 to 1.11)	0.65(0.52 to 0.80)**	0.65(0.52 to 0.80)**
Tenure			
Owner (base)			
Rent/rent free		1.51(1.29 to 1.77)**	1.66(1.41 to 1.95)**
Economic			
No (base)			
Yes		4.31(3.56 to 5.22)**	4.45(3.67 to 5.39)**
Household Impairment Level			
No impairment (base)			
At least one mild/moderate		1.85(1.52 to 2.25)**	1.89(1.55 to 2.30)**
At least one severe		6.32(4.37 to 9.13)**	6.65(4.59 to 9.65)**
Household Size			
One (base)			
More than one		0.99(0.77 to 1.26)	0.98(0.76 to 1.25)
Children <16 in Household			
No children			
Up to 11		2.61(2.08 to 3.29)**	2.63(2.08 to 3.31)**
12-15		1.19(0.92 to 1.55)	1.20(0.92 to 1.56)
Deprivation Index Quintiles			
5(Least Deprived)			
4			0.82(0.67 to 1.01)
3			0.93(0.75 to 1.15)
2			0.85(0.68 to 1.06)
1 (Most Deprived)			0.58(0.45 to 0.74)**
Rurality			
Urban (base)			
Rural			0.88(0.76 to 1.03)

Table D5: Participation Restriction: Social – Everyone

	Model 1	*Model 2*	*Model 3*
Impairment			
Not having impairment (base)			
Impaired	1.84(1.67 to 2.03)**	1.51(1.32 to 1.72)**	1.50(1.32 to 1.71)**
Age			
16-24 (base)			
25-34	1.05(0.87 to 1.27)	1.03(0.85 to 1.26)	1.03(0.85 to 1.26)
35-44	0.95(0.78 to 1.16)	0.94(0.76 to 1.14)	0.93(0.76 to 1.14)
45-54	0.91(0.75 to 1.12)	0.89(0.72 to 1.09)	0.89(0.72 to 1.10)
55-64	0.52(0.41 to 0.65)**	0.50(0.39 to 0.63)**	0.50(0.39 to 0.64)**
65+	0.36(0.28 to 0.48)**	0.34(0.26 to 0.46)**	0.35(0.26 to 0.46)**
Sex			
Female (base)			
Male	0.83(0.77 to 0.89)**	0.82(0.76 to 0.89)**	0.82(0.76 to 0.89)**
Marital Status			
Single (base)			
Married	1.02(0.89 to 1.17)	1.08(0.93 to 1.26)	1.08(0.92 to 1.25)
Separated/Divorced	1.30(1.10 to 1.53)**	1.28(1.09 to 1.52)**	1.28(1.08 to 1.51)**
Widowed	0.83(0.66 to 1.04)	0.83(0.65 to 1.05)	0.82(0.65 to 1.05)
Ethnicity			
White(base)			
Non-white	0.79(0.66 to 0.95)*	0.78(0.64 to 0.94)**	0.79(0.65 to 0.95)*
Economic Activity			
Employed (base)			
Unemployed	0.61(0.49 to 0.76)**	0.57(0.46 to 0.72)**	0.58(0.46 to 0.73)**
Retired	0.45(0.37 to 0.54)**	0.44(0.36 to 0.53)**	0.44(0.36 to 0.53)**
Inactive	0.52(0.46 to 0.60)**	0.49(0.43 to 0.56)**	0.49(0.43 to 0.57)**
Tenure			
Owner (base)			
Rent/rent free		1.00(0.88 to 1.12)	1.04(0.92 to 1.18)
Economic			
No (base)			
Yes		1.20(1.07 to 1.34)**	1.21(1.08 to 1.36)**
Household Impairment Level			
No impairment (base)			
At least one mild/moderate		1.28(1.11 to 1.48)**	1.29(1.12 to 1.49)**
At least one severe		1.58(1.30 to 1.93)**	1.61(1.32 to 1.97)**
Household Size			
One (base)			
More than one		0.89(0.76 to 1.06)	0.90(0.76 to 1.06)
Children <16 in Household			
No children			
Up to 11		1.00(0.86 to 1.15)	1.00(0.86 to 1.16)
12-15		0.87(0.70 to 1.08)	0.88(0.71 to 1.09)
Deprivation Index Quintiles			
5(Least Deprived)			
4			1.10(0.92 to 1.30)
3			1.06(0.89 to 1.26)
2			0.94(0.78 to 1.12)
1 (Most Deprived)			0.76(0.63 to 0.93)**
Rurality			
Urban (base)			
Rural			0.82(0.72 to 0.94)**

D6: Random Part/Work

Random Part Levels	Model 1	Model 2	Model 3
Local Authority (Intercept) Variance	0.16(0.08 to 0.30)	0.12(0.05 to 0.26)	0.12(0.05 to 0.26)
Household (Intercept) Variance	2.69(2.22 to 3.25)	2.60(2.13 to 3.16)	2.59(2.13 to 3.15)

D7: Random Part/Accessibility at home

Random Part Levels	Model 1	Model 2	Model 3
Local Authority (Intercept) Variance	0.09(0.00 to 1.27)	0.04(0.00 to 13.55)	0.04(0.00 to 9.36)
Household (Intercept) Variance	4.44(2.81 to 7.02)	3.99(2.81 to 5.67)	4.00(2.82 to 5.68)

D8: Random Part/Transport

Random Part Levels	Model 1	Model 2	Model 3
Local Authority (Intercept) Variance	1.20(0.99 to 1.47)	1.28(1.06 to 1.56)	1.11(0.91 to 1.37)
Household (Intercept) Variance	10.85(9.75 to 12.08)	11.21(10.02 to 12.53)	11.21(10.01 to 12.55)

D9: Random Part/Civic

Random Part Levels	Model 1	Model 2	Model 3
Local Authority (Intercept) Variance	9.90(1.71 to 5.74)	3.08(1.68 to 5.65)	5.09(2.95 to 8.78)
Household (Intercept) Variance	31.51(17.85 to 55.62)	24.74(14.36 to 42.61)	24.65(14.32 to 42.44)

D10: Random Part/Social

Random Part Levels	Model 1	Model 2	Model 3
Local Authority (Intercept) Variance	0.24(0.15 to 0.37)	0.25(0.16 to 0.38)	0.23(0.15 to 0.36)
Household (Intercept) Variance	4.69(4.10 to 5.36)	4.68(4.09 to 5.35)	4.68(4.09 to 5.35)