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A FRAMEWORK FOR COMPARATIVE ANALYSES OF SOCIAL MOBILITY

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Abstract Criticisms of the analysis of social mobility using the structural mobility/exchange mobility distinction are discussed, and its replacement by an absolute/relative mobility perspective, following Goldthorpe (1980), is advocated. Based on this perspective a framework for cross-population analyses of mobility is developed and illustrated using well-known English/Welsh and Danish data. This framework leads to a definition of the total mobility variance in the populations under study, which may, in turn, be separated into shared and unique components of mobility variance within each of which the importance of absolute and relative mobility may be assessed. It is argued that the absolute/relative approach avoids the problems which have beset the more ambitious structure/exchange distinction and that the framework developed here permits the straightforward testing of the Lipset-Zetterberg (1959) and Featherman, Lancaster-Jones and Hauser (1975) theses.

For many years, analysts of occupational and class mobility have sought to disaggregate mobility into structural and exchange components. This has taken the form, for example, of showing the pattern of exchange mobility that, it is believed, would have prevailed if structural mobility influences were removed (Hazelrigg, 1974; Mosteller, 1968; Pullum, 1975); measuring the amount of mobility accounted for by structural and exchange processes respectively (Bibby, 1975; Hope, 1981a, 1982; Hutchinson, 1958; Yasuda, 1964); or simply controlling for the effects of structural mobility by fitting the perfect mobility model (Glass, 1954; Hope, 1981a, 1982; McRoberts and Selbee, 1981; Tyree *et al.*, 1979).

This paper argues against that approach to mobility analyses. Specifically it is argued that the structural/exchange approach runs into formidable difficulties, not least in the necessity of making certain assumptions about the effects of the two types of mobility, some of which assumptions make the structural/exchange distinction approach a distinction between absolute and relative mobility. The suggestion advanced here is that the former approach should be abandoned in favour of an explicit absolute/relative mobility analysis. As developed here, such an analysis allows us, in studies of comparative mobility, to define a total mobility variance which may be divided into two parts; namely, common variance, shared between populations, and unique variance which is associated with cross-population differences in mobility.

The absolute/relative distinction has been used in mobility analyses by McClendon (1977: albeit in a slightly different context) who explicitly equates structural with absolute mobility and exchange with relative mobility, and by Goldthorpe (1980; Erikson, Goldthorpe and Portocarero, 1979; 1982). The present paper seeks initially to develop and refine Goldthorpe's approach in the context of comparative mobility analysis by defining the components of mobility differences and measuring the degree to which such differences in mobility can be accounted for by variations in absolute and relative mobility respectively. In doing this the paper develops a very simple framework within which both of the analyses of Erikson *et al.*(1979; 1982) may be straightforwardly integrated. Subsequently, however, the focus of the paper is broadened to encompass models that define not only the components of mobility difference, or unique, variance, but also common mobility variance – that is, which is constant across populations. These unique and common components comprise total mobility variance.

In the following section absolute and relative mobility are defined and the structural/exchange mobility distinction is discussed. Some of the major criticisms that have been made of this distinction are reviewed. The absolute/relative mobility approach to comparative analysis is then presented and demonstrated using the well-known English/Welsh and Danish mobility data (Glass, 1954; Svalastoga, 1959). Subsequently, the possibilities are briefly investigated of applying this approach to the analysis of a single mobility table, which leads us to our definition of total mobility and its components. Finally, the advantages of this approach over the structure/exchange distinction are discussed.

Structural and Exchange Mobility, Absolute and Relative Mobility

The log-linear model for a mobility table can be written:

$$F_{ij} = ab_i\, c_j\, d_{ij} \qquad (1)$$

where F_{ij} is the estimated frequency in the $_{ij}$th cell, b_i and c_j are the origin and destination effects, a is a scale parameter and d_{ij} is the set of parameters describing the association between origins and destinations. Parameter estimation requires some normalizing constraints, in this case:

$$b_1 = c_1 = d_{1j} = d_{i1} = 1$$

The set of d_{ij} interaction parameters may be subject to additional constraints depending upon the exact model chosen: for example, if origins and destinations are independent all the d_{ij} will be set to unity; if the origin/destination association is described by a model of uniform association the d_{ij} will be set to d^{ij}; in a Hauser (1978) type model, the d_{ij} will be constrained to a restricted set of values used to define conditional independence within areas of the table.

(1) can be recast as a multivariate logit model (Fienberg, 1977: 77–90; Hout, 1983: 34–5; Logan, 1983) in which the odds of falling into destination class j rather than j′ depend upon origin category, thus:

$$\frac{F_{ij}}{F_{ij'}} = \Phi_{ij} = (c_j/c_{j'})\,(d_{ij}/d_{ij'}) \qquad (2a)$$

However, rewriting the model in this way forces us to adopt an explicit outflow perspective: under (2a) we learn nothing of inflow patterns. The equivalent inflow odds are:

$$\frac{F_{ij}}{F_{i'j}} = \Omega_{ij} = (b_i/b_{i'})\,(d_{ij}/d_{i'j}) \qquad (2b)$$

which tells us the estimated odds that a member of destination class j is drawn from origin class i rather than i′. (2a) and (2b), then, provide log linear conceptualizations of outflow and inflow analyses respectively. Of course a generalisation of (2a) and (2b) together takes us back to the full log-linear model of (1). However, we shall preserve the distinction between (2a) and (2b) as it will prove significant later. The full set of non-redundant odds of the form Φ_{ij} and Ω_{ij} is our measure of absolute mobility: two tables displaying identical absolute mobility flows will thus have frequency dispersions which are identical save, possibly, for differences in a multiplicative scale factor.

Relative mobility is expressed by odds ratios. As Erikson, Goldthorpe and Portocarero (1982: 8) point out, an odds ratio can be viewed as the chances of an individual of origin class i being found in destination class j (where i may equal j) rather than any other single class or set of classes, relative to the chances of an individual of origin category i′ being found in j, rather than in any other single or set of classses.[1] That is:

$$\theta_{ij} = \frac{F_{ij}/F_{ij'}}{F_{i'j}/F_{i'j'}}$$

The greater the deviation of this ratio of odds from unity, the stronger the association between destinations and origins, and, to adopt Goldthorpe's (1980: 77) term, the less equal the competition between men of different origins for particular destination categories.

The odds ratio is formed, as its name indicates, from the ratio of two expressions having the form of (2a) or (2b); thus, for example

$$\theta_{ij} = (c_j/c_{j'})\ (d_{ij}/d_{ij'})\ /\ (c_j/c_{j'})\ (d_{i'j}/d_{i'j'}) = \frac{d_{ij}/d_{ij'}}{d_{i'j}/d_{i'j'}} \qquad (3)$$

Absolute mobility (Φ_{ij} and Ω_{ij}) then, depends upon the main effects of destination and origin and the origin/destination interaction parameters, whereas, as is well known, odds ratios (θ_{ij}), in this case representing relative mobility chances, are expressible in terms of interaction parameters only.

Whereas absolute and relative mobility have a straightforward interpretation and operationalisation, the same is not true of the structural and exchange components of mobility. Interest in the structural/exchange distinction springs ultimately from a belief that the degree of social mobility reflects the extent of societal 'openness' or inequality in access to occupations. The particular assumption underlying the distinction is that structural changes in the economy (such as changes associated with rapid industrialisation) will induce or necessitate some degree of mobility. Therefore, to assess the openness of different societies through examining mobility *per se* is likely to prove misleading. Rather, it is necessary first to control for different rates of structural change, or, more accurately, to control for the amount of mobility that arises from structural causes, before carrying out comparisons on what remains, namely exchange mobility, which is taken to be the true indicator of societal 'openness'.

Although the precise meaning and method of operationalising these concepts has varied somewhat since the initial attempts of, for example, Glass (1954), Kalsh (1957) and Hutchinson (1958) to define and separate structural and exchange components, at its most basic structural mobility is taken to be that movement which is necessitated by the failure of the table to display marginal homogeneity (Sobel, 1983: 721). We can identify at least three problems associated with the concept of structural mobility (and, since it is its complement, exchange mobility also) and its operationalisation.

(1) Can the marginal inhomogeneity of the table be given a convincing empirical referent? Duncan (1966) provides the strongest argument against this possibility. He refutes the

previously held supposition that the row marginal distribution (of fathers' occupations) can be seen as reflecting the occupational distribution at a particular point in time (though the column marginal distribution may be so viewed) and that the difference between margins can be seen as a reflection of changes in the occupational structure of the society under study. Despite this, as Sobel (1983: 721–2) has noted, subsequent authors have continued to use the differences in the row and column marginal distributions as a rough proxy for shifts in the occupational structure. Duncan (1966) suggested the reconceptualization of the rows and column margins as origins and destinations, and in the most recent attempt at the disaggregation of observed mobility into structural and exchange components, by Hope (1981a, 1982), structural mobility is no longer identified with a change in the occupational structure between two points in time but rather with the variance of movement that arises when we take into account the 'availability of occupations' and 'the distribution of origins' (Hope, 1981a: 43).

(2) If an empirical referent can be given to marginal inhomogeneity, is it meaningful to distinguish between mobility arising from exchange factors and structural shifts? Goldthorpe (1980) has identified the major difficulty here as follows. Even if we can avoid, in our disaggregation, the problems that arise in operationalising the two kinds of mobility in terms of a division of the movements of individuals (thus treating as an individual level phenomenon what has meaning only at the societal level: Goldthorpe, 1980: 74) it is still necessary to construct an argument based on some awkward counter-factual propositions. That is to say that the disaggregation necessitates speculation about, for example, what pattern of exchange mobility would have prevailed had there been no structural change. However,

> it seems implausible to suppose that factors which determine change in the occupational structure, such as the rate of economic growth, are unrelated to ones which are likely to influence the pattern of exchange mobility, such as the development of education institutions. (Goldthorpe 1980: 88)

The difficulties encountered in this form of argument lead directly to the third problem in the structure/exchange approach.

(3) Can we specify the effects that arise from the absence of marginal homogeneity? Such effects may differ depending upon the empiricial meaning we attach to marginal inhomogeneity; however, discussions of structural/exchange mobility seldom if ever provide explicit *a priori* accounts of what the effects of either should be, though criticisms of the implicit assumptions that underlie particular methods of disaggregation or of controlling for structural effects have been made by several authors. For example, Hazelrigg (1974: 117) has criticised as 'unrealistic' the assumptions necessitated by the use of the index of dissimilarity in assessing the relative importance of the two types of mobility.

At the statistical level the problem may be put as follows. If the presence of structural mobility effects is identified with marginal inhomogeneity, the absence of such effects will be identified with marginal homogeneity. Thus, under Hope's (1981a) scheme, the variance associated with structural shifts is given by the difference between two models identical in all respects save that one displays marginal homogeneity (the Halfway model) while the other displays the margins of the observed table (the Perfect mobility model). In Hazelrigg's (1974; Garnier and Hazelrigg, 1974) own preferred method (also used by Mosteller, 1968 and Pullum, 1975 among others) the observed table with marginals adjusted to be homogenous represents exchange mobility uncontaminated by structural mobility. In both cases, however, a comparison of the model which excludes structural effects (Halfway in Hope's case, the adjusted table in Hazelrigg's) with that which includes them (the Perfect mobility model and the observed table in the two cases respectively) shows that they differ in their marginal effects while preserving the same pattern of odds ratios. In terms of our earlier discussion, in both cases d_{ij} remain constant in both models, only b_i and c_j change, and thus structural shifts change absolute mobility patterns but leave relative mobility unaffected. Why this should be the case is not discussed by either author: indeed it is reasonable to suppose (particularly in Hazelrigg's (1974) case, given the interpretation he attaches to structural mobility) that those origin groups best placed in terms of exchange (relative) mobility chances, would also be best placed to take advantage of such shifts in the occupational structure as had occurred. If this is accepted, however, severe problems arise as to where to make the structure/exchange division in the partitioning of observed mobility.[2] Precluding structural mobility from influencing relative mobility may not be plausible but it is computationally convenient.

We have identified three major obstacles to the use of the structural/exchange mobility distinction. While some approaches appear to avoid certain of these obstacles (e.g. Hope's method avoids Duncan's (1966) critique) none of them evades all three.

Absolute and Relative Mobility in Comparative Analyses

Hope (1976: 730) has noted that the techniques of mobility analysis 'come into their own ... in comparative analysis.' The generalisation to comparative analyses of the structural/exchange approaches discussed above is straightforward (Hope, 1982; McClendon, 1980), although probably the commonest means of controlling for differences in structural mobility is by fitting the perfect mobility model to each population (a good example is provided by McRoberts and Selbee, 1981: 410–412). The use of the perfect mobility model to control for structural effects has been shown to be deficient by Sobel (1983: 724).

Given the difficulties confronting the structural/exchange approach, the suggestion is advanced that it be replaced by the absolute/relative mobility approach in the analysis of comparative mobility, outlined below.

Consider K mobility tables of identical dimensions involved in a comparative analysis. Let the best fitting model for the comparative analysis be

$$F_{ijk} = a\, b_{ik}\, c_{jk}\, d_{ijk} \tag{4}$$

where b_{ik} are population-specific (heterogenous, in Clogg's (1982) terminology) origin effects, c_{jk} are heterogenous destination effects and d_{ijk} are heterogenous origin/destination association effects.

If we fit the model

$$F_{ijk} = a\, b_i\, c_j\, d_{ij}\, e_k \tag{5}$$

we replace all the heterogenous effects of (4) with homogenous effects (plus a set of main effect terms for the populations e_k). Under (5) both absolute and relative mobility are identical in all populations, since (2a), (2b) and (3) are cross-population constant: indeed, the K tables are identical except for the scale factor, e_k. Note also that the dissimilarity index D[3], is the same (but not necessarily equal to zero) in all K populations since the origin and destination marginals are identically distributed.

Model (5) says not that there is no mobility nor that there are no relative mobility distinctions within each population, but that there is no difference in mobility in either absolute or relative patterns, between the populations. (5) is a 'no mobility difference' model and is therefore the true basis for the analysis of comparative mobility, since any additional parameters will act to reduce the L^2 associated with the failure of (5) to fit the data; that is to say, with the degree to which the K tables differ.

The failure of (5) to fit the data suggests two areas in which parameters may be added – in dealing with the marginal distributions (to relax the constraint that $D_1 = D_2 = \ldots = D_k$) and in dealing with the origin/destination association. These two areas of potential variation are frequently identified with structural and exchange mobility differences, but in fact they can quite simply be related to differences in absolute and relative mobility. Letting the marginal effects differ between populations while retaining a set of homogenous d_{ij} allows one to model differences in absolute mobility and cross-population constancy in the distribution of relative mobility chances. Differences in absolute mobility take precedence over differences in relative mobility since if absolute mobility shows cross-population constancy, then so must relative mobility, but not *vice versa*; hence the next step after (5) is to hypothesise a model that allows for differences in absolute mobility only as in

$$F_{ijk} = a\, b_{ik}\, c_{jk}\, d_{ij} \qquad (6)$$

(6) is what Erikson et al (1982) term a model of 'common social fluidity' and can plausibly be advanced as telling us, when compared with (5), how much of the cross-population difference in mobility can be accounted for by differences in the marginal distributions alone. In sociological terms, (6) posits a state of affairs in which, although the observed patterns of mobility may differ across countries, this arises not because any one of them displays less or more inequality or openness, but because of cross-population differences in marginal distributions which, using Hope's (1981a: 43) terminology, we identify with the distribution of available occupations (columns) and the distribution of origins (rows). We might also consider a model intermediate to (5) and (6), which allowed for heterogeneity in either the origin or destination main effects. For example, the L^2 reduction associated with a model incorporating heterogenous origin main effects would be a measure of how far differences in overall mobility could be accounted for by differences in the origin distribution. Such a model would permit cross-population differences in inflow patterns (interpretable under some circumstances as class recruitment patterns) while preserving homogeneity in out-flow patterns.[4]

Finally, since the only difference between (4) and (6) is that in the former the θ_{ij} (or relative mobility patterns) are heterogenous whereas in (6) they are homogenous, the L^2 difference between these models measures the degree to which cross-population variations in mobility are due to differences in relative mobility chances[5] over and above differences in absolute mobility flows alone.

In summary, the comparative analysis of mobility requires first fitting a model that accounts for mobility in the K tables under analysis: let us call this the 'true mobility model' (equation (4)). The L^2 statistic for this model is a measure of random error in the samples. The disaggregation of comparative mobility then requires the fitting of a model which, rather than positing no mobility, establishes a baseline of no mobility differences between populations (equation (5)). The L^2 difference between these two models ((4) and (5)) is a measure of the total 'mobility difference' variance (or unique mobility variance) in the analysis. The difference between the L^2 statistics for the no mobility difference model and that allowing differences in absolute mobility only (equation (6)) is a measure of the degree to which differences in mobility can be accounted for by differences in absolute mobility alone (i.e., to cross-population differences in margins). Finally the L^2 difference between the latter model and the true model measures the extent to which, in accounting for mobility differences, we must postulate differences in relative mobility chances over and above absolute mobility differences. This final portion of the mobility difference variance can plausibly be advanced as an indication of the extent of cross-population differences in the degree of inequality in intergenerational access to occupational or class categories within the societies under analysis.

TABLE 1:

Danish and English/Welsh 5 × 5 Mobility Tables

	Son's Class					
Denmark		1	2	3	4	5
	1	18	17	16	4	2
	2	24	105	109	59	21
Father's Class	3	23	84	289	217	95
	4	8	49	175	348	198
	5	6	8	69	201	246
England and Wales	1	50	45	8	18	8
	2	28	174	84	154	55
	3	11	78	110	223	96
	4	14	150	185	714	447
	5	0	42	72	320	411

Source: Clogg 1981: 844 (Clogg incorrectly reports cell 4, 4 of the England/Wales data as 741: the correct frequency is reported here).

To illustrate the method we apply it to the data of Table 1, which shows the well-known England/Wales and Denmark mobility tables as reported by Clogg (1981: 844, but see the footnote to Table 1) and originally drawn from Glass (1954) and Svalastoga (1959) who constructed the tables to make them comparable. The occupational categories comprise a collapsed version of the Hall-Jones grouping, having the following labels (Hauser, 1978: 932):

1. Professional, higher administrative;
2. Managerial and executive; inspectional, supervisory and other higher non-manual;
3. Inspectional, supervisory and other non-manual;
4. Routine non-manual and skilled manual;
5. Semi-skilled and unskilled manual.

For the purpose of the analysis the true model of mobility was taken to be the six-level Hauser-type model shown in Table 2. This is the model developed by Hauser (1978: 933) for the English/Welsh data alone.

TABLE 2:

Allocation of cells to interaction levels in the Hauser-type model applied to data of Table 1:

1	2	4	5	6
2	3	4	5	6
4	4	4	5	5
5	5	5	6	5
6	6	5	5	4

Source: Hauser 1978: 933 Table 4.

Table 3 reports goodness of fit statistics and the decomposition of the mobility difference variance. As can be seen, the Hauser model fits the data with L^2 of 32.12 on 22 d.f. (L^2 of 12.1 for England/Wales, 20.0 for Denmark, each with 11 d.f.).[6] The no-mobility difference model has L^2 of 406.7 with 35 d.f., thus the total mobility difference variance to be accounted for is $406.7 - 22.12 = 376.58$ with 13 d.f. The model hypothesising only absolute mobility differences fails to fit the data, but nevertheless accounts for 93 per cent

TABLE 3: *Goodness of fit statistics for models applied to data of Table 1 and decomposition of mobility difference variance*

	Model	L^2	d.f.	Equation in text	Model Description
(a)	True mobility model	32.12	22	(4)	Heterogenous main effects and association parameters.
(b)	No mobility differences	406.7	35	(5)	Homogenous main effects and association parameters.
(c)	Absolute mobility differences	57.39	27	(6)	Heterogenous main effects and homogenous association parameters.

Decomposition of Variance

	L^2	d.f.	
Random error	32.12	22	
Total Mobility Difference Variance	374.58	13	Percentage of Variance:
Absolute mobility differences	349.31	9	93.3
Relative mobility differences	25.27	5	6.7

of the variance to be explained. Differences in the underlying level of inequality in access to occupational categories play only a minor, but nonetheless significant ($L^2 = 25.27$ with 5 d.f.) role. Thus the great majority of the differences between the two tables can be accounted for by their different marginal distributions. This finding, in common with those of, for example, Erikson et al (1982) and Hope (1982) gives support to the hypothesis of Featherman, Lancaster-Jones and Hauser (1975) which states that relative mobility patterns will be constant across western industrialised nations, and differences in observed mobility will, as a consequence, derive from differences in the origin and destination distributions.

Our interest so far has centred on the sources of differences between mobility in Denmark and England and Wales as reflected in the tables we have analysed. It is, of course, possible to adopt the approach and the notation outlined here to investigate those areas of difference more closely. For example, Erikson et al (1979) presented discussions of the differences among England, France and Sweden in inflow and outflow patterns. In our terms they were examining absolute mobility differences as given by (slight modifications of) expression (2b) and (2a) respectively. We might examine cross-national differences in inflow patterns to specific classes by elaborating (2b) to

$$\frac{\Omega_{ij1}}{\Omega_{ij2}} = \frac{(b_{i1}/b_{i'1})\,(d_{ij1}/d_{i'j1})}{(b_{i2}/b_{i'2})\,(d_{ij2}/d_{i'j2})} \tag{6a}$$

which expresses the cross-population ratio in the odds of a member of destination class j having come from origin class i rather than i′. A simple extension of (6a) which allows i′ to represent all origin classes except i and setting i = j gives an expression for the relative degree to which classes are self-recruiting. Thus, taking category four (skilled manual and routine non-manual) in our data, as an example, we obtain an estimated (under (4)) ratio of 1.4 in favour of England and Wales, showing that category four is somewhat more heavily self-recruited here than in Denmark.

The comparable outflow expression is

$$\frac{\Phi_{ij1}}{\Phi_{ij2}} = \frac{(c_{j1}/c_{j'1})\,(d_{ij1}/d_{ij'1})}{(c_{j2}/c_{j'2})\,(d_{ij2}/d_{ij'2})} \tag{6b}$$

which gives the cross-population ratio in the odds of entry into destination class j rather than j′ given origins in class i. Modifying (6b) to let j′ stand for all destinations other than j and setting i = j we obtain a ratio for category four of 1.12 in favour of England and Wales. In other words, men of origin class four are slightly more likely to remain in class four (and therefore are less likely to be mobile) in England and Wales than in Denmark.

Finally, cross-national differences in relative mobility are given by:

$$\frac{\theta_{ij1}}{\theta_{ij2}} = \frac{d_{ij1}\, d_{i'j'1}\, d_{i'j2}\, d_{ij'2}}{d_{i'j1}\, d_{ij'1}\, d_{ij2}\, d_{i'j'2}} \tag{6c}$$

(6c) is a measure of cross-national differences in the inequality of access to a particular destination class (relative to another destination class) between men of a pair of origin classes. So, for example, if we examine the competition between men of origin classes three and four for destination class three rather than four, we find that the cross-national ratio is 0.76 indicating that, in this case, inequality of access is only three-quarters as great in England and Wales as in Denmark.

Two general points might also be made here. First, we could, of course, take the fully saturated model as our true model in all cases. The effect of this would be to conflate the error component with the variance due to differences in relative mobility, thus increasing the importance of the latter and diminishing that of differences in absolute mobility. This is not likely to be severe, however, and would lead to a relatively conservative test of hypotheses such as that of Featherman, Lancaster-Jones and Hauser (1975). In the case of the data shown in Table 1, taking the saturated model as the true mobility model yields an estimate of 12 per cent of mobility difference due to relative mobility differences. Secondly, in some cases (Hauser et al. 1975) the true mobility model will indeed be the model of absolute but not relative differences, indicating that differences in mobility are due solely to the cross-national differences in marginal distributions.

Total Mobility Variance

So far, then, we have dealt with mobility differences. We now want to move to an examination of the total mobility variance in cross-population analyses, which we shall find comprises both mobility difference variance and variance associated with common patterns of mobility. In order to introduce these concepts, however, we first examine the application of our approach to the study of single mobility tables.

While the structure/exchange approach has been used in cross-population studies of mobility, where analysts have attempted to answer the question of how much of the difference in mobility is due to differences in structural effects (identifying the residual with differences in exchange mobility), it has been extensively used in the analysis of single tables, where the question becomes, 'how much of the observed mobility is attributable to structural effects?' These are clearly two different kinds of question; it would, for example, be perfectly plausible for structural influences to be the major source of difference in cross-population mobility patterns while only accounting for a minority of mobility within any single population.

For reasons discussed earlier, we suggest that such questions are not, as they stand, susceptible of satisfactory answers. Paralleling our reformulation of the comparative analysis of mobility to ask 'how much of the difference in mobility can be accounted for by absolute mobility differences alone?', we pose the following question in the analysis of a single table: 'How much of the mobility can be accounted for by positing absolute mobility flows within a framework of constant relative mobility chances?'

We can consider our previous comparative analysis as utilising three constraints: these were:

$$\Phi_{ij1} = \Phi_{ij2} = \ldots. = \Phi_{ijk} \quad (7a)$$

$$\Omega_{ij1} = \Omega_{ij2} = \ldots. = \Omega_{ijk} \quad (7b)$$

which state that absolute mobility is cross-nationally equal, and

$$\theta_{ij1} = \theta_{ij2} = \ldots. = \theta_{ijk} \quad (7c)$$

stating that relative mobility is cross-nationally equal. Equation (5) embodies all three constraints (as noted earlier, if (7a) and (7b) hold, then so must (7c)) equation (6) constraint (7c) only. The counterparts of these constraints to be adopted in the analysis of a single table are:

$$\Phi_{ij} = 1 \quad (8a)$$

$$\Omega_{ij} = 1 \quad (8b)$$

and

$$\theta_{ij} = 1 \quad (8c)$$

The model embodying all three constraints is given by

$$F_{ij} = a \quad (9)$$

while the model embodying (8c) only is

$$F_{ij} = a\, b_i\, c_j \quad (10)$$

(9) is a model fitting only the grand mean, (10) is the perfect mobility model.

Viewed from the perspective adopted here, the perfect mobility model is seen as the optimum[7] model allowing for absolute mobility effects only. The improvement in fit of (10) over (9)[8] shows the degree to which observed mobility may be accounted for by a pattern of absolute mobility dictated by the marginal distributions while preserving equality in the relative (as between origins) chances of access to the various destination categories. The difference between (10) and the true mobility model for a single table, (1), is a measure of the degree to which, in addition to absolute mobility effects, one must postulate inequalities in relative mobility chances in accounting for the pattern of observed mobility.

As a means of disaggregating mobility variance, this method is more modest in its attribution of meaning to specific effects than is the structure/exchange approach and the interpretation of, for example, model (10) is, if hardly novel, clearly more defensible than the more ambitious interpretation given to the perfect mobility model under the structure/exchange scheme – for example that it controls for structural mobility operationalised as the departure of the table from marginal homogeneity. Furthermore, the absolute/relative mobility distinction is useful in analysing single tables in other ways. Most importantly, if one's interest lies in processes of class formation, and specifically in what Giddens (1973: 107–112) terms 'class structuration', then one will wish to focus on the absolute mobility flows that determine class composition rather than on relative chances of access to classes (see Goldthorpe 1980: 45). In other words, one will focus on expressions such as (2b) relating to inflow patterns. This being so, it casts doubt on the validity of attempts such as those of Breiger (1981) and also Hope (1981b) to infer class structure from an examination of equalities and inequalities of relative mobility chances among occupational categories.

Having examined the application of our approach to both comparative and single table analyses we are now in a position to draw the two together to arrive at a measure of overall mobility in cross-population data which may, in its turn, be disaggregated into unique and common components.

In any single population the mobility variance is given by the L^2 difference between (9) and (1): thus the total mobility variance in K population tables is given by the L^2 difference between

$$F_{ijk} = a\,e_k \qquad (11)$$

and (4). Since we have already defined mobility difference variance as the L^2 difference between (5) and (4), it follows that a measure of the common mobility variance shared between populations is given by the L^2 difference between (11) and (5). In other words, this L^2, when expressed as a percentage of the total mobility variance, tells us how well a model of common mobility effects, both absolute and relative, accounts for the total mobility in the populations. This can be further subdivided to arrive at, for example, an estimate of how well a model of common absolute mobility only accounts for total mobility.

TABLE 4: *Decomposition of total mobility variance for data of Table 1*

Models	L^2	d.f.	Percentage of total mobility variance
Baseline ae_k	6527	48	
Common Absolute Mobility $ab_ic_je_k$	1858	40	71.9
Common Mobility $ab_ic_jd_{ij}e_k$	406.7	35	22.3
Absolute Mobility Differences $ab_{ik}c_{jk}d_{ij}$	57.39	27	5.4
Absolute and Relative Mobility Differences $ab_{ik}c_{jk}d_{ijk}$	32.12	22	0.4

Such a disaggregation applied to the English and Danish data is shown in Table 4. It can be seen from this that a model which allows only for a cross-nationally common pattern of absolute mobility accounts for 72 per cent of the total mobility variance in the tables, and that a common model allowing, in addition, relative mobility chances to differ identically within each table, accounts for 94 per cent of the total variance. So, a common pattern of mobility obviously fails to fit the data but nevertheless takes up the great bulk of the variance. At first sight such a finding might appear to support the Lipset-Zetterberg thesis, which states that 'the overall pattern of social mobility appears to be much the same in the industrial societies of various western countries' (Lipset and Zetterberg, 1959:13). However, such a conclusion must be approached with caution. As Erikson et al. (1979: 437) have pointed out, this thesis is imprecise: how much similarity in mobility is needed in order to justify the term 'much the same'? In addition, tests of the thesis will be sensitive to the particular occupational categories used and their number: for example, the categorisation of the English/Welsh and Danish data does not maintain a separation between the agricultural and non-agricultural sectors and thus possibly diminishes the effect of what may be an important source of cross-national differences in mobility (Erikson et al., 1979: 415). Finally, the thesis will be sensitive to the measures adopted in testing it and particularly to the choice of baseline model, and the importance attached to such results must take this into account. Hence, while acceptance or rejection of (5) is a sound statistical test of the Lipset-Zetterberg thesis, if (5) fails to fit, and we do not wish to fail to reject the null hypothesis (as we would normally do in statistical testing), then the degree of support the thesis has received must be gauged in relation to the extent of the failure of (5) to fit the data, as much as by the reduction in L^2 brought about by (5) when compared with (11). In this case the deviations of (5) from the true model are large and are of much more substantive significance than are the deviations associated with the failure to fit of model (6) which tests the Featherman et al. (1975) thesis. This being so, unequivocal acceptance of the Lipset-Zetterberg thesis would clearly be a mistake. What we can say is that the thesis is supported in so far as 94 per cent of total mobility variance can be accounted for by a model common to the two countries. On the other hand, once the thesis is operationalised in the form of a model, or set of models, its imprecision becomes clear, in that mobility patterns can be 'much the same' while at the same time displaying important differences, as in the present instance. Given this imprecision it may be preferable to treat the degree of sameness between mobility regimes not as an hypothesis that can be rejected or not, but rather as a matter of degree. Between the English and Danish data there is clearly a high level of similarity; in other comparative analyses there may be less, and accordingly our interest will shift from testing the Lipset-Zetterberg thesis *per se* to the question of why there should be differences in the degree of common mobility between populations.[9]

Conclusion

In the central part of this paper a baseline model for comparative mobility analysis was defined. This constituted a model of complete identity between populations. We then showed what percentage of the cross-population difference in mobility patterns could be viewed as due solely to cross-population differences in marginal distributions (i.e. differences in absolute mobility patterns) and how much to differences in the origin/destination association (i.e., relative mobility patterns which differences reflect variations in the prevailing degree of intergenerational inequality in access to positions). We then showed that the (unique) variance associated with cross-population differences in mobility accounted for only one part of total mobility variance and that the variance associated with differences has, as its obverse, common mobility variance. Given the models that define total mobility variance and its components we were able to test, in a simple way, hypotheses such as those of Lipset and Zetterberg (1959) and Featherman, Lancaster-Jones and Hauser (1975) and to examine specific areas of differences and similarities in cross-population mobility comparisons.

One question raised by the development of this method is whether or not it can be viewed as a means of operationalising the structural/exchange mobility distinction, since it does purport explicitly to take into account the effects of differences in marginal distributions, a phenomenon traditionally identified with structural mobility variance. An answer to this question depends to a degree upon semantics: if structure/exchange are reduced to mean absolute/relative, as has occurred in instances discussed in the first section of the paper, then the answer is obviously affirmative. On the other hand the method advanced here will no more bear the weight of the kind of interpretations more generally associated with structural and exchange mobility than will the schemes criticised earlier (and by Duncan 1966; Goldthorpe 1980; Hazelrigg 1974; and Sobel 1983). The reader can verify this by treating the method illustrated in the third section of this paper as though it were advanced for the purpose of disaggregating exchange from structural mobility: it will be clear that under such an interpretation, it does not evade the second and third problems identified in connection with the structure/exchange approach.

The main thrust of this paper has been towards questions of interpretation. We have shown that, unlike structural and exchange mobility, absolute and relative mobility can be given simple and plausible mathematical expression and straightforward empirical referents. With a few exceptions the models required by the proposed approach differ little in their general form from those conventionally used in log-linear analysis of mobility. We have sought to provide accurate and theoretically relevant interpretations of these models.

Notes

1. The odds ratio may be given an inflow rather than an outflow interpretation as expressing the chances of an individual of class j having been drawn from origin class i rather than i′ relative to the chances of an individual of class j′ having been drawn from i rather than i′.
2. As Hutchinson (1958: 116) points out in discussing his own measure for estimating structural mobility:

   'this is, of course, a minimum estimate which does not take into account exchange mobility stimulated in its turn by structural change, but whose dimensions we have no means of ascertaining'.

3. The dissimilarity index D within a table is a measure of the percentage of cases that must, of necessity, lie in off-diagonal cells because of the discrepancy between the marginal distributions: that is

   $$D = \tfrac{1}{2} \sum_i | m_{i.} - m_{.1} |$$

   where m_{ij} is the percentage of cases in cell ij. In the analysis of a mobility table, D is conventionally used as a measure of the difference between origin and destination distributions.
4. Erikson et al (1979: 438) note that much of the cross-national differences in mobility that they find in their English, French and Swedish data is related to differences in origin distributions. Therefore a model allowing for heterogeneity in origin effects only

   $$F_{ijk} = a\, b_{ik}\, c_j\, d_{ij}\, e_k$$

   should be almost as effective in reducing L^2 over model (5) as would be model (6).

5. Of course, the values of Φ_{ijk} and Ω_{ijk} will also differ between models (6) and (4).
6. Ideally, if we are to assume (4) to be true then the hypothesised model should fit each of the K tables satisfactorily. In this case the six level Hauser model just fails to fit the Danish data (the critical value for 11 d.f. at $p = .05$ is 19.68); however, some minor adjustment to the model (such as adding a seventh interaction parameter) would yield a very good fit to these data.
7. Optimum in the sense that it is the best fitting of any possible model which hypothesises absolute mobility flows within equality of relative mobility.
8. McClendon (1980: 494) has pointed to two types of structural influences on mobility, namely the shape of the occupational structure itself and the intergenerational change in that structure. However, if we take into account the effects of the origin and destination distributions, then clearly we also account for the effects of differences between these two. If we compare, as baseline models for the analysis of a single table, model (9) with the Halfway model, we see that in moving from (9) to (10) we comprehend all these effects (and we can, of course, disaggregate these effects by, for example, fitting

   $$F_{ij} = a\, b_i$$

   before (10)) whereas, in moving from the Halfway model to (10) (under Hope's 1981a; 1982) scheme) we allow, in a sense, for the effects that arise from the difference between origins and destinations, but not for the effects of the origin distribution itself (contrary to Hope's (1981a: 43) own claims.)
9. Among other recent papers dealing with the Lipset-Zetterberg and/or Featherman et al theses, are Grusky and Hauser (1984), Hauser (1984), Hope (1982), Tyree et al (1979), Whelan and Whelan (1984).

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