TABLE 3A.4 Statistics on Business Ownership for Selected Ethnic Groups, Los Angeles County, 1987

			Firms with Paid Employees		
Ethnic Group	*Firms per Capita*[a]	*Mean Sales and Receipts ($ thousands)*	*Percent of All Firms*	*Mean Number of Employees*	*Mean Sales and Receipts ($ thousands)*
Asian					
Asian Indian	.17	149	26	4.0	407
Chinese	.11	122	27	4.8	334
Filipino	.05	44	13	2.4	210
Japanese	.12	84	19	4.1	314
Korean	.21	145	32	4.4	346
Vietnamese	.12	61	22	4.6	180
Hispanic					
Cuban	.08	91	23	4.8	302
Mexican	.03	59	18	3.5	218
Puerto Rican	.05	86	20	3.0	346
Black	.05	54	15	3.1	251

[a] Denominator estimated from the 1990 census file as the number of adults (persons age 20 and older) not enrolled in school, multiplied by 20.

Source: U.S. Bureau of the Census 1991a: table 7; 1991b: table 7; 1991c: table 4. Since we could not readily locate the figures for blacks, we estimated them by subtracting the figures for Hispanics and Asians from the total figures reported in 1991c.

4

The Structure of Career Mobility in Microscopic Perspective

Jesper B. Sørensen and David B. Grusky

Although more attention has been lavished on mobility tables than perhaps any other type of sociological data, only rarely have sociologists sought to map the underlying contours of mobility between actual *occupations*, where these are understood as functionally defined positions in the division of labor (cf. Rytina 1992; Evans and Laumann 1978). The prevailing practice has been to examine patterns of mobility between "classes" or "strata" formed by aggregating detailed jobs or occupations in terms of their measured (or presumed) work conditions, market position, consumption practices, mobility chances, or socioeconomic standing. While there is surely no consensus on any single class schema, the shared and unchallenged assumption has been that some sort of aggregation into supraoccupational categories is appropriate. The latter assumption has limited empirical inquiry into such fundamental matters as (1) the extent of social closure at the detailed occupational level, (2) the size and location of interoccupational cleavages, disjunctures, and discontinuities in mobility chances, and (3) the macrolevel sources and causes of occupational persistence and mobility. This chapter provides new insights into these issues by presenting a disaggregate occupational classification and calibrating it against one of the standard data sets in the field.

The tabular and event history approaches to mobility analysis differ in many respects, but they evidently share the foregoing preference for extreme aggregation. In some cases, event history analysts use language suggestive of a suboccupational level of analysis, but such language is easily misunderstood. It should be borne in mind that many, if not most, event history analysts resort to modeling job shifts between categories that are defined in terms of occupational status, thus implying that the de facto level of analysis is in fact supraoccupational. The typical researcher will of course distinguish between upward and downward "job shifts" (e.g., Sørensen and Tuma 1981); however, jobs nonetheless disappear from the analysis because researchers rely upon occupational status in ascertaining the directionality of moves, thereby introducing an implicit aggregation of not just jobs but occupations as well.[1] In similar fashion, conventional analyses of "grade mobility" may confound patterns of exchange between and within occupations, since a great many diverse occupations are typically classified into the same grade (e.g., DiPrete 1989).

We would therefore suggest that the principal difference between event history and tabular traditions is not so much the level of analysis at which they operate but rather the particular types of occupational aggregation that are privileged. Whereas the tabular tradition operates within a (not always Marxian) class analytic approach, the event history literature shares with the older path analytic tradition (e.g., Blau and Duncan 1967) a taste for socioeconomic aggregations of occupations. It is ironic that occupations themselves are missing from these analyses despite the great respect that mobility scholars pay to the conventional view that occupations are the "backbone" of the modern stratification system (Parkin 1971:18; also, Blau and Duncan 1967:6–7; Featherman and Hauser 1977:4). We shall attempt here to analyze mobility data in ways that take this conventional view more seriously.

The popularity of aggregate categories can be attributed to such pragmatic considerations as (1) the relatively small samples available for mobility research and the consequent sparseness of disaggregate tables, (2) the convenience of introducing new models and methods with aggregate cross-classifications, and (3) the forces of sociological tradition and convention. The aggregate categories that mobility researchers routinely apply are thus regarded as analytically convenient rather than true collectivities of the realist variety (Holton and Turner 1989; cf. Goldthorpe and Marshall 1992; Wright 1985). Indeed, if a realist model of inequality is to be preferred, there is much to be said for ratcheting the level of analysis down to the detailed occupation itself. We have argued elsewhere that occupational categories are the fundamental units of modern labor markets and the main bases of social closure, collective action, and identity formation (see Grusky and Sørensen 1995). In documenting this claim, we would begin by noting that workers frequently invoke and deploy detailed occupational categories (e.g., doctor, plumber), whereas the aggregate languages of class and status are spoken almost exclusively in academic institutions. The labor market is likewise rife with associations (e.g., unions, professional associations) that act on behalf of *detailed* occupational groupings. By contrast, there are no supraoccupational

organizations that represent aggregate classes (see Murphy 1988), nor are there formally institutionalized barriers to mobility that are truly aggregate in scope. This line of reasoning suggests that the life chances of workers are governed by their occupations more so than their aggregate classes (see Grusky and Sørensen 1995 for further details).

The mobility analyses presented here explore the implications of adopting disaggregate models that correspond to such lay representations of inequality. We proceed by first speculating on the contours of persistence and exchange that our disaggregated analyses will likely reveal. After outlining these hypotheses and possible criticisms of them, we introduce our detailed occupational classification and the data on which it is based. We conclude by discussing our mobility models and the implications of these models for contemporary theories of mobility.

Disaggregation and Persistence

It is instructive to begin our discussion of occupational persistence by rehearsing the received wisdom on such matters. In conventional analyses of career mobility, the densities of class persistence invariably take on a U-shape, with the most extreme rigidities appearing at the top and bottom of the class structure (Featherman and Hauser 1978; Stier and Grusky 1990). This pattern is revealed, for example, in the three-dimensional graph of Figure 4.1, where we have displayed the underlying densities of career mobility reported by Featherman and Hauser (1978). As shown here, the densities of upper nonmanual and farming persistence are quite strong, whereas the densities in the interior of the occupational structure are relatively weak. The results presented in Figure 4.1 are based on the standard levels model introduced by Hauser (1978), but it should be emphasized that the contours of persistence are similar under nearly all competing specifications of the mobility regime (cf. MacDonald 1981).

Although the U-shape of Figure 4.1 has been represented as one of the fundamental features of modern mobility, it may ultimately prove to be an artifact of the highly aggregate classification schemes that sociologists conventionally adopt. As we suggested earlier, one might expect to find considerable heterogeneity in the underlying contours of persistence, since closure and exclusion are secured at the level of occupations rather than classes. The manual sector, for instance, may well be poorly formed in the aggregate, yet it comprises many occupations that have successfully deployed such exclusionary tactics as unionization, closed hiring, and credentialing. At the same time, some professional occupations have failed to achieve fully their exclusionary objectives (e.g., nurses), while others have neither pursued nor articulated such objectives in any sustained fashion (e.g., artists). The aggregate statistics of standard mobility standard 5 × 5 tables, the manual-nonmanual cleavage proves to be especially large, while the upper and lower sectors of the manual class are marked by a further, albeit smaller, divide (see Featherman and Hauser 1978; see also Grusky and Fukumoto 1989; Fukumoto and Grusky 1993). The former result appears as a plateau comprising the northwest quadrant of the Featherman-Hauser design matrix, while the latter appears as a low-lying formation in the southeast quadrant of this same matrix (see Figure 4.1). When Featherman and Hauser (1978:195-8) analyzed an elaborated 12-category classification, they found additional rifts and fissures, yet all were less substantial than the foregoing major divides (see also Snipp 1985).

It is unclear whether further disaggregation will be equally benign. If it is, then much of the interoccupational variability in mobility chances should be located *between* aggregate classes rather than *within* them. There are, of course, any number of alternative outcomes that would require more fundamental revisions in our understanding of mobility regimes. For example, the disaggregate results might suggest (1) a gradational mobility regime in which intraclass heterogeneity is so substantial as to eliminate the manual-nonmanual cleavage as well as all other class divides or (2) a fractured mobility regime in which the principal disjunctures and divides occur within conventional classes rather than between them. In examining these possibilities, we shall carry out exploratory analyses of the sort introduced by Goodman (1981b), yet we shall do so with highly disaggregate data and hence ratchet down the level at which primitive (i.e., untested) classificatory decisions are made (see also Breiger 1981; Jacobs and Breiger 1988).

We hope this approach will provide new insights of an explanatory as well as descriptive sort. In a now classic article, Hout (1984) has argued that off-diagonal exchange is explained not merely by the vertical standing of occupations (as indexed by their socioeconomic status) but also by their relative autonomy and an additional "farming effect" that captures the fundamental disjuncture between farm and nonfarm mobility chances (also, Hout 1988, 1989; Hout and Jackson 1986). The resulting model has rightly become a standard in the field. However, further debate on the sources of exchange should not be closed off altogether, since the posited dimensions have not yet been exhaustively tested against various plausible alternatives. We therefore approach the issue of explanation de novo by fitting association models that identify the underlying dimensions of exchange without imposing any explicit constraints on the data (see Goodman 1987; Smith and Garnier 1987). These multidimensional models are estimable only because disaggregation affords us the requisite degrees of freedom to tease out highly correlated dimensions.

Constructing a Disaggregate Mobility Table

If one wishes to work at the disaggregate level, the data requirements are substantial and can only be met by pooling across multiple sources. We proceed, then, by drawing data from both the 1962 and 1973 Occupational Changes in a Generation (OCG) Surveys (Blau and Duncan 1967; Featherman and Hauser 1978). Although our analyses will not allow for known intersurvey trends in the parameters of mobility (Hout 1984; Featherman and Hauser 1978), the observed changes are surely not strong enough to lead us too far astray. At the same time, we hope that trend analyses will ultimately be carried out at the disaggregate level, since doing so would yield important evidence on the sources of stasis and change. The parameter estimates from our own (more limited) models must of course be interpreted as averaging over the small changes that have been observed in the American mobility regime in recent decades.

The OCG data pertain, unfortunately, to men alone. We further restricted the analyses to respondents who were members of the experienced civilian labor force and were 25 to 64 years old at the time of the surveys. After imposing these restrictions and applying the OCG weights, we constructed a conventional mobility table in which the rows and columns refer to origins and destinations respectively. That is, the rows of our mobility table index the "first occupations" of the OCG respondents, while the columns index the corresponding "current occupations" (see Featherman and Hauser 1978). When the missing responses on these variables are eliminated, the pooled sample size is reduced to 40,127 and the mean cell count for the final mobility table becomes 8.2.[2]

In constructing this table, we had no alternative but to devise a new occupational classification, since the currently available ones are either too detailed (e.g., three-digit census classifications), not detailed enough (e.g., standard class categories), or not readily applied to American occupational data (e.g., two-digit International Standard Classification of Occupations).[3] There are, of course, *some* middle-range classifications available for American data, yet they invariably rest on such extraneous criteria as socioeconomic status, life chances, or mobility prospects. For example, Rytina (1992) has combined census occupations into socioeconomic categories, while Breiger (1981) has aggregated occupations on the basis of mobility chances, and Blau and Duncan (1967) have popularized a 17-category classification based, at least partly, on industrial distinctions (see also Jacobs and Breiger 1988; Stier and Grusky 1990). We would readily concede that aggregations of this sort are useful; however, the resulting categories cannot properly be regarded as occupations, since they rest on criteria other than functional similarities in the social division of labor.

We take a more narrowly occupational approach here. Although we have thus proceeded by aggregating census occupations in terms of their functional tasks, the resulting classification also indirectly captures work conditions and market situations (Lockwood 1958). In constructing this classification, we were guided principally by the work descriptions provided in the *Dictionary of Occupational Titles* (1949, 1965, 1977), but we further attended to the aggregations embedded in other classification systems (e.g., the International Standard Classification of Occupations).[4] The results of our efforts are listed in the Appendix. As reported there, we have mapped each of the three-digit 1960 census codes into one (and only one) of 70 middle-range occupational titles. We then distributed these titles into seven strata and sorted them in order of descending socioeconomic status.

Models of Mobility

We analyze our 70 × 70 classification with log-multiplicative association models (Goodman 1979, 1981a, 1981b, 1981c, 1987; Smith and Garnier 1987). The distinctive feature of such models is that they freely scale origin and destination categories without conditioning on any a priori scorings or orderings of the data. In its most general form, the log-multiplicative model can be represented as follows:

$$F_{ij} = \alpha\, \beta_i\, \gamma_j \exp\Big(\sum_{m=1}^{M} \Phi_m\, \mu_{im}\, \nu_{jm} \Big) \tag{1}$$

where i indexes origins (with $i = 1, \ldots, I$), j indexes destinations (with $j = 1, \ldots, J$), F_{ij} refers to the expected value in the ijth cell, α is the grand mean, β_i is the marginal effect for the ith row, γ_j is the marginal effect for the jth column, Φ_m is the intrinsic association pertaining to the mth dimension, μ_{im} is the scale value for the ith row and mth dimension, and ν_{jm} is the scale value for the jth column and mth dimension.

The foregoing model estimates M association parameters and M sets of row and column scores. While mobility scholars have conventionally estimated one-dimensional association models (e.g., Grusky and Hauser 1984), our disaggregate table is large enough to fit additional dimensions and thereby formally test the three-variable model proposed by Hout (1984). We shall also test for asymmetries of the sort that Blau and Duncan (1967) postulated (also, MacDonald 1981); that is, given the one-to-one correspondence between our row and column categories, we can plausibly impose the further constraint that $\mu_{im} = \nu_{jm}$ (for $i = j$). This

equality constraint generates a set of "homogeneous" multidimensional association models (see Goodman 1979).

We have identified the model of equation 1 by forcing the row and column scores to sum to zero, by fixing the sum of their squares at zero, and by constraining the multiple dimensions of association to be orthogonal to one another.[5] These constraints can be represented as follows:

$$\sum_{i=1}^{I} \mu_{im} = 0, \quad \sum_{j=1}^{J} \nu_{jm} = 0 \tag{2}$$

$$\sum_{i=1}^{I} \mu_{im}^2 = 1, \quad \sum_{j=1}^{J} \nu_{jm}^2 = 1 \tag{3}$$

$$\sum_{i=1}^{I} \mu_{im}\, \mu_{im'} = 0, \quad \sum_{j=1}^{J} \nu_{jm}\, \nu_{jm'} = 0 \tag{4}$$

where $m \neq m'$, and the remaining notation is defined as above. If only one dimension is estimated (i.e., $M = 1$), then Φ_m reduces to Φ and the orthogonality constraints of equation 4 are no longer relevant.

We are perhaps obliged to defend our model against the recent claim (see Stier and Grusky 1990) that analyses of career mobility are best carried out with categorical specifications. The latter argument is not wholly inconsistent with our present modeling strategy; in fact, association models are no longer antithetical to categorical interpretations of mobility, since the introduction of multiple dimensions allows for complex disjunctures that could previously be captured only by fitting categorical terms. The well-known competition between categorical and gradational models of mobility has therefore effectively ended. In the past, mobility scholars selected categorical or gradational models on the basis of conceptual preferences or predispositions (see Erikson and Goldthorpe 1992), whereas now such matters can be addressed empirically by examining the number and type of dimensions underlying the mobility regime.

Selecting a Model

We begin our formal analyses by asking whether standard aggregations conceal much intrastratum heterogeneity in mobility chances. As shown in Table 4.1, over 57 percent of the total disaggregate association is generated within our seven strata, while the remaining 43 percent is generated between these strata. In interpreting this result, some scholars might emphasize that most of the origin-by-destination association is concealed by aggregation, whereas others might be impressed by the amount of association (i.e., 43 percent) that a mere 36 degrees of freedom can explain. We incline toward the former view; indeed, given that mobility scholars have spent the last half century analyzing the minority component of association, it is perhaps high time to begin analyzing the large residue that has so far been ignored (but see Rytina 1992). The intellectual payoff to disaggregation is, at the very least, likely to be greater than that secured by carrying out yet another reanalysis of aggregate mobility.

We have thus applied a series of log-multiplicative association models to our full 70 × 70 mobility table. The fit statistics presented in Table 4.2 indicate that our most complex model (see line D2) accounts for 88.7 percent of the total association and correctly allocates over 92.2 percent of all respondents. This result suggests that association models can be readily elaborated to account for disaggregate mobility. Although the impressive fit statistics of Table 4.2 are attributable in part to the (standard) device of blocking the main diagonal, it is nonetheless striking that our association models fit substantially better than the baseline model of quasi-independence (see line A2). If a standard chi-square decomposition is carried out, we find that our simplest association model (see line B1) accounts for 49.1 percent of the total off-diagonal association [(16,188–8,243)/16,188 = .491), while our most complex model accounts for as much as 66.4 percent of this association [(16,188–5,440)/16,188 = .664).

The fit statistics reported in Table 4.2 do not unambiguously identify a single preferred model. If we were to rely solely on a BIC criterion (Raftery 1986), we would opt for the homogeneous variant of the three-dimensional model (see line D1). At the same time, the test statistics

TABLE 4.1 Decomposition of the Total Association in Disaggregate Mobility Table into Components Within and Between Major Strata

Models	L^2	*df*	L^2_h/L^2_t
1. Total association {O} {D}	48,098	4,761	100.0
2. Between strata $\{O_s\}$ $\{D_s\}$	20,644	36	42.9
3. Within strata	27,454	4,725	57.1

Note: O = occupational origin; D = occupational destination; O_s = stratum origin; D_s = stratum destination

TABLE 4.2 Log-Linear and Log-Multiplicative Association Models Applied to Disaggregate Mobility Table

Models	L^2	*df*	L^2_h/L^2_t	Δ	L^2/df	*BIC*
A. Baseline models						
1. Independence	48,098	4,761	100.0	30.8	10.10	−2,378
2. Quasi-Independence	16,188	4,691	33.7	18.2	3.45	−33,546
3. Quasi-Symmetry	2,593	2,346	5.4	5.1	1.11	−22,279
B. One-dimensional models						
1. Homogeneous	8,243	4,622	17.1	10.9	1.78	−40,759
2. Heterogeneous	7,980	4,554	16.6	10.6	1.75	−40,302
C. Two-dimensional models						
1. Homogeneous	7,151	4,554	14.9	9.6	1.57	−41,130
2. Heterogeneous	6,596	4,419	13.7	9.1	1.49	−40,255
D. Three-dimensional models						
1. Homogeneous	6,198	4,487	12.9	8.7	1.38	−41,374
2. Heterogeneous	5,440	4,286	11.3	7.8	1.27	−40,000

Note: The association models reported here were all fitted with the main diagonal blanked out.

imply that the row and column scores differ significantly from one another, and the L^2/df ratio likewise suggests that our heterogeneous three-dimensional solution is to be preferred relative to all alternatives (save quasi-symmetry). While Hout (1984) is correct, then, in insisting on a three-dimensional model, it is unclear whether the heterogeneous or homogeneous version of this model should be selected here. In the present context, we see little harm in opting for the more complex specification, and we shall accordingly carry out most of our analyses with the model of line D2. By doing so, we allow our readers, rather than BIC, to decide whether the (clearly significant) departures from quasi-symmetry are of sociological interest.

The Structure of Occupational Persistence

We first deploy this model to explore the contours of persistence. As emphasized in our introductory comments, we are principally interested in whether conventional analyses have been unduly misleading, and we therefore contrast our preferred estimates with those secured when the data are aggregated into the seven strata defined in the Appendix. The resulting 7×7 table returns an L^2 statistic of 265 when the main diagonal is blocked and a one-dimensional homogeneous association model is applied. In the analyses that follow, we rely on this simple model exclusively, if only because it has become one of the standards in the field. It is nonetheless reassuring that the contours of immobility are largely the same under most other conventional specifications (e.g., levels models).

The first column of Table 4.3 presents the total densities of immobility under this standard model, while the second column provides the corresponding densities under our preferred model of line D2 (Table 4.2). These densities are calculated as follows:

$$D_{ij} = \ln [\exp (\sum_{m=1}^{M} \Phi_m \mu_{im} \nu_{jm}) \delta_i]$$

$$= \ln [F_{ij} / (\alpha \beta_i \gamma_j)] \qquad (5)$$

where δ_i refers to the immobility parameter for the ith class, and the remaining parameters are defined as before (see equation 1). In our 7×7 classification, the definition of D_{ij} simplifies because M equals one and μ_i equals ν_j (for $i = j$), but the formula of equation 5 otherwise applies equally to the aggregate and disaggregate cases (see Featherman and Hauser 1978:150-61 for analogously defined mobility ratios). The aggregate values of D_{ij} (see column 1) can thus be safely contrasted with the disaggregate values (see column 2) calculated by averaging across the detailed occupations that make up each stratum. Although we subsequently examine the densities of immobility for all 70 occupations, our comparative interests are best served by first examining the central tendency within each stratum. We have likewise reported the within-stratum variances of D_{ij} (see column 3).

In each of the seven strata, the entries in column 2 are larger than their counterparts in column 1 (see Table 4.3), thereby implying that the densities of persistence are attenuated when occupations are aggregated. This "aggregation bias" is quite substantial; that is, the average difference between corresponding entries in columns 1 and 2 is 2.22, which means that the underlying densities of occupational persistence are 9.24 times greater than those of stratum persistence [exp(2.22) = 9.24]. The most dramatic evidence of aggregation bias can be found within strata comprising occupations that have frequently deployed such exclusionary tactics as credentialing, unionization, and closed hiring. For example, the value of

TABLE 4.3 The Structure of Persistence for Aggregate and Disaggregate Mobility Tables

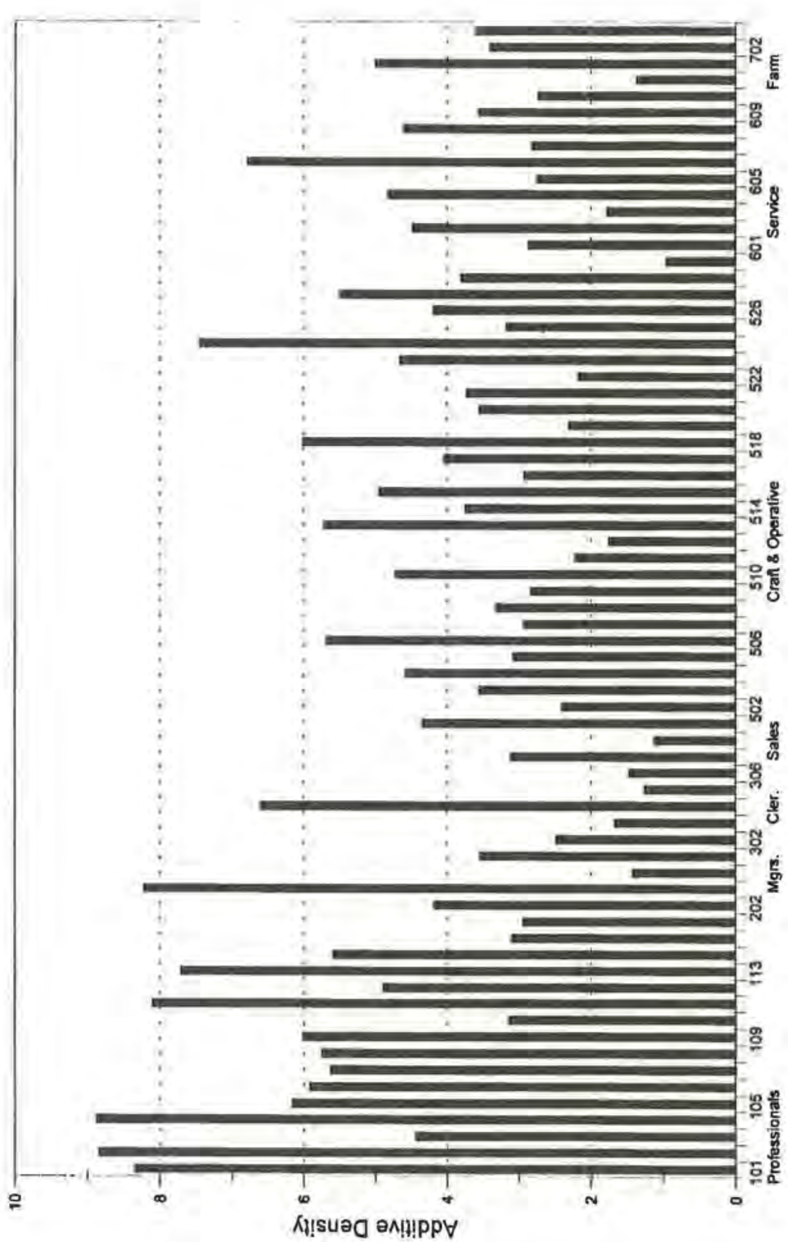
Stratum	Stratum Densities	Detailed Occ. Densities	
		Mean	*Variance*
1. Professional	2.72	6.17	3.53
2. Manager	1.07	4.20	8.48
3. Clerical	0.98	2.84	4.10
4. Sales	1.01	2.12	2.00
5. Craft and operative	0.90	3.81	2.06
6. Service	1.26	3.57	2.64
7. Farm	3.22	4.01	0.75

Note: The densities reported here are in additive form. The stratum densities are taken from a one-dimensional homogeneous association model, and the detailed occupation densities are taken from a three-dimensional hetrogeneous association model (model D2, Table 4.2). For purposes of presentation, the variances have been multiplied by a factor of 100.

D_{ij} increases for professionals by a factor of 31.5 [exp(6.17–2.72) = 31.5], while it increases for managers and craft workers by factors of 22.9 and 18.4 respectively [exp(4.20–1.07) = 22.9; exp(3.81–0.90) = 18.4]. In all such cases, aggregate models misspecify the contours of persistence, since closure is secured through associations or unions that operate at the (detailed) occupational level.

We have graphed the full set of densities in Figure 4.2. As revealed here, the U-shaped curve that appears in aggregate analyses is now more difficult to discern, and not simply because there are pockets of extreme immobility in the skilled manual sector. We find further evidence of such hyper-rigidity in routine nonmanual sectors of the occupational structure (e.g., clerical, sales, service) that have conventionally been regarded as mere "staging posts" for workers engaged in upward mobility projects (see Goldthorpe 1980). Moreover, while the farming sector has long been characterized as the principal region of extreme closure, we now find that the densities of immobility for many professional and managerial occupations rival the corresponding densities for farming. The overall picture that emerges, then, suggests that (1) there is far more immobility than has heretofore been appreciated, (2) the middle regions of the occupational structure can no longer be characterized as zones of great fluidity, and (3)

FIGURE 4.2 Total Densities on Main Diagonal Under Three-Dimensional Heterogeneous Association Model



pockets of hyper-rigidity appear in virtually all sectors of the class structure.

This variability in the densities of persistence may well be explicable in sociological terms. We can distinguish in this regard between artifactual, descriptive, and structural explanations of the relative strength of D_{ij}. Although a great many accounts stressing artifactual sources are currently on offer (e.g., Rytina 1992), the most straightforward one rests on our prior observation that heterogeneous categories are characterized by relatively weak exchanges among the constituent occupations. As Sorokin (1927/1959:439) noted long ago, "the closer the affinity between occupations, the more intensive among them is mutual interchange of their members; and, *vice versa*, the greater the difference between occupations, the less is the number of individuals who shift from one group to another." This line of reasoning suggests that the D_{ij} can be raised or lowered at will simply by defining an occupational category more or less narrowly. The extreme immobility of farmers, for instance, might therefore be interpreted as reflecting the relative homogeneity of the farming stratum rather than the effects of spatial isolation, landownership, or other intrinsic features of the occupation. The results of Figure 4.2 lend some credence to such a story, since the gap between farm and nonfarm immobility indeed closes when nonfarm occupations are disaggregated into categories as homogeneous as those pertaining to farming. By the same logic, one might further conclude that the remaining variability in D_{ij} is equally artifactual, with the driving force in all cases being intercategory differences in the extent to which occupations are homogeneous groupings.

We suspect that the holding power of occupations would nonetheless vary even if these artifactual effects could be wholly purged. While there is a long tradition of constructing (nonartifactual) theories of persistence, the SAT model (Hout 1984, 1988, 1989) stands out as one of the few attempts to formalize such theories (see also Erikson and Goldthorpe 1992; Evans and Laumann 1978).[6] We have applied this model to our highly disaggregate data by regressing the densities of persistence (i.e., D_{ij}) on detailed measures of status, autonomy, and specialized training.[7] As we earlier noted, the SAT model is best characterized as an inspired hypothesis, since the posited dimensions have not yet been exhaustively tested against various plausible alternatives.[8] For purposes of comparison, we have thus regressed D_{ij} on standard measures of substantive complexity (with respect to data, people, and things), all of which have again been operationalized at the detailed occupational level.[9] The rationale underlying this DPT Model is seemingly straightforward; namely, insofar as complex occupations require substantial occupation-specific investments in training, the incentives for extraoccupational mobility are correspondingly reduced (see Stier and Grusky 1990). Under the above formulation, the DPT model might well be advanced as a serious account of persistence, yet our principal intention here is merely to calibrate the SAT model against a quite arbitrarily chosen alternative. The results of Table 4.4 indicate that (1) much of the interoccupational variability in persistence remains unexplained under either model, (2) the coefficient of variation for the SAT model is slightly smaller than that for our alternative DPT model, and (3) none of the SAT variables remains significant (at $\alpha = .05$) when our two models are overlaid on one another (see column 3, Table 4.4). These results bear out our earlier suggestion that scholars of mobility may have settled prematurely on an SAT formulation.

The models of Table 4.4 might be characterized as descriptive in orientation, since they rest on generic features of occupations (e.g., socioeconomic status) rather than those that directly generate social closure and exclusion. We think that sociologists might usefully develop models that

TABLE 4.4 Regression of Total Occupational Persistence on External Variables

Variables	Model		
	SAT	*DPT*	*Hybrid*
STAT	0.013 *(0.161)*	–	0.011 *(0.128)*
AUTON	0.056* *(0.225)*	–	0.052 *(0.208)*
TRAIN	0.388 *(0.301)*	–	0.461 *(0.358)*
COM1	–	0.022 *(0.024)*	−0.277 *(−.300)*
COM2	–	0.634* *(0.595)*	0.439* *(0.412)*
COM3	–	0.243* *(0.289)*	0.071 *(0.084)*
Constant	1.816*	9.646*	3.718
R^2	0.226	0.242	0.321

Note: The coefficients in parentheses are standardized. STAT = Duncan socioeconomic index; AUTON = autonomy; TRAIN = specialized training; COM1 = substantive complexity pertaining to data; COM2 = substantive complexity pertaining to people; COM3 = substantive complexity pertaining to things. All significant coefficients (at $\alpha = 0.05$) are asterisked.

are more nearly "structural" in form (e.g., Duncan 1975). That is, just as modern models of fertility rest on the proximate physiological sources of reproduction (see Menken 1987), so too one might model immobility in terms of the proximate occupational sources of reproduction. We do not wish to suggest that the descriptive effects of generic variables are altogether uninteresting; however, insofar as such effects reflect exclusionary mechanisms and processes that operate at the (detailed) occupational level, one is well advised to condition on a structural model in which these proximate sources of immobility are explicitly specified. The results of Figure 4.2 suggest, for example, that holding power is strengthened (1) when occupational incumbents are spatially isolated from competing occupational opportunities (e.g., fishermen, forestry workers), (2) when exclusionary tactics such as credentialing and unionization are successfully deployed (e.g., accountants, printers), (3) when workers share all-encompassing lifestyles of the sort classically characterized as "vocations" (e.g., locomotive operators, cabinetmakers), (4) when workplaces are occupationally homogeneous and thereby limit contact with alternative employment possibilities (e.g., professors), and (5) when occupational incumbents own physical capital in the form of a farm, business, or professional practice (e.g., farmers, funeral directors, health professionals). While we do not attempt to construct a formal structural model here, the preceding list of variables is, in our view, a useful starting point for such an exercise (see also Evans and Laumann 1978; Spilerman 1977).

The Structure of Occupational Exchange

The estimates from our association models also speak to the implications of aggregation for interoccupational exchange. The principal question at hand is whether aggregate classes "emerge" from our disaggregate data and hence provide empirical justification for conventional analyses of mobility (see Breiger 1981 for related analyses; see also Jacobs and Breiger 1988). If patterns of exchange have indeed been adequately represented in prior analyses, we should find that classes are internally homogeneous and that the major cleavages in mobility chances are located between classes rather than within them. In addressing this matter, we can safely summarize the data by graphing the scale values from our homogeneous model (line D1, Table 4.2), since we have found that the more complex heterogeneous specification does not, at least in this context, provide additional information of much consequence. The resulting three-dimensional graph is presented in Figure 4.3.[11]

The data points of Figure 4.3 suggest a tripartite division into (1) a professional-managerial "new class" (e.g., Ehrenreich and Ehrenreich 1979; Gouldner 1979), (2) an agricultural class of farmers, farm laborers, and

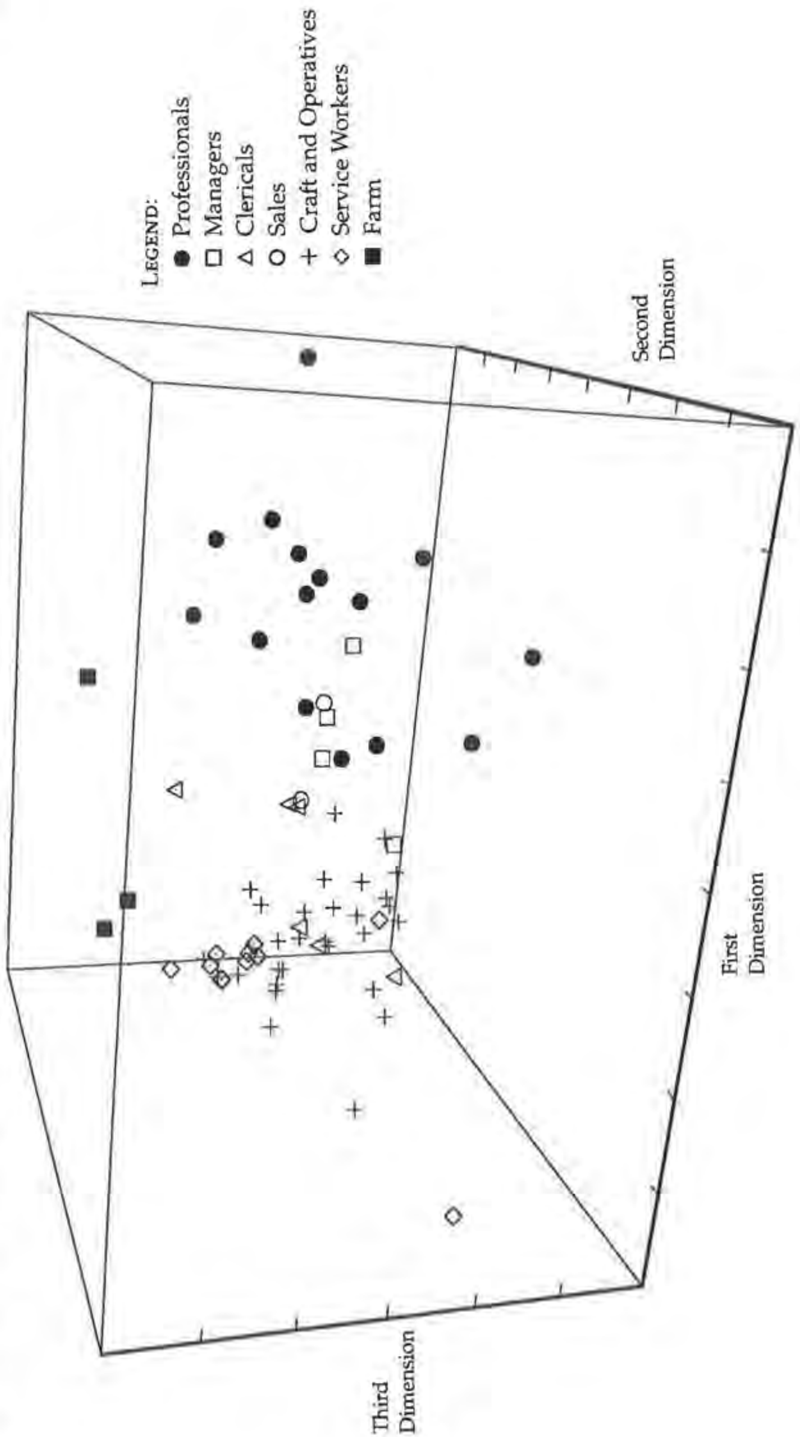


FIGURE 4.3 Scale Values for Three-Dimensional Homogeneous Association Model

farm managers, and (3) a working class of craft, service, and clerical labor. The detailed occupations falling within the latter class appear as a jumble of overlapping data points; indeed, if the detailed occupations within this class were aggregated inductively, one would be forced to define new clusterings that differ from the conventional ones of craft, service, and clerical labor. This is not to suggest that an alternative aggregation emerges here with any clarity. As Figure 4.3 reveals, these intermediary occupations are tightly clustered without any obvious cleavages or dividing lines, thus bearing out the long-standing claim that industrialism "obliterates all distinctions of labor" (Marx 1894/1964:480). Moreover, some clerical occupations are located in the very center of the working class, while others have evidently resisted proletarianization of the sort that Braverman (1974) describes. This result is surely inconsistent with the standard practice of aggregating clerical labor into a single category.

If conventional aggregations cannot be sustained in the middle of the occupational structure, there is nonetheless evidence of a distinct professional-managerial class at the very top of this structure. Although this class is clearly set off from the manual sector, its constituent occupations are also highly dispersed in space, so much so that the resulting "class" spreads out across nearly half the entire figure. This intraclass heterogeneity is *not* reducible to the conventional distinction between salaried and self-employed professionals that Hope (1972:173–9) has emphasized. In examining the right-hand sector of Figure 4.3, we find that some of the occupations indeed involve high rates of self-employment (e.g., accountants), while others are largely staffed by salaried employees (e.g., workers in religion). The principal conclusion that emerges, then, is that standard aggregate categories conceal considerable heterogeneity that is not readily interpretable in conventional ways. In carrying out a de novo aggregation, we would no doubt settle on a conventional farm category, but otherwise our inductive categories would not closely correspond to conventional ones.

The typology of Table 4.5 codifies the various ways in which aggregate classes may or may not be empirically defensible (cf. Jacobs and Breiger 1988). The farming class, for example, approximates the ideal of complete structuration, since it is both internally homogeneous and spatially isolated from all other classes. The working class of craft, service, and clerical labor is more poorly formed; to be sure, its constituent occupations are tightly clustered into dense networks of exchange, but they are also centrally located and accordingly participate in large counterbalancing streams of extraclass flows. By contrast, the professional-managerial class is isolated from the center of the mobility regime, yet it is simultaneously dispersed over much space and is, in this respect, poorly formed. The

TABLE 4.5 Types of Aggregate Class Structuration

Type	*Interclass Distances*	*Intraclass Homogeneity*
Complete structuration	High	High
Partial structuration: Type A	Low	High
Partial structuration: Type B	High	Low
Poor structuration	Low	Low

latter two classes provide our clearest examples of type A and type B structuration.

The foregoing results are usefully recast in terms of expected densities. In Figure 4.4, we have projected these densities on a vertical axis, with the height of the bars given by

$$D^{*}_{ij} = \exp\left(\sum_{m=1}^{M} \Phi_m \mu_{im} \nu_{jm} \right), \tag{6}$$

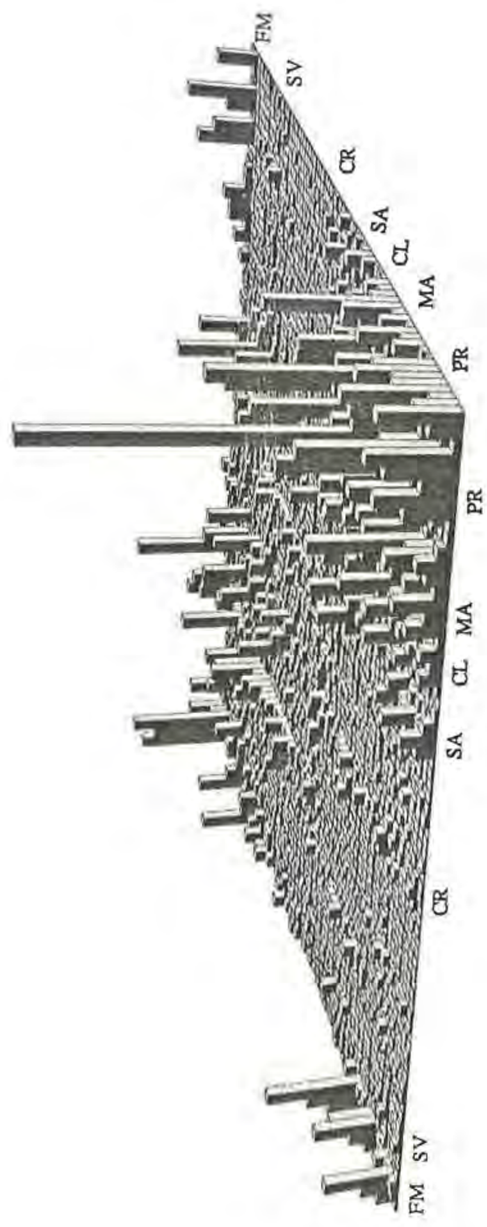
where μ_{im} and ν_{jm} are now drawn from our preferred heterogeneous specification in which asymmetries are freely estimated (see line D2, Table 4.2). The resulting graph bears out the interpretations elaborated above. In the far background of Figure 4.4, we find that the densities of farming persistence are consistently strong, thus implying that the farming class is indeed as well formed as mobility analysts implicitly assume. The densities of professional-managerial persistence are more variable, while those of working-class persistence are comparatively weak and are marked by only occasional high-exchange affinities. There is, then, much heterogeneity within each of these classes; however, when one ignores such heterogeneity by averaging across intraclass densities, Figure 4.4 provides little more than a recapitulation of conventional results. That is, the aggregate densities of class persistence in Figure 4.4 are not unlike those of Figure 4.1, with the characteristic U-shape emerging in both cases. In interpreting this result, we should recall that Figure 4.4 represents not the total densities of persistence and exchange but rather those that remain after all residual immobility, as captured by δ_i, has first been purged (see equation 6). We can therefore conclude that the U-shaped diagonal of aggregate tables reflects the structure of short-distance mobility rather than true immobility at the level of detailed occupations. In aggregate analyses of mobility, the densities of working-class persistence are muted, since they are confounded with low-frequency exchange off the microdiagonal.

If the intraclass heterogeneity of Figure 4.4 merely reflects corresponding heterogeneity in the variables that govern mobility, then our results might well be consistent with conventional explanatory accounts. We have examined this possibility in Table 4.6 by correlating the scale values from our heterogeneous specification (line D2, Table 4.2) with the explanatory variables favored by Hout (1984). As we earlier noted, Hout (1984) has argued that off-diagonal exchange is explained not merely by the vertical standing of occupations but also by their relative autonomy and an additional "farming effect" that captures the disjuncture between farm and nonfarm mobility chances.[12] For purposes of comparison, we have contrasted this conventional account with our own DPT specification, where the latter rests on the three measures of substantive complexity that we earlier introduced. The resulting correlation matrix suggests that (1) the first dimension of mobility is, as expected, principally socioeconomic in its underlying structure, (2) the second and third dimensions cannot be adequately explained by the variables of either model, and (3) these residual dimensions are nonetheless most strongly correlated with the variables indexing farming (i.e., FARM) and the substantive complexity of jobs (i.e., COM3).[13] This set of results hardly constitutes a rousing performance by what has become the premier explanatory model in the field.[14] Indeed, the effects of farming are relatively weak, while those of autonomy are exceedingly so. In emphasizing the above problems, we do not mean to suggest that the DPT model is itself plausible but only that it is no less so than the SAT convention.

Conclusions

The preceding analyses have been inspired by closure theory as elaborated by Parkin (1979), Collins (1979), and others (e.g., Manza 1992; Murphy 1988). In modeling patterns of mobility, we have thus emphasized the various ways in which social closure is secured, with the most important of these being the well-known institutional devices of private property and credentialism. As Parkin notes, the institution of private property "prevents general access to the means of production," while that of credentialism "controls and monitors entry to key positions in the division of labor" (Parkin 1979:48). Although closure theory provides a (relatively) new language for understanding how class boundaries are defended, the actual class mappings posited by closure theorists have so far proven to be standard aggregate fare. For example, Parkin (1979:58) proposes a two-class solution for modern capitalism, with the exclusion-

FIGURE 4.4 Densities of Mobility and Persistence for Three-Dimensional Heterogeneous Association Model



Note: The occupational categories are labeled as follows: PR = professionals; MA = managers; CL = clericals; SA = sales; CR = craft and operatives; SV = service workers; FM = farm. The left-hand labels index occupational origins, and the right-hand labels index occupational destinations. For purposes of presentation, the 96 cells with densities greater than 11 were rescaled by the formula: $10 + (D^*_{ij} - 10)^{2/3}$.

TABLE 4.6 Correlations Between Scale Values and External Variables for Three-Dimensional Heterogeneous Association Model

	External Variables					
Scale Values	*STAT*	*AUTON*	*FARM*	*COM1*	*COM2*	*COM3*
μ_{i1}	0.828	0.131	0.094	0.773	0.655	0.514
μ_{i2}	0.347	−0.268	−0.474	0.093	0.037	0.156
μ_{i3}	0.152	−0.094	−0.051	0.195	−0.072	−0.479
ν_{j1}	0.841	0.011	0.126	0.757	0.705	0.503
ν_{j2}	0.220	−0.198	−0.373	0.128	−0.166	0.090
ν_{j3}	0.116	−0.076	−0.239	−0.036	−0.104	−0.446

Note: μ_{i1} = first dimension row scores; μ_{i2} = second dimension row scores; μ_{i3} = third dimension row scores ν_{j1} = first dimension column scores; ν_{j2} = second dimension column scores; ν_{j3} = third dimension column scores; STAT = Duncan socioeconomic index; AUTON = autonomy; FARM = farming dummy variable; COM1 = substantive complexity pertaining to data; COM2 = substantive complexity pertaining to people; COM3 = substantive complexity pertaining to things.

ary class comprising those who control productive capital and professional services, and the subordinate class comprising all those who are excluded from these positions of control (also, Giddens 1973:107–12; Weber 1922/1968).

The question that emerges here is whether an aggregate formulation is a necessary feature of closure theory or merely a superfluous adjunct. We favor the latter interpretation. If closure theory could somehow be reinvented without the coloration of class analytic convention, its authors would likely emphasize that the fundamental institutions of closure (i.e., professional associations, craft unions) represent the interests of *occupational* incumbents and thus impose barriers to *occupational* entry. As Murphy (1988:174) concedes, the closure rules of advanced capitalism are "not defined broadly, [but] are usually imposed by an association representing the credential-holders themselves." We appreciate that many occupations are relatively unformed; however, where explicit rules of closure *have* been successfully established, one typically finds them implemented at the level of occupations rather than classes. The longstanding attempt to identify a single "exclusionary bourgeoisie" (Parkin 1979) is therefore doubly problematic. That is, such conceptual efforts not only misrepresent the analytic level at which exclusionary barriers are drawn, but they also ignore the many pockets of exclusionary closure that are found within craft, service, and other subordinate occupations.

This disaggregate version of closure theory is clearly inconsistent with the standard practice of carrying out class analyses of social mobility. The results from these conventional analyses have been variously interpreted, but it is becoming increasingly fashionable to characterize modern exchange as so fluid, permeable, and inchoate that "exclusionary institutions do not seem to be designed first and foremost to solve the problem of class reproduction" (Parkin 1979:62; see also Kingston 1994). The latter conclusion is potentially misleading, since it rests on data that conceal exclusionary practices operating at the occupational level. There are at least two ways in which occupation-specific credentials protect incumbents from the hazards of the marketplace: they provide long-term "tenure" by guaranteeing the competence of credential-holders for the duration of their careers, and they require such lengthy training (e.g., advanced schooling) that only workers at the beginning of their careers will seek to undertake the necessary investment (Sørensen 1983; Sørensen and Kalleberg 1981). The principal barriers to inflow and outflow are thereby occupational in nature, and our estimate of persistence will be correspondingly muted insofar as mobility scholars continue to pitch their analyses at the level of aggregate classes.

This argument is supported by our results. When conventional mobility tables are disaggregated, we find that the "holding power" of many detailed occupations is quite strong, whereas that of aggregate classes is comparatively weak. If, then, the amount of intragenerational closure revealed in conventional research falls short of what reproduction theorists promised us (e.g., Bourdieu and Passeron 1977), this is not because bourgeois forms of closure are necessarily unreliable but rather because researchers have misspecified the analytic level at which closure is secured. We have also found that conventional aggregate classes conceal considerable heterogeneity in patterns of persistence and exchange. As revealed in Figure 4.2, pockets of hyper-rigidity appear in virtually all sectors of the occupational structure, thus belying the standard view that social closure is most prominent at the socioeconomic extremes. The sociological convention on interoccupational exchange is likewise misleading, since the principal cleavages and disjunctures in mobility chances are located within major classes rather than between them (see especially Figure 4.3). This set of results suggests that contour mappings of career mobility are quite sensitive to the level of aggregation that is adopted.

Although our analyses have been largely descriptive in orientation, we have also estimated a series of supplementary explanatory models, all of which yielded results of a largely negative sort. When our data are disaggregated to the occupational level, we find that conventional generic variables cannot provide a powerful account of occupational holding power, nor can they adequately explain the residual (nonsocioeconomic) dimensions underlying interoccupational exchange. We would therefore advocate for structural models that explain mobility and persistence in terms of more proximate occupational characteristics (e.g., Duncan 1975). These models can now be realistically pursued because disaggregation affords us the requisite degrees of freedom to measure and distinguish occupational effects that are strongly intercorrelated.

Notes

Direct all correspondence to Jesper B. Sørensen, Department of Sociology, University of Notre Dame, Notre Dame, Indiana, 46556. This research was carried out with support from the Presidential Young Investigator Program of the National Science Foundation (NSF SES-8858467) and the Stanford Center for the Study of Families, Children, and Youth. The data were kindly provided by the National Opinion Research Center and the University of Wisconsin Data and Program Library Service. We have presented earlier drafts of this essay to the American Sociological Association (Los Angeles, California), the Stanford Center for the Study of Families, Children, and Youth (Stanford, California), and the Working Group on the Problems of the Low-Income Population (Madison, Wisconsin). We are most grateful for the comments of James Baron, Diane Burton, Robert Hauser, Robert Mare, Robert Szafran, Szonja Szelényi, Donald Treiman, and Kimberly Weeden. The opinions expressed herein are nonetheless those of the authors alone.

1. To be sure, the residual category of "lateral shifts" is also conventionally analyzed, and here suboccupational forms of mobility perforce reappear. This residual category is nonetheless an amalgam of various levels of analysis, since it encompasses both job shifts occurring within the same occupation and those occurring between occupations that share the same status score.

2. The total number of sampling zeroes in our 70×70 table is 2,229.

3. While we were preparing this chapter, Kalmijn (1994) published a 70-category classification that bears some similarity to our own. This classification merges three-digit occupations that are "roughly similar with respect to industry and type of work" but at the same time distinguishes titles that are "similar in type of work and different in earnings or education" (Kalmijn 1994:429–30).

4. We were obviously obliged to accept the primitive classification decisions embedded in three-digit census codes. If we had instead recoded the original individual-level data, we would no doubt have produced a rather different classification.

5. We have also identified the marginal effects by constraining them to sum to zero.

6. The SAT model was originally devised for intergenerational mobility tables. Although some mobility scholars (e.g., Stier and Grusky 1990) have applied the

same model to intragenerational data, such extensions are not necessarily consistent with the intentions of Hout (1984).

7. These measures were operationalized with General Social Survey data (1974–1990) in accord with the protocol described by Hout (1984:1389–90).

8. The dependent variable in our specification is total persistence, whereas Hout (1984) sought to explain the residue of persistence that remained after purging all clustering arising by virtue of interoccupational distances.

9. These measures are drawn from the full set of 15 General Social Surveys covering the years between 1974 and 1990. The variables COM1, COM2, and COM3 are scored on an interval scale ranging from low to high complexity (see Cain and Treiman 1981).

10. We have constructed this list by carefully examining the results of Figure 4.2. If one wished to test formally the model implied by our listing, it would therefore be appropriate to rely on other data.

11. The axes for each dimension in Figure 4.3 have been scaled by the global association parameter (Φ_m) pertaining to that dimension.

12. We have again operationalized these variables in accord with the protocol that Hout (1984:1389–90) specifies.

13. In interpreting Table 4.6, we should bear in mind that the scale values have been orthogonalized (see equation 4), whereas the explanatory variables of interest are no doubt correlated with one another.

14. The SAT model may well provide a better account of intergenerational exchange. We shall test this fallback claim in a subsequent paper.

References

Blau, Peter M., and Otis D. Duncan. 1967. *The American Occupational Structure.* New York: Wiley.

Bourdieu, Pierre, and Jean-Claude Passeron. 1977. *Reproduction.* Beverly Hills, CA: Sage.

Braverman, Harry. 1974. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century.* New York: Monthly Review Press.

Breiger, Ronald L. 1981. "The Social Class Structure of Occupational Mobility." *American Journal of Sociology* 87:578–611.

Cain, Pamela S., and Donald J. Treiman. 1981. "The Dictionary of Occupational Titles as a Source of Occupational Data." *American Sociological Review* 46:253–78.

Collins, Randall. 1979. *The Credential Society: An Historical Sociology of Education and Stratification.* New York: Academic.

Dictionary of Occupational Titles. 2nd Edition. 1949. Washington, DC: U.S. Government Printing Office.

Dictionary of Occupational Titles. 3rd Edition. 1965. Washington, DC: U.S. Government Printing Office.

Dictionary of Occupational Titles. 4th Edition. 1977. Washington, DC: U.S. Government Printing Office.

DiPrete, Thomas A. 1989. *The Bureaucratic Labor Market.* New York: Plenum Press.

Duncan, Otis D. 1975. *Introduction to Structural Equation Models.* New York: Academic Press.

Ehrenreich, Barbara, and John Ehrenreich. 1979. "The Professional-Managerial Class." Pp. 5–45 in Pat Walker (ed.), *Between Labor and Capital.* Boston: South End Press.

Erikson, Robert, and John H. Goldthorpe. 1992. *The Constant Flux: A Study of Class Mobility in Industrial Societies.* Oxford: Clarendon Press.

Evans, Mariah D., and Edward O. Laumann. 1978. "Professional Commitment: Myth or Reality?" Pp. 3–40 in Donald J. Treiman and Robert V. Robinson (eds.), *Research in Social Stratification and Mobility.* Greenwich, CT: JAI Press.

Featherman, David L., and Robert M. Hauser. 1977. "Commonalities in Social Stratification and Assumptions About Status Mobility in the United States." Pp. 3–50 in Robert M. Hauser and David L. Featherman (eds.), *The Process of Stratification: Trends and Analyses.* New York: Academic Press.

———. 1978. *Opportunity and Change.* New York: Academic Press.

Fukumoto, Ivan K., and David B. Grusky. 1993. "Social Mobility and Class Structure in Early-Industrial France." Pp. 40–67 in Andrew Miles and David Vincent (eds.), *Building European Society: Occupational Change and Social Mobility in Europe, 1840–1940.* Manchester: Manchester University Press.

Giddens, Anthony. 1973. *The Class Structure of the Advanced Societies.* New York: Harper and Row.

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

Goldthorpe, John H., and Gordon Marshall. 1992. "The Promising Future of Class Analysis: A Response to Recent Critiques." *Sociology* 26:381–400.

Goodman, Leo A. 1979. "Multiplicative Models for the Analysis of Occupational Mobility Tables and Other Kinds of Cross-Classification Tables." *American Journal of Sociology* 84:804–19.

———. 1981a. "Association Models and Canonical Correlation in the Analysis of Cross-Classifications Having Ordered Categories." *Journal of the American Statistical Association* 76:320–34.

———. 1981b. "Criteria for Determining Whether Certain Categories in a Cross-Classification Table Should Be Combined, with Special Reference to Occupational Categories in an Occupational Mobility Table." *American Journal of Sociology* 87:612–50.

———. 1981c. "Three Elementary Views of Log Linear Models for the Analysis of Cross-Classifications Having Ordered Categories." Pp. 193–239 in Samuel Leinhardt (ed.), *Sociological Methodology, 1981.* San Francisco: Jossey-Bass.

———. 1987. "New Methods for Analyzing the Intrinsic Character of Qualitative Variables Using Cross-Classified Data." *American Journal of Sociology* 93:529–83.

Gouldner, Alvin. 1979. *The Future of Intellectuals and the Rise of the New Class.* New York: Seabury.

Grusky, David B., and Ivan K. Fukumoto. 1989. "A Sociological Approach to Historical Social Mobility." *Journal of Social History* 23:221–32.

Grusky, David B., and Robert M. Hauser. 1984. "Comparative Social Mobility Revisited: Models of Convergence and Divergence in 16 Countries." *American Sociological Review* 49:19–38.
Grusky, David B., and Jesper B. Sørensen. 1995. "Are Class Models Salvageable?" Working paper, Department of Sociology, Stanford University.
Hauser, Robert M. 1978. "A Structural Model of the Mobility Table." *Social Forces* 56:919–53.
Hauser, Robert M., and John A. Logan. 1992. "How Not to Measure Intergenerational Occupational Persistence." *American Journal of Sociology* 97:1689–711.
Holton, Robert J., and Bryan S. Turner. 1989. *Max Weber on Economy and Society*. London: Routledge and Kegan Paul.
Hope, Keith. 1972. "Quantifying Constraints on Social Mobility: The Latent Hierarchies of a Contingency Table." Pp. 121–90 in Keith Hope (ed.), *The Analysis of Social Mobility: Methods and Approaches*. Oxford: Clarendon Press.
Hout, Michael. 1984. "Status, Autonomy, and Training in Occupational Mobility." *American Journal of Sociology* 89:1379–409.
———. 1988. "More Universalism, Less Structural Mobility: The American Occupational Structure in the 1980s." *American Journal of Sociology* 93:1358–1400.
———. 1989. *Following in Father's Footsteps*. Cambridge: Harvard University Press.
Hout, Michael, and John A. Jackson. 1986. "Dimensions of Occupational Mobility in the Republic of Ireland." *European Sociological Review* 2:114–37.
Jacobs, Jerry A., and Ronald L. Breiger. 1988. "Careers, Industries, and Occupations." Pp. 43–63 in George Farkas and Paula England (eds.), *Industries, Firms, and Jobs*. New York: Plenum Press.
Kalmijn, Matthijs. 1994. "Assortative Mating by Cultural and Economic Occupational Status." *American Journal of Sociology* 100:422–52.
Kingston, Paul W. 1994. "Are There Classes in the United States?" Pp. 3–41 in Robert Althauser and Michael Wallace (eds.), *Research in Social Stratification and Mobility*, Volume 13. Greenwich, CT: JAI Press.
Lockwood, David. 1958. *The Blackcoated Worker*. London: George Allen and Unwin.
MacDonald, K. I. 1981. "On the Formulation of a Structural Model of the Mobility Table." *Social Forces* 60:557–71.
Manza, Jeff. 1992. "Classes, Status Groups, and Social Closure: A Critique of Neo-Weberian Social Theory." Pp. 275–302 in Ben Agger (ed.), *Current Perspectives in Social Theory*. Greenwich, CT: JAI Press.
Marx, Karl. (1894) 1964. *Selected Works*, Volume 1. Moscow: Progress Publishers.
Menken, Jane. 1987. "Proximate Determinants of Fertility and Mortality: A Review of Recent Findings." *Sociological Forum* 2:697–717.
Murphy, Raymond. 1988. *Social Closure: The Theory of Monopolization and Exclusion*. Oxford: Clarendon Press.
Parkin, Frank. 1971. *Class Inequality and Political Order: Social Stratification in Capitalist and Communist Societies*. New York: Praeger Press.
———. 1979. *Marxism and Class Theory: A Bourgeois Critique*. New York: Columbia University Press.
Raftery, Adrian. 1986. "Choosing Models for Cross-Classifications." *American Sociological Review* 51:145–6.

Rytina, Steven L. 1992. "Return to Normality: Simple Structure for the Mobility Table and the Symmetric Scaling of Intergenerational Continuity." Working paper, Department of Sociology, McGill University.
Smith, Herbert L., and Maurice A. Garnier. 1987. "Scaling via Models for the Analysis of Association: Social Background and Educational Careers in France." Pp. 205–45 in Clifford C. Clogg (ed.), *Sociological Methodology, 1987*. San Francisco: Jossey-Bass.
Snipp, C. Matthew. 1985. "Occupational Mobility and Social Class: Insights from Men's Career Mobility." *American Sociological Review* 50:475–93.
Sørensen, Aage B. 1983. "Processes of Allocation to Open and Closed Positions in Social Structure." *Zeitschrift für Soziologie* 12:203–24.
Sørensen, Aage B., and Arne L. Kalleberg. 1981. "An Outline of a Theory of the Matching of Persons to Jobs." Pp. 49–74 in Ivar Berg (ed.), *Sociological Perspectives on Labor Markets*. New York: Academic Press.
Sørensen, Aage B., and Nancy B. Tuma. 1981. "Labor Market Structures and Job Mobility." Pp. 67–94 in R. Robinson (ed.), *Research in Social Stratification and Mobility*, Volume 1. Greenwich, CT.: JAI Press.
Sorokin, Pitirim A. (1927) 1959. *Social and Cultural Mobility*. Glencoe, IL: Free Press.
Spilerman, Seymour. 1977. "Careers, Labor Market Structure, and Socioeconomic Achievement." *American Journal of Sociology* 83:551–93.
Stier, Haya, and David B. Grusky. 1990. "An Overlapping Persistence Model of Career Mobility." *American Sociological Review* 55:736–56.
Weber, Max. (1968) 1922. *Economy and Society*. New York: Bedminster Press.
Wright, Erik O. 1985. *Classes*. London: Verso Press.

Appendix to Chapter 4

TABLE 4A.1 Mapping of Detailed Occupational Classification into 1960 Census Occupational Codes

Code	*Title*	*1960 Census Classification*
A. Professionals		
101	Jurists	105
102	Health professionals	162, 071, 194, 160, 152, 153, 022
103	Architects and engineers	013, 082, 083, 080, 085, 081, 090, 091, 084, 093, 092
104	Professors and instructors	031, 032, 034, 035, 040, 041, 042, 043, 045, 050, 051, 052, 053, 054, 060, 030
105	Authors, journalists, and related writers	020, 075, 163
106	Scientists	021, 140, 145, 134, 131, 130, 174, 135, 172, 173, 175

(continued)

TABLE 4A.1 *(continued)*

Code	Title	1960 Census Classification
107	Accountants	000
108	Elementary and secondary school teachers	183, 182, 184
109	Aircraft and ship officers	012, 265
110	Nonmedical technicians	181, 074, 190, 192, 191
111	Funeral directors and embalmers	104
112	Creative Artists	014, 072, 120, 070, 010, 101
113	Workers in religion	023, 170
114	Health semiprofessionals	185, 303, 073, 150, 151, 842, 840, 193
115	Professional, technical, and related workers, n.e.c.	102, 420, 161, 195, 015, 180, 103, 154, 164, 111, 171, 165
B. Managers		
201	Buyers	250, 285, 251
202	Government officials	280, 270, 260
203	Managers and proprietors, lodging and building	262, 821
204	Managers, officials, and proprietors, n.e.c.	254, 290, 253, 275
C. Clerical		
301	Office support staff	345, 360, 342, 325, 341, 302, 320
302	Bookkeepers, cashiers, and related workers	310, 312, 305, 354, 333, 313
303	Postal and mail distribution clerks	340, 323, 315, 324, 351
304	Telephone and telegraph operators	353, 352
305	Stock and shipping clerks	350, 343
306	Clerical workers, n.e.c.	314, 370, 321
D. Sales		
401	Agents and brokers	301, 385, 393, 395, 380, 381
402	Salesman and shop assistants	394, 382, 383

(continued)

TABLE 4A.1 *(continued)*

Code	Title	1960 Census Classification
E. Craft and operative		
501	Printers and related workers	414, 512, 423, 424, 503, 404, 695, 615
502	Foremen	430
503	Electrical and electronics workers	474, 421, 453, 604
504	Locomotive operators	454, 460, 690, 640, 713
505	Stationary engine operators	701, 520, 712
506	Jewelers, opticians, and precious metal workers	451, 494
507	Blacksmiths, toolmakers, and machinetool operators	402, 431, 492, 530, 502, 452, 653, 614
508	Machinists and millwrights	465, 491, 605
509	Plumbers, welders, and related metal workers	510, 721, 525, 403, 523, 612
510	Food product workers	490, 675
511	Inspectors and checkers	450, 643, 654, 671
512	Mechanics	472, 475, 471, 470, 473, 480, 601, 610, 692, 963
513	Cabinetmakers	410
514	Heavy machinery operators	415, 425
515	Bakers	401
516	Bricklayers, carpenters, and related construction workers	405, 413, 514, 411, 960, 505, 630, 434, 501, 602, 603, 613
517	Metal processors	513, 435, 670, 672
518	Tailors and related workers	524, 651, 432, 680, 705, 535, 515
519	Assemblers	631
520	Painters	495, 694
521	Miners and related workers	685, 634
522	Truck drivers	715, 971, 972
523	Textile workers	710, 461, 720, 673, 652
524	Fishermen	962
525	Longshoremen and freight handlers	965, 973, 841

(continued)

TABLE 4A.1 *(continued)*

Code	Title	1960 Census Classification
526	Sawyers and lumber inspectors	704, 444
527	Forestry workers	970
528	Craftsmen and kindred workers, n.e.c.	521, 493, 504, 545, 620, 621
529	Operatives and kindred workers, n.e.c.	693, 775, 642, 985, 703, 635
F. Service		
601	Transport conductors	252, 645
602	Protective service workers	850, 853, 852, 854
603	Newsboys and deliverymen	390, 650
604	Housekeeping workers	832, 802, 804, 801, 823
605	Mass transportation operators	714, 641, 691
606	Hairdressers	814, 843
607	Food service workers	825, 835, 875, 815, 830
608	Launderers and dry-cleaners	674, 803
609	Gardeners	964
610	Janitors and cleaners	834, 824
611	Service workers, n.e.c.	304, 632, 851, 890, 810, 812, 813, 831, 874, 820, 860
G. Farm		
701	Farm managers and foremen	222, 901
702	Farmers	200, 903
703	Farm laborers	902, 905
H. Other		
999	Members of armed forces	555
0	Occupation not reported	990, 991, 993, 995, 999

PART THREE

Demographic Aspects of Social Differentiation