

# **Understanding the risks of social exclusion across the life course: Working age adults without dependent children**

**A Research Report for the Social Exclusion Task Force,  
Cabinet Office**

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# Executive Summary

## Project overview

This research was undertaken as part of a wider research initiative commissioned by the Cabinet Office Social Exclusion Task Force (SETF) which seeks to better understand the complex interrelationships between different forms of disadvantage, and how these vary across the life course amongst the British population. This report addresses the changing situation of working age adults aged 25 plus living in households without dependent children during the 1991-2005 period.

## Measuring multidimensional exclusion

The research described here builds upon earlier research commissioned by SETF into the measurement of multidimensional disadvantage resulting in the Bristol Social Exclusion Matrix (B-SEM) (Levitas et al., 2007). This research applies this approach empirically in order to examine the nature, distribution and dynamics of multidimensional disadvantage amongst working age adults without dependent children.

The results presented here are based upon analysis of two large-scale sample survey data sets: the *General Household Survey* (GHS) and the *British Household Panel Survey* (BHPS). Based upon analysis of pooled cross-sectional GHS data we estimate the incidence of specific indicators of disadvantage and explore the interrelationships between indicators using a range of advanced statistical methods. Based upon a similar approach, we use BHPS data tracking individuals over time in order to investigate the dynamics of disadvantage and the individual and household-level factors associated with the hazard of becoming multi-dimensionally disadvantaged.

## The structure of multidimensional disadvantage

Multiple disadvantages are associated with variations by employment status, educational attainment, housing tenure, household type, marital status, age group and gender. In particular, economic activity status and educational attainment both emerge as powerful predictors of disadvantage with unemployed and economically inactive respondents, and those with few or no qualifications, being especially vulnerable to many singular indicators of disadvantage. Whilst the pattern of association is complicated by cohort and life cycle effects, these analyses suggest that single, divorced, separated and widowed respondents are at especial risk of disadvantage, along with single person and lone parent households. Whilst understanding the age structure of disadvantage is similarly fraught, in general the incidence of most singular instances of disadvantage appears to increase with age, with those approaching retirement age at greatest risk.

The observed variability in indicators of deprivation can be explained with reference to the presence of two or more underlying 'dimensions' of deprivation. Canonical correlation analysis suggests the presence of at least two distinct dimensions of disadvantage - one focusing upon

labour market non-participation and ill health, and a second dimension relating to material deprivation, low social status and support, and poor housing quality.

In order to characterise the overall pattern of disadvantage amongst this population, we therefore classify respondents according to their disadvantage profile using cluster analysis methods. These analyses identify a 'severely disadvantaged' group (comprising 8% of respondents) who tend to be disadvantaged according to virtually every one of the 25 indicators included in the analysis. Two further groups are identified who experience multiple forms of disadvantage across a wide variety of indicators – the 'low income sick' and the 'working poor'. Taken together these three groups represent nearly 16% of working age adults without dependent children. This group is disproportionately concentrated amongst older respondents, the unemployed and inactive, single person households, those with few educational qualifications, and rental tenants.

## The dynamics of multidimensional disadvantage

Based upon trend analysis of the 1997-2005 period, no significant decline in the overall incidence of most singular instances of disadvantage is evident for this population. On the basis of cluster analysis of BHPS data, we identify two clusters of BHPS respondents who are disproportionately vulnerable to multiple disadvantage: the 'severely disadvantaged' and the 'low skilled' comprising 17% of the BHPS sample in total. Persistence over time is often held to be a key characteristic of social exclusion. Our results suggest that there may be less mobility out of these multidimensionally disadvantaged groups than there is for any of the 'non-disadvantaged' groups so that the experience of disadvantage appears to be relatively enduring and persistent over time.

However, our main focus here is upon dynamic analysis of BHPS data, focusing in particular upon the individual and household-level factors associated with elevated hazard of *becoming* multidimensionally disadvantaged. On the basis of survival analysis and Cox regression analysis the hazard of becoming 'severely disadvantaged' is significantly greater for women, older respondents, rental tenants, manual occupational groups, the unemployed, home makers, early retirees, the sick and disabled, those with no qualifications, unmarried (never married) respondents, and single person households. The hazard of entering the 'low skilled' group is significantly greater for older respondents, manual occupational groups, respondents in employment, respondents with few or no qualifications, couples with no dependent children, and single person households.

## Policy implications

This research suggests that approximately 16% of this population – 2.6 million adults – are experiencing multidimensional disadvantage at any one point in time. Tackling multidimensional disadvantage amongst working age adults without children therefore ought to be a key priority within the UK's overall strategy for social inclusion. However, the circumstances facing this group are not wholly explicable in terms of labour market non-participation, for example with regard to the circumstances of the 'working poor' and 'low skilled' groups identified here. The absolute magnitude of these groups means that tackling disadvantage amongst those in work should also be a priority in reducing the overall incidence of disadvantage in the UK.

Equally, inclusion through paid work is likely to be a highly inappropriate policy solution for those working age adults whose disadvantaged circumstances are associated with ill health, disability, and caring responsibilities. Labour market activation policies therefore need to be supplemented by policies directed at improving the quality of working life for those in work, as well as income maximisation policies for those working age adults unable to participate in the paid economy.

Finally, trends in the incidence of specific instances of disadvantage suggest that overall progress in tackling disadvantage amongst this population has, at best, been mixed. Whilst there appears to have been progress in some areas (material deprivation, housing and neighbourhood quality) there remains much to be done. These findings draw attention to the enduring and cumulative nature of disadvantage - and therefore to the need for a continuing long-term policy commitment to tackling disadvantage and holistic approaches for combating it.

# 1. Introduction

## 1.1 About this research

This report aims to develop our understanding of the complex relationship between different forms of disadvantage in Britain, and how the profile of multidimensional disadvantage has changed over time since the early 1990s. This report addresses the changing situation of working age adults without dependent co-resident children aged 25 plus over the 1991-2005 period, by focusing upon the changing profile of vulnerability to multiple forms of disadvantage over this period<sup>1</sup>.

This research has been commissioned by the Cabinet Office Social Exclusion Task Force (SETF) in order to investigate:

- The prevalence and social distribution of different forms of disadvantage and their inter-relationship.
- The incidence of multidimensional disadvantage.
- Change over time in different forms of disadvantage and in multidimensional disadvantage.
- Key events and triggers of multidimensional disadvantage.

This research is undertaken as part of a wider research initiative commissioned by SETF into **Multidimensional Exclusion Across the Life Course** focusing in addition upon the situation of young people (University of York), families with children (SETF), and older people (NatGen).

In comparison with low income and poverty, our understanding of social exclusion and its measurement is less well developed. In particular, the complex relationships between different aspects of disadvantage and exclusion have been subject to much less investigation than more familiar concepts such as low income and material and social deprivation. This report therefore addresses the following questions:

1. How many singular forms of disadvantage do working age adults without children experience, and how does their incidence vary?
2. How are different forms of disadvantage related to each other?
3. How widespread is multidimensional disadvantage amongst working age adults without children?
4. How do singular forms of disadvantage amongst working age adults without children vary over time?

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<sup>1</sup> The analyses presented here reflect the situation of working age adults aged 25 and over living in private households without co-resident dependent children. Throughout this report references to 'working age adults without children' (and similar) refer to this group only.



5. How are different forms of longitudinal disadvantage related to each other?
6. What events can trigger multidimensional exclusion, and what are the underlying drivers of multidimensional exclusion?

This report builds upon earlier research commissioned by SETF into the measurement of multidimensional disadvantage resulting in the Bristol Social Exclusion Matrix (B-SEM) (Levitas et al., 2007). This report seeks to operationalise and measure the incidence and changing distribution of different dimensions of disadvantage based upon the B-SEM model and using data drawn from the General Household Survey (GHS) and the British Household Panel Survey (BHPS).

The data sources investigated here were identified on the basis of their coverage of the range of B-SEM indicators, themes and domains amongst working age adults without children. Inevitably, there are indicators of disadvantage and exclusion which are not enumerated within the data sets analysed here. One key theme emerging from earlier research highlights the shortcomings of existing sample surveys in addressing social exclusion with respect both to topic and sample coverage (Levitas et al., 2007).

In particular, it must be emphasised that the analyses presented here reflect the situation of the working age adults (aged 25+) living in private households only. Those living in institutional accommodation (care institutions, prisons, hostels, etc.), the homeless and other individuals not living in private households are outside the scope of this study. Similarly, the sample comprises only working age adults *without co-resident dependent children*. Thus, in addition to childless adults, this sample includes adults with 'non-dependent' children living with them or elsewhere, and adults with dependent children who are not co-resident. The latter group includes the separated/divorced fathers (and occasionally mothers) of children living in lone parent households, as well as parents of children in institutional care. *Thus although the sample excludes dependent co-resident children, this does not mean that all sample members are childless.*

The report is divided into four main sections. Chapter One reviews our understanding of multiple disadvantage amongst working age households, how this research fits into the existing evidence base, and the data and methods informing this study. In Chapter Two we outline the data and methods used in this report to examine the multidimensional structure of disadvantage and how the experience of multidimensional disadvantage varies over time for working age adults without children. Chapter Three explores the cross-sectional incidence, distribution and structure of disadvantage using GHS data to address questions 1-3 above. Chapter Four explores the longitudinal dynamics of multiple disadvantage based upon analysis of the BHPS in order to address questions 4-7 above. Chapter Five summarises the key findings arising from this study and considers their implications for policies for tackling disadvantage and social exclusion amongst working age adults without children in Britain.

## 1.2 Conceptualising and measuring social exclusion

As Levitas et al. (2007) outline, the idea of social exclusion is contested both conceptually and in terms of appropriate measurement. Frequently the dyad ‘poverty and social exclusion’ is used without clear differentiation of the two elements, while for working age adults (although not for children or older people) social exclusion is sometimes treated as synonymous with non-participation in paid work. For young people, it is assumed to be closely related to the new category of NEET – not in employment, education or training. Following a survey of the theoretical literature and the principal sets of indicators used in measurement, Levitas et al. (2007) defined social exclusion as follows.

Social exclusion is a complex and multidimensional process. It involves the lack or denial of resources, rights, goods and services, and the inability to participate in the normal relationships and activities, available to the majority of people in a society, whether in economic, social, cultural or political arenas. It affects both the quality of life of individuals and the equity and cohesion of society as a whole.

Working to a project brief focusing on both exclusion and deep exclusion, Levitas et al. defined deep exclusion as follows:

Deep exclusion refers to exclusion across more than one domain or dimension of disadvantage, resulting in severe negative consequences for quality of life, well-being and future life chances.

That there is a connection between ‘social exclusion’ and multidimensional disadvantage (the topic of this project) is clear. However, the identification of relevant domains and dimensions is more problematic. The purpose of the earlier report was to identify how well existing data sets addressed these domains and dimensions, and the scope for secondary analysis to investigate the relationships between the different dimensions. For such an exercise, it is necessary to derive the appropriate domains and dimensions from existing theoretical frameworks and current knowledge, and map these on to the data sources under scrutiny. It therefore needs to draw on explicit definitions, and on the implicit definitions of social exclusion and of relevant domains embedded in current sets of indicators used for monitoring exclusion. These sets of indicators include:

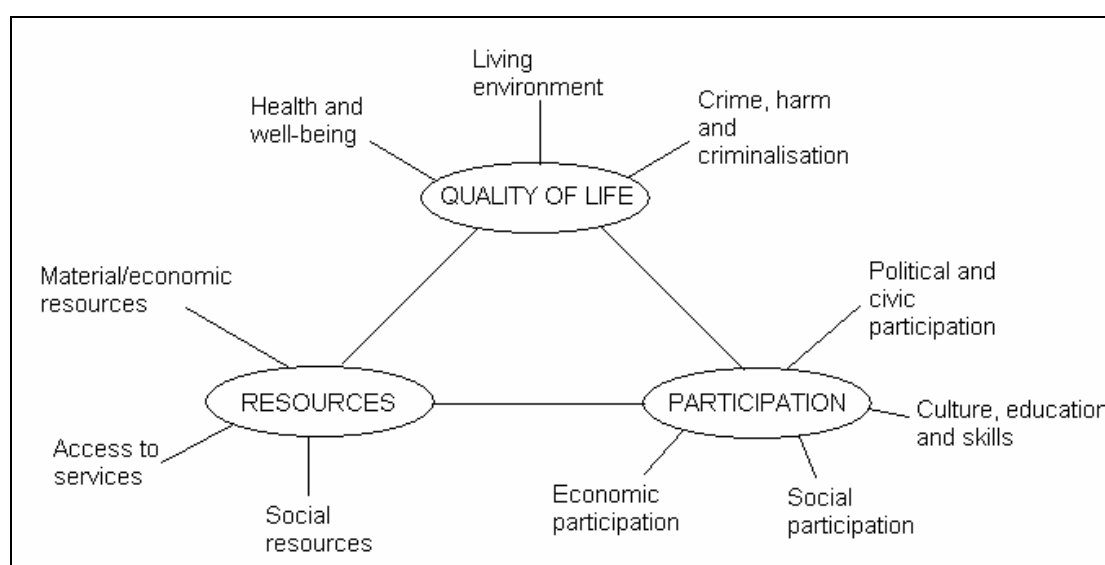
- The Laeken indicators, the agreed battery of indicators for measuring progress in tackling poverty and social exclusion across the European Union
- The wider set proposed to the Social Protection Committee (the Atkinson indicators)
- Indicators included in the *UK National Action Plan on Social Inclusion* (UK NAPIncl), which go beyond the Laeken indicators and essentially coincide with those forming the basis of the UK annual audit of poverty and social exclusion, initiated in 1999 as *Opportunity For All*
- The separate but overlapping series developed by the New Policy Institute and the Joseph Rowntree Foundation, *Monitoring Poverty and Social Exclusion*

Most of the above batteries of single indicators are differentiated by the stage of the life-course, with separate indicators for children, young people, working age adults and older people. For working age people, the emphasis is very heavily on income poverty and its relationship to the labour market, whereas for children and older people, there is more emphasis on health, social relations and quality of life. Given the limitations of the main indicator sets on social exclusion, Levitas et al. looked also at the *Index of Multiple Deprivation*, the Audit Commission’s *Quality of Life Indicators* for use by Local Authorities, and the *Sustainable Development Indicators*, as well as

some new, exploratory research into the development of quality of life and well-being indicators that could be operationalised at an individual rather than an aggregate level.

From this process, the Bristol Social Exclusion Matrix (B-SEM) was derived. The B-SEM identified three domains of resources, participation and quality of life; and a total of ten dimensions within these domains, as set out in Figure 1.1 (*below*).

**FIGURE 1.1: Conceptualising Multidimensional Exclusion: B-SEM Domains and Sub-domains.**



Source: Levitas et al., 2007

The B-SEM does not specify appropriate indicators within these domains, although it could be developed as a set of survey questions that would do precisely that. Its original purpose was to assess the coverage of existing data sets, and for that it was appropriate to examine what if any data in each data set related to the identified dimensions.

In this project, we examine the empirical distribution and dynamics of multidimensional exclusion by focusing upon specific data sets and indicators, in order to identify precise indicators within the B-SEM domains. The move from conceptualisation to measurement is always a pragmatic one, involving a compromise between the data one might ideally like and that which is actually available or practically achievable. In this case, there were three further considerations which shaped the identification of indicators. The first was the desire of SETF to link the topics chosen within the dimensions of the B-SEM to Public Service Agreements and other targets where possible. The second was that the focus here upon working age adults without dependent children is related to a wider SETF research initiative investigating disadvantage across the life course and including the situation of households with children, young people, and older people. Keeping the data as far as possible comparable across the projects was one reason for using the B-SEM across all in the first place, but also for using similar definitions within the B-SEM dimensions. Thirdly, of course, there

was the constraint of the data sets actually under scrutiny, the General Household Survey (GHS) and the British Household Panel Survey (BHPS).

The crucial point here is that while the constraints in this project took a particular form, there are always pragmatic limitations when moving from theory to data. What this means is that one cannot, in fact, directly measure social exclusion, but only seek indicators of it. Because indicators are not measures, they need to be treated with extreme caution, and interpreted in the light of their known limitations. This is even more true when seeking, as this project does, to examine the dynamics of exclusion and the relationship between domains. For example, correlations (or lack of correlation) between indicators cannot automatically be taken as demonstrating equivalent levels of connection between the underlying theoretical dimensions they purport to measure.

### 1.3 Social exclusion and working age adults without children

This section reviews our understanding of the nature and distribution of multiple disadvantage and exclusion amongst working age adults without children.

Whilst there is a long tradition of research in Britain into the distribution and dynamics of household income, and into the changing extent of material and social deprivation amongst British households, much less attention has focused upon the operationalisation and empirical measurement of social exclusion. As a result, research into inequalities in the UK has tended to focus upon income disparities usually on the basis of some needs-adjusted indicator of household income which is assumed to reflect underlying inequalities in wealth and living standards. It is certainly clear that income poverty increased substantially for all household types in Britain during the 1980s and early 1990s (e.g. Webb & Goodman, 1994; DWP, 2007). For example, over the 1979 to 1992-3 period as a whole the proportion of households experiencing relative low income (based on the 60% median AHC measure) increased from 5% to 12% for couples without children, and from 7% to 22% for single person households without children (Goodman et al., 1997).

More recent trends in income inequality suggest that the tide of rising inequality may finally be beginning to ebb. Nevertheless, these trends disguise significant variation across households of different types. Recent analysis of the distributional impact of changes in the taxation and benefit system for the 1997-2004/05 period conducted by Sefton and Sutherland (2005) suggest that working age adults without children have benefited far less from policy changes since 1997 than pensioners and families with children. Reductions in inequality over this period as measured by the Gini coefficient have been far more pronounced for pensioners and families with dependent children than for working age adults without children. Indeed, these authors estimate that by 2004/05 income poverty rates amongst pensioners and families with dependent children were respectively 44% and 30% lower than they would have been under 1997 taxation and benefit policies, whilst rates of income poverty remained unchanged for working age adults without children (Sefton & Sutherland, 2005).

As a result, over the 1994/95 to 2006/07 period, the proportion of working-age adults living in UK households with less than 60% of contemporary equivalised median income after housing costs

remained unchanged at 20 percent. However, using these contemporary medians, 5.3 million working age adults in the UK were living in low income households using the HBAI definition in 2006/07 – a rise of 600,000 since 1998/99 after housing costs (DWP, 2008). Indeed, in recent years the *only* group where the number of low-income people is higher than a decade ago is working age adults without dependent children (Palmer et al., 2007).

In 2006/07, 18% of working age adults without children were income poor using the 60% median AHC threshold, with income poverty being twice as prevalent amongst single people compared with couples (12%) (DWP, 2008). Amongst working age adults as a whole the following groups are especially vulnerable to low income: young people, households with children, social and private renters, minority ethnic groups, people with disabilities, benefits recipients, students, and those with few or no qualifications (DWP, 2008). Single person households also experience heightened vulnerability to low income across the EU as a whole and for all age groups, but older workers aged 40-55 are especially vulnerable (Abramov, 2002). However, analyses based upon the BHPS suggests that older non-pensioner couples without children are also disproportionately vulnerable to declining income over time (Rigg & Sefton, 2004).

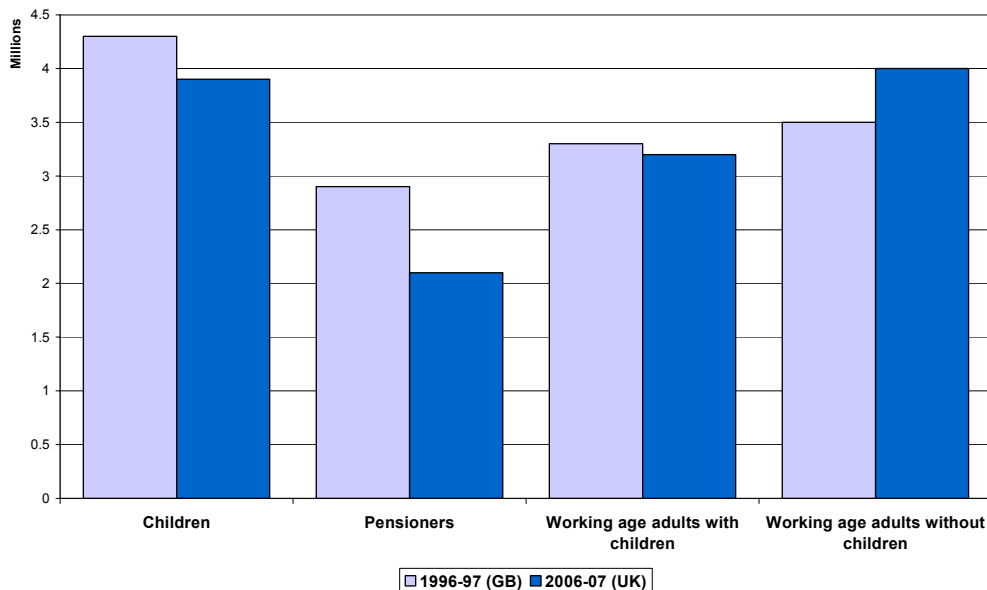
However, by definition rates of low income amongst working age adults with dependent children closely parallel those found amongst children so that it is useful to examine the situation of working age adults without children separately. Analyses by Brewer et al. (2007) show that 4.0 million working age adults without children are income poor after housing costs at the 60% median threshold level - a statistically significant rise of 300,000 from 2004–05 and the largest annual rise since 1990. By 2006/07, overall rates of income poverty amongst this group (17.6% BHC, 13.2% AHC) were higher than at any point since the introduction of the HBAI data set in 1961 (Brewer et al., 2008).

Brewer et al. (2007) also decompose the rise in income poverty rates amongst working age adults without children for the 1996-2006 period, showing that the incidence of income poverty is highest for those in workless households, and for those working part-time or on a self-employed basis. However, although the incidence of low income is highest for workless households, these analyses show that the increase in income poverty rates has been concentrated amongst working age adults without children living in households with at least one person in work. In fact, the rate of income poverty has actually fallen amongst workless households. During this period the number of working age adults without children in work has increased producing a beneficial compositional effect. However, this has been outweighed by the increased incidence of income poverty amongst working adults without children. In other words, although this group are more likely to be in employment in 2005/06 compared with 1996/97 (and are less vulnerable to low income on this basis), the increased overall incidence of low income for this group has more than offset such compositional changes.

Taking a longer-term view, since 1996-7 there have been significant falls in poverty among families with children and pensioners, but there have not been comparable falls in poverty among working-aged households without children. Consequently, individuals in these households are now numerically the largest category in poverty in the UK, outnumbering children, working-age parents and pensioners in both absolute and relative poverty (DWP, 2008). In 2006-7, there was a total of

13.2 million people in relative poverty (AHC), including 4 million working aged adults without children compared with 3.9 million children, 3.2 million working aged parents, and 2.1 million pensioners, as illustrated in Figure 1.2 (*below*).

**FIGURE 1.2: Individuals with household incomes below 60% median AHC income in 1996-97 and 2006-07 by population group**



Source: Households Below Average Income, 1996-97, 2006-07.

Although working age adults without children have not been the primary focus of anti-poverty and social inclusion policies in the UK, efforts to combat income poverty for this group have concentrated on labour market activation policies resulting in a whole raft of 'welfare to work' measures targeting this group (see Hasluck & Green, 2004). Nevertheless, it is increasingly clear that whilst the incidence of labour market participation has increased for this group, their vulnerability to low pay has also grown. Research by Stewart (1999) shows that low pay is no longer concentrated amongst the female and youth labour markets but is increasingly widespread also amongst older workers and men. As a result, around half those paid less than £6.50 per hour in 2007 were aged over 40 (Palmer et al., 2008). Equally, although the overlap between low pay and low income is not substantial, it is nevertheless increasing so that by 2001 a third of those living on low incomes in the UK live in households where the head of household was in some form of paid work (Rahman et al., 2001; Stewart, 1999; Webb et al., 1996).

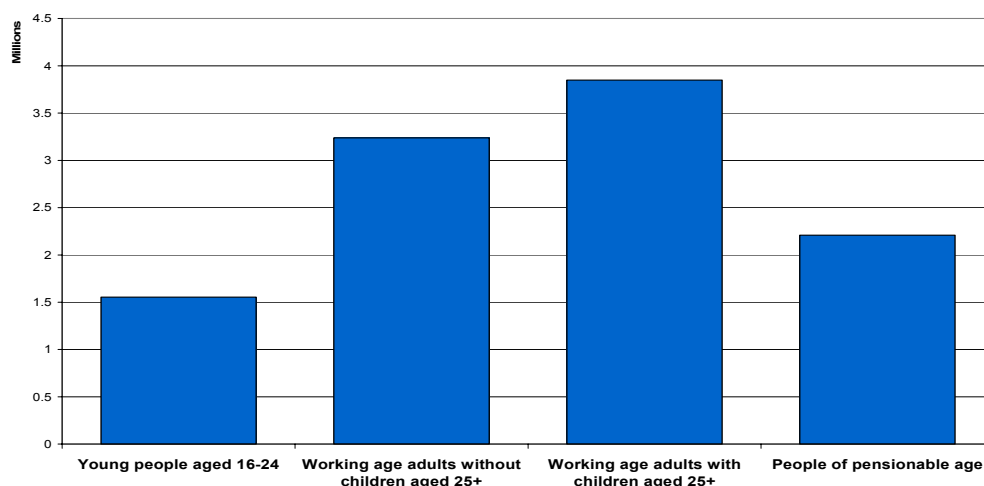
The importance of tackling in-work poverty is therefore becoming increasingly evident as a result of research demonstrating the scale of the problem. For example, cross-national research based upon the ECHP demonstrates that although being in work is certainly a protective factor in insulating individuals and households against the risk of poverty and social exclusion, those in work nevertheless represent a large proportion of those 'at risk' of poverty. Across the EU as a whole, around one quarter of individuals at risk of poverty *are* in work though substantial cross-national variations are evident (Bardone & Guio, 2005). In addition to the problem of low pay, it should also be acknowledged that social inclusion measures premised upon labour market



insertion policies have their limitations given the profile of workless households in the UK. Based upon analysis of the DWP Longitudinal Study, Palmer et al. (2008) estimate that around three-quarters of all working age people in receipt of long-term out-of-work benefits (2+ years) are sick or disabled. As Levitas et al. (2007) argue, reducing the overall numbers of working age adults without children experiencing low income and multiple disadvantage therefore involves the development of policies to address the situation of working age adults who are *not* able to participate in the labour market, for example, as a result of sickness, disability or caring responsibilities.

At the same time, it is now widely acknowledged that poverty is about much more than income, but implies an inability to participate in society and to access the socially-defined 'necessities of life', as a result of a lack of resources. However, in comparison with low income rather less is known about the extent of material and social deprivation amongst this group, and how this relates to low income. To the extent that research and analysis is guided by prevailing policy concerns this is probably not surprising given the policy focus upon tackling poverty amongst children and older people. As a result, most analyses of deprivation have focused upon exploring the extent and dynamics of deprivation amongst families with children (e.g. Calandrino, 2003; Berthoud et al., 2004; Willetts, 2006), and to a lesser extent older people (Berthoud et al., 2006; Dominy & Kempson, 2006).

Nevertheless, the availability of better data and more advanced statistical techniques for the measurement of 'multidimensional poverty' are beginning to shed light upon the situation of working age adults without children. For example, recent research by Tomlinson et al. (2008) suggests that multidimensional poverty is more prevalent amongst single non-elderly households, and amongst lone parents with non-dependent children. Although in need of updating, the 1999 *Poverty and Social Exclusion* (PSE) survey also gives an indication of the extent of poverty and social exclusion amongst working age adults without children at the beginning of the 21st century. Here, households are considered 'poor' if they both lack many of the social and material necessities of life as defined by the UK public *and* experience low household incomes (see Gordon et al., 2001; Pantazis et al., 2006). Using this measure, around one fifth (20%) of working age adults without children are poor, compared with 22% of pensioners, 32% of working age families with children, and 33% of young people. However, as Figure 1.3 (*below*) shows, in terms of absolute numbers working age adults without children were the second most numerous group of adults experiencing poverty in 1999 – and given the trends in low income reviewed above, this number is likely to have increased substantially since then.

**FIGURE 1.3: Individuals classified as PSE poor by population group, 1999.**

Source: Poverty and Social Exclusion Survey of Britain

NOTE: Population estimates based upon 2001 Census estimates (Feb. 2005 release)

In terms of wider indicators of exclusion, the low visibility of this group in terms of research and policies directed at tackling poverty and low income has been reflected in a narrow focus on paid work as the accepted and appropriate solution. This is also mirrored in the relatively small number of official indicators relating to this group within the *Opportunity for All* (OFA) framework. Aggregate OFA indicators of poverty and social exclusion for working-aged adults aged 25+ are listed in Table 1.1 (*below*), together with an indication of progress since 1999 in meeting these objectives. Table 1.1 shows that there has been considerable progress in tackling worklessness, both for working age adults as a whole and for many disadvantaged groups. There has also been a decline in long-term income-related benefit receipt. Aside from the focus upon paid work, there is also evidence of progress in relation to indicators of social well-being relating to smoking, suicide and homelessness.

Nevertheless, the very limited range of indicators available within the OFA framework means that it is not possible to reach any firm conclusions about the material and social resources available to working age adults without children, nor about their participation in society (other than through paid work) or wider health and social well-being. The paucity of indicators relating to this group and the wider lacuna of research focusing upon exclusion and disadvantage amongst working age adults without children is a major gap in our understanding of the incidence, nature and dynamics of social exclusion in Britain – and one which this project seeks to fill.



TABLE 1.1: Opportunity for All indicators for working age adults

Indicator		Trend since baseline	Direction of latest change	Summary of change since baseline
Employment rate		✓	≈	<b>Increased</b> from 72.9% (1997) to 75.0% (2004). Since then, there has been a slight <b>decline</b> to 74.6% (2006)
Employment of disadvantaged groups:	<i>Disabled people</i>	▲	▲	<b>Increased</b> from 38.1% (1998) to 47.4% (2006)
	<i>Lone parents</i>	▲	▲	<b>Increased</b> from 45.3% (1997) to 56.6% (2006)
	<i>Ethnic minorities</i>	▲	▲	<b>Increased</b> from 56.2% (1997) to 60.2% (2006)
	<i>People aged 50+</i>	▲	▲	<b>Increased</b> from 64.7% (1997) to 70.9% (2006)
	<i>Lowest qualified</i>	▲	▲	<b>Declined</b> from 51.7% (1997) to 49.4% (2006)
Working age people in workless households		✓	≈	<b>Declined</b> from 13.3% (1997) to 11.5% (2006)
Working age people lacking Level 2 NVQ		▲	▲	<b>Declined</b> from 39.1% (1998) to 31.4% (2006)
Long periods on income-related benefits (IS or income-based JSA for 2+ years)		✓	✓	<b>Declined</b> from 2.0 million (1997) to 1.77 million (1999). Since then, numbers have been <b>stable</b> (1.77m in 2007)
Low income:	<i>Relative</i>	≈	✗	<b>Stable</b> over the 1996/7 to 2005/6 period as whole, with recent <b>increase</b> to 20% (2005/06) (AHC)
	<i>Absolute</i>	✓	≈	<b>Declined</b> from 19% (1998/99) to 13% (2004/05) then <b>increased</b> to 14% (2005/06) (AHC)
	<i>Persistent</i>	≈	≈	<b>Declined</b> from 9% (2000) to 8% (2003). Since then has remained <b>stable</b> (AHC)
Smoking rates:	<i>All adults</i>	✓	≈	<b>Declined</b> from 28% (1998) to 24% (2005)
	<i>Manual SEG</i>	✓	≈	<b>Declined</b> from 33% (1998) to 29% (2005)
Death rates from suicide & undetermined injury		✓	✓	<b>Increased</b> from 12.0 per 1,000 (1995/97) to 12.7 per 1,000 (1999/2001). Since then, <b>declined</b> to 10.8 per 1,000 (2004/06)
Rough sleepers		✓	≈	<b>Declined</b> from 1,850 (1998) to 498 (2007)

Source: *Opportunity for all: Indicators update, 2007*. (DWP, 2007)

NOTE: ✓ = data moving in the right direction; ≈ = data show broadly constant trend or no significant movement; ✗ = data moving in wrong direction; ▲ only baseline data available or insufficient data available to determine a trend.

## 2. Data and methods

This section describes the data sources and methods used in this report. The results presented here are based upon analysis of two large-scale sample survey data sets: the *General Household Survey* (GHS) and the *British Household Panel Survey* (BHPS). Section 2.1 considers the selection of data sets for the analysis of social exclusion. The advantages and limitations of the GHS and BHPS in relation to social exclusion amongst working age adults without children are reviewed in Section 2.2. Finally, Section 2.3 presents an overview of the primary statistical methods used to explore the research question discussed above. (*A glossary of the statistical methods used in this report is presented in Appendix 2*).

### 2.1 Selection of Data Sources

Previous research by Levitas et al. (2007) has highlighted the shortcomings of existing sample surveys as a basis for understanding social exclusion as a result of limitations relating to sampling methods, sample sizes, and topic coverage. Those populations often most at risk of social exclusion are systematically omitted entirely from household surveys, including for example children in care, young offenders, prisoners, people in residential and nursing care, some asylum seekers, and the homeless. Amongst the household population sampled by large-scale social surveys in the UK, those vulnerable to social exclusion are frequently under-represented, and limited sample sizes and/or the absence of booster samples for specific population groups means that sample numbers may simply be too small for reliable disaggregation. Finally, limited topic coverage with respect to disadvantage and social exclusion means that individual data sets generally offer only a limited and partial view of the extent and distribution of social exclusion which frustrates attempts to explore the multidimensional nature of disadvantage in contemporary Britain.

Identifying appropriate data sources therefore needs to take account both of topic coverage in relation to the B-SEM model, and of overall methodological quality in relation to the measurement of social exclusion. In addition, the selection of appropriate data sets also needs to take account of research objectives, for example, whether our primary goal is estimation of prevalence or investigation of its dynamics over time. Existing research identifies the GHS and BHPS as especially appropriate to the investigation of social exclusion amongst working age adults without dependent children (Levitas et al., 2007). It is well known that differential attrition in panel surveys is related to low income (e.g. Nathan, 1999; Zabel, 1998; Watson, 2003; Behr et al., 2002). Since the BHPS is also subject to differential attrition (Taylor, 2001) and estimates are also based upon relatively small samples, it may be an inappropriate base upon which to estimate the overall prevalence of exclusion.

Nevertheless, the BHPS is a vital source for the panel analysis of change over time social exclusion and has been widely used by the UK research community for this purpose (e.g. Burchardt et al., 1999, 2002; Taylor et al., 2004; Taylor, 2005; Tomlinson et al., 2008). In the analyses that follow, we therefore draw upon GHS data in order to understand the prevalence and distribution of different forms of disadvantage, their inter-relationship, and the extent of multiple

disadvantage amongst working age adults without children. Data drawn from the BHPS are then used in order to explore the nature and drivers of change over time in different forms of disadvantage, and in multidimensional disadvantage.

### **The General Household Survey**

The GHS is a repeat cross-sectional national survey of people living in private households conducted on an annual basis since 1971. Since the 1970s, the GHS has been widely used for secondary analysis of social inequalities in income and earnings, healthcare and illness, pension provision, and housing tenure, though so far use of the GHS to investigate poverty and exclusion has been extremely limited. Nevertheless, the GHS is characterised both by good topic coverage in relation to the analysis of social exclusion (facilitating multidimensional analysis), and relatively large sample sizes (facilitating detailed analysis of population sub-groups) (Levitas et al., 2007). Moreover, the core GHS survey is supplemented by additional modules relating to social capital in 2000/01 and 2004/05 covering topics such as social networks and support, social trust and neighbourliness, civic engagement, and area perceptions. As such, it offers a reliable and extensive source of data in relation to most themes covered by the B-SEM, though coverage is extremely limited in relation to access to services, education and skills, and crime and social harm.

The results presented here are based on analysis of GHS respondent data for 2000/01 and 2004/05. Results are reported for all working age adults without children aged 25+ completing the respondent questionnaire, and where appropriate that subset of respondents completing the supplementary social capital module. Estimates of overall prevalence are reported separately for 2000/01 and 2004/05. However, in order to facilitate detailed disaggregation and more complex multivariate analysis these samples are pooled. With respect to the multidimensional analysis of social exclusion our sample therefore comprises all GHS respondents completing both the main respondent questionnaire and the supplementary social capital module in 2000/01 and 2004/05.

### **The British Household Panel Survey**

The BHPS is an on-going multi-purpose panel survey of adults living in private households conducted annually since 1991. The original BHPS sample comprised 5,500 households and 10,000 individuals sampled from the Postcode Address File. All original sample members are followed in subsequent waves of the BHPS and re-interviewed along with other adult household members. As a result of the survey's panel design the BHPS therefore offers a unique insight into the dynamics of disadvantage in Britain. As a result, the BHPS dataset has been widely used in existing research into poverty and social exclusion in Britain in order to investigate cross-sectional trends in prevalence, to explore the duration and persistence of episodes of poverty and social exclusion, and to model the dynamics of poverty entry and exit (e.g. Burchardt, 1999; Burchardt et al., 2002; Taylor et al., 2004; Barnes, 2005; Taylor et al., 2004).

Nevertheless, as a general purpose household survey, the BHPS is not ideally suited to the measurement of multidimensional disadvantage. In particular, the adequacy of the BHPS data set

is constrained by limitations in topic coverage with respect to multidimensional disadvantage, which mean some aspects of multidimensional advantage are largely absent from the survey, or are measured in ways that compromise their validity. As with the GHS, limitations in sample design mean that the non-household population, including many of society's most disadvantaged people, are again excluded from the study. The panel is also subject to attrition bias arising from high attrition rates amongst low income households (Taylor, 2001). Finally, relatively small sample sizes limit the possibilities for detailed disaggregation and analysis.

The above caveats should be borne in mind in interpreting the findings presented here. In addition, it should be noted that the findings presented here are based upon analysis of Waves 7 (1997) to 15 (2005) only for two reasons. Firstly, we are concerned here primarily with longitudinal analysis of individual-level 'transitions' rather than with understanding longer-term cross-sectional trends in disadvantage over time. Secondly, several key indicators of exclusion are absent in the earlier BHPS waves, as discussed above.

## 2.2 Indicators of multidimensional disadvantage

### The General Household Survey

Investigating the incidence and social distribution of singular forms of disadvantage is a key objective of this study. In order to address this objective using sample survey data it is crucial that:

- Observations are representative of the British population with respect to those social-demographic factors known to be associated with social disadvantage
- Sample sizes are sufficiently large to facilitate meaningful disaggregation (e.g. by age group, household type, etc.)
- Data are sufficiently broad in their topic coverage with respect to different dimensions of exclusion, for example, as detailed in the B-SEM model

As a repeat cross-sectional survey, the GHS avoids the potential pitfalls associated with differential attrition amongst disadvantaged groups associated with UK panel and cohort surveys as discussed in Section 2.1 (*above*). Given the relatively small sample sizes associated with such studies and the incidence of general attrition within panel and cohort studies, estimates of prevalence are likely to be much less precise in comparison with estimates derived from the GHS especially where it is also possible to pool data across years.

The GHS data set also provides for reasonably comprehensive coverage of many of the dimensions of social exclusion identified within the B-SEM framework. A total of 33 variables were identified as potentially of interest with respect to operationalising and measuring multiple disadvantage amongst working age adults without children based upon the B-SEM model. However, differences in the definition, scope and incidence of some variables for GHS samples in 2000/01 and 2004/05 mean that eight of these were dropped from the final indicator set.

Table 2.1 (*below*) shows the final 25 indicators (GHS25) used to estimate the prevalence of singular forms of disadvantage, their inter-relationship and social distribution amongst GHS

respondents of working age without children. Although the GHS provides reasonably good topic coverage across the B-SEM domains as a whole, it is clear from Table 2.1 that the GHS suffers from many of the limitations of existing data sets reviewed by Levitas et al. (2007), for example in its emphasis upon material and economic resources and participation at the expense of more comprehensive coverage of indicators of social well-being and inclusion. Particular shortcomings are evident with regard to specific B-SEM themes relating to access to services, social networks, social participation, and crime, harm and criminalisation.

Nevertheless, based upon analysis of the GHS25 indicators it is possible to estimate the prevalence of singular instances of disadvantage amongst the wider GB population using appropriate inferential statistics. Using more advanced statistical methods it is also possible to estimate the incidence of multidimensional exclusion based upon the GHS25 indicators, and subsequently to estimate the social distribution of multidimensional disadvantage amongst working age adults without children. An overview of the main methods used in this study is presented in Section 2.3 (*below*). However, as stated earlier, it must be stressed that the results described here relate to working age people without children living in private households only and therefore exclude many of those groups most vulnerable to multiple disadvantage. Furthermore, the limitations of the GHS25 indicator set itself with respect to their comprehensiveness and appropriateness in measuring social exclusion will inevitably also impact upon the taxonomy of social exclusion arising from multidimensional analysis.

**TABLE 2.1: GHS indicators of multidimensional disadvantage amongst working age adults (2000/1 and 2004-5 only)**

B-SEM domain	Indicator	Variable
RESOURCES	Living in household with income less than 60% of modified-OECD median	oecd60
	Living in household in receipt of any means-tested state benefits	benefits
	Living in household with incomes less than 70% of modified-OECD equiv. median AND lacking any of the following: car, phone, washer, fridge/freezer, TV	matdep
	Living in household in shared ownership, rented, rent-free, or squatting	newten
	Living in household without a phone (fixed or mobile)	phone
	Living in household with no access to a car/van within household	car
	No-one to turn to when in need of: an urgent lift OR care when ill	crisis
PARTICIPATION	Not in paid work OR unpaid work OR unpaid care	anywork
	Living in household with no-one in paid work	hhwork
	Providing care (other than professionally) for someone sick, disabled or elderly	carer
	Undertaking unpaid work (ILO definition) OR looking after home	unpaid
	Low socio-economic status (NS-Sec semi/unskilled manual)	loclass
	With no qualifications	noqual
	With GCSE-level qualifications or lower	loqual
	Not attending educational courses OR apprenticeships OR leisure courses	edcourse
	Reporting taking no action to solve a local issue in past 12 months [2001: 3 years]	locactgr
	Believing they can influence local decisions AND that local people can work together to influence decisions	influenc
WELL-BEING	Reporting 'not good' general health (GHQ12 items)	ill
	Reporting mental ill health (GHQ12 items)	menthlth
	Reporting a limiting longstanding illness	ltill
	Receiving means-tested benefits (JSA, IS,IB) AND unemployed for over 6 months	ltbenefit
	Reporting never having had paid work (ILO definition)	neverwk
	Reporting smoking regularly (any cigarettes, cigars, etc.)	smoker
	Living in overcrowded households (bedroom standard) OR households sharing facilities OR households with no central heating	qualhous
	Reporting dissatisfaction with local area [2000: do not enjoy living in area]	dissatis

## The British Household Panel Survey

Although the BHPS is relatively comprehensive in topic coverage, the multipurpose nature of the survey means it is not ideally adapted to the investigation of multidimensional disadvantage. Inevitably, the operationalisation and measurement of relevant theoretical concepts within the BHPS dataset has the potential for much further refinement. At a practical level, not all potential indicators of exclusion are available in all waves of the BHPS. Inevitably indicator selection therefore involves a compromise between ensuring the comprehensiveness of the potential indicator set, and ensuring it has a sufficient longitudinal sweep to provide useful data on change over time in the experience of disadvantage at an individual level.

In this instance, several key indicators of exclusion are absent in the earlier BHPS waves, and for this reason the analyses presented here focus upon Waves 7 (1997) to 15 (2005) only. Table 2.2

shows the full range of BHS21 indicators considered in these analyses, in comparison with the B-SEM model. Overall, the BHPS provides excellent longitudinal coverage in relation to most B-SEM themes when the number of waves is compressed. However, a much less comprehensive picture is available in relation to access to services (other than access to a car), education and skills (other than attainment), and the BHPS provides no longitudinal data on crime (relevant data are collected in 1997 and 2003 only) .

**TABLE 2.2: BHPS indicators of multidimensional disadvantage amongst working age adults, waves 7 to 15**

Sub-Theme	Indicator	Var.	Wave											
			7	8	9	10	11	12	13	14	15			
MATERIAL RESOURCES	Gross household income lt. 60% OECD median BHC	oecd60	●	●	●	●	●	●	●	●	●	●	●	●
	Lacks 2+ necessities: warmth; annual hols; furniture; clothes; meat/eq.; visits	matdep	●	●	●	●	●	●	●	●	●	●	●	●
	Living in rental accommodation	renter	●	●	●	●	●	●	●	●	●	●	●	●
	Unable to save from current income	saver	●	●	●	●	●	●	●	●	●	●	●	●
	Finds debt repayments a heavy burden	debt	●	●	●	●	●	●	●	●	●	●	●	●
	Finding it quite/very difficult to get by	subjpov	●	●	●	●	●	●	●	●	●	●	●	●
SERVICES	No access to a car or van in household	car	●	●	●	●	●	●	●	●	●	●	●	●
SOCIAL RESOURCES	Low social support (index score 0-5)	losuprt	●	○	●	○	●	○	●	○	●	○	●	○
	Does not talk to neighbours OR meet people 'most days'	contact	●	●	●	●	●	●	●	●	●	●	●	●
ECON. PARTICIP.	Not in paid work OR carer	anywork	●	●	●	●	●	●	●	●	●	●	●	●
	Living in workless household	hhwork	●	●	●	●	●	●	●	●	●	●	●	●
	Cares for handicapped/other in household or non-resident	carer	●	●	●	●	●	●	●	●	●	●	●	●
	More than 20 hours per week housework	hswork	●	●	●	●	●	●	●	●	●	●	●	●
	NS-Sec (Semi)/Routine (most recent job)	loskill	●	●	●	●	●	●	●	●	●	●	●	●
	Unsocial hours OR long hours AND low job satisfaction	poorwk	●	●	●	●	●	●	○	●	●	●	●	●
EDUC./SKILLS	No academic qualifications	noquals	●	●	●	●	●	●	●	●	●	●	●	●
POL. & CIVIC PARTICIP.	Did not vote in most recent election	vote	●	●	●	●	●	●	●	●	●	●	●	●
	Not active member of local group	locact	●	○	●	○	●	○	●	○	●	○	●	○
HEALTH & WELLBEING	General health poor/very poor over last 12 months	genhlth	●	●	○	●	●	●	●	●	●	●	●	●
	Low subjective well-being (GHQ12 index score 0-7)	lomhlth	●	●	●	●	●	●	●	●	●	●	●	●
	Health limits daily activity	ltill	●	●	○	●	●	●	●	○	●	○	●	○
	Low satisfaction with life overall (<4 out of 10)	satis	●	●	●	●	○	●	●	●	●	●	●	●
	GHQ12 items: low self-worth; unable to face problems; not playing useful role	esteem	●	●	●	●	●	●	●	●	●	●	●	●
	A smoker	smoker	●	●	○	●	●	●	●	●	●	●	●	●
	Alcohol or drug problems	alcdrug	●	●	●	●	●	●	●	●	●	●	●	●
LIVING ENVIRON.	Any housing-related problems (space, light, heat, condensation, leaky roof, damp, rot)	hqual	●	●	●	●	●	●	●	●	●	●	●	●
	Experiences neighbourhood problems	nhood	●	●	●	●	●	●	●	●	●	●	●	●
	Does not like neighbourhood	lknhood	●	●	●	●	●	●	●	●	●	●	●	●

NOTE: ● full data available; ○ data imputed based upon adjacent values



## 2.3 Overview of statistical methods

### Singular forms of disadvantage

Investigation of the incidence and social distribution of singular forms of disadvantage is based upon standard inferential statistical methods appropriate to binary dependent measures. Here we examine the bivariate relationship between singular forms of disadvantage and a range of socio-demographic indicators appropriate to the situation of working age adults without children, as detailed below:

- **Gender** (male; female)
- **Age group** (25-34 years; 35-44 years; 45-54 years; 55-60/64 years)
- **Household composition** (single; couple with non-dependent children; couple no children; lone parents with non-dependent children; other households)
- **Marital status** (married; cohabiting; single; widowed; divorced; separated)
- **Employment status** (in employment; unemployed; not economically active)
- **Educational attainment** (no qualifications; less than 5 GCSEs or equivalent; 5+ GCSEs or equivalent; A-level or equivalent; higher education qualifications)

Estimates of effect sizes and statistical significance are based upon Chi Square based measures (Cramer's V) and we derive risk estimates (odds ratios) to describe the overall pattern of variation between the above population sub-groups. Since these socio-demographic risk markers are also inter-correlated we estimate multivariate odds ratios for the GHS25 indicator set based upon logistic regression. (*A fuller description of logistic regression methods and outputs is presented in Appendix A2*).

### Investigating multidimensional disadvantage

As was noted in Section 2.2 (*above*), operational measurement of multidimensional disadvantage is fraught with difficulties relating amongst other things to the interactive nature of social exclusion (i.e. that indicators may simultaneously also be risk markers), and the challenges involved in combining measures in a theoretically informed way (i.e. in establishing the weight to be accorded to the different components of summary measures). From a methodological perspective, the investigation of multidimensional disadvantage therefore requires the deployment of more advanced techniques of data analysis. Given the methodological challenges involved, and in view of the limitations of the existing evidence base on multidimensional disadvantage, it is also prudent to deploy a number of different approaches to understanding the multidimensionality of social exclusion. Such 'methodological triangulation' has the advantage of minimising biases arising from the methods employed themselves.

Our primary method of investigation seeks to classify GHS and BHPS samples on the basis of the observed variability within the GHS25 and BHPS21 indicator sets respectively using cluster analysis methods. Here our objective is to develop a taxonomy of social exclusion amongst working age adults without children based upon the characteristics of sample members rather than investigation of the relationship between variables. For both the GHS25 and the BHPS21 we



therefore classify our sample based upon cluster analysis methods which seek to identify to relatively homogenous clusters based upon iterative algorithms that minimise dissimilarity between observations (in this case using Ward's method). This initial solution can be simplified using K-means clustering, resulting in a limited number of discrete sample groups. It is then possible to estimate the probabilities associated with membership of different clusters using descriptive methods and multivariate techniques (logistic regression). *(A fuller description of cluster analysis and logistic regression methods is presented in Appendix 2).*

Nevertheless, it is also important to explore the relationship between the indicators themselves using a range of techniques including reliability analysis and optimal scaling techniques including non-linear canonical correlation. As a first step, we examine the covariance structure within the GHS25 and BHPS21 indicator sets based upon the tetrachoric correlations between indicators. Since our starting point is the B-SEM model, this approach can be extended by assessing the scale reliability of the B-SEM domains based upon classical reliability theory (Cronbach's Alpha). Our main approach here is based upon non-linear canonical correlation which can be used to explore the relationship between two or more sets of nominal variables. This technique is useful because these variable sets may be considered as latent constructs based upon the observed indicators that comprise them so that it is possible to investigate the latent structure of the observed indicators based upon various specifications for combining the individual components of the GHS25 and BHPS21 indicators. *(A fuller description of optimal scaling and reliability analysis is presented in Appendix A2).*

### **The dynamics of multidimensional disadvantage**

The cluster analysis methodology described above can be applied to the pooled BHPS data for Waves G (1997) to O (2005) to derive cluster memberships for each BHPS respondent for each wave at which they are present in the survey. Since cluster analysis assumes independence of errors between cases, it is first necessary to ensure that respondents (rather than person-wave observations) are given equal weight through suitable re-weighting, and then to estimate the initial dissimilarity matrix based upon some function of respondents cluster profile over time (e.g. mean scores, random selection, etc.).

In this study, person-wave data for each eligible respondent providing data on at least one occasion during the period of observation is identified on the basis of random selection across waves. The unit of analysis in the initial K-means cluster solution is therefore the respondent (N = approx. 6,000) rather than the respondent-wave (N = approx. 38,000). The initial cluster solution is therefore an *approximation* of the underlying variability in item scores across time. Nevertheless, it is then possible to 'read back' the K-means solution for all eligible respondents across all waves based upon the model parameters in order to investigate change over time in cluster memberships.

On this basis we then model change over time in respondents' cluster membership using regression methods suitable to the investigation of longitudinal data such as Cox's proportionate hazards. The Cox regression approach is especially advantageous in that it takes account of

‘censored cases’ in estimating hazard and survival rates, that is, cases where either the event of interest was not observed during the study period, or the respondent has exited the sample before the end of the study (e.g. as a result of sample attrition or ineligibility). Since such ‘missing data’ is widespread within the BHPS data set, the ability to control for the effects of such censoring is vital in generating accurate estimates of hazard.

In this context Cox regression methods seek to address the following general question: What is the hazard of experiencing multidimensional disadvantage given that the respondent was not previously disadvantaged and taking account of the influence of censored cases? In this report we estimate Cox regression models which address this question in relation to each of those groups identified as multidimensionally disadvantaged within the cluster analysis. These models estimate the relative hazard of experiencing disadvantage based upon respondents’ initial socio-demographic characteristics. It is possible that the relationship between a given set of predictors and the risk of multidimensional disadvantage will itself vary over time, i.e. that the relationship is time dependent. In order to address this question we estimate models based upon the Cox regression method with time dependent covariates in order to test the assumption of proportionality of hazards. Since we are interested in drawing inferences in relation to the wider population of working age adults without children, models are fitted on the basis of backward stepwise selection of variables based upon the significance of the likelihood ratio test. *(A fuller description of proportionate ‘hazard’ models and outputs is presented in Appendix 2).*

## 3. Understanding multiple disadvantage

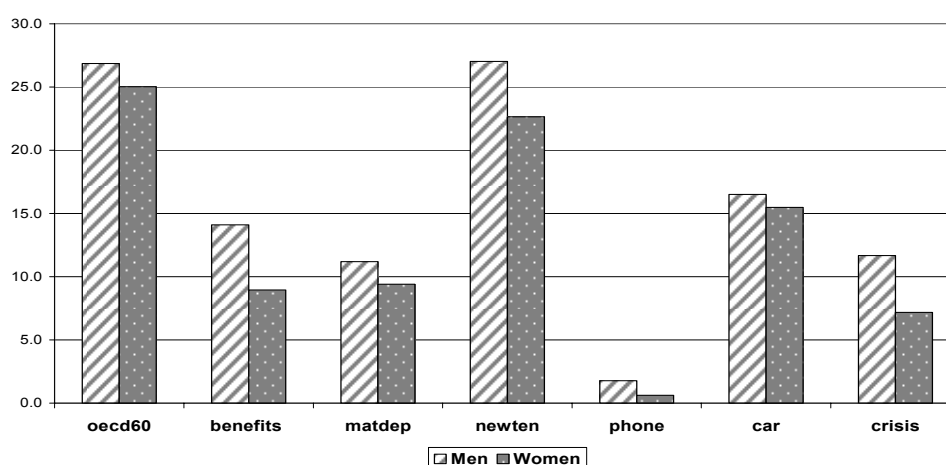
### 3.1 Singular forms of disadvantage

In this section we examine the prevalence and social distribution of singular indicators of disadvantage amongst working age adults without children based upon analysis of GHS data for 2000/01 and 2004/05. Our focus here is upon those established indicators of socio-economic inequality found to be significant predictors of disadvantage within existing research, principally gender, age group, household composition, marital status, employment status, and educational attainment. For clarity of presentation, findings are presented separately in relation to the three key domains comprising the B-SEM model: resources, participation, and well-being. (A full cross-tabulation of these analyses can be found in Tables A1.3 and A1.4 (Appendix 1)).

#### Gender

Figure 3.1 (*below*) shows the distribution of resource disadvantage amongst working age men and women without children respectively. It is clear that working age men without children are more likely to experience deprivation of social, material and financial resources in comparison with their female peers. Men are more likely to experience low income (*oecd60*), material deprivation (*matdep*), and live in households in receipt of means-tested state benefits. Men are also considerably more likely than women to have no-one to turn to in a crisis situation (*crisis*), to be renters (*newten*), and to have no access to a car (*car*).

**FIGURE 3.1: Resource deprivation by sex in Britain, 2000/05 (%).**

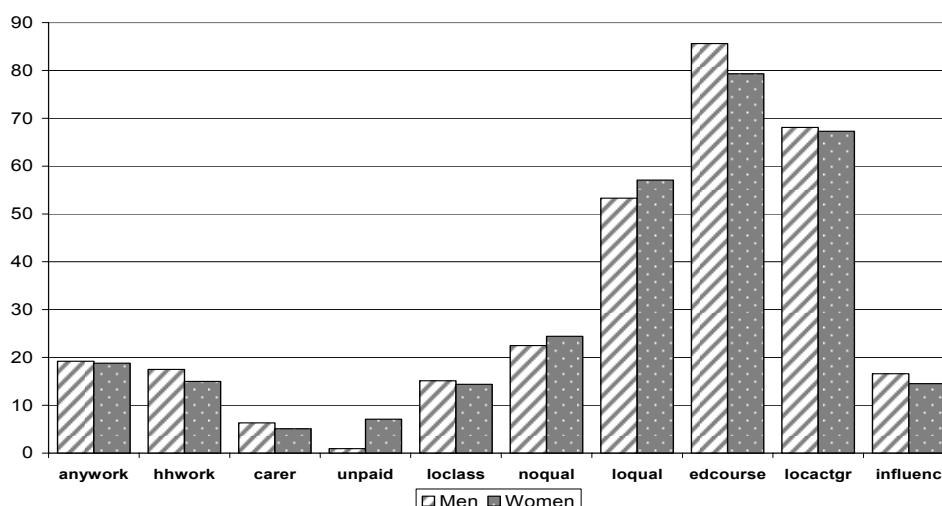


Source: GHS 2000/01 and 2004/05 (pooled data)

Substantially less variation by gender is evident with respect to social, economic, cultural and civic participation, as shown in Figure 3.2 (*below*). Nevertheless, men are more likely to report non-

participation in educational courses (*edcourse*), and to report feeling unable to influence local decisions (*influenc*). By contrast, women are much more likely to report undertaking unpaid work (*unpaid*), and are also somewhat more vulnerable to low educational achievement (*noqual*, *loqual*).

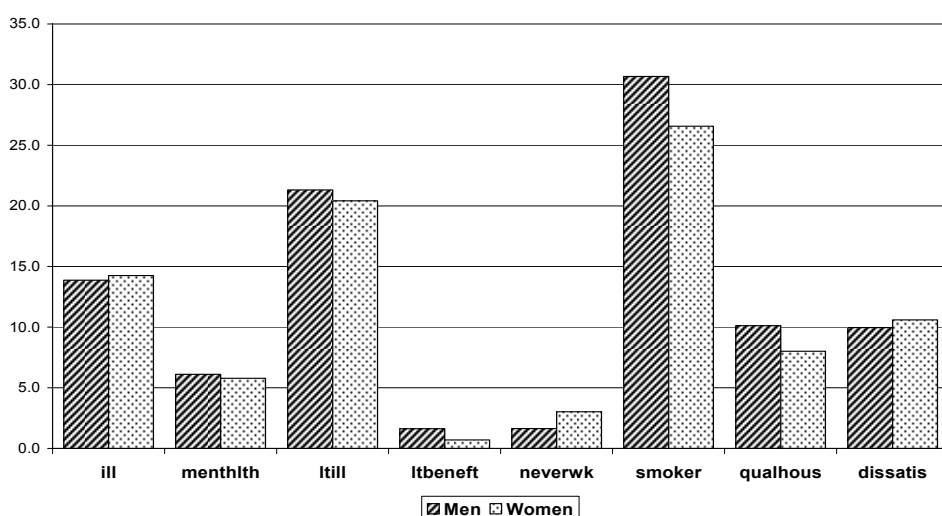
**FIGURE 3.2: Participation by sex in Britain, 2000/05 (%).**



Source: GHS 2000/01 and 2004/05 (pooled data)

As with participation, gender differences in well-being and quality of life (*Fig. 3.3, below*) are far less marked, and are generally not statistically significant. Nevertheless, men are more likely to experience limiting illness (*ltill*), to be long-term unemployed (*ltbenefit*) or smokers (*smoker*), and to live in poor quality housing (*qualhous*).

**FIGURE 3.3: Well-being by sex in Britain, 2000/05 (%).**

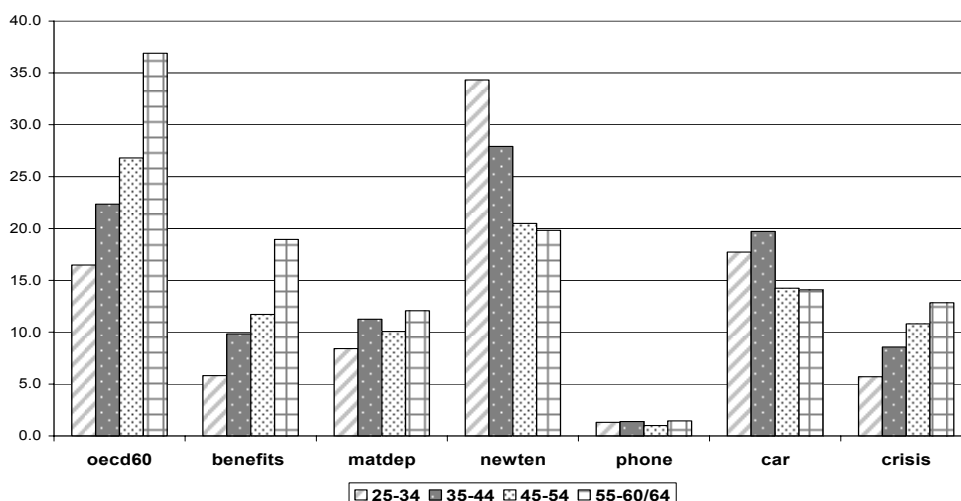


Source: GHS 2000/01 and 2004/05 (pooled data)

### Age Group

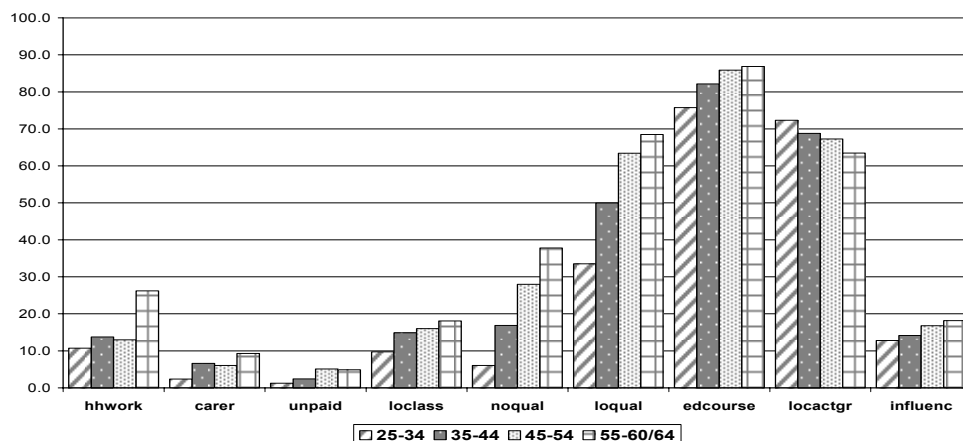
Amongst working age adults without children the profile of resource disadvantage is complex. In general older working age adults are least likely to have access to the material financial and social resources that might insulate them against the risk of social exclusion, as shown in Figure 3.4 (*below*). Older respondents are thus at greatest risk of low income (*oecd60*), receipt of means-tested benefits (*benefits*), material deprivation (*matdep*), and lack of social support (*crisis*). Nevertheless, younger respondents are more likely to be renters (*newten*) and to report no access to a car (*car*).

**FIGURE 3.4: Resource deprivation by age group in Britain, 2000/05 (%).**



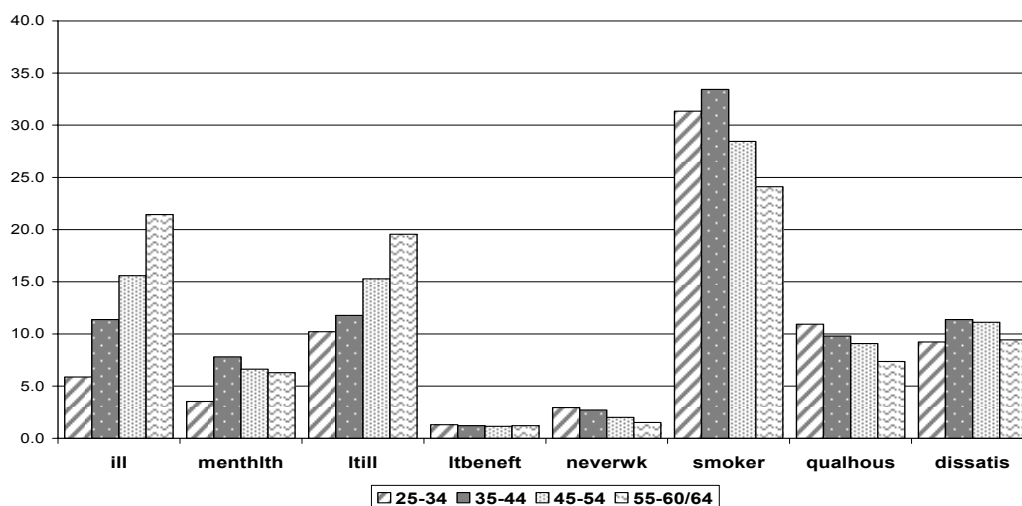
Source: GHS 2000/01 and 2004/05 (pooled data)

In general, older respondents are also at greater risk of non-participation as shown in Figure 3.5 (*below*). For example, older respondents are more likely to report living in workless households (*hhwork*), to report caring responsibilities (*carer*), low social class (*loclass*), low educational achievement (*noqual*, *loqual*), educational non-participation (*edcourse*), and to report feeling unable to influence local decisions (*influenc*). Of course, it is not clear whether these associations reflect the influence of life cycle or cohort effects, for example relating to generational trends in educational participation and attainment.

**FIGURE 3.5: Participation by age group in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

Similar variability is also evident with respect to the influence of age upon social well-being and quality of life. As Figure 3.6 (*below*) shows, the risk of ill health (*ill*), poor mental health (*menthlth*), and limiting illness is increases substantially with age. Nevertheless, the incidence of smoking (*smoker*) decreases with age reflecting generational changes (and possibly a survivor effect). Similarly, the incidence of poor housing (*qualhous*) also declines with age.

**FIGURE 3.6: Well-being by age group in Britain, 2000/05 (%).**

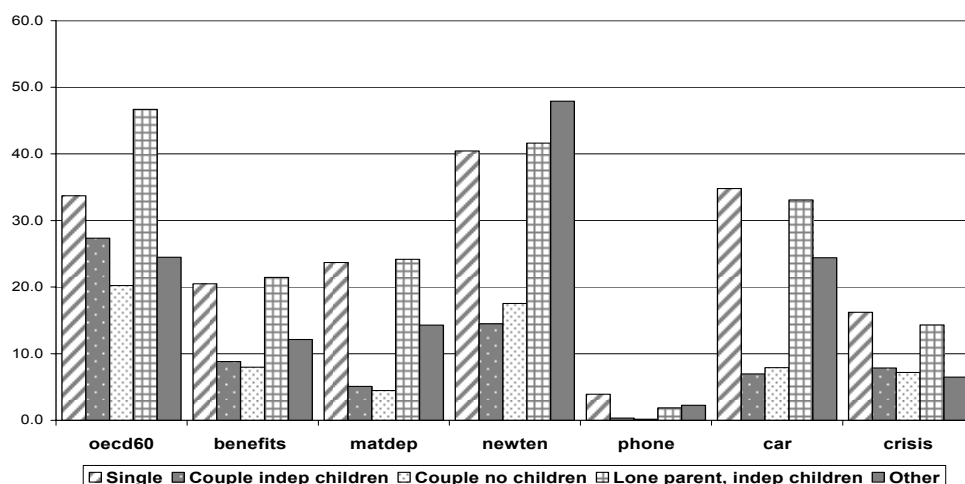
Source: GHS 2000/01 and 2004/05 (pooled data)

### Household composition

With respect to household composition, these data confirm that the incidence of resource deprivation is greatest amongst single person households, lone parents with non-dependent children, and to a lesser extent amongst 'other' household types (3+ adults). As Figure 3.7 (*below*) shows, in comparison with other household types single person households and lone parents with

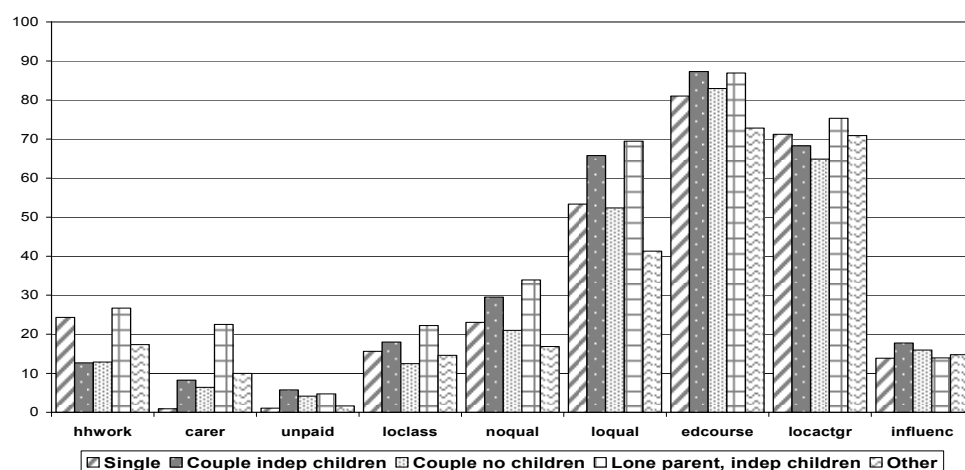
non-dependent children are more likely to experience low income (*oecd60*), receipt of means tested benefits (*benefit*), material deprivation (*matdep*), lack of access to a car (*car*), and to report a lack of social support in a crisis (*crisis*). Along with the 'other' household type group, they are also more likely to report being renters (*newten*).

**FIGURE 3.7: Resource deprivation by household composition in Britain, 2000/05 (%).**



Source: GHS 2000/01 and 2004/05 (pooled data)

**FIGURE 3.8: Participation by household composition in Britain, 2000/05 (%).**

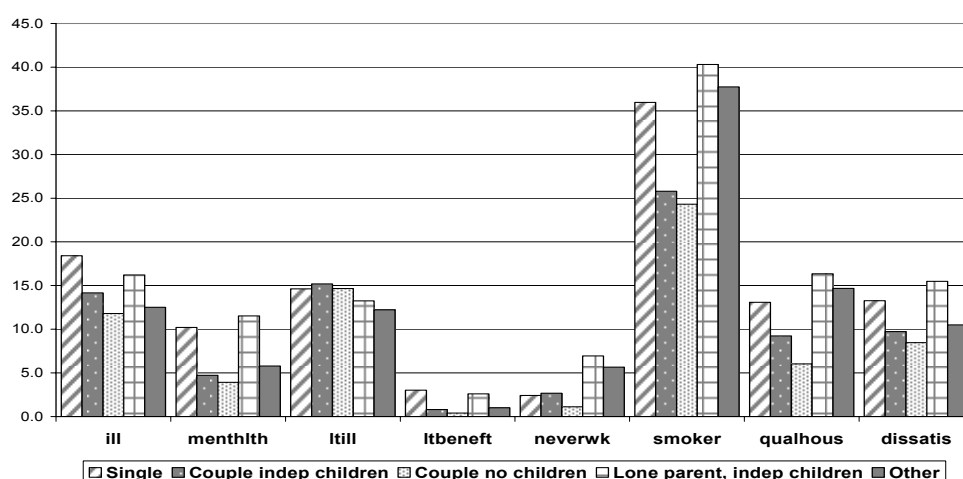


Source: GHS 2000/01 and 2004/05 (pooled data)

The profile of social, economic, cultural and civic participation amongst this group reveals similar variability by household composition, as shown in Figure 3.8 (*above*). In general, lone parents and couples with independent children tend to report somewhat higher levels of non-participation, for example in relation to undertaking educational courses (*edcourse*) and civic participation (*locactgr*), and these groups are also more likely to report few or no qualifications (*loqual*, *noqual*), and low social class (*loclass*). However, such differences tend to be slight, and it is likely that these trends reflect generational differences for example in educational achievement and occupational status.

Although the overall picture is again complex, in general it is evident from Figure 3.9 (*below*) that in comparison with other household types, single person households and those headed by a lone parent with non-dependent children experience higher levels of poor health (*ill*), poor mental health (*menthlth*), and are more likely to report smoking (*smoker*), poor quality housing (*qualhous*), and area dissatisfaction (*dissatis*).

**FIGURE 3.9: Well-being by household composition in Britain, 2000/05 (%).**

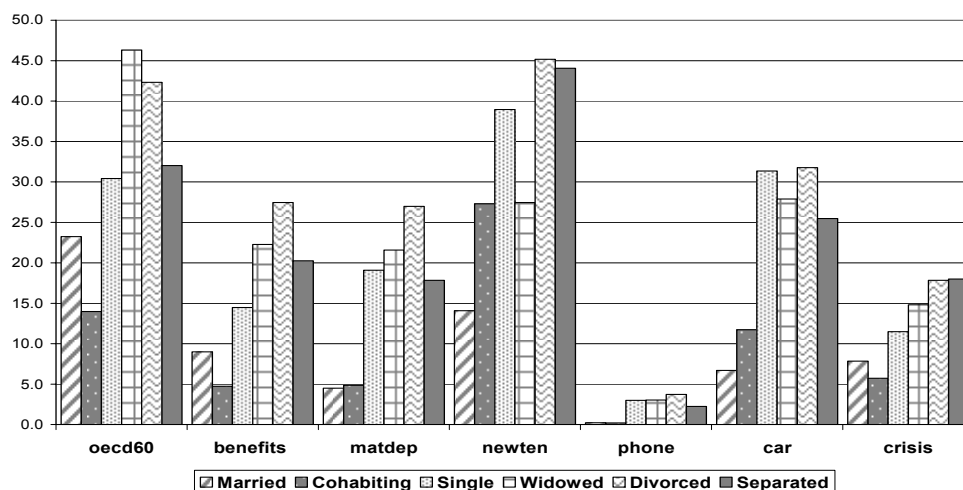


Source: GHS 2000/01 and 2004/05 (pooled data)

### Marital Status

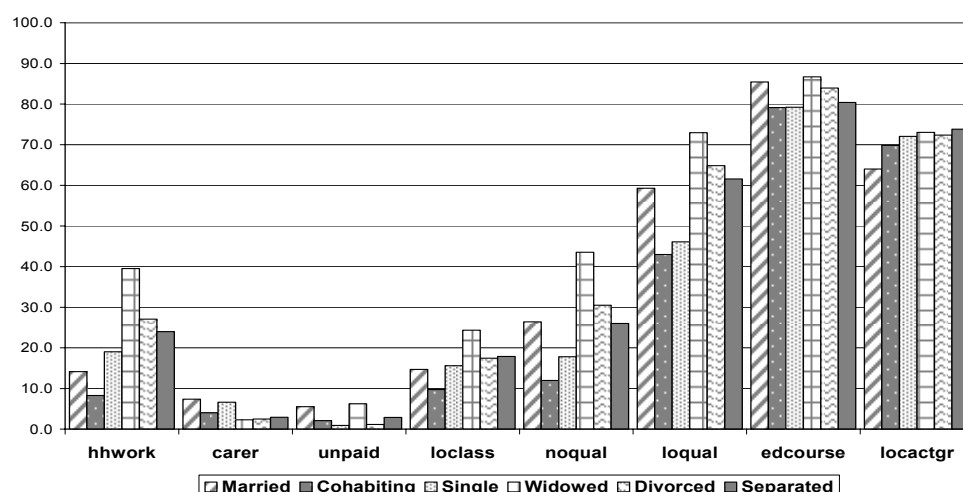
Figure 3.10 (*below*) shows the distribution of resource disadvantage amongst working age adults without dependent children by marital status. These data show resource deprivation to be concentrated amongst single, widowed, divorced and separated working age adults without children, with much lower levels of disadvantage amongst married and cohabiting couples. In comparison with couples, single, widowed, divorced and separated respondents are more likely to report relative low income (*oecd60*), receipt of means-tested benefits (*benefits*), material deprivation (*matdep*), lack of access to a car (*car*) or to support in a crisis situation (*crisis*).



**FIGURE 3.10: Resource deprivation by marital status in Britain, 2000/05 (%).**

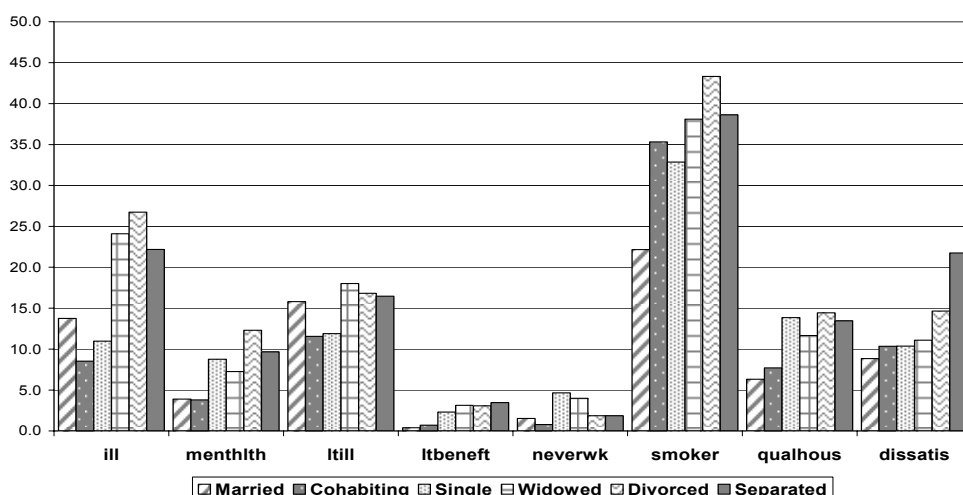
Source: GHS 2000/01 and 2004/05 (pooled data)

A more complex picture is evident in relation to social, economic, cultural and civic participation, as illustrated in Figure 3.11 (*below*). Single, widowed, divorced and separated respondents are more likely to live in workless households (*hhwork*), and to be civic non-participants in their local area (*locactgr*), in comparison with married and cohabiting respondents. Nevertheless, and perhaps as a reflection of cohort effects, married respondents are also vulnerable to low educational attainment (*loqual*, *noqual*) and non-participation (*edcourse*).

**FIGURE 3.11: Participation by marital status in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

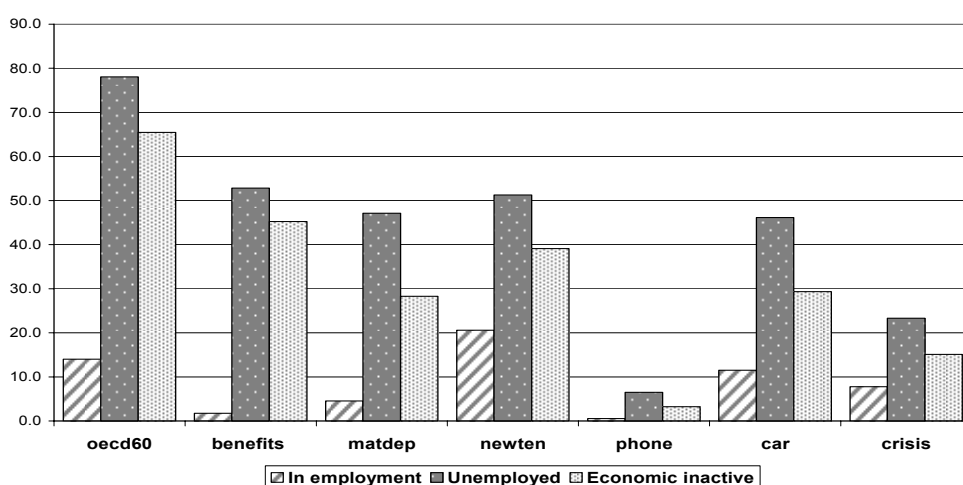
Single, widowed, divorced and separated respondents are also especially vulnerable to threats to their social well-being and quality of life, as shown in Figure 3.12 (*below*). In comparison with married and cohabiting respondents they are more likely to report poor housing (*qualhous*) and dissatisfaction with their local area (*dissatis*). This group is also more vulnerable to general ill health (*ill*), to poor mental health (*menthlth*), and more likely to report limiting long term illness (*ltill*).

**FIGURE 3.12: Well-being by marital status in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

### Employment status

Social variation in the distribution of resource disadvantage by employment status is shown in Figure 3.13 (*below*). The pattern of variation is monotonic with unemployed and economically inactive respondents being substantially more likely to report low income (*oecd60*), receipt of means-tested benefits (*benefits*), material deprivation (*matdep*), renting accommodation (*newten*), no access to a car or van (*car*), and no-one to turn to in a crisis.

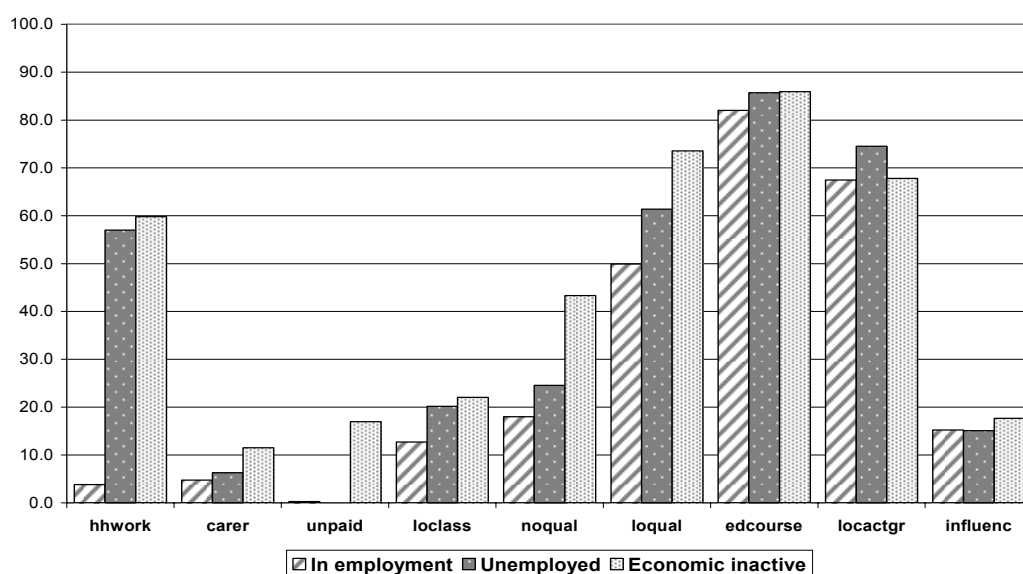
**FIGURE 3.13: Resource deprivation by employment status in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

A broadly similar profile of disadvantage is evident amongst unemployed and economically inactive respondents with respect to their economic, social, and cultural participation in society, as shown in

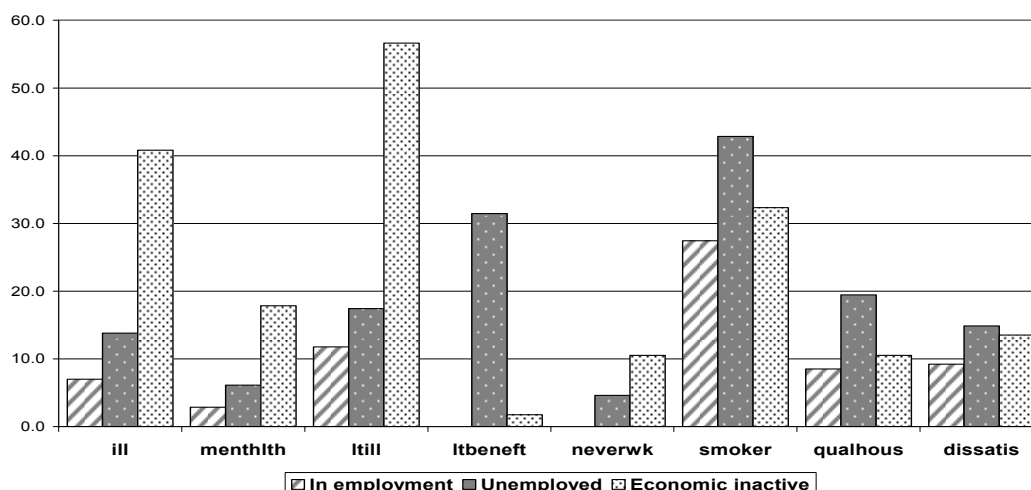
Figure 3.14 (*below*). The unemployed and economically inactive are (unsurprisingly) very substantially more likely to report living in a workless household (*hhwork*), but are also more likely to be carers (*carer*), and to report low occupational status (*loclass*) and low educational attainment (*noqual*, *loqual*). No substantial variation by employment status is evident for the civic engagement items (*locactgr*, *influenc*).

**FIGURE 3.14: Participation by employment status in Britain, 2000/05 (%).**



Source: GHS 2000/01 and 2004/05 (pooled data)

As with resources and participation, employment status is also strongly associated with social well-being and quality of life, with unemployment and economic inactivity being strongly associated with negative outcomes (*Figure 3.15, below*). Economically inactive respondents and to a lesser extent those currently unemployed are substantially more likely to report poor general health (*ill*), poor mental health (*menthlth*) and limiting long term illness (*ltill*) in comparison with those respondents in work. These groups are also more likely to be smokers (*smoker*), and to experience poor quality housing (*qualhous*) and dissatisfaction with their local area (*dissatis*).

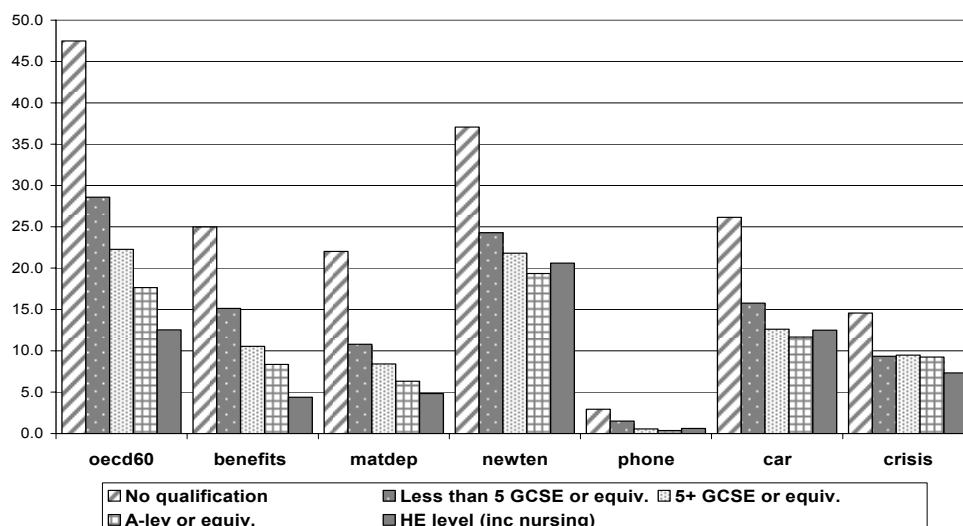
**FIGURE 3.15: Well-being by employment status in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

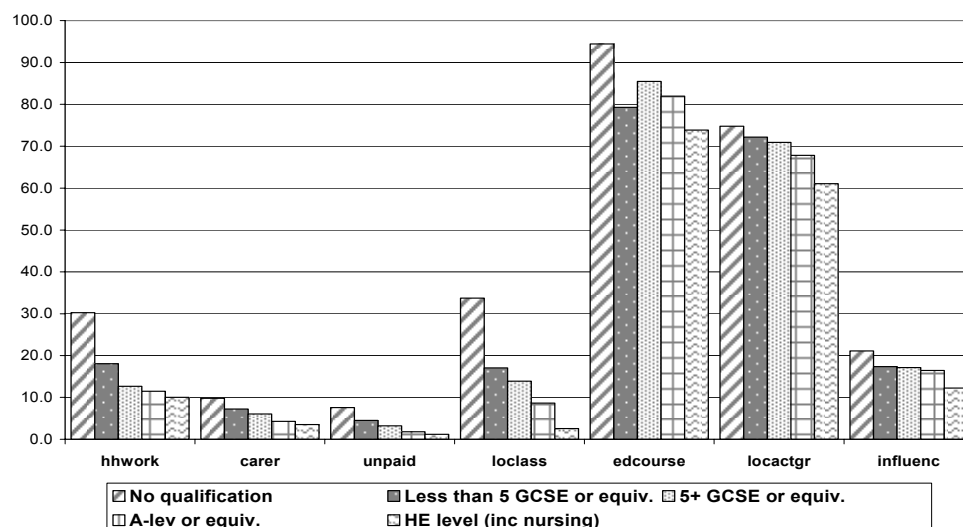
### **Educational attainment**

Low educational attainment is strongly associated with vulnerability to resource deprivation, as shown in Figure 3.16 (*below*). GHS respondents with few or no qualifications are thus much more vulnerable to low income (*oecd60*), benefit receipt (*benefit*), and material deprivation (*matdep*) in comparison with better qualified respondents. This group are also more likely to report being renters (*newten*), having no access to a car (*car*) or phone (*phone*) within the household, and no-one to turn to in a crisis (*crisis*).

Figure 3.17 (*below*) shows the distribution of indicators of social, economic and cultural participation by education achievement for GHS01/05 working age adults without children. It is clear that GHS respondents with few or no qualifications are also more likely to live in workless households (*hhwork*), to be carers (*carer*), undertake unpaid work (*unpaid*), and are concentrated amongst manual occupational groups (*loclass*). This group are also more likely to be civic non-participants (*locactgr*), and to feel unable to influence local decision-making on either an individual or collective basis (*influenc*).

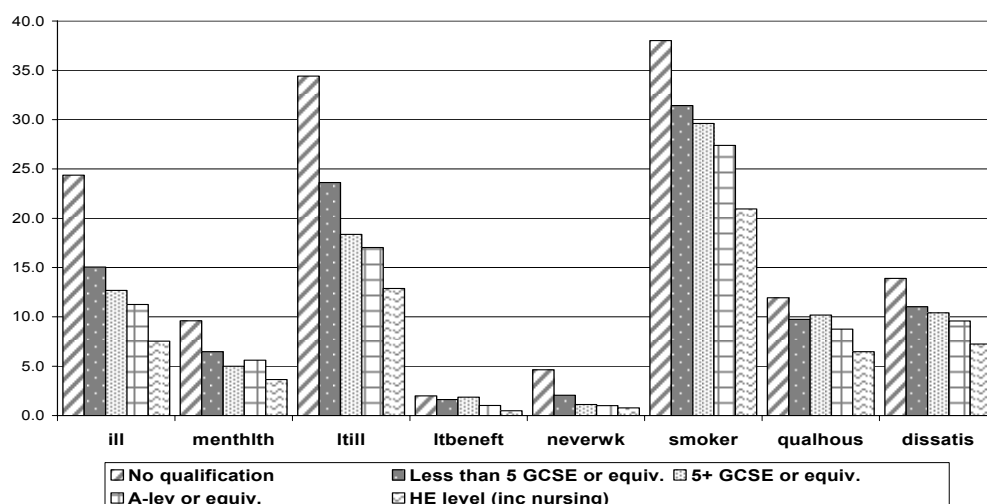
**FIGURE 3.16: Resource deprivation by educational achievement in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

**FIGURE 3.17: Participation by educational attainment in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

Low educational attainment is also strongly associated with poorer outcomes with respect to GHS respondents' social well-being and quality of life, as shown in Figure 3.18 (*below*). Respondents with few or no qualifications are considerably more vulnerable to ill health (*ill*), poor mental health (*menthlth*), limiting long-term illness (*ltill*). This group is also more likely to report poor quality housing (*qualhous*), and dissatisfaction with their local area (*dissatis*).

**FIGURE 3.18: Well-being by educational attainment in Britain, 2000/05 (%).**

Source: GHS 2000/01 and 2004/05 (pooled data)

## Summary

In order to get a clearer idea of the complex relationships described above, Table 3.1 (*below*) summarises the associations between GHS25 items and the socio-demographic 'risk markers' reviewed above based upon the Cramer's V test statistic. These analyses reveal that in general the association between the GHS25 items and respondents' socio-demographic profile is strongest for employment status, and to a lesser extent educational attainment and tenure. These associations are rather weaker with respect to household composition, age group and especially gender, though in general a discernible effect is nevertheless likely amongst the wider population for most GHS25 indicators.

This section has investigated social variations in the distribution of disadvantage as measured by the GHS25 indicator set. Whether the focus of investigation is resource deprivation, non-participation in social, economic and cultural life, or respondents' quality of life and social well-being, economic activity status and educational attainment both emerge as key predictors of disadvantage in relation to a wide range of singular indicators. In particular, analysis of the GHS25 indicator set suggests that unemployed and economically inactive respondents, and those with few or no qualifications, are especially vulnerable to most of the singular indicators of disadvantage reviewed above.

In addition, marital status and household composition are also important, although to some extent these relationships may simply reflect generational differences (e.g. educational attainment, occupational class) and life cycle effects (e.g. poor health, limiting illness). Nevertheless, the above analyses suggest that single, divorced, separated and widowed respondents are at greater risk of disadvantage than their married and cohabiting counterparts. Similarly, single person households and those comprising a lone parent with non-dependent children are also more vulnerable to disadvantage in comparison with couple households. The relationship of age itself

with the singular indicators of disadvantage reviewed above is more complex. Nevertheless, in general the incidence of most singular instances of disadvantage appears to increase with age, with those approaching retirement age at greatest risk of disadvantage in comparison with their younger peers. Only with respect to home and car ownership, housing quality and smoking behaviour is a significant inverse trend evident with young GHS respondents being at greatest risk.

**TABLE 3.1: Measures of association for GHS25 indicators by gender, age group, household type, marital status, employment status, highest qualification and tenure.**

	Gender	Age group	Hhld. type	Marital status	Empl. status	Educ. attain.	Tenure
oecd60	.027	.166	.154	.177	<b>.499</b>	<b>.305</b>	<b>.338</b>
benefits	.088	.160	.161	.188	<b>.586</b>	.239	.262
matdep	.028	.042	.281	.275	<b>.337</b>	.214	<b>.405</b>
newten	.047	.135	.276	.278	.184	.153	--
phone	.053	ns	.135	.123	.125	.088	.137
car	ns	.065	<b>.333</b>	<b>.318</b>	.213	.142	<b>.407</b>
crisis	.075	.091	.132	.119	.127	.091	.113
anywork	ns	.207	.097	.153	<b>.889</b>	.212	.256
hhwork	.053	.166	.146	.158	<b>.606</b>	.200	.252
carer	.037	.105	.182	.074	.114	.072	.078
unpaid	.180	.098	.126	<b>.353</b>	<b>.353</b>	.118	.078
loclass	ns	.070	.090	.081	.093	<b>.347</b>	.153
loqual	ns	.260	.123	.159	.186	--	.126
edcourse	.079	.118	.086	.083	.027	.204	.045
locactgr	ns	.069	.068	.084	ns	.120	.068
influenc	.029	.058	ns	.052	ns	.090	.022
ill	ns	.167	.079	.140	<b>.389</b>	.182	.158
menthlth	ns	.076	.109	.114	.253	.096	.126
ltill	ns	.199	.084	.128	<b>.440</b>	.201	.177
ltbenefit	.050	ns	.091	.092	<b>.469</b>	.051	.111
neverwk	.046	ns	.087	.097	.283	.114	.132
smoker	ns	.072	.117	.164	.067	.133	.211
qualhous	.050	.061	.120	.127	.076	.081	.141
dissatis	ns	ns	.073	.083	.063	.083	.108

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: Test statistic = Cramer's V. 'ns' not significant at .05 level; '--' not applicable. Bold text indicates test statistic greater than 0.3. 'Noqual' excluded from analysis due to redundancy.

INTERPRETATION: Cramer's V is an extension of Chi square-based methods where the strength of association between variables varies between 0 (no association) and 1 (perfect association). A significant test statistic at the .05 level indicates 95% confidence that the association exists in the wider population

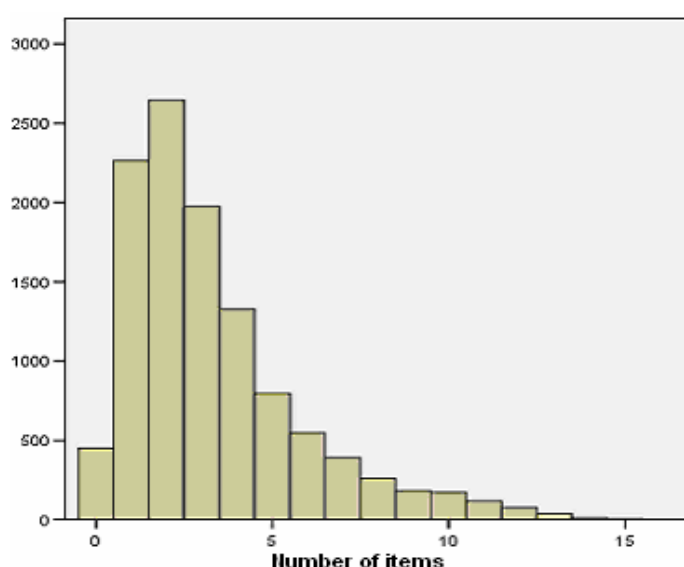
Finally, analysis of the GHS25 indicator set reveals significant gender differences in respondents' vulnerability to disadvantage with male respondents being more likely to report low income and material and social deprivation, low occupational status and educational attainment, and poor quality housing. At first sight, this finding appears to contradict a substantial body of scholarship documenting the continued and disproportionate vulnerability of women to poverty and social exclusion (e.g. Pantazis & Ruspini, 2006; Bradshaw et al., 2003; Millar, 2003; Daly, 1992; Millar &

Glendinning, 1989). However, it should be noted that our sample excludes many of those groups usually found to be most vulnerable to poverty (e.g. children and young people, families with children, the elderly) where we might reasonably expect a significant gender gap to result in a heightened vulnerability to disadvantage amongst women. It should also be noted that our sample excludes lone parents with dependent co-resident children. Most lone parents with co-resident dependent children are women, and this group is especially vulnerable to low income and poverty. As a result, these analyses effectively underestimate the extent of poverty amongst working age women by excluding such lone mothers but nevertheless including the non-co-resident fathers.

### 3.2 Cumulative disadvantage amongst working age adults

The above analyses suggest that there are substantial overlaps with respect to the social factors predicting vulnerability to disadvantage. By combining GHS25 items it is therefore possible to examine the ways in which singular forms of disadvantage are linked within the GHS sample and the wider population of interest. Figure 3.19 (*below*) shows the overall distribution of cumulative disadvantage based upon the GHS25 items for working age adults without children. It is clear that most GHS respondents experience very few 'symptoms' of social exclusion as suggested by the GHS25 indicators, with a majority of respondents experiencing no more than three instances of disadvantage (mean = 3.3). Nevertheless, the great majority of respondents have experienced at least one instance of disadvantage with respect to the GHS25.

**FIGURE 3.19: The distribution of cumulative disadvantage amongst GHS working age adults - GHS25 indicators.**



Source: GHS 2000/01 and 2004/05 (pooled data)

However, whilst illuminating in themselves it is also useful to combine these singular items in order to get a clearer idea of the underlying pattern of variation across the population in access to resources, participation and social well-being. The simplest way to do so is by combining relevant



items in an additive scale and then comparing average (mean) scores for respondents of different types, as illustrated in Table 3.2 (*below*). Results are tabulated by gender, age group, household composition, marital status, employment status, educational attainment and tenure. These data suggest that the following groups appear to be at especial risk of cumulative disadvantage: older people; single person and lone parent households; divorced, separated and never married respondents; the unemployed and economically inactive; people with few or no qualifications. A very similar pattern of findings is evident in relation to the individual B-SEM domains (resources, participation, well-being) as operationalised by the GHS25 items.

**TABLE 3.2: Cumulative disadvantage by gender, age group, household type, marital status, employment status, highest qualification and tenure.**

		GHS25	Resources	Particip.	Well-being
<b>Gender</b>	Men	<b>3.41</b>	<b>1.02</b>	<b>1.79 ns</b>	<b>0.61</b>
	Women	3.16	0.83	1.75	0.57
<b>Age group</b>	25-34	2.82	0.86	1.43	0.53
	35-44	3.32	0.96	1.72	<b>0.64 ns</b>
	45-54	3.32	0.88	1.83	0.61
	55-60/64	<b>3.71</b>	<b>1.06</b>	<b>2.05</b>	0.60
<b>Household composition</b>	Single	<b>4.63</b>	<b>1.71</b>	<b>2.09</b>	0.83
	Couple, indep. children	2.85	0.59	1.72	0.53
	Couple, no children	2.69	0.60	1.64	0.46
	Lone parent, indep children	4.60	1.65	<b>2.09</b>	<b>0.86</b>
	Other	3.51	1.24	1.53	0.74
<b>Marital status</b>	Married	2.77	0.58	1.73	0.46
	Cohabiting	2.62	0.64	1.44	0.54
	Single/ unmarried	3.95	1.42	1.83	0.70
	Widowed	4.89	1.55	<b>2.48</b>	0.87
	Divorced	<b>5.04</b>	<b>1.90</b>	2.14	<b>1.00</b>
	Separated	4.49	1.54	2.07	0.87
<b>Employment status</b>	In employment	2.56	0.56	1.56	0.44
	Unemployed	<b>6.22</b>	<b>2.88</b>	<b>2.18</b>	<b>1.16</b>
	Econ. Inactive	5.75	2.12	2.53	1.11
<b>Educational attainment</b>	No qualifications	<b>5.61</b>	<b>1.65</b>	<b>3.06</b>	<b>0.91</b>
	Less than 5 GCSEs	3.23	0.99	1.58	0.66
	At least 5+ GCSEs	2.98	0.80	1.58	0.60
	A-level or equiv.	2.64	0.67	1.42	0.55
	HE level (inc nursing)	2.23	0.59	1.24	0.40
<b>Tenure</b>	Owens outright	2.87	0.58	1.80	0.48
	Owens with mortgage	2.31	0.30	1.56	0.44
	Rents	<b>5.74</b>	<b>2.58</b>	<b>2.16</b>	<b>1.00</b>
	Other	4.20	1.48	1.92	0.80
<b>ALL</b>		<b>3.30</b>	<b>0.94</b>	<b>1.77</b>	<b>0.59</b>

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: Test statistic = Jonckheere-Terpstra test (J-T). 'ns' not significant at .05 level; Bold text indicates highest group mean.

### 3.3 Understanding multidimensional disadvantage

Making sense of the complexity of the GHS25 items can be facilitated by combining these items within summary indices of cumulative disadvantage, as discussed in Section 3.2. However, this approach is limited in two respects. Firstly, it assumes that the underlying structure of disadvantage is one-dimensional, such that the individual GHS25 indicators can simply be combined additively, and similar assumptions are made with respect to the individual B-SEM domains. However, one key objective of this research is precisely to explore the dimensionality of social exclusion. In this section, we examine the empirical relationships between GHS25 items using statistical methods such as classical reliability theory and canonical correlation. (*A description of these methods and associated outputs is presented in Appendix A2*).

Secondly, it does not address the issue of defining thresholds or classifying respondents according to their experience of disadvantage. For example, it may be desirable to define thresholds beyond which an individual can be said to be multiply excluded, or to classify respondents in relation to their survey responses to questions concerning social exclusion. In this section we therefore use cluster analysis methods in order to estimate the vulnerability of working age adults to multidimensional disadvantage based upon the GHS25 indicator set. (*A description of cluster analysis methods and outputs is presented in Appendix A2*).

#### The relationship between indicators of disadvantage

One means of understanding the dimensionality of social exclusion is afforded by examining the observed correlation between the GHS25 items. The correlation matrix presented in Table A1.5 (*Appendix 1*) reveals a relatively consistent pattern of association between those items comprising 'resource deprivation' as conceptualised within the B-SEM model. Thus, scores for low income (*oecd60*), benefit receipt (*benefits*), material deprivation (*matdep*), phone ownership (*phone*), access to a car (*car*), and to a lesser extent support in a crisis (*crisis*) are all highly inter-correlated. These items are also strongly associated with variations in occupational status (*loclass*), educational attainment (*loqual*), and health status (*ill*, *menthlth*, *ltill*).

In contrast, and with the exception of economic participation (*anywork*), GHS25 indicators associated with participation and social well-being are much more weakly correlated. This might suggest that resource deprivation constitutes a reasonably distinct single underlying construct explaining much of the observed variability within the B-SEM 'resource' domain, and influencing also GHS respondents' participation in society and their social well-being. In comparison, the structure of disadvantage with respect to participation and well-being is more diffuse and generally characterised by much smaller overlaps between the relevant GHS25 indicators.

In fact, based upon classical reliability theory we should expect that if the B-SEM domains are in fact measuring singular and distinct underlying constructs then their scale reliability should be similar to that associated with the combined additive scale. This expectation is addressed in Table 3.3 (*below*) showing the scale reliability of the overall GHS25 scale and similar additive scales comprising resource deprivation (seven items), participation (nine), and well-being (eight).

**TABLE 3.3: Reliability analysis of GHS25 indicators.**

	GHS25		RESOURCES		PARTICIPATION		WELL-BEING	
	Item- Total Corr.	Alpha if Deleted	Item- Total Corr.	Alpha if Deleted	Item- Total Corr.	Alpha if Deleted	Item- Total Corr.	Alpha if Deleted
oecd60	0.599	0.756	0.489	0.672				
benefits	0.653	0.757	0.460	0.678				
matdep	0.628	0.758	0.699	0.621				
newten	0.434	0.768	0.433	0.689				
phone	0.239	0.781	0.246	<b>0.725</b>				
car	0.464	0.767	0.544	0.654				
crisis	0.214	0.781	0.195	<b>0.734</b>				
anywork	0.581	0.759			0.359	0.377		
hhwork	0.535	0.762			0.364	0.378		
carer	0.048	<b>0.786</b>			0.021	<b>0.489</b>		
unpaid	0.063	<b>0.785</b>			0.133	0.467		
loclass	0.268	0.778			0.244	0.429		
loqual	0.347	0.775			0.379	0.366		
edcourse	0.107	<b>0.788</b>			0.128	0.472		
locactgr	0.100	<b>0.792</b>			0.087	<b>0.500</b>		
influen	0.129	<b>0.787</b>			0.095	<b>0.484</b>		
ill	0.435	0.769					0.383	0.313
menthlth	0.336	0.776					0.308	0.373
ltill	0.444	0.768					0.378	0.300
ltbenefit	0.244	0.781					0.086	<b>0.445</b>
neverwk	0.202	0.782					0.064	<b>0.448</b>
smoker	0.245	0.782					0.131	<b>0.466</b>
qualhous	0.122	<b>0.785</b>					0.079	<b>0.456</b>
dissatis	0.166	0.783					0.136	0.435
<b>ALPHA</b>		<b>0.783</b>		<b>0.718</b>		<b>0.474</b>		<b>0.443</b>
<b>N items</b>		<b>24</b>		<b>7</b>		<b>9</b>		<b>8</b>

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: Bold text indicates that removal of item improves scale reliability (i.e. results in an increase in Cronbach's Alpha). 'Noqual' excluded from analysis due to redundancy (subsumed within 'loqual').

It is clear from these results that the resources scale does indeed constitute a reasonably consistent one-dimensional index, though further improvement in scale reliability remains possible. The resources scale has an overall Alpha reliability of .718, indicating a high degree of internal consistency. In comparison, the participation and well-being scales perform much more poorly (recording Alpha values of .444 and .443 respectively). Although some improvement in Alpha scores is possible, these indices do not meet commonly used reliability of thresholds of 0.7 or higher, suggesting that these item do not constitute singular underlying dimensions with respect to multidimensional social exclusion.

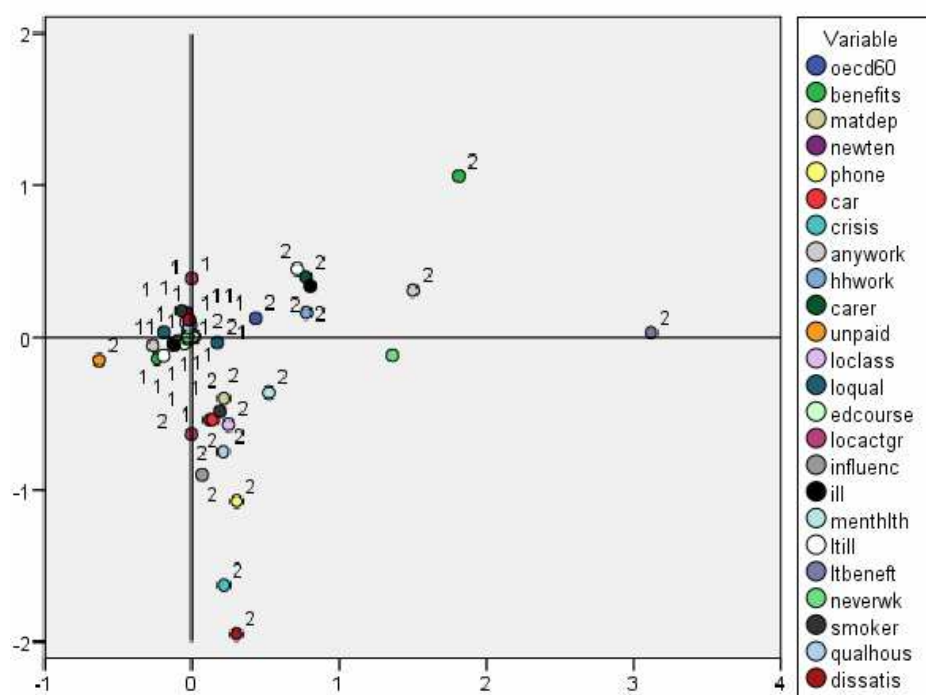
Another way of examining the association between GHS25 indicators is provided by means of examining the canonical correlation between (sets of) items and the underlying constructs they are

assumed to measure. For clarity of presentation we present results of non-linear canonical correlation based upon a two-dimensional solution. Key statistical outputs derived using this approach are presented in Table A1.6 (*Appendix 1*). However, interpretation of findings is greatly assisted by plotting component loadings (or 'weights') for the GHS25 items as indicated in Figure 3.20 (*below*). The relative magnitude of component loadings indicates the contribution of each indicator with respect to the two underlying dimensions of analysis. Here we are primarily interested not in the latent structure of these data *as a whole* but specifically in the responses of GHS respondents reporting disadvantage. It is therefore useful to examine the component loadings by disaggregating the data to distinguish between 'advantaged' and 'disadvantaged' GHS respondents.

Figure 3.20 (*below*) shows the (orthogonally rotated) component loadings for the above dimensions separately for respondents lacking GHS25 items (coded '2') and those with access to them (coded '1'). A clear separation is evident between these groups, with the non-disadvantaged being concentrated around the origin. In contrast, rotated component loadings for those lacking GHS25 items fan out and away from the origin indicating a much stronger association with the underlying construct. With respect to those lacking GHS25 items, these data suggest two broad clusters of responses:

- One cluster of responses (orientated along the x-axis) relating to long term benefit receipt, worklessness, ill health and limiting illness.
- A second cluster of responses (orientated along the y-axis) relating to material deprivation, low occupational status, lack of social support, poor housing and area dissatisfaction.

**FIGURE 3.20: Non-linear canonical correlation: multiple category dimension loadings.**



Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: All indicators are coded as follows: '1' does not lack item; '2' lacks item.

## Multidimensional classification of disadvantage

The above analyses have explored the structure of disadvantage by examining the relationship between the GHS25 indicators themselves. However, we are also interested in how multidimensional disadvantage varies amongst the population of working age adults without children according to their personal and household-level socio-demographic profile (i.e. in the classification of cases rather than variables). In order to address this question this section provides a multidimensional classification of GHS respondents on the basis of their observed responses to the GHS25 items using cluster analysis methods.

The clustering or ‘agglomeration’ process is described in the dendograms shown in Figure A1.1 (*Appendix 1*) for both the initial cluster model and the final cluster memberships. The final cluster solution identifies eight distinct groups ranging in size from 428 to 1810 cases. The cluster solution indicates that the first three K-means clusters are quite distinct with respect to observed values for the GHS25 indicators relative to the remaining five clusters (see *Fig. A1.1, Appendix 1*). However, interpretation of these findings is greatly assisted by comparing final cluster means for the GHS25 items, as illustrated in Table 3.4 (*below*). For virtually every GHS25 item included in these analyses, group means for Cluster 1 (‘Severely Disadvantaged’) are greater than the sample mean, indicating that this cluster experiences high levels of deprivation for virtually every item included in the analysis relative to the sample as a whole. Such instances are highlighted in Table 3.4 in order to better illustrate the overall pattern of association emerging from the cluster analysis.

**It is clear from Table 3.4 that Clusters 1 (‘Severely Disadvantaged’), 2 (‘Low Income Sick’), and 3 (‘Working Poor’) experience multiple disadvantages with respect to many or most of the GHS25 indicators.** In total this group comprises 15.8% of the GHS pooled sample of working age adults aged 25+ without dependent co-resident children. In comparison, Cluster 4 (‘No disadvantage’) experiences little or no disadvantage and in no case do cluster means exceed those for the sample as a whole. Although the remaining four clusters (Clusters 5 to 8) are vulnerable to specific combinations of disadvantage it is clear that these groups are not multiply deprived, at least not in comparison with the situation of Clusters 1 to 3.

**TABLE 3.4: GHS25 Cluster analysis results – K-cluster means (eight cluster solution).**

Cluster:	[Sample mean]	MULTIPLY DISADVANTAGED			NOT MULTIPLY DISADVANTAGED				
		1. Severely disadvantaged	2. Low income sick	3. Working poor	4. Not disadvantaged	5. Isolated carers	6. Dissatisfied smokers	7. Poorly housed renters	8. Disengaged manual workers
<b>Sample %</b>		<b>7.9</b>	<b>3.9</b>	<b>4.0</b>	<b>17.9</b>	<b>30.2</b>	<b>13.2</b>	<b>13.1</b>	<b>9.8</b>
oecd60	<b>1.26</b>	1.94	1.66	1.78	1.00	1.23	1.11	1.03	1.27
benefits	<b>1.12</b>	1.79	1.89	1.08	1.00	1.10	1.02	1.01	1.02
matdep	<b>1.11</b>	1.88	1.04	1.97	1.00	1.03	1.00	1.01	1.02
newten	<b>1.25</b>	1.88	1.35	1.64	1.02	1.12	1.11	1.62	1.19
phone	<b>1.01</b>	1.13	1.01	1.06	1.00	1.00	1.00	1.01	1.01
car	<b>1.16</b>	1.84	1.10	1.86	1.01	1.05	1.04	1.41	1.07
crisis	<b>1.10</b>	1.27	1.13	1.15	1.00	1.16	1.05	1.07	1.09
anywork	<b>1.19</b>	1.97	1.89	1.09	1.01	1.17	1.06	1.01	1.25
hhwork	<b>1.16</b>	1.55	1.39	1.04	1.00	1.14	1.01	1.01	1.11
carer	<b>1.06</b>	1.00	1.00	1.04	1.00	1.13	1.01	1.01	1.04
loclass	<b>1.15</b>	1.29	1.28	1.37	1.07	1.08	1.06	1.08	1.44
noqual	<b>1.24</b>	1.52	1.53	1.37	1.00	1.14	1.12	1.08	1.88
loqual	<b>1.56</b>	1.77	1.85	1.66	1.00	1.64	1.49	1.43	1.99
locactgr	<b>1.68</b>	1.72	1.68	1.77	1.62	1.63	1.65	1.70	1.89
ill	<b>1.13</b>	1.49	1.75	1.08	1.00	1.18	1.05	1.03	1.06
menthlth	<b>1.06</b>	1.32	1.23	1.03	1.00	1.09	1.03	1.01	1.02
ltbenefit	<b>1.01</b>	1.12	1.07	1.01	1.00	1.01	1.00	1.00	1.00
neverwk	<b>1.02</b>	1.15	1.02	1.00	1.00	1.01	1.00	1.00	1.04
smoker	<b>1.29</b>	1.52	1.36	1.36	1.01	1.13	1.75	1.31	1.40
qualhous	<b>1.09</b>	1.20	1.13	1.13	1.00	1.04	1.04	1.29	1.12
dissatis	<b>1.10</b>	1.22	1.17	1.10	1.00	1.04	1.41	1.04	1.03

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: Highlighted cells denotes cluster mean substantially greater than sample mean for GHS25 indicators. All indicators are coded as follows: '1' does not lack item; '2' lacks item. The following GHS25 items excluded from analysis due to significant changes in incidence and/or definition between GHS2000/01 and GHS2004/05: unpaid edcourse and influenc ltill.

On the basis of the K-cluster means described above it is possible to characterise these clusters with reference to the GHS25 items included in the model as illustrated in Box 1 (*below*). These analyses suggest that Clusters 1 to 3 are clearly experiencing multidimensional exclusion and are quite distinct from the other clusters with respect to the GHS25 indicators defining the cluster model. In total, these clusters comprise 15.8% of the GHS sample of working age adults without children. *Applying these results to 2001 Census returns, we estimate that at any point in time approximately 2.6 million working age adults aged 25+ without children were experiencing multidimensional exclusion during the 2000-05 period.*



**Box 1: Cluster membership descriptors (GHS25 items)**

- **Cluster 1: Multiply Deprived.** This group experience deprivation with respect to virtually every indicators included in the analysis. In this respect they may be viewed as the most disadvantaged group - the 'poorest of the poor'.
- **Cluster 2: Low Income Sick.** This group are defined primarily in terms of poor health, and the association between poor health and multiple disadvantage. Unlike Cluster 1 they are not especially vulnerable to material deprivation, at least in the short-term.
- **Cluster 3: Working Poor.** Like Clusters 1 and 2 this cluster is associated with high levels of resource, deprivation, low occupational status and educational attainment, poor housing, and negative area perceptions. Unlike Clusters 1 and 2 these respondents tend to be in employment and not in receipt of means-tested benefits.
- **Cluster 4: Not disadvantaged.** This group of respondents are not disadvantaged with respect to any of the GHS25 indicators included in the cluster model.
- **Cluster 5: Isolated carers.** This group is defined primarily in terms of their vulnerability to social isolation (lacking social support), caring responsibilities and ill health. Nevertheless, with respect to other aspects of disadvantage covered by the GHS25 items they are not obviously disadvantaged.
- **Cluster 6: Dissatisfied smokers.** This cluster is defined with reference to area dissatisfaction and elevated vulnerability to smoking. Nevertheless, with respect to other aspects of disadvantage covered by the GHS25 items they are not obviously multiply disadvantaged.
- **Cluster 7: Poorly housed renters.** This cluster identifies respondents with no access to a car and living in rental accommodation characterised by poor quality. Nevertheless, with respect to other aspects of disadvantage covered by the GHS25 items they are not obviously multiply disadvantaged.
- **Cluster 8: Disengaged manual workers.** This cluster is defined by low occupational status and educational attainment, high rates of smoking, and civic non-participation. Whilst in some ways comparable with Clusters 1 to 3, these respondents are not especially vulnerable to resource deprivation or poor health.

In the analyses that follow we therefore compare the personal and household circumstances of GHS respondents classified within Clusters 1 to 3 (i.e. the 'multiply disadvantaged') with the situation of those not similarly disadvantaged. Table 3.5 (*below*) therefore compares the socio-demographic profile of multiply disadvantaged and non-multiply disadvantaged respondents with respect to gender, age group, household composition, marital status, employment status, educational attainment, and tenure. For example, whilst just over one quarter (26.7%) of single person households are multidimensionally disadvantaged (i.e. by predictor), they comprise nearly half (45.6%) of the multidimensionally disadvantaged group (i.e. by dependent).



**TABLE 3.5: Multidimensional disadvantage by gender, age group, household composition, marital status, employment status, educational attainment, and tenure.**

Variable	Categories	% by predictor	% by dependent	Cramer's V
<b>Gender</b>	Men	15.2	62.3	0.045
	Women	12.1	37.7	
<b>Age group</b>	25-34	10.3	18.3	0.091
	35-44	12.4	15.9	
	45-54	13.4	29.5	
	55-60/64	18.6	36.3	
<b>Household composition</b>	Single	26.7	45.6	0.243
	Couple, independent children	8.2	10.5	
	Couple, no children	8.0	28.4	
	Lone parent, independent children	28.8	8.5	
	Other	16.8	7.0	
<b>Marital status</b>	Married	8.3	30.6	0.248
	Cohabiting	5.6	4.7	
	Single/ never married	20.9	36.4	
	Widowed	34.0	4.6	
	Divorced	32.1	19.4	
	Separated	21.8	4.3	
<b>Employment status</b>	In employment	4.8	26.6	0.482
	Unemployed	51.5	10.5	
	Economically inactive	43.3	62.9	
<b>Educational attainment</b>	No qualifications	28.2	49.5	0.251
	Less than 5 GCSE or equivalent	13.8	19.0	
	5+ GCSEs or equivalent	11.5	10.6	
	A-level or equivalent	7.8	6.7	
	HE level (inc nursing)	6.0	14.1	
<b>Tenure status</b>	Owns outright	10.1	18.5	0.399
	Owns with mortgage	4.1	14.5	
	Rents	38.0	65.7	
	Other	13.2	1.4	

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: All coefficients significant at the .05 level.

The overall relationship between these predictors and multidimensional exclusion is described by the Cramer's V coefficient (an extension of Chi-square methods) where a value of 1 indicates a perfect association and a value of 0 indicates no association. These data suggest that a significant association exists within the wider population of interest in relation to all of the classificatory variables reviewed here. Of these, economic status ( $V = .482$ ) and tenure ( $V = .399$ ) appear to be most influential. For example, more than half (51%) of the unemployed, and around two fifths of the economically inactive (43%) and renters (38%) are identified as disadvantaged compared with less than one in ten home owners and one in twenty (5%) respondents in work. Of the remaining

variables, educational attainment ( $V = .251$ ), marital status ( $V = .248$ ), and household composition ( $V = .243$ ) appear to be more influential in comparison with the effects of differences in age ( $V = .091$ ) and gender ( $V = .045$ ) upon vulnerability to multidimensional disadvantage.

Nevertheless, it is also important to note that when considering the composition of the multidimensionally disadvantaged group, this clearly also depends on the socio-demographic profile of the population itself. For example, based upon the GHS sample profile although only 5% of respondents in work are classified as experiencing multidimensional disadvantage. However, this group nevertheless comprises more than one quarter (27%) of the multidimensionally disadvantaged group. Similarly, although only a small proportion (8%) of married respondents are multidimensionally disadvantaged they comprise nearly one third (31%) of the disadvantaged group itself. *These observations emphasise the importance of considering the composition of the disadvantaged group itself alongside examination of those factors predicting heightened vulnerability to disadvantage.*

Finally, it should be noted that the estimates of vulnerability described in Table 3.5 (above) do not take account of the relationship between these socio-demographic predictors of disadvantage themselves. Since these variables are often highly inter-correlated it is useful to derive an estimate of the independent effects of each predictor taking into account the influence of other factors using multivariate methods. Table 3.6 (below) therefore presents the results of logistic regression analysis of the odds of multidimensional disadvantage as defined above for sample groups defined by gender, age group, household composition, marital status, employment status, educational attainment and tenure.

Overall estimates of model fit (Nagelkerke  $R^2 = .519$ ) suggest that these classificatory variables are highly discerning in their ability to correctly classify respondents and, based upon the Hosmer-Lemeshow statistic, the model appears well-fitted. Taking into account the influence of the other classificatory variables included within the model, the odds of multidimensional disadvantage are nearly 19 times (1:18.6) higher for unemployed respondents, and 15 times (1:14.8) higher for economically inactive respondents, in comparison with those respondents in work. Similarly, in comparison with owner occupiers, renters are more than six times (1:6.5) more likely to experience multidimensional disadvantage. However, once the influence of other factors is taken into account gender is no longer significant. Based upon these multivariate estimates the most influential predictors of multidimensional disadvantage are listed below:

- unemployed and economically inactive respondents;
- renters;
- respondents with few or no qualifications;
- single/never married and divorced respondents; and
- single person households.

**FIGURE 3.6: Multivariate odds of multidimensional exclusion by gender, age group, household composition, marital status, employment status, educational attainment, and tenure.**

		Odds
Gender	Male	ref.
	Female	[0.82]
Age group	25-34	ref.
	35-44	[0.98]
	45-54	1.51
	55-60/64	[1.37]
Household composition	Couple, no dep. children	ref.
	Single	1.81
	Couple, indep. children	[0.73]
	Lone parent, indep children	[1.16]
	Other	[1.17]
Marital status	Married	ref.
	Cohabiting	[1.24]
	Single/ never married	2.78
	Widowed	[1.82]
	Divorced	2.34
	Separated	[1.44]
Employment status	In work	ref.
	Unemployed	18.60
	Econ. Inactive	14.82
Educational attainment	HE level (inc nursing)	ref.
	No qualifications	3.29
	Less than 5 GCSE or equiv.	1.88
	5+ GCSEs or equiv.	1.94
	A-level or equiv.	[1.16]
Tenure	Owns with mortgage	ref.
	Owns outright	[1.16]
	Rents	6.46
	Other	[1.82]

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: [ ] indicates coefficients not significant at the .05 level. Method = Backward stepwise binary logistic regression (Likelihood Ratio test). Nagelkerke R sq. = .519; N (unweighted) = 6,009.

## 4. The Dynamics of Disadvantage

This stage of the research explores the dynamics of disadvantage by examining how different combinations of disadvantage behave over time, and the relative risk of experiencing disadvantage over time for different sample sub-groups. The findings presented here are based upon analysis of the British Household Panel Survey (BHPS) Waves 7 to 15. In particular this phase of the research addresses the following questions:

- How do singular forms of disadvantage amongst working age adults without children vary over time?
- How are different forms of longitudinal disadvantage related to each other?
- What is the hazard of experiencing multidimensional disadvantage for different sample sub-groups?

Firstly, in Section 4.1 we consider the ways in which singular instances of disadvantage vary across time by examining the changing dynamics of the BHPS21 indicator across Waves 7 to 15 (1997 to 2005), and their association with established socio-demographic predictors of disadvantage. In Section 4.2 we examine the multidimensional structure of disadvantage based upon the BHPS21 indicators. This section examines the ways in which different forms of disadvantage combine by developing a multidimensional classification of respondent histories based upon cluster analysis methods. Section 4.3 then goes on to examine social differences in the relative hazard of experiencing multidimensional disadvantage over time defined on the basis of the above multidimensional classification of respondent histories.

### 4.1 Cross-sectional estimates of disadvantage

Based upon analysis of the BHPS21 indicator set, this section examines trends in the overall incidence of singular instances of disadvantage, and their association with established socio-demographic predictors of disadvantage. Table 4.1 (*below*) examines cross-sectional trends in the distribution of the BHPS21 indicators for working age adults without children between 1997 (Wave 7) and 2005 (Wave 15).

In interpreting these findings the potential impact of differential attrition amongst panel respondents in the period prior to observation should be borne in mind. For example, the clear disparity in GHS and BHPS estimates of income poverty is likely to reflect atypically high rates of attrition amongst BHPS panel respondents in early waves of the survey, (as well as unrelated remaining definitional and measurement differences). Such problems are compounded by large measurement errors associated with relatively small samples available for analysis within the BHPS dataset.

Nevertheless, the effects of such differential attrition effects may be expected to decline over time since it is known that the incidence of panel attrition itself within the BHPS declines over the course of the panel (Uhrig, 2008). Table 4.1 (*below*) suggests that for most singular indicators the incidence of disadvantage amongst working age adults without children has remained relatively

stable over the 1997-2005 period. These data are suggestive of some modest improvements with respect to housing and neighbourhood quality, educational achievement, home ownership and material deprivation. Nevertheless, with the exception of declining rates of civic participation, most other indicators are not suggestive of substantial improvements in the cross-sectional incidence of disadvantage.

**TABLE 4.1: Cross-sectional prevalence of individual BHPS21 indicators, Waves 7-15 (%).**

Indicator	Variable	7	8	9	10	11	12	13	14	15	Trend
Household income lt. 60% modified OECD median BHC	oecd60	8	8	8	10	10	9	9	10	9	↔
Lacks material 'necessities of life' (2+ items)	matdep	20	19	18	18	16	15	14	13	14	↘
Living in rental accommodation	renter	22	21	21	21	19	19	20	19	18	↘
Unable to save from current income	saver	50	49	52	49	50	52	51	52	50	↔
Finds making debt repayments a heavy burden	debt	11	11	10	10	9	9	9	7	10	↔
Finding it quite/very difficult to get by	subjpov	7	7	6	6	6	5	5	6	6	↔
Living in household with no access to a car or van	car	13	14	13	14	12	12	12	12	11	↔
Low social support (index score 0-5)	losuprt	14	--	10	--	9	--	13	--	14	↔
Does not talk to neighbours OR meet people 'most days'	contact	48	44	43	47	43	45	46	48	47	↔
Not in paid work OR carer	anywork	82	82	84	84	84	84	84	85	85	↗
Living in workless household	hhwork	12	13	12	12	12	13	12	12	12	↔
Cares for someone in household or non-resident	carer	16	16	18	18	20	21	18	20	18	↔
More than 20 hours per week housework	hswork	10	10	9	10	9	8	9	8	8	↘
NS-Sec (Semi)/Routine (most recent job)	loskill	28	29	28	28	28	30	28	28	29	↔
Unsocial hours OR long hours AND low job satisfaction	poorwk	9	9	10	10	10	10	--	9	10	↔
No academic qualifications	noquals	34	32	30	29	27	27	25	24	22	↘
Did not vote in most recent election	vote	18	20	22	21	29	30	29	29	25	↘
Not active member of local group	locact	49	--	52	--	54	--	55	--	57	↗
General health poor/very poor over last 12 months	genhlth	10	10	--	10	9	10	9	9	9	↔
Low subjective well-being (GHQ12 index score 0-7)	lomhlth	25	26	27	25	25	26	26	26	23	↔
Health limits daily activity	ltill	16	15	--	15	16	16	15	--	14	↔
Low satisfaction with life overall (<4 out of 10)	satis	25	22	26	28		24	23	24	27	↔
GHQ12 items: low self-worth; face problems; useful role	esteem	19	19	19	19	19	19	18	18	19	↔
A smoker	smoker	29	29	--	29	29	29	28	27	27	↘
Alcohol or drug problems	alcdrug	1	1	0	1	1	1	1	1	1	↔
Reports poor housing quality (leaks, damp, etc)	hqual	38	37	39	35	36	36	32	32	33	↘
Reports neighbourhood problems (pollution, noise, etc)	nhood	38	34	38	34	34	35	32	31	32	↘
Does not like neighbourhood	lknhood	9	7	8	8	7	7	7	6	6	↘
Sample N		3248	3179	3180	3144	3050	3002	2926	2808	2762	

Source: BHPS Waves 7 to 15 (re-weighted pooled sample)

NOTE: '--' indicates data not collected. ✓ = data moving in the right direction; ↔ = data show broadly constant trend or no significant movement; ✗ = data moving in wrong direction

Table A1.9 (*Appendix 1*) examines the association between singular indicators of disadvantage and selected personal characteristics again based on Kendall's Tau-b test and applied to the re-weighted pooled sample data. These results confirm that many 'conventional' socio-demographic indicators are indeed significantly associated with many aspects of exclusion. As one might expect, the overall profile of association is similar to that pertaining to the GHS25 indicators. In particular:

- Employment status, educational attainment, and tenure emerge as the three most powerful predictors of singular disadvantage for virtually every indicator included within the BHPS21 set.
- Age cohort, marital status, occupational class and religion emerge as significant predictors of disadvantage though their influence is variable across the BHPS21 set as a whole.
- The influence of gender, ethnicity and settlement type (urban/rural) is generally not substantial though some specific individual associations are evident.

## 4.2 The multidimensional structure of disadvantage

In this section we examine how multidimensional disadvantage varies amongst working age adults without children according to their socio-demographic profile based upon a multidimensional classification of BHPS respondents' profile with respect to the BHPS21 items. Building upon the earlier analyses of GHS data we again use cluster analysis methods to define an initial set of clusters, which can subsequently be simplified using K-means clustering. This cluster solution can then be applied to the BHPS person-wave data to generate cluster memberships for each eligible BHPS respondent at each wave for which they are present in the study. The derivation of BHPS clusters and the profile of cluster memberships is described in Section 4.2.1. It is then possible to describe how cluster memberships change over time by examining paired transitions, that is, movements across clusters between adjacent waves. The results of these analyses are presented in Section 4.2.2.

### BHPS Cluster Memberships

In this section we derive a multidimensional classification of BHPS respondents on the basis of their observed responses to the BHPS21 items using cluster analysis methods. Building upon the analysis of the GHS data discussed in Chapter 3, here we estimate an initial cluster model for BHPS respondents present in Waves 7 to 15 based upon random selection of person-wave records for all eligible respondents present in the BHPS. This initial cluster solution is then applied to the full person-wave data in order to generate final cluster memberships for each eligible respondent and in relation to each wave of the survey for which data has been collected.

As with the previous analyses of GHS data, evaluating the optimal number of clusters is facilitated by examination of dendograms which provide a visual representation of the agglomeration (clustering) process. Here, we again derive eight clusters of cases based on observed values for the BHPS21 items. The process of agglomeration describes the way in which initial clusters of

cases are combined iteratively, and is illustrated in Figure A1.2 (*Appendix 1*) for each of the 5,229 cases included in the initial K-means cluster model. The initial solution identifies eight relatively homogenous groups ranging in size from 304 to 1162 cases. The scaling of Figure A1.2 denotes the overall relative (re-scaled) 'distance' between the K-means cluster centroids defined by the BHPS21 indicators. These results suggest that Clusters 1 to 3 are quite distinctive in their profile with regard to their observed values for the BHPS21 indicators relative to the remaining clusters.

However, interpretation of findings is greatly assisted by comparing cluster means for the BHPS21 indicators - and as applied to the full person-wave data. Table 4.2 (*below*) therefore shows the results for all person-waves re-weighted to the original sample size. **It is clear from Table 4.2 that Clusters 1 ('Severely Disadvantaged'), 2 ('Inactive Sick'), and 3 ('Low Skilled') experience multiple disadvantages with respect to many or most of the BHPS21 indicators.** In comparison, Clusters 7 ('No problem') and 8 ('No problem carer') experience little or no disadvantage and in no case do cluster means exceed those for the sample as a whole. Although the remaining four clusters (Clusters 4 to 6) are vulnerable to specific combinations of disadvantage it is clear that these groups are not multiply deprived, at least not in comparison with the situation of Clusters 1 to 3.



**TABLE 4.2: BHPS Cluster analysis results – derived pooled sample cluster membership and K-cluster means (eight cluster solution).**

Cluster:	[Sample Mean]	MULTIPLY DISADVANTAGED			NOT MULTIPLY DISADVANTAGED				
		1 Severely Disadvantaged	2. Inactive Sick	3. Low Skilled	4. Depressed worker	5. Poor housing	6. Lonely	7. No problems	8. No problem carer
N	<b>5895</b>	449	487	533	677	784	1176	1169	619
%	<b>100</b>	<b>7.6</b>	<b>8.3</b>	<b>9.0</b>	<b>11.5</b>	<b>13.3</b>	<b>19.9</b>	<b>19.8</b>	<b>10.5</b>
Low household income	<b>0.08</b>	0.47	0.19	0.08	0.04	0.05	0.02	0.03	0.06
Lacks 2+ necessities	<b>0.16</b>	0.62	0.10	0.18	0.24	0.19	0.07	0.06	0.10
Material deprivation index	<b>0.61</b>	2.01	0.47	0.69	0.85	0.74	0.35	0.31	0.42
Lives in rental accomm.	<b>0.20</b>	0.64	0.11	0.25	0.18	0.50	0.06	0.09	0.07
Does not save regularly	<b>0.50</b>	0.88	0.74	0.60	0.63	0.49	0.34	0.39	0.40
Debt burden on finances	<b>0.10</b>	0.16	0.03	0.07	0.18	0.18	0.08	0.08	0.05
Difficult to manage finances	<b>0.06</b>	0.33	0.05	0.03	0.13	0.04	0.01	0.01	0.03
No access to a car/van	<b>0.11</b>	0.46	0.11	0.13	0.11	0.17	0.04	0.05	0.04
No support in a crisis	<b>0.28</b>	0.43	0.27	0.31	0.35	0.26	0.26	0.22	0.23
No daily social contact	<b>0.46</b>	0.29	0.33	0.35	0.63	0.47	1.00	0.00	0.38
In paid work (or carer)	<b>0.85</b>	0.30	0.00	0.91	0.91	0.95	0.98	0.98	1.00
No-one in paid work	<b>0.11</b>	0.68	0.59	0.04	0.02	0.01	0.00	0.00	0.13
Cares for someone	<b>0.18</b>	0.23	0.00	0.24	0.13	0.07	0.00	0.00	1.00
Hours per week housework	<b>9.2</b>	11.8	12.5	13.7	8.7	7.2	7.1	7.6	11.3
20+hrs housework weekly	<b>0.09</b>	0.16	0.18	0.24	0.07	0.03	0.03	0.04	0.12
(Semi)routine occupation	<b>0.27</b>	0.65	0.28	0.95	0.23	0.19	0.12	0.14	0.15
Poor working conditions	<b>0.09</b>	0.01	0.00	0.22	0.06	0.10	0.11	0.11	0.09
No academic qualifications	<b>0.26</b>	0.69	0.38	0.97	0.13	0.10	0.11	0.09	0.19
Non-UK citizen	<b>0.00</b>	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Did not vote in Gen Election	<b>0.26</b>	0.39	0.17	0.22	0.29	0.36	0.22	0.25	0.17
Not active in local group	<b>0.54</b>	0.75	0.45	0.66	0.61	0.54	0.51	0.47	0.43
Poor/v poor gen health	<b>0.09</b>	0.52	0.16	0.06	0.15	0.04	0.03	0.03	0.05
Subjective well being	<b>0.26</b>	0.04	0.35	0.25	0.02	0.31	0.32	0.35	0.25
Limiting illness	<b>0.15</b>	0.75	0.31	0.12	0.17	0.07	0.04	0.05	0.12
Not satisfied with life overall	<b>0.24</b>	0.74	0.14	0.17	0.96	0.08	0.05	0.06	0.14
Low GHQ12 score	<b>0.19</b>	0.57	0.14	0.11	0.60	0.10	0.08	0.07	0.12
Respondent is a smoker	<b>0.29</b>	0.55	0.26	0.37	0.33	0.34	0.21	0.25	0.19
Drug/alcohol problems	<b>0.01</b>	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00
1+ housing problems	<b>0.36</b>	0.56	0.20	0.33	0.51	0.91	0.18	0.17	0.25
Poor quality housing	<b>0.58</b>	1.04	0.29	0.53	0.83	1.62	0.25	0.24	0.35
Low neighbourhood safety	<b>0.34</b>	0.54	0.25	0.36	0.45	0.85	0.17	0.15	0.26
Dislikes neighbourhood	<b>0.07</b>	0.19	0.04	0.09	0.14	0.11	0.03	0.03	0.04

Source: BHPS Waves 7 to 15 (re-weighted pooled data)

With respect to the situation of those BHPS respondents experiencing specific combinations of disadvantage, and based upon inspection of cluster means for the BHPS21 items as illustrated in Table 4.2 (*above*), these clusters can be characterised as follows:

- **Cluster 1 - The 'Severely Disadvantaged' (7.6%):** comprising around 1 in 13 of BHPS respondents, this cluster is disadvantaged in relation to virtually every one of the BHPS21 indicators included in the cluster model. This group comprises those working age adults without children most seriously disadvantaged within contemporary British society.
- **Cluster 2 - The 'Inactive Sick' (8.3%):** this group is characterised by low income, labour market inactivity, poor health and relatively low educational attainment.
- **Cluster 3 - The 'Low Skilled' (9.0%):** this group is predominantly drawn from respondents in (semi)routine occupations, typically experiencing poor working conditions, and low educational attainment
- **Cluster 4 – 'Depressed Workers' (11.5%):** this group is characterised by relatively high levels of material deprivation and financial stress, low social contact and support, and low levels of subjective well-being
- **Cluster 5 – 'The Poorly Housed' (13.3%):** this group is predominantly drawn from rental tenants and is characterised by poor housing quality and neighbourhood dissatisfaction

## Descriptive Analysis of Transitions

How then does cluster membership vary over time? One way of addressing this question is provided simply by cross-tabulating observed paired transitions for BHPS respondents providing data in consecutive waves. Table 4.3 (*below*) therefore compares respondents current cluster membership (i.e. at time  $t$ ) with their status in the preceding wave (i.e. at time  $t-1$ ). It is clear from this analysis that there is a reasonably high degree of stability in cluster membership over time, but that this also varies quite substantially depending on the cluster under investigation. In particular, around three quarters of paired transitions relating to the 'Severely Disadvantaged' (71%) and 'Low Skilled' (78%) groups involved no change in cluster membership between consecutive waves. Since the weighting model applied to these data accords equal weight to each respondent (rather than to each respondent-wave) this suggests a lower degree of overall mobility for respondents classified as 'Severely Disadvantaged' or 'Low Skilled' during the 1997-2005 period relative to the other groups identified within the cluster model.

**TABLE 4.3: BHPS Paired transitions: Cluster membership by ‘origin’ (Row %)**

ORIGINS:	MULTIPLY DISADVANTAGED			NOT MULTIPLY DISADVANTAGED					TOTAL
	Severely Disadvantaged	Inactive sick	Low skilled	Depressed worker	Poor housing	Lonely	No problems	No problem carer	
Severely disadvantaged	71	7	8	7	3	0	0	3	100
Inactive sick	6	57	4	6	5	8	7	7	100
Low skilled	4	3	78	4	3	3	4	2	100
Depressed worker	3	3	2	44	14	14	12	7	100
Poor housing	2	3	2	11	50	12	16	4	100
Lonely	0	2	2	7	8	56	21	4	100
No problems	0	2	2	8	10	20	53	6	100
No problem carer	1	5	2	6	6	8	10	60	100

Source: BHPS Waves 7 to 15 (re-weighted pooled data)

**TABLE 4.4: BHPS Paired transitions: Cluster membership by ‘destination’ (Row %)**

DESTINATIONS:	MULTIPLY DISADVANTAGED			NOT MULTIPLY DISADVANTAGED					TOTAL
	Severely Disadvantaged	Inactive sick	Low skilled	Depressed worker	Poor housing	Lonely	No problems	No problem carer	
Severely disadvantaged	78	7	5	4	3	0	0	2	100
Inactive sick	8	62	4	5	5	5	4	8	100
Low skilled	7	3	74	3	3	4	3	3	100
Depressed worker	5	4	3	45	11	13	12	7	100
Poor housing	2	3	3	13	46	12	14	5	100
Lonely	0	3	1	8	7	56	19	5	100
No problems	0	3	2	8	9	21	51	6	100
No problem carer	2	5	1	8	4	8	10	62	100

Source: BHPS Waves 7 to 15 (re-weighted pooled data)

A very similar picture is evident when we consider the *destinations* of BHPS respondents, as illustrated in Table 4.4 (*above*). Here we examine the profile of paired transitions with respect to change in cluster membership between respondents' current status (i.e. at time  $t$ ) and their destination status (i.e. at time  $t+1$ ). Thus of those respondents classified as 'Severely Disadvantaged' at time  $t$ , 78% remained poor at time  $t+1$ . Similarly, of those respondents classified as 'Low Skilled' at time  $t$ , 74% remained low skilled at time  $t+1$ . Both clusters are

noticeably more stable in their membership over time than the remaining clusters. To the extent that there is movement out of these clusters between time  $t$  and  $t+1$  this is also disproportionately associated with movement into other relatively disadvantaged groups. **Overall, these results suggest a relatively low level of social mobility for BHPS respondents experiencing multidimensional disadvantage in comparison with the situation of more advantaged respondents and those experiencing more specific and singular instances of disadvantage.**

Clearly, given the pattern of associations revealed in Tables 4.2 to 4.4 our main focus of analysis with respect to the investigation of longitudinal dynamics of multidimensional exclusion should be upon the 'Severely Disadvantaged'. Nevertheless, there is a danger that in focusing only upon the 'poorest of the poor' we obscure the extent of multiple disadvantage and the underlying structural inequalities that perpetuate disadvantage. In particular, the apparent persistence of relative disadvantage over time for both the 'Severely Disadvantaged' *and* the 'Low Skilled' associated with relatively low between-wave 'exit' rates for these respondents suggests the need to investigate the hazard of becoming disadvantaged for *both* sets of respondents. Indeed, the most common 'destination' for those exiting the 'Low Skilled' group is entry into the 'Severely Disadvantaged' cluster, and this emphasises the importance of considering the situation of the 'Low Skilled' alongside that of the 'Severely Disadvantaged'.

In examining social differences in exposure to multiple disadvantage over time we therefore adopt a broader approach which examines the risk associated not only with extreme disadvantage (i.e. the 'Severely Disadvantaged' cluster) but also the situation of the 'Low Skilled' (Cluster 3).

### 4.3 Vulnerability to multidimensional disadvantage over time

In this section we address the question of how vulnerability to multidimensional disadvantage changes over time for different sample sub-groups. Here, we investigate the hazard of becoming disadvantaged given that the respondent had not previously reported experiencing multidimensional disadvantage during the period of observation. In estimating such hazard rates, it is clearly also vitally important to take account of the influence of cases that have exited the study early (e.g. as a result of attrition or ineligibility), and cases who are no longer at risk of experiencing the 'event' (i.e. because they have already become disadvantaged), collectively known as 'right censoring'.

In order to do so, in Section 4.3.1 we begin by examining how the cumulative hazard of experiencing multidimensional disadvantage changes over time based upon inspection of 'survival' tables for different sample sub-groups. It is then possible to plot the resulting 'survival function' for these groups that describes the cumulative probability of avoiding becoming multidimensionally disadvantaged during the period of observation, and taking account of right censoring. Here, we present results for Cluster 1 ('Severely Disadvantaged') and Cluster 3 ('Low Skilled') and disaggregate analyses based upon sample socio-demographic characteristics at the earliest observation for which data are available. For example, with respect to Cluster 1 the resulting 'survival tables' describe how the cumulative probability of avoiding becoming 'Severely Disadvantaged' changes over time for different groups defined by their initial sample

characteristics. In the interests of economy of presentation we describe here only statistically significant results based upon pair wise comparisons (Wilcoxon-Gehan statistic).

It is possible to extend this approach by estimating hazard rates using Cox regression methods. In Section 4.3.2 we estimate univariate Cox proportional hazard models for the 'Severely Disadvantaged' (Cluster 1) and the 'Low Skilled' (Cluster 3) disaggregating analyses by sex, age group, tenure, and so on as reported at the beginning of the period of observation. The resulting odds and associated confidence intervals describe the cumulative hazard of becoming multidimensionally disadvantaged relative to a specified reference group. The Cox regression approach can be easily extended to provide multivariate estimates of hazard rates which take account of the association between predictors in estimating the hazard of becoming multidimensionally disadvantaged. In Section 4.3.3 we therefore estimate multivariate Cox proportional hazard models for the 'Severely Disadvantaged' (Cluster 1) and the 'Low Skilled' (Cluster 3). Using Cox regression with time-dependent covariates we also test the assumption of proportionality of hazard rates over time, that is, the assumption that the relationship between the hazard of disadvantage and its various predictors remains constant over time.

## Survival analysis

Figures A1.3 and A1.4 (*Appendix 1*) plot the cumulative probability of avoiding multidimensional disadvantage for BHPS sample members across Waves 7 to 15 with respect to the 'Severely Disadvantaged' (Cluster 1) and the 'Low Skilled' (Cluster 8). Results are disaggregated by gender, age group, tenure, NS-Sec, employment status, highest qualification, household type, religion, ethnic group, and area type. Table 4.5 (*below*) summarises the overall pattern of association for the 'Severely Disadvantaged' and the 'Low Skilled' by highlighting statistically significant associations based upon pairwise comparisons between groups.

With regard to the 'Severely Disadvantaged' (Cluster 1), Table 4.5 (*below*) shows that the cumulative probability of avoiding multidimensional disadvantage is significantly lower for the following groups: social rental tenants; semi- and routine manual occupational groups; the sick and disabled; the unemployed; respondents with no qualifications; single person households; lone parents with non-dependent children; respondents with a non-Christian religion; divorced, widowed and separated respondents, and; black and Asian ethnic groups.

With regard to the 'Low Skilled' (Cluster 8), Table 4.5 (*below*) shows that the cumulative probability of avoiding multidimensional disadvantage is significantly lower for the following groups: respondents aged 45-59; social rental tenants; (semi) routine manual occupational groups; respondents looking after the home; respondents with no qualifications; couples without dependent children; lone parents with non-dependent children, and; white respondents.

**Table 4.5: Summary of BHPS survival analysis - the 'hazard' of becoming multidimensionally disadvantaged.**

The 'Severely Disadvantaged' (Cluster 1)	The 'Low Skilled' (Cluster 3)
<ul style="list-style-type: none"> <li>• Social rental tenants</li> <li>• Semi- and routine manual occupational groups</li> <li>• The sick and disabled</li> <li>• The unemployed</li> <li>• Respondents with no qualifications</li> <li>• Single person households</li> <li>• Lone parents with non-dependent children</li> <li>• Respondents with a non-Christian religion</li> <li>• Divorced, widowed and separated respondents</li> <li>• Black and Asian ethnic groups</li> </ul>	<ul style="list-style-type: none"> <li>• Social rental tenants</li> <li>• (Semi) routine manual occupational groups</li> <li>• Respondents looking after the home</li> <li>• Respondents with no qualifications</li> <li>• Couples without dependent children</li> <li>• Lone parents with non-dependent children</li> <li>• White respondents</li> </ul>

### Multivariate Cox Regression Analysis

Whilst the survival tables referred to above and presented in Figures A1.3 and A1.4 describe the cumulative probability of disadvantage for different sample groups, in this section we examine the overall hazard of multidimensional disadvantage across the observation period as a whole using Cox regression methods. This approach also allows us to estimate the statistical significance of our comparisons based upon the partial likelihood function, that is, the extent to which findings drawn from the BHPS data set may be generalised to the wider population of working age adults without children.

Clearly, many of the predictors presented in the above survival analyses are also highly inter-correlated so that estimates of the independent effect of these predictors are likely to be biased unless we take account of the underlying pattern of association between the predictor variables themselves. For example, it is well documented that educational attainment is subject to intergenerational change so that in estimating the *independent* impact of educational attainment upon the hazard of experiencing multidimensional exclusion we need to take account of variations by age within the sample. In this section we therefore present multivariate Cox proportionate hazards models in order to estimate the independent effects of our covariates upon the hazard of experiencing multidimensional exclusion during the study period.

Given the above observations, we therefore examine how the hazard of experiencing multidimensional disadvantage varies for different sample groups taking into account the impact of other potentially inter-correlated variables using multivariate Cox regression methods. Table 4.6 (*below*) describes variations in hazard ratios for the 'Severely Disadvantaged' (Cluster 1) and the



'Low Skilled' (Cluster 3) respectively relative to a series of reference groups defined by gender, age group, tenure, NS-Sec, employment status, highest qualification, marital status, household type, religion, ethnicity, and area type. The odds estimates presented in Table 4.6 describe the effect of a one-unit difference in the associated predictor on the hazard (or *odds*) of becoming multidimensionally disadvantaged during the period of observation relative to a specified reference group (and given that the respondent was not previously disadvantaged). For example, relative to the situation of male respondents women are 36% (1: 1.36) more likely to become 'severely disadvantaged' during the period of observation. The odds estimates presented in Table 4.6 (*below*) suggest the following overall patterns of association with regard to the hazard of entering the 'Severely Disadvantaged' and 'Low Skilled' clusters respectively:

**The 'Severely Disadvantaged' (Cluster 1):** Overall, gender, age group, tenure, occupational group, employment status, educational attainment, household type, and (to a lesser extent) marital status are important social predictors of heightened vulnerability to multidimensional disadvantage as defined by the 'Severely Disadvantaged' cluster. The assumption of proportionality of hazards over time cannot be rejected – in other words we can reasonably assume the relationship between these predictors and the hazard of multidimensional exclusion to be constant over the period of observation. The following groups are especially vulnerable to becoming 'Severely Disadvantaged':

- Women
- Respondents aged 40-54
- Social rental tenants
- Private rental tenants
- (Semi-) routine occupational groups
- The unemployed
- Home makers
- Early retirees
- The sick and disabled
- Respondents with no qualifications
- Never married respondents
- Single person households

**The 'Low Skilled' (Cluster 3):** As with 'Severe Disadvantage' (Cluster 1), the assumption of proportionality of hazards cannot be rejected, that is these associations can be assumed to be time independent. Age group, NS-Sec, employment status, educational attainment, and household type remain important social predictors of heightened vulnerability to multidimensional disadvantage as defined by the 'Low Skilled' cluster. The following groups are especially vulnerable to becoming 'Low Skilled':

- Respondents aged 40-54
- (Semi-) routine occupational groups
- Respondents in employment
- Respondents with few or no qualifications
- Couples with no dependent children
- Single person households



**TABLE 4.6: The cumulative hazard of multidimensional disadvantage:  
BHPS Cox regression multivariate odds**

		Severely Disadvantaged	Low Skilled
<b>Sex</b> (ref = male)	Female	1.27	--
<b>Age group</b> (ref = 25-29 yrs)	30-34 yrs	[1.52]	[1.26]
	35-39 yrs	1.68	[1.65]
	40-44 yrs	2.66	2.55
	45-49 yrs	2.30	1.93
	50-54 yrs	2.51	2.20
	55-59 yrs	[1.58]	1.71
	60-64 yrs	[0.78]	[0.75]
<b>Tenure</b> (ref = owns outright)	Owns with mortgage	[0.96]	--
	Private rental	2.42	--
	Social rental	2.61	--
	Other	[1.58]	--
<b>NS-Sec</b> (ref = prof/ managerial)	Intermediate	[1.11]	3.17
	Semi-routine	2.38	8.07
	Routine	2.79	8.92
<b>Employment status</b> (ref = employee)	Self-employed	[1.48]	[0.66]
	Unemployed	5.25	0.46
	In education /training	[1.79]	[3.51]
	Looks after home	2.35	0.55
	Retired	2.91	0.39
	Sick /disabled	6.23	0.17
<b>Highest qualification</b> (ref = HE level)	A-level or equiv	[1.28]	[1.01]
	GCSE or equiv	[1.41]	3.21
	CSE or equiv	[1.08]	4.04
	None of above	3.02	47.65
<b>Marital status</b> (ref = married/ cohab)	Separated	[0.98]	--
	Never married	1.65	--
	Divorced	[1.35]	--
	Widowed	[0.54]	--
<b>Household type</b> (ref = couple, no children)	Single person household	1.67	0.54
	2+ unrelated adults	0.34	[0.34]
	Lone parent, non-dep. children	[1.51]	[0.70]
	Other	[0.81]	[0.76]
<b>Model chi sq. (df)</b>		1216 (34)	1356 (24)
<b>N</b>		6073	5322

NOTES: Method = Backward Stepwise (Likelihood Ratio). Variables dropped: area type; ethnic group ('Severely Disadvantaged'); area type; ethnic group; tenure; marital status ('Low Skilled'). T\_cov (time dependency) not significant at .05 level (Loss Chi square) for both models. [...] indicates estimate is not significant at the .05 level. '--' indicates variable dropped from final model.

Source: BHPS Waves 7 to 15 (respondent survival data)

## 5. Summary and conclusions

### 5.1 Summary of findings

#### Understanding multiple disadvantage

The cross-sectional nature of the GHS data analysed in this chapter provide a comprehensive basis for reliable estimation of the extent and social distribution of multidimensional disadvantage amongst working age adults without children living in private households in Britain. By harmonising and pooling data across different waves of the GHS it is possible to disaggregate analyses to provide a detailed picture of the social profile of individual indicators of disadvantage, and - using more advanced statistical methods - to examine the multidimensional structure of disadvantage and its incidence and distribution amongst this population.

The analyses presented in this chapter suggest that the social distribution of singular instances of disadvantage is highly patterned. In particular, multiple disadvantages are associated with variations by employment status, educational attainment, housing tenure, household type, marital status, age group and gender. Economic activity status and educational attainment both emerge as powerful predictors of disadvantage with unemployed and economically inactive respondents, and those with few or no qualifications, being especially vulnerable to many singular indicators of disadvantage. Although the pattern of association is complicated by cohort and life cycle effects, these analyses also demonstrate that single, divorced, separated and widowed respondents are at especial risk of disadvantage, along with single person and lone parent households. For similar reasons understanding the age structure of disadvantage is similarly fraught. Nevertheless, in general the incidence of most singular instances of disadvantage appears to increase with age, with those approaching retirement age at greatest risk.

It is also important to consider both the ways in which different forms of disadvantage are related to each other, and (arising from this) how widespread multidimensional disadvantage is amongst working age adults without children. The simplest way of doing so is to combine items additively in order to investigate their incidence and social distribution. These analyses suggest that whilst high levels of cumulative disadvantage are relatively uncommon amongst this population, they are again most prevalent amongst older respondents, single person and lone parent households, divorced, separated and widowed respondents, the unemployed and economically inactive, those with few or no qualifications and rental tenants.

Nevertheless, investigation of the relationship between different indicators of disadvantage based upon reliability analysis suggests that such cumulative scales are not always internally consistent. Rather, a number of different dimensions of disadvantage may explain the observed variability in observed scores and the canonical correlation analysis presented here suggests the presence of at least two empirically distinct dimensions of disadvantage - one focusing upon labour market non-participation and ill health, and a second dimension relating to material deprivation, low social status and support, and poor housing quality. A more fruitful strategy is therefore to focus upon classifying respondents (rather than variables) according to their disadvantage profile using cluster analysis methods. These analyses identify a 'severely disadvantaged' group (comprising 8% of respondents) who are disadvantaged according to virtually every indicator included in the

model. In addition, two further groups are identified who experience multiple forms of disadvantage across a wide variety of indicators – the ‘low income sick’ and the ‘working poor’. Taken together these groups represent nearly 16% of working age adults without children. On the basis of multivariate analysis this group is disproportionately concentrated amongst men, older respondents, the unemployed and inactive, single person households, those with few educational qualifications, and rental tenants.

## The dynamics of disadvantage

The BHPS is unique amongst large-scale general purpose surveys of the resident population living in private households in illuminating into the dynamics of disadvantage over time. As such, and notwithstanding the limitations of the BHPS data reviewed in Chapter 2, these data provide a unique insight into the ways singular forms of disadvantage vary over time amongst working age adults and how the hazard of experiencing multidimensional exclusion differs for various population sub-groups. However, the analyses presented here do not suggest a significant decline over the period of investigation (1997-2005) in the overall incidence of disadvantage amongst this population with respect to the singular forms of disadvantage investigated here. Despite some notable improvements, for example with regard to material deprivation, housing quality and educational underachievement, the overall pattern of cross-sectional change during this period remains inconsistent, with no overall trend of change discernible for many of the indicators included here - and some notable examples of increasing disadvantage over this period, for example with regard to civic participation and worklessness.

Whilst the focus in Chapter 3 was upon the structure of disadvantage and the social factors predicting its cross-sectional incidence, in this chapter we have been primarily concerned with the hazard of *becoming* multidimensionally disadvantaged using a range of advanced statistical methods. On the basis of cluster analysis of BHPS data, we identify two clusters of BHPS respondents who are disproportionately vulnerable to experiencing multiple forms of disadvantage: the ‘severely disadvantaged’ and the ‘low skilled’ comprising 8% and 9% of the BHPS sample respectively.

The notion of persistence over time is often held to be a key characteristic of social exclusion (e.g. Room, 1995), and it is therefore useful to investigate how group memberships change over time specifically with reference to the situation of these groups. The results presented here suggest that there is in fact more stability in group membership over time for these groups than for any of the other clusters identified within the BHPS data. In other words, there appears to be less mobility out of the clusters than there is for any of the ‘non-disadvantaged’ groups so that the experience of disadvantage appears to be relatively enduring and persistent over time.

For those respondents not initially identified as ‘severely disadvantaged’ or ‘low skilled’ the hazard of becoming disadvantaged in these terms is also strongly socially patterned. On the basis of survival analysis and Cox regression analysis the hazard of becoming ‘severely disadvantaged’ is significantly greater for women, older respondents, rental tenants, manual occupational groups, the unemployed, home makers, early retirees, the sick and disabled, those with no qualifications, unmarried (never married) respondents, and single person households. The hazard of entering the ‘low skilled’ group is significantly greater for older respondents, manual occupational groups,

respondents in employment, respondents with few or no qualifications, couples with no dependent children, and single person households.

## 5.2 Policy Implications

What then are the overall findings emerging from the analyses presented here? Firstly, existing comparisons across the life course suggest that multidimensional disadvantage is likely to be less prevalent amongst working age adults without children than for many other population groups (e.g. households with children, the elderly, young people). Nevertheless, the absolute size of this population suggests that tackling multidimensional disadvantage amongst working age adults without children ought to receive higher priority within the UK's overall strategy for social inclusion. Based upon analysis of GHS data this research suggests that approximately 16% of this population – 2.6 million adults – are experiencing multidimensional disadvantage at any one point in time, and efforts to tackle disadvantage in the UK are unlikely to be effective unless they seriously engage with the situation facing these households.

Secondly, it should be emphasised that the circumstances facing working age adults experiencing multidimensional disadvantage are not wholly explicable in terms of labour market non-participation, despite the emphasis within current policy making on paid employment as a route out of disadvantage. It is clear from the analyses presented here that unemployment and economic activity are very powerful predictors of multidimensional disadvantage within this population. Nevertheless, the multidimensional classification presented here also highlights the extent of disadvantage amongst working age adults classified as 'working poor' or 'low skilled'. At the same time, the absolute magnitude of these groups means that whilst employment may generally be considered as a protective factor in insulating individuals against the threat of marginalisation and disadvantage, tackling disadvantage amongst the working population should be a key priority in reducing the overall incidence of disadvantage within the UK population.

At the same time, as the circumstances of the working poor and the low skilled demonstrate, it should also be recognised that for this group social participation and inclusion cannot be simply equated in an unproblematic way with participation in paid work. Equally, the multidimensional classification of disadvantage presented here suggests that inclusion through paid work is likely to be a highly inappropriate policy solution for those working age adults whose disadvantaged circumstances are associated with ill health, disability, and caring responsibilities. Whilst labour market activation policies certainly have an important role to play in tackling and preventing multidimensional exclusion amongst this population, they therefore also need to be supplemented by policies directed at improving the quality of working life for those in work (including adequate minimum wage provision), as well as a range of income maximisation policies for those working age adults unable to participate in the paid economy as a result of ill health, disability, and caring responsibilities.

Thirdly, trends in the incidence of specific instances of disadvantage suggest that overall progress in tackling disadvantage amongst this population has, at best, been mixed. Whilst there appears to have been some progress in specific areas (notably material deprivation and housing and neighbourhood quality) there is still much to be done in tackling the overall incidence of disadvantage amongst working age adults without children. To some extent this may reflect the

relatively low 'visibility' of this population in contemporary UK social inclusion policies, and the preoccupation with paid employment as a route out of exclusion and disadvantage for this group as noted above. However, these findings also draw attention to the enduring and cumulative nature of disadvantage and therefore to the need for a continuing long-term political commitment to tackling disadvantage, as well as to the development of holistic approaches for combating it.

At the same time, in considering the wider drivers of exclusion it is also vital that account is taken of the impact of demographic change in assessing the future direction of social inclusion policies. It is evident from the above analyses that the hazard of becoming multidimensionally disadvantaged is significantly elevated for single person households and for older people of working age. On the basis of current demographic projections associated with population ageing and declining household size, one might expect these trends to become an increasingly significant driver of exclusion for this population in future. At the same time, secular trends in educational achievement, home ownership and occupational structure suggest countervailing pressures with respect to the overall incidence of disadvantage given the association between disadvantage and low educational achievement, rental tenure, and manual employment. Nevertheless, the potential for increasing 'residualisation' with regard to the social circumstances of the latter groups suggests that these factors may in fact increase in significance as predictors of disadvantage.

Finally, the above observations highlight the importance of considering the *overall* incidence of disadvantage for specific population sub-groups in the formulation of social inclusion policies alongside investigation of the risk factors associated with disadvantage. In particular, there is a danger that an exclusive focus upon investigating the individual-level risk factors associated with multidimensional disadvantage may obscure the extent of disadvantage amongst population sub-groups with lower levels of vulnerability (e.g. people in work, owner occupiers, non-manual workers, etc.). If social inclusion policies are to be effective in reducing the overall incidence of disadvantage amongst working age adults without children, then their design needs to take account not only of the individual-level risk factors associated with heightened vulnerability, but also of the wider societal processes associated with disadvantage and their impact amongst working age adults without children as a whole.

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# Appendices

## Appendix 1      Additional tables and figures

**TABLE A1.1: Cross-tabulation of GHS25 indicator set by gender, age group, household composition and marital status.**

			ALL	GENDER		AGE GROUP				HOUSEHOLD COMPOSITION					MARITAL STATUS					
			TOTAL	Men	Women	25-34	35-44	45-54	55-64	Single	Couple indep children	Couple no children	indep children	Other	Married	Cohabiting	Single	Widowed	Divorced	Separated
RESOURCES	Material/ economic resources	oecd60	26.1	26.8	25.0	16.5	22.3	26.8	36.9	33.7	27.3	20.2	46.7	24.5	23.2	14.0	30.4	46.3	42.3	32.0
		benefits	11.9	14.1	9.0	5.8	9.8	11.7	19.0	20.5	8.8	8.0	21.5	12.1	9.0	4.7	14.5	22.3	27.5	20.3
		matdep	10.4	11.2	9.4	8.4	11.3	10.1	12.1	23.7	5.1	4.5	24.2	14.3	4.5	4.9	19.1	21.6	27.0	17.8
	Access to services	newten	25.1	27.0	22.6	34.3	27.9	20.5	19.8	40.4	14.5	17.5	41.6	47.9	14.1	27.3	38.9	27.5	45.2	44.1
		phone	1.3	1.8	0.6	1.3	1.4	1.0	1.4	3.9	0.3	0.2	1.9	2.3	0.2	0.2	3.0	3.0	3.7	2.2
		car	16.1	16.5	15.5	17.7	19.7	14.2	14.1	34.8	7.0	7.9	33.1	24.4	6.7	11.7	31.4	27.9	31.8	25.5
	Social resources	crisis	9.7	11.7	7.2	5.7	8.6	10.8	12.8	16.2	7.8	7.2	14.3	6.5	7.8	5.7	11.5	14.8	17.8	18.0
PARTICIPATION	Economic participation	anywork	19.0	19.2	18.8	10.7	13.0	18.2	31.6	24.8	15.7	17.1	26.5	16.5	18.6	8.0	19.5	44.8	29.8	20.8
		hhwork	16.4	17.5	15.0	10.8	13.8	13.0	26.2	24.3	12.7	12.9	26.7	17.4	14.1	8.3	19.0	39.5	27.1	24.0
		carer	6.1	6.3	5.1	2.2	6.2	5.8	8.9	0.9	7.4	6.1	19.4	9.4	6.9	3.8	6.2	2.2	2.4	2.9
		unpaid	3.6	0.9	7.1	1.3	2.4	5.1	4.9	1.1	5.7	4.1	4.7	1.6	5.5	2.1	0.9	6.2	1.1	2.9
		loclass	14.8	15.1	14.4	9.7	14.9	16.0	18.1	15.6	18.0	12.5	22.3	14.6	14.7	9.8	15.6	24.4	17.4	17.9
	Culture, education & skills	noqual	23.3	22.5	24.4	6.0	16.9	28.0	37.8	23.0	29.5	21.0	33.9	16.9	26.4	12.0	17.8	43.5	30.5	26.0
		loqual	55.0	53.3	57.1	33.5	49.9	63.4	68.5	53.3	65.8	52.4	69.5	41.3	59.3	43.0	46.1	72.9	64.8	61.6
		edcourse	82.9	85.6	79.3	75.7	82.1	85.8	86.8	81.0	87.3	83.0	86.9	72.8	85.4	79.1	79.2	86.7	83.9	80.4
	Civic participation	locactgr	67.7	68.1	67.3	72.3	68.7	67.3	63.4	71.2	68.3	64.9	75.3	70.9	64.0	69.9	72.1	73.0	72.4	73.8
		influent	15.7	16.6	14.5	12.8	14.1	16.8	18.2	13.9	17.8	16.0	13.9	14.7	17.1	15.9	12.6	18.0	16.6	13.4
WELL-BEING	Health & well- being	ill	14.0	13.9	14.3	5.9	11.4	15.6	21.4	18.4	14.2	11.8	16.2	12.5	13.7	8.5	11.0	24.1	26.7	22.2
		menthlth	6.0	6.1	5.8	3.5	7.8	6.6	6.3	10.2	4.7	3.9	11.5	5.8	3.9	3.8	8.7	7.3	12.3	9.7
		ltill	20.9	21.3	20.4	9.2	18.1	23.3	31.0	25.8	20.6	18.7	27.8	15.4	21.0	12.9	18.4	32.9	34.0	27.7
		ltbenefit	1.2	1.6	0.7	1.3	1.2	1.2	1.2	3.0	0.8	0.4	2.6	1.0	0.4	0.7	2.3	3.1	3.1	3.5
		neverwk	2.2	1.6	3.0	2.9	2.7	2.0	1.5	2.4	2.7	1.1	6.9	5.7	1.5	0.8	4.7	4.0	1.9	1.9
	Living environment	smoker	28.9	30.7	26.6	31.4	33.4	28.5	24.1	36.0	25.8	24.3	40.3	37.8	22.2	35.3	32.9	38.1	43.3	38.6
		qualhous	9.2	10.1	8.0	10.9	9.8	9.1	7.4	13.1	9.2	6.0	16.3	14.7	6.3	7.7	13.8	11.6	14.4	13.4
		dissatis	10.2	10.0	10.6	9.2	11.4	11.1	9.4	13.3	9.7	8.5	15.5	10.5	8.8	10.3	10.4	11.1	14.6	21.8

The analysis and views expressed in this paper are not a statement of Government policy.

Source: GHS 2000/01 and 2004/05 (pooled data)

**TABLE A1.2: Cross-tabulation of GHS25 indicator set by employment status, educational attainment and tenure.**

				EMPL. STATUS			HIGHEST QUALIFICATION					TENURE			
			TOTAL	In employment	Unemployed	Economic inactive	No qualification	Less than 5 GCSE or equiv.	5+ GCSE or equiv.	A-level or equiv.	HE level (inc nursing)	Ow.. outright	Ow.. with mortgage	Rents	Other
RESOURCES	Material/ economic resources	oecd60	26.1	14.0	78.1	65.5	47.5	28.6	22.3	17.7	12.5	31.0	12.9	47.6	32.0
		benefits	11.9	1.7	52.8	45.3	25.0	15.1	10.5	8.4	4.4	10.8	5.2	26.7	12.8
		matdep	10.4	4.6	47.1	28.3	22.0	10.8	8.4	6.3	4.8	6.2	2.2	32.4	11.1
		newten	25.1	20.6	51.3	39.1	37.1	24.3	21.8	19.3	20.6	0.0	0.0	100.0	73.7
	Access to services	phone	1.3	0.6	6.5	3.2	2.9	1.5	0.5	0.4	0.6	0.5	0.4	3.9	2.2
		car	16.1	11.5	46.2	29.4	26.2	15.8	12.6	11.7	12.5	8.5	7.1	42.3	15.8
	Social resources	crisis	9.7	7.8	23.3	15.1	14.6	9.3	9.5	9.3	7.3	10.1	6.9	15.2	8.7
PARTICIPATION	Economic participation	anywork	19.0	0.0	90.0	81.9	32.7	19.6	15.8	15.1	11.0	26.8	9.1	68.7	82.4
		hhwork	16.4	3.8	57.0	59.8	30.2	18.0	12.7	11.5	10.0	20.3	7.5	29.8	22.5
		carer	6.1	4.5	6.0	10.9	9.7	7.2	6.0	4.3	3.5	7.7	4.4	6.5	11.4
		unpaid	3.6	0.3	0.0	17.0	7.6	4.5	3.2	1.8	1.2	5.4	2.3	4.2	7.2
	Culture, education & skills	loclass	14.8	12.7	20.2	22.0	33.7	17.1	13.9	8.6	2.6	13.9	10.9	23.8	13.4
		noqual	23.3	18.0	24.6	43.3	100.0	0.0	0.0	0.0	0.0	26.0	16.3	35.0	21.5
		loqual	55.0	49.9	61.4	73.6	100.0	100.0	100.0	0.0	0.0	59.7	48.2	63.9	58.8
		edcourse	82.9	82.0	85.7	85.9	94.4	79.3	85.5	82.0	73.9	84.0	82.3	82.9	82.7
	Civic participation	locactgr	67.7	67.5	74.5	67.8	74.8	72.2	70.9	67.8	61.0	64.1	67.0	72.9	71.4
		influenc	15.7	15.2	15.1	17.6	21.1	17.4	17.1	16.4	12.3	15.7	15.4	16.2	19.6
WELL-BEING	Health & well- being	ill	14.0	7.0	13.8	40.8	24.4	15.1	12.7	11.3	7.5	13.7	9.6	23.1	20.2
		menthlth	6.0	2.9	6.1	17.9	9.6	6.5	5.0	5.6	3.6	6.1	3.3	11.0	8.5
		ltill	20.9	11.8	17.4	56.6	34.4	23.6	18.4	17.0	12.9	24.2	14.1	31.3	26.1
		ltbenefit	1.2	0.0	31.4	1.7	2.0	1.6	1.9	1.0	0.5	0.9	0.3	3.5	0.7
		neverwk	2.2	0.0	4.6	10.5	4.6	2.1	1.1	1.0	0.8	2.4	0.5	5.4	5.5
		smoker	28.9	27.4	42.8	32.3	38.0	31.4	29.6	27.4	20.9	19.6	25.9	44.0	37.1
	Living environment	qualhous	9.2	8.5	19.4	10.5	11.9	9.8	10.2	8.8	6.5	7.4	6.6	16.3	11.3
		dissatis	10.2	9.2	14.9	13.5	13.9	11.0	10.4	9.6	7.3	7.3	9.0	15.8	13.0

Source: GHS 2000/01 and 2004/05 (pooled data)

**TABLE A1.3: Tetrachoric correlations between GHS25 items.**

	oecd60	benefits	matdep	newten	phone	car	crisis	anywork	hhwork	carer	unpaid	loclass	noqual	loqual	edcourse	locactgr	influnc	ill	menthlth	ltill	ltbenefit	neverwk	smoker	qualhous
oecd60																								
benefits	.44																							
matdep	.54	.42																						
newten	.31	.28	.41																					
phone	.12	.16	.22	.13																				
car	.31	.30	.70	.42	.17																			
crisis	.17	.16	.15	.10	.11	.11																		
anywork	.45	.55	.33	.19	.14	.21	.12																	
hhwork	.45	.47	.33	.20	.13	.22	.11	.55																
carer	.13	.09	.06	..	-.03	..	.05	-.13	.12															
unpaid	.11	..	..	..	..	..	..	.26	.10	.06														
loclass	.19	.10	.21	.16	.05	.18	.06	.09	.07	.03	.05													
noqual	.28	.25	.23	.17	.10	.16	.09	.22	.19	.06	.08	.33												
loqual	.23	.20	.17	.09	.05	.09	.07	.17	.15	.08	.10	.28	.50											
edcourse	.04	.04	.04	..	..	.03	..	..	..	..	..	.07	.16	.15										
locactgr	.05	..	.06	.08	.04	.06	.04	..	..	..	..	.07	.08	.13	.05									
influnc	.06	..	..	..	..	..	.07	..	..	..	..	.06	.09	.11	..	..								
ill	.28	.46	.21	.16	.05	.14	.07	.34	.29	.05	-.02	.06	.18	.14	.05	-.01	.07							
menthlth	.19	.31	.19	.11	.06	.13	.07	.25	.20	.02	-.01	.06	.09	.07	..	..	..	.25						
ltill	.27	.48	.21	.14	..	..	..	.38	.30	..	..	.07	..	..	..	..	..	.49	.36					
ltbenefit	.16	.30	.20	.12	.11	.14	.10	.21	.17	.02	..	.03	.05	.04	..	..	..	.08	.03	..				
neverwk	.16	.17	.19	.12	.09	.14	.05	.21	.19	.07	.16	-.06	.09	.06	..	.06	..	.03	.06	..	..			
smoker	.13	.13	.15	.20	.06	.14	..	.09	.08	..	-.03	.09	.11	.14	.06	.06	.08	.12	.07	.07	.08	..		
qualhous	.09	.07	.10	.10	.06	.11	.04	.04	.04	.03	..	.07	.05	.07	..	..	..	..	.03	..	.03	..	.08	
dissatis	.06	.06	.07	.11	.05	.07	.06	.09	.07	..	..	.07	.07	.09	..	..	.13	.10	.09	..	.07	.04	.11	.04

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: '..' correlation not significant at .05 level

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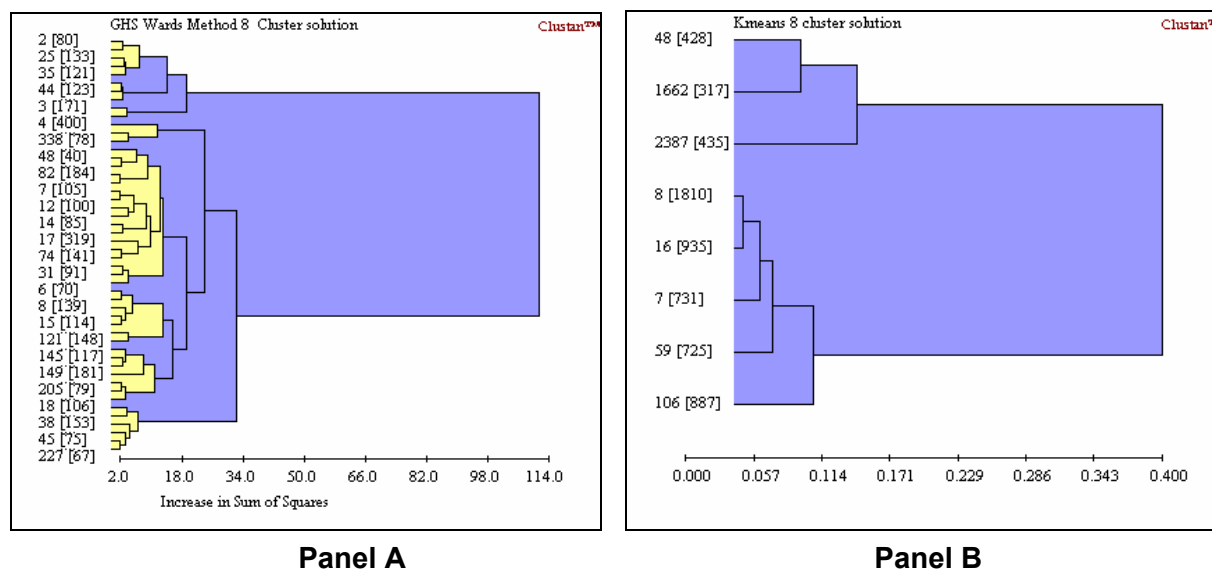
**TABLE A1.4: Non-linear canonical correlation: Factor structure and variance contribution of GHS25 indicators**

		Component loadings		Variance contribution		Communality coefficient
		Dimension 1	Dimension 2	Dimension 1	Dimension 2	
SET 1	oecd60	<b>0.572</b>	-0.043	<b>0.327</b>	0.002	<b>0.329</b>
	benefits	<b>0.821</b>	0.158	<b>0.674</b>	0.025	<b>0.699</b>
	matdep	<b>0.518</b>	-0.292	0.268	0.085	<b>0.354</b>
	newten	<b>0.350</b>	<b>-0.377</b>	0.123	0.142	0.265
	phone	0.203	-0.206	0.041	0.042	0.084
	car	<b>0.386</b>	<b>-0.379</b>	0.149	0.144	0.293
	crisis	0.202	<b>-0.443</b>	0.041	0.196	0.237
	<i>Mean contribution</i>			<i>0.232</i>	<i>0.091</i>	
SET 2	anywork	<b>0.713</b>	0.033	<b>0.508</b>	0.001	<b>0.509</b>
	hhwork	<b>0.489</b>	0.053	0.239	0.003	0.242
	carer	0.130	0.044	0.017	0.002	0.019
	unpaid	0.060	0.004	0.004	0.000	0.004
	loclass	0.219	-0.257	0.048	0.066	0.114
	loqual	<b>0.321</b>	-0.121	0.103	0.015	0.118
	edcourse	0.077	0.000	0.006	0.000	0.006
	locactgr	0.112	<b>-0.544</b>	0.013	0.296	<b>0.308</b>
	influnc	0.095	<b>-0.374</b>	0.009	0.140	0.149
	<i>Mean contribution</i>			<i>0.104</i>	<i>0.042</i>	
SET 3	ill	<b>0.589</b>	0.156	<b>0.347</b>	0.024	<b>0.371</b>
	menthlth	<b>0.391</b>	-0.023	0.153	0.001	0.153
	ltill	<b>0.630</b>	0.214	<b>0.397</b>	0.046	<b>0.443</b>
	ltbenefit	<b>0.384</b>	-0.034	0.147	0.001	0.149
	neverwk	0.258	-0.008	0.067	0.000	0.067
	smoker	0.205	<b>-0.333</b>	0.042	0.111	0.153
	qualhous	0.123	-0.269	0.015	0.072	0.087
	dissatis	0.166	<b>-0.500</b>	0.028	0.250	0.278
	<i>Mean contribution</i>			<i>0.146</i>	<i>0.032</i>	

Source: GHS 2000/01 and 2004/05 (pooled data)

NOTE: Bold text indicates loading greater than 0.3. 'Noqual' excluded from analysis due to redundancy (subsumed within 'loqual').

**FIGURE A1.1: GHS cluster analysis results - Wards and K-means eight cluster solution (GHS25 items).**



Source: GHS 2000/01 and 2004/05 (pooled data)

**TABLE A1.5: BHPS indicators of disadvantage amongst working age adults (Waves 7 to 15).**

	B-SEM theme	Indicator	Variable	Wave									
				7	8	9	10	11	12	13	14	15	
RESOURCES	Household income	Gross household income lt. 60%o OECD median BHC	oecd60	●	●	●	●	●	●	●	●	●	
	Necessities of life	Lacks material 'necessities of life' (2+ items)	matdep	●	●	●	●	●	●	●	●	●	
	Home ownership	Living in rental accommodation	renter	●	●	●	●	●	●	●	●	●	
	Assets/savings	Unable to save from current income	saver	●	●	●	●	●	●	●	●	●	
	Debt	Finds debt repayments a heavy burden	debt	●	●	●	●	●	●	●	●	●	
	Subjective poverty	Finding it quite/very difficult to get by	subjpov	●	●	●	●	●	●	●	●	●	
	Transport	No access to a car or van in household	car	●	●	●	●	●	●	●	●	●	
	Social support	Low social support (index score 0-5)	losuprt	●	○	●	○	●	○	●	○	●	
	Social contact	Does not talk to neighbours/meet people 'most days'	contact	●	●	●	●	●	●	●	●	●	
PARTICIPATION	Paid work	Not in paid work / carer	anywork	●	●	●	●	●	●	●	●	●	
		Living in workless household	hhwork	●	●	●	●	●	●	●	●	●	
	Unpaid care	Cares for someone in household or non-resident	carer	●	●	●	●	●	●	●	●	●	
	Unpaid work	More than 20 hours per week housework	hswork	●	●	●	●	●	●	●	●	●	
	Working life	NS-Sec (Semi)/Routine (most recent job)	loskill	●	●	●	●	●	●	●	●	●	
		Unsocial hours / long hours AND low job satisfaction	poorwk	●	●	●	●	●	●	○	●	●	
	Educ. attainment	No academic qualifications	noquals	●	●	●	●	●	●	●	●	●	
	Enfranchisement	Did not vote in most recent election	vote	●	●	●	●	●	●	●	●	●	
WELL-BEING	Civic action	Not active member of local group	locact	●	○	●	○	●	○	●	○	●	
	Physical health	General health poor/very poor over last 12 months	genhlth	●	●	○	●	●	●	●	●	●	
	Mental health	Low subjective well-being (GHQ12 index score 0-7)	lomhlth	●	●	●	●	●	●	●	●	●	
	Disability	Health limits daily activity	ltill	●	●	○	●	●	●	●	○	●	
	Life satisfaction	Low satisfaction with life overall (<4 out of 10)	satis	●	●	●	●	○	●	●	●	●	
	Self-esteem	GHQ12 items: low self-esteem	esteem	●	●	●	●	●	●	●	●	●	
	Substance misuse	A smoker	smoker	●	●	○	●	●	●	●	●	●	
		Alcohol or drug problems	alcdrug	●	●	●	●	●	●	●	●	●	
	Housing Quality	Reports poor housing quality (leaks, damp, etc)	hqual	●	●	●	●	●	●	●	●	●	
	N'hood safety	Reports neighbourhood problems (pollution, noise, etc)	nhood	●	●	●	●	●	●	●	●	●	
	N'hood satisfaction	Does not like neighbourhood	lknhood	●	●	●	●	●	●	●	●	●	

NOTE: ○ indicates data not collected (data imputed)

The analysis and views expressed in this paper are not a statement of Government policy.

**TABLE A1.6: Non-parametric correlations between BHPS indicators of disadvantage, Waves 7 to 15.**

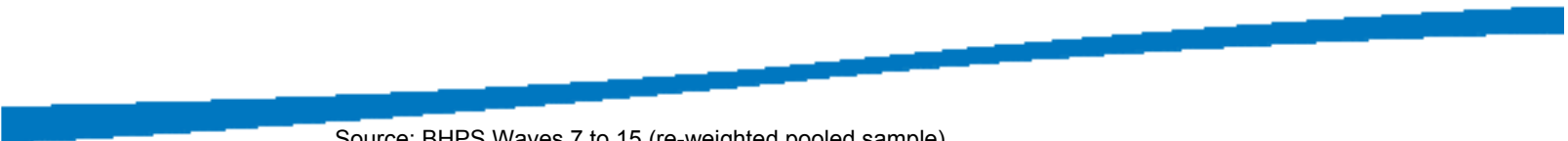
	oecd60	matdep	renter	saver	debt	subpov	car	losuprt	contact	anywork	hhwork	carer	hswork20	loskill	poorwk	noquals	vote	locact	genhlth	lomhlth	ltill	satis	esteem	smoker	alcdrug	hqual	nhood
oecd60	1																										
matdep	.21	1																									
renter	.21	.29	1																								
saver	.17	.15	.16	1																							
debt	..	.15	.10	.09	1																						
subpov	.18	.25	.12	.17	.16	1																					
car	.28	.23	.34	.13	..	.10	1																				
losuprt	.10	.11	.08	.08	..	.11	.06	1																			
contact	-.10	-.05	-.12	-.11	..	..	-.10	.06	1																		
anywork	-.26	-.13	-.13	-.21	..	-.16	-.17	..	.13	1																	
hhwork	.37	.23	.21	.17	..	.13	.29	.09	-.16	-.56	1																
carer	..	.05	..	..	..	..	..	.06	-.09	.18	.12	1															
hswork20	.06	..	..	.06	..	..	..	.06	-.07	-.12	.09	.19	1														
loskill	.13	.13	.15	.13	..	.05	.13	.10	-.12	-.13	.13	.06	.14	1													
poorwk	..	..	..	..	..	..	..	..	..	.14	-.12	..	-.04	.07	1												
noquals	.17	.10	.12	.14	-.08	.06	.13	.12	-.11	-.23	.23	.09	.25	.32	..	1											
vote	..	..	.13	.07	.08	.06	..	..	..	..	..	..	..	..	..	..	1										
locact	.06	.05	.06	.06	..	..	.08	.09	..	..	..	..	.05	.09	..	.09	.06	1									
genhlth	.09	.07	.09	.10	..	.14	.08	.09	..	-.26	.18	..	.07	.10	..	.13	..	..	1								
lomhlth	-.07	-.02	..	..	..	-.11	..	-.08	..	..	..	-.05	-.10	..	.07	-.05	..	..	-.12	1							
ltill	.15	.13	.15	.13	..	.10	.13	.10	-.11	-.34	.28	.06	.10	.15	-.07	.24	..	..	.53	-.13	1						
satis	.16	.17	.11	.13	.07	.21	.14	.20	..	-.14	.15	..	.06	.10	-.06	.07	.06	.08	.24	-.26	.24	1					
esteem	.09	.08	.07	.11	..	.19	.08	.14	..	-.18	.13	..	.06	.07	-.07	..	.08	..	.25	-.28	.24	.38	1				
smoker	.10	.14	.21	.12	..	.09	.14	..	-.08	-.08	.08	..	..	.14	.05	.10	.11	.10	.09	..	.09	.10	.06	1			
alcdrug	.06	.10	.10	.06	.07	.14	.10	.06	..	-.08	.11	..	..	..	..	..	.08	..	.13	..	.07	.11	.10	.10	1		
hqual	..	.20	.16	..	.11	.10	.08	.06	..	..	..	..	..	.05	..	..	..	..	..	-.06	.05	.10	.06	.07	.05	1	
nhood	.06	.09	.12	..	.05	.07	.10	..	..	-.06	.07	..	..	..	..	..	.05	..	.08	..	.05	.11	.08	.08	..	.24	1
lnkhood	.07	.06	.08	.07	..	.09	.08	.07	.04	-.09	.07	..	..	.07	..	..	..	..	.06	..	.05	.14	.08	.07	..	.11	.20

Source: BHPS Waves 7 to 15 (re-weighted pooled sample)

NOTE: Test statistic = Kendall's Tau-b. '..' indicates not significant at .05 level

**TABLE A1.7: Measures of association for BHPS indicators by selected socio-demographic characteristics, Waves 7-15.**

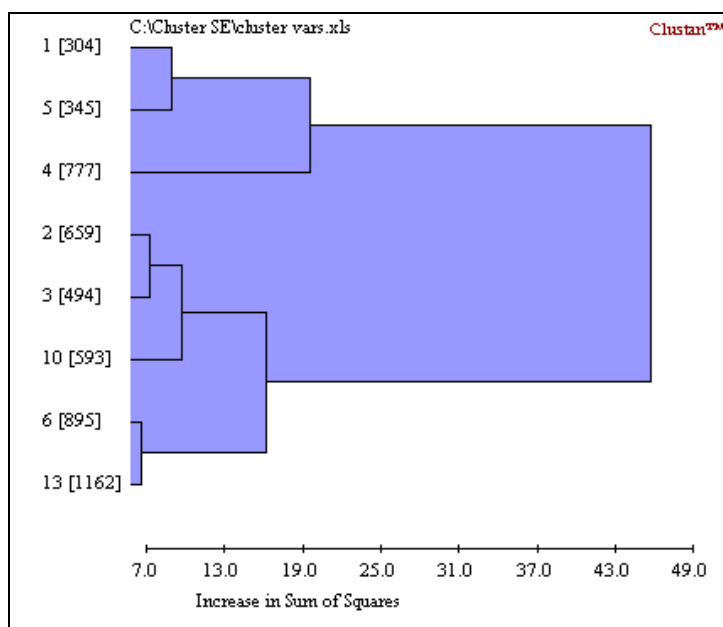
	Sex	Age group	Household type	Marital status	Ethnicity	Employment status	NS-Sec	Highest qualification	Tenure	Urban/rural	Religion
oecd60	..	.120	.202	.171	.033	.335	.153	.185	.257	..	.043
matdep	..	..	.211	.217	.034	.229	.143	.134	.275	..	..
renter	..	.118	.261	.226	..	.212	.169	.129	na	..	.050
saver	..	.064	.079	.087	.033	.261	.152	.156	.171	..	..
debt	..	.127	.063	.042	..	.084	..	.046	.150	.041	.042
subjpov	..	..	.123	.161	.044	.246	.102	.068	.186	..	.042
car	..	..	.298	.261	.045	.230	.159	.125	.376	.134	..
losuprt	.075	.113	.056	.053	.047	.122	.083	.118	.127	..	..
contact	.032	.090	.075	.088	..	.133	.098	.098	.132	..	.048
anywork	.030	.237	.055	.088	.048	na	.162	.227	.240	..	.081
hhwork	..	.271	.158	.138	..	.712	.137	.211	.314	..	.083
carer	.066	.206	.094	.090	..	.157	.049	.099	.136	..	.094
hswork20	.254	.225	.100	.146	..	.334	.152	.213	.123	..	.098
loskill	.036	.128	.094	.087	..	.273	na	.392	.238	.050	..
poorwk	.062	..	..	..	..	.220	.091	.059	.083	..	..
noquals	.035	.406	.084	.185	..	.313	.367	..	.279	..	.134
vote	.028	.233	.096	.132	..	.111	.071	.089	.149	.065	.141
locact	.065	..	..	..	..	.125	.155	.146	.100	..	.083
genhlth	.043	.100	.049	.080	..	.412	.105	.149	.157	..	.060
lomhlth	.097	.083	.041	.056	..	.114	.046	.059	.050	..	.051
ltill	.047	.191	.058	.098	..	.556	.155	.226	.222	..	.100
satis	..	.082	.148	.164	.049	.231	.100	.092	.143	.053	..
esteem	.056	.052	.076	.090	..	.226	.054	.059	.088	..	..
smoker	..	.106	.101	.115	..	.168	.173	.146	.225	.084	.085
alcdrug	..	..	.072	.092	..	.126	.038	..	.093	..	..
hqual	..	.119	.067	.062	.035	.100	.046	..	.176	.051	.058
nhood	..	.054	.093	.074	.066	.080	.042	.047	.147	.135	.056
lknhood	..	..	.059	..	.051	.094	.073	.072	.119	.087	..



Source: BHPS Waves 7 to 15 (re-weighted pooled sample)

NOTE: Test statistic = Kendall's Tau-b. '...' indicates not significant at .05 level

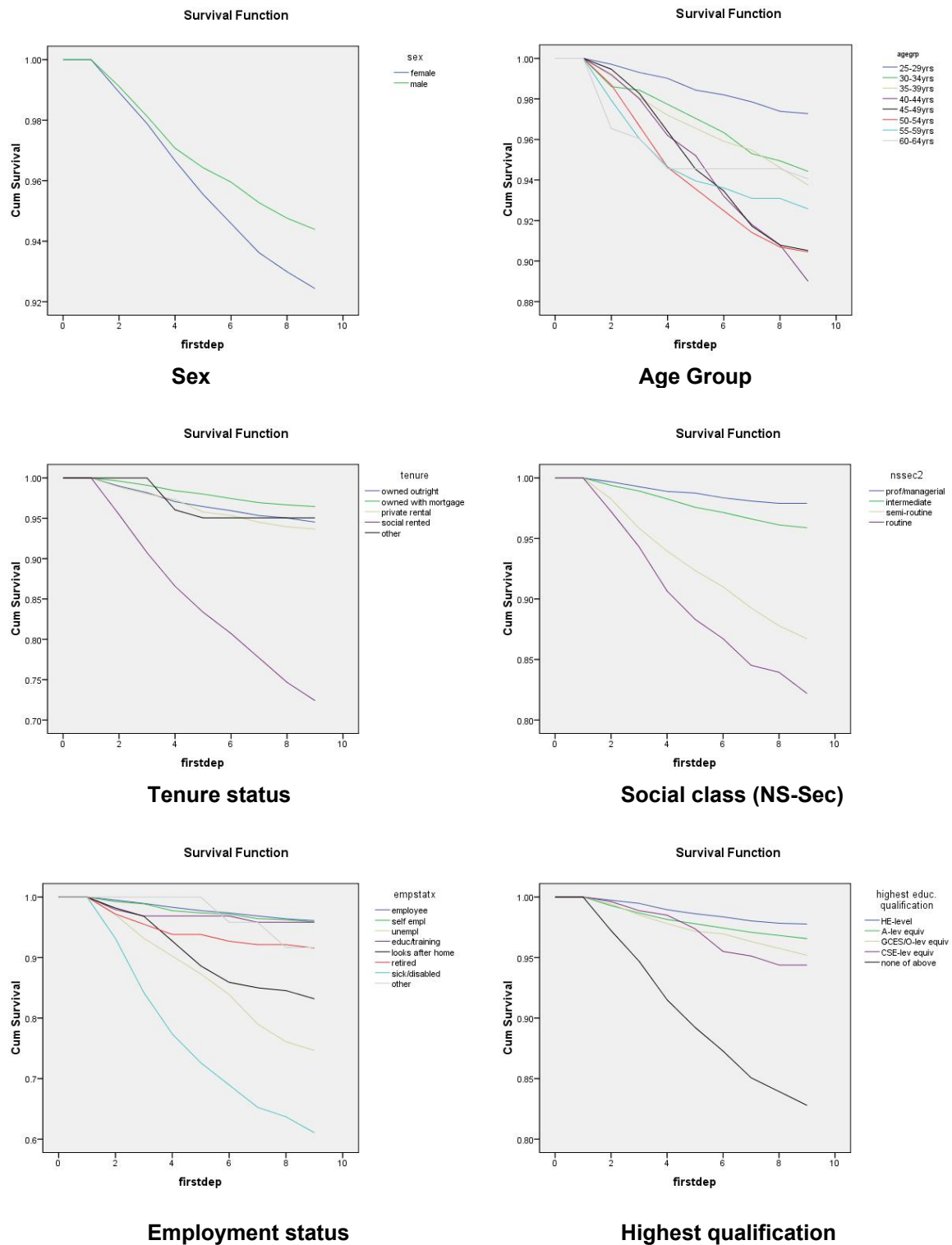
**FIGURE A1.2: BHPS cluster analysis dendrogram - K-means eight cluster solution (BHPS21 items).**



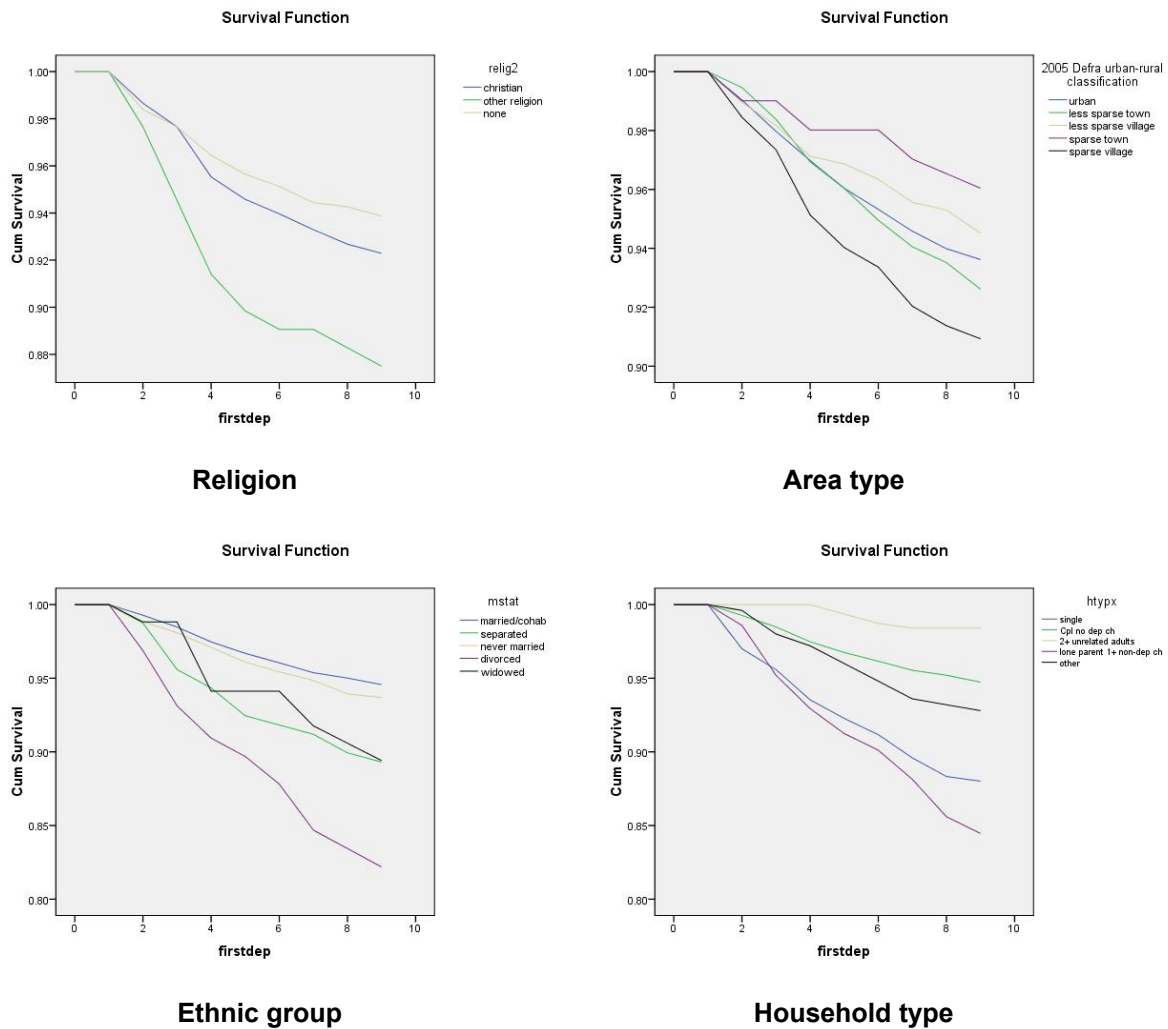
Source: BHPS Waves 7 to 15 (re-weighted pooled data)



**FIGURE A1.3: BHPS Survival Analysis – The ‘Severely Disadvantaged’**

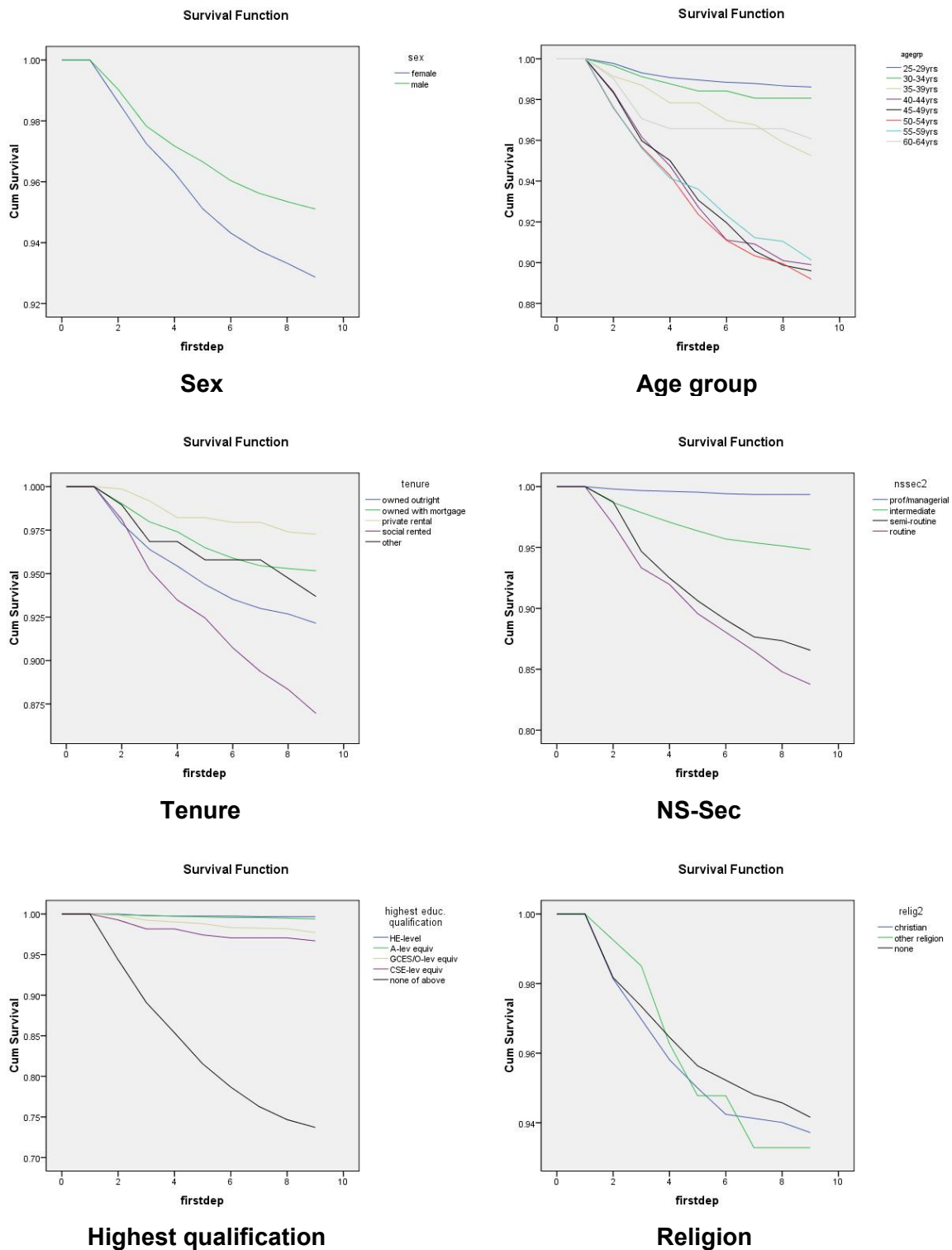


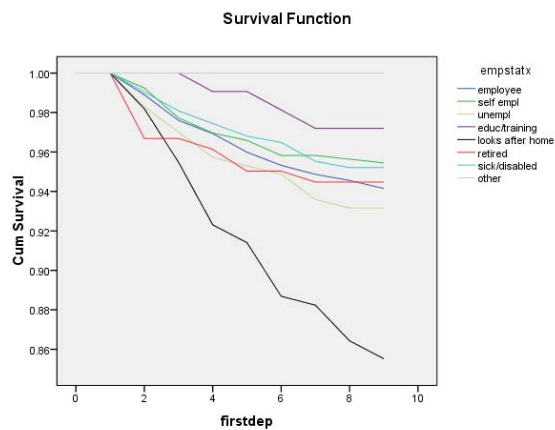
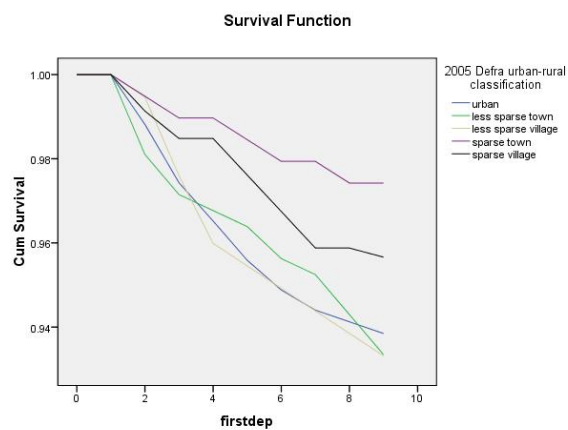
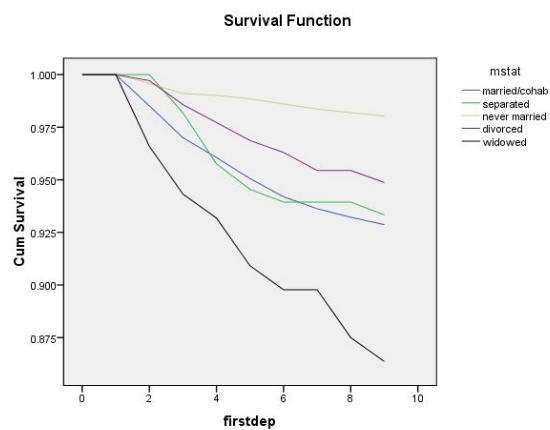
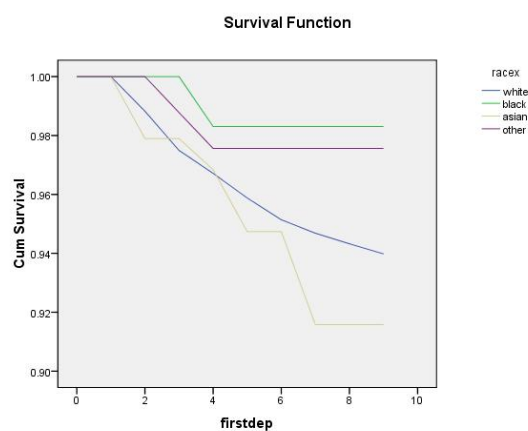
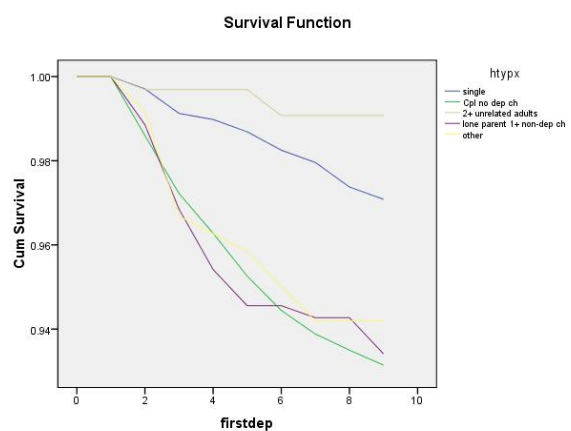
**FIGURE A1.3: BHPS Survival Analysis – The ‘Severely Disadvantaged’ (*continued*)**



Source: BHPS Waves 7 to 15 (respondent survival data)

**FIGURE A1.4: BHPS Survival Analysis – The ‘Low Skilled’**



**FIGURE A1.4: BHPS Survival Analysis – The ‘Low Skilled’(continued)****Employment status****Area type****Marital status****Ethnic group****Household type**

## Appendix 2. Glossary of statistical methods

### Reliability analysis

Reliability analysis is a widely used technique used in the construction and evaluation of measurement scales and indices. Classical reliability theory is based upon interrogating the observed correlations between items comprising measurement scales and indices in order to explore the internal consistency of measures and their relationship to the hypothesised unidimensional construct they purport to measure. Cronbach's Alpha is the most widely used statistic for assessing the internal consistency (reliability) of a given scale where a value of 1 indicates that all items comprising the scale are measuring the same underlying construct, and a value of 0 indicates that the items do not measure the underlying construct at all and there is only an error component.

If all items are truly measuring the same single underlying construct they should be characterised by a high degree of internal reliability as measured by Cronbach's Alpha. Items characterised by a high degree of reliability are also by definition 'valid' in that they measure the true variance rather than the error variance. Cronbach's Alpha can therefore be interpreted as measuring the correlation between the items comprising the observed scale and all other theoretically possible scales of a similar size measuring the same underlying phenomenon. For further details see Nunnally (1970).

### Non-linear canonical correlation

Non-linear canonical correlation is an extension of canonical correlation suitable to the investigation of non-parametric data. Canonical correlation describes the relationship between 'canonical', or latent, variables on the basis of two or more sets of observed measures based upon the optimal linear combination of latent variables. As in principal component analysis, more than one latent dimension may be present, and the contribution of individual observed variables to the latent dimensions is given by the canonical coefficients or 'weights'. By drawing upon optimal scaling techniques in order to quantify categorical variables, canonical correlation can be extended to non-continuous data and as such is an extremely flexible technique for investigating the relationship between sets of categorical variables. For further details see Gifi (1990) and Van der Burg et al. (1994).

### Cluster analysis

Cluster analysis methods are generally used to identify relatively homogeneous groups of cases based on the observed values for a set of variables using Euclidean geometry. The procedure is iterative, being based upon an algorithm that starts with each case in a separate cluster and combines clusters based upon statistical criteria. In this study Ward's Method is used to define an initial set of clusters of cases based upon the observed values for the GHS25 and BHPS21 using an analysis of variance approach.

Here, this initial solution is then subsequently simplified using K-means clustering in order to generate a specified number of relatively homogenous latent clusters based on Euclidean distance (effectively analysis of variance ‘in reverse’). The relative distance of all clusters in multidimensional space from the sample mean is shown by means of a dendrogram. A dendrogram is a visual representation of the steps in a clustering solution that shows the clusters being combined and the values of the distance coefficients at each step. Cluster analyses were performed using Clustan Graphics. For further details see Everitt et al. (2001) and Aldenderfer (1984).

### **Logistic regression**

Logistic regression is a form of regression suitable for the analysis of categorical dependent variables and independent predictors of a variety of types. Since such data are by definition non-linear, logistic regression analyses the probability of the event of interest occurring (e.g. that  $y = 1$ ) based upon the logit function and using maximum likelihood estimation. By transforming the dependent variable based upon the natural log of the odds of the event occurring it is therefore possible to estimate the probability or odds of event occurrence on the basis of a series of continuous or categorical covariates. In comparison with OLS linear regression, logistic regression also makes no assumptions relating to linearity and homoskedasticity.

In logistic regression assessment of goodness of fit is generally based upon goodness of fit measures such as the likelihood ratio test and associated quasi-R square statistics (e.g. Nagelkerke R squared). Within logistic regression, exponential transformation of regression coefficients yield odds ratios which (for a continuous covariate) indicate the effects on the odds of event occurrence arising from a one unit increase in the covariate. With regard to categorical covariates, the odds ratio indicates the effect of a specified level of the categorical predictor upon the odds of event occurrence relative to that of a specified reference category. Analogous to the  $t$  statistic, the Wald statistic tests the significance of individual independent variables and variable categories. For further details see Hosmer and Lemeshow (2000).

### **Cox regression**


Cox regression is a semi-parametric technique that can be used in the analysis of the time taken until the event of interest occurs. Unlike other event history models, no assumptions are made concerning the baseline hazard associated with the probability of event occurrence. Cox regression is an especially robust technique insofar as estimates derived using Cox regression methods take account of the effects of ‘right censoring’ where the event of interest has not occurred during the period of observation, or where the respondent has left the study (e.g. as a result of ineligibility or attrition) before the end of the observation period.

Central concepts in Cox regression include the survival function and the hazard function. The cumulative survival function describes the proportion of cases who had not experienced the event

at the onset of the risk period and who survived to the end of the period of observation for one group relative to the rate of another group, and taking into account the influence of censored cases. Conversely, the hazard function describes the relative hazard (or odds) of experiencing the event of interest during the period of observation for one group relative to another given the absence of the event or condition at the onset of the risk period, and again taking into account the influence of censored cases. For example, for a continuous covariate, the hazard ratio describes the effects of a one unit increase in the predictor on the hazard of a given event relative to the hazard rate without such an increase.

A key assumption of Cox regression methods is the assumption of proportionality of hazards, namely that the hazard function is constant over time relative to the influence of a specified set of covariates. This assumption can be tested using Cox regression with time-dependent covariates on the basis of the model loss chi square statistic. For further details see Cox (1972) and Box-Steffensmeier & Jones (2004).





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