J. R. Statist. Soc. A (2007)
170, *Part* 2, *pp.* 469–481

Increasing social mobility: an effective policy to reduce health inequalities

Mel Bartley

University College London, UK

and Ian Plewis

Institute of Education, London, UK

[Received April 2006. Final revision December 2006]

Summary. Data from the Office for National Statistics Longitudinal Study are used to investigate the effect of mobility between occupationally defined social classes between 1991 and 2001 on health inequality in men and women. Logistic regression models related movement into more or less advantaged employment conditions to limiting long-term illness in 2001, controlling for social class in 1991 and 2001. When class in 1991 was controlled ('class of origin') those who moved into more advantaged social classes were least likely and those moving into less advantaged classes most likely to report a limiting illness. However, when social class in 2001 ('class of destination') was controlled, those moving from less to more advantaged positions were most likely to report limiting illness. The same patterns were seen in women. This means that social mobility did not increase the extent of health inequality over the time period that was observed, but rather served to constrain or dilute it. The results are interpreted in terms of an accumulation model of health inequality, and the policy implications are discussed.

Keywords: Gender; Health inequality; Logistic regression; Social class; Social mobility

1. Introduction

In the early years of the 21st century the UK governing party discovered social mobility (Aldridge, 2001; de Lorenzi *et al.*, 2005). Several high level meetings have been held, beginning with one in September 2003 which was attended by the Chancellor of the Exchequer, and several Government statements have been made about the desirability of increasing social mobility. Greater possibility for those born into less privileged social and economic circumstances to move into a more favourable socio-economic position is of course highly consistent with the philosophy of many political parties of 'opportunity for all'. Dismay has accordingly been expressed over recent findings indicating that movement between the social classes is, if anything, decreasing. The social class of their father now has a stronger influence on a person's own adult social class than was so 20 years ago. The relative importance of parental social class and the individual's own abilities have shifted to give more weight to parental origins (Feinstein, 2003; Galindo-Rueda and Vignoles, 2003; Blanden and Gregg, 2004).

For many years it was believed that social mobility, although politically desirable, would

Address for correspondence: Mel Bartley, Department of Epidemiology and Public Health, University College London, 1–19 Torrington Place, London, WC1E 6BT, UK.
E-mail: m.bartley@ucl.ac.uk

© 2007 Royal Statistical Society 0964–1998/07/170469

act to increase the degree of health inequality in the population (Glendinning *et al.*, 1992; MacIntyre, 1997). It seemed quite plausible that, as society became more 'meritocratic', healthier people, or those with greater 'health potential' arising from their psychological characteristics such as intelligence and coping skills, would be more likely to move from less to more privileged social groups (Stern, 1983; Fox, 1990; Blane *et al.*, 1993). Likewise, those with less favourable personal and health characteristics would be selected by the competition for social advantage into positions of less advantage. Thus the effect of social mobility would be to allow individuals to find their 'natural' social level, based on their abilities, which in turn influence health potential. Most studies of social mobility and health find that health tends to be better, regardless of the measure that is used, in those who experience mobility towards a more favourable situation in terms of income, prestige or conditions of employment, compared with others in their social class of origin who remain 'socially stable', or whose circumstances deteriorate (Power *et al.*, 1986; Fox, 1990; Nystrom Peck, 1992; Faresjo *et al.*, 1994; Karvonen *et al.*, 1999).

Since the early 1990s, a data set has been available in the UK that makes it possible to observe intragenerational social mobility over several decades in a fully representative sample of the population of England and Wales. This is the Office for National Statistics Longitudinal Study (ONS LS) (Hattersley and Creeser, 1995). The LS links census data and vital events (births, deaths and cancer registrations) for 1% of the population of England and Wales, about 500 000 people between the censuses of 1971 and 2001, and so offers a unique opportunity for the study of social mobility and health. In 1991 and 2001, the census has included additional questions on long-term illness.

In 2001, three simultaneous coding and classification changes were made: an update of the standard occupational classification that happens at the time of each decennial census; changes to the coding rules for employment status and the introduction of a new measure of socio-economic position, the National Statistics socio-economic classification (NS SEC), to replace the Registrar-General's social classification (RGSC) that had been used in previous studies of health inequality (Fitzpatrick and Dollamore, 1999a; Donkin *et al.*, 2002; Fitzpatrick, 2003; Rose and Pevalin, 2003a). The NS SEC, unlike the RGSC, is theoretically based, independently validated, identifies the self-employed and does not have the disadvantage of containing small groups at the upper and lower extremes of the class distribution (Rose and O'Reilly, 1997; Rose and Pevalin, 2003b), and it has been seen to discriminate health outcomes more finely than the older system (Fitzpatrick and Dollamore, 1999a). The question therefore arises of the extent to which previous studies on the links between socio-economic conditions and health will be replicated by using the newer measure. A version of the NS SEC using the 1990 occupational codes and a version of the RG classes using the 2000 occupational codes were developed specifically for comparative longitudinal work using the LS at the time of the 2001 census link. It is therefore possible to compare the different measures of socio-economic position directly, owing to the development of a dual coding of 2001 occupations to the 1990 coding scheme, which has allowed a version of the RGSC to be derived for 2001 (Blackwell *et al.*, 2005).

This paper has three objectives:

(a) to examine the relationship in this data set between social mobility and limiting long-term illness (LLTI), building on previous work with the data set (Bartley and Plewis, 1997; Blane *et al.*, 1999);
(b) to investigate the effect of the new social classification on this relationship;
(c) to investigate the relationship in women.

2. Sample and methods

2.1. Sample

The ONS LS is a record linkage study of approximately 1% of the population initially based on those who were enumerated in the 1971 census of England and Wales (approximately 500 000 people). Sample members are those who were born on any of four dates evenly spread throughout the year. Sample members were traced in the National Health Service central register and record linkage was used to add information from subsequent censuses and from vital registration, including births to sample mothers, death of spouse and death. The LS has been maintained through the addition of 1% of new births and immigrants who were born on the chosen dates (Office for National Statistics, 2006). Data in this paper include men and women aged 16–50 years in 1991 (and therefore 26–60 years old in 2001). Sample members had to be present in the UK on the census days of 1991 and 2001, as residents rather than visitors to the UK, and resident in private households. Certain other individuals were excluded owing to discrepancies in sex or age in the linked data.

2.2. Measures

Socio-economic position was measured by the NS SEC (Rose *et al.*, 1997). The NS SEC operationalizes social class on the basis of employment relations and conditions. The basic underlying notion is that of variations in the nature of the contract of employment. Employers and the self-employed are first distinguished from employees. Within the group of employees the classification distinguishes further according to the form of employment regulation. There are two types of employment regulation: the service contract and the labour contract. The service contract is typical of employees who must exercise delegated authority or exercise specialized skills in the interests of their organization and clients. It is characterized by greater levels of job security, an incremental pay scale, opportunities for promotion and a high degree of power to decide the work schedule (O'Reilly and Rose, 1999). The labour contract is described as a 'relatively short-term exchange of money for effort' (Rose and Pevalin (2003c), page 32). It entails higher levels of supervision, lower job security, no automatic pay increments and no automatic routes for promotion. Other occupations have 'mixed' labour contracts and are grouped according to typical degrees of autonomy, job security and responsibility for one's own and other people's work.

The NS SEC has been developed by a careful process in which occupations were classified into groups by using seven explicit criteria: monthly or more frequent payment of wages or salaries; regular pay increments; length of notice required; degree of influence over the start and end times of the working day; opportunities for promotion; degree of influence over planning in the workplace; influence over daily employment tasks, that were included in the British Labour Force Survey of 1996–1997 (Coxon and Fisher, 2003). The NS SEC was allocated to both men and women on the basis of their own present or most recently held occupation as stated at the time of the 1991 and 2001 censuses. There were, as is always the case, some changes in occupational codes between the two censuses, and also a change in the way in which employment status (whether a person was a manager or supervisor) was recorded (Donkin *et al.*, 2002). Dual coding of 2001 occupations to the 1990 coding scheme allows researchers to establish longitudinal patterns in the data (Blackwell *et al.*, 2005).

LLTI was measured according to the census question. The 'Household reference person' (who fills out the census form) answers, for each person in the household

> 'Does the person have any long-standing illness, health problem or handicap, which limits his/her activities, or the work they can do? Include problems that are due to old age.'

This measure was first used in a census of England and Wales in 1991 and is based on questions that have been used in British General Household Surveys every year since 1971. 'LLTI' is a broad category which may contain a wide variety of diseases and conditions of different severity. Like all self-reported measures, which are the most common measures of morbidity that are used in population health studies, this will be to some extent influenced by subjective factors. However, it has been shown that responses to this type of question are most strongly influenced by the presence of limiting physical diseases rather than psychological health problems (Cohen *et al.*, 1995).

Social mobility: as the NS SEC is not a hierarchical measure of social status or prestige, it is no longer appropriate to follow the previous convention of referring to 'upward' or 'downward' social mobility (Rose, 1999). Here we use the terms 'movement from more to less favourable (or advantaged) employment conditions', or vice versa, as appropriate. In other words, social mobility as used here has three categories: more favourable, stable and less favourable. It is slightly more problematic to characterize movement between self-employment and employee status. Generally speaking such a move would be characterized as follows: movement from SEC 4 (self-employed and small employers) into SECs 1 or 2 would represent an improvement in job security and authority over the work of others, though not in autonomy, and would be regarded as 'more favourable'. Movement to SECs 5, 6 and 7 would represent movement into lower levels of all these employment features and therefore would be regarded as 'less favourable'. Self-employment is the most stable social class, with over 60% of those in this group in 1991 remaining there in 2001.

2.3. Methods

Logistic regression was used to model the probability P of LLTI for case i. In the first model, we estimate the odds of poor health in the mobility categories conditional on the NS SEC groups that they left 10 years previously (the 'class of origin'), i.e.

$$\text{logit}(P_i) = \log\left(\frac{P_i}{1-P_i}\right) = \alpha + \sum_{j=2}^{7} \beta_j x_{ji} + \sum_{k=2}^{3} \gamma_k z_{ki} + \delta a_i$$

where x_{ji} and z_{ki} are respectively dummy variables for 1991 NS SEC categories j and mobility categories k and a is age, which is included to control for the fact that LLTI increases with age and that the social class and mobility experiences might be different for older compared with younger members of the sample. Hence $\exp(\alpha)$ is the odds of being in poor health for cases in the higher managerial and professional NS SEC category ($j=1$, the reference category) and in the 'to more favourable' mobility reference category ($k=1$) when a_i is 0, and γ_2 and γ_3—the coefficients of real interest—are, when exponentiated, the multiplicative effects on the odds of LLTI of being in the 'stable' and 'to less favourable' mobility categories for fixed 1991 NS SEC and age. The second model is the same as the first except that the x_{ji} are now the 2001 or 'destination' NS SEC dummy variables. We estimate the two models separately for men and women.

3. Results

Table 1 shows the numbers and percentages of men and women in the categories of RGSC and NS SEC. Because of problems in the reporting of women's occupations at the time of the census, more women than men are missing from this analysis, as would have been so regardless of the method that is used to classify occupations into social class groups.

Table 2 shows the extent of social mobility in men and women by using both the NS SEC and the RGSC. Mobility from less to more advantageous employment conditions between the

Table 1. Distribution of men and women among the RGSC and NS SEC at the 1991 census†

RGSC	*Men*	*%*	*Women*	*%*	*NS SEC*	*Men*	*%*	*Women*	*%*
I, professional	5967	6.9	1591	1.9	1, high managerial and professional	10025	12	3012	3.7
II, managerial	24714	29	21763	26	2, low managerial and professional	18646	22	17336	21
IIIN, routine non-manual	10396	12	35097	42	3, intermediate	8494	9.9	24598	30
					4, self-employed	11319	13	3468	4.2
IIIM, skilled manual	28373	33	6054	7.2	5, lower supervisory, higher technical	12142	14	2670	3.2
IV, semi-skilled manual	12945	15	14533	17	6, semiroutine	11610	13	18889	23
V, non-skilled manual	4007	4.6	4585	5.5	7, routine	14022	16	12652	15
All included	86402 (85%)		83623 (76%)			86258 (85%)		82625 (75%)	
Missing	15521 (15%)		26872 (24%)			15665 (15%)		27870 (25%)	
Total	101923		110495			101923		110495	

†Source: ONS LS.

Table 2. Distribution of men and women according to social mobility 1991–2001 between the RGSC and NS SEC†

Direction of mobility 1991–2001	*Results for men*		*Results for women*	
	NS SEC	*RGSC*	*NS SEC*	*RGSC*
To more favourable	22519	19795	22692	19577
%	26	23	27	23
Stable	51294	53801	47420	50710
%	59	62	57	61
To less favourable	12445	12806	12513	13336
%	14	15	15	16
Total	86258	86402	82625	83623

†Source: ONS LS. The version of the RGSC using the occupational codes for the 2001 census that was used in this comparison was provisional.

censuses of 1991 and 2001 was more common than mobility in the opposite direction, and there were few differences between men and women. The RGSC suggests a slightly more stable picture than the NS SEC does. The most common forms of mobility are between adjacent classes, but longer-range mobility was by no means uncommon. Using the NS SEC (which is the measure to be used in the rest of this paper), around 36% of men and 44% of women who moved into more advantaged employment conditions moved by more than two classes, and around 30%

Table 3. NS SEC in 1991, social mobility and NS SEC in 2001 in relation to LLTI in 2001 for men†

	Results for model 1 (NS SEC 1991)		*Results for model 2 (NS SEC 2001)*	
	Odds ratio	*95% confidence interval*	*Odds ratio*	*95% confidence interval*
Age	1.066	(1.064–1.069)	1.064	(1.062–1.067)
1, higher professionals and managers	1 (reference group)		1 (reference group)	
2, lower professionals and managers	1.38	(1.26–1.50)	1.34	(1.24–1.45)
3, intermediate	2.25	(2.02–2.50)	2.23	(2.01–2.49)
4, self-employed	1.87	(1.71–2.06)	1.94	(1.78–2.10)
5, lower supervisory, higher technical	2.24	(2.04–2.46)	2.35	(2.16–2.56)
6, semiroutine	3.20	(2.91–3.52)	3.27	(2.99–3.58)
7, routine	3.86	(3.53–4.22)	3.47	(3.20–3.77)
Social mobility				
To more favourable	1 (reference group)		1 (reference group)	
Stable	1.21	(1.15–1.28)	0.71	(0.68–0.75)
To less favourable	1.45	(1.35–1.56)	0.52	(0.48–0.56)
Model fit	$\chi^2 = 4049.6$, 9 degrees of freedom		$\chi^2 = 4026.4$, 9 degrees of freedom	

†Source: ONS LS.

of men and nearly 40% of women who moved towards less advantaged employment conditions moved by an equivalent amount.

Table 3 shows the results of the two logistic models for men's mobility, comparing the risk of LLTI with a base-line group. The base-line group was chosen to be those who had moved from less to more favourable employment conditions ('upwardly mobile'), as we hypothesized that this group would have the lowest risk of illness. In the first model, social class is allocated in 1991, i.e. 'class of origin', the social class from which individuals moved in the subsequent decade. In the second model social class is allocated in 2001 and is the 'class of destination', into which individuals had moved in the previous decade. In model 1, the odds of LLTI in each mobility group are compared with those of the upwardly mobile, adjusting for social class in 1991 (class of origin), whereas in model 2 the odds of illness in each other mobility group are compared with those of the upwardly mobile, adjusting for social class in 2001 (class of destination).

The odds ratios in the first model show that, within each NS SEC group of origin, those who moved to more advantaged occupations were the least likely and those who moved to less advantaged occupations (1.45) as well as socially stable men (1.21) were more likely to report LLTI in 2001. In contrast with the first model, model 2 shows that, when class of destination is adjusted for, relative odds of LLTI were actually significantly lower in those who had moved 'downwards' from more to less favourable employment conditions (0.52), and in socially stable men (0.71), than in those moving into more favourable conditions of employment, i.e., when compared with others in their class of destination, those who moved from previous occupations that are more characterized by a 'labour' type of employment contract towards occupations approximating more to the 'service' contract appear at a higher risk of illness than those who had remained in the classes that are more characterized by a service type of employment regulation during

Table 4. NS SEC in 1991, social mobility and NS SEC in 2001 in relation to LLTI in 2001 for women†

	Results for model 1 (NS SEC 1991)		*Results for model 2 (NS SEC 2001)*	
	Odds ratio	*95% confidence interval*	*Odds ratio*	*95% confidence interval*
Age	1.059	(1.056–1.061)	1.058	(1.055–1.060)
1, higher professionals and managers	1 (reference group)		1 (reference group)	
2, lower professionals and managers	1.35	(1.17–1.56)	1.35	(1.21–1.51)
3, intermediate	1.57	(1.36–1.81)	1.42	(1.27–1.60)
4, self-employed	1.60	(1.34–1.90)	1.50	(1.31–1.72)
5, lower supervisory, higher technical	2.42	(2.03–2.88)	2.24	(1.97–2.56)
6, semiroutine	2.35	(2.04–2.88)	2.20	(1.96–2.46)
7, routine	2.89	(2.50–3.34)	3.10	(2.75–3.48)
Social mobility				
Up	1 (reference group)		1 (reference group)	
Stable	1.28	(1.22–1.35)	0.92	(0.87–0.98)
Down	1.40	(1.30–1.51)	0.72	(0.66–0.78)
Model fit	$\chi^2 = 3193.8$, 9 degrees of freedom		$\chi^2 = 3273.4$, 9 degrees of freedom	

†Source: ONS LS.

1991 and 2001. Those moving from service towards labour contracts had a relatively low risk of illness, compared with others who were already in social classes with employment conditions that are more characterized by a labour contract, i.e., overall, the health of those moving into more advantaged social positions is somewhat worse, and that of those moving into less advantaged positions is somewhat better, than that of other members of each of the classes of destination.

Table 4 shows the same analysis for women, classified by the NS SEC according to their own occupations. As for men, the first model shows the relative odds of LLTI in all three mobility groups adjusted for the class of origin in 1991. Those who were socially mobile into more favourable employment conditions between 1991 and 2001 (the base-line group) were least likely to report LLTI in 2001 compared with others remaining stable in the same class of origin (1.28). Worst health adjusted for class of origin was seen in those who moved to less advantaged circumstances (1.40). However, when adjusted for class of destination (model 2), women who were socially mobile into less advantaged employment conditions had the lowest risk of LLTI (0.72), followed by the socially stable (0.92), and those who had moved from less to more favourable circumstances had the highest risk.

4. Discussion

This paper replicates earlier studies using the ONS LS (Bartley and Plewis, 1997; Blane *et al.*, 1999) in the most recently updated version that links social and health information from the census of 2001. There are important differences between the studies that indicate the robustness of the previous findings. This analysis uses the new social classification that was developed for

use in British official statistics from 2001: the NS SEC. A derivation of the NS SEC from the 1990 standard occupational classification, which was developed to test and validate the NS SEC before its use in the 2001 census (Donkin *et al.*, 2002), has been used rather than the RGSC, but yielding very similar results, and in particular showing exactly the same pattern of 'gradient constraint'. When the analysis was repeated using the original RGSC for 1991 and a special derivation of this variable for 2001, the result remained essentially the same (the results are not shown).

The analysis has been extended to women for the first time. There is considerable debate about the extent to which a woman's own occupation reflects her own 'human capital' (education, skills and work experience) because women's occupational histories are so strongly affected by parental responsibilities (Arber and Ginn, 1995; Warren *et al.*, 1998; Joshi *et al.*, 1999). A woman's own occupation may also be a weaker indicator of the standard of living in her own household, as women often earn less than men, even for the same work (Davies and Joshi, 1998; Joshi, 1998). Despite these differences, the data that are presented here show that social mobility acts to dilute health inequalities in women in a very similar manner to what is found in men.

The analysis that is presented here is not intended as an exercise in causal modelling of the determinants of LLTI in 2001. Rather, it is intended to address a persistent issue in medical sociology and social epidemiology (Illsley, 1955; Stern, 1983; West, 1997), namely whether social mobility could be one reason for the persistence of health inequality by 'sorting' fitter individuals into more advantaged social positions and the less fit into situations of less advantage. To test this idea in a large nationally representative data set, we have used the ONS LS, which is the largest data set available in the UK with repeated measures of social class. If social mobility were to act to increase social class differences in ill-health, such mobility would have to contribute to poorer health in the less advantaged classes and to better health in the more advantaged. For this to be so, the probability of illness in those moving to less advantaged class positions would, at the very least, need to be no lower than that in their class of destination (and vice versa). In fact we find the very opposite of this: that the probability of illness in men and women who move into more favourable employment conditions is actually higher, and the probability of illness in those who move to less favourable conditions is lower than that in other members of the destination class. Because of this, we concluded from our previous analysis (Bartley and Plewis, 1997) that mobility did not increase class differences in health. That result is now replicated here for the period 1991–2001 and with a different measure of social position. Social mobility in fact contributes to a somewhat lower probability of illness in the less advantaged social classes, and to a higher probability in the more advantaged.

The paper is not intended as a test of the relative merits of the different social class schemas that were used in 1991 and 2001. It is generally agreed that the strength of the relationship of social class to health should not be used as a test of the validity of a class measure (Rose and O'Reilly, 1997; Rose and Pevalin, 2003c). If a more conceptually valid measure were *less* strongly related to health, this would merely provide evidence that previous estimates of 'health inequality' may have been exaggerated; not that the measure was in some sense inferior.

The main importance of the findings is that, despite the difference in time periods and in measures of socio-economic position, a pattern of gradient constraint is clearly seen in both men and women. The term gradient constraint merely refers to the implication of the models that inequality in health is diluted rather than increased by social mobility. In a society with no mobility, there would be more, rather than less, health inequality. It has been important to replicate previous work that showed this pattern (van de Mheen *et al.*, 1999; Elstad and Krokstad, 2003; Cambois, 2004; Claussen *et al.*, 2005) because the finding has caused considerable surprise. At one time, when it was thought that the post Second World War welfare state

and taxation regimes had greatly reduced social inequality, social mobility was regarded as the most likely reason for the persistence of health inequality. More recently, when an international comparative study of health inequality caused surprise by showing that health inequality was at least as great in egalitarian Sweden as in the UK (Mackenbach *et al.*, 1997), greater social mobility in Sweden was proposed as one possible reason for this. It should be emphasized that social mobility does not *inevitably* result in a gradient constraint (a claim which our previous work has been mistakenly believed to make). If the risk of illness in those moving from more to less favourable conditions of employment were higher than that in existing members of the less advantaged social class (and vice versa), then social mobility would indeed increase the 'health gradient'. The analysis that is presented here merely shows that this was not so in England and Wales between 1991 and 2001; not that it never could be.

If it were the case that social mobility increased health inequality by greater efficiency in sorting 'fitter' individuals into the more socially advantaged and rewarded occupations, and the less fit into less advantaged positions, we would expect the recent decrease in social mobility to have a favourable effect on health inequality. And yet all the evidence is that health inequality increased through the 1980s and 1990s, although at a rate that has recently begun to slow somewhat (Hattersley, 1999; White *et al.*, 2003). Health differences between those in the most and the least socio-economically advantaged situations do not, therefore, seem to have decreased at a time of lower social mobility.

An alternative model of the relationship between health and the 'social trajectory'—the individual's experience of movement in the social structure over time—is the 'accumulation model' (Hart *et al.*, 1998; Bartley and Plewis, 2002; Ferrer and Palmer, 2004; Singh-Manoux *et al.*, 2004). This explanation sees health at any one time as the outcome of exposures to material, biological and psychosocial hazards up to that time. An accumulation model would predict something rather different from changing patterns of social mobility. The effect of mobility would depend on the conditions that are experienced within each social position that is occupied by the individual, and the amount of time exposed to those conditions. So in fact a society where fewer people experienced a mixture of socio-economic circumstances over their life course would in this view be one with greater health inequality. This is a more complex model, requiring more detailed data to be fully tested (Sacker *et al.*, 2005). However, with simple measures of social position at different time points some simple predictions could be made. The most important of these is that an individual who moved from less to more favourable socio-economic circumstances would be expected to have worse health than one who had never experienced exposure to a less advantaged social position. So, if we observe within, let us say, higher managerial occupations, a group of people who have held that position since the beginning of their working lives and another group who had attained managerial status after social mobility from the factory floor, the latter group would not be expected to enjoy as good health as the former. What would be expected to influence health status in the managerial group would not be solely their innate abilities and personal resources, but a combination of these with the conditions to which they had been exposed over their life course.

Since the late 1990s, several papers have appeared using this and other data sets which have suggested that social mobility may act to decrease rather than to increase health inequality in a population. Analyses of birth cohort data found little influence of social mobility on the size of health gradients (Power *et al.*, 1996; Rahkonen *et al.*, 1997). As more data from the British birth cohorts became available, it was noticed that health inequalities between cohort members in different social classes did not increase as these cohorts grew older (Power *et al.*, 1997). This was a puzzle in two ways. If social mobility (of which there is still much; see Table 2) is increasingly sorting fitter individuals into more favourable social positions over time, should health

differences not increase as members of the cohorts age? And even if there is no such sorting mechanism at work, and health inequalities are entirely due to behavioural differences (such as smoking and diet) between the social classes, how can it be that an additional 10 years of differential exposure to behavioural hazards that vary between classes at all adult ages fail to widen the health gradients?

One answer seems to be that social mobility has the effect of mixing up people with different combinations of hazard exposure histories within the same social class. Studies have begun to show that, in various ways, not just health but also health resources, such as height (Power *et al.*, 2002) and body mass (Langenberg *et al.*, 2003), of socially mobile individuals fall somewhere in between those of socially stable members of their 'origin' and 'destination' classes (Bartley and Plewis, 1997; Blane *et al.*, 1999; Kuh *et al.*, 2002).

A model of accumulation of risk over the life course (Mann *et al.*, 1992; Blane *et al.*, 1993; Holland *et al.*, 2000; Ben-Shlomo and Kuh, 2002; Davey Smith and Hart, 2002) is a plausible approach that has developed rapidly in recent years. The simple notion of accumulation can do no more than begin the development of a full explanation of the complex phenomena being observed, and it will not fit every case (Hallqvist *et al.*, 2004; Singh-Manoux *et al.*, 2004). However, it would go some way towards explaining the paradox of good health in the upwardly mobile relative to their class of origin combined with poor health relative to their class of destination. Those who are at risk of mobility from social classes with labour to those with service modes of employment regulation have, by definition, experienced at least some degree of exposure to the hazards that are associated with less favourable employment conditions. Likewise, by definition those who move from service towards labour forms of employment contract have experienced at least some period of time in a more advantaged, lower hazard environment. There is also evidence that socially mobile individuals change their health behaviours, to 'fit in' with the group that they join (Glendinning *et al.*, 1992, 1995; Burrows and Nettleton, 1995; Karvonen *et al.*, 1999). This will, for example, mean that mobile smokers may accumulate fewer pack-years than socially stable smokers, although we know rather little on this topic.

An 'accumulation' model of this kind accounts for the failure of social gradients in health to increase very much as members of cohorts age (Power *et al.*, 1997). As around 35% may be expected to move into a different social situation over a 10-year period, each social class contains quite a high proportion of people who have originated somewhere else, and who bring with them the effects of prior hazard levels, whether these be material, psychosocial or behavioural. Such a model also does make sense of the co-existence of decreasing social mobility with increasing health inequality. Social mobility means that individuals are exposed to a mix of socio-economic hazard exposures. When individuals are more constrained to remain within the same social groups over the majority of their life course, health experiences of these groups will be more divergent.

There are considerable implications of the research for health and wider social policy. This and a growing number of other studies provide consistent evidence that the overall effect of social mobility on population health and health resources appears to be one of decreasing the amount of health inequality, by exposing individuals of various social origins to more of a 'mix' of experiences over time. The implication of this is, likewise, that increasing social mobility would make a positive contribution to the policy objective of reducing health inequality.

Acknowledgement

Mel Bartley's work was supported by Economic and Social Research Council grant RES 000 23 0588.

References

Aldridge, S. (2001) Social Mobility: a discussion paper. Prime Minister's Strategy Unit, Performance and Innovation Unit, London.

Arber, S. and Ginn, J. (1995) The mirage of gender equality: occupational success in the labour market and within marriage. *Br. J. Sociol.*, **46**, 21–43.

Bartley, M. and Plewis, I. (1997) The relationship between social mobility and illness in England and Wales 1971-1991. *J. Hlth Socl Behav.*, **38**, 376–387.

Bartley, M. and Plewis, I. (2002) Accumulated labour market disadvantage and limiting long-term illness: data from the 1971-1991 Office for National Statistics' Longitudinal Study. *Int. J. Epidem.*, **31**, 336–341.

Ben-Shlomo, Y. and Kuh, D. (2002) A life course approach to chronic disease epidemiology: conceptual models, empirical challenges and interdisciplinary perspectives. *Int. J. Epidem.*, **31**, 285–293.

Blackwell, L., Akinwale, B., Antonatos, A. and Haskey, J. (2005) Opportunities for new research using the post-2001 ONS Longitudinal Study. *Popln Trends*, **121**, 8–16.

Blanden, J. and Gregg, P. (2004) Family income and educational attainment: a review of approaches and evidence for Britain. *Oxf. Rev. Econ. Poly*, **20**, 245–263.

Blane, D., Harding, S. and Rosato, M. (1999) Does social mobility affect the size of the socioeconomic mortality differential?: evidence from the Office for National Statistics Longitudinal Study. *J. R. Statist. Soc.* A, **162**, 59–70.

Blane, D., Smith, G. D. and Bartley, M. (1993) Social selection—what does it contribute to social-class differences in health. *Sociol. Hlth Illnss*, **15**, 2–15.

Burrows, R. and Nettleton, S. (1995) Going against-the-grain—smoking and heavy drinking amongst the British middle classes. *Sociol. Hlth Illnss*, **17**, 668–680.

Cambois, E. (2004) Careers and mortality in France: evidence on how far occupational mobility predicts differentiated risks. *Socl Sci. Med.*, **58**, 2545–2558.

Claussen, B., Smits, J., Naess, O. and Smith, G. D. (2005) Intragenerational mobility and mortality in Oslo: social selection versus social causation. *Socl Sci. Med.*, **61**, 2513–2520.

Cohen, G., Forbes, J. and Garraway, M. (1995) Interpreting self reported limiting long standing illness. *Br. Med. J.*, **311**, 722–724.

Coxon, A. P. M. and Fisher, K. (2003) Criterion validation and occupational classification: the seven economic relations and the NS-SEC. In *A Researcher's Guide to the National Statistics Socio-economic Classification* (eds D. Rose and D. Pevalin), pp. 107–130. London: Sage.

Davey Smith, G. and Hart, C. (2002) Life-course socioeconomic and behavioural influences on cardiovascular disease mortality: the Collaborative Study. *Am. J. Publ. Hlth*, **92**, 1295–1298.

Davies, H. and Joshi, H. (1998) Gender and income inequality in the UK 1968–1990: the feminization of earnings or of poverty? *J. R. Statist. Soc.* A, **161**, 33–61.

Donkin, A., Lee, Y. H. and Toson, B. (2002) Implications of changes in the UK social and occupational classifications in 2001 for vital statistics. *Popln Trends*, **107**, 23–29.

Elstad, J. I. and Krokstad, S. (2003) Social causation, health-selective mobility and the reproduction of socioeconomic health inequalities over time: panel study of adult men. *Socl Sci. Med.*, **57**, 1475–1489.

Faresjo, T., Svardsudd, K. and Tibblin, G. (1994) Social mobility and health in a prospective study of middle-aged men. *Scand. J. Socl Med.*, **22**, 86–89.

Feinstein, L. (2003) Not just the early years. *New Econ.*, **10**, 213–218.

Ferrer, R. L. and Palmer, R. (2004) Variations in health status within and between socioeconomic strata. *J. Epidem. Commty Hlth*, **58**, 381–387.

Fitzpatrick, J. (2003) Examining mortality rates by the NS-SEC using death registration data and the 1991 census. In *A Researcher's Guide to the National Statistics Socio-economic Classification* (eds D. Rose and D. Pevalin), pp. 173–193. London: Sage.

Fitzpatrick, J. and Dollamore, G. (1999a) Examining adult mortality rates using the National Statistics Socioeconomic Classification. *Hlth Statist. Q.*, **2**, 33–41.

Fox, J. W. (1990) Social class, mental illness and social mobility—the social selection drift hypothesis for serious mental illness. *J. Hlth Socl Behav.*, **31**, 344–353.

Galindo-Rueda, F. and Vignoles, A. (2003) *Class Ridden or Meritocratic?: an Economic Analysis of Recent Changes in Britain*. London: London School of Economics and Political Science.

Glendinning, A., Hendry, L. B. and Shucksmith, J. (1995) Lifestyle, health and social class in adolescence. *Socl Sci. Med.*, **41**, 234–248.

Glendinning, A., Love, J. G., Hendry, L. B. and Shucksmith, J. (1992) Adolescence and health inequalities: extension to Macintyre and West. *Socl Sci. Med.*, **35**, 679–687.

Hallqvist, J., Lynch, J., Bartley, M., Lang, T. and Blane, D. (2004) Can we disentangle life course processes of accumulation, critical period and social mobility?: an analysis of disadvantaged socio-economic positions and myocardial infarction in the Stockholm Heart Epidemiology Program. *Socl Sci. Med.*, **58**, 1555–1562.

Hart, C. L., Smith, G. D. and Blane, D. (1998) Social mobility and 21 year mortality in a cohort of Scottish men. *Socl Sci. Med.*, **47**, 1121–1130.

Hattersley, L. (1999) Trends in life expectancy by social class—an update. *Hlth Statist. Q.*, **2**, 16–24.
Hattersley, L. and Creeser, R. (1995) *Longitudinal Study 1971-1991: History, Organisation and Quality of Data*. London: Her Majesty's Stationery Office.
Holland, P., Berney, L., Blane, D., Smith, G. D., Gunnell, D. J. and Montgomery, S. M. (2000) Life course accumulation of disadvantage: childhood health and hazard exposure during adulthood. *Socl Sci. Med.*, **50**, 1285–1295.
Illsley, R. (1955) Social class selection and class differences in relation to stillbirths and infant deaths. *Br. Med. J.*, no. 4955, 1520–1524.
Joshi, H. (1998) The opportunity costs of childbearing: more than mothers' business. *J. Popln Econ.*, **11**, 161–183.
Joshi, H., Paci, P. and Waldvogel, J. (1999) The wages of motherhood: better or worse? *Camb. J. Econ.*, **23**, 543–564.
Karvonen, S., Rimpela, A. H. and Rimpela, M. K. (1999) Social mobility and health related behaviours in young people. *J. Epidem. Commty Hlth*, **53**, 211–217.
Kuh, D., Hardy, R., Langenberg, C., Richards, M. and Wadsworth, M. E. J. W. (2002) Mortality in adults aged 26-54 years related to socioeconomic conditions in childhood and adulthood: post war birth cohort study. *Br. Med. J.*, **325**, 1076–1080.
Langenberg, C., Hardy, R., Kuh, D., Brunner, E. and Wadsworth, M. (2003) Central and total obesity in middle aged men and women in relation to lifetime socioeconomic status: evidence from a national birth cohort. *J. Epidem. Commty Hlth*, **57**, 816–822.
de Lorenzi, S., Reed, J. and Robinson, P. (2005) *Maintaining Momentum: Extending Social Mobility and Life Chances from Early Years to Adulthood*. London: Institute for Public Policy Research.
MacIntyre, S. (1997) The Black Report and beyond: what are the issues? *Socl Sci. Med.*, **44**, 723–745.
Mackenbach, J. P., Kunst, A. E., Cavelaars, A. E. J. M., Groenhof, F. and Geurts, J. J. M. (1997) Socioeconomic inequalities in morbidity and mortality in western Europe. *Lancet*, **349**, 1655–1659.
Mann, S. L., Wadsworth, M. E. J. and Colley, J. R. T. (1992) Accumulation of factors influencing respiratory illness in members of a national birth cohort and their offspring. *J. Epidem. Commty Hlth*, **46**, 286–292.
van de Mheen, H., Stronks, K., Schrijvers, C. T. M. and Mackenbach, J. P. (1999) The influence of adult ill health on occupational class mobility and mobility out of and into employment in The Netherlands. *Socl Sci. Med.*, **49**, 509–518.
Nystrom Peck, A. M. (1992) Childhood environment, intergenerational mobility, and adult health—evidence from Swedish data. *J. Epidem. Commty Hlth*, **46**, 71–74.
Office for National Statistics (2006) The National Statistics Socio-Economic Classification. Office for National Statistics, London. (Available from `http://www.statistics.gov.uk/about/data/methodology/specific/population/LS/`.)
O'Reilly, K. and Rose, D. (1999) Changing employment relations: plus ca change, plus c'est la meme chose?: reflections arising from the ESRC review of government classification. *Wrk Emplymnt Soc.*, **12**, 713–734.
Power, C., Fogelman, K. and Fox, A. J. (1986) Health and social-mobility during the early years of life. *Q. J. Socl Aff.*, **2**, 397–413.
Power, C., Hertzman, C., Matthews, S. and Manor, O. (1997) Social differences in health: life-cycle effects between ages 23 and 33 in the 1958 British birth cohort. *Am. J. Publ. Hlth*, **87**, 1499–1503.
Power, C., Manor, O. and Li, L. (2002) Are inequalities in height underestimated by adult social position? *Br. Med. J.*, **325**, 131–134.
Power, C., Matthews, S. and Manor, O. (1996) Inequalities in self-rated health in the 1958 birth cohort—lifetime social circumstances or social-mobility. *Br. Med. J.*, **313**, 449–453.
Rahkonen, O., Arber, S. and Lahelma, E. (1997) Health-related social mobility: a comparison of currently employed men and women in Britain and Finland. *Scand. J. Socl Med.*, **25**, 83–92.
Rose, D. (1999) Once more into the breach: in defence of class anaysis yet again. *Wrk Emplymnt Soc.*, **12**, 755–756.
Rose, D. and O'Reilly, K. (1997) *Constructing Classes: Towards a New Social Classification for the UK*. Swindon: Economic and Social Research Council.
Rose, D., O'Reilly, K. and Martin, J. (1997) The ESRC review of Government Social Classifications. *Popln Trends*, **89**, 49–59.
Rose, D. and Pevalin, D. (eds) (2003a) *A Researcher's Guide to the National Statistics Socio-economic Classification*. London: Sage.
Rose, D. and Pevalin, D. (2003b) The NS-SEC described. In *A Researcher's Guide to the National Statistics Socio-economic Classification* (eds D. Rose and D. Pevalin), pp. 6–27. London: Sage.
Rose, D. and Pevalin, D. (2003c) The NS-SEC explained. In *A Researcher's Guide to the National Statistics Socio-economic Classification* (eds D. Rose and D. Pevalin), pp. 29–43. London: Sage.
Sacker, A., Clarke, P., Wiggins, R. D. and Bartley, M. (2005) Social dynamics of health inequalities: a growth curve analysis of aging and self assessed health in the British household panel survey 1991-2001. *J. Epidem. Commty Hlth*, **59**, 495–501.
Singh-Manoux, A., Ferrie, J., Chandola, T. and Marmot, M. (2004) Socioeconomic trajectories across the life course and health outcomes in midlife: evidence for the accumulation hypothesis? *Int. J. Epidem.*, **33**, 1072–1079.

Stern, J. (1983) Social mobility and the interpretation of social class mortality differentials. *J. Socl Poly*, **12**, 27–49.
Warren, J. R., Sheridan, J. T. and Hauser, R. M. (1998) Choosing a measure of occupational standing—how useful are composite measures in analyses of gender inequality in occupational attainment? *Sociol. Meth. Res.*, **27**, 3–76.
West, P. (1997) Health inequalities in the early years: is there equalization in youth? *Socl Sci. Med.*, **44**, 833–858.
White, C., van Galen, F. and Chow, Y. H. (2003) Trends in social class differences in mortality by cause, 1986 to 2000. *Hlth Statist. Q.*, **20**, 25–36.