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Health Development Agency

Social capital for health

Investigating the links between social capital and health using the British Household Panel Survey

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All remaining errors and deficiencies in the report are the responsibility of the authors, and the views expressed in this report are those of the authors and not necessarily those of the HDA.

The Health Development Agency (HDA) is a special health authority established to support and enhance national efforts to improve health in England, with a particular emphasis on health inequalities. In partnership with others, it gathers evidence of what works, advises on putting evidence into practice, and develops the skills of all those working to improve people's health.

Foreword

Social capital for health

The Acheson Report on inequalities in health, and the government's public health strategy *Saving Lives: Our Healthier Nation*, recognise that the solutions to major public health problems such as heart disease, cancers, mental health and accidents are complex. They will require interventions that cut across sectors to take account of the broader social, cultural, economic, political and physical environments which shape people's experiences of health and wellbeing.

A major challenge is how to influence these broader determinants of health in such a way that relative inequalities in health can be addressed.

Recent evidence suggests that social approaches to the organisation and delivery of public health may have considerable potential for health improvement, particularly for those that suffer most disadvantage in society. The evidence base for moving forward in this field is, however, somewhat limited.

The Health Development Agency is committed to developing this evidence base and to testing social approaches to reducing health inequalities and to the promotion of health and the prevention of disease.

The concept of social capital serves as one coherent construct which will allow us to progress the debate and discussion about the general importance of social approaches to public health and health promotion. It is, however, only one part of an approach to health improvement, which must also clearly embrace structural changes.

This report presents the results of a series of secondary analyses that aim to investigate the links between social capital and health using data already available in national datasets.

This research utilises data from the British Household Panel Survey (BHPS) to explore the importance of social capital on aspects of mental illness and self-reported health in relation to the more well-established indicators of social inequality. In doing so it provides an important contribution to the development of an evidence base in this field.

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Summary

Introduction

This report investigates the links between measures of social capital, social support and health using data from the first nine annual waves of the British Household Panel Survey (BHPS). The data are analysed in two main ways:

- Cross-sectionally to identify correlates of social capital, social support and health
- Longitudinally to identify precursors of entry to and exit from states of social capital and social support along with the onset of and recovery from spells of poor health.

Social capital was measured in four ways: social participation, level of contact with friends, extent of crime in neighbourhood and level of attachment to neighbourhood. Social support was measured by the perceived support available in times of need and crisis. The two main health indicators were common mental illness – determined by the General Health Questionnaire (GHQ) – and poor self-rated health. Supplementary analyses were conducted using the eight sub-scales of the Short Form 36 (SF-36), health service usage, health limited activities, health problems and smoking behaviour.

Key findings

The key point in the results is that while social capital and social support have positive effects on health, they do not mediate (and only moderate some of) the effects of the basic structural factors included in our models. The only exception is that social participation completely moderated the effect of working status on health for working age women. This may indicate that social participation provides some of the benefits, possibly through increased access to knowledge, that are available to non-working women. However, basic structural conditions remain important for health and also important for the individual's level of social capital, which does have an independent effect on health.

This implies that programmes or policies that encourage the development of individual social capital through involvement in the community may produce benefits for health but they will do little to negate the more fundamental inequalities in health.

Summary of findings

In the cross-sectional analysis, sex, age, marital status and household social class are the main determinants of social capital and social support but the associations vary depending on which measure is used:

- Compared with women, men are more likely to report any social participation but they are also more likely to report low contact with friends, low neighbourhood attachment and low social support
- Older age is associated with being more likely to report social participation but also with being more likely to report low contact with friends. Those in the older age groups are less likely to report a high extent of crime or low attachment to their neighbourhood
- Compared with those who are married, those cohabiting are less likely to report social participation, those in all other marital status categories are less likely to have low contact with friends, and those cohabiting and single are more likely to report a high extent of crime and low neighbourhood attachment.
- Household social class has a negative effect on the likelihood of social participation and a positive effect on the likelihood of reporting a high extent of crime and low social support.

All measures of social capital and social support except contact with friends reduced the likelihood of common mental illness and poor self-rated health. These effects were net of any effects of the structural and demographic variables included in the multivariate models.

Including the social capital and social support measures in the multivariate models did not mediate the direct effects of the structural variables on the health indicators. However, social capital moderated some of the effects, particularly those in older age and those not working.

Sex and age were the factors most strongly associated with entry to and exit from social capital and social support, with education, marital status and household social class only having effects on the likelihood of exiting social participation.

Net of any structural effects, only social participation reduced the likelihood of an onset of common mental illness, and low social support reduced the likelihood of a recovery. For poor self-rated health, those reporting social participation had a higher chance of recovering sooner in the survival analysis.

Overall, the longitudinal analyses suggest that the measures of social capital and social support play only minor roles in the processes leading to the onset of and recovery from common mental illness and poor self-rated health.

Residential mobility reduced social capital in the year after the move and was associated with higher chances of poor health. However, social capital by way of social participation reduced the likelihood of moving, but low perceptions of neighbourhood (attachment or crime) increased the chances of moving in the following year.

1 Introduction

Background

In 1999, the Health Education Authority (HEA) commissioned the Institute for Social and Economic Research (ISER) at the University of Essex to undertake a research project investigating the links between social capital and health using existing and future data from the British Household Panel Survey (BHPS). This project was one of many commissioned within a larger programme of work, entitled Exploring the Relationship between Social Capital and Health. The programme contained projects that primarily used quantitative or qualitative studies, analysed existing data and created new data for analysis. With the closure of the HEA in 2000, this programme of work was taken over by the Health Development Agency.

Research description

Conceptual approach

The concept of social capital is contested at both the levels of theory and measurement. However, Portes (1998: 6) notes that 'the consensus is growing in the [sociological] literature that social capital stands for the ability of actors to secure benefits by virtue of membership in social networks or other social structures'. Drawing primarily on the work of Bourdieu (1985) and Coleman (1988), Portes (1998: 21) argues that social capital resides in the relationships between actors and, thus, differs from the more definitively individual characteristics of economic and human capital but ultimately 'the greatest theoretical promise of social capital lies at the individual level'. But even in Bourdieu's (1985: 248) conceptualisation of social capital, the capital resides in the relationships between actors within the group and access to that capital is not available to actors outside the group. In this way the capital lies outside the individual per se but by an individual being or becoming part of a group that individual may access the capital. Thus, individual level measurement of group membership and affiliations are important indicators of potential social capital assuming access to the capital is equal within the group. It is worth noting that Bourdieu's definition of a 'group' extends well beyond formal organisations to family and friends.

Not surprisingly, Portes' approach to the nature and measurement of social capital lies somewhat at odds with the more collective approach to social capital taken by political scientists, most notably Robert Putnam. In this approach, social capital means 'features of social organizations, such as networks, norms, and trust, that facilitate action and cooperation for mutual benefit' (Putnam, 1993: 35). Thus, social capital is less a characteristic of individuals and more a 'structural property of large aggregates' (Portes, 1998: 21). Indeed, those more inclined to Putnam's view of social capital take care to make exactly this distinction as Lochner et al. (1999: 260) note:

> *'Social capital is a feature of the social structure, not of the individual actors within the social structure; it is an ecologic characteristic. In this way social capital can be distinguished from the concepts of social networks and support, which are attributes of individuals.'*

We take the view that social capital can be properties of both the individual and the larger community and that these are not mutually exclusive, are partially interchangeable, and the amount of social capital in the community is not the simple addition of the social capital of the individuals within that community. Indeed, the very nature of what constitutes effective social capital probably differs between the community and the individual. Further, we would argue that even if social capital is solely a community characteristic then access to that capital would not be evenly distributed and would vary by basic structural factors and levels of social exclusion.

So, where does this leave us in terms of measurement? It follows that if social capital adheres in the relationships between individuals then direct measurement of what is inherently intangible is extremely difficult and must rely on identifying suitable proxies. It is then possible to address the face and construct validity of these proxies but because of the intangible nature of social capital it is impossible to accurately assess their criterion validity. Further, by using proxies it becomes a matter of theoretical bent if social capital resides at the individual or community level as it could be equally argued that the proxies reflect individual levels of social capital or that they reflect another dimension of access to community levels of social capital.

In the end, we are more persuaded by Bourdieu's (and by extension, Portes') conceptualisation of the nature of social capital, primarily because of their emphasis on the dynamic and dialectical nature of the processes involved. That is to say that social capital (as with all other forms of capital) is implicated in the reproduction of the very inequalities it is generally thought to mediate against (see Bourdieu, 1985; Portes and Landolt, 1996; Portes, 1998, 2000). The dynamic nature of capital under Bourdieu's theory enables analysis to move away from 'static' interpretations of associations and investigate the role of all forms of capital in transitions and change over time. Although the role of social capital in the reproduction of inequalities is beyond the remit of the current project, there may be a very real question for the study of health inequalities over the life course. That is, being able to disentangle any direct effects of social capital on health and the indirect effects through increased social mobility and access to economic capital.

Social capital's influence on health

As Portes (1998: 2) clearly states: social capital 'does not embody any idea really new to sociologists. That involvement and participation in groups can have positive consequences for the individual and community is a staple notion'. What concerns Portes (and many others) is that the popular uptake of the notion of social capital has resulted in the idea being severely stretched as it is applied in more and more areas of substantive research. It would appear that the case was made early for its applicability in health research with the frequent references to Durkheim's *Suicide* but it still remains necessary to construct causal narratives of the role social capital plays in the production of good or ill health. In this regard, health research has an extra burden also to specify plausible biological pathways to the health outcomes used.

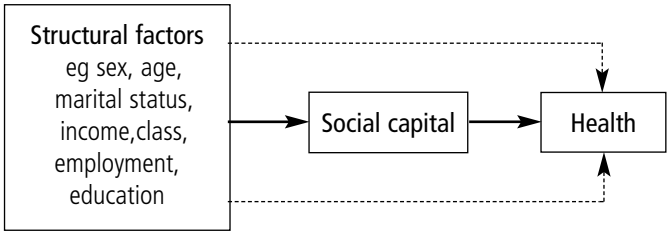
Expanding on the points above about its dynamic nature, this conceptualisation of social capital allows health research to go beyond examining health 'status' to an investigation of the role of social capital in the onset and recovery of illness and poor health. Bourdieu's ideas of a dialectic of production and reproduction leads to a hypothesis that those with low stocks of capital are more likely to become ill, take longer to recover or are less likely to recover at all, and are more likely to suffer adverse consequences of their illness in other fields such as regaining employment (for a similar argument in relation to social support and mental health see Goldberg and Huxley, 1992).

Social capital is usually thought of as a multi-dimensional concept with different facets such as social participation and kinship networks. As Muntaner et al. (2001) note, it is not necessary that each of the dimensions of social capital will have similar effects on health, or for that matter on different indicators of health status. Further, the mechanisms that link social factors to health outcomes may also change over time as structural inequalities manifest themselves in different outcomes (see Link and Phelan, 1995).

Constructing narratives

For the analyses presented in this report, we have adopted the conceptual model shown in Figure 1.1. The figure shows that we hypothesise that levels of social capital vary by broad structural factors and that social capital may either have its own direct effect on health or it may mediate or moderate the effects of the structural factors on health. This approach is similar to the main effect and buffering effect hypotheses of the role of social support on health (see Kawachi and Berkman, 2001). However, we emphasise the role of structural factors as both determinants of health and social capital (Muntaner et al., 2001).

Figure 1.1: Conceptual model



The structural factors are associated with varying levels of health – the presence of higher levels of social capital in those individuals in otherwise structurally disadvantageous positions may reduce the risk of ill health and, conversely, low levels of social capital in those in otherwise structurally advantageous positions may increase the risk of ill health. In this way, possession of or access to social capital acts to provide access to resources or knowledge otherwise inaccessible to those in disadvantageous structural circumstances while lack of social capital may not allow the most effective use of advantageous circumstances. However, as Bourdieu (1985) theorises, all other forms of capital, such as human, cultural and economic, can be utilised in similar ways to social capital to gain access to resources and/or knowledge.

Plausible biological pathways

Brunner (1997) and Brunner and Marmot (1999) have posited a number of plausible biological mechanisms involving the unintended consequences of the physiological reactions to the fight-or-flight response under chronic low-level stress. These hypotheses are controversial. As Brunner and Marmot (1999: 17-18) note:

> *'First, is it plausible that the organization of work, degree of social isolation, and sense of control over life, could affect the likelihood of developing and dying from chronic diseases...? The answer is an empathic 'yes'. The second issue is more complicated: do any of the plausible biological pathways actually operate...? The evidence on this is incomplete and is an important topic for current and future research, but it is sufficiently suggestive to point to hypotheses for testing.'*

They go on to note that social isolation and lack of social support may produce consistent low levels of psychological stress. One biological response to this stress is the increased output of fibrogen in the blood in response to the hormones generated by the fight-or-flight response. Fibrogen increases the blood's ability to clot and may lead to the formation of arterial plaques that lead to increased risk of ischaemic heart disease and stroke. Ischaemic heart disease is not the only health cost associated with maladaptive biological responses to chronic low-level stress. Others include depression, increased susceptibility to infection, diabetes and high blood pressure (Brunner and Marmot, 1999).

Empirical evidence

Cooper et al. (1999), Lochner et al. (1999), Macinko and Starfield (2001) and Muntaner et al. (2001) provide reviews of the previous literature on social capital and health and so these details are not repeated here. However, it is worth noting that a number of recent analyses at the individual level from survey data (see Forbes and Wainwright, 2001; Blaxter and Poland, 2002, for critiques of this approach) have found that social capital measures have little or no effect on health indicators and even when they do, structural factors, to use our term, continue to have substantial effects.

As part of the same HDA research programme, Cooper et al. (1999) analysed existing data from the HEA Health and Lifestyles Survey 1992, the Health Surveys for England 1993 and 1994, and the General Household Survey 1994 to investigate the links between social capital, social support and health status. In their analysis, Cooper et al. (1999) found that low levels of social capital were associated with poorer health and an increased probability of being a cigarette smoker after allowing for socio-economic factors, but more so for women than men. They found that the socio-economic factors were more strongly related with health and smoking behaviour than their measures of social capital and social support.

In a further analysis of existing survey data, Cooper et al. (2000) focused on the differences in social capital and social support in relation to health between white and minority ethnic groups in the UK. They found that socio-economic disadvantage was the main factor in the ethnic differences in general health. Also, high levels of social capital and social support did not have consistent associations with general health across ethnic groups. High levels of social support had a positive effect on mental health across all ethnic and gender groups.

Veenstra (2000) examined individual-level social capital in a survey sample from Saskatchewan, Canada. Social capital was measured by civic participation, trust in government, trust in neighbours, trust in people from the community, trust in people from the area of the province, and trust in general. Veenstra concluded that there was little evidence for compositional effects of social capital on health although there were significant associations between social participation (clubs, church, colleagues) and health for older people.

Statistical approach

This project encompasses a variety of statistical approaches, depending on the question under investigation and the data used. Specific details are given in the relevant chapters along with the sample characteristics. Broadly speaking, the approach and analyses sought to use the key strengths of the BHPS data and thus concentrates on pooled data and longitudinal analyses. All statistical analyses were computed using STATA 7.0 software (StataCorp., 2001).

2 Data and measures

The British Household Panel Survey

All data in these analyses come from the first nine annual waves of the British Household Panel Survey (BHPS). The BHPS started in 1991 and is an ongoing annual survey of each adult (aged 16 and over on 1 December) member of a nationally representative sample of more than 5,000 households, making a total of about 10,000 individual interviews per wave. The same individuals are re-interviewed in successive waves and, if they split-off from original households, all adult members of their new households are also interviewed. So the sample should have remained broadly representative of the British adult population as it changed through the 1990s. Information on the BHPS can be found in Buck (1990), Taylor et al. (1998) and on ISER's website at www.iser.essex.ac.uk/bhps

The strengths of the BHPS data are that many of the same people have been re-interviewed over a number of years and that all adult members of each household are interviewed. The actual number of interviews from each panel member does vary with non-response and the sampling procedures as households form and dissolve over time. For example, members of the original sample at wave 1 are followed regardless of their original household breaking up or their forming of a new household. New people may enter the panel by joining a household with an original sample member, but if that household breaks up the new people are not followed to their new households.

Samples

Various samples drawn from the main BHPS data are used in the analyses that follow. This is because not all items of interest to this project were carried at every wave. Sample descriptions are given in the appropriate analysis section.

Measures

The main health and social capital indicators and which BHPS wave they were included in are shown in Table 2.1. Descriptions of each indicator follow.

Table 2.1: Health and social capital measures by wave included in the BHPS

	Wave								
Measure	1	2	3	4	5	6	7	8	9
Health outcomes									
GHQ-12	✓	✓	✓	✓	✓	✓	✓	✓	✓
SF-36									✓
Self-rated health	✓	✓	✓	✓	✓	✓	✓	✓	
Health service use	✓	✓	✓	✓	✓	✓	✓	✓	✓
Health problems	✓	✓	✓	✓	✓	✓	✓	✓	✓
Health limits activities	✓	✓	✓	✓	✓	✓	✓	✓	
Social capital									
Social participation	✓	✓	✓	✓	✓		✓		✓
Friends		✓		✓		✓		✓	
Crime							✓		
Neighbourhood								✓	
Social support	✓		✓		✓		✓		✓

The link between the dimensions of social capital and their suggested proxies in the BHPS is further complicated by the lack of any theorised or substantiated empirical evidence on the distribution of social capital, and its dimensions, across communities and individuals. For example, we do not believe that the distribution of social participation (see Figure 2.1) would reflect a theorised distribution of social capital with between 40% and 50% of individuals having none. The theorised case for social support may be a little clearer if having social support simply means the absence of unfavourable relationships (Coyne and Downey, 1991, cited in Cooper et al., 1999: 20). In which case we might expect most people to be high on social support scores and a distribution skewed to the high end such as that in Figure 2.5.

Indicators of social capital

Predominately, the literature maintains that social capital is inherently multi-dimensional with disputed definitions at both conceptual and measurement level (eg Cooper et al., 1999; Muntaner et al., 2001). The issue of the validity of currently available quantitative measures is keenly contested (see Coulthard et al., 2001, for developmental work in relation to a social capital module in the General Household Survey). More broadly, there is an overarching problem with all or most potential indicators of social capital in that it could be argued that while they may indicate social capital they may also be products of social capital. This is particularly problematic in relation to two measures in these data – the extent of crime and neighbourhood attachment. For example, a high extent of crime (also feelings of not being safe) in an area may well indicate low levels of social capital but does low social capital encourage crime or does crime discourage social participation, for instance by people not leaving home in the evenings to attend community groups? Or do both crime and social participation act in a reciprocal relationship?

However, the BHPS data does offer some reasonable proxies for certain dimensions of social capital. In terms of the availability of relevant data, social capital can be operationalised as follows.

(a) Social participation

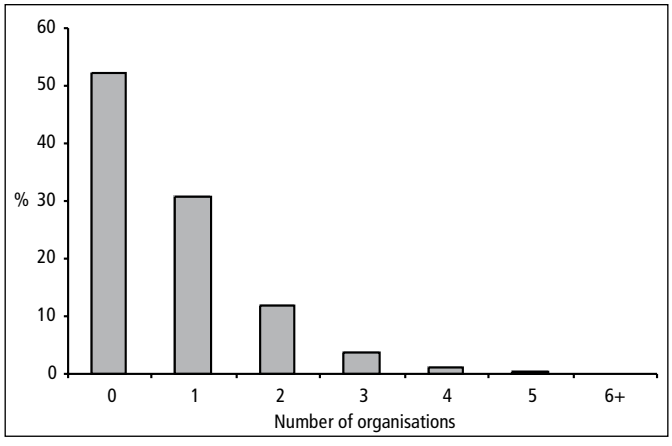
Data on membership of organisations and whether or not the person is active in those organisations have been collected in waves 1-5, 7 and 9. The use of organisational membership and/or activity has been used extensively as a proxy for social capital (eg, Lindström et al., 2001; 2002). The questions were as follows:

- Member/active in political party
- Member/active in trade union
- Member/active in environmental group
- Member/active in parents' association
- Member/active in tenants' group
- Member/active in religious group
- Member/active in voluntary group
- Member/active in other community group
- Member/active in social group
- Member/active in sports club
- Member/active in Women's Institute
- Member/active in women's group
- Member/active in other organisation
- Member/active in professional organisation
- Member/active in pensioners' organisation
- Member/active in Scout/Guides organisation
- Number of organisations member of/active in

The correlation between the 'number of organisations member of' and 'number of organisations active in' was between $r = 0.7$ and 0.8 for each wave, so social participation was measured by the 'number of organisations active in' as this would probably be a better proxy for social capital. A problem with this measure is that, in any wave, between 46% and 53% of the panel report not being active in any of the listed organisations (see Figure 2.1). The maximum number of organisations was truncated at six or more because of the very low numbers of respondents reporting above six.

In addition to the number of organisations, social participation was measured as a dichotomous variable indicating whether the respondent is active in any organisation or not. Various forms of the measure of social participation were tested and the dichotomous

Figure 2.1: Distribution of social participation – pooled data waves 1-5, 7 and 9



variable was the most efficient, as there were few significant differences in the health outcomes between different levels of involvement, but there were between those with any involvement and those not involved (see Chapter 3).

(b) Frequency of contact with three closest friends

In waves 2, 4, 6 and 8, the respondents were asked about how regularly they were in touch with their three closest friends:

- How often do you see or get in touch with your 1st/2nd/3rd closest friend either by visiting, writing or by telephone?

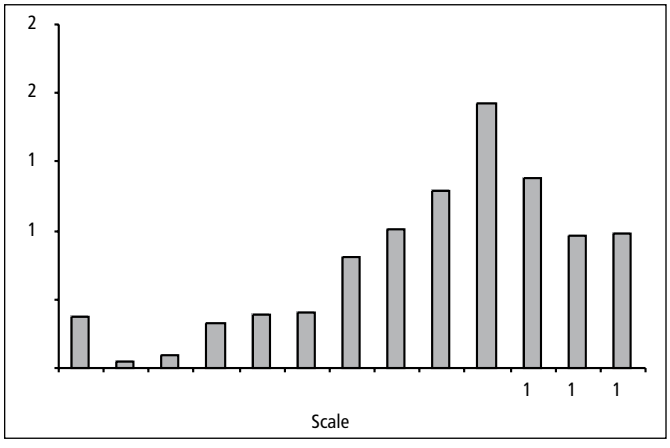
The possible responses and scale values (in brackets) to the three items were:

- Most days (4)
- At least once week (3)
- At least once month (2)
- Less often (1)
- No friend nominated (0)

The responses were constructed into two measures. First, an additive scale was used as an overall index of contact with friends (see Figure 2.2). The scale ranged from 0 to 12 and had an internal reliability coefficient (Cronbach's alpha) of 0.73.

Second, this scale was collapsed into quartiles and a dichotomous indicator was used to identify the lowest quartile of the scale.

Figure 2.2: Distribution of contact with friends' index – pooled data waves 2, 4, 6 and 8



(c) Perceptions of crime in neighbourhood

In wave 7, 11 items were included that asked about the respondent's concerns and perceptions of the extent of crime in their neighbourhood. These items were:

- Worry about being affected by crime
- Extent of concern about crime
- Feel safe walking alone at night
- Extent of: graffiti on walls
- Extent of: teenagers hanging about
- Extent of: drunks/tramps on street
- Extent of: vandalism
- Extent of: racial insults/attacks
- Extent of: homes broken into
- Extent of: cars stolen/broken into
- Extent of: people attacked on street

The first two items were linked and combined to construct an indicator of concern about crime with the following categories and distributions (% in brackets):

- Not concerned (36.7)
- Occasional doubt (22.4)
- Bit of a doubt (31.0)
- Big worry (9.9)

The third item about feeling of safety walking alone after dark had the following categories and distributions (% in brackets):

- Very safe (24.7)
- Fairly safe (41.8)
- A bit unsafe (15.1)
- Very unsafe (7.9)
- Never go out after dark (10.5)

The responses to the last eight items and scale values (in brackets) were:

- Very common (3)
- Fairly common (2)
- Not very common (1)
- Not at all common (0)

These eight items were combined in an additive scale to form an extent of crime index. The scale ranged from 0 to 24 and had an internal reliability coefficient (Cronbach's alpha) of 0.87. The distribution of the scale is shown in Figure 2.3. A dichotomous indicator

Figure 2.3: Distribution of extent of crime index – wave 7 data only

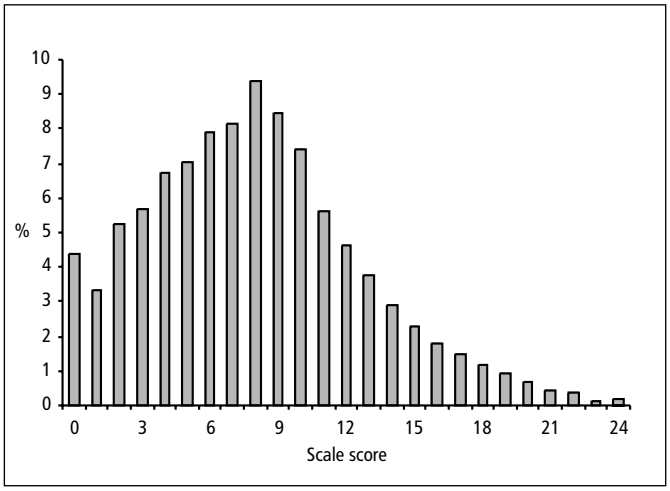
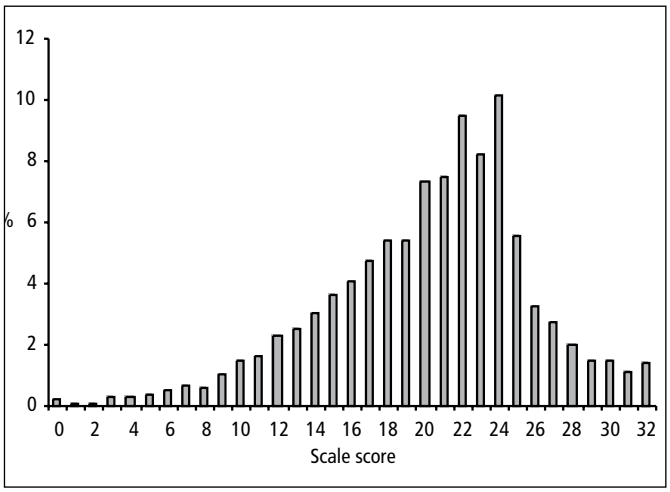


Figure 2.4: Distribution of neighbourhood attachment index – wave 8 data only



was also constructed to identify those respondents who reported the highest quintile of the overall extent of crime.

(d) Neighbourhood attachment

In wave 8, eight questions were asked about the respondent's neighbourhood and the relationships they have with people in the neighbourhood. The items were:

- I feel like I belong to this neighbourhood
- The friendship and associations I have with other people in my neighbourhood mean a lot to me
- If I need advice about something I could go to someone in my neighbourhood
- I borrow things and exchange favours with my neighbours
- I would be willing to work together with others on something to improve my neighbourhood
- I plan to remain a resident of this neighbourhood for a number of years
- I like to think of myself as similar to people who live in this neighbourhood
- I regularly stop and talk with people from my neighbourhood

The possible responses and scale values (in brackets) to above items were:

- Strongly agree (4)
- Agree (3)
- Neither agree/disagree (2)
- Disagree (1)
- Strongly disagree (0)

Responses to the eight items were combined in an additive scale ranging from 0 to 32. The internal reliability (Cronbach's alpha) was 0.84, which was satisfactory for an eight-item scale. The distribution of the scale is shown in Figure 2.4.

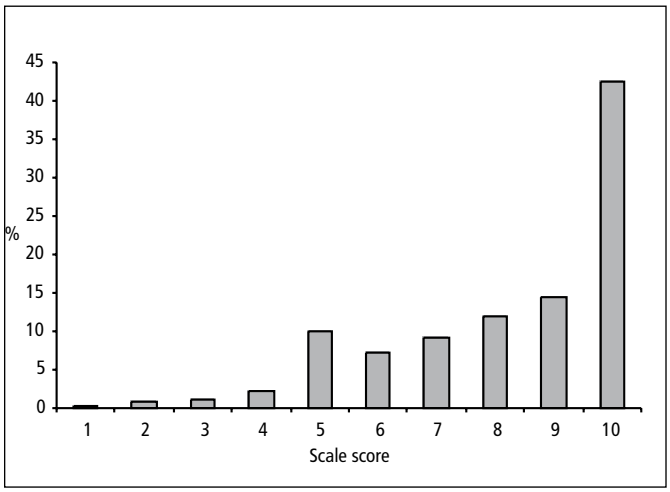
The scale was also collapsed into quartiles and the lowest quartile used as a dichotomous indicator for low neighbourhood attachment. Using BHPS data, McCulloch (2001) presented an initial analysis of the associations between social capital (represented by the neighbourhood attachment scale) and social disorganisation (represented by the extent of crime scale) with both collapsed into quartiles – very high, high, medium, low – and common mental illness (using a 3+ threshold), self-reported problems with limbs, chest or breathing, and heart or blood pressure. He found that those in the lowest category of social capital had an increased likelihood of common mental illness and those in the lowest category of social disorganisation had an increased likelihood of physical health problems. There were no significant differences between the other categories and, thus, this lends weight to using the dichotomous indicators adopted in these analyses.

Social support

Five questions designed to measure social support were included in waves 1, 3, 5, 7 and 9. The questions were:

- Is there someone who will listen?
- Is there someone to help in a crisis?
- Is there someone you can relax with?
- Anyone who really appreciates you?
- Anyone you can count on to offer comfort?

Figure 2.5: Distribution of social support scale – pooled data waves 1, 3, 5 and 7



The answers to each question were:

- No-one (0)
- Yes, one person (1)
- Yes, more than one (2)

These combined to make an additive scale ranging from 0 to 10. The internal reliability (Cronbach's alpha) ranged from 0.82 to 0.84, which was satisfactory for a five-item scale. The scale was highly skewed toward the high end (see Figure 2.5). Because of an error in questionnaire construction, the response categories to the five items were different in wave 9 and so social support data from this wave has not been included in the subsequent analyses.

In addition to the scale of social support, a dichotomous variable was created to indicate those at the cut-off score of six or below (ie those not reporting a reasonable level of social support) which corresponded with the lowest quartile of the respondents overall.

Correlation between measures

Table 2.2 presents the correlations between the various proxies of social capital and social support detailed above. Five out of the possible ten correlations are missing because the items were not carried in the same wave(s). As the table shows, there are significant but weak correlations among these measures.

Table 2.2: First order correlations among social capital and social support measures (Pearson's *r*)

		1	2	3	4
1	Social participation	–			
2	Friends	.04**	–		
3	Crime	-.03*	X	–	
4	Neighbourhood	X	.09**	X	–
5	Social support	.10**	X	-.04**	X

Notes: * $p < .05$ ** $p < .01$ X = items not in same wave

Health indicators

(a) General Health Questionnaire (GHQ-12)

Every wave of the BHPS contains the 12-item General Health Questionnaire (GHQ). This battery of questions was designed as a screening instrument for minor psychiatric morbidity. It is usually self-administered and is based on the respondent's assessment of their present state relative to their usual, or normal, state (Goldberg and Williams, 1988; Bowling, 1991). The items of the GHQ have formed the first part of the BHPS self-completion section in all waves of the survey to date. This results in the GHQ being completed prior to any other items concerning the respondent's health.

- Have you recently been able to concentrate on whatever you're doing?
- Have you recently lost much sleep over worry?
- Have you recently felt that you were playing a useful part in things?
- Have you recently felt capable of making decisions about things?
- Have you recently felt constantly under strain?
- Have you recently felt you couldn't overcome your difficulties?
- Have you recently been able to enjoy your normal day-to-day activities?
- Have you recently been able to face up to problems?
- Have you recently been feeling unhappy or depressed?
- Have you recently been losing confidence in yourself?
- Have you recently been thinking of yourself as a worthless person?
- Have you recently been feeling reasonably happy, all things considered?

The GHQ items were coded to create a scale from 0 to 12 and a threshold score of 4+ was employed to create a dichotomous indicator of 'common mental illness' (Goldberg et al., 1998) – a term we use in this report. The GHQ in the BHPS has been shown to be robust to

retest effects making it a suitable longitudinal instrument (Pevalin, 2000). In some of the longitudinal analyses the GHQ scores above the threshold are divided into three categories – 4-6, 7-9 and 10-12 – as a measure of severity.

(b) Short Form 36 (SF-36)

The SF-36 is a generic measure of health status derived from items used in the Medical Outcomes Study in the USA (Ware et al., 1993). The SF-36 was only carried in wave 9 of the BHPS. There are 36 items that form eight health indicators:

- Physical functioning (10 items)
- Social functioning (2 items)
- Role limitations due to physical problems (4 items)
- Role limitations due to emotional problems (3 items)
- Mental health (5 items)
- Energy/vitality (4 items)
- Pain (2 items)
- General health perception (5 items)

There is also a single item indicator of change in health status in the past year. The eight health indicators are scaled from 0 to 100. Further work (Ware and Gandek, 1998) has proposed that the eight indicators can be aggregated into two summary measures: physical health and mental health. In these analyses the eight sub-scales are used as separate outcomes rather than further aggregating the data. Table 2.3 presents the first order correlations among the eight sub-scales.

(c) Self-rated health

One of the most commonly used measures of perceived physical health status consists of a single Likert-type scale item, asking about respondents' overall health. Various studies have shown this measure to be one of the best predictors of healthcare utilisation, costs and mortality (eg Bierman et al., 1999; Davies and Ware, 1981; Fylkesnes and Forde, 1991; Mossey and Shapiro, 1982).

The item in the BHPS asks:

> *'Please think back over the last twelve months about how your health has been. Compared to people of your own age, would you say that your health has on the whole been...'*

The response categories are: excellent, good, fair, poor, and very poor. These categories are collapsed into a dichotomous indicator of poor self-rated health by combining the poor and very poor compared to the rest.

(d) Health service utilisation

An item measuring the frequency of GP visits has been collected in all waves, while the use of a large variety of other health services has been collected in most waves and a minority only in waves 5, 6, and 7. Within this category is a subset of potential preventive measures such as self-reported blood pressure checks, cholesterol tests, cervical smears, and breast screenings.

(e) Health problems

Also included in the health section of the BHPS is an item asking if the person has any of the following specific health problems or disabilities:

- Problems with arms, legs, hands, feet, back or neck
- Difficulty in seeing
- Difficulty in hearing
- Skin conditions/allergies
- Chest/breathing problems, asthma, bronchitis
- Heart/blood pressure or blood circulation problems
- Stomach/liver/kidneys

Table 2.3: First order correlations among SF-36 sub-scales (Pearson's *r*)

		1	2	3	4	5	6	7
1	*PF*	–						
2	*RP*	.60	–					
3	*RE*	.34	.45	–				
4	*SF*	.58	.65	.52	–			
5	*MH*	.28	.30	.47	.51	–		
6	*EV*	.49	.47	.39	.57	.63	–	
7	*P*	.58	.61	.35	.59	.33	.48	–
8	*GHP*	.62	.51	.37	.56	.47	.61	.55

Note: all significant at $p < .000$ Legend: *PF* – physical functioning, *SF* – social functioning, *RP* – role limitations (physical), *RE* – role limitations (emotional), *MH* – mental health, *EV* – energy/vitality, *P* – pain, *GHP* – general health perception

- Diabetes
- Anxiety, depression or bad nerves
- Alcohol or drug-related problems
- Epilepsy
- Migraine or frequent headaches

(f) Health limits activities

The BHPS data also contain a wide range of activities that could be limited by the person's health subsequently affecting their day-to-day quality of life. Specifically:

- Does your health in any way limit your daily activities compared to most people of your age?
- Which of these activities, if any, would you normally find difficult to manage on your own:
  – Doing the housework?
  – Climbing stairs?
  – Dressing yourself?
  – Walking for at least 10 minutes?

Structural factors

The structural and demographic factors that were used in these analyses were:

- Sex – indicated by a dichotomous variable for men compared to women
- Age – collapsed into seven categories
- Employment status – whether currently working as employed or self-employed compared with not employed
- Highest level of education – also collapsed into seven categories
- Marital status – with categories for married, cohabiting, widowed, divorced, separated and single (never married)
- Household social class – measured by using the National Statistics Socio-economic Classification (NS-SEC) (see Rose and Pevalin, 2003) of the Household Reference Person (HRP). In this case the HRP was defined as the principal owner or renter of the property and where there is more than one, the eldest took precedence.

These factors were used in all models for consistency and because they are usually associated with basic variations in health. Other factors are also associated with health status, such as housing conditions, but we would argue that these more proximal factors are also determined by the more distal, structural factors used in our models. The role of these more proximal factors and their possible interaction with social capital are important mechanisms but are not the focus of our analyses reported here (see also Rose and Pevalin, 2000).

Indicators for region of residence and race are included in the multivariate models but the parameter estimates are not shown as geographical and racial variations are not the focus of this analysis and the categories used in these variables are rather crude. For a more detailed analysis of ethnic differences see Cooper et al. (2000), and for a geographical perspective see Ellaway et al. (2001) and another HDA project, Social capital, place and health, conducted by Mohan, Jones, Twigg and Barnard at the University of Portsmouth (forthcoming HDA publication).

3 Pooled data analysis

Approach

Following the conceptual model presented in Figure 1.1, these analyses are conducted in three stages. First, bivariate associations and multivariate regression models are used to determine which structural factors are associated with the various measures of social capital and social support (additional tables and cross-tabulations are available from the authors).

In the next stage, the associations between social capital, social support measures and health outcomes are detailed.

In the final stage, multivariate analysis is used to determine the simultaneous effects of structural factors, social capital and social support measures on health and whether or not the inclusion of social capital and social support measures mediate and/or moderate the effects of the structural factors.

Mediating effects are investigated by examining the change in magnitude and/or statistical significance of the structural factor parameter estimates between a model with structural factors only and a model containing structural factors plus social capital or social support measures. Moderating effects are investigated by examining the interactions between the structural factors and social capital or social support. More examples are given in the section on mediating and moderating effects.

Data samples

We use pooled data from all nine waves of the BHPS. In total there are approximately 85,000 person/year observations but the samples for analysis are smaller because not all the indicators are used in every wave. The sample sizes vary from approximately 57,000 for all waves that included social participation, to 8,000 for those analyses that use only one wave of data, as in the case of neighbourhood attachment. Sample size is further reduced in the multivariate models due to the list-wise deletion of missing cases on any of the variables as no imputation procedures have been used in these cases.

Statistical models

The primary factor in choosing statistical models is the structure of the dependent variable. In this part there are three different variable structures: dichotomous indicators, a count variable and scale scores.

The dichotomous indicators are in the usual zero/one form that indicates the presence or absence of a state. It is common to use logistic (logit) regression in models that have a dichotomous indicator as the dependent variable, although other regression methods are available (see Long (1997) for a wide range of techniques appropriate for dependent variables with discrete categories).

Count data (or event count data) are the number of occurrences in a fixed domain and consist of discrete non-negative integers (King, 1988; Long, 1997). Poisson regression may be used to estimate models with count data. However, Poisson regression models have the restrictive property of equidispersion – the equality of mean and variance. In most cases the count data are overdispersed and fitting a negative binomial model (of which a Poisson distribution is a particular case) is usually more appropriate. The STATA 7.0 software provides a test to determine if the negative binomial model is preferred over the Poisson model by testing if the overdispersion parameter is significantly different from zero, which is the Poisson case.

Scale scores are assumed to be a representation of a continuous measure and these models can be estimated with ordinary least squares (OLS) regression.

Unobserved heterogeneity

In our models, it is possible that the independent variables do not adequately account for *persistent unobserved heterogeneity* among individuals. Using panel data it is possible to estimate the individual-specific component of the error term that is invariant over time. Uncontrolled heterogeneity may bias the coefficients, so the regression models use a random-effects specification in the logit and negative binomial cases and generalised least squares (GLS) in the continuous dependent variable case to account for this particular type of heterogeneity. The random-effects models produce a test parameter to determine if the individual-specific variance is significantly different from zero. If this is the case then the random-effects parameters are more appropriate. In all cases, this test was significant so only the random-effects parameters are reported (see Wooldridge, 2002, for more details on these techniques and others appropriate for panel data).

Statistical significance

The large sample sizes used in these analyses require stricter tests of statistical significance than the traditionally employed levels. Raftery (1995) argues that using traditional *p* values with large samples tends to indicate rejecting the null hypothesis even when the null model seems reasonable. He applies Bayesian inference to produce appropriate *t* ratios (and *z* statistics) to account for sample size, ie for sample sizes of 30,000 to 50,000 the *t* ratios for adequate evidence are: positive – 3.40; strong – 3.95; very strong – 4.45.

Social participation

Determinants

Table 3.1 shows the bivariate and multivariate associations between the structural factors and social participation. The first column of coefficients are the bivariate odds ratios (OR) of social participation, using the dichotomous indicator, produced by each of the structural factors in turn without controlling for any other factor (unadjusted). The second column of coefficients are the ORs produced from a multivariate regression model that simultaneously controls (adjusts) for all other independent variables. In this case, all the structural factors listed in the first column of the table along with race, region of residence and a data wave indicator are the independent variables. The ORs for the last three variables are not shown in the table (see Chapter 2).

The coefficients in the last column are the incidence rate ratios (IRR) produced by a multivariate negative binomial regression model. This model has the same independent variables as the second column but uses the count variable – number of organisations active in – as the dependent variable rather than the dichotomous indicator. This final column provides a robustness check.

The sample size reported in the table title is for the multivariate models. As the bivariate ORs are produced by separate models for each structural factor, the numbers are not reported but are usually slightly more than those reported for the multivariate models due to less list-wise deletion.

From Table 3.1 it can be seen that sex, age, education, marital status and household social class are all associated with varying odds of social participation. Men are more likely to participate than women and the middle-aged are more likely than those younger and older. Those with lower levels of education are less likely to participate as are those in households in NS-SEC Classes 4 to 8. Results from the regression model using the count dependent variable are generally consistent with the logit results with the exception of sex not being significant.

Effects on health

Table 3.2 shows the bivariate associations between social participation and the health measures – common mental illness, poor self-rated health, and the eight sub-scales of the SF-36. Those who report social participation are less likely to report common mental illness (19% less likely) or poor self-rated health (40% less likely) and score significantly higher on five of the eight SF-36 sub-scales ($t > 3.0$).

Analysis of the individual items that are used to construct the social participation variables shows that being active in the listed organisations is generally associated with lower levels and lower odds of common mental illness and poor self-rated health (Table 3.3). A few of the coefficients remain statistically non-significant because of the larger standard errors produced by the small numbers involved. For both common mental illness and poor self-rated health there is no significant difference between the coefficients obtained for being active in one organisation and two or more – common mental illness: $\chi^2 = 3.02$, $p = .08$; poor self-rated health: $\chi^2 = 0.56$, $p = .45$. This procedure was repeated using none, one, two or three, and four or more categories with similar results.

Table 3.1: Social participation regressed on structural factors – pooled data waves 1-5, 7 and 9; random-effects logit and negative binomial models (*n* = 59,260) [a]

Structural factors	Bivariate OR	Multivariate OR	Multivariate *IRR*
Sex (ref: female)	1.43***	1.31***	*1.03*
Age (ref: 15-24)			
25-34	1.15	1.24*	*1.17***
35-44	1.34***	1.62***	*1.42***
45-54	1.25*	1.78***	*1.49***
55-64	1.07	1.89***	*1.57***
65-74	1.00	1.96***	*1.66***
75 and over	0.60***	1.31	*1.35***
Currently working (ref: not working)	1.21***	1.03	*1.02*
Education (ref: higher degree)			
1st degree	0.58	0.67	*0.91*
HND, HNC	0.71	0.75	*0.90*
A level	0.39***	0.43***	*0.77***
O level	0.32***	0.38***	*0.72***
CSE	0.15***	0.23***	*0.56***
None	0.14***	0.16***	*0.48***
Marital status (ref: married)			
Cohabiting	0.75***	0.77***	*0.84***
Widow	0.84	1.35*	*1.09*
Divorced	0.83	0.88	*0.93*
Separated	0.74	0.81	*0.88*
Single	1.05	1.08	*1.00*
Household social class (ref: NS-SEC 1)			
2	0.82*	0.89	*0.96*
3	0.72***	0.85	*0.93*
4	0.56***	0.70***	*0.87***
5	0.48***	0.66***	*0.83***
6	0.40***	0.57***	*0.78***
7	0.39***	0.59***	*0.77***
8	0.37***	0.54***	*0.79***

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] coefficients for race, region of residence and wave not shown

Table 3.2: Bivariate associations between social participation and health measures – pooled data waves 1-5, 7 and 9

Health measure	*n*	Social participation No	Yes	
		%	%	*OR*
Common mental illness	62,348	21.7	18.4	0.81***
Poor self-rated health	55,023	10.0	6.3	0.60***
		Mean	*Mean*	*t ratio*[a]
SF-36				
Physical functioning	8,777	85.6	88.8	6.6
Social functioning	8,769	87.1	90.0	6.2
Role limitations (physical)	8,806	83.8	85.3	2.2
Role limitations (emotional)	8,795	90.5	92.1	2.8
Mental health	8,776	78.1	81.1	8.1
Energy/vitality	8,779	60.2	63.7	7.7
Pain	8,806	79.6	80.9	2.3
General health perception	8,770	70.4	73.9	7.8

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] difference of means test

Table 3.3: Detailed analysis of social participation items using wave 1 data

Social participation		Common mental illness		Poor self-rated health	
	n[a]	%	OR[b]	%	OR[b]
Active in:					
Political party	143	17.9	0.85	8.5	0.66
Trade union[c]	265	12.2	0.75	3.3	0.73
Environmental group	138	11.5	0.52*	4.2	0.42*
Parents' association[d]	401	21.0	1.00	4.6	0.61
Tenants' group	309	18.9	0.89	8.3	0.68
Religious group	1000	15.6	0.69**	7.1	0.57**
Voluntary group	373	18.2	0.83	4.6	0.36**
Community group	339	17.4	0.79	6.6	0.53**
Social group	887	18.8	0.96	8.9	0.88
Sport's group	1672	13.7	0.68**	3.0	0.38**
Women's Institute[e]	182	11.2	0.40**	5.3	0.30**
Women's group[e]	81	15.1	0.60	3.7	0.27*
Other organisation	880	15.4	0.71**	6.2	0.52**
Any organisation	4595	16.5	0.78**	5.7	0.55**
Not active	5331	20.5	(ref.)	10.3	(ref.)
One organisation	3045	17.1	0.82**	5.7	0.58**
Two or more	1535	15.3	0.71**	5.7	0.52**
Total sample	9613	18.6	–	8.2	–

Notes: * $p < .05$ ** $p < .01$ [a] weighted; [b] the reference group are those not active in any organisation. Controlling for sex and age;s
[c] employees only sub-sample; [d] parents only sub-sample; [e] female only sub-sample

Therefore, using a dichotomous variable indicating active in any organisation is an efficient form of data reduction.

In Table 3.4 each health measure, common mental illness and poor self-rated health, is first regressed onto the structural factors (model 1) and then onto the structural factors plus the social participation indicator (model 2) using multivariate models. Overall, these results show that social participation lowers the odds of common mental illness (15% less likely) and poor self-rated health (28% less likely) even in the presence of structural factors. In addition, the presence of the social participation indicator does not appear to mediate the effects of the structural factors on the health measures.

Table 3.5 shows the unstandardised OLS regression coefficients for social participation on each of the eight SF-36 summary scale scores from the full models (model 2 in Table 3.4). Social participation has a positive association with five of the eight scales in these full models as it did in the bivariate *t*-tests reported in Table 3.2. The inclusion of the social participation indicator did not mediate any of the effects from the structural factors.

Table 3.4: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and social participation – pooled data waves 1-5, 7 and 9; random-effects logit models [a]

Dependent variable	Common mental illness		Poor self-rated health	
Model	1	2	1	2
Independent variables	OR	OR	OR	OR
Sex (ref: female)	0.61***	0.62***	0.75*	0.75*
Age (ref: 15-24)				
25-34	1.16	1.16	1.51	1.50
35-44	1.25	1.26	1.64*	1.63*
45-54	1.27	1.28	2.76***	2.76***
55-64	0.73**	0.74*	2.00**	2.03***
65-74	0.50***	0.50***	1.82*	1.81*
75 and over	0.70	0.70	3.05***	3.03***
Currently working (ref: not working)	0.54***	0.54***	0.27***	0.28***
Education (ref: higher degree)				
1st degree	0.76	0.75	0.82	0.80
HND, HNC	0.56*	0.56*	1.17	1.14
A level	0.63	0.61	1.23	1.18
O level	0.56*	0.54**	1.21	1.12
CSE	0.54*	0.52*	1.85	1.68
None	0.59*	0.56*	2.14	1.92
Marital status (ref: married)				
Cohabiting	1.09	1.07	1.21	1.18
Widow	1.69***	1.72***	0.96	0.97
Divorced	1.62***	1.61***	1.80***	1.81***
Separated	2.85***	2.84***	1.29	1.33
Single	0.93	0.94	0.93	0.93
Household social class (ref: NS-SEC 1)				
2	1.13	1.13	1.22	1.22
3	1.07	1.06	1.40	1.39
4	1.22	1.21	1.27	1.23
5	1.13	1.12	1.91***	1.88***
6	1.26	1.25	1.86***	1.83***
7	1.23	1.21	2.29***	2.21***
8	1.28	1.27	1.25	1.21
Social participation (ref: not active)	-	0.85***	-	0.72***
χ^2 *(df)*	804 (40)	828 (41)	1043 (39)	1065 (40)
n	57,883		51,255	

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] coefficients for race, region of residence and wave not shown

Table 3.5: Multivariate models of the eight SF-36 health scales regressed on structural factors and social participation – wave 9 data; OLS regression models [a]

Dependent variable	*PF*	*SF*	*RP*	*RE*
	b	*b*	*b*	*b*
Social participation (ref: not active)	1.88***	2.18***	0.79	1.10
R^2	0.37	0.09	0.11	0.05
n	7,948	7,943	7,977	7,967
Dependent variable	*MH*	*EV*	*P*	*GHP*
	b	*b*	*b*	*b*
Social participation (ref: not active)	2.12***	2.75***	0.01	2.37***
R^2	0.07	0.08	0.10	0.13
n	7,949	7,953	7,977	7,942

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] unstandardised OLS regression coefficients. Coefficients for structural factors not shown.
Legend: *PF* – physical functioning, *SF* – social functioning, *RP* – role limitations (physical), *RE* – role limitations (emotional), *MH* – mental health, *EV* – energy/vitality, *P* – pain, *GHP* – general health perception

Table 3.6: Contact with friends regressed on structural factors – pooled data waves 1, 3, 5 and 7; random-effects logit and GLS models (*n* = 34,002) [a]

Structural factors	Bivariate OR	Multivariate OR	*Multivariate b*[b]
Sex (ref: female)	1.45***	1.47***	*-0.42****
Age (ref: 15-24)			
25-34	2.24***	1.69***	*-0.57****
35-44	3.99***	2.92***	*-1.12****
45-54	5.21***	3.99***	*-1.46****
55-64	6.30***	4.93***	*-1.72****
65-74	8.50***	7.23***	*-2.26****
75 and over	10.93***	11.71***	*-2.90****
Currently working (ref: not working)	0.75***	0.87	*0.06*
Education (ref: higher degree)			
1st degree	0.78	1.15	*-0.26*
HND, HNC	0.50**	0.56	*0.42*
A level	0.34***	0.51**	*0.41*
O level	0.29***	0.40***	*0.73****
CSE	0.20***	0.42**	*0.67***
None	0.77	0.52**	*0.37*
Marital status (ref: married)			
Cohabiting	0.65***	1.13	*-0.11*
Widow	1.02	0.50***	*0.59****
Divorced	0.48***	0.51***	*0.61****
Separated	0.54***	0.60*	*0.34*
Single	0.23***	0.44***	*0.67****
Household social class (ref: NS-SEC 1)			
2	0.73***	0.80*	*0.09*
3	0.71**	0.87	*0.10*
4	0.74*	0.85	*0.04*
5	0.72**	0.81	*0.11*
6	0.70***	0.88	*0.07*
7	0.72***	0.89	*0.02*
8	0.96	1.16	*-0.23*

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] coefficients for race, region of residence and wave not shown
[b] unstandardised GLS regression coefficients

Contact with friends

Determinants

Table 3.6 shows the bivariate and multivariate associations between the structural factors and contact with friends. The table is organised in a similar way to Table 3.1 with a dichotomous indicator of a low level of contact used in the first two columns and the scale score used in the third. Note here that positive coefficients in the third column mean higher scale scores and thus they are less likely to have a low level of contact which would produce an OR of less than one in the first two columns. Men are more likely to have low levels of contact than women and there is a very strong positive gradient of increasing likelihood of low contact with age. The differences in odds of low levels of contact by household social class seen in the bivariate column are rendered non-significant in the multivariate model. Compared with those who are married, all categories of marital status other than those cohabiting are less likely to have low levels of contact with friends. Those with lower levels of education are less likely to have a low level of contact. The results from GLS regression models using the contact with friends scale are shown in the third column and are very consistent with the results using the dichotomous indicator.

Effects on health

Table 3.7 reports the bivariate associations between low contact with friends and the health measures – common mental illness and poor self-rated health. Those with low contact with friends are significantly more likely to report common mental illness (12% more likely) and poor self-rated health (27% more likely).

Table 3.7: Bivariate associations between low contact with friends and health measures – pooled data waves 2, 4, 6 and 8

Health measure	*n*	Low contact with friends		
		No	Yes	
		%	%	*OR*
Common mental illness	35,811	20.0	21.9	1.12**
Poor self-rated health	36,574	7.9	9.9	1.27**

Note: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$

Table 3.8: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and low contact with friends – pooled data waves 2, 4, 6 and 8; random-effects logit models [a]

Dependent variable	Common mental illness		Poor self-rated health	
Model	1	2	1	2
Independent variables	OR	OR	OR	OR
Sex (ref: female)	0.61***	0.60***	0.86	0.86
Age (ref: 15-24)				
25-34	1.28	1.27	1.66*	1.65*
35-44	1.48***	1.45**	2.16***	2.12***
45-54	1.42*	1.38*	2.93***	2.87***
55-64	0.77	0.75	2.03**	1.99**
65-74	0.48***	0.47***	1.49	1.46
75 and over	0.63*	0.60*	2.46***	2.37***
Currently working (ref: not working)	0.49***	0.49***	0.22***	0.22***
Education (ref: higher degree)				
1st degree	0.87	0.87	0.73	0.73
HND, HNC	0.61	0.62	1.09	1.09
A level	0.76	0.77	1.22	1.23
O level	0.62	0.64	1.10	1.11
CSE	0.58	0.60	1.50	1.51
None	0.67	0.69	1.84	1.85
Marital status (ref: married)				
Cohabiting	1.17	1.16	1.22	1.22
Widow	1.73***	1.76***	0.96	0.97
Divorced	1.76***	1.79***	1.85***	1.87***
Separated	3.39***	3.43***	1.45	1.46
Single	0.98	0.99	0.87	0.88
Household social class (ref: NS-SEC 1)				
2	0.99	0.99	1.32	1.32
3	0.96	0.96	1.34	1.34
4	1.07	1.07	1.52	1.52
5	0.94	0.95	2.06***	2.07***
6	1.12	1.12	2.23***	2.24***
7	1.02	1.02	2.24***	2.25***
8	1.06	1.06	1.59	1.59
Low contact with friends (ref: not low)	–	1.17*	–	1.09
X^2 *(df)*	646 (37)	660 (38)	883 (37)	884 (38)
n	33,279		33,981	

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] coefficients for race, region of residence and wave not shown

The multivariate regression models shown in Table 3.8 are similarly structured to those in Table 3.4 with the low contact with friends indicator replacing social participation. In this case, the inclusion of the low contact indicator has little (17% increase in the likelihood of common mental illness) or no effect (in the case of poor self-rated health), while the effects of the structural factors remain unchanged.

Extent of crime

Determinants

Table 3.9 shows the bivariate and multivariate associations between the structural factors and the extent of crime for wave 7 data only. Again, in a similar way to Table 3.1, a dichotomous indicator of the high extent of crime is used in the first two columns of coefficients and the extent of crime scale is used in the third column. As the extent of crime data was only collected once in the BHPS, random-effects specification is not used. In the multivariate logit model, only the oldest age categories, marital status and household social class demonstrate any variation in the likelihood of reporting a high extent of crime. The results using OLS regression and the extent of crime scale score produced more differences with age and less with household social class but point to similar associations with the structural factors.

The multivariate associations between the structural factors and the two individual items regarding worry about crime and safety after dark are shown in Table 3.10. In both models, sex and age produce the most significant associations with males being less worried about crime and feeling safer walking after dark in their neighbourhood. Increasing age is associated with less concern about crime but feelings of less safety after dark or never going out after dark.

Effects on health

Table 3.11 shows that those reporting a high extent of crime are more likely to report common mental illness (53% more likely) and poor self-rated health (more than twice as likely). Table 3.12 shows the associations of the different categories of the items, worry about crime and safety after dark, with the two health indicators. Those who report that crime in their area is a big worry for

Table 3.9: Extent of crime regressed on structural factors – wave 7 data; logit and OLS models (*n* = 7,809) [a]

Structural factors	Bivariate OR	Multivariate OR	*Multivariate b*[b]
Sex (ref: female)	0.82*	0.86	*-0.21*
Age (ref: 15-24)			
25-34	0.55***	0.75	*-0.90***
35-44	0.53***	0.79	*-0.78**
45-54	0.59***	0.80	*-0.63*
55-64	0.64***	0.73	*-1.14****
65-74	0.53***	0.50***	*-2.02****
75 and over	0.31***	0.27***	*-3.35****
Currently working (ref: not working)	0.77***	0.84	*-0.38*
Education (ref: higher degree)			
1st degree	0.97	0.69	*-0.33*
HND, HNC	1.33	1.04	*0.27*
A level	1.62	0.86	*-0.11*
O level	1.51	0.90	*0.22*
CSE	2.38*	1.23	*0.43*
None	2.15*	1.54	*1.04*
Marital status (ref: married)			
Cohabiting	1.57***	1.70***	*0.61**
Widow	1.05	1.18	*-0.19*
Divorced	1.75***	1.49	*0.80*
Separated	1.95*	1.74	*0.61*
Single	1.79***	1.51***	*0.64*
Household social class (ref: NS-SEC 1)			
2	1.55*	1.52*	*0.43*
3	2.17***	1.90***	*0.81**
4	2.08***	1.83***	*0.61*
5	2.14***	1.83***	*0.99****
6	3.14***	2.35***	*1.50****
7	3.08***	2.35***	*1.48****
8	2.92***	1.80	*0.23*

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for race and region of residence not shown; [b] unstandardised OLS regression coefficients

Table 3.10: Worry about crime and safety after dark regressed on structural factors – wave 7 data; multivariate ordered logit models (*n* = 8,303) [a]

Structural factors	Worry about crime	Safety after dark
Sex (ref: female)	-0.30***	-1.79***
Age (ref: 15-24)		
25-34	0.15	0.07
35-44	0.23	0.10
45-54	0.34*	0.20
55-64	0.01	0.40**
65-74	-0.32	0.88***
75 and over	-0.63***	1.97***
Currently working (ref: not working)	-0.02	-0.21**
Education (ref: higher degree)		
1st degree	-0.20	0.15
HND, HNC	-0.02	0.22
A level	0.08	0.35
O level	0.00	0.34
CSE	-0.06	0.24
None	0.11	0.65**
Marital status (ref: married)		
Cohabiting	-0.02	-0.04
Widow	-0.14	0.17
Divorced	-0.01	0.02
Separated	-0.62*	-0.14
Single	-0.34***	0.02
Household social class (ref: NS-SEC 1)		
2	0.16	0.13
3	0.36	0.28
4	0.13	0.03
5	0.24	0.27
6	0.33	0.27
7	0.19	0.32**
8	-0.01	0.06

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for race and region of residence not shown

Table 3.11: Bivariate associations between high extent of crime and health measures – wave 7 data

Health measure	*n*	High extent of crime		
		No	Yes	
		%	%	*OR*
Common mental illness	8,272	18.7	26.1	1.53***
Poor self-rated health	8,467	7.4	14.1	2.06***

Note: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$

them are more than twice as likely to report common mental illness and poor self-rated health. Those who feel very unsafe after dark are more than twice as likely to report common mental illness and more than three times more likely to report poor self-rated health.

Table 3.12: Bivariate associations between worry about crime, safety after dark and health measures – wave 7 data

	n	Common mental illness		Poor self-rated health	
		%	*OR*	%	*OR*
Worry about crime					
Not concerned	3,242	17.0	ref.	8.2	ref.
Occasional doubt	1,990	17.7	1.04	6.9	0.83
Bit of a doubt	2,769	21.6	1.34***	8.4	1.02
Big worry	870	34.5	2.56***	18.0	2.47***
Safety after dark					
Very safe	2,184	17.3	ref.	5.5	ref.
Fairly safe	3,701	18.3	1.07	7.1	1.30
A bit unsafe	1,337	22.4	1.38**	8.1	1.50
Very unsafe	683	30.5	2.09***	18.3	3.82***
Never go out after dark	896	25.6	1.64***	18.8	3.96***

Note: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$

Table 3.13: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and high extent of crime – wave 7 data; logit models [a]

Dependent variable	Common mental illness		Poor self-rated health	
Model	1	2	1	2
Independent variables	OR	OR	OR	OR
Sex (ref: female)	0.64***	0.63***	0.97	1.01
Age (ref: 15-24)				
25-34	1.17	1.21	2.11**	2.31**
35-44	1.09	1.07	2.65***	2.88***
45-54	1.26	1.23	3.11***	3.28***
55-64	0.93	0.90	2.17*	2.38*
65-74	0.52**	0.52**	1.41	1.53
75 and over	0.67	0.69	1.91	2.16
Currently working (ref: not working)	0.62***	0.60***	0.22***	0.21***
Education (ref: higher degree)				
1st degree	0.92	0.87	0.55	0.57
HND, HNC	0.72	0.68	0.75	0.79
A level	0.80	0.78	0.87	0.91
O level	0.78	0.76	0.85	0.89
CSE	0.72	0.65	1.29	1.27
None	0.83	0.79	1.30	1.24
Marital status (ref: married)				
Cohabiting	1.11	1.02	1.29	1.22
Widow	1.09	1.05	1.00	0.95
Divorced	1.32	1.15	1.40	1.29
Separated	2.61***	2.37***	0.86	0.92
Single	1.00	0.96	0.98	0.95
Household social class (ref: NS-SEC 1)				
2	1.35	1.39	1.13	1.18
3	1.26	1.28	1.20	1.18
4	1.22	1.25	1.29	1.15
5	1.44	1.42	1.82*	1.86*
6	1.34	1.32	1.29	1.28
7	1.42	1.40	1.67	1.62
8	1.27	1.21	0.79	0.68
High extent of crime (ref: not high)	-	1.45***	-	1.92***
X^2 *(df)*	235 (34)	255 (35)	518 (34)	525 (35)
n	7,629		7,807	

Note: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for race and region of residence not shown

Table 3.14: Multivariate models of common mental illness and poor self-rated health regressed on worry about crime, safety after dark – wave 7 data; logit models [a]

Dependent variable	Common mental illness OR	Poor self-rated health OR
Worry about crime		
Not concerned	ref.	ref.
Occasional doubt	1.06	0.99
Bit of a doubt	1.32**	1.15
Big worry	2.41***	2.22***
n	8,169	8,362
Safety after dark		
Very safe	ref.	ref.
Fairly safe	0.99	1.22
A bit unsafe	1.12	1.38
Very unsafe	1.67***	2.78***
Never go out after dark	1.43	2.34***
n	8,106	8,297

Note: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for structural factors not shown

Table 3.13 has a similar structure to Table 3.4 and the findings are also broadly similar. Those reporting a high extent of crime are more likely to report common mental illness (45% more likely) and poor self-rated health (92% more likely) even in the presence of the structural factors. The effects of the structural factors are not mediated by the inclusion of the high extent of crime indicator.

Table 3.14 shows the results of the worry about crime and safety after dark items in full regression models (as in Table 3.13). It shows that significant associations are still present even when the structural factors are included and the items do not appear to mediate the effects of the structural factors (not shown).

Neighbourhood attachment

Determinants

Table 3.15 shows the bivariate and multivariate associations between the structural factors and neighbourhood attachment for wave 8 data only. A dichotomous indicator of low neighbourhood attachment is used in the first two columns of coefficients and the scale in the third column. Again, note the opposite effects as in Table 3.6. As the attachment to neighbourhood data was only collected once in the BHPS, random-effects specification is not used. In the multivariate logit model, only sex, age, and marital status have varying odds of low neighbourhood attachment. The third column provides results using OLS regression and, overall, the results are very consistent across the two types of regression models.

Effects on health

Table 3.16 shows the bivariate associations between low neighbourhood attachment and two health measures – common mental illness and poor self-rated health. Those with low neighbourhood attachment are more likely to report common mental illness (62% more likely) while there is no significant difference in odds of poor self-rated health.

Table 3.17 shows the results of the regression models with common mental health and poor self-rated health as outcomes in a similar fashion to Table 3.4. The effect of low neighbourhood attachment is to increase the likelihood of reporting common mental illness (76% more likely) and poor self-rated health (41% more likely). As with the other measures of social capital, their effect on health does not mediate the effects of the structural factors.

Table 3.15: Neighbourhood attachment regressed on structural factors – wave 8 data; logit and OLS models (*n* = 8,085) [a]

Structural factors	Bivariate OR	Multivariate OR	*Multivariate b*[b]
Sex (ref: female)	1.38***	1.36***	*-0.77****
Age (ref: 15-24)			
25-34	0.71***	0.86	*0.89***
35-44	0.42***	0.59***	*1.65****
45-54	0.34***	0.49***	*2.26****
55-64	0.20***	0.32***	*2.82****
65-74	0.17***	0.29***	*2.92****
75 and over	0.22***	0.38***	*2.68****
Currently working (ref: not working)	1.49***	1.19	*-0.47*
Education (ref: higher degree)			
1st degree	1.17	0.92	*-0.41*
HND, HNC	0.70	0.72	*0.48*
A level	0.91	0.71	*0.28*
O level	0.77	0.75	*0.27*
CSE	0.83	0.66	*0.56*
None	0.48***	0.82	*-0.02*
Marital status (ref: married)			
Cohabiting	2.83***	1.84***	*-1.86****
Widow	0.64*	1.04	*-0.41*
Divorced	1.34	1.45	*-0.95**
Separated	1.56	1.43	*-1.89***
Single	2.92***	1.77***	*-1.40****
Household social class (ref: NS-SEC 1)			
2	0.91	0.95	*0.18*
3	0.90	0.96	*0.23*
4	0.78	0.92	*0.28*
5	0.76	0.88	*0.48*
6	0.98	1.16	*-0.24*
7	0.83	0.94	*0.43*
8	0.85	1.01	*-0.13*

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for race and region of residence not shown; [b] unstandardised OLS regression coefficients

Table 3.16: Bivariate associations of low neighbourhood attachment and health measures – wave 8 data

Health measure	*n*	Low neighbourhood attachment		
		No	Yes	
		%	%	*OR*
Common mental illness	8,576	17.8	26.1	1.62***
Poor self-rated health	8,689	9.1	9.4	1.03

Note: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$

Table 3.17: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and low neighbourhood attachment – wave 8 data; logit models [a]

Dependent variable	Common mental illness		Poor self-rated health	
Model	1	2	1	2
Independent variables	OR	OR	OR	OR
Sex (ref: female)	0.64***	0.62***	1.02	1.00
Age (ref: 15-24)				
25-34	1.26	1.31	1.74	1.88
35-44	1.70***	1.84***	2.71***	2.94***
45-54	1.46	1.64**	2.82***	3.12***
55-64	0.97	1.12	1.92	2.19*
65-74	0.74	0.85	1.28	1.45
75 and over	0.71	0.81	1.73	2.01
Currently working (ref: not working)	0.58***	0.56***	0.24***	0.24***
Education (ref: higher degree)				
1st degree	0.90	0.87	0.70	0.63
HND, HNC	0.80	0.82	1.02	0.97
A level	0.88	0.88	1.48	1.47
O level	0.73	0.72	1.22	1.18
CSE	0.70	0.67	1.26	1.19
None	0.84	0.83	1.83	1.74
Marital status (ref: married)				
Cohabiting	1.36	1.27	1.25	1.17
Widow	1.29	1.25	1.26	1.20
Divorced	1.60***	1.48	1.80**	1.69*
Separated	2.98***	2.92***	1.87	1.75
Single	1.19	1.12	1.14	1.12
Household social class (ref: NS-SEC 1)				
2	0.93	0.93	1.40	1.47
3	0.91	0.93	1.41	1.49
4	0.88	0.91	1.67	1.74
5	0.93	0.94	1.95*	2.06**
6	1.00	0.97	2.06**	2.08**
7	0.89	0.90	1.75	1.77
8	1.28	1.30	1.47	1.58
Low neighbourhood att. (ref: not low)	–	1.76***	–	1.41*
χ^2 *(df)*	270 (34)	335 (35)	534 (34)	521 (35)
n	7,974		8,074	

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for race and region of residence not shown

Social support

Determinants

Table 3.18 shows the bivariate and multivariate associations between the structural factors and social support. A dichotomous indicator of low social support is used in the first two columns of coefficients and the scale in the third column. Again, note the opposite effects as in Table 3.6. In the multivariate logit model only sex, age, working status and household social class are associated with varying odds of low social support. The results from the GLS regression in the third column are very consistent with those from the logit regression model.

Effects on health

Table 3.19 shows the bivariate associations between low social support and two health measures – common mental illness and poor self-rated health. Those with low social support are more likely to report common mental illness (85% more likely) and poor self-rated health (82% more likely).

Table 3.20 has a similar structure to the other tables reporting multivariate models with health outcomes except that an indicator of low social support is used in place of the various measures of social capital. The social support measure appears to operate in a similar fashion to the social capital indicators in that low levels of social support increase the likelihood of common mental illness (over twice as likely) and poor self-rated health (48% more likely), while not mediating the effects of the structural factors on health.

Table 3.18: Social support regressed on structural factors – pooled data waves 1, 3, 5 and 7; random-effects logit and GLS models (*n* = 33,381) [a]

Structural factors	Bivariate OR	Multivariate OR	*Multivariate b*[b]
Sex (ref: female)	1.95***	2.23***	*-0.53****
Age (ref: 15-24)			
25-34	1.33*	1.33	*-0.14****
35-44	2.11***	2.07***	*-0.37****
45-54	2.16***	1.95***	*-0.37****
55-64	2.25***	1.64**	*-0.30****
65-74	2.52***	1.63*	*-0.34****
75 and over	3.86***	2.61***	*-0.61****
Currently working (ref: not working)	0.68***	0.73***	*0.12***
Education (ref: higher degree)			
1st degree	0.84	0.83	*0.02*
HND, HNC	0.94	0.92	*-0.06*
A level	0.99	1.07	*-0.13*
O level	1.35	1.24	*-0.18*
CSE	1.87	1.62	*-0.38*
None	3.36***	2.05	*-0.53***
Marital status (ref: married)			
Cohabiting	0.63***	0.89	*0.06*
Widow	1.22	0.83	*0.16*
Divorced	1.20	1.17	*-0.14*
Separated	1.36	1.46	*-0.31**
Single	0.58***	0.87	*0.03*
Household social class (ref: NS-SEC 1)			
2	1.08	1.05	*-0.01*
3	1.06	0.97	*0.01*
4	1.78***	1.43*	*-0.18**
5	1.84***	1.42*	*-0.18**
6	2.35***	1.82***	*-0.30****
7	2.58***	1.91***	*-0.32****
8	3.39***	2.12***	*-0.48****

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] coefficients for race, region of residence and wave not shown; [b] unstandardised GLS regression coefficients

Table 3.19: Bivariate associations of low social support and health measures – pooled data waves 1, 3, 5 and 7

Health measure	*n*	Low social support		
		No	Yes	
		%	%	*OR*
Common mental illness	35,466	17.5	28.3	1.85***
Poor self-rated health	35,827	6.9	11.9	1.82***

Note: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$

Table 3.20: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and low social support – pooled data waves 1, 3, 5 and 7; random-effects logit models [a]

Dependent variable	Common mental illness		Poor self-rated health	
Model	1	2	1	2
Independent variables	OR	OR	OR	OR
Sex (ref: female)	0.61***	0.57***	0.77	0.75*
Age (ref: 15-24)				
25-34	1.13	1.11	1.54	1.55
35-44	1.18	1.11	1.76*	1.72*
45-54	1.28	1.23	3.00***	3.00***
55-64	0.69*	0.66*	1.96**	1.96**
65-74	0.50***	0.48***	1.76	1.67
75 and over	0.66	0.61*	2.68***	2.43***
Currently working (ref: not working)	0.52***	0.54***	0.24***	0.24***
Education (ref: higher degree)				
1st degree	0.88	0.91	1.00	1.01
HND, HNC	0.74	0.75	1.24	1.25
A level	0.75	0.75	1.57	1.54
O level	0.66	0.65	1.41	1.38
CSE	0.65	0.63	2.22	2.12
None	0.71	0.67	2.49	2.34
Marital status (ref: married)				
Cohabiting	1.06	1.07	1.36	1.37
Widow	1.49**	1.50**	0.97	1.01
Divorced	1.57***	1.54***	2.01***	2.10***
Separated	2.94***	2.80***	1.50	1.35
Single	0.91	0.91	0.93	0.96
Household social class (ref: NS-SEC 1)				
2	1.22	1.20	1.22	1.17
3	1.19	1.19	1.36	1.31
4	1.34	1.31	1.21	1.19
5	1.28	1.25	1.93**	1.89***
6	1.44**	1.36*	1.80*	1.73*
7	1.43**	1.35*	2.32***	2.20***
8	1.45	1.34	1.15	1.20
Low social support (ref: not low)	–	2.14***	–	1.48***
X^2 *(df)*	576 (37)	829 (38)	870 (37)	854 (38)
n	33,551		34,319	

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ [a] coefficients for race, region of residence and wave not shown

Multiple indicators

In this section, we investigate the simultaneous effects of the social capital and social support measures when they are included in the same model. As noted in Tables 2.1 and 2.2, not all combinations of the various measures are possible due to their inclusion in different waves of the BHPS. The combinations that are possible are shown in Tables 3.21 to 3.23. The different measures of social capital and social support can be included in the same models as they are not highly correlated with each other (see Table 2.2) and, therefore, avoid multicolinearity.

On the whole, the presence of other measures of social capital or social support do not change the individual measure effect on health, except that the effect of social participation becomes non-significant in the presence of a high extent of crime and low social support in Table 3.21. In addition, the direction and magnitude of the individual effects are very similar to those in the models with single social capital or social support indicators. The inclusion of multiple social capital and social support indicators did not mediate the effects of the structural factors.

Table 3.21: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and multiple social capital and social support indicators – wave 7 data; logit models [a]

Dependent variable	Common mental illness			
Model	1 OR	2 OR	3 OR	4 OR
Social participation (ref: not active)	0.87	–	–	0.91
High crime index (ref: not high)	–	1.45***	-	1.40***
Low social support (ref: not low)	–	–	2.11***	2.12***
χ^2 *(df)*	242 (35)	255 (35)	349 (35)	362 (37)
n	7,401			
Dependent variable	Poor self-rated health			
Model	1 OR	2 OR	3 OR	4 OR
Social participation (ref: not active)	0.73*			0.77
High crime index (ref: not high)	–	1.92***	–	1.83***
Low social support (ref: not low)	–	-	1.53***	1.55***
χ^2 *(df)*	520 (35)	525 (35)	508 (35)	516 (37)
n	7,500			

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for structural factors not shown

Table 3.22: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and multiple social capital indicators – wave 8 data; logit models [a]

Dependent variable	Common mental illness		
Model	1 OR	2 OR	3 OR
Low neighbourhood att. (ref: not low)	1.76***	–	1.73***
Low contact with friends (ref: not low)	–	1.22	1.16
X^2 *(df)*	335 (35)	280 (35)	340 (36)
n		7,974	
Dependent variable	Poor self-rated health		
Model	1 OR	2 OR	3 OR
Low neighbourhood att. (ref: not low)	1.41*	–	1.39*
Low contact with friends (ref: not low)	–	1.09	1.06
X^2 *(df)*	521 (35)	535 (35)	521 (36)
n		8,074	

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for structural factors not shown

Table 3.23: Multivariate models of common mental illness and poor self-rated health regressed on structural factors and multiple social capital indicators – pooled data waves 2 and 4; random-effects logit models [a]

Dependent variable	Common mental illness		
Model	1 OR	2 OR	3 OR
Social participation (ref: not active)	0.76***	–	0.77***
Low contact with friends (ref: not low)	–	1.17	1.15
X^2 *(df)*	340 (36)	330 (36)	345 (37)
n		16,750	
Dependent variable	Poor self-rated health		
Model	1 OR	2 OR	3 OR
Social participation (ref: not active)	0.64***	–	0.65***
Low contact with friends (ref: not low)	–	1.16	1.12
X^2 *(df)*	431 (36)	423 (36)	432 (37)
n		17,168	

Notes: * $z > 3.30$ ** $z > 3.80$ *** $z > 4.30$ [a] coefficients for structural factors not shown

Mediating and moderating effects

Mediating effects

Potential mediating effects are investigated by examining the change in magnitude and/or statistical significance of the structural factor parameter estimates between the structural factors only model (model 1 in Tables 3.4, 3.8, 3.13, 3.17 and 3.20) and the structural factors plus social capital or social support model (model 2 in the same tables). If the parameter estimates of the structural factors change noticeably, or even lose statistical significance altogether, then the presence of the social capital or social support measure is mediating that direct effect. It is clear from the above results that most of the structural factors maintain direct effects on the health outcomes even in the presence of the social capital and social support measures. Thus, these direct effects are not mediated by the social capital or social support measures.

Returning to the conceptual model in Figure 1.1, we anticipated that the presence of social capital would mediate some or all of the direct effects of the structural factors. This was represented by the dotted lines from the structural factors to health. As we found that social capital or social support did not mediate the direct effects of the structural factors on health then another possible intervening role of social capital is to moderate the structural effects.

Moderating effects

Moderating effects are investigated by examining the interactions between the structural factors and social capital or social support. For example, if social capital moderated the effects of social class on health then we would expect to find significant differences in the effect of social capital across classes, ie does social capital have more or less influence on health for those in households in Classes 6 and 7? Following this example through, we find that the OR for social participation on common mental illness in the full model for those in NS-SEC Classes 1 and 2 is 0.82 and for those in Classes 6 and 7 0.84. There is no significant difference between these ORs and thus social participation does not moderate the effect of social class.

There are a number of ways of determining the presence of a significant interaction, but in these analyses we utilise interaction terms in the full statistical models (structural plus social capital/social support). Due to the numerous combinations of potential interactions, only the notable results are presented below in summary or graphical form.

(a) Social participation and age

Significant statistical interactions between age and social participation were found on two of the SF-36 sub-scales – physical functioning and social functioning. The significant differences in the positive effect of social participation were seen in the older age groups. In Figure 3.1, age has a curvilinear association with the physical functioning scale and social participation moderates the general decline in physical functioning with age in that for those who report social participation the decline is less marked.

In the case of the SF-36 social functioning scale, the association with age is linear but the overall result is the same as physical functioning in that those who report social participation show less decline in scale scores with age – see Figure 3.2.

Figure 3.1: The interaction between social participation and age and their effects on the SF-36 physical functioning scale – wave 9 data; OLS full models

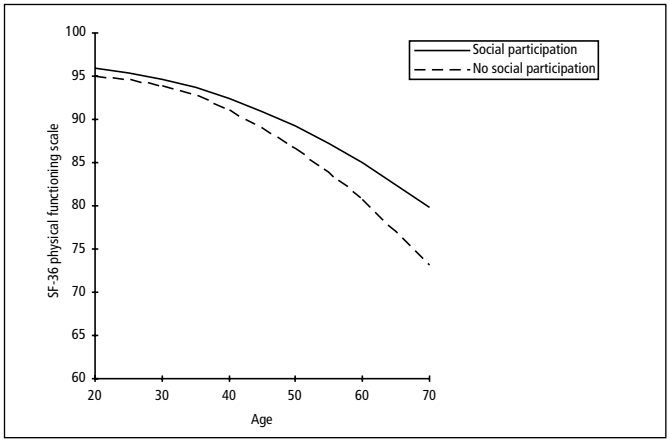
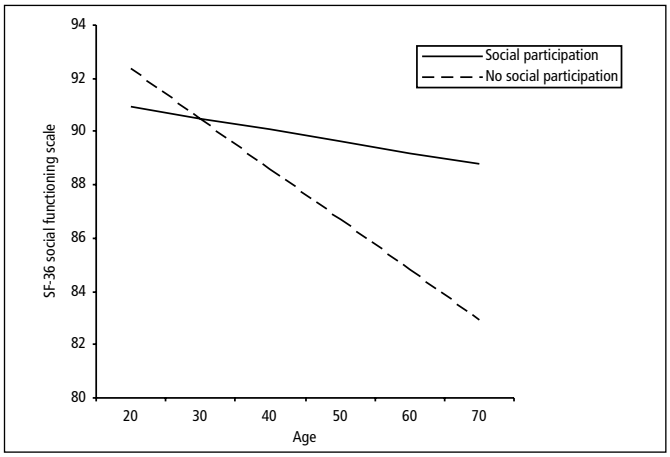


Figure 3.2: The interaction between social participation and age and their effects on the SF-36 social functioning scale – wave 9 data; OLS full models

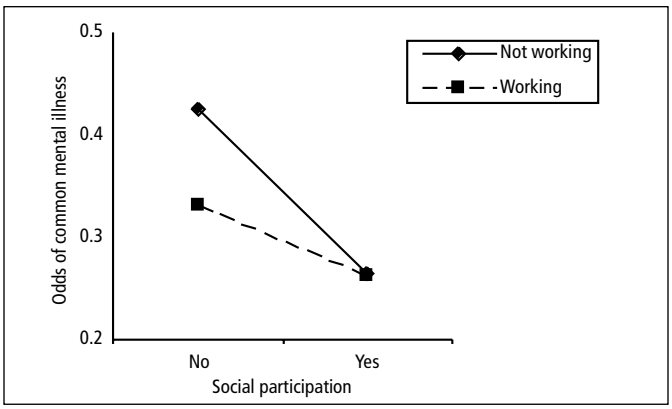


(b) Social participation and working status

In the full models, social participation also moderated the association between working status, common mental illness and three of the SF-36 sub-scales. However, working status is a problematic category when considering interactions. Its inclusion in the full models as a structural factor and potential confounding variable is less problematic as it is clearly associated with most health measures in 'static' analyses but it is equally plausible that the working status results from the poorer health of the respondent. In addition to 'reverse causation' is the issue that working status has considerable overlap with both sex and age in that a higher proportion of working age men are active in the labour market than women of the same age and there is less labour market participation, for both sexes, in the older age groups. To try and untangle some of these issues we first restrict the analyses to only those respondents of working age – in our case 26 to 65 years of age. The significant interactions remain in the models. However, when we conducted similar analyses for men and women separately we found that for men there were no significant interactions but there were for women.

Figure 3.3 illustrates that the effect of social participation is greater for those not working. The magnitude of this difference is captured in the steeper gradient in the solid line representing those not working compared to the gradient in the dotted line for those working. There is no gap between the end points of the lines which suggests that social participation completely moderates the effect of working status on the odds of common mental illness, ie for those who report social participation their working status has no effect on the odds of common mental illness.

Figure 3.3: The interaction between working status and social participation on the odds of common mental illness for women aged 26 to 65 years only – pooled data waves 1-5, 7 and 9; logit full models



Figures 3.4 to 3.6 illustrate similar findings on the three SF-36 sub-scales – physical functioning, social functioning and role limitations due to a physical problem. That similar interactions should be found with each of these outcomes is not surprising as all three correlate with each

Figure 3.4: The interaction between social participation and working status and their effects on the SF-36 physical functioning scale for women aged 26 to 65 years only – wave 9 data; OLS full models

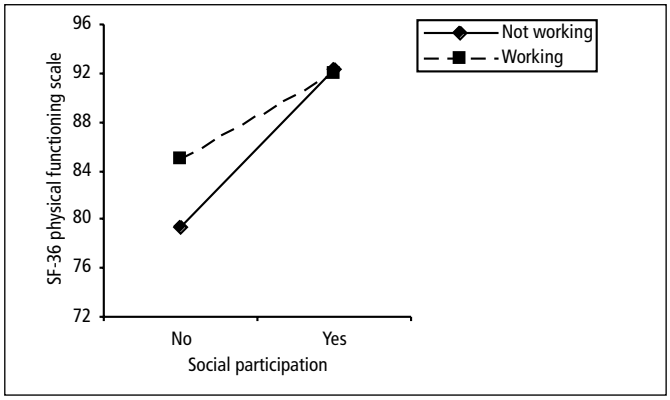


Figure 3.5: The interaction between social participation and working status and their effects on the SF-36 social functioning scale for women aged 26 to 65 years only – wave 9 data; OLS full models

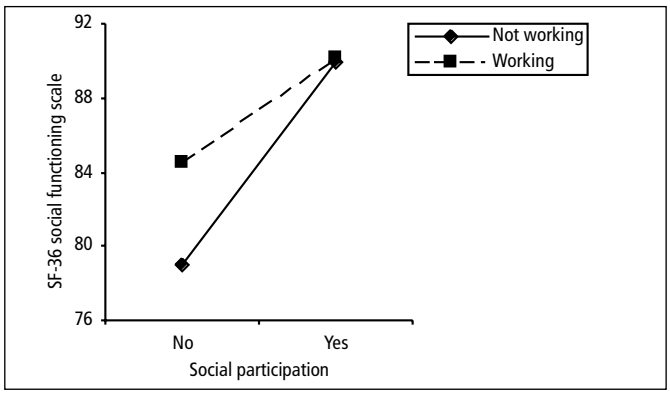
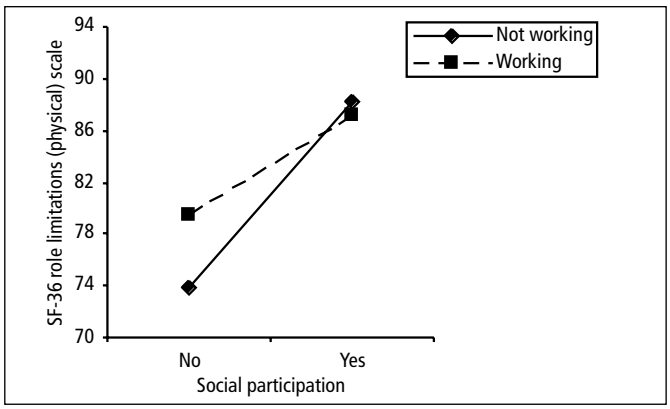


Figure 3.6: The interaction between social participation and working status and their effects on the SF-36 role limitations (physical) scale for women aged 26 to 65 years only – wave 9 data; OLS full models



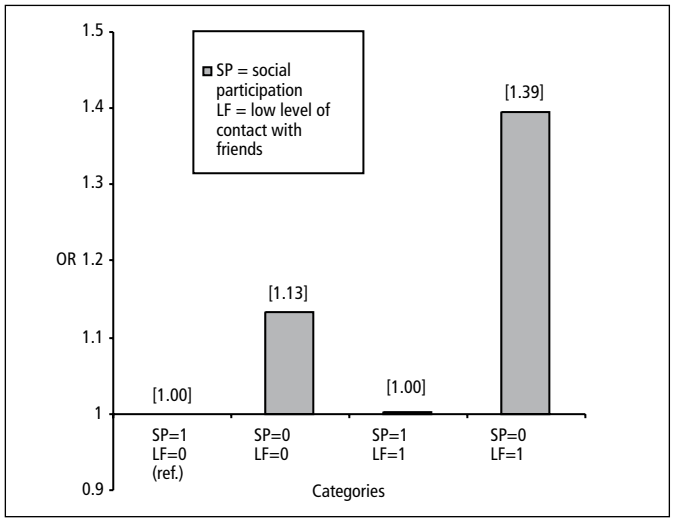
other at about $r = 0.6$. As with common mental illness, the effects of working status are completely moderated by social participation. The net effect of working status for those not reporting social participation is still rather substantively small with the difference of about six scale points being one quarter of a standard deviation at most.

Multiplicative effects

In this section we investigate whether or not the combinations of different social capital and social support measures increase the risk of common mental illness or poor self-rated health. Again, because of the data being collected at different waves of the BHPS a comprehensive simultaneous assessment is not possible and out of the five pairwise combinations (see Tables 2.1 and 2.2) only one – social participation and low contact with friends – has significant effects.

Figure 3.7 illustrates the ORs of the combinations of the indicators for social participation and low contact with friends on common mental illness. The reference category (on the left in the figure) is those who report social participation and not low contact with friends. The middle two categories in the figure are those with no social participation but not having low contact with friends and vice versa. The last category refers to those with no social participation and low contact with friends. The OR for this last category is significantly above all three other categories – $z = 5.7$, $p < .001$ from reference category; $\chi^2 = 3.2$, $p < .001$ and $\chi^2 = 23.5$, $p < .001$ from the two middle categories respectively. The ORs for the middle two categories are not significantly different from each other or from the reference category.

Figure 3.7: Multiplicative effects of social participation and low level of contact with friends on the odds of common mental illness [odds ratios in brackets]; logit full models (*n* = 16,750)



Health service use and specific health problems

Data on health service usage and specific health problems were also collected in the BHPS. This section reports the associations between social capital and social support and these specific instances. For conciseness, the dependent variables (health service use and health problems) are listed in the first columns of Tables 3.24 and 3.25 with the bivariate and multivariate coefficients for the social capital and social support measures in the following columns.

From the multivariate models, social participation is associated with a lower likelihood of six or more visits to a GP in the previous year and increased likelihood of five of the seven listed health check-ups (Table 3.24). High extent of crime was associated with an increased likelihood of six or more GP visits in the previous year but there were few other significant associations. Of particular interest is that the two measures that represent more immediate contact with people outside the home – social participation and contact with friends – are significantly associated with cervical smear and breast screen in the sub-sample of women, indicating that these networks may play an important role in preventative screening compliance.

In Table 3.25, all social capital and social support measures, with the exception of low contact with friends, are associated significantly with the indicator that health limits daily activities. This is further reflected in the specific ways in which the respondent's health hinders a number of daily activities. From the multivariate models, there are few notable associations other than the very high and significant ORs produced for alcohol/drug-related problems and the high extent of crime indicator. Whether this association reflects a genuine effect or is produced by housing choices and/or housing policies is difficult to decipher.

Table 3.24: Bivariate and multivariate models of health service use measures regressed on structural factors and social capital or social support – pooled data waves 1-9 [a]

	Social participation		Low contact with friends		High extent of crime		Low neighbourhood attachment		Low social support	
	OR (1)	OR (2)	OR (1)	OR (2)	OR (1)	OR (2)	OR (1)	OR (2)	OR (1)	OR (2)
Six + visits to GP in year	0.77***	0.89*	0.99	0.91	1.71***	1.59***	0.84	1.14	1.26***	1.13
Health check-up:										
Dental	1.54***	1.33***	0.85***	0.98	0.79***	0.88	0.87	0.82*	0.66***	0.82***
Eye test	1.22***	1.16***	1.06	0.95	0.91	1.01	0.86	1.03	0.93	0.97
Chest or other x-ray	1.04	1.08	0.99	0.89	1.26*	1.32*	0.89	1.07	1.22***	1.09
Blood pressure	1.08*	1.12***	1.04	0.91	1.01	1.08	0.79***	1.00	0.92	0.91
Cholesterol test	1.28***	1.21***	1.17**	0.91	1.18	1.33	0.67***	0.92	1.07	0.94
Cervical smear[b]	1.08	1.06	0.70***	0.86*	1.24	1.19	1.28*	0.99	0.86	0.98
Breast screen[b]	1.22***	1.17*	1.12	0.85	0.86	0.95	0.65**	1.05	0.91	0.91

Notes: OR (1) is bivariate OR, OR (2) is multivariate OR from full models as in Tables 3.4 etc. * positive ** strong *** very strong (actual minimum *z* values vary by sample size)
[a] coefficients for structural factors not shown. Data samples not from all waves – see Table 2.1. Logit models with robust standard errors for multiple waves. [b] women only sample

Table 3.25: Bivariate and multivariate models of health problems and health limited activities regressed on structural factors and social capital or social support – pooled data waves 1-9 [a]

	Social participation		Low contact with friends		High extent of crime		Low neighbourhood attachment		Low social support	
	OR (1)	OR (2)	OR (1)	OR (2)	OR (1)	OR (2)	OR (1)	OR (2)	OR (1)	OR (2)
Health limits daily activities	0.70***	0.84***	1.44***	1.06	1.53***	1.49***	0.78**	1.30*	1.66***	1.31***
Health hinders:										
Doing the housework	0.58***	0.71***	1.63***	1.16	1.70***	1.68***	0.79	1.62**	1.66***	1.35***
Climbing the stairs	0.56***	0.71***	1.69***	1.13	1.61***	1.60***	0.77	1.58**	1.77***	1.31**
Getting dressed	0.54***	0.67***	1.74***	1.23	1.49	1.17	0.87	1.62	1.79***	1.32
Walking 10 mins +	0.55***	0.69***	1.62***	1.09	1.71***	1.64***	0.79	1.59**	1.84***	1.32***
Health problems:										
Limbs, back or neck	0.90*	1.02	1.38***	0.99	1.16	1.23*	0.73***	1.24**	1.34***	1.10
Seeing	0.80**	0.90	1.58***	1.11	1.17	1.32	0.78	1.22	1.48***	1.20
Hearing	0.93	1.08	1.62***	1.05	0.96	1.18	0.71*	1.21	1.38***	1.05
Skin conditions/allergies	1.14*	1.09	0.95	1.08	1.15	1.11	1.29**	1.21	0.81***	0.97
Chest/breathing	0.81***	0.87	1.04	1.00	1.50***	1.44***	0.99	1.09	1.15	1.06
Heart/blood/circulation	0.92	1.01	1.46***	0.89	0.94	1.07	0.61***	1.21	1.32***	1.05
Stomach/liver/kidneys	0.95	1.03	1.24**	0.99	1.64***	1.74***	0.88	1.27	1.22*	1.05
Diabetes	0.74	0.84	1.48**	1.02	1.37	1.27	0.78	1.27	1.64***	1.27
Depression/nerves	0.73***	0.84	1.36***	1.27***	1.83***	1.60***	1.31*	1.74***	1.94***	1.83***
Alcohol/drug-related	0.70	0.72	1.48	1.72	5.47***	6.55***	2.63	2.35	2.27**	1.91
Epilepsy	0.83	0.99	1.01	1.18	1.06	0.81	1.50	1.24	1.15	1.15
Migraine/often headaches	0.90	0.97	0.93	1.07	1.47***	1.32	1.06	1.10	1.04	1.12

Notes: OR (1) is bivariate OR, OR (2) is multivariate OR from full models as in Tables 3.4 etc. * positive ** strong *** very strong (actual minimum *z* values vary by sample size)
[a] coefficients for structural factors not shown. Data samples not from all waves – see Table 2.1. Logit models with robust standard errors for multiple waves

Smoking behaviour

This section reports similar analyses to those presented earlier but with smoking behaviour as the outcome. Using smoking behaviour rather than a health indicator as the outcome provides a challenge in constructing another narrative by which social capital and social support may be associated with varying probabilities of smoking. Also, smoking behaviour may be another intervening variable in the link between structural factors and the health indicators. However, smoking is associated with poor health both contemporaneously and over the long term, and while it may not be an efficient health indicator its use may provide some important indications of risk behaviour in relation to health. For these analyses, smoking is a dichotomous indicator based on the respondent's self-report of whether or not they are a smoker at the time of interview.

Table 3.26 shows a summary of the results of social capital and social support with current smoking status. In the bivariate models all the social capital and social support indicators are significantly associated with smoking. In the multivariate models only three retain their effects. Notably, low contact with friends is associated with a lower likelihood of smoking, which appears counter-intuitive as the socially isolated are thought more likely to smoke. Social participation lowers the likelihood of smoking while a high extent of crime increases the chances.

In the full models, sex, age, marital status and household social class were the major factors associated with smoking status. Men are more likely to smoke than women and those in the older age groups are less likely to smoke than the younger respondents. All marital status categories have a higher likelihood of smoking than those who are married, and those in NS-SEC Classes 4 to 8 are more likely to smoke then those in Class 1. All of these findings are in line with previously reported findings (see Cooper et al., 1999). Interactions between the social capital and social support indicators and the structural factors were investigated and none proved to be significant in the full models.

Discussion of pooled data results

The results from the analyses in this chapter show that four out of the five measures of social capital and social support have significant effects on common mental illness and poor self-rated health (and most of the SF-36 sub-scales) in the presence of structural factors. The exception is the measure of low contact with friends which only exhibits a weak association with common mental illness and no association with poor self-rated health.

The associations of the structural factors to the social capital and social support measures differed, although most were significantly associated with sex, age, marital status and household social class. Education level had effects on some of the measures while working status only had an effect on social support. Table 3.27 summarises the significant effects on the measures of social capital and social support.

The summary disguises some important differences in the directions of the effects, particularly for sex and age. Men are significantly more likely to report social participation but at the same time are more likely to have low contact with friends, low neighbourhood attachment and low social support. Increasing age is associated with an increased likelihood of social participation and a lower likelihood of a high extent of crime and low neighbourhood attachment but with an increased likelihood of low contact with friends and low social support.

Table 3.26: Bivariate and multivariate models of smoking behaviour regressed on structural factors and social capital or social support – pooled data; logit full models [a]

	n[b]	Bivariate OR	Multivariate OR
Social participation[c]	51,177	0.69***	0.63***
Low contact with friends[c]	33,949	0.73***	0.86**
High extent of crime	7,805	1.83***	1.48***
Low neighbourhood attachment	8,079	1.38***	1.18
Low social support[c]	33,321	1.13*	1.02

Notes: * positive ** strong *** very strong (actual minimum *z* values vary by sample size)
[a] coefficients for structural factors not shown; [b] from multivariate models; [c] robust standard errors used

Table 3.27: Summary of effects of structural factors on social capital and social support measures – multivariate models only

	Sex	Age	Work status	Education	Marital status	Social class
Social participation	✓	✓		✓	✓	✓
Low contact with friends	✓	✓		✓	✓	
High extent of crime		✓			✓	✓
Low neighbourhood attachment	✓	✓			✓	
Low level of social support	✓	✓	✓			✓

Additionally, compared to those who are married, those cohabiting are less likely to report social participation. All other categories of marital status are less likely to have low contact with friends, and those cohabiting and single are more likely to report a high extent of crime and low neighbourhood attachment. Household social class has a negative effect on the likelihood of social participation and a positive effect on the likelihood of reporting a high extent of crime and low social support. We return to these points in our discussion of the longitudinal results.

Across the different samples analysed the structural factors that had significant effects on the likelihood of common mental illness and poor self-rated health remained very consistent. For common mental illness, sex, age, working status and marital status had consistent effects while education level was inconsistent across the samples. For poor self-rated health, age, working status, marital status and household social class were consistent and the effect of age was inconsistent across the samples.

The structural factors were associated with both levels of social capital and social support along with maintaining direct effects on the health outcomes in the presence of the social capital and social support measures. A few significant interactions were found that suggested that social participation moderated the effect of age on two SF-36 sub-scales (physical and social functioning) and the effect of working status on common mental illness and three SF-36 sub-scales (physical and social functioning and role limitations (physical)) for women only. A multiplicative effect between absence of social participation and low contact with friends on the likelihood of common mental illness was also discovered.

Most of these results are consistent with those reported by Cooper et al. (1999). Their two measures of social capital, neighbourhood and participation in community activities, have direct comparisons with our neighbourhood attachment and social participation measures. They found that both of their measures increased with age which mirrors our findings that the likelihood of social participation increases with age and low neighbourhood attachment is less likely with increasing age. They further note (p64) that they are unable to say whether this is due to a generational decline in social capital or a true age effect. We were able to go further in our analysis of social participation over time and by age cohort (see Chapter 4) but ultimately could not shed further light with our data.

Cooper et al. also examined the associations with social support and found that women have higher levels than men and there was little variation with age. We found that men are more likely to report low social support but found that age had a substantial effect of increasing the chances of low social support. It is worth noting that Cooper et al. were able to distinguish between regular contact with friends and that with relatives. In the BHPS questions the friends nominated by the respondent could also be relatives which might confound some of the results. Following on from that, Cooper et al. found that low contact with friends was significantly associated with higher chances of poor self-rated health but our results did not support this.

Overall, the results presented in this chapter show that while the measures of social capital and social support are associated with the health outcomes, and remain so in the presence of the structural factors, they do not consistently mediate or moderate the effects of the structural factors.

4 Longitudinal analyses

Approach

In this chapter we focus on analysing change in the health indicators and how those changes relate to temporally prior conditions, both structural and those measuring social capital and social support. This allows us to differentiate between possible effects on the start, duration and recovery from a state of poor health. It may be the case that structural and social capital measures have varying effects on these three elements of a spell of poor health and panel data gives us the opportunity to explore these possibilities.

In the first three sections of this chapter, we follow the overall approach adopted in Chapter 3 in that we first examine the observed change over time in the measures of social capital and social support that have been collected in multiple waves of the BHPS – social participation, contact with friends and social support. The measures of the extent of crime and neighbourhood attachment are not included as they were only collected at one wave. Next, we examine the associations between the structural factors and the measures of social capital and social support. However, in this case we look at the precursors to change in the social capital and social support indicators.

In the next two sections we assess the simultaneous effects of the structural factors and social capital or social support measures on the onset and recovery of common mental illness and poor self-rated health. The format of these sections depart from those in Chapter 3 – here the health indicator becomes the focus with the effects of each social capital and social support indicator contained within those sections.

In the next section, we use survival analysis to investigate the effects of the structural factors and social capital on the time to recovery in a sub-sample of those experiencing a spell of common mental illness or poor self-rated health. The last two sections deal with changes in smoking behaviour and the effects of residential mobility on social capital, social support and health.

Definitions and assumptions

For the analyses involving the health indicators, 'onset' is defined as a change in state from one wave to the next where the change results in common mental illness or poor self-rated health, eg at wave 1 being zero on the dichotomous indicator and then at wave 2 being one on the indicator. 'Recovery' is simply the reverse to onset, ie one and then zero on the indicator. These definitions assume that the change in state between the waves is representative of the general change in health condition over that time. Therefore, observing an onset represents a decline in mental or overall health and observing a recovery represents an improvement in health. We acknowledge that with a year interval between waves a person's health may fluctuate a number of times between measurements.

We take a similar approach to describing changes in the social capital and social support indicators. To distinguish these from the health measures we use 'entry' and 'exit' rather than 'onset' and 'recovery'. These terms come with the same caveats though.

In the survival analysis we make a stronger assumption about the relationship between the annual measurements of health and the person's health over time. In these analyses we are modelling time to recovery from onset. If we observe someone with poor self-rated health in consecutive waves we assume that this represents the general trend to be in poor health over that time while acknowledging that there are probably times between waves when the person would not rate their health as

poor. To pay due regard to this assumption we use the term 'number of observations to recovery' rather than the term 'duration'.

Data samples

To investigate entry/exit and onset/recovery, the pooled data are transformed into a series of conditional transitions – one for entry/onset and one for exit/recovery for each of the indicators. These analyses use all available data for pairs of consecutive waves but, as with the pooled data, the number of possible transitions increases with the number of times the social capital or social support indicator was collected. For example, data on neighbourhood attachment was collected only in wave 8, so the maximum number of transitions are those from wave 8 to wave 9.

Survival analysis of observed time to recovery was investigated by using two sub-samples. The first, comprising those who had a complete nine wave GHQ record, had at least one observation of common mental illness and an observed onset, ie were not observed to be suffering from common mental illness in wave 1. This resulted in a sample of 2,119, and of those 1,898 also had an observed recovery. The second sub-sample included those who had a complete eight wave self-rated health record, had at least one observation of poor self-rated health and an observed onset. This resulted in a sample of 1,223, and of those 930 had an observed recovery.

As the social capital and social support indicators were not measured at every wave of the BHPS, for the survival analysis we imputed data from the previous wave, ie social support was in waves 1, 3, 5, and 7 and so data from wave 1 were imputed to wave 2, wave 3, to wave 4, etc. Similarly, social participation was not asked in waves 6 and 8 so data were imputed from waves 5 and 7. Different methods of imputation were tested, such as using the scale score between the ones in the waves either side of the missing wave. However, the different methods made little or no difference to the final results mainly because the scale was collapsed into a dichotomous indicator.

Statistical analyses

Entry/exit and onset/recovery are modelled by way of stationary first-order Markov models. These models assume that only the most recent set of conditions are important for predicting the present state and that all cases have the same transition probabilities (Bijleveld et al., 1998). The covariates in these models produce a probability of observing a change in state from one time to the next. The probability of transition significantly varied by the number of prior observations in that state. This is not surprising as it is common sense that the longer we observe someone not being ill then the less likely they are to become ill, and vice versa in that the longer one is ill the less likely one is to recover. This state dependence breaches one of the main assumptions of the stationary Markov model. We attempt to compensate for this by including as a predictor variable an indicator of the number of prior observations in that state. This variable could be interpreted as an indicator of wellness in relation to the onset model and an indicator of chronicity in the recovery model. Thus, we would argue that these indicators capture a characteristic immediately at the observation prior to any transition and therefore help meet the Markov assumption.

The onset model is the probability of a case above the threshold conditional upon being below the threshold at the previous time and vice versa for the recovery model. Once the data have been transformed into a series of conditional transitions, the odds ratios for the covariates are estimated by a maximum likelihood logit function. Robust standard errors (Huber, 1981) are used to compensate for individuals with multiple observations and the models employ the weighting scheme provided with the BHPS. Survival analysis is by way of discrete-time models with time-varying covariates (Allison, 1982; Jenkins, 1995).

Changes in social participation

Observed change

Table 4.1 shows the pooled proportions and the transition probabilities for the indicator of social participation. In waves 1 to 5, 48% of respondents report social participation. The year-on-year change is shown on the right hand side of the table and of those reporting social participation at *t* approximately 25% report no participation in the following year, *t+1*. Similarly, approximately 25% of those not reporting social participation in year *t* report participation in the following year.

Table 4.1: Pooled proportions and transition probabilities for social participation

Pooled proportions		Transition probabilities		
	t_{1-5}	*t*	*t+1*	
Social participation		Social participation	No	Yes
No	0.520	No	0.758	0.242
Yes	0.480	Yes	0.243	0.757

Table 4.2: Odds ratios of entry to and exit from social participation by structural factors; logit models [a]

Dependent variable	Entry		Exit	
Model	1	2	1	2
Structural factors at *t-1*	OR	OR	OR	OR
Sex (ref: female)	1.15	1.11	0.96	1.00
Age (ref: 15-24)				
25-34	0.95	0.91	0.74**	0.74*
35-44	0.85	0.86	0.61***	0.63***
45-54	0.74**	0.78	0.55***	0.52***
55-64	0.63***	0.72	0.51***	0.41***
65-74	0.60***	0.68*	0.48***	0.37***
75 and over	0.52***	0.57***	0.68*	0.48***
Currently working (ref: not working)	1.28***	1.00	0.89	0.89
Education (ref: higher degree)				
1st degree	0.65	0.70	1.36	1.20
HND, HNC	0.64	0.74	1.28	1.25
A level	0.58	0.63	2.08*	1.54
O level	0.49	0.57	2.17**	1.69
CSE	0.34**	0.41*	3.24***	1.93
None	0.29***	0.40*	2.56***	2.36**
Marital status (ref: married)				
Cohabiting	1.14	0.92	1.70***	1.51***
Widow	0.80	1.25	1.09	0.99
Divorced	0.80	0.85	1.17	1.08
Separated	0.86	0.88	1.73	1.56
Single	1.13	0.87	1.37***	0.96
Household social class (ref: NS-SEC 1)				
2	0.91	0.99	1.11	1.09
3	0.84	1.01	1.19	1.05
4	0.73*	0.90	1.58***	1.33
5	0.70**	0.92	1.84***	1.54***
6	0.58***	0.78	1.96***	1.55***
7	0.60***	0.85	2.00***	1.54***
8	0.58**	0.79	2.41***	1.85***
	n	15,667	*n*	15,285

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$ Model 1 – bivariate, model 2 – multivariate [a] coefficients for race and region of residence not shown

Likelihood of change by structural factors

Table 4.2 presents the bivariate and multivariate odds ratios for the structural factors on the entry to and exit from social participation. Those in older age groups and those with lower education are less likely to enter social participation. The effects of household social class observed in the bivariate ORs (model 1) become non-significant in the multivariate model (model 2). The effect of age in the exit from any social participation models shows that those in the older age groups are less likely to exit. So, taken together, those in the older age groups are less likely to enter but also less likely to exit if they are already engaged in any social participation. The effect of lower levels of education is perhaps more intuitive in that those with lower levels are more likely to exit any social participation and they are less likely to enter. The effect

of household social class remains significant in the multivariate model for exiting, with those in Classes 5 to 8 being more likely to exit any social participation than those in Class 1.

Social participation over time and by age cohort

Here we examine the trends of social participation over time and by age cohort. We chose the social participation measure as it had been collected the most often over the nine waves of the BHPS. We restrict our analysis to those respondents who were in the sample at all nine waves. In this way they can be weighted for panel attrition by using the longitudinal weights supplied with the BHPS data.

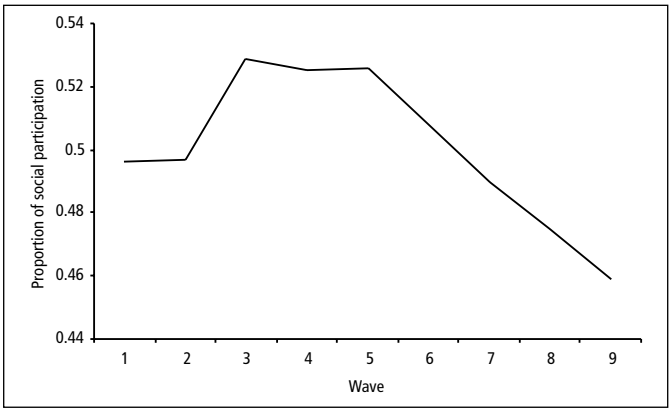
Table 4.3 shows the logit and negative binomial coefficients when regressing the wave number on the dichotomous and count variable for social participation. They both show that using wave 1 as the reference point, there is an increase in social participation up to wave 5 and then a decline to wave 9 being significantly lower than wave 1. These results are graphically presented in Figure 4.1.

Table 4.3: Logit and negative binomial models of social participation regressed on wave number (*n* = 39,467)

	Model	
Wave (ref. 1)	logit	neg. bin.
2	0.018	0.046
3	0.138***	0.103***
4	0.144***	0.110***
5	0.139***	0.117***
7	-0.005	0.014
9	-0.163***	-0.092***

Notes: * $z > 3.40$ ** $z > 3.95$ *** $z > 4.45$

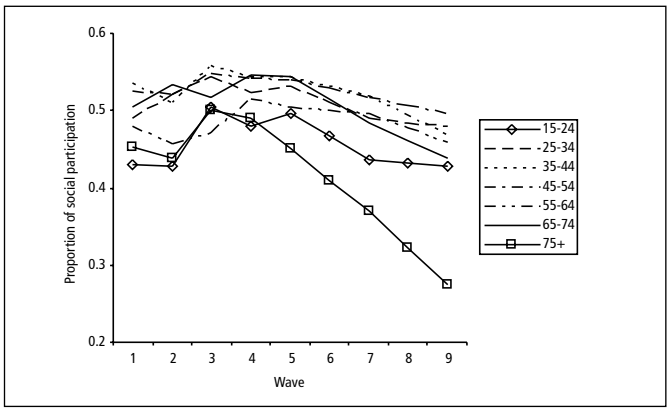
Figure 4.1: Proportion of social participation over waves of BHPS (*n* = 5,980)



To see whether this overall pattern over time varied by age cohort we divided the sample by age group at wave 1, shown in Figure 4.2. The pattern over time does not appear to vary with age at wave 1 and this is supported by regression models with interaction terms that produce only one significant term between wave 9 and the oldest age group (75+) which can also be clearly seen on the graph.

We tested other ways of trying to distinguish cohort from age effects but found little more information than that above and the effects of age on entry and exit to social participation reported earlier in this chapter. The aggregated social participation measure was broken down into the individual items with the most responses, other than 'other organisation', but even then the numbers proved too small for determining trends over time. For more on this area see Hall (1999) and the response from Lowndes (2000).

Figure 4.2: Proportion of social participation over waves of BHPS by age at wave 1



Changes in contact with friends

Observed change

The pooled proportions in Table 4.4 show that approximately 35% of respondents were deemed to have low contact with their friends. The transition probabilities are calculated over every other wave as these data were only collected in waves 2, 4, 6 and 8. Of those reporting low contact with friends approximately 41% reported not having a low level two waves later. For those not with a low level of contact about 21% report a low level two waves later.

Likelihood of change by structural factors

Table 4.5 shows that sex and age have large and significant effects on the entry to and exit from low

contact with friends. Men are 30% more likely to enter and 30% less likely to leave than women while increasing age makes entry more likely and exit less likely.

None of the other structural factors have significant effects in the multivariate models. The large and significant bivariate effect of the being single category in the marital status variable is probably rendered non-significant by the inclusion of the age groups.

Table 4.4: Pooled proportions and transition probabilities for low contact with friends

Pooled proportions		Transition probabilities		
	$t_{2,4,6,8}$	*t*	*t+2*	
Low contact with friends		Low contact with friends	No	Yes
No	0.653	No	0.789	0.211
Yes	0.347	Yes	0.412	0.588

Table 4.5: Odds ratios of entry to and exit from low contact with friends by structural factors; logit models [a]

Dependent variable	Entry		Exit	
Model	1	2	1	2
Structural factors at *t-2*	OR	OR	OR	OR
Sex (ref: female)	1.25***	1.30***	0.72***	0.73***
Age (ref: 15-24)				
25-34	1.61***	1.43*	0.48***	0.50***
35-44	2.06***	1.75***	0.28***	0.28***
45-54	2.10***	1.80***	0.28***	0.27***
55-64	2.48***	2.14***	0.27***	0.27***
65-74	2.61***	2.30***	0.22***	0.22***
75 and over	3.61***	3.41***	0.22***	0.21***
Currently working (ref: not working)	0.86*	0.92	1.23***	1.17
Education (ref: higher degree)				
1st degree	0.90	1.06	1.03	0.76
HND, HNC	0.55	0.64	1.17	0.98
A level	0.52*	0.71	1.60	1.14
O level	0.49*	0.67	1.60	1.22
CSE	0.44**	0.72	2.53**	1.29
None	0.75	0.78	1.21	1.13
Marital status (ref: married)				
Cohabiting	0.79	1.00	1.41*	0.95
Widow	1.12	0.79	0.93	1.07
Divorced	0.75	0.76	1.33	1.29
Separated	0.81	0.89	1.35	1.26
Single	0.56***	0.79	1.56***	1.01
Household social class (ref: NS-SEC 1)				
2	0.83	0.86	1.07	1.05
3	0.77	0.82	1.28	1.15
4	0.78	0.78	1.04	0.95
5	0.77	0.78	1.34*	1.26
6	0.81	0.83	1.27	1.14
7	0.76	0.79	1.28	1.12
8	0.85	0.89	1.15	0.96
	n	14,331	*n*	7,808

Notes: * positive ** strong *** very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate
[a] coefficients for race and region of residence not shown

Changes in social support

Observed change

Table 4.6 shows that overall approximately 22% of respondents reported low social support. Of those reporting low social support at *t*, 46% reported not having low social support at *t+2* – two waves later, ie 46% were observed to exit a state of low social support. For those not reporting low social support at *t*, approximately 12% reported a low level at *t+2*.

Likelihood of change by structural factors

As with changes in level of contact with friends, sex and age are the dominant effects in the multivariate models (Table 4.7). Compared to women, men are 60% more likely to enter a state of low social support and 22% less

Table 4.6: Pooled proportions and transition probabilities for low social support

Pooled proportions		Transition probabilities		
	$t_{1,3,5,7}$	*t*	*t+2*	
Low social support		Low social support	No	Yes
No	0.777	No	0.883	0.117
Yes	0.223	Yes	0.460	0.540

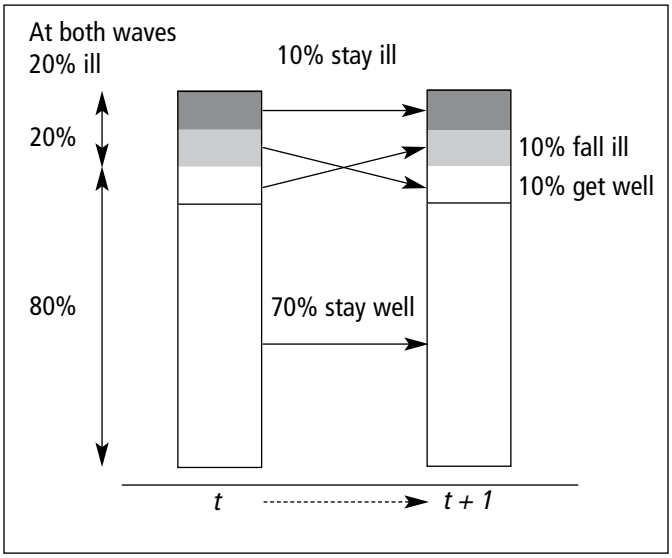
Table 4.7: Odds ratios of entry to and exit from low social support by structural factors; logit models [a]

Dependent variable	Entry		Exit	
Model	1	2	1	2
Structural factors at *t-2*	OR	OR	OR	OR
Sex (ref: female)	1.42***	1.60***	0.82	0.78*
Age (ref: 15-24)				
25-34	1.36	1.33	0.60***	0.59**
35-44	1.81***	1.67**	0.44***	0.44***
45-54	1.49**	1.34	0.42***	0.44***
55-64	1.53*	1.17	0.38***	0.43***
65-74	1.80***	1.24	0.40***	0.48***
75 and over	2.28***	1.54	0.44***	0.51*
Currently working (ref: not working)	0.80**	0.80	1.20	1.23
Education (ref: higher degree)				
1st degree	0.82	0.89	1.01	0.91
HND, HNC	0.88	0.95	1.12	1.00
A level	0.88	0.93	0.99	0.87
O level	0.84	0.90	1.18	0.96
CSE	1.20	1.28	1.41	1.05
None	1.44	1.33	0.76	0.78
Marital status (ref: married)				
Cohabiting	0.89	1.00	0.94	0.75
Widow	1.23	1.04	0.98	1.06
Divorced	1.08	1.07	0.91	0.97
Separated	0.91	0.90	1.10	1.12
Single	0.68***	0.79	1.57***	1.08
Household social class (ref: NS-SEC 1)				
2	1.15	1.16	0.92	0.93
3	1.18	1.13	1.17	1.17
4	1.41	1.30	0.92	0.95
5	1.62***	1.47*	0.99	1.09
6	1.67***	1.46	0.86	0.94
7	1.89***	1.65**	0.80	0.84
8	2.17***	1.63	0.77	0.91
	n	16,029	*n*	4,860

Notes: * positive ** strong *** very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate
[a] coefficients for race and region of residence not shown

likely to exit the state. The bivariate effect of increasing age making entry more likely is mostly non-significant in the multivariate model but age maintains a large effect on the chances of exiting in that increasing age makes an exit less likely. There is a weak and inconsistent effect of household social class in the multivariate model on the chances of entry in that those in NS-SEC Classes 5 and 7 are more likely to enter.

Figure 4.3: Wave-on-wave change in common mental illness



Common mental illness

Observed change

Table 4.8 shows the pooled proportions and the transition probabilities for common mental illness. Overall, approximately 20% of respondents report common mental illness but about half of them recover one wave later, while approximately 13% of those who do not report common mental illness at *t* do one wave later. Figure 4.3 illustrates the wave-on-wave change in common mental illness in terms of the percentages at *t*.

Onset and recovery

In these analyses we examine the influence of the social capital and social support indicators on the onset of and recovery from common mental illness. In Table 4.9, model 1 shows the bivariate ORs for the social capital and social support indicators on the chances of onset of and recovery from common mental illness. Model 2 shows the multivariate OR that was estimated for each indicator separately in the presence of the structural factors, plus a measure of severity in the recovery models. The models including extent of crime and neighbourhood attachment were restricted to those who had not moved between waves as these measures of social capital are location dependent.

As can be seen from the table, three of the social capital indicators had significant bivariate effects on the risk of onset of common mental illness. Specifically, social

Table 4.8: Pooled proportions and transition probabilities for common mental illness

Pooled proportions		Transition probabilities		
	t_{1-9}	*t*	*t+1*	
Common mental illness		Common mental illness	No	Yes
No	.797	No	.865	.135
Yes	.203	Yes	.516	.484

Table 4.9: Bivariate and multivariate odds ratios of onset of and recovery from common mental illness; logit models [a]

Dependent variable	Onset			Recovery		
Model	1	2		1	2	
Measure at *t-1*	OR	OR	n[b]	OR	OR	n[b]
Social participation	0.87*	0.88*	35,907	1.17*	1.07	8,840
Low contact with friends	1.01	1.06	23,833	0.80**	0.88	6,053
High extent of crime[c]	1.43*	1.37	5,647	0.73	0.82	1,387
Low neighbourhood attachment[c]	1.32*	1.31	5,840	1.09	0.91	1,429
Low social support	1.10	1.14	23,956	0.68***	0.75***	5,790

Notes: *positive **strong ***very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors, plus severity for recovery only [a] structural coefficients not shown; [b] multivariate model; [c] non-movers sample only

participation reduced the risk and high extent of crime and low neighbourhood attachment increased the risk. However, in the multivariate models only social participation maintained a significant effect in reducing the likelihood of an onset. Similarly for recovery, social participation increased the likelihood while low contact with friends and low social support decreased the likelihood of a recovery in the bivariate models. In the multivariate models only low social support maintained a significant effect reducing the chances of a recovery by 25%.

Mediating and moderating onset and recovery

In a similar vein to the investigation of mediating effects in Chapter 3, we found that the inclusion of the social capital or social support indicators did not mediate the effects of the structural factors on the likelihood of an onset of or a recovery from common mental illness.

Again, we explored the possibility of moderating effects by using interaction terms in the full models for both onset and recovery. Two significant terms were found in the recovery models: between low social support and sex (Figure 4.4) and between low neighbourhood attachment and sex (Figure 4.5).

Figure 4.4 shows that the effect of low social support on the odds of recovery from common mental illness is significantly greater for women. The difference in the effect of social support for men is not significant while for women having a low level of support reduces the odds of recovery substantially.

The effect of low neighbourhood attachment on the chances of recovery from common mental illness is also different by sex, but in this case the effect is only significant for men. Figure 4.5 shows that the effect of neighbourhood attachment is not significant for women – effectively a flat line – while for men having low neighbourhood attachment significantly reduces the likelihood of a recovery from common mental illness.

Multiplicative effects

Again, in a similar vein to that in Chapter 3, we investigated if the multiplicative effects of more than one measure of social capital or social support had any effects on the likelihood of onset and recovery. No significant effects were found.

Figure 4.4: The interaction between a low level of social support and sex and their effects on the odds of recovery from common mental illness; full logit models

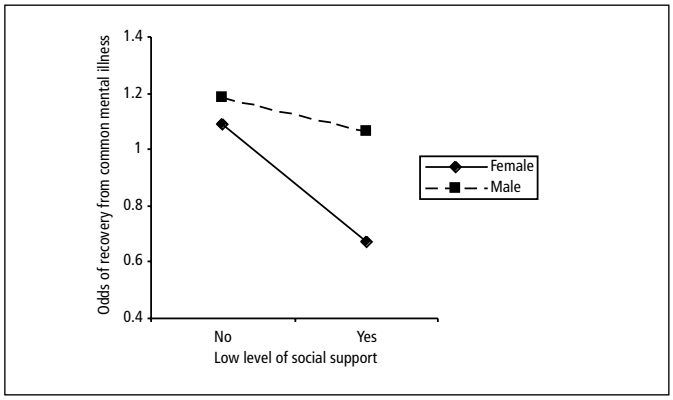
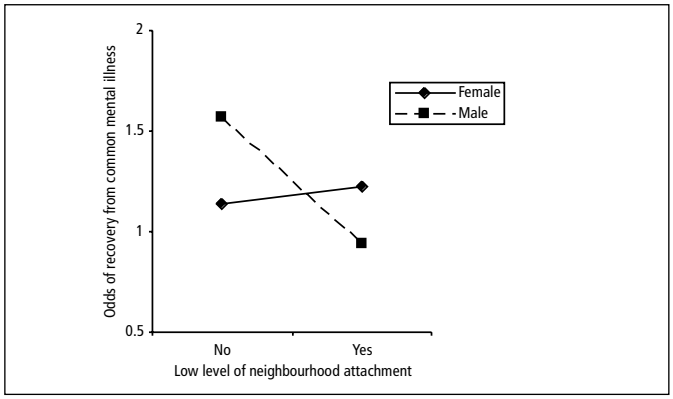


Figure 4.5: The interaction between a low level of neighbourhood attachment and sex and their effects on the odds of recovery from common mental illness; full logit models



Poor self-rated health

Observed change

Table 4.10 shows that overall 8.4% of respondents report poor self-rated health and of those 53% show a recovery at the next wave. Of the 91% who do not report poor self-rated health, approximately 5% show an onset at the next wave.

Onset and recovery

Table 4.11 shows the effects of the social capital and social support indicators on the onset of and recovery from poor self-rated health. Note that there are no coefficients for neighbourhood attachment as these data were collected in wave 8 and the self-rated health item was not included in wave 9. Social participation and low social support have significant effects in the bivariate models for both onset and recovery while high extent of crime also reduces the likelihood of a recovery. However, in the multivariate models none of the social capital or social support indicators has significant effects.

Mediating and moderating onset and recovery

In a similar manner to the investigation of mediating effects in Chapter 3, we found that the inclusion of the social capital or social support indicators did not mediate the effects of the structural factors on the likelihood of an onset of or a recovery from poor self-rated health.

Again, using interaction terms in the full model we explored the possibility of moderated effects and found that low social support moderates the effect of being widowed on the chances of recovery from poor self-rated health as shown in Figure 4.6. This shows that the level of social support does not change the odds of a recovery for those who are married, divorced or single (there were too few cohabiting cases to be analysed separately). Those who are widowed see a significant reduction in their odds of a recovery if they have low social support.

Multiplicative effects

Again, in a similar vein to that in Chapter 3, we investigated if the multiplicative effects of more than one measure of social capital or social support had any effects on the likelihood of onset and recovery. No significant effects were found.

Figure 4.6: The interaction between a low level of neighbourhood attachment and marital status and their effects on the odds of recovery from poor self-rated health; full logit models

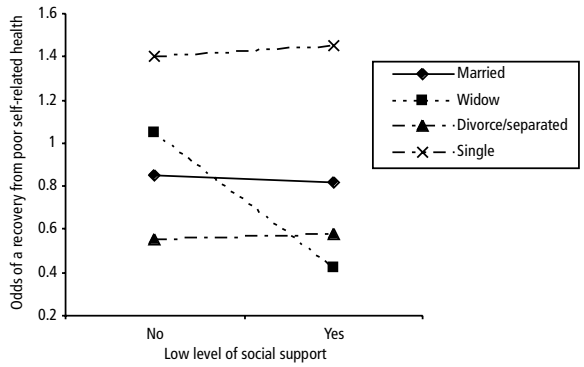


Table 4.10: Pooled proportions and transition probabilities for poor self-rated health

Pooled proportions		Transition probabilities		
	t_{1-8}	*t*	*t+1*	
Poor self-rated health		Poor self-rated health	No	Yes
No	0.914	No	0.951	0.049
Yes	0.085	Yes	0.466	0.533

Table 4.11: Bivariate and multivariate odds ratios of onset of and recovery from poor self-rated health; logit models [a]

Dependent variable	Onset			Recovery		
Model	1	2		1	2	
Measure at *t-1*	OR	OR	n[b]	OR	OR	n[b]
Social participation	0.77***	0.92	43,427	1.50***	1.24	1,895
Low contact with friends	1.11	1.01	21,807	0.87	0.92	1,012
High extent of crime[c]	1.49	1.30	6,696	0.56*	0.49	288
Low social support	1.42***	1.22	28,454	0.71**	0.82	1,223

Notes: *positive **strong ***very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors
[a] structural coefficients not shown; [b] multivariate model; [c] non-movers sample only

Survival analysis

Common mental illness

In these analyses we use a sub-sample of those who had experienced a 'spell' of common mental illness in that they had an observed onset and one or more observations above the GHQ threshold. If a respondent had more than one spell, the first observed spell was used as estimation procedures become complex when including multiple spells. In these models we test whether or not those with social capital or social support recover in fewer observations than those who do not.

Table 4.12 shows the bivariate log-rank test and the χ^2 test for a significant difference between the observed and expected recoveries. Only low social support produces a significant difference with fewer than expected recoveries.

Table 4.13 shows the hazard ratios for each of the social capital and social support indicators from full models. Low social support still has a significant negative effect – that is a negative effect on the 'hazard' of recovery, in other words individuals are more likely to spend more time in the state until recovery. However, this effect loses significance in the models controlling for unobserved heterogeneity.

We tested for any significant interactions between the social capital, social support and the structural factors but did not find any in the models controlling for unobserved heterogeneity.

Table 4.12: Log-rank tests for equality of survivor functions for common mental illness by social capital and social support measures

	Recoveries		
	Observed	Expected	
Social participation			
No	912	924.9	$\chi^2 = 0.8$
Yes	972	959.0	$p = 0.35$
Low contact with friends			
No	1253	1239.8	$\chi^2 = 1.1$
Yes	645	658.2	$p = 0.29$
Low social support			
No	1468	1444.7	$\chi^2 = 4.3$
Yes	406	429.3	$p = 0.03$

Table 4.13: Multivariate tests of hazard functions for common mental illness by social capital and social support measures; discrete time proportional hazards models [a]

Model	1 Hazard ratio	2 Hazard ratio
Social participation	0.08	0.08
Low contact with friends	-0.08	-0.09
Low social support	-0.22**	-0.17

Notes: * $z > 3.00$ ** $z > 3.60$ *** $z > 4.10$
Model 1 – without unobserved heterogeneity; model 2 – Gamma distributed unobserved heterogeneity
[a] coefficients for structural factors and severity at onset not shown

Poor self-rated health

For spells of poor self-rated health only social participation demonstrated a significant effect in the bivariate and multivariate models.

Table 4.14 shows that those reporting social participation had a higher than expected number of recoveries. Table 4.15 presents the hazard ratios in the multivariate models. Social participation has a positive effect on the hazard of leaving, ie more likely to spend less time in a spell. This effect is still significant in the models controlling for unobserved heterogeneity. As with common mental illness, no significant interactions were found in these models.

Table 4.14: Log-rank tests for equality of survivor functions for poor self-rated health by social capital and social support measures

	Recoveries		
	Observed	Expected	
Social participation			
No	452	486.6	$\chi^2 = 12.2$
Yes	446	411.4	$p = 0.00$
Low contact with friends			
No	580	567.3	$\chi^2 = 1.7$
Yes	327	339.7	$p = 0.19$
Low social support			
No	646	638.3	$\chi^2 = 0.7$
Yes	235	242.7	$p = 0.38$

Table 4.15: Multivariate tests of hazard functions for poor self-rated health by social capital and social support measures; discrete time proportional hazards models [a]

Model	1	2
	Hazard ratio	Hazard ratio
Social participation	0.33***	0.37*
Low contact with friends	-0.07	-0.03
Low social support	-0.02	0.00

Notes:* $z > 3.00$ ** $z > 3.60$ *** $z > 4.10$ Model 1 – without unobserved heterogeneity; model 2 – Gamma distributed unobserved heterogeneity [a] structural coefficients not shown

Changes in smoking behaviour

Table 4.16 shows the bivariate and multivariate ORs for the entry to and exit from smoking status by the social capital and social support indicators. None of the indicators has a significant effect in the multivariate models. Sex and age are the dominant precursors of entry to smoking status, with men being more likely to enter and those in the older age groups being less likely to enter. For exits, education level and marital status have the largest effects. The lower the education level the less likelihood of exiting and all marital status categories have lower chances of exiting than those who are married. Interactions between the social capital and social support indicators and the structural factors were investigated in both the entry and exit models and none proved to be significant.

As smoking status was significantly associated with common mental illness (OR 1.30, $p < .001$) and poor self-rated health (OR 1.44, $p < .001$), we included smoking status as an intervening variable between the structural factors and the health indicators along with the indicators of social capital and social support. The inclusion of smoking status did not change the effects of the social capital and social support indicators on both common mental illness and poor self-rated health while smoking maintained an independent effect.

Table 4.16: Bivariate and multivariate odds ratios for social capital and social support on the entry to and exit from smoking behaviour; logit models [a]

Dependent variable	Entry			Exit		
Model	1	2		1	2	
Measure at *t-1*	OR	OR	n^b	OR	OR	n^b
Social participation	0.77*	0.80	33,781	1.37***	1.21	12,695
Low contact with friends	0.59***	0.94	16,941	1.09	1.03	6,290
High extent of crime[c]	1.50	1.23	4,806	1.39	1.45	1,956
Low social support	0.92	0.95	22,172	0.82	0.93	8,423

Notes: *positive **strong ***very strong (actual minimum z values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors [a] structural coefficients not shown; [b] multivariate model; [c] non-movers sample only

Residential mobility, social capital and health

Residential stability or instability has been viewed as an important indicator of social capital in that residential instability cuts the links people have to their immediate community. It has also been posited as a significant causal process in social disorganisation theories when communities are largely transitory for the individuals and families in them at any one time.

A major problem with trying to investigate the correlates of residential stability by way of length of time at a particular residence is that this measure is highly correlated with the age of the respondent. Furthermore, modelling both age and time in residence simultaneously usually 'washes out' the effects of both independent variables. In an attempt to overcome this problem, we examine residential instability by way of year-on-year moves and their main reasons that have been collected in the BHPS at every wave from wave 2. Over the nine waves of data about 12% of movers cite employment as their main reason for moving – either working for the same or a new employer, self-employment or to seek work. Of the non-employment reasons, moving in with a partner is given by 13% of the movers, 10% say to move is because of attending tertiary education, another 10% move to larger accommodation and 7% because they have been evicted or their house repossessed.

First we examine the structural factors associated with a change in residence between waves and then how that change is related to social capital, social support and health both by a generic 'mover status' indicator and then by the main reason given for the move.

The structural factors most strongly associated with mover status are age, marital status and education. Those in the older age groups have significantly less likelihood of moving than do those with lower education. All marital statuses, except being single, have a significantly higher likelihood of moving compared to married people. It is not surprising given the description above that those cohabiting are over three times more likely to have moved in the previous year, as are those who have separated from their partner.

Table 4.17 shows the ORs of the social capital and social support indicators for mover status since the previous wave. Note that the dependent variables – social capital and social support indicators – are listed in the first column. There are marked differences between the bivariate and multivariate models. While moving between waves results in being significantly less likely to report social participation in both the bivariate and multivariate models, this consistency is not seen in any of the other social capital or social support indicators. In particular, low contact with friends switches from being significantly less likely in the bivariate models to significantly more likely in the multivariate models. This switch is caused by the inclusion of age as a covariate.

Using the full models (structural plus mover status), the ORs of mover status on common mental illness and poor self-rated health are 1.18 ($p < .001$) and 1.22 ($p < .001$), respectively showing significant but small increases in the likelihood of poor health. The effect of mover status on common mental illness was rendered non-significant in the presence of indicators for high extent of crime and low neighbourhood attachment while they maintained significant and substantial effects. For poor self-rated health, the effect of mover status was non-significant in the presence of indicators for low contact with friends and low neighbourhood attachment.

Table 4.17: Bivariate and multivariate odds ratios of social capital and social support regressed on mover status – pooled data; logit models [a]

	Bivariate OR	Multivariate OR	n[b]
Social participation	0.88**	0.84***	49,838
Low contact with friends	0.81***	1.22***	33,984
High extent of crime	1.05	0.71*	7,800
Low neighbourhood attachment	2.06***	1.18	8,076
Low social support	0.70***	0.99	24,267

Notes: * positive ** strong *** very strong (actual minimum z values vary by sample size)
[a] coefficients for structural factors not shown; [b] multivariate model

Table 4.18: Bivariate and multivariate odds ratios for the entry to and exit from social capital and social support by mover status; logit models [a]

	Entry			Exit		
Model	1	2		1	2	
Dependent variables	OR	OR	n^b	OR	OR	n^b
Social participation	1.16	0.94	15,655	1.49***	1.05	15,655
Low contact with friends	0.98	1.31**	14,146	1.28	0.95	7,687
Low social support	0.79	0.96	15,905	1.24	0.98	4,853

Notes: *positive **strong ***very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors
[a] structural coefficients not shown; [b] multivariate model

Table 4.19: Bivariate and multivariate odds ratios for the onset of and recovery from common mental illness and poor self-rated health by mover status; logit models [a]

	Onset			Recovery		
Model	1	2		1	2	
Dependent variables	OR	OR	n^b	OR	OR	n^b
Common mental illness	1.28***	1.18*	48,139	1.19*	1.02	11,959
Poor self-rated health	0.86	1.23	50,168	1.15	1.01	4,392

Notes: *positive **strong ***very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors
[a] structural coefficients not shown; [b] multivariate model

Table 4.20: Multivariate odds ratios of social capital and social support regressed on reason for moving (ref. non-movers) – pooled data; logit models [a]

Reason for moving	SP	LF	HC	LNA	LSS
Employment reasons	0.70**	1.97***	0.82	1.57	0.79
Non-employment reasons					
Move in with partner	1.02	1.06	1.01	1.16	0.73
Split with partner	0.93	1.01	1.03	1.12	1.15
Move in with family	0.79	1.03	0.63	1.82	1.03
Move to college	1.05	2.72*	-	3.91	0.11
Evicted/repossessed	0.77	1.06	0.86	2.04	0.95
For larger accommodation	0.89	1.03	0.36*	0.92	0.97
For smaller accommodation	0.62	1.05	0.41	0.73	0.78
Health reasons	0.71	1.92	1.43	1.18	1.83

Notes: * positive ** strong *** very strong (actual minimum *z* values vary by sample size) [a] structural coefficients not shown
Legend: SP – social participation, LF – low contact with friends, HC – high extent of crime, LNA – low neighbourhood attachment, LSS – low social support

Table 4.18 shows that mover status is only significantly associated with an increased likelihood of entry to low contact with friends in the multivariate models. Table 4.19 shows the ORs of mover status on the onset of and recovery from common mental illness and poor self-rated health, and that mover status is only significantly associated with an increased risk of an onset of common mental illness.

In this part we follow the same procedures and investigate any variation by the main reason for moving. The BHPS data contain over 20 reasons but we report only the most common. Table 4.20 shows the associations, from full models, between reasons for moving and the social capital and social support indicators. Moving for employment reasons is associated with a lower likelihood of social participation and with a higher likelihood of low contact with friends. Of the other associations shown only two are significant, mainly because of the relatively small numbers and the larger standard errors even render the large effects non-significant. Table 4.21 shows the ORs of entry to and exit from states of social capital and social support. Moving for employment reasons increases the chances of an exit from social participation and an entry to low contact with friends. No other reasons were significantly associated with either entries or exits.

Table 4.22 shows the associations between reasons for moving and common mental illness and poor self-rated health. Not surprisingly, those with the main reason for moving of splitting from partner, being evicted/repossessed or moving for health reasons are significantly more likely to report common mental illness. Those moving for health reasons are also more likely to report poor self-rated health.

Table 4.23 shows the chances of onset and recovery by reason for moving and only splitting with partner and health reasons significantly increase the likelihood of an onset of common mental illness in the multivariate models.

The data presented in Tables 4.22 and 4.23 may give some clues into the differences in health indicators reported for the generic 'mover status' reported above – ORs of 1.18 for common mental illness and 1.22 for poor self-rated health. The underlying reason for the move appears to be more important for poor health than the move itself. Where the move has been enforced, either through breakdown of a relationship or eviction, people are substantially more likely to report common mental illness. For those who cite health reasons the processes may be different in that they were suffering from poor health prior to the move and continue to suffer after the move.

Table 4.21: Bivariate and multivariate odds ratios for the entry to and exit from social capital and social support by reason for moving (ref. non-movers); logit models [a]

Dependent variable	Entry			Exit		
Model	1	2		1	2	
	OR	OR	*n*[b]	OR	OR	*n*[b]
Social participation						
Employment reasons	1.26	0.74	14,304	1.69*	2.00**	14,112
Non-employment reasons						
Move in with partner	1.04	0.91		1.11	0.95	
Split with partner	1.23	1.08		1.51	1.16	
Move in with family	1.18	0.88		2.55*	1.83	
Move to college	3.11***	2.47		1.41	0.75	
Evicted/repossessed	1.03	0.80	15,008	1.49	1.13	14,661
For larger accommodation	1.02	0.82		1.21	1.12	
For smaller accommodation	0.67	0.59		1.10	1.02	
Health reasons	0.71	0.86		1.34	0.93	
Low contact with friends						
Employment reasons	1.54	2.16*	12,822	0.97	0.77	7,163
Non-employment reasons						
Move in with partner	0.81	1.45		1.00	0.58	
Split with partner	0.52	0.64		2.27	1.53	
Move in with family	0.37	0.80		1.94	0.87	
Move to college	0.76	1.61		2.08	0.23	
Evicted/repossessed	0.65	1.03	13,535	1.69	1.16	7,379
For larger accommodation	0.96	1.06		1.17	0.86	
For smaller accommodation	1.27	1.23		1.88	1.42	
Health reasons	2.91	2.93		0.77	0.96	
Low social support						
Employment reasons	0.67	0.83	14,508	1.19	0.92	4,515
Non-employment reasons						
Move in with partner	0.74	1.13		2.62	1.84	
Split with partner	1.18	1.32		0.97	0.82	
Move in with family	0.88	1.32		2.38	2.56	
Move to college	0.22	0.16		3.18	0.85	
Evicted/repossessed	0.98	1.17	15,221	0.87	0.56	4,681
For larger accommodation	0.68	0.73		0.95	0.84	
For smaller accommodation	0.71	0.55		1.99	1.72	
Health reasons	1.54	1.24		0.68	0.70	

Notes: *positive **strong ***very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors [a] structural coefficients not shown; [b] multivariate model

These results suggest that, for the individual, residential mobility can be deleterious for social capital in that those who move are less likely to report social participation and more likely to cease being engaged in the year after the move; similarly they are more likely to report low contact with friends and to enter a state of low contact. It remains to be investigated if these individuals restart their social participation after a period of adjustment to their new location. The reasons that lead to the move are more important determinants of mental health than the move itself, especially family breakdown and eviction.

Table 4.22: Bivariate and multivariate odds ratios of common mental illness and poor self-rated health regressed on reason for moving (ref. non-movers) – pooled data; logit models [a]

Dependent variable	Common mental illness		Poor self-rated health	
Model	1	2	1	2
Reason for moving	OR	OR	OR	OR
Employment reasons	1.00	1.08	0.35***	1.00
Non-employment reasons				
Move in with partner	0.93	0.95	0.66	1.16
Split with partner	2.65***	1.92***	1.05	1.23
Move in with family	0.91	0.87	0.88	1.22
Move to college	0.89	0.83	0.37***	0.13
Evicted/repossessed	1.48***	1.51**	0.74	1.10
For larger accommodation	1.09	1.05	0.73	1.11
For smaller accommodation	1.02	0.93	0.65	0.81
Health reasons	2.27***	2.12***	4.66***	3.01***

Notes: * positive ** strong *** very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate.
[a] coefficients for race, region of residence and wave not shown

Table 4.23: Bivariate and multivariate odds ratios for the onset of and recovery from common mental illness and poor self-rated health by reason for moving (ref. non-movers); logit models [a]

Dependent variable	Onset			Recovery		
Model	1	2		1	2	
	OR	OR	*n*[b]	OR	OR	*n*[b]
Common mental illness						
Employment reasons	1.00	0.91	44,283	1.12	0.91	10,658
Non-employment reasons						
Move in with partner	1.09	1.00		1.61	1.37	
Split with partner	3.18***	2.83***		0.80	0.71	
Move in with family	1.10	1.09		1.60	1.23	
Move to college	1.08	0.87		2.22*	1.99	
Evicted/repossessed	1.73	1.74	46,253	1.16	0.95	11,344
For larger accommodation	1.22	1.08		1.36	1.14	
For smaller accommodation	1.47	1.17		1.69	1.48	
Health reasons	1.60***	1.70***		0.41	0.41	
Poor self-rated health						
Employment reasons	0.46	0.71	46,741	3.21*	1.65	4,081
Non-employment reasons						
Move in with partner	0.80	1.21		2.20	1.16	
Split with partner	1.27	1.34		0.96	0.75	
Move in with family	0.83	0.86		2.28	1.04	
Move to college	0.37	0.45		5.72	0.85	
Evicted/repossessed	0.88	1.15	48,075	1.34	0.66	4,541
For larger accommodation	0.97	1.27		2.13	1.38	
For smaller accommodation	0.83	0.81		2.47	1.75	
Health reasons	3.83***	2.27		0.51	0.62	

Notes: *positive **strong ***very strong (actual minimum *z* values vary by sample size). Model 1 – bivariate, model 2 – multivariate with structural factors [a] structural coefficients not shown; [b] multivariate model

It is also possible that social capital has a stabilising effect on residential change. Individuals or families with more attachment to local groups, networks or the neighbourhood may be less likely to leave the area. To test this we examined whether or not the indicators for social capital and social support predicted moving. From full models we found that social participation reduced the likelihood of moving (OR 0.88, $p = .001$) while low neighbourhood attachment and high extent of crime increased the likelihood of moving (ORs 2.48, $p < .001$; 1.39, $p < .001$ respectively). Social support and contact with friends had no effect. It is not surprising that the two measures that specifically ask about the respondent's immediate neighbourhood have such large effects (see Pevalin (in press) for further analysis).

Discussion of longitudinal results

In this chapter we first investigated the precursors of entry to and exit from states of social participation, low contact with friends and low social support. The results are summarised in Table 4.24 below and it is notable that sex and age are the most consistent effects on the chances of both entry and exit.

These results give some insights into the dynamics of social capital and social support over time by cross-referencing with the information presented in Table 3.27 summarising the pooled data analysis results. Differences in any state, such as social participation, can be produced by three main mechanisms: differential entry rates, differential exit rates, and differences in duration in the state. The analyses presented in this chapter and Chapter 3 provide information on most of these elements and allow us to make inferences both about changes over time and how 'static' differences in social capital and social support are produced.

In the case of social participation, differences in the state were seen by categories of sex, age, education, marital status and household social class (see Table 3.27). When we look at Table 4.24 we see that age and education produce different chances of entry; and age, education, marital status and household social class produce different chances of exiting. There are no differences between the sexes in both chances of entry and exit but in the static analysis men are significantly more likely to report social participation. It can be inferred from these pieces of information that the sex difference at any point in time is produced by the duration men are involved in social participation rather than more chances of them entering or less chances of them exiting.

The effects of age are more complex as increasing age is associated with an increasing likelihood of social participation but at the same time is a precursor to lower chances of entry and exit. The lower chances of exiting could account for the increased likelihood of being in the state but the lower chances of entry suggest that duration in the state of social participation plays an important part in producing the static differences observed in Chapter 3. The effects of education level are somewhat easier to untangle in that those with lower levels of education are less likely to be in the state, are less likely to enter and more likely to exit. Duration may play a role but it is difficult to say from these results. People cohabiting and those in household social Classes 5 to 8 are less likely to be in the state and are more likely to exit without differences in the chances of entry.

Table 4.24: Summary of effects of structural factors on entry to and exit from social capital and social support – multivariate models only

	Sex	Age	Work status	Education	Marital status	Social class
Social participation						
Entry		✓		✓		
Exit		✓		✓	✓	✓
Low contact with friends						
Entry	✓	✓				
Exit	✓	✓				
Low social support						
Entry	✓					✓
Exit	✓	✓				

For low contact with friends, sex and age produce the only differences in chances of entry and exit. The differences observed in the categories of education and marital status in Chapter 3 (see Table 3.27) could be inferred to be due to differences in duration in the state. For sex and age the results show that men and those in the older age groups are more likely to enter, more likely to be in the state and are less likely to exit.

For low social support, men are more likely to enter, more likely to be in the state and are less likely to exit. Those in the older age groups have the same chances of entry but are more likely to be in the state and have less chance of exiting. Those in household social Classes 5 to 8 have more chance of entry and are more likely to be in the state, but have the same chances of exiting. Those working are less likely to have low social support but there are no differences in the chances of entry and exit suggesting that duration plays an important role in the static differences observed in Chapter 3.

In the next stage of the longitudinal analyses we investigated the effects of social capital and social support on the onset of and recovery from common mental illness and poor self-rated health. Only social participation lowered the likelihood of an onset of common mental illness in the presence of the structural factors and only low social support reduced the chances of a recovery. None of the social capital or social support measures had significant effects on the chances of an onset of or a recovery from poor self-rated health. In the survival analyses none of the social capital or social support measures had an effect on the hazard rate for spells of common mental illness while social participation had a positive effect on the hazard rate for spells of poor self-rated health. These findings are summarised in Table 4.25 below. Overall these results suggest that these measures of social capital and social support play only minor roles in the processes leading to the onset of and recovery from common mental illness and poor self-rated health (see Pevalin and Goldberg (in press) for similar analyses in relation to life events).

A note on temporal ordering

These longitudinal analyses are partially able to address the issue of temporal ordering between our variables of interest unlike the cross-sectional analyses reported in Chapter 3. However, which comes first is still mainly a matter of theoretical bent as we are interested in the effect of the state of social capital on changes to health. It is equally plausible, especially in relation to health and social activities, that poor health reduces the chances of entry to or increases the chances of exiting a state of social capital or social support. As a preliminary examination to this question we used the full entry and exit models for social participation and tested if the health indicators at *t-1* had significant effects. Common mental illness had no effect on the chances of entry to social participation but significantly increased the chances of exiting (OR 1.21, $p < .001$) while poor self-rated health reduced the chances of entry (OR 0.78, $p < .001$) but had no effect on the chances of exiting. This is a point we return to in the conclusion.

Table 4.25: Summary of effects of social capital and social support on entry to, observations to recovery, and exit from common mental illness and poor self-rated health – multivariate models only

	Common mental illness			Poor self-rated health		
	Entry	OTR	Exit	Entry	OTR	Exit
Social participation	✓				✓	
Low contact with friends						
High extent of crime		n/a			n/a	
Low neighbourhood attachment		n/a		n/a	n/a	n/a
Low level of social support			✓			

Note: OTR – observations to recovery

5 Conclusions

In this project we report the results of analyses investigating the links between social capital, social support and health using data from the first nine annual waves of the British Household Panel Survey (BHPS). The initial sample and following rules of the BHPS mean that it has remained broadly representative of the British population over the 1990s. However, as the initial sample of households was intended to be representative of British households overall, without any over-sampling of minority groups or sparsely populated areas, the data are not the most appropriate for examination of ethnic, racial or geographical differences.

The strengths of the data have largely dictated the course of the analyses. First, the pooled data provided an extremely large dataset for analysis and, second, the longitudinal data provided an opportunity to explore changes in social capital, social support and health over time and the precursors associated with such changes. Additionally, with all members of the household being included, intra-household analyses are possible and are reported separately in an edited volume (Pevalin, forthcoming HDA publication).

The results show that when examined cross-sectionally the main determinants of social capital and social support are sex and age, with education, marital status and household social class having significant roles for most of the measures used. However, this overview disguises some differences in the directions of effects, especially for sex and age. Men are more likely to be active in organisations – social participation – while, at the same time, being more likely to have low contact with friends, low neighbourhood attachment and low social support. Increasing age is associated with increased chances of social participation and lower chances of reporting a high extent of crime and low neighbourhood attachment but with increased chances of low contact with friends and low social support.

All of the measures of social capital and social support were significantly associated with the two main health indicators used – common mental illness and poor self-rated health – except for low contact with friends which was not associated with poor self-rated health. Social participation reduced the chances of common mental illness and poor self-rated health while the other measures, with the above exception, increased the chances of poorer health. The inclusion of the social capital and social support measures in the health indicator models did not mediate the effects of the structural factors on health but several significant interactions were observed with age and working status for women only. In the latter case, working status had no effect on health for women who reported social participation. However, the inclusion of working status as a predictor of health is problematic.

The longitudinal analyses showed that sex and age were also important determinants of changes in social capital and social support with other structural factors only having effects on changes in social participation.

There are no differences in the chances of entering and exiting a state of social participation between men and women but, at any point in time, men are more likely to be in the state which suggests that differences in duration account for the observed differences in the cross-sectional analysis. Men are more likely to be in the state of low contact with friends but they are also more likely to enter that state and less likely to exit, similarly for a state of low social support.

The effect of age on social participation was asymmetrical in that increasing age reduced the chances of entry to social participation but also reduced the chances of

exiting. For low contact with friends the effect of age is symmetrical in that increasing age is associated with increased chances of entering the state and reduced chances of exiting. Age is only significantly associated with the chances of exiting a state of low social support in that increasing age reduces the chances of exiting the state.

The effects of social capital and social support on the chances of an onset of and recovery from both common mental illness and poor self-rated health were minimal. Only social participation reduced the chances of an onset and low social support reduced the chances of a recovery from common mental illness. None had an effect on the onset of and recovery from poor self-rated health, but in a survival analysis social participation did reduce the time to leaving a state of poor self-rated health.

These results from the longitudinal analyses stand in contrast to those from the cross-sectional analyses in which most of the measures were significantly associated with both common mental illness and poor self-rated health. A clue to this inconsistency may lie in the note at the end of Chapter 4 when we examined the effect of health indicators on the entry to and exit from social participation. This was done in the knowledge that in the cross-sectional analyses common mental illness and poor self-rated health are significantly associated with substantial reductions in the likelihood of social participation. Not surprisingly, common mental illness did increase the chance of an exit and poor self-rated health reduced the chance of an entry. The temporal ordering between health indicators and variables that entail some involvement whether socially or through employment are problematic in that it is equally plausible that social participation affects health and health affects social participation. Moreover, it is very likely that both processes are occurring simultaneously. In this way it becomes an assessment of which ordering is more likely but our results do not provide a conclusive answer to that question.

The theme of temporal ordering is especially important for the affect of residential mobility on social capital. As we demonstrated in Chapter 4, residential mobility is associated with increased chances of exiting social participation and entering low contact with friends, both plausible mechanisms but which leave the question of resumption open to further examination. However, social capital by way of social participation, neighbourhood attachment and extent of crime also reduced the likelihood of a subsequent move. So residential mobility reduces the individual's social capital but prior low social capital is related to more chances of moving. This suggests that social capital may have a stabilising effect on communities in that those more attached are less likely to move but for the individual who moves their social capital may, only temporarily, be reduced.

The key point in all of these results is that while social capital and social support have positive effects on health, they do not mediate (and only moderate some of) the effects of the basic structural factors included in our models. The only exception is that social participation completely moderated the effect of working status on health for working age women. This may indicate that social participation provides some of the benefits, possibly through increased access to knowledge, that are available to non-working women. However, basic structural conditions remain important for health and also important for the individual's level of social capital, which does have an independent effect on health.

These imply that programmes or policies that encourage the development of individual social capital through involvement in the community may produce benefits for health but they will do little to negate the more fundamental inequalities in health.

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Notes