Quality & Quantity **30**: 389–404, 1996.

Multilevel analysis of the changing relationship between class and party in Britain 1964–1992

A. HEATH
Nuffield College, Oxford

and

M. YANG & H. GOLDSTEIN
Mathematical Sciences Department, Institute of Education, University of London, 20 Bedford Way, London WC1H 0AL, England

Abstract. Previous analyses of the changing relationship between class and vote in Britain have assumed that the British Election Surveys constitute simple random samples. In fact, they are all clustered samples, and the number of sampling points has varied substantially over time. The paper uses the statistical technique of multi-level modelling to investigate the effects of this clustering and compares the results with those obtained with single-level logistic models. In general, the multilevel and single-level models lead to similar conclusions about the changing relation between class and vote; they both show evidence of a change in the class/vote relationship over time. However, the multilevel models also show that, while the clustering does not affect conclusions about the class dealignment debate, there are other important substantive findings which emerge from the multilevel approach. First, there is clear evidence of substantial constituency differences in the intercepts; that is, individuals had very different propensities to vote Conservative in different constituencies. Second, there were also significant constituency differences in class voting, that is, constituencies seemed to vary in their level of class polarization.

1. Introduction

The relationship between class and vote in Britain has attracted a good deal of scholarly attention in recent years. A number of scholars have argued that the class basis of voting is in long-term decline, thus perhaps opening the way to radical change in British politics (e.g. Crewe, 1984, Franklin, 1985, Rose and McAllister, 1986). This has been termed the 'class dealignment' thesis, and in essence it holds that the classes have been gradually converging in their propensities to support the different parties. It is thus held, on this view, that the classes used to be distinctive in their politics – the middle class supporting the Conservatives and the working class supporting Labour – but that they are now becoming more and more alike. This group of scholars have typically used dichotomous models of class and party but linear regression techniques (see, especially, Franklin, 1985 and Franklin *et al.*, 1992).

Other scholars have challenged this view and have suggested that the decline in class voting has been exaggerated and that, when more appropriate statistical tools such as loglinear modelling and more detailed class schemas are used, a rather different picture is obtained. Rather than continuous processes of dealignment, these scholars have detected 'trendless fluctuation' and class realignment (Heath *et al.*, 1985, 1991; Weakliem, 1989, Marshall *et al.*, 1988, Payne *et al.*, 1994).

These debates have generated widespread interest outside the narrow field of British election studies and have contributed to the wider international debates about the (un)changing importance of class in contemporary society (Clark and Lipset, 1991, Hout *et al.*, 1993).

The different groups of scholars have largely made use of the same datasets – the British Election Surveys which were started in 1964 and continued after every subsequent general election. There have now been a total of nine such election surveys. All the statistical analyses of these data which have been carried out so far, whether with linear regression, loglinear or log-multiplicative models, have assumed that the nine British Election surveys consist of independent simple random samples. In fact, however, the nine surveys diverge in a number of interesting and complex ways from simple random sampling, and the implications of these divergences have never previously been taken into account – partly no doubt because the appropriate statistical techniques and software for analysing these complexities have not previously been available.

There are two main aspects of the data structure which need to be considered. First, as is usual with national surveys, the British Election Surveys are for cost reasons clustered samples, with polling districts taken as the primary sampling units. The number of primary sampling units has varied considerably over the years: in the earliest studies there were only 80, whereas in the later studies there have been 200 or more. Second, a number of the earlier British Election Surveys incorporated panel components. The founders of the BES wished to carry out both cross-sectional surveys and panel surveys of the electorate, and for cost reasons they combined the two. For example, the 1966 survey included some repeat interviews with respondents previously interviewed at the time of the 1964 survey (thus giving a 1964–66 panel study). Given the well-known problem of panel attrition, the 1966 survey was then topped-up with some new respondents in order to make the overall survey representative of the electorate as a whole. This strategy of incorporating a panel component in the main BES was followed in the surveys undertaken at the times of the October 1974 and 1979 elections as well as in 1966.

In the present paper we focus on the effects of the clustering of the samples; we shall turn to the effects of the panel components in a future paper.

Clustering is likely to be of particular importance when studying class voting. It has often been argued by political scientists that local neighbourhoods influence vote; for example local political subcultures may emerge in close-knit communities, thus increasing the political homogeneity of voters within a given polling district (Przeworski and Soares, 1971; see Kelley and McAllister, 1985 for a contrary view). Such arguments have usually been advanced to explain patterns of working-class political behaviour, but we do not know whether they apply to middle-class behaviour as well.

Moreover, we cannot assume that the substantive political effects of clustering have remained constant over time. Some theoretical considerations – such as an alleged decline of community solidarity in contemporary Britain and the breakup of traditional communities – suggest that these substantive effects will have declined (Robertson, 1984), while other scholars have brought forward empirical evidence that may be consistent with a strengthening of neighbourhood influences over time (Miller, 1978).

Some of the statistical consequences of clustering are well known. Thus in comparison with SRS clustering will in general tend to increase the confidence intervals for our estimates of population proportions (see appendix III of Heath *et al.*, 1985 for the calculation of some confidence intervals in the 1983 BES.) In contemporary social science, however, sample surveys are more often used to estimate relations between variables than to estimate population proportions, and indeed in the present debate on class voting the surveys are being used to estimate *changes in the relations* between variables. The consequences of clustering for such estimates are not well known.

The consequences of clustering can be investigated using the statistical technique of multilevel modelling (see, e.g., Goldstein, 1987, 1995), and the aim of this paper is to report our preliminary findings. Multilevel modelling can take account of the differences in the number of sampling points in the different British Election Surveys, and it can also test for the substantive effects of cluster membership on vote.

2. Data

The data available for analysis consist of nine post-election British Election Surveys. The surveys were initiated by Butler and Stokes and have been conducted after every general election from 1964 onwards.[1] The surveys were intended to be representative of the electorate of Great Britain (excluding Scotland north of the Caledonian Canal).

As noted above, however, the 1966, October 1974 and 1979 surveys also included panel components, respondents to previous surveys being reinterviewed and incorporated in the new samples. In 1966 the proportion of the sample that consisted of reinterviews was 70%; in October 1974 it was 74% and in 1979 it was 54%. Repeat interviews of this kind require different statistical analysis from independent random samples, and hence we exclude all three from the present paper. (In principle, it is possible to incorporate the repeat measures within the general multilevel framework used in this paper, but the highly skewed distribution of repeat interviews in the overall dataset causes some difficulties for the analysis.)

The basic sampling procedure used for drawing the six remaining independent random samples (with some variations)[2] was first to stratify parliamentary constituencies (e.g., by percentage Labour vote) and then to select a predetermined number of constituencies with probability of selection proportional to size of electorate. Within each constituency a polling district was then chosen (again with probability proportional to size of electorate), and within each polling district a predetermined number of electors was selected with equal probability from the Electoral Register in force.[3]

In 1970 the investigators used the same 80 constituencies which they had originally selected for 1964.[4] The documentation for these surveys is somewhat unsatisfactory, but it appears that identical polling districts, and not simply identical constituencies, were used. In February 1974, 1983, 1987 and 1992, on the other hand, fresh samples of constituencies were drawn, and within these constituencies polling districts were drawn afresh. Thus there is some overlap of constituencies between these three surveys in 1983, 1987 and 1992, due to chance not deliberate selection, but there is virtually no overlap of polling districts between them.

The boundaries of Parliamentary Constituencies are regularly redrawn by the Boundary Commission. New boundaries came into force between the 1970 and February 1974 elections, and again between the 1979 and 1983 elections. We therefore have three separate lists of constituencies.

The details of the six surveys are shown in Table 1.

One further complication needs to be noted. A booster sample of Scots was carried out in 1992, thus oversampling Scottish electors. We have therefore weighted the 1992 data to correct for this oversampling.

All the surveys collected information on vote at the last election. We have coded this information as follows:

1. Conservative.
2. Labour
3. Liberal/Alliance (in 1983 and 1987)/Liberal Democrat (in 1992).

Table 1. The characteristics of the British Election Surveys

	Response rate	Number of sampling points	Number of respondents in sample	Number of respondents used in the analysis
1964	68.3	80	1769	1346
1970	69.7	81	1842	1320
Feb. 1974	75.8	200	2462	1901
1983	72.4	250	3955	2858
1987	70.0	250	3826	2847
1992	72.6	218	3534	2620

4. Other (mainly Scottish National Party and Plaid Cymru).

We exclude nonvoters (nonvoting is only weakly related to class and appears to show no systematic change over time in Britain). For further discussion of nonvoting and its relationship to social class see Swaddle and Heath (1989).

The surveys also collected information on the respondents' occupations and employment status and, if married women, their husbands' occupations and employment status (using the OPCS Classification of Occupations in force at the time of the survey). The information on occupation and employment status has been used to derive Goldthorpe's seven-class schema (Goldthorpe, 1980; Goldthorpe and Heath, 1992; for a comparison of Goldthorpe's with other class schemas see Marshall *et al.*, 1988). Note that, due to the changes over time in the Classification of Occupations, there cannot be exact comparability between the classes over time.

In order to minimize missing data on class and to maximize comparability over time we classify single respondents and male respondents according to their own occupations (providing they were economically active or retired) and married women according to their husbands' (again providing the husband was economically active or retired). Alternative approaches can be suggested, but unfortunately the first surveys in the series were not well adapted to these alternative procedures.[5]

The seven classes which we use are as follows:

I. Higher service class (managers and administrators in large firms, professionals and large employers)
II. Lower service class (managers and administrators in small firms and semi-professionals).
III. Routine nonmanual class (clerical and sales workers).

IV. Petty bourgeoisie (farmers, small employers and own-account nonprofessional workers).
V. Foremen (manual foremen and technicians).
VI. Higher working class (skilled manual workers).
VII. Lower working class (semi- and unskilled manual workers in industry, services and agriculture).

After excluding nonvoters and respondents who could not be assigned to classes, the data to be analysed are reduced as in column 5 in Table 1.

3. Results

1. *Single-level logistic model*

We begin with the conventional single-level logistic regression of the class/vote relation. This can be written as follows.[6]

$$Logit(\pi_i) = \beta_0 + \sum_{l=1}^{6} \beta_l x_{li} + \sum_{h=1}^{5} \gamma_h z_{hi} \tag{A}$$

$$\pi_i = \exp\left(\beta_0 + \sum_{l=1}^{6} \beta_l x_{li} + \sum_{h=1}^{5} \gamma_h z_{hi}\right) \Big/ \left(1 + \exp\left(\beta_0 + \sum_{l=1}^{6} \beta_l x_{li} + \sum_{h=1}^{5} \gamma_h z_{hi}\right)\right)$$

$\pi_i = E(p_i)$.

$p_i = 1$ if voting for a party; 0 if not voting for, $p_i \sim Bin[\pi_i, n_i]$

where i ($i = 1, 2, \ldots, N$) indicates individuals, l ($l = 1, 2, \ldots, 6$) indicates classes and h ($h = 1, 2, \ldots, 5$) indicates elections, π_i is the probability of the ith individual voting for a party. In this formulation x_l are dummy variables contrasting the other six classes with the higher service class, and z_h are dummy variables contrasting the later five elections with the election of 1964.

The model (model A) expressed above postulates that class and year of election affect voting behaviour in an additive fashion on the logistic scale and that the differences between the classes remain constant over time. We can term it the 'constant class voting' model.

There are a number of ways in which we can model changes in the class/vote relation. Perhaps the simplest is to introduce three-way interaction terms between class, vote and election year, treating election year as a continous variate with a linear regression 'slope' coefficient.[7] We thus obtain

Table 2. Goodness of fit

Model	Comparison	χ^2	Parameters
A (single level)			12
B (single level with class/year interaction)	B vs. A	18.9 (d.f. = 6)	18
C (multilevel)	C vs. A	98.6 (d.f. = 1)	13
D (multilevel with class/year interaction)	D vs. C	25.5 (d.f. = 6)	19
E (multilevel with class/year interactions and random slopes)	E vs. D	18.9 (d.f. = 5)	25
F (multilevel with class/year interactions and random intercepts/year interactions)	F vs. D	0.75 (d.f. = 1)	20
G (multilevel with class/year interactions and random slopes/year interactions)	G vs. D	11.38 (d.f. = 5)	25

six new parameters, one for each class. These parameters may of course have different signs, and may or may not show the converging trends that proponents of the class dealignment thesis anticipate.

The new model (model B) can be expressed as follows:

$$Logit(\pi_i) = \beta_0 + \sum_{l=1}^{6} \beta_l x_{li} + \sum_{h=1}^{5} \gamma_h z_{hi} + \sum_{l=1}^{6} \alpha_l (x_{li} \times t_i) \qquad (B)$$

Table 2 shows that this model does produce a significant but modest improvement in fit over the baseline 'constant class voting model'. The improvement in fit is 18.9 for 6 degrees of freedom.

Table 3 shows the parameter estimates for this single-level logistic model with interaction terms. As we can see, the classes differ significantly in their propensity to vote Conservative, but the differences are not linear. Thus class IV (the petty bourgeoisie) is more inclined to support the Conservatives than is class 1. On the other hand, there is no significant difference between classes VI and VII (the skilled and semi-skilled working classes) in their propensity to vote Labour.

The parameter estimates also show the expected pattern of Conservative strength over time. We know from the election results themselves that the Conservative share of the vote rose in 1970 above its 1964 level, slumped below in 1974, and returned to its 1964 level in 1979 and then showed a modest subsequent decline. This pattern is mirrored in the parameter estimates.

Finally, turning to the parameter estimates for the interaction terms, we see that none of the terms is statistically significant although there does appear to be some patterning. What we see is that the relative positions of

Table 3.1. Parameter estimates (standard error in brackets) for Conservative voting

	Model A	Model B	Model C	Model D
Constant	0.53 (0.08)	0.51 (0.13)	0.46 (0.10)	0.50 (0.15)
HHCLASS				
II	−0.38 (0.07)	−0.10 (0.19)	−0.35 (0.07)	−0.08 (0.20)
III	−0.40 (0.07)	−0.10 (0.20)	−0.33 (0.08)	−0.06 (0.21)
IV	0.18 (0.08)	0.38 (0.22)	0.24 (0.08)	0.38 (0.23)
V	−0.87 (0.09)	−1.00 (0.21)	−0.82 (0.09)	−1.05 (0.23)
VI	−1.38 (0.07)	−1.61 (0.19)	−1.33 (0.07)	−1.70 (0.20)
VII	−1.42 (0.07)	−1.46 (0.18)	−1.36 (0.07)	−1.54 (0.19)
YEAR				
1970	0.07 (0.08)	0.08 (0.09)	0.08 (0.08)	0.07 (0.09)
1974	−0.25 (0.08)	−0.25 (0.10)	−0.28 (0.11)	−0.32 (0.13)
1983	−0.01 (0.07)	0.01 (0.13)	−0.01 (0.10)	−0.06 (0.16)
1987	−0.06 (0.07)	−0.03 (0.15)	−0.08 (0.10)	−0.13 (0.17)
1992	−0.02 (0.07)	0.01 (0.17)	−0.05 (0.11)	−0.11 (0.20)
Class/Year*				
II		−0.13 (0.08)		−0.12 (0.08)
III		−0.14 (0.08)		−0.13 (0.08)
IV		−0.09 (0.09)		−0.07 (0.10)
V		0.07 (0.09)		0.11 (0.10)
VI		0.12 (0.08)		0.18 (0.08)
VII		0.02 (0.07)		0.09 (0.08)
Level 2				
σ^2_{u0}	–	–	0.34 (0.03)	0.34 (0.03)

* Class/year parameters multiplied by 10.
The subscript 0 refers to the constant or intercept.

the higher service class and the lower working class have remained the same. In between, however, we see that the remaining classes have been converging towards the centre, the petty bourgeoisie, the lower service class and the routine nonmanual class having negative coefficients, while the foremen and skilled working class have positive coefficients.

The pattern, then, is not one of general convergence: general convergence would have seen all the parameters (except that for the petty bourgeoisie) having positive signs as they all became closer to Class I. What we see could, instead, be characterised as class realignment, with the lower nonmanual and upper manual classes converging, but higher nonmanual and lower manual remaining where they were.

2. *The basic multilevel model*

We now compare the single-level models with the equivalent multilevel models. This basic 'constant class voting' model without interaction terms can be expressed as follows:

$$Logit(\pi_{ij}) = \beta_{0j} + \sum_{l=1}^{6} \beta_l x_{lij} + \sum_{h=1}^{5} \gamma_h z_{hij} \qquad (C)$$

$$\beta_{0j} = \beta_0 + u_{0j} \qquad \pi_{ij} = \mathrm{E}(p_{ij}), \qquad p_{ij} = \begin{Bmatrix} 0 \\ 1 \end{Bmatrix}$$

where the subscript j indicates constituency and u_{0j} is a random error term at the constituency level. This model (model C) postulates that class and year of election affect vote additively, just as the single-level logistic model did. In addition, however, the multilevel model assumes that voters from the same class and election survey but from different constituencies have different probabilities of voting for the Conservative party. This variation is captured by the term u_{0j} which we can refer to as the constituency intercept. Conditional on β_{0j}, the p_{ij} have a binomial distribution with mean π_{ij}, variance $\pi_{ij}(1 - \pi_{ij})$.

By substituting β_{0j} in Equation (C) above, we obtain

$$Logit(\pi_{ij}) = \beta_0 + \sum_{l=1}^{6} \beta_l x_{lij} + \sum_{h=1}^{5} \gamma_h z_{jij} + u_{0j}$$

where the coefficients β_0 relate to the baseline group (higher service-class respondents in 1964), the class contrasts and the year contrasts are estimated in the fixed part of the model, and var(u_{0j}) is estimated at constituency level. We complete the specification of this as a 2-level model by writing

$$p_{ij} = \pi_{ij} + e_{ij}$$

where the e_{ij} are level 1 residuals, in this case with known mean and variance which are functions of the π_{ij}. The estimation procedure, quasilikelihood, is given by Goldstein (1991, 1995).

This model (model C) thus takes into account the constituency-level variation in voting behaviour. As can be seen from Table 2, it gives a very substantial improvement in fit, compared with the single-level logistic model. There is clearly very substantial level-2 variation, and the parameter is ten times its standard error. That is to say, there is substantial variation between sampling units in their level of support for the Conservatives. This might be caused by, for example, unmeasured variation in individual characteristics, for example their housing tenure. Or it might be caused by constituency characteristics, for example the tactical situation.

Adding the three-way interaction terms $\Sigma_l \alpha_l (x_{lij} \times t_{ij})$ $(l = 1, 2, \ldots 6)$ to the basic multilevel model gives model D. Again this yields a significant

Table 3.2. Parameter estimates (standard error in brackets) for Conservative voting

	Model E	Model F	Model G
Constant	0.50 (0.15)	0.49 (0.15)	0.50 (0.15)
HHCLASS II			
II	0.08 (0.20)	0.09 (0.19)	−0.09 (0.20)
III	−0.07 (0.21)	−0.07 (0.20)	−0.07 (0.21)
IV	0.38 (0.23)	0.35 (0.22)	0.38 (0.23)
V	−1.04 (0.22)	−1.01 (0.22)	−1.04 (0.22)
VI	−1.75 (0.21)	−1.63 (0.19)	−1.68 (0.19)
VII	−1.60 (0.20)	−1.48 (0.18)	−1.62 (0.20)
YEAR			
1970	0.06 (0.09)	0.06 (0.09)	0.06 (0.09)
1974	−0.31 (0.13)	−0.31 (0.12)	−0.32 (0.13)
1983	−0.05 (0.15)	−0.06 (0.15)	−0.05(0.15)
1987	−0.13 (0.17)	−0.13 (0.16)	−0.14 (0.17)
1992	−0.09 (0.19)	−0.10 (0.19)	−0.10 (0.19)
Class/Year*			
II	−0.12 (0.08)	−0.12 (0.08)	−0.12 (0.08)
III	−0.13 (0.09)	−0.12 (0.09)	−0.13 (0.09)
IV	−0.07 (0.10)	−0.06 (0.09)	−0.07 (0.10)
V	0.11 (0.10)	0.11 (0.09)	0.11 (0.10)
VI	0.19 (0.09)	0.17 (0.08)	0.18 (0.08)
VII	0.10 (0.08)	0.08 (0.08)	0.11 (0.08)
Level 2			
σ^2_{u0}	0.28 (0.04)	0.23 (0.05)	σ^2_{u0} 0.30 (0.04)
σ_{u05}	0.01 (0.05)		σ_{u06} 0.06 (0.07)
σ_{u06}	0.08 (0.05)		σ^2_{u6} 0.28 (0.16)
σ^2_{u5}	0.30 (0.12)		$\sigma_{u0(83-92)}$ 0.02 (0.09)
σ_{u56}	0.04 (0.09)		$\sigma_{u6(83-92)}$ −0.05 (0.10)
σ^2_{u6}	0.22 (0.10)		$\sigma^2_{u(83-92)}$ 0.0
$\sigma_{u0(83-92)}$		0.03 (0.03)	

* Class/year parameters multiplied by 10.
The subscripts refer to the following explanatory variables: 0 = constant, 5 = class VI, 6 = class VII.

improvement in fit over model C, just as we found with the corresponding single-level models.

In general we see from Table 4 that the ratio of the parameters to their standard errors in the multilevel model is, as expected, somewhat smaller than it was with the single-level logistic model. But the main parameters of interest are little changed and the interpretation of the results is broadly the same as before. However model D leads to one substantive change in the main effects of class of vote: it shifts class I away from the petty bourgeoisie and towards classes II and III etc.

3. *Random slopes*

Models C and D simply allow the constituency intercepts to vary. That is to say, they allow the overall level of support for the Conservative party to vary across constituencies but they assume that the effect of class on Conservative vote is the same in all constituencies alike in any given election.

However, we also need to check whether the class effects vary across constituencies. If strong local communities do indeed influence individual voting behaviour, we might expect to find that the members of such communities are rather similar in their voting behaviour irrespective of their social class. Community norms of support for a particular party might thus override individual class position. That is, we might expect to find rather flat slopes in strong communities and steeper slopes in weaker communities.

Alternatively, it might be that the working class in particular is affected by local community structure. There is a substantial literature which suggests that the working class has a geographically more localised set of social relationships than does the service class. We might therefore expect to find that the effect of working-class membership on vote varied across constituencies whereas the effect of other classes did not.

We can model this by allowing coefficients associated with classes VI and VII to randomly vary at constituency level based on model D, e.g.:

$$Logit(\pi_{ij}) = \beta_0 + \sum_{l=1}^{6} \beta_l x_{lij} + \sum_{h=1}^{5} \gamma_h z_{hij} + \sum_{l=1}^{6} \alpha_l (x_{lij} \times t_{ij}) + u_{0j} + u_{5j} x_{5ij} + u_{6j} x_{6ij}. \qquad (E)$$

These random slopes models can become quite complex, as we have six classes whose slopes can vary and we also have 15 possible covariance terms between slopes and intercepts. After fitting a variety of models, we have found that a parsimonious model which gives a substantial improvement in fit over model D contains random slopes and covariances for classes VI and VII. We found no indication that random slopes for classes II, III, IV and V would yield an improved fit.

This result is of substantial interest in its own right. However, we should note that the inclusion of these extra terms in the model does not lead to any major changes in the main effects of class or in the three-way interaction terms.

4. *Time-dependent level 2 variation*

Since we are concerned with trends over time, it is naturally of some interest to check whether these level-2 properties vary over time.

There are two main sorts of models which we can test. First, we can check whether the constituency intercepts have changed in their variance over time. And secondly we can check whether the variance in the working-class slopes has changed over time.

A simple procedure here is to dichotomize the election surveys into two periods – the earlier period consisting of the 1964, 1970 and February 1974 surveys and the later period consisting of the 1983, 1987 and 1992 surveys. Then we can model the coefficient β_{0j} in model D as

$$\beta_0 + u_{0j} + u_{j(83-92)} z_{ij(83-92)} \tag{F}$$

By constraining the variance term for $u_{j(83-92)}$ to be zero, we estimate the variance of voting for 1964–74's to be the variance for u_{0j}, i.e., for the baseline voters.

$$\mathrm{var}(64\text{–}74) = \mathrm{var}(u_{0j}) = \sigma^2_{u0}$$

$$\mathrm{var}(83\text{–}92) = \mathrm{var}(u_{0j} + u_{j(83-92)}) = \sigma^2_{u0} + 2\sigma_{u0(83-92)}.$$

The MLn (Rasbash and Woodhouse, 1995) software allows such a model to be fitted, simply by constraining $\sigma^2_{u(83-92)}$ to zero.

This model shows in Table 3 that the variance for the constituency intercepts is larger in the later period than in the former one, 0.29 vs. 0.23, although the difference is not significant.

To see whether the variance in the working-class slopes has changed over time, for example checking for class VII, the following model is used,

$$Logit(\pi_{ij}) = \beta_{0j} + \sum_{l=1}^{5} \beta_l x_{lij} + \beta_{6j} x_{6ij} + \sum_{h=1}^{5} \gamma_h z_{hij} + \sum_{l=1}^{6} \alpha_l (x_{lij} \times t_{ij}) \tag{G}$$

$$\beta_{0j} = \beta_0 + u_{0j}$$

$$\beta_{6j} = \beta_6 + u_{6j(83-92)} z_{ij(83-92)} + u_{6j}.$$

This models the total variance at constituency level

$$\mathrm{var}(u_{0j} + u_{6j} x_{6ij} + u_{6j(83-92)} x_{6ij} \times z_{ij(83-92)}).$$

The last term reflects the change of class VII slope in the later period. Having fitted this model for each class separately and compared with model D, we find that only classes VII and V show a significant improvement with $\chi^2 = 11.38$ and 13.90 (d.f. = 5) respectively. Results in Table 3 are for class VII only. We can calculate from Table 3 that, in the earlier period, the variance in the slope across constituencies was 0.70 (i.e., $0.30 + 0.28 + 2 * 0.06$). In the later period this variance fell to 0.64 ($0.70 + 2 * 0.02 - 2 * 0.05$).

Conclusions

This paper has been concerned with the methodological and substantive implications of the clustered nature of the British Election Surveys. Methodologically, we have investigated whether the use of single-level models which ignore the clustered character of the surveys have led to misleading conclusions about the changing relationship between class and vote in Britain. Substantively, we have investigated whether there are variations in the class/vote relation across sampling points, that is across constituencies.

On the methodological side, we found that the conclusions to be drawn about class dealignment were not greatly affected by the use of multilevel models in order to take account of the clustering of the samples. In general, there were very small increases in the size of the standard errors when the clustering was taken into account, but the general pattern of the parameters in the standard models of class voting was much the same in the single and in the multilevel models.

However, on the substantive side, the multilevel models did show some large differences between constituencies. There were significant constituency differences in the intercepts; that is, individuals from the same social class had very different propensities to vote Conservative in different constituencies. There were also significant constituency differences in the slopes for the working classes although not for other classes; that is, in some constituencies members of the working class were relatively similar to members of the higher service class whereas in other constituencies they were rather different in their propensity to vote Conservative. In other words, constituencies seemed to vary in their level of class polarization.

The fact that there are significant differences in the constituency intercepts is not particularly surprising. It might be due, as Kelley and McAllister (1985) have suggested, to unmeasured individual characteristics, such as housing tenure or education. After all, we know that these individual characteristics are associated with vote (Heath *et al.*, 1991), and it is also likely that they vary across constituencies. The differences in the constituency intercepts might also be due to contextual effects, such as the tactical situation in a given constituency. Again, there is clear evidence from previous research that the tactical situation is related to voting behaviour (Heath *et al.*, 1991, Heath and Evans 1994). In fact, given these considerations, it would have been surprising if we had failed to find significant constituency variation in the intercepts.

The findings about constituency variations in slopes, on the other hand, are relatively novel (see Jones *et al.*, 1992) and they may have important implications for our understanding of processes of working-class formation and political action. It has often been suggested that the working classes are rather different from other classes in their responsiveness to constituency characteristics and processes, but hard evidence for this hypothesis has hitherto been lacking. To be sure, the analyses which we have carried out in this paper cannot on their own demonstrate that the variation in slopes is due to constituency characteristics rather than to unmeasured individual characteristics. Nevertheless, the multilevel models have demonstrated that there is a phenomenon to be explained – a phenomenon that would have been hard to detect with conventional single-level models.

Acknowledgements

This work was funded by the ESRC, to Multilevel Models Project at IOE under the ALCD initiative, grant Y303253001 to Heath *et al.* under the JUSST centre.

Notes

1. The 1964, 1966 and 1970 surveys were directed by David Butler and Donald Stokes. The February 1974, October 1974 and 1979 surveys were directed by Ivor Crewe and Bo Sarlvik, joined by David Robertson in 1979. The 1983, 1987 and 1992 surveys were directed by Anthony Heath, Roger Jowell and John Curtice. We are very grateful to the previous investigators and their funders, and to the Data Archive for providing the data. The usual disclaimers apply.
2. The main point to notice is that the 1964 and 1970 samples included panel components drawn from 1963 and 1969 pre-election surveys respectively. They are not therefore straightforward random samples but are nonetheless independent of the other surveys which we use in this paper.
3. The 1983 sample was based on the previous Electoral Register since the new ones which were actually used for the election were not available at the time the sample was drawn. The data were subsequently coded to the new constituencies, and we have used these new constituency codes in the present study.

4. In fact there are 81 sampling points in the 1970 sample. This appears to be caused by one respondent from the 1969 survey being traced to a new constituency in 1970.
5. The earlier surveys asked for occupational information on the respondent and on the head of household. Information was not collected about wife's occupation until 1974.
6. While it is technically straightforward to fit a multinomial logit with separate categories for the four party groupings, for ease of exposition we dichotomise the parties namely Conservative versus Labour, Liberal and Other.
7. We score the surveys according to the number of years since 1960. Thus the 1964 surveys scores 4, the 1970 survey 10, and so on.
8. An alternative method is the 'unidiff' model. See Payne *et al.*, 1994.

References

Clark, T.N. & Lipset, S.M. (1991). Are social classes dying? *International Sociology* 6: 397–410.

Crewe, I. (1984). The electorate: partisan dealignment ten years on. In H. Berrington (ed.), *Change in British Politics*, London: Frank Cass.

Franklin, M. (1985). *The Decline of Class Voting in Britain.* Oxford: Clarendon Press.

Franklin, M.N., Mackie, T.T., Valen, H. *et al.* (1992). *Electoral Change: Responses to Evolving Social and Attitudinal Structures in Western Countries.* Cambridge: Cambridge University Press.

Goldstein, H. (1987). *Multilevel Models in Educational and Social Research.* London: Griffin.

Goldstein, H, (1991). Nonlinear multilevel models, with an application to discrete response data. *Biometrika* 78: 45–51.

Goldstein, H. (1995). *Multilevel Models in Educational and Social Research* (2nd edition). London: Edward Arnold; New York, Halstead Press.

Goldthorpe, J.H. (1980). *Social Mobility and Class Structure in Modern Britain.* Oxford: Clarendon Press.

Goldthorpe, J.H. & Heath, A.F. (1992). Revised class schema 1992, JUSST working paper no. 13.

Heath, A.F., Jowell, R.M., & Curtice, J.K. (1985). *How Britain Votes.* Oxford: Pergamon.

Heath, A.F., Jowell, R.M., Curtice, J.K., Evans, G., Field, J., & Witherspoon, S. (1991). *Understanding Political Change: The British Voter 1964–1987.* Oxford: Pergamon.

Heaths, A.F., & Evans, G. (1994). Tactical voting: concepts, measurement and findings. *British Journal of Political Science* 24: 557–61.

Hout, M., Brooks, C., and Manza, J. (1993). Classes in postindustrial society. *International Sociology* 8, 293–316.

Kelley, J. & McAllister, I. (1985). Social context and electoral behaviour in Britain. *American Journal of Political Science* 29: 564–586.

Marshall, G., Rose, D., Newby, H., & Vogel, C. (1988). *Social Class in Modern Britain.* London: Hutchinson.

Miller, W.L. (1978). Social class and party choice in England: a new analysis. *British Journal of Political Science* 8: 257–84.

Jones, K., Johnston, R.J., & Pattie, C.J. (1992). People, places and regions: exploring the use of multilevel modelling in the analysis of electoral data. *British Journal of Political Science* 22: 343–80.

Payne, C., Evans, G., & Heath, A.F. (1994). Modelling the class/party relationship in Britain, 1964–92, paper presented at the 9th International Workshop on Statistical Modelling, Exeter University, 11–15 July 1994.

Przeworski, A. Soares, G.A. (1971). Theories in search of a curve: a contextual interpretation of the Left vote. *American Political Science Review* 65: 51–68.

Rasbash, J. and Woodhouse, G. (1995). *MLn Command Reference*. London, Institute of Education.

Robertson, D. (1984). *Class and the British Electorate*. Oxford: Blackwell.

Rose, R. & McAllister, I. (1986). *Voters Begin to Choose: From Closed Class to Open Elections in Britain*. London: Sage.

Swaddle, K. & Heath, A.F. (1989). Official and reported turnout in the British General Election of 1987. *British Journal of Political Science* 19, 537–570.

Weakliem, D. (1989). Class and party in Britain, 1964–87. *Sociology* 23: 285–97.