AN EMPIRICAL STUDY OF MARRIAGE AND SOCIAL STRATIFICATION

by

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ABSTRACT

The dual objectives of this thesis are to assess the merits of certain statistical methods as applied to sociological data and to use statistical methods to produce interesting and worthwhile substantive results.

The main statistical focus of the thesis is the analysis of two-way tables, for which purpose association models and correspondence analysis are used. Some of the tables analysed require the application of quasi-association models and association models with more than one dimension. Elsewhere in the thesis a proportional hazards model and various log-linear models are fitted.

The substantive focus of the thesis is the relationship between marital formation/dissolution and social stratification in modern Britain. Particular attention is paid to assortative marriage for social status, with the relationships between spouses' occupations, educational levels and social origins being considered in detail. Assortative marriage for religion and for party political identification/voting intention are also examined.

The data analysed come from a variety of social surveys, including both government surveys (e.g. various General Household Surveys, and the Family Formation Survey) and academic surveys (e.g. the Oxford Mobility Survey and the Social Change and Economic Life Initiative survey).

The thesis conclusively demonstrates the utility of association models, log-linear models and proportional hazards models as applied to data relating to marital formation/dissolution. Among the numerous substantive findings are that there was a significant post-war decline in the strength of the relationship between spouses' social origins, and that unemployment appears to cause an increase in the risk of marital dissolution.

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This thesis is dedicated to my parents.

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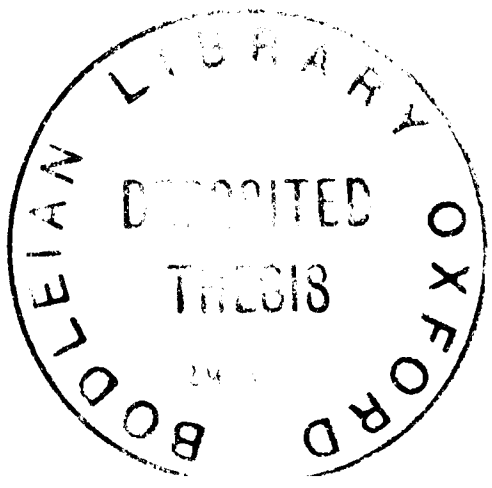
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CHAPTER 1: Introduction

1. The objectives of this thesis

This thesis has two linked objectives. The methodological objective is to assess the merits of certain statistical methods as applied to sociological data. The second objective is to use statistical methods to produce interesting and worthwhile substantive results.

Since the thesis is mainly concerned with the evaluation of statistical methods through their application to sociological data it was not felt necessary to produce a narrowly focused thesis. Thus a broad range of substantive issues is addressed, though all relate to the central issues of marital formation and dissolution.

Similarly, the development of new statistical methodology is not a central objective of this thesis, though on occasions the nature of the data being considered necessitates a certain amount of methodological originality.

The application of sophisticated statistical techniques to sociological data is more common in some areas of sociological research than in others; this thesis aims to demonstrate that marriage-related data are as amenable to this form of analysis as, for example, social mobility data. (Other researchers pursuing a similar line include Mare, 1991; and Kalmijn, 1991a; 1991b).

From a methodological viewpoint this thesis aims to assess the usefulness when applied to data in the context of substantive research of the association models and related models currently being developed by (among others) Goodman, Clogg and Becker. Thus the models are evaluated empirically through their application to data relating to marriage.

The next section of this chapter introduces some of the substantive issues considered in later chapters. The third section introduces some marriage-related terminology, and the final section discusses in detail the content of the rest of the thesis; broadly speaking Chapter 2 is an in-depth review of the statistical methods evaluated in the thesis and Chapters 3 to 6 apply the statistical methods to marriage-related data.

2. The substantive focus of this thesis

The main substantive focus of this thesis is the relationship between marriage and social stratification in Great Britain. The volume of basic quantitative research relating to marriage in Britain is much smaller than that relating to marriage in the United States to the extent that a very high proportion of standard 'demographic' references on British marriage are the work of a single individual, John Haskey of OPCS.

Hence it is relatively straightforward to find combinations of variables which have not been examined previously in relationship to each other, or at least not in detail in the context of Britain. Thus while the methodological emphasis of the thesis places limitations on its substantive and theoretical depth, the novelty of the analyses means that they almost inevitably make a contribution to substantive sociological knowledge.

More precisely, the thesis focuses primarily on the relationship between marital formation/dissolution and social status in Britain in the mid-to-late 20th Century. However, it is not solely concerned with occupational status, since social status in the context of marriage is highly likely to be dependent on education, family background, income, etc., as well as occupation. Additionally, since both economic/financial circumstances and social status might be expected to be relevant in the context of marriage, the thesis is concerned also with the socio-economic aspect of social stratification.

How might social status be related to marital formation? Though marriage is essentially a private relationship, the process of couple formation is heavily influenced by peer groups, the family, and career/training considerations, so one might expect social status to be linked to most aspects of marital formation.

Clearly, social status could be related to whether people ever marry (see Kiernan, 1988), but marriage is still very much the norm, so much so that it is of limited interest to ask why someone marries - of rather more interest would be to ask why a small minority of people do not ever marry.

The existence of social segregation in British society suggests that social status may be related to where and in what context people meet their eventual spouses. For example, individuals of high social status frequently meet their spouses in the context of some form of post-compulsory education. It is also well-known (see Kiernan and

Eldridge, 1987) that there is a relationship between social status and the age at which people marry. The effect of social status on age at marriage is of particular interest because age at marriage has been shown to be related to the risk of marital dissolution (see, e.g., Murphy, 1985)

Given the existence of a dichotomy of civil and religious marriage ceremonies in Britain, there is scope for a relationship between social status and how people marry. In addition, more marriages take place in the summer than during the winter, so one might ask whether there is a relationship between when (during the year) couples marry and social status. Note that these last two relationships could reflect socio-economic differences rather than social status differences per se.

Probably the most obvious and perhaps the most interesting relationship between social status and marital formation is the extent to which social status determines whom one marries (see, e.g., Coleman, 1977). The relationship between spouses' social statuses is one of the most striking aspects of social stratification, and plays a role in maintaining its existence. However, comparatively little effort has been made to determine which aspects of social status are of most importance in the context of this crucial relationship.

As to marital dissolution, it is easy to see that there may well be relationships between social status and whether, when and why marriages dissolve, since the incentives to stay married and the frequency of behaviour likely to prompt dissolution are both likely to vary according to social status. However, relationships such as these could once again reflect socio-economic differences rather than social status per se.

Several studies (e.g Bott, 1957; Edgell, 1980; see also Allan, 1985) have suggested or shown relationships between social status (or social class) and aspects of married life. However, this thesis is concerned primarily with marital formation and dissolution rather than with aspects of married life itself.

While this thesis is primarily methodological in orientation, there are two specific theoretical issues on which the thesis may possibly shed some light, i.e. the complementary roles of 'structure' and of 'preference' in determining marriage patterns, and variations in the 'salience' of social characteristics in the context of partner selection.

In a way similar to that in which social geographers are interested in the contribution made to marriage patterns by geographical proximity

as opposed to personal preference, sociologists should be interested in the contribution made to the relationship between spouses' social status characteristics by social proximity as opposed to personal preference. In as much as individuals exercise some degree of control over whom they associate with, the 'social circles' in which people move are likely to be related to the social status of their preferred 'types' of marriage partner. However, while social segregation may thus in itself be partly a reflection of an individual's personal preferences, it is still of interest to consider the extent to which personal preference influences choice of marriage partner within the constraints of the range of potential partners that an individual meets.

The extent to which particular social characteristics are of salience to an individual in the context of partner selection is clearly of interest. For example, the ethnic group of a potential spouse is of more importance to some individuals than to others. In addition to considering the extent to which the salience of a particular social characteristic varies between individuals, it is also interesting to consider which characteristics are in general the most salient, e.g. on average is education a more salient characteristic in the context of partner selection than family background?

3. Definitions of some technical terms relating to marriage

Several technical terms which appear in this thesis need to be defined. Foremost among these is the term assortative marriage. When one talks about assortative marriage for (with respect to) a variable, one is describing a situation where marriage partners tend to be more similar with respect to that variable than would be expected if couples were paired off at random.

Two further terms relating to assortative marriage are the terms homogamy and heterogamy. A couple is said to be homogamous if the partners share a common attribute, and heterogamous if they do not. Homogamy and heterogamy are reasonably straightforward terms when one is considering the similarity/dissimilarity of partners with respect to a categorical variable. When one is considering a continuous variable, the decision as to what constitutes a homogamous couple becomes arbitrary, and differing degrees of heterogamy are a possibility.

Hypogamy and hypergamy are two forms of heterogamy. These terms arise when the variable under consideration is ordinal. Hypogamy describes the situation where the wife has a higher value or belongs to a higher category of the variable than her husband, and hypergamy occurs where the husband has a higher value or belongs to a higher category.

While endogamy is normally an anthropological term meaning marriage within a clan or tribe, it is sometimes 'hijacked' by sociology and used to describe in-marriage in a broader sense, i.e. marriage within a social, ethnic or religious group.

Propinquity is a term which appears in the marriage-related literature primarily in the context of the 'homogamy versus propinquity' debate (see, for example, Morgan, 1981). This debate concerns the relative importance of geographical proximity (propinquity) and of personal preference in determining partner selection.

4. The structure and contents of the remainder of this thesis

Chapter 2 reviews the statistical methods evaluated in the thesis, with attention being paid to the methodological issues arising from the application of these methods in the later chapters.

Much of this thesis is concerned with the analysis of tables of husbands' and wives' characteristics in combination. Chapter 2 pays particular attention to techniques which explore/model two-way tables by decomposing the association in the tables into sets of scores relating to underlying dimensions.

The chapter compares the pros and cons of some of these techniques. Correspondence analysis (see Greenacre, 1984) is shown to be technically superior to multidimensional scaling. Probabilistic models which have some advantages over the implicit model underlying correspondence analysis are discussed, with the main conclusion of this section of Chapter 2 being that, in most cases, the appropriate approach to analysing a table of husbands' and wives' characteristics in combination is the application of Goodman's association models (see, e.g., Goodman, 1986), or adaptations of these models, e.g. 'quasi-association' models.

The chapter continues by discussing the interpretation of parameters in quasi-association models and then by discussing quasi-association models with more than one dimension. A simulation study demonstrates that there are dangers attached to using association models to determine the number of dimensions underlying the structure of a contingency table.

Odds ratios underly many of the statistical models used in this thesis, and the next section examines the implicit 'decomposition' of odds ratios which occurs in log-linear models and in association models.

The analysis of 'collapsed' multi-way tables using quasi-association models is then considered. In the context of this issue the number of categories in each variable is of particular interest, and Chapter 2 considers briefly the limitations of modelling compact but simplified tables, and the way in which large tables can be 'collapsed' with a minimal loss of information.

Some of the more conventional statistical techniques used in the thesis are described in Section 1 of the Appendix to Chapter 2.

Chapter 2 concludes with a brief discussion of the secondary analysis of social survey data, and gives brief descriptions of the sources of data used in the thesis. Section 3 of the Appendix to Chapter

2 describes the data sources in more detail, and mentions briefly some other relevant sources.

Chapters 3 to 6 apply various statistical techniques (primarily those discussed in Chapter 2) to data about marriage.

Chapter 3 considers the period bounded by a couple's first meeting and by their marriage ceremony. Association models and log-linear models are used to look at the relationship between spouses' place of first meeting and three variables relating to social status, i.e. occupation, education and social origin. The relationships of age at marriage and age when started going steady to these three variables are then examined using OLS (Ordinary Least Squares) regression. Log-linear models are then used to examine the possibility that marriages which are in some sense 'rushed' are unusually heterogamous. Finally, log-linear models and logit models are used to explore the relationship between class/status and the nature and timing of the marriage ceremony.

Chapter 4 is possibly the most important substantive chapter in this thesis. It contains a detailed analysis of assortative marriage for social status, with the trio of social status-related variables considered once again being occupation, education and social origin. The main statistical techniques used in Chapter 4 are log-linear models, association models and quasi-association models.

The chapter starts with an examination of assortative marriage for social origin. The structure of a detailed table of husband's social origin by wife's social origin is modelled, and trends in social origin heterogamy are considered. Assortative marriage for school-type (e.g. comprehensive, grammar, etc.) is then examined, and the extent to which this form of assortative marriage is the consequence of assortative marriage for social origin is considered.

Attention is then turned to educational level (based on qualifications and school-leaving age), and the extent to which assortative marriage for educational level underlies school-type endogamy is explored. Assortative marriage for social origin, for school-type, and for educational level are then considered simultaneously, and trends in assortative marriage for social status are examined.

Correspondence analysis is then used to look at the relationship between husbands' and wives' educational qualifications in detail, and a hierarchy of qualifications is derived from the structure underlying this relationship.

Assortative marriage according to pre-marital occupation is the next topic covered by the chapter, and the effects of husbands' and wives' occupations on their childrens' chances of attaining 'high class' jobs are considered.

The most methodologically innovative part of Chapter 4 is an analysis of a six-way table of husband's and wives occupations, educational levels (judged in terms of qualifications), and social origins. In the first instance hierarchical log-linear models are used, but association models are then applied to a two-way representation of the table. Two major substantive purposes of the analysis are to identify the relative importance of the trio of social status-related variables in the context of assortative marriage for social status and to explore how many underlying dimensions are needed to represent adequately the patterns of assortative marriage for these three variables, since it is not entirely implausible that the patterns reflect partner selection based on a single underlying social status dimension.

The last part of Chapter 4 compares the patterns of assortative marriage for occupation in first marriages with those in remarriages, and also considers the relationships between the pre-marital occupations of twice-married women and the occupations of their first and second husbands.

Chapter 5 uses log-linear models to examine religious assortative marriage and political assortative marriage. The relationship between the likelihood that an individual has a spouse identifying with a different political party and the individual's attitude towards that party is considered. The relationship between party political identification heterogamy and the likelihood of voting is examined, as is the strength of assortative marriage for voting intention among homogamous graduate couples. The relationship between spouses' occupations in combination and homogamy of party political identification is also explored.

The relationship of religious endogamy to school-leaving age is examined, and trends in religious endogamy are considered. Finally, the relationships between remarriage and the two forms of assortative marriage are explored.

The last substantive chapter, Chapter 6, focuses on marital dissolution. The main analysis in Chapter 6 is a proportional hazards model of marital dissolution, wherein the effects of occupation,

education and social origin on the risk of dissolution are examined both in the absence and in the presence of other covariates, so that the gross and net effects of the social status-related variables can be compared. Another analysis examines the relationships of occupation and of education to attitudes to the current British divorce law in the context of a logit model including other relevant covariates

The last section of Chapter 6 considers the relationship between heterogamy and marital dissolution. A logit model is used to analyse the effect of age heterogamy on the risk of dissolution. This analysis is followed by an analysis of the effect of social origin heterogamy on the risk of dissolution. The latter analysis uses a novel, log-linear model-based, data analytic technique, unfortunately somewhat unsuccessfully (since the power of the related significance test is rather low). After a brief comparison between first marriages and remarriages of the extent of school-leaving age heterogamy is carried out, the last analysis in this chapter uses a proportional hazards model to look at the relationship between marital dissolution and a combination of husband's pre-marital occupation, wife's pre-marital occupation and wife's post-compulsory schooling.

Chapter 7 has three sections: an overview of statistical aspects of the thesis, followed by a brief discussion of issues arising from the use of secondary analysis in the thesis, and finally a brief discussion of the theoretical contribution made by the substantive conclusions of the thesis.

CHAPTER 2: A review of statistical methods and methodological issues

1. Introduction

Chapter 2 provides an overview of the statistical methods used in this thesis. In addition to the discussion of the statistical techniques/models themselves, attention is paid to the methodological issues arising from the application of these techniques/models in later chapters. The chapter also considers some more general methodological issues.

Much of this thesis involves the analysis of two-way tables, so Section 2 of the chapter pays particular attention to techniques which explore/model a two-way table by decomposing the association in the table into sets of scores corresponding to underlying dimensions. Multidimensional scaling and correspondence analysis are compared, and some related probabilistic models (including association models) are then discussed. Attention is also paid to specific issues relating to the application of such models to assortative marriage-related tables.

As noted above, the techniques discussed in Section 2 decompose the association in a table into sets of scores corresponding to underlying dimensions. The association in a table can be described in terms of odds ratios, and both log-linear models and association models involve the implicit 'decomposition' of these odds ratios. Section 3 is a discussion of this 'decomposition'.

Section 4, the last section of the chapter concerned with statistical techniques, considers the merits/demerits of dichotomising variables to simplify the modelling process, and also considers the related issue of 'collapsing' tables based on variables with large numbers of categories without a substantively significant loss of information.

Finally, Section 5 briefly discusses the secondary analysis of social survey data, and outlines the uses to which the various sources of data used in the thesis were put. (The data sources are described in more detail in Section 3 of the Appendix to the chapter, which also mentions briefly some other relevant sources).

Section 1 of the Appendix to the chapter considers some technical points relating to the statistical analyses in the thesis and briefly discusses some fairly standard techniques used in the thesis, i.e. log-linear models and logit models. Proportional hazards models are then briefly outlined.

2. Exploring the association in two-way tables

This section is concerned with the description/analysis of the association in two-way tables. While such association can be crudely summarized by a single measure (see Goodman and Kruskal, 1954), it is more usual to examine the association in more detail, for example by converting the observed frequencies in a table into odds ratios, or by calculating residuals for the independence model applied to the table.

An alternative approach is to assume that the association in a table is determined by some underlying structure, either unidimensional or multidimensional. (For example, the association in a table of religion by party political identification could reflect underlying dimensions such as liberalism and traditionalism). Scores relating to the positions of the two sets of marginal categories on underlying dimensions can be determined empirically, with the association in the table being a reflection of these scores.

The contents of the rest of this section are as follows: First, an overview of a debate surrounding the use of two-way tables to produce scale scores corresponding to occupational categories is given. (A detailed examination of the association in two-way tables may not have necessarily been one of the primary objectives of those authors who have extracted scale scores from such tables. However, in the process of extracting scale scores from such tables the authors have implicitly modelled the association in these tables. Therefore the debate highlights many important issues relevant to the exploration/modelling of the association in two-way tables).

Two different approaches to the scaling of two-way tables are then introduced, i.e. multidimensional scaling (using Blau and Duncan's dissimilarity index) and correspondence analysis (see Greenacre 1984), and correspondence analysis is shown to have certain theoretical advantages over multidimensional scaling in this context. (In Section 2 of the Appendix to this chapter a table of husbands' and wives' social origins is analysed using correspondence analysis as an illustration).

The relationship of the row and column scores from the correspondence analysis of a two-way table to the structure of the association in the table is then discussed, and the graphical presentation of the results of correspondence analysis is then considered. Computational aspects of correspondence analysis are then discussed.

Association (and correlation) models are then introduced as probabilistic alternatives to correspondence analysis and a comparison is made of the advantages and the limitations of the different techniques.

Adaptations of association models relevant to the analysis of tables of husbands' and wives' characteristics in combination are then considered. These include quasi-association models, which include extra parameters corresponding to the leading diagonal of a symmetric table, and association models with more than one dimension.

A simulation study is then carried out which shows that the difference in goodness-of-fit between association models with different numbers of dimensions cannot be used straightforwardly to establish the number of dimensions underlying the association in a table.

Finally, the application of association models to collapsed versions of tables with more than two dimensions is considered.

2.1. Two-way tables and scores for occupational categories

Whereas some researchers produce scores for occupational categories almost as a side-product of their attempt to model the association in two-way tables, other researchers see the production of scale scores for occupational categories as being of importance in its own right. Either way, the extraction of scale scores from a two-way table is intrinsically linked to an implicit model of the association in the table.

A debate exists in the sociological literature as to whether it is better to produce scale scores for occupational categories by a relational approach (Stewart et al, 1980) or by a reputational approach (Goldthorpe and Hope, 1974). The relational approach bases scores on some aspect of social relations (e.g. the parent-child relationship, friendship, or marriage) and is typically operationalised by the analysis of a two-way table. The reputational approach bases scores on the subjective assessment of a group of individuals as to the ranking of occupations with respect to some property such as prestige or desirability.

A major limitation of the relational approach is highlighted by a comparison of occupational categories based on the scaling of a two-way table carried out by Blau and Duncan (1967). Blau and Duncan concluded from the results of their analysis that "the first dimension .... evidently represents the socio-economic status of occupations" [p71].

However, Blau and Duncan analysed an intergenerational social mobility table, and hence the underlying dimension labelled by Blau and Duncan as "socio-economic status" is more properly labelled 'those aspects of social status which are relevant in the context of intergenerational social mobility'. Clearly, the scores for the occupational categories in Blau and Duncan's analysis are specific to the relationship on which they are based, i.e. the relationship between son's occupation and father's occupation.

Whereas it would appear at first sight that the 'context-specific' nature of scale scores produced by the relational approach means that they are inferior to scale scores produced by the reputational approach, the reputational approach clearly has the parallel disadvantage of producing scores which are <u>not</u> tied to a specific context and which are based on the aggregation of subjective interpretations as to the meaning of the word 'prestige', or whatever other concept it was with respect to which individuals were asked to rank occupations. In other words, in neither the relational or the reputational case is it clear precisely what is being measured!

Stewart et al (1980) concluded that their scale scores for occupational categories, which were based on a table of the occupations of men cross-classified by the occupations of their friends, were related to an underlying dimension measuring "similarity of life-styles". This would appear only to be a reasonable label if one is prepared to assume that "similarity of life-styles" is synonymous with whatever underlying process/processes dictate friendship choice. Mitchell and Critchley (1985) referred to the common structure underlying the results of their analyses of three different stratification-related tables as "general social status". With the qualification that it might better have been called 'general associational social status', such a label seems reasonable.

Leaving aside questions of the 'meaning' of underlying dimensions, another difficulty is that any assumption that 'social status' can be represented by a unidimensional scale is very questionable. Coxon, Davies and Jones (1986; p42) note that social scientists tend to attempt to identify a 'dominant' prestige (social status) dimension, despite the fact that studies have repeatedly found that at least <u>two</u> dimensions are needed to represent adequately the stratification space within which the categories under consideration lie.

Both Macdonald (1972; p229) and Coxon et al (1986; pp 112-120) report circumstances where occupations/occupational categories lie along

a curve in multidimensional space rather than a straight line. It is not clear to what extent results such as these are the results of the scaling techniques employed rather than representations of a substantively meaningful aspect of the underlying social structure, but the results do suggest that there is a possibility of an ordinal relationship which cannot be represented unidimensionally. Coxon et al also note that an empirically produced scale is not necessarily uniform in substantive 'meaning' along its whole length. For example, one part of the scale may reflect differences in income, while another part of the scale may reflect educational differences.

It is arguable that the extra dimensions which previous studies have found to be necessary to describe adequately the underlying structure of 'prestige-related' contingency tables are related simply to additional factors which one might expect to be reflected in the data. Goldthorpe and Hope (1974; p10), with reference to using the relational approach to produce scores from a table corresponding to a particular 'mode of association', comment that the "mode of association .....will almost certainly reflect a number of determining factors in addition to prestige". However, the problem still remains as to how one can identify the 'social status dimension' in the multidimensional representation of a contingency table's underlying structure. The axes in a multidimensional solution are empirically rather than theoretically defined, and the researcher therefore has to choose whether to assume that one of these empirically defined axes can be reasonably taken as corresponding to a 'social status dimension' or whether to arbitrarily rotate the solution to find an axis which 'looks' as if it corresponds to an underlying 'social status dimension'! There is a particular problem with categories which have extreme values on other ('non-social status') dimensions in this respect, as the social status scores for these categories can vary considerably between different choices of axis for the 'social status dimension'.

Two extra points are worth noting. Assigning an occupational category a score on a social status scale tends to make one think of that category as a homogeneous entity, whereas as Macdonald (1972) notes, two categories with the same score "can behave very differently as a result of heterogeneity". It would seem sensible to attach a 'measure of spread' of some sort to each category in addition to its scale score, though previous studies have not done this.

It is also important to realise that the scale score for an occupational category may reflect the 'social status' attached to the

occupations in that category, but may alternatively be a reflection of the 'social status' attached to the average educational level of the individuals in that category. Thus what appears to be a set of scores corresponding to 'occupational social status' may in fact be a set of scores corresponding to 'educational social status'.

The above discussion emphasises two important points relating to the analysis of the association in a two-way table by methods which involve the production of scores on various dimensions for the table's marginal categories. Firstly, the dimensions to which the scores relate are empirically defined and are therefore difficult to interpret substantively. Secondly, it is difficult to establish how many underlying dimensions are involved in determining the association in the table. A third point which relates to both the previous points is that, since the dimensions are empirically defined, more than one dimension, and hence more than one set of scores, may be related to a single substantive concept.

2.2. Multidimensional scaling using Blau and Duncan's dissimilarity index

Multidimensional scaling techniques have frequently been applied to 'sociological' two-way tables to produce a set of positions in multidimensional space for one or both sets of marginal categories.

Multidimensional scaling techniques produce multidimensional maps of a set of objects starting from a table of distances between those objects. For example, Mitchell and Critchley (1985) used multidimensional scaling to produce 'maps' of the relative positions of male occupational categories based on the association in three tables (man's occupation by father's occupation, by wife's father's occupation, and by spare time associate's occupation). The three 'maps' were very similar, causing Mitchell and Critchley to conclude that the underlying dimension determining the association was the same in each of the tables.

In the case of two-way contingency tables, the 'distance' between two categories of a variable is often calculated using Blau and Duncan's dissimilarity index (Blau and Duncan, 1967).

Table 2/1 gives an example of the calculation of Blau and Duncan's index for pairs of columns in a two-way table.

The index for a pair of columns is constructed as follows

(i) for each row the absolute difference between the proportions of cases in the two columns in question is calculated,

(ii) the values calculated in (i) are summed across the rows, and

(iii) the total from (ii) is halved.

As Macdonald (1972) observes, use of this index means that 'once the dissimilarity measures [distances] are computed, each category exerts the same weight irrespective of size'. It is also doubtful whether the combination of multidimensional scaling and Blau and Duncan's index is appropriate for the analysis of a table where some of the rows and/or columns only contain a small number of cases, since the distribution of the cases in a category with a small sample size across the categories of the other variable is going to bear little relation to the asymptotic distribution for that category.

Apart from the fact that Blau and Duncan's index is not necessarily the best distance measure to use in this case, it is also worth asking oneself whether the explicit calculation of <u>any</u> distance measure as a preliminary to the dimensional analysis of a two-way contingency table is ideal or indeed necessary. It might be better to let a scaling procedure derive the distances implicitly, since the distances between the categories are part of the spatial relationship between the categories that one wishes to determine.

Consider a two-way table of Variable A by Variable B. Authors such as Mitchell and Critchley (1985), who use Blau and Duncan's index as a measure of the distance between two categories of Variable A, use a concept of distance which depends solely on the extent to which the distributions of the cases in the two categories across the categories of Variable B differ, and not the <u>way</u> in which the distributions differ. While the basic principle underlying this distance measure (i.e. one that says that two categories are 'close together' if their members are 'distributed similarly' across the categories of Variable B) seems reasonable, one would ideally like to take account of the <u>substantive</u> significance of a difference in the proportions of individuals in two categories of Variable A which belong to a specific category of Variable B.

TABLE 2/1: Blau and Duncan's dissimilarity index: an example using a table of male occupational class by party political identification. (Data from the 1987 British Election Study)

Proportions of those identifying with parties cross-classified by occupational category

Heath-Goldthorpe class	Party Political Identification		
	Conservative	Alliance	Labour
High grade prof. & manag.	24.1	19.6	6.0
Low grade prof. & manag.	17.0	22.5	10.3
Routine office	6.5	8.7	4.9
Sales and Personnel	1.3	0.7	0.7
Small Pet. Bourg. (+emps)	8.6	4.7	2.2
Small Pet. Bourg. (no emps)	5.7	1.5	3.8
Farmers	1.3	0.7	0.4
Manual foremen	7.3	8.4	11.4
Skilled manual	11.3	14.2	26.9
Semi/unskilled manual	16.0	18.2	33.0
Agricultural employees	1.1	0.7	0.5
TOTALS	100.0	100.0	100.0

Differences between parties in the proportions of those identifying with parties cross-classified by occupational category

Heath-Goldthorpe class	Pair of parties		
	Con/All	All/Lab	Con/Lab
High grade prof. & manag.	4.5	13.6	18.1
Low grade prof. & manag.	5.5	12.2	6.7
Routine office	2.2	3.8	1.6
Sales and Personnel	0.6	0.0	0.6
Small Pet. Bourg. (+emps)	3.9	2.5	6.4
Small Pet. Bourg. (no emps)	4.2	2.3	1.9
Farmers	0.6	0.3	0.9
Manual foremen	1.1	3.0	4.1
Skilled manual	2.9	12.7	15.6
Semi/unskilled manual	2.2	14.8	17.0
Agricultural employees	0.4	0.2	0.6
TOTALS	28.1	65.4	73.5

The three Blau and Duncan dissimilarity indices (expressed as percentages) corresponding to the three pairs of parties are 28.1/2=14.1, 65.4/2=32.7 and 73.5/2=36.8

For example, if Variable A is occupation and Variable B is educational level, a difference of 1% between the percentages of graduates in two occupational categories may well be of more substantive significance than a difference of 1% between the percentage of individuals with 'O' levels in the two categories. It is instructive to consider specific examples such as one where the percentages of graduates in two occupational categories are 0% and 1% and the corresponding percentages of individuals with 'O' levels are 39% and 38%. This example suggests that it might be better to consider relative rather than absolute differences between percentages, or alternatively that differences of the same absolute magnitude should be 'weighted' in some fashion (since the 'graduate category' is likely to have an extreme position on one or more of the underlying dimensions determining the structure of the association in the table, and hence the difference corresponding to this category is probably of more substantive importance).

An aggregation of distributional differences such as the one used to produce Blau and Duncan's index does not necessarily result in the loss of too much important information regarding the spatial relationship between the various categories of Variable A, but it would seem preferable to avoid the introduction of the extra 'noise' which accompanies the use of such an index, presuming that a suitable alternative option is available.

In conclusion, reasonable requirements for a scaling technique to be used for the analysis of a two-way table (Variable A by Variable B) would seem to be that it should utilise all the information in the table to produce distances between categories, and that differences in the proportions of cases in two categories of Variable A falling into a particular category of Variable B should be assigned an importance relative to the position of that category of Variable B on the underlying dimensions determining the structure of the association in the table. Unfortunately multidimensional scaling of distances calculated using Blau and Duncan's dissimilarity index does not meet these 'reasonable requirements'!

2.3. Correspondence analysis

Correspondence analysis (a 'translation' of the French phrase "L'analyse des correspondances") is another technique which has been used to uncover the structure underlying two-way tables.

Correspondence analysis is in effect the canonical correlation analysis of a contingency table, and it can also be shown to be equivalent to the Singular Value Decomposition of a transformed version of the table treated as a matrix (see Weller and Romney, 1990, p58).

Correspondence analysis produces sets of scores for a table's marginal categories which relate to the positions of the marginal categories on the dimensions underlying the table and which can be shown to be the eigenvectors of transformed versions of the original table treated as a matrix. The eigenvalue corresponding to a particular eigenvector/set of scores is an indication of the empirical importance of the underlying dimension to which the set of scores corresponds.

The academic history of correspondence analysis is very interesting. Van Rijckevorsel and De Leeuw (1988) comment that it is not difficult to find ten cases in the post-1955 English-speaking applied statistics literature of authors 're-inventing' correspondence analysis under the impression that they have discovered a 'new' technique. The latest case is probably Prandy (1990, p633), who without knowing it is moving away from the use of multidimensional scaling towards correspondence analysis.

Greenacre (1984) attributes the mathematical origins of correspondence analysis to Hirschfeld (1935). Fisher (1940) also derived the same theory in the context of the discriminant analysis of a contingency table, and Horst (1935) independently suggested a similar approach in the psychometric literature, though he did not formalise the idea mathematically.

Two 'strands' in the history of correspondence analysis are particularly relevant to this thesis. Horst (1935) suggested the terminology "method of reciprocal averages" to describe his suggested technique. In the 1970's, Hill (1973; 1974) introduced correspondence analysis to the non-psychometric English speaking statistical world in the guise of "reciprocal averaging". Greenacre (1984; pp 96-102) gives a detailed description of both the theoretical and computational aspects of reciprocal averaging, and notes that a difficulty with the iterative approach adopted by Hill (1973) is that it leads to "excessively large stress being placed on the unidimensionality of the ordinations and

their separate interpretations" (Greenacre, 1984; p102). In other words, there is a risk of the 'reification' of empirically defined axes in what is in reality a multidimensional solution rather than just a series of unidimensional solutions.

The second relevant 'strand' in the correspondence analysis literature runs through Fisher (1940) via Kendall and Stuart (1967) to Hope (1972a). It appears that Hope picked up on the canonical analysis of an r x c table as described by Kendall and Stuart (1967; pp 599-606) and developed the technique (Hope, 1972a), referring to it as "canonical regression". Unfortunately Hope's paper is not easy to understand, and does not appear to have generated much interest in Britain, though "canonical regression" was utilised by Cote (1983). However, Hope did apply the technique to a table of husbands' and wives' occupations (Hope, 1972b), though the comments of Johnson (1980) suggest that those reading the paper in question are unlikely to have completely understood its technical aspects! (Johnson links Hope's decomposition of contingency tables into "contingency hierarchies" to an assumption of panmixia fundamental to the demographic research of Henry (1972) but not in this author's opinion made either explicitly or implicitly by Hope).

While Benzecri and other French data-analysts have been using correspondence analysis since the 1960's, their usage has been within a philosophical framework which rejects the validity of probabilistic modelling. A possible result of this is that correspondence analysis only began to feature prominently in the English speaking statistical world in the early 1980's. In addition to the publication of books by Greenacre (1984) and Lebart, Morineau and Warwick (1984), a string of articles have appeared (Van der Heijden and De Leeuw, 1985; Van Rijckevorsel and De Leeuw, 1988; Van der Heijden et al, 1989; Gilula and Habermann, 1986 and 1988; Gilula et al, 1988; Goodman, 1981a and 1986). Ecological researchers have continued to follow Hill's lead in the use of correspondence analysis (see, for example, Digby and Kempton, 1987).

Relevant work in the British literature includes the review of the book by Nishisato (1980) written by Aitkin (1982), a paper by Goldstein (1987), and a paper by Everitt and Dunn (1988), which includes correspondence analysis in a comparison of various methods for the analysis of categorical data, and cooperation between the French and English speaking statistical worlds is evident in the paper by Aitkin et al (1987)!

2.4. Correspondence analysis versus multidimensional scaling using Blau and Duncan's dissimilarity index

This subsection shows that correspondence analysis meets the reasonable requirements for a scaling technique which were outlined in Section 2.2, and thus shows that correspondence analysis is a superior technique to multidimensional scaling using Blau and Duncan's index in the context of the analysis of two-way tables.

Suppose that one is interested in using a table of occupation by educational level to learn something about the relative positions of occupational categories in the social structure. Calculating the 'distance' between two occupational categories using Blau and Duncan's dissimilarity index involves comparing the distributions of educational levels of the individuals in the two occupational categories. Clearly, a difference in the proportions of individuals in the two categories who have a particular educational level is suggestive of a difference in the types of individuals in the two categories. However, the difference in proportions on its own is not particularly informative. The occupation by educational level table contains information relating to educational levels which Blau and Duncan's index fails to utilise. A difference in the proportions of individuals in the two occupational categories who have a particular educational level can be qualified by the range of occupations of individuals who have that educational level. Each column of an occupation by educational level table contains information about the range of occupations of individuals with a specific educational level. It is this information that Blau and Duncan's index ignores.

Any individual shares his or her educational level with a range of other individuals from a variety of occupational categories. Hence that individual is in some sense 'similar' to a distribution of individuals across occupational categories. If one considers an individual with occupation i and educational level j, then that individual is 'similar' to the distribution of occupations in the j-th column of the occupation by educational level table.

Following on from above, if one considers <u>all</u> the individuals in the i-th occupational category, then one can produce a distribution of occupations 'similar' to that defining the i-th category by

(i) successively taking the educational level (k) of each individual in the i-th occupational category

(ii) adding to the new distribution the relative distribution across occupational categories of individuals with educational level k (i.e. the distribution of individuals in the k-th column of the occupation by educational level table).

In effect the procedure outlined above when repeated for all occupational categories amounts to the production of a new, occupation by occupation, table wherein the educational levels of each individual in each occupational category have been replaced by the occupations of a cross-section of the individuals in the sample who share his or her educational level. (see Table 2/2 for an example).

The value in the cell in the new table corresponding to the k-th row (occupational category) and the q-th column (occupational category) is

$$z_{kq} = \sum_{p=1}^{N_E} (F_{kp}F_{qp}/\sum_{r=1}^{N_O} F_{rp})$$

where the number of cases in the cell of the original occupation by education table corresponding to occupation i and educational level j is F_{ij}, and N_E is the number of educational levels and N_O the number of occupational categories in the original table.

The new table is symmetric and it can easily be seen that

$$\sum_{q=1}^{N_O} z_{kq} = \sum_{p=1}^{N_E} F_{kp}$$

i.e. the sum of each row in the new table is equal to the sum of the corresponding row in the original table. Each row in the new table summarizes the information carried by the educational level variable regarding the similarity of the corresponding occupational category to all the other occupational categories. While Blau and Duncan's dissimilarity index treats as identical differences of the same absolute magnitude between the proportions of two occupational categories falling into educational level categories, this new method of summarising the information carried by the educational level variable treats each difference in proportions as a multidimensional quantity equivalent to a vector describing the distribution of the relevant educational level across the occupational categories multiplied by the magnitude of the difference in proportions.

It is clear from the above that so far the requirements for an acceptable scaling technique outlined in Section 2.2 have been met. The next stage is to use the new table to produce scale scores for the occupational categories.

The new occupation by occupation table has a strong similarity to the table of distances input to multidimensional scaling software. However, there is a more straightforward way to produce scale scores from this table than the use of multidimensional scaling.

Suppose that the score of occupational category i on one of the table's underlying dimensions is labelled v_i. Then an intuitively reasonable course of action would seem to be to define v_i to be equal to a weighted average of the scores of the other occupational categories on the underlying dimension, with the weights coming from the row of the new table corresponding to occupational category i. Thus, one is defining the position of an occupational category on the underlying dimension to be the average of the positions of 'similar' individuals in other occupational categories.

Using the definition of z_{ij} from earlier in this section

$$v_i = \sum_{j=1}^{N_O} z_{ij}v_j / \left(\sum_{j=1}^{N_O} z_{ij} \right)$$

$$\text{If } w_{ij} = z_{ij} / \left(\sum_{j=1}^{N_O} z_{ij} \right) \text{ then}$$

$$v_i = \sum_{j=1}^{N_O} w_{ij} v_j$$

If $\underline{v}$ is the vector of the positions of all the occupational categories on the underlying dimension, then

$$\underline{v} = W\underline{v}$$

where W is a matrix whose elements are the w_{ij}. The above equation differs from an eigenequation only by the absence of a symbol corresponding to the eigenvalue. Adding in a symbol for the eigenvalue and solving the resulting equation identifies the positions of the occupational categories on the underlying dimension.

Adding in an eigenvalue-related symbol to the above equation and solving the resulting eigenequation is equivalent to solving the original equation iteratively and rescaling the solution after each iteration. This two-step iterative process can be written:

$$\underline{v}_{(n+1)} = W\underline{v}_{(n)}$$

and

$$\underline{v}_{(n+2)} = c_{(n+1)}\underline{v}_{(n+1)}$$

where $\underline{v}_{(n)}$ is the version of $\underline{v}$ after n iterations, and $\underline{c}_{(n+1)}$ is the scaling factor.

In fact the above iterative process is identical to the "reciprocal averaging" interpretation of correspondence analysis described by Hill (1973; 1974). The eigenvectors of W are the positions of the occupational categories on the dimensions underlying the table and the eigenvalues are indications of the relative empirical importance of these underlying dimensions. Note that the largest eigenvalue of W is always 1, and that the eigenvector corresponding to this eigenvalue is $\underline{1}$, and it is therefore the second largest eigenvalue and its corresponding eigenvector which are of most interest.

Thus correspondence analysis embodies the requirements for a theoretically adequate scaling technique described in Section 2.2 and is therefore superior to multidimensional scaling using Blau and Duncan's dissimilarity index.

Note that there are <u>two</u> possible versions of W relating to the table examined above, one corresponding to the occupational categories and one to the educational categories. Henceforth the scores corresponding to the two sets of marginal categories are referred to as 'row' scores and 'column' scores.

The sets of row scores and the sets of column scores are not unrelated. The first set of row scores and the first set of column scores produced by the correspondence analysis (i.e. the eigenvectors corresponding to the second largest eigenvalues of the two versions of W) correspond to one underlying dimension of the original table, the second set of row scores and the second set of column scores correspond to a second underlying dimension, etc. Note that the eigenvalues of the two versions of W are therefore identical.

TABLE 2/2: An example of the manipulation of a two-way table to give the type of symmetric table described in Section 2.4. (The data correspond to ever-married female respondents to the main survey of the 1986 Social Change and Economic Life Initiative).

Class of occupation	Educational level			
at marriage	Degree	'A' level	'O' level	No quals
Service class	50	123	124	101
Intermediate class	29	116	499	708
Working class	1	21	121	867
TOTALS	(80)	(260)	(744)	(1676)

The distribution of educational levels corresponding to the service class is replaced by a distribution of occupations as follows

Number of service class occupations in new distribution is
((50*50)/80) + ((123*123)/260) +
((124*124)/744) + ((101*101)/1676) = 116.2

Number of intermediate class occupations in new distribution is
((50*29)/80) + ((123*116)/260) +
((124*499)/744) + ((101*708)/1676) = 198.9

Number of working class occupations in new distribution is
((50*1)/80) + ((123*21)/260) +
((124*121)/744) + ((101*867)/1676) = 83.0

By repeating the above procedure for the intermediate and working class rows one obtains the (symmetric) table

	Service	Intermediate	Working
Service class	116.2	198.9	83.0
Intermediate class	198.9	696.0	457.1
Working class	83.0	457.1	469.9

[The above table shows, for example, that the category of Service Class women have a similar range of educational levels to a group of women consisting of 116.2 Service Class women, 198.9 Intermediate Class women, and 83 Working Class women].

2.5. Correspondence analysis 'scores' and the structure of a two-way table

Given that the sets of row and column scores produced by correspondence analysis correspond to underlying dimensions, there remains a need for a less technical and more intuitively comprehensible interpretation of both the order in which these dimensions are 'chosen' and the contribution of each dimension towards the explanation of the association in the table. (However it should be emphasised that the dimensions are not substantively distinct entities and as such it is dangerous to interpret them in isolation from each other).

Hope (1972b; pp109-110) demonstrates that "canonical regression" (his name for correspondence analysis) can be viewed as the decomposition of a contingency table into a series of additive "contingency hierarchies". The mathematics behind this result is given by Greenacre (1984; pp87-93), who shows that

$$F_{ij} = (r_i c_j / n)\left(1 + \sum_{k=1}^{K} [v_{rki} v_{ckj} / (\sqrt{\phi_k})]\right)$$

where

F_{ij} is the cell frequency of the (i,j)th cell

r_i is the i-th row total

c_j is the j-th column total

n is the sample size

v_{rki} is the row score for the i-th category on the k-th underlying dimension

v_{ckj} is the column score for the j-th category on the k-th underlying dimension

ϕ_k is the eigenvalue corresponding to the k-th underlying dimension

Each of the elements of the summation term in the above equation relates to a different "contingency hierarchy", which in turn corresponds to one of the underlying dimensions of the table.

Perhaps the most important thing to note about the above decomposition is that it contains the term $r_i c_j / n$. This is the expected frequency in the cell (i,j) of the contingency table under the independence model. In other words, each dimension (i.e. each pairing of a set of row scores with a set of column scores produced by correspondence analysis) contributes to the explanation of the residuals resulting from the application of the independence model to the table.

As an example consider Table 2/3, which is a crosstabulation of responses to the statement "A husband's job is to earn the money; a wife's job is to look after the home and family" made by a sample of respondents to the 1980 Women and Employment Survey (WES) and their husbands. Table 2/4 shows the raw residuals when the independence model is fitted to Table 2/3.

The raw residual for cell (i,j) is equal to

$$(r_i c_j / n) \sum_{k=1}^{K} [v_{rki} v_{ckj} / \{\sqrt{\phi_k}\}]$$

Table 2/5 shows the first "contingency hierarchy", i.e. that part of Table 2/4 which is explained by the first underlying dimension.

The element of this contingency hierarchy for cell (i,j) is

$$(r_i c_j / n) v_{r1i} v_{c1j} / \{\sqrt{\phi_1}\}$$

Table 2/6 shows the second contingency hierarchy. Table 2/7 shows the remainder of Table 2/4 when the first and second contingency hierarchies have been removed, i.e. it is the sum of the third and the fourth contingency hierarchies.

A standard measure of the deviation of a two-way table from the frequencies expected under the independence model (or, for that matter, from any other model) is the Pearson chi-square statistic. Kendall and Stuart (1967, pp 574-575) show that the chi-square statistic divided by the table's sample size ("Pearson's mean-square contingency coefficient") is the sum of the squares of the canonical correlations extracted from the table by a canonical analysis, or in other words is the sum of the eigenvalues corresponding to the various sets of row scores/column scores.

The eigenvalue corresponding to the first set of row scores/column scores is bigger than that corresponding to the second set, which is bigger than that corresponding to the third set, etc.

The monotonically decreasing eigenvalues are a pointer to the fact that the successive sets of scores produced by correspondence analysis are 'chosen' in such a way as to maximise the proportion of the table's chi-square statistic which is explained at each stage.

Referring again to the WES example, the value of chi-square for Table 2/3 under the independence model is 153.3. Hence the sum of the eigenvalues is 153.3/774 = 0.198. The eigenvalue corresponding to the first dimension produced by the correspondence analysis is 0.170, and that corresponding to the second dimension is 0.023, so the first two dimensions explain 0.193/0.198 = 97% of the 'deviation' of Table 2/3 from the independence model. However, it is worth noting that the residuals in Table 2/7 hint that the first two dimensions may not account for all the tendency for couples to have reacted identically to the statement.

TABLE 2/3: A crosstabulation of responses to the statement "A husband's job is to earn the money; a wife's job is to look after the home and family" made by a sample of respondents to the 1980 Women and Employment Survey (WES) and their husbands.

	Husband's response				
	Str. Agree	Agree	Neither	Disag.	Str. Disag.
Wife's response					
Strongly Agree	79	41	17	17	4
Agree	67	55	54	27	14
Neither	36	40	52	23	13
Disagree	18	30	30	29	17
Strongly Disagree	6	28	28	27	32

TABLE 2/4: Raw residuals from the independence model fitted to Table 2/3

	Husband's response				
	Str. Agree	Agree	Neither	Disag.	Str. Disag.
Wife's response					
Strongly Agree	39.0	1.4	-20.0	-8.1	-12.3
Agree	12.1	0.6	3.3	-7.5	-8.4
Neither	-5.5	-1.1	13.7	-3.1	-4.0
Disagree	-20.9	1.4	3.3	10.9	5.2
Strongly Disagree	-24.6	-2.3	-0.3	7.8	19.5

TABLE 2/5: First contingency hierarchy of Table 2/3

	Husband's response				
	Str. Agree	Agree	Neither	Disag.	Str. Disag.
Wife's response					
Strongly Agree	35.7	1.3	-9.3	-11.2	-16.5
Agree	13.9	0.5	-3.6	-4.4	-6.5
Neither	-1.9	-0.1	0.5	0.6	0.9
Disagree	-18.8	-0.7	4.9	5.9	8.7
Strongly Disagree	-28.8	-1.1	7.5	9.0	13.4

TABLE 2/6: Second contingency hierarchy of Table 2/3

	Husband's response				
	Str. Agree	Agree	Neither	Disag.	Str. Disag.
Wife's response					
Strongly Agree	3.6	-0.1	-10.1	1.7	4.9
Agree	-2.2	0.1	6.2	-1.1	-3.0
Neither	-4.3	0.2	12.1	-2.1	-5.9
Disagree	-0.4	0.0	1.0	0.2	0.5
Strongly Disagree	3.3	-0.1	-9.2	1.6	4.5

TABLE 2/7: Remainder after the expected frequencies under the independence model and the first and second contingency hierarchies have been subtracted from Table 2/3

	Husband's response				
	Str. Agree	Agree	Neither	Disag.	Str. Disag.
Wife's response					
Strongly Agree	-0.3	0.2	-0.6	1.3	-0.7
Agree	0.4	0.0	0.7	-2.0	1.1
Neither	0.7	-1.2	1.1	-1.6	1.0
Disagree	-1.7	2.1	-2.6	4.8	-4.0
Strongly Disagree	0.9	-1.1	1.4	-2.8	1.6

2.6. The graphical presentation of row and column scores

One of the aspects of correspondence analysis which researchers seem to find most attractive is the way in which the results can be displayed graphically. More often than not graphical displays correspond to the first two dimensions produced by the correspondence analysis; frequently both row and column scores are plotted on the same display (see, for example, Greenacre, 1984; Chapter 9).

In Section 2.5 it was shown how each dimension produced by the correspondence analysis of a table can be represented as a contingency hierarchy. If one adds together the first and second contingency hierarchies one obtains a table which is that part of the table of residuals resulting from the application of the independence model to the original table which is 'explained' by the first two dimensions produced by the correspondence analysis.

The formula for cell (i,j) of this new table is

$$(r_i c_j/n)[(v_{r1i}v_{c1j}/\sqrt{\phi_1})+(v_{r2i}v_{c2j}/\sqrt{\phi_2})]$$

Suppose that

$$z_{r1i} = v_{r1i}\cos\theta + v_{r2i}\sin\theta$$

$$z_{c1j} = (v_{c1j}\cos\theta/\sqrt{\phi_1}) + (v_{c2j}\sin\theta/\sqrt{\phi_2})$$

$$z_{r2i} = v_{r2i}\cos\theta - v_{r1i}\sin\theta$$

$$z_{c2j} = (v_{c2j}\cos\theta/\sqrt{\phi_2}) + (v_{c1j}\sin\theta/\sqrt{\phi_1})$$

then it quickly follows that

$$z_{r1i}z_{c1j} + z_{r2i}z_{c2j} = (v_{r1i}v_{c1j}/\sqrt{\phi_1}) + (v_{r2i}v_{c2j}/\sqrt{\phi_2})$$

The implication of this is that the sum of the first two contingency hierarchies can be decomposed into alternative sets of row and column scores corresponding to an alternative pair of first and second dimensions, where these new dimensions correspond to axes which are in the same two-dimensional vector space as the original dimensions, but are at an angle to the original axes.

The consequence of the above is that if one plots v_{r2i} against v_{r1i} one can view the plot as a two-dimensional map of the relative positions of the row categories. Note that Goodman (1986) emphasises that concentrating too much on the first two dimensions produced by a correspondence analysis may distract one from important differences between categories only visible in the third and higher dimensions.

Greenacre (1984) describes two ways in which row and column scores can be included in the same display. The first way, referred to by Greenacre as an 'asymmetric display', is where the positions of the row categories are given by the row scores and the positions of the column categories are weighted averages of the positions of the row categories (or vice versa). Goodman (1986) favours this approach as there is a clearly-defined relationship between the positions of the row scores and the positions of the column scores. However, if the eigenvalues of the first two dimensions are small, the positions of the column categories will be squashed together in the centre of the display.

The second way, referred to by Greenacre as a 'joint display', consists simply of the row scores and the column scores plotted on the same axes. This form of display gives some indication of which row categories are strongly associated with which column categories on each dimension, but the precise distance between the position of any row category and the position of any column category is meaningless.

This author's inclination is to plot row and columns scores on different displays and to consider them 'in combination' by reference to the relevant contingency hierarchies, since it will be clear from the contingency hierarchies which row categories are strongly associated with which column categories and this approach does not involve asymmetry.

Figures 2/1 to 2/5 show the 'asymmetric' displays, the 'joint' display, the row score display, and the column score display for the WES example. The plots suggest that the second dimension produced by the correspondence analysis is related to a phenomenon akin to the famous 'horseshoe' effect, i.e. the 'distance' between the two extreme categories for each partner appears to be less in both cases than the sum of the 'distances' between the extreme categories and the middle category. It is also possible that the 'Neither agree nor disagree' category is somewhat heterogeneous.

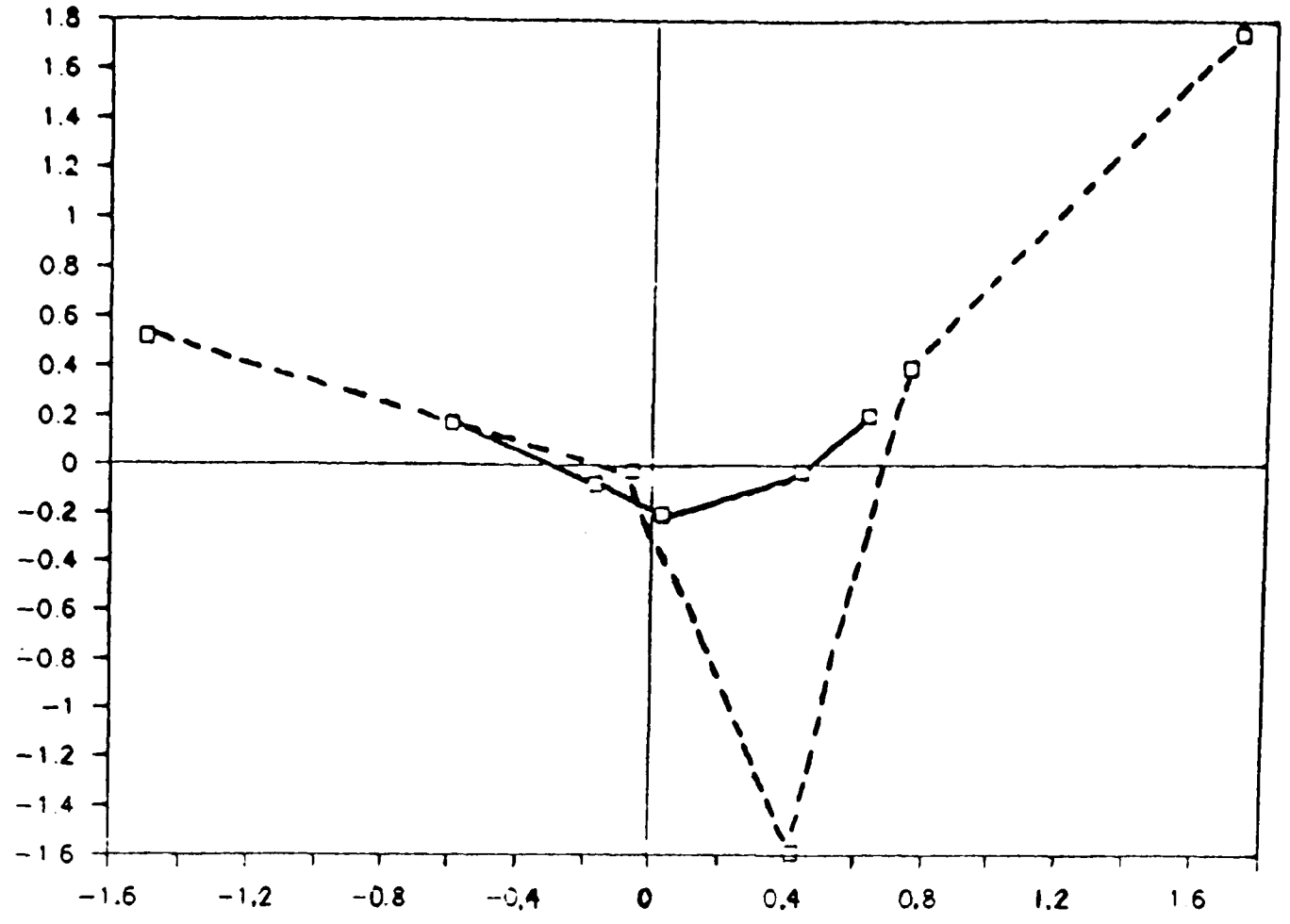


FIGURE 2/1: An 'asymmetric display' (with columns scores as averages of row scores) of first and second dimension row and column scores from a correspondence analysis of a table of husbands' and wives' attitudes towards the domestic division of labour: data from the 1980 Women and Employment Survey (See Table 2/3)

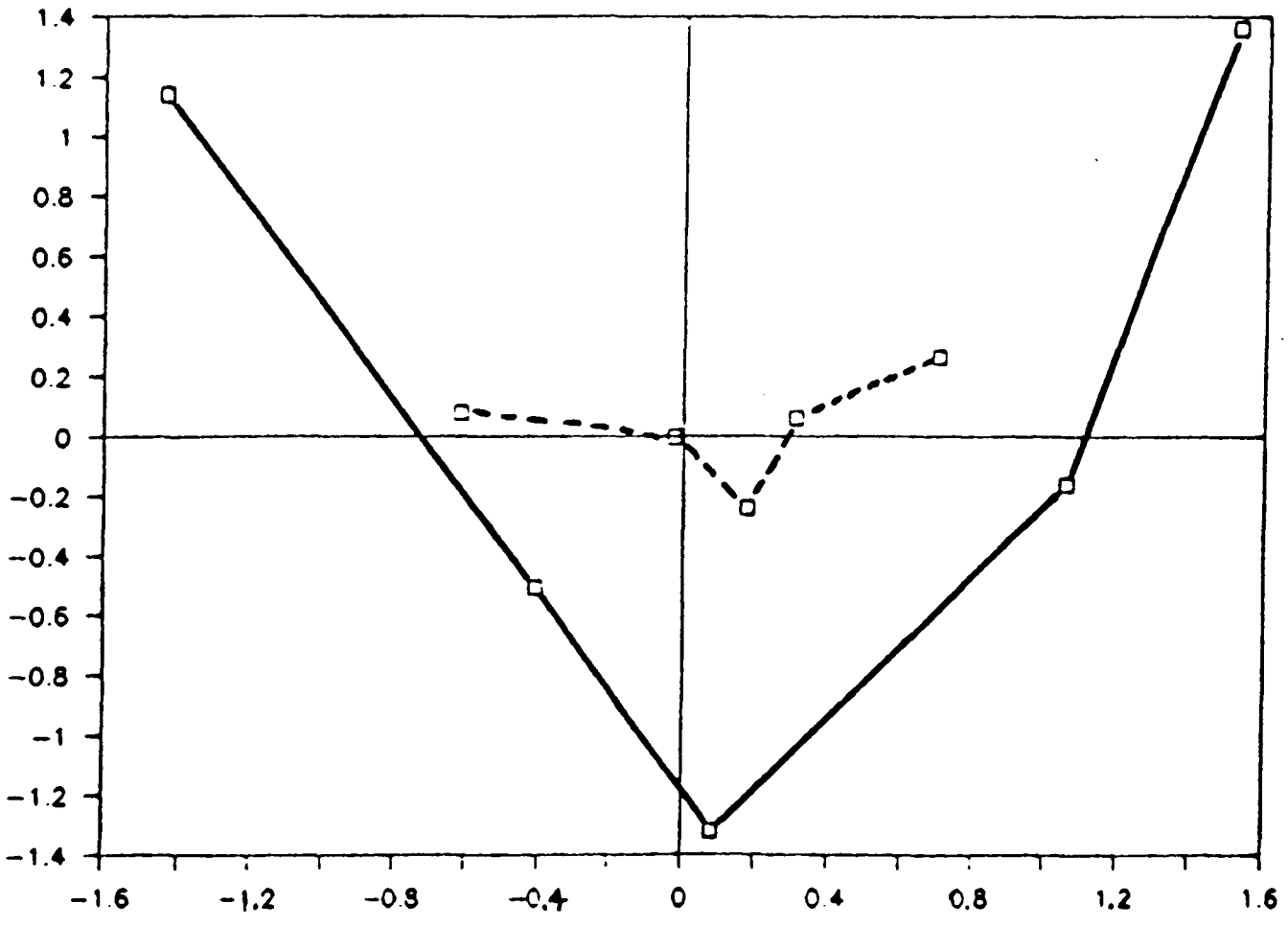


FIGURE 2/2: An 'asymmetric display' (with row scores as averages of column scores) of first and second dimension row and column scores from a correspondence analysis of a table of husbands' and wives' attitudes towards the domestic division of labour: data from the 1980 Women and Employment Survey (See Table 2/3)

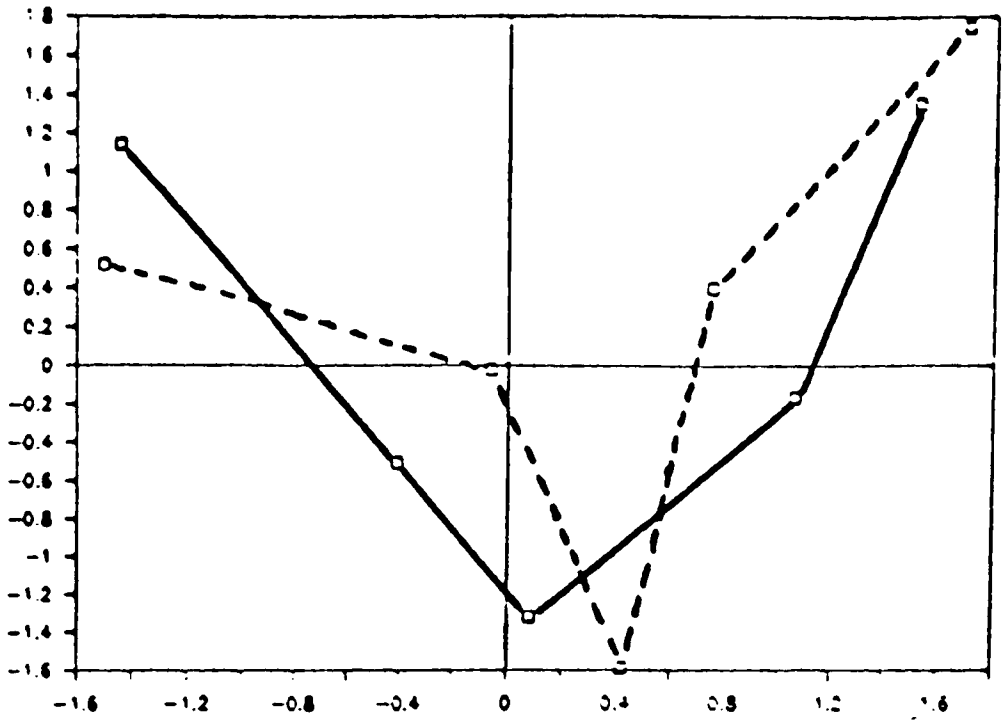


FIGURE 2/3: A 'joint display' of first and second dimension row and column scores from a correspondence analysis of a table of husbands' and wives' attitudes towards the domestic division of labour: data from the 1980 Women and Employment Survey
(See Table 2/3)

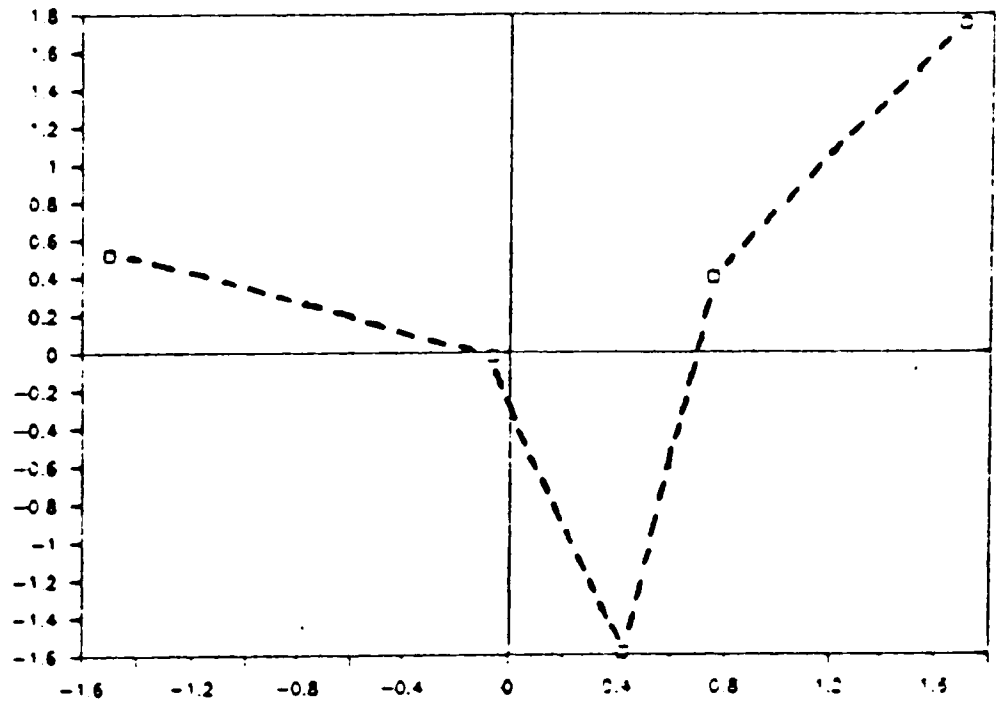


FIGURE 2/4: A display of first and second dimension row scores from a correspondence analysis of a table of husbands' and wives' attitudes towards the domestic division of labour: data from the 1980 Women and Employment Survey
(See Table 2/3)

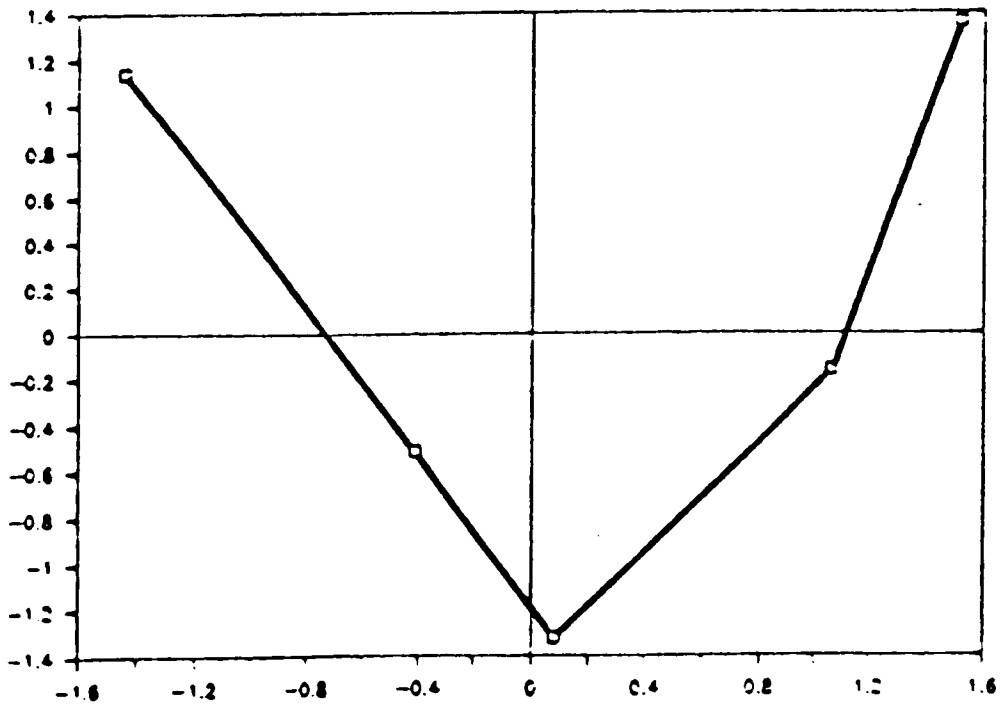


FIGURE 2/5: A display of first and second dimension column scores from a correspondence analysis of a table of husbands' and wives' attitudes towards the domestic division of labour: data from the 1980 Women and Employment Survey
(See Table 2/3)

2.7. Computational aspects of correspondence analysis

The growth of interest in correspondence analysis in the 1980's has resulted in its inclusion as a sub-program (program CA) in the 1987 release of the BMDP statistical package. Program CA allows one to produce plots of the row and column scores for the first two dimensions produced by a correspondence analysis. The 1989 GENSTAT 5 manual also reports the availability of correspondence analysis as a library routine. Previous to the existence of this library routine, the availability within GENSTAT of a command to do a singular value decomposition of a matrix meant that it was not difficult to write a GENSTAT program to implement correspondence analysis (see Greenacre, 1984; p354). Correspondence analysis is frequently described theoretically in terms of singular value decomposition, a matrix algebraic 'tool' which includes eigendecomposition as a special case (see Greenacre, 1984; p38).

Greenacre (1984; p353) recommends the use of the reciprocal averaging algorithm (in effect the iterative solution of the eigenequation in Section 2.4) in the absence of sophisticated statistical software, though he notes that convergence is likely to be slow if two of the eigenvalues are close to each other in value

Many of the researchers outside France who have studied correspondence analysis have developed their own software, so a range of (overlapping) software is available.

2.8. Alternatives to Correspondence Analysis: Correlation and Association Models.

Goodman (1985) discusses two varieties of statistical model which when applied to two-way tables often produce results which are very similar to those obtained from correspondence analysis.

Correlation models (Goodman, 1985; p23) are almost identical in form to the implicit model underlying correspondence analysis, as can be seen from the formula that follows.

The expected frequency given by a correlation model with n dimensions corresponding to cell (i,j) of a two-way table is

$$NP_{i.}P_{.j}\left(1+\sum_{k=1}^{n}\theta_k v_{1ki}v_{2kj}\right)$$

In the preceding equation, N is the overall sample size. v_{1ki} and v_{2kj} are parameters equivalent to the row and column scores obtained from correspondence analysis. $P_{i.}$ and $P_{.j}$ are parameters which roughly correspond to marginal proportions (Goodman [1985; p25] describes a set of models where the $P_{i.}$ and $P_{.j}$ exactly correspond to the observed marginal proportions, and refers to them as "approximate correlation models"). θ_k is similar to the k-th dimension eigenvalue in correspondence analysis.

The parameter estimates for the above model are chosen so as to maximise the likelihood of having obtained the observed frequencies in the two-way table given the model and an assumption that the observations come from a multinomial distribution.

Association models (Goodman, 1985; p17) are based on the following formula for the expected frequency in cell (i,j)

$$N\alpha_i\beta_j\exp\{\sum_{k=1}^{n}\phi_k v_{1ki}v_{2kj}\}$$

which is equivalent to the following formula for the log of the expected frequency

$$\log(N)+\log(\alpha_i)+\log(\beta_j)+\sum_{k=1}^{n}\phi_k v_{1ki}v_{2kj}$$

In this case the α_i and β_j correspond roughly to the row and column proportions and the v_{1ki} and v_{2kj} are equivalent to the row and column scores obtained from correspondence analysis. ϕ_k is similar to the k-th dimension eigenvalue in correspondence analysis.

As was the case for correlation models, the parameter estimates for association models are maximum likelihood estimates.

It can be seen by reference to the above and the earlier sections of this chapter that the major differences between correspondence analysis and correlation models are the way in which the parameter estimates for correlation models are obtained and the fact that $P_{i.}$ and $P_{.j}$ are not identical to the observed marginal proportions. Association models further differ from correspondence analysis by being multiplicative rather than additive in form.

Note that the above formula effectively divides the association in a table into multiplicative 'contingency hierarchies' (see Section 2.5).

Goodman (1985; pp40-46) gives an example of how similar the parameter estimates from a correlation model fitted to a table can be to the row and column scores of a correspondence analysis of the same table. Given that the results of applying correspondence analysis, correlation models and association models to a table are likely to be very similar, which technique should one use?

A major advantage that correlation and association models have over correspondence analysis is that they make easier the task of judging how many dimensions are necessary to adequately represent the observed data. As is the case with log-linear models, the fit of correlation and association models can be assessed by a comparison of the residual deviance with the residual degrees of freedom. It is therefore not entirely unreasonable to assume that a model which fits the data well contains a 'sufficient' number of dimensions. (However, the minimum number of dimensions which has to be included before a correlation or an association model fits the data should really be regarded as a lower bound on the number of dimensions which need to be considered). See Section 2.10 for a further discussion of association models with more than one dimension.

Assessing how many dimensions of a correspondence analysis solution one needs to take into consideration is more difficult. The analogous approach to examining residual deviance is the examination of the proportions of the overall chi-square statistic (comparing the observed frequencies with the expected frequencies under the independence model) which are explained by successive dimensions of the solution, but the early observations of Kendall and Stuart (1961) on this subject were shown to be erroneous by Lancaster (1963), and more recent contributions by Nishisato (1980) and Lebart et al (1984) have also been shown to be flawed (Goodman, 1986; p301).

A second major advantage of correlation and association models over correspondence analysis is that testing the difference between two row scores (or two column scores) for significance is relatively straightforward (see Goodman, 1985; pp27-29). Furthermore, in the case of a 'symmetric' table, i.e. a table where there is a one-to-one correspondence between rows and columns, the two statistical models allow the equality of the row and column scores to be tested ("Homogeneity"; see Goodman, 1985; p48 onwards). Lebart et al (1984) show how one can test the difference between a specific category's

position on the first two dimensions of a correspondence analysis solution and the 'average' scores on these dimensions, and Greenacre (1984) shows how one can compare the positions of all the categories on the first two dimensions of the solution by performing correspondence analyses on a series of 'bootstrap samples' extracted from the original sample, but no precise test of the equivalence of two row scores from a correspondence analysis solution exists at present.

Section 2.9 discusses adapting association models and correspondence analysis to cope with symmetrical tables where the leading diagonal is of empirical and substantive significance, and concludes that association models are much more adaptable in this respect.

One possible advantage of correspondence analysis is its lack of explicit assumptions. This may mean that it is more suitable than association or correlation models for analysing tables with large numbers of cells in relation to their sample sizes. The precise effects of 'sparseness' (i.e. large numbers of empty cells or cells with very low frequencies) on statistics relating to the goodness-of-fit of (and changes in goodness-of-fit between) models estimated using maximum likelihood are unknown. Additionally, the amount of computer time needed to perform the correspondence analysis of a large table is appreciably smaller than that needed to fit an association model with several dimensions to the same table.

One crucial difference between association models on the one hand and correlation models and correspondence analysis on the other hand does not appear to have been the focus of much attention in the existing literature. Both correlation models and correspondence analysis are basically concerned with the observed <u>absolute</u> deviations from what would be expected under the model of independence (consider, for example, the contingency hierarchies of Hope, 1972). However, association models are concerned with the observed <u>relative</u> deviations from the expected frequencies under the model of independence. This is simply the result of association models being multiplicative rather than additive models.

At first sight this may appear to be a trivial, technical point. However, in this author's opinion the use of correspondence analysis or correlation models places undue importance on the expected frequencies under the independence model, whereas association models, which are principally concerned with the <u>observed</u> odds ratios in a table, do not. Given that the independence model does not fit the data at all well

under most circumstances, why should the expected frequencies under the independence model play an important role in determining the parameter estimates relating to the association in the table?

Goodman (1985; p31) puts forward a technical advantage of association models over correlation models. He notes that the first dimension row and column scores are approximately equal for the two types of model when a table either arises from an underlying (discretized) joint bivariate normal distribution or from an underlying bivariate distribution that is not normal, but where separate transformations of the first dimension row scores and the first dimension column scores can be found so that the transformed scores have a discretized joint bivariate normal distribution (see also Goodman, 1981). However, if a table <u>does</u> come from an underlying joint bivariate normal distribution, with first dimension row and column scores pertaining to the underlying variables, the bivariate distribution obtained with the one-dimensional correlation model will not provide as good an approximation to the distribution in the table as the one-dimensional association model.

Goodman also notes (1985; p32) that the correlation model is only defined when $v_{1i}v_{2j} \geq -1/\text{abs}(\theta)$. Once again, this problem arises because correlation models, like correspondence analysis, are based on an additive model.

To sum up, though the results obtained from correspondence analysis, correlation models, and association models will frequently be similar, association models are to be preferred because of slight theoretical/technical advantages and the increased ease with which inferences can be made from the results obtained.

In recent papers (e.g. Clogg, 1986; Becker, 1990a) the association model with M dimensions has been referred to as the RC(M) model, and this notation is adopted in this thesis. Association models corresponding to more than one underlying dimension are discussed in Section 2.10.

A method for the maximum likelihood estimation of association models is given in an appendix to Goodman (1985). However, the association models in this thesis were fitted using adapted versions of a GLIM macro presented by Breen (1985). (See also Lindley, 1989). Goodman (1985) notes that the likelihood function corresponding to association models can include local maxima, and that one should therefore be careful not to mistake one of these local maxima for the global maximum!

2.9. Quasi-association models.

Tables of husbands' and wives' characteristics are more often than not symmetric, in the sense that there is a one-to-one correspondence between the row categories and the column categories. One might expect the cells on the leading diagonal of a symmetric table of this sort to be qualitatively different from the off-diagonal cells, since the two groups of cells respectively correspond to 'endogamous' and 'exogamous' marriages. In practice, politically, socially and educationally endogamous marriages are particularly common. There is a strong argument for considering at least some of these endogamous marriages to be the result of some process which cannot be thought of in terms of the relative positions of the spouses on some underlying continuum. In other words, there would seem to be sufficient justification for adapting association models so that they can directly take account of discrete effects rather than taking account of them indirectly in terms of supposedly continuous underlying dimensions.

Association models can be adapted to cope with endogamous marriages in symmetric tables by the addition of extra parameters corresponding to the leading diagonal cells. Becker (1990b) discusses the extension of the RC(1) association model to include such parameters.

The names given to models of two-way tables which include parameters corresponding to the leading diagonal cells tend to include the prefix 'quasi' (see, for example, Hout, 1983). In the context of this thesis, a model consisting of an association model plus parameters to fit the leading diagonal cells exactly is therefore referred to as a quasi-association model.

The suitability of the quasi-RC(1) model for the analysis of symmetric tables is easily shown by considering the fit of various models to a much-analysed 7x7 table of fathers' and sons' occupational statuses first examined in Glass and Hall (1954), which has the usual property of a disproportionately large number of cases in its leading diagonal cells. The deviance of the RC(1) model fitted to this table is 75.6 on 25 degrees of freedom ($P<0.001$), whereas the deviance of the quasi-RC(1) model is 21.5 on 18 degrees of freedom ($P>0.05$). As a comparison, the deviance of the RC(2) model is 32.8 on 16 degrees of freedom ($P<0.01$). (For a more detailed consideration of a collapsed (5x5) version of this table, see Becker, 1990b).

Becker (1989) contains a GLIM macro which can be used to fit the quasi-RC(1) model. However, the major appeal of this macro lies in its

ability to fit the quasi-symmetric RC(1) model (i.e. the quasi-RC(1) model but with the row and column scores constrained to be equal). The quasi-association models in this thesis were fitted using adapted versions of the GLIM macro presented by Breen (1985).

Since many of the tables analysed in this thesis are symmetric, quasi-association models are in fact used more often than straightforward association models. Chapter 4, which is entirely concerned with the analysis of symmetric tables, includes half-a-dozen applications of either quasi-association models or slight modifications of them.

Adapting correspondence analysis to handle the leading diagonal cells adequately is not as straightforward as adapting association models. One approach, which seems to give reasonably acceptable results in practice, is to replace the cell frequencies on the leading diagonal of the table being studied by zeros. This tactic does not seem entirely unreasonable if one views correspondence analysis from a reciprocal averaging perspective, since the row score for a category of husbands is simply a weighted average of the column scores of those of their wives who do not belong to the same category, i.e. those wives who are in exogamous marriages. However, basing row and column scores entirely on exogamous marriages can bias the scores of extreme categories towards the average, and can also seriously bias the scores corresponding to highly endogamous categories.

The problems noted above with adapting correspondence analysis to cope adequately with endogamous marriages are related to a problem with the interpretation of parameter estimates from quasi-association models. The parameters corresponding to the leading diagonal in a quasi-RC(1) model relate to endogamy/'exact' homogamy, while the row and column scores relate to assortative marriage more broadly. Thus the two sets of parameters correspond to overlapping underlying forms of association.

Two analyses later in the thesis serve as excellent examples of this problem. In both the analysis of the Penn and Dawkins data (Chapter 4, Section 3.1) and the analysis of assortative marriage for school-type (Chapter 4, Section 4.1) the row and column scores from the RC(1) models differ noticeably from the row and column scores from the quasi-RC(1) models. In the former analysis the scaling factor ϕ_k for the row and column scores is more or less halved by the inclusion of the leading diagonal parameters. No doubt the leading diagonal parameter estimates would also differ between the quasi-RC(1) models and the quasi-independence models (i.e. the models only containing the leading

diagonal parameters; these models can be referred to as quasi-RC(0) models).

The row and column scores from the quasi-association models correspond, in a sense, to the remaining part of assortative marriage once endogamy has been taken into account. However, this correspondence rests on the assumption that the parameterization of the quasi-association model distinguishes in a theoretically adequate way between the two underlying forms of association.

It would seem, however, to be at least possible to put bounds on the contributions to the overall association made by the two underlying forms of association. The upper bounds for the leading diagonal parameters and the row and column scores are provided by the estimates from the quasi-independence and RC(1) models respectively. The lower bounds are provided by fitting two versions of the quasi-RC(1) model, in the first case with the row and column scores from the RC(1) model entered as constants, and in the second case with the leading diagonal parameter estimates from the quasi-independence model entered as constants. These two versions of the quasi-RC(1) model should provide lower bounds for the leading diagonal parameters and the row and column scores respectively.

Note that a similar problem, in this case with distinguishing between trends in endogamy and trends in assortative marriage, occurs in Section 3.4 of Chapter 4. Another example of the same type of issue occurs in Section 3.3 of Chapter 4, where in an analysis of assortative marriage it is not entirely clear whether agricultural endogamy should be primarily viewed as a distinct phenomenon or as part of a more general form of urban/rural assortative marriage.

2.10. Association models with more than one dimension

Much of the literature relating to association models focuses on the association model with one dimension, i.e. the model of the form

$$\alpha_i \beta_j \exp\{\phi v_{1i} v_{2j}\}$$

This model is often referred to as the row and column effects Model II (e.g. by Hout, 1983).

It is unsurprising that Goodman's RC(1) model has been applied to tables far more frequently than association models with two or more

dimensions, since the structures of many tables are dominated by a single underlying substantive concept/dimension. Clogg (1986) suggests that researchers use the standardised residuals from the RC(1) model as an aid in describing departures from one-dimensional association.

However, it is not impossible that the structure of some tables may justify the use of the RC(2) model, especially in those circumstances where the row and column categories can be seen to be determined by two or more defining criteria (e.g. skill and employment status in the case of occupational categories). In any case, when an RC(2) model is applied to a table whose structure is determined by a single continuous underlying dimension and several 'discrete' effects, the second dimension row and column scores are likely to be related to the strongest discrete effect, or possibly more than one of the discrete effects. However, some adaptation of the RC(1) model, akin to the quasi-RC(1) model, is probably more appropriate in this kind of situation. The analysis of assortative marriage for social origin in Section 3.3 of Chapter 4 is a good example of a situation where it is not transparently obvious whether association is best modelled with continuous underlying dimensions or discrete effects.

Section 6.2 of Chapter 4 contains an analysis where there would seem to be some justification for fitting RC(M) models for values of M up to 3, since the table analysed is a collapsed version of a six-way table based on husbands' and wives' occupations, educational levels and social origins, and there are therefore three obvious dimensions which one might expect to underly the association in the table (though the overlap between the three variables means that one would not necessarily expect to find three distinct underlying dimensions).

Unfortunately, while the absolute fit of an RC(M) model can be tested by comparing the deviance of the model with the chi-square distribution for the relevant number of degrees of freedom, the relative fits of the RC(M) and RC(M-1) models cannot be compared by comparing the change in deviance between the models with the relevant chi-square distribution.

McCullagh and Nelder (1989) note that the change in deviance between the independence model (i.e. the RC(0) model) and the RC(1) model does not have an asymptotic chi-square distribution, the correct asymptotic distribution being the distribution of the largest root of a certain Wishart matrix (see Haberman, 1981). It would therefore seem unreasonable to assume that the change in deviance between models RC(M-1) and RC(M), with M>1, has an asymptotic chi-square distribution, and

it lies beyond the scope of this thesis to derive the true asymptotic distribution! See Section 2.11. for a simulation which demonstrates that the change in deviance between the RC(1) and RC(2) models does not have an asymptotic chi-square distribution when the RC(1) model is 'correct'.

The GLIM macro presented by Breen (1985) which carries out maximum likelihood estimation of the RC(1) model was extended by the author to carry out maximum likelihood estimation for RC(M) models for values of M up to 4. This extended macro was easily adapted to cope with models consisting of an RC(M) model plus extra parameters. The major problem with association models in this context is their non-linearity, a problem which Breen's macro handles by obtaining a solution iteratively, alternately estimating the row scores and the column scores.

A FORTRAN subroutine which carries out the maximum likelihood estimation of RC(M) models is presented by Becker (1990a), while CDAS, a PC-based categorical data analysis package written by Eliason (1988) can be used to fit RC(M) models.

2.11. Change in deviance between the RC(1) and RC(2) models: A simulation study.

As mentioned earlier, it is difficult to test formally the hypothesis that the RC(2) model fits a table better than the RC(1) model. This is not a problem when the RC(1) model does not adequately fit the table, since one can justify the addition of a second dimension by the inadequacy of the RC(1) model. However, circumstances may arise where the RC(1) model fits a table adequately, but the parameter estimates from the RC(2) model applied to table suggest that the second dimension takes account of a substantively meaningful underlying effect. It would therefore seem worthwhile to investigate the distribution of the difference in deviance between the RC(1) and RC(2) models when there is, in fact, only one underlying dimension determining a table's structure, i.e. when the second dimension is, in fact, only accounting for some of the 'noise' in the data.

Table 2/8 was extracted from data collected by the 1976 Family Formation Survey. The rows correspond to husband's pre-marital occupation (Registrar General's Social Class) and the columns correspond to wife's pre-marital occupation and school leaving age (Registrar General's Social Class/any post-compulsory years of education). Goodman's RC(1) and RC(2) models were fitted to Table 2/8, with the

former fitting the table poorly and the latter fitting the table well. However, in this context it is not Table 2/8 which is of interest.

Table 2/9 contains the expected frequencies obtained from the RC(1) model applied to Table 2/8. Therefore, random samples taken from Table 2/9 with probability proportional to cell frequency (and with replacement) are in effect samples from a population where the association between husband's pre-marital occupation and wife's pre-marital occupation/education is governed by a single underlying dimension. Hence one of the dimensions of an RC(2) model fitted to the table corresponding to a sample of this sort has no useful role to play in describing the underlying structure of the data.

Ten samples of size 4,040 (i.e. the sum of the cell frequencies in Table 2/8) were drawn from Table 2/9 using the FORTRAN pseudo-random number generator, and RC(1) and RC(2) models were fitted to the tables corresponding to the ten samples. The deviances of the models and the changes in deviance between the RC(1) and RC(2) models are given in Table 2/10.

As one might have expected, for each of the ten samples the deviance of the RC(1) model shows that the model fits the data adequately. However, the deviances of the RC(2) models are all <u>less</u> than the number of degrees of freedom, and in two cases the change in deviance between the RC(1) and RC(2) models is greater than the critical value at the 5% level of the chi-square distribution on the relevant number of degrees of freedom (i.e. the difference in degrees of freedom between the RC(1) and RC(2) models, which in this case is 7).

The sum of the deviances of the RC(2) models is 56.5 on 90 degrees of freedom, and the sum of the changes in deviance between the RC(1) and RC(2) models is 91.2 on 70 degrees of freedom. If one assumes that both these statistics come from chi-square distributions, then one can perform an F-test of the equality of the ratios of the statistics to their degrees of freedom. The F-statistic is (91.2/70)/(56.5/90) = 2.07, which is significantly different from unity at the 1% level. In other words, the second dimension of the RC(2) model explains more than its 'fair share' of the deviance of the RC(1) model. This suggests that, under the assumption that the RC(1) model is the 'correct model', the change in deviance between the RC(1) and RC(2) models does not have an asymptotic chi-square distribution.

The above should be enough to make one cautious of interpreting as substantively meaningful the second dimension of an RC(2) model when the

corresponding RC(1) model fits the data. This applies both in the situation where the RC(1) model fits the data very well and in the situation where the RC(1) model has a deviance which is close to significance. A 'significant' change in deviance between the RC(1) and RC(2) models in the latter situation could easily be a simple reflection of the efficiency of the second dimension at explaining 'noise', combined with an above-average amount of 'noise' to be explained!

In conclusion, the above analysis suggests the following 'rules' relating to modelling a table using association models:

(i) if the RC(M) model does not fit the data, the RC(M+1) model is to be preferred,

(ii) if the RC(M) model fits the data, then the RC(M+1) model should only be preferred if the change in deviance between the models is highly 'significant' as judged by a formal chi-square test and the row and column scores of the (M+1)th dimension of the RC(M+1) model exhibit clear-cut patterns which are consistent with existing substantive theory (assuming that the row and column scores for the first M dimensions do not alter much between the RC(M) and RC(M+1) models).

2.12. Association models and collapsed higher dimensional tables.

When a set of categorical variables can be divided into two theoretically distinct subsets, the relationship between the two subsets can be examined using association models in a way similar to that in which canonical correlation analysis is applied to two sets of interval-level variables.

Each subset of variables is treated as a single categorical variable, with the categories of this 'new' variable being all the possible combinations of the categories of the 'old' variables. Association models are then fitted to the table defined by the two 'new' variables.

Clearly the numbers of categories in the 'old' variables must be relatively small, or the table defined by the 'new' variables will have a very large number of cells and will be very sparse. However, there are likely to be theoretical disadvantages to using variables with a small number of categories. This issue is discussed further in Section 4 of this chapter.

TABLE 2/8: Crosstabulation of husband's pre-marital occupation against wife's pre-marital occupation and education (Data from the 1976 Family Formation Survey)

		Wife					
	RGSC	I/II		IIINM/IIIM		IV/V	
	Post-comp.sch.	Yes	No	Yes	No	Yes	No
Husband's RGSC	I	103	9	97	30	5	6
	II	152	26	152	91	19	36
	IIINM	71	20	197	202	9	69
	IIIM	93	101	364	744	66	642
	IV	26	32	87	173	21	223
	V	8	3	20	52	7	82

TABLE 2/9: Expected frequencies for Table 2/8 from Goodman's RC(1) model (figures rounded to nearest integer).

		Wife					
	RGSC	I/II		IIINM/IIIM		IV/V	
	Post-comp.sch.	Yes	No	Yes	No	Yes	No
Husband's RGSC	I	107	8	90	35	5	6
	II	137	21	174	104	13	27
	IIINM	86	30	175	177	19	81
	IIIM	99	98	369	720	67	657
	IV	21	26	88	199	18	211
	V	4	7	21	58	5	77

TABLE 2/10: Deviances of RC(1) and RC(2) models applied to random samples taken from Table 2/9.

Sample	RC(1) deviance	RC(2) deviance	Change in deviance
1	14.4 on 16 d.f.	6.6 on 9 d.f.	7.8 on 7 d.f.
2	18.2 on 16 d.f.	8.8 on 9 d.f.	9.4 on 7 d.f.
3	14.6 on 16 d.f.	7.9 on 9 d.f.	6.7 on 7 d.f.
4	9.1 on 16 d.f.	3.6 on 9 d.f.	5.5 on 7 d.f.
5	18.3 on 16 d.f.	6.7 on 9 d.f.	11.6 on 7 d.f.
6	13.4 on 16 d.f.	4.2 on 9 d.f.	9.2 on 7.d.f.
7	11.7 on 16 d.f.	4.4 on 9 d.f.	7.3 on 7 d.f.
8	7.3 on 16 d.f.	3.1 on 9 d.f.	4.2 on 7 d.f.
9	20.3 on 16 d.f.	6.0 on 9 d.f.	14.3 on 7 d.f.
10	20.4 on 16 d.f.	5.2 on 9 d.f.	15.2 on 7 d.f.
Totals:			
	147.7 on 160 d.f.	56.5 on 90 d.f.	91.2 on 70 d.f.

Section 6.2 of Chapter 4 contains an analysis of this sort, the table analysed being a collapsed version of a six-way table based on husbands' and wives' occupations, educational levels and social origins. This is a case where the division of variables into subsets is very straightforward and each subset contains variables which are strongly empirically and theoretically related to each other. Furthermore, while the variables within each subset are clearly strongly interrelated, there would seem to be justification for fitting association models up to RC(3), since there could be anywhere between one and three dimensions underlying the triad of occupation, education level and social origin.

In Section 6.2 of Chapter 4 a relationship is demonstrated between a constrained version of an association model fitted to the 'collapsed', two-way table and a hierarchical log-linear model fitted to the multi-way table defined by the entire set of (six) variables. This relationship emphasises the fact that the two types of model are in effect doing the same thing, i.e. modelling the pattern of observed odds ratios in the table, but with the fitted odds ratios being constrained in different ways. In the association model the constraints are supplied by the dependency of the fitted odds ratios on scores relating to a limited number of underlying dimensions, whereas in the hierarchical log-linear model the constraints are supplied by the fact that the odds ratios reflect two-way interactions rather than higher order interactions.

See Section 3 of this chapter for a discussion of the way in which odds ratios are decomposed in association models.

3. Decomposing odds ratios

Odds ratios are fundamental to log-linear models and are also important in the context of association models (see Goldthorpe, 1987, pp78-84 for a discussion of odds ratios). Both log-linear models and association models model contingency tables by applying constraints to the patterns of odds ratios.

As a measure of association the odds ratio has some similarities to the correlation coefficient, the conventional measure of association for interval-level variables. The term 'spurious correlation' applies equally well to either measure, i.e. an odds ratio indicating a significant relationship between variables X and Y might simply be reflecting the relationships of X and Y with a third variable Z.

Section 6.1 of Chapter 4 introduces the idea of 'partial odds ratios'. A partial correlation, as described by Blalock (1981; p455), is a measure of the degree of relationship between two variables, controlling for one or more other variables. This kind of measure is equally desirable in a categorical context as it is in an interval-level context. Hence partial odds ratios are used to measure the extent of the remaining relationship between two dichotomous variables once their interrelationships with other variables have been taken into account. A comparison of a partial odds ratio with the corresponding observed odds ratio is an implicit decomposition of the observed odds ratio into a 'genuine' part (the partial odds ratio) and a 'spurious' part (the ratio of the observed odds ratio to the partial odds ratio).

In the context of a log-linear model, a partial odds ratio is the exponentiated estimate corresponding to the parameter relating to the interaction between the two variables of interest.

In the multivariate analysis in Section 6.1 of Chapter 4 the partial odds ratios corresponding to occupational homogamy, educational homogamy and social origin homogamy are all shown to be considerably less than the corresponding observed odds ratios. This is because the observed odds ratios overlap, i.e. the same underlying association contributes to more than one observed odds ratio.

In Section 4 of Chapter 4 unexponentiated parameter estimates from log-linear models (which one might call 'partial log-odds ratios') are used to show to what extent the association evident in some observed odds ratios can be shown to be a 'spurious' consequence of relationships between other variables.

Several odds ratios can reflect the same underlying association. Conversely, a single odds ratio can reflect several underlying forms of association. For example, in Section 3 of Chapter 4 it is clear that both geographical and social status dimensions underly patterns of marriage according to social origin. Association models with two or more dimensions work on the principle of decomposing the association in a table so that it corresponds to one or more underlying dimensions.

The row and column scores for an association model relate fairly straightforwardly to the fitted odds ratios for that model. Consider the fitted odds ratio O_R corresponding to rows R_1 and R_2 and columns C_1 and C_2. If r_1 and r_2 are the relevant row scores and c_1 and c_2 are the relevant column scores in the RC(1) model, then

$$\log(O_R) = r_2c_2 - r_2c_1 - r_1c_2 + r_1c_1$$

i.e.

$$\log(O_R) = (r_2-r_1)(c_2-c_1)$$

For the RC(M) model

$$\log(O_R) = \sum_{i=1}^{M} \{(r_{i2}-r_{i1})(c_{i2}-c_{i1})\}$$

where r_{ij} is the i-th dimension score for row j and c_{ij} is the i-th dimension score for column j

Hence the decomposition of the association in a table into multiplicative 'contingency hierarchies' (see Section 2.8) in effect involves the decomposition of the table's odds ratios.

It should be remembered from earlier in this chapter that the axes of the underlying dimensions are empirically determined and that the row and column scores from different dimensions should therefore not be considered in isolation from each other.

Note that quasi-association models also decompose observed odds ratios. (In fact, the discussion in Section 2.9 of this chapter relating to differentiating between endogamy and assortative marriage more

generally is of relevance in this context). On some occasions the quasi-RC(1) model and the RC(2) model will decompose the association in a table in a very similar fashion (e.g. in the case of a symmetric table where the association is determined by a single underlying dimension plus strong endogamy for one of the categories).

4. Modelling simplified tables and collapsing large tables

The results of any statistical analysis are dependent on the way in which the concepts in the analysis are operationalized. It may not be obvious whether a concept should be operationalized as a continuous variable or as a categorical variable (e.g. class/status), but assuming that a concept is operationalized as a categorical variable, a crucial decision has to be made as to how many categories the variable should have.

Many of the analyses in this thesis are based on dichotomous variables. Operationalizing a concept as a dichotomous variable can lead to many pitfalls. For example, consider the hypothetical situation where the only form of assortative marriage for educational attainment is graduate endogamy. If one were to operationalize educational attainment as an 'O' levels or better/Less than 'O' levels dichotomy, then an analysis of homogamy for educational attainment would provide little evidence of assortative marriage, as the graduate endogamy would be 'swamped' by the rest of the data (though a series of analyses based on different dichotomous operationalizations of educational attainment might be adequate).

This kind of problem does not only occur when concepts are operationalized as dichotomies. In the analyses in Section 3 of Chapter 4 conclusive evidence is found of endogamy among those from agricultural backgrounds. However, class background is often operationalized using schemata which do not contain an agricultural dimension (e.g Registrar General's Social Class). An analysis of assortative marriage for social origin using this kind of schema would not discover this agricultural endogamy. More to the point, the underlying agricultural endogamy could result in patterns in the data which might be misinterpreted as prestige-related homogamy.

Occupational class schemata often isolate occupations in the armed forces from other occupations. In preliminary analyses relating to the proportional hazards model of marital dissolution in Chapter 6, an apparently class-related effect on the risk of dissolution disappeared when armed forces occupations were included as a separate category.

In the analysis of a multi-way table in Section 6 of Chapter 4, dichotomous versions of occupation, educational level and social origin are used. The analysis attempts to identify the relative importance of the three variables as determinants of assortative marriage for social status. A problem with the analysis is that the apparent relative

importance of the variables is dependent on the way in which they have been operationalized. For example, professional occupations and routine non-manual occupations fall into the same half of the occupational dichotomies. Endogamy among those with professional occupations might be misinterpreted as educational homogamy, assuming that the educational dichotomy 'picked up' the assortative marriage for occupation which the occupational dichotomy was not detailed enough to represent.

The above examples suggest that one should aim to operationalize variables in a reasonably detailed fashion. However, analyses using dichotomies will often have the advantages of simplicity and clarity. Moreover, sample size often dictates the extent to which detailed operationalizations are of practical use.

In practice there are occasions when it is helpful to reduce the number of categories in variables by aggregating some of the categories. In Section 3.2 of Chapter 4 a 36x36 table is reduced to an 18x18 table by the aggregation of some of the marginal categories. The aggregation of categories is based both on theoretical and empirical criteria. Theoretically, it makes more sense to aggregate categories which appear to have something in common (e.g. professional employees and self-employed professionals) than it does to aggregate superficially dissimilar categories (e.g. unskilled manual workers and supervisors of office workers). Empirically, it makes more sense to aggregate categories which display similar forms of behaviour/attitudes than it does to aggregate categories which display dissimilar forms of behaviour/attitudes.

Judging the similarity of categories of a variable empirically is not straightforward. If one uses survey data to judge the similarity of categories by identifying whether they differ significantly in a statistical sense in terms of behaviour/attitudes, then categories containing small numbers of cases are more likely to be deemed similar to each other than categories containing large numbers of cases. Additionally, using empirical similarity as an over-riding criterion for aggregating categories leaves one at the mercy of sampling error.

Aggregating categories empirically in the absence of a theoretical perspective is dangerous, but there is a strong case for not letting theoretical criteria for the aggregation of categories over-ride empirical results suggesting that categories are in some sense dissimilar. Section 2 of Chapter 4 discusses empirical criteria for aggregating categories ('Strict Collapsibility' and 'Collapsibility') devised by Breiger and by Goodman.

5. The use of secondary analysis in this thesis

As Dale et al (1988, p2) comment "Secondary analysis has not become the established method of research among social scientists in Britain in the way that it has in the USA". This thesis is based on the secondary analysis of data collected by a variety of moderate-to-large scale social surveys (see also Hakim, 1982, for a general discussion of secondary analysis). The advantages and disadvantages of this approach are discussed below.

The main advantage of this approach is that it allowed a wide-ranging examination of the relationship between marriage formation/dissolution and social stratification to be carried out within a short space of time. If a researcher's primary concern is to gain a broad impression of some aspect of social behaviour, then it is possible that sufficient relevant data already exist for him or her to avoid the necessity of any further data collection

A wealth of data on Britain is available to the social researcher. The ESRC Data Archive at the University of Essex can supply data from a large number of academic and government social surveys (see Taylor, 1986). At present this valuable resource is probably under-utilised. Hence a second advantage of the secondary analysis approach is that it can make use of the unexplored potential of existing sources of quantitative data.

The main disadvantage of this approach is the extent to which it is constrained by the range and nature of existing data. While many social surveys collect information relating to marriage, it is only in a few cases that marriage is an issue in which the researchers are particularly interested. For example, the failure of the 1972 Oxford Mobility Survey to collect information relating to the occupations of its respondents' wives was not only indicative of a lack of interest in female employment but also of a lack of interest in the interdependence of husbands' and wives' occupations/employment.

The majority of the available data relates to spouses rather than to marriages, and the most frequently recorded features of marriages are the timing of their formations and dissolutions. Hence secondary analysis is reasonably suited to the examination of spouses' characteristics in combination and to the examination of marital formation and dissolution, but is in practice less appropriate if one wishes to learn something about the experience of married life.

A second disadvantage of the secondary analysis approach is that making the most of existing sources of data necessitates the analysis of data from a number of surveys. This compounds the usual secondary analysis problem of the researcher being at a distance from the design, data collection and coding processes by multiplying the input of time and effort needed to achieve an adequate level of familiarity with the data. Differences between the timing, target populations and methods of data collection of different surveys, and variations in the way in which they operationalize variables, are also potentially a problem.

5.1. Sources of data used in this thesis

This section briefly outlines the sources of data used in this thesis and the substantive topics on which they provided data. (The references in brackets are the chapter and section numbers of the relevant sections/analyses). More detailed descriptions of the data sources are given in an Appendix to this chapter.

The two main sources of data used in this thesis were both government surveys. The annual General Household Survey (GHS) was particularly useful, since it collects stratification-related data on all the members of the households in its sample, and hence collects stratification-related data on married couples. The GHS provided data for analyses relating to the following topics: age at marriage and social status/social origin heterogamy (3/3.2 and 3/4.1); heterogamy and pre-marital conceptions (3/4.3); trends in social origin heterogamy (4/3.5); assortative marriage for educational attainment (4/4.7); social origin homogamy among graduate couples (4/4.8); husbands' and wives' occupations, educational levels and social origins in combination (4/6.1 and 4/6.2); social origin heterogamy and marital dissolution (6/3.2).

The other government survey used was the 1976 Family Formation Survey which, though primarily concerned with fertility, collected useful data on a variety of marriage-related topics (including especially valuable data on current and ex-spouses) and was used in the following analyses: duration spent 'going steady' in relation to various forms of heterogamy (3/4.2); heterogamy and pre-marital conceptions (3/4.3); class and type of marriage ceremony/seasonality of marriage (3/5.1 and 3/5.2); assortative marriage for pre-marital occupations (4/5.2); assortative marriage for occupation and remarriage (4/7); religious heterogamy and education (5/3.1); trends in religious heterogamy (5/3.2); religious heterogamy and remarriage (5/4);

educational homogamy and marital dissolution (6/3.3); husband's occupation/wife's education and marital dissolution (6/3.4).

Most of the other data sources were academic surveys. The 1972 Oxford Mobility Survey provided data relating to patterns of and trends in assortative marriage for social origin (4/3) and for school-type/educational attainment (4/4). Glass's 1949 Mobility Survey also provided data on these topics (Appendix to Chapter 4).

The 1986 Social Change and Economic Life Initiative main survey provided useful data relating to marital dissolution (6/2). It also provided data on husbands' and wives' voting intentions in combination (5/2 and 5/4) and on the effects of parents' occupations on childrens' occupational attainment (4/5.3).

Further political data, in this case on husbands' and wives' party political identifications in combination, were provided by the 1987 British Election Study (5/2).

Data on social status and spouses' place of first meeting were provided by the 1972 Reading Marriage Survey (3/2.3) and by a commercial survey carried out by Gallup (3/2.2).

A survey which has considerable potential for further marriage-related secondary analysis is the British Social Attitudes Survey. The 1987 survey was used briefly to look at attitudes to the divorce law (Appendix to Chapter 6), but the 1986 survey contains additional interesting material on attitudes towards marriage.

Some of the data analysed in this thesis ~~was~~ were obtained from existing publications. Penn and Dawkins (1983) provided data on social origin homogamy (4/3.1), Hout (1982) provided data on assortative marriage for occupation (4/5.1), and OPCS's 'Marriage and Divorce Statistics' provided data on age heterogamy and marital dissolution (6/3.1).

6. Summary of Chapter 2

The aim of this chapter was to provide a methodological 'backdrop' to the substantive chapters that follow.

Particular attention was paid to the analysis of the association in two-way tables. The chapter suggests that association models (and quasi-association models) are preferable to two other techniques which also decompose association into sets of 'scores' corresponding to the positions of marginal categories on a succession of 'underlying dimensions' (i.e. multidimensional scaling using Blau and Duncan's dissimilarity index, and correspondence analysis).

Correspondence analysis was shown to be superior to multidimensional scaling using Blau and Duncan's dissimilarity index because it utilised more of the association-related information in the table. It, however, was 'rejected' in favour of association models, primarily because of the author's preference for a statistical modelling/maximum likelihood approach and because the 'scores' produced by correspondence analysis are based on the deviation of an observed table from the expected table under the independence model (which was felt to be theoretically unsatisfactory).

Later in this thesis three-way tables are modelled using an approach described in Section 1 of the Appendix to this chapter. It should be noted that the association models described in Section 2.8 can be extended in such a fashion that they can be used to compare the patterns of association in two or more two-way tables (c.f. Becker and Clogg, 1989). Hence the analyses of three-way tables could have been carried out using these extensions of association models. However, finding a parsimonious representation of the association in a single two-way table is a qualitatively different problem from finding trends in the association in a series of two-way tables, and it seems unlikely that the approach described in the Appendix would produce radically different results from those produced by the application of 'extended' association models.

Sections 2.9 to 2.12 discussed a variety of issues relating to the application of association models, and Sections 4 and 5 discussed some issues which partly relate to the application of association models but also relate to the analysis of contingency tables more generally. The issues in these sections arose from the analyses discussed later in this thesis; hence the reader will probably get most out of this chapter if he or she relates it to these analyses.

Perhaps the most interesting of these issues is the way in which the row and column scores from association models are related to odds ratios. The decomposition of the association in a table into multiplicative 'contingency hierarchies' (see Section 2.8) involves the simultaneous decomposition of the table's odds ratios (see Section 3).

The chapter briefly discussed the use of secondary analysis in this thesis, and Section 3 of the Appendix gives details of the data sources used. While the secondary analysis approach is constrained by the limitations of data availability, this thesis by no means exhausted the supply of marriage-related data, e.g. potentially interesting data from both the 1986 British Social Attitudes Survey and the West of Scotland Twenty-07 Health in the Community Survey (Macintyre, 1987) came to the author's attention too late to be considered for analysis.

APPENDIX TO CHAPTER 2

1. Additional material on technical issues and statistical techniques

1.1. Some points relating to the statistical analyses in this thesis

This sub-section mentions some technical issues which are relevant to the analyses in this thesis.

GOODNESS OF FIT

The measure of goodness-of-fit used throughout this thesis, i.e. the deviance (often referred to elsewhere as G^2), is defined by

$$\text{Deviance} = 2 \sum_i \sum_j O_{ij}(\log O_{ij} - \log F_{ij})$$

where O_{ij} is the observed frequency in cell (i,j) and F_{ij} is the fitted frequency for cell (i,j). Note that the deviance is usually numerically close to the familiar

$$\sum_i \sum_j (O_{ij}-F_{ij})^2/F_{ij}$$

RESIDUALS

Standardised residuals (as calculated for contingency tables in this thesis) are defined by

$$\text{St.Resid.}_{ij} = (O_{ij}-F_{ij})/F_{ij}^{\frac{1}{2}}$$

where O is the observed cell frequency and F is the fitted cell frequency.

REGRESSION

OLS Regressions carried out in Chapter 3 were performed using SPSS-X (see SPSS Inc., 1988).

EFFECTS OF COMPLEX SAMPLE DESIGNS

The survey data analysed in this thesis come from surveys with relatively complex sample designs. However, the analyses in effect assume that the data come from simple random samples. Thus the standard errors calculated in the analyses are quite likely to be underestimates, and hence the P-values are quite likely to be smaller than they ought to be. The reader should therefore regard the P-values as over-emphasising significance.

1.2. Some statistical models used in this thesis

Log-linear models

Many of the statistical analyses in this thesis are analyses of contingency tables. The techniques used to examine two-dimensional tables are described at length in the main part of the chapter. However, many of the tables have three or more dimensions; typically analyses of these tables involve the application of log-linear models. Introductions to log-linear models are given by Gilbert (1981) and Fienberg (1977), the latter being rather more mathematical (see also Bishop et al, 1975). Section 3 of Chapter 2 focuses on the odds ratio, the measure of association which underpins log-linear models. Note that in log-linear models all the variables are on an equal footing.

Fienberg's notation for log-linear models is used in various places in this thesis. As an example, consider the three-way table defined by variables A, B and C. Fienberg uses the notation

[A][B][C]

to represent the 'baseline' model including all three main effects but no interaction terms, and the notation

[ABC]

to represent the 'saturated' model. The notation

[A][BC]

represents the model including the interaction between B and C, but including neither the interaction between A and C nor that between A and B.

One form of log-linear model frequently used in this thesis is the model of a three-dimensional table which allows for both the main effects of the three variables defining the table and the interactions between each pair of variables, i.e. the model which only differs from the 'saturated' model of the table in the respect that the interaction simultaneously including all three variables is excluded. In Fienberg's notation this model is written

[AB][AC][BC]

The reason why this type of model is of particular relevance is that a type of null hypothesis frequently encountered in research on marriage patterns is that the association between husbands' and wives' characteristics is the same for two or more groups of couples. The goodness-of-fit statistic (the 'deviance') corresponding to this type of model can be used as a test statistic for this sort of hypothesis.

However, it should be noted that if the husband and wife variables have more than a very small number of categories it is possible that the consequently large number of degrees of freedom of the test statistic will obscure significant between-group differences in the association in a part of the husband's characteristic by wife's characteristic table.

In the above context, a sensible approach to take is to construct log-linear models with structures somewhere in between that of the type of model outlined above and that of the 'saturated' model, i.e. models where the three-way interaction in the table is assigned an explicit structure. Adapting Fienberg's notation, this model might be written as

[AB][AC][BC][D]

where [D] is the constrained version of the three-way interaction.

All the log-linear analyses in Chapter 5 involve such parsimonious representations of interactions, as do the analyses in Section 4 of Chapter 3. A particularly good example can be found in Section 3.4 of Chapter 4.

The log-linear models used in this thesis were fitted either using GLIM (see Aitkin et al, 1989) or MicLog (see Macdonald, 1989).

Logit models

In a few analyses in this thesis, there is an obvious binary dependent variable and the other variables can be regarded as explanatory. The models used in these instances are logit (logistic) models (see Cox and Snell, 1989).

The logit models in this thesis were fitted using GLIM.

Proportional hazards models

The survival/dissolution of a marriage can obviously be conceptualized as a binary dependent variable. However, if the timing of a marital dissolution is of relevance to the researcher, then logit models are probably a less appropriate technique than proportional hazards models (see McCullagh and Nelder, 1989, pp419-431), which are used in this thesis and which are discussed further in Section 2.3 of Chapter 6.

The proportional hazards models in this thesis were fitted using BMDP (see Dixon, 1988).

APPENDIX TO CHAPTER 2 (continued)

2. An illustrative example of correspondence analysis (as applied to a table of husband's social origin by wife's social origin)

Correspondence analysis was applied to a 36x36 table of husbands' and wives' fathers' occupations (N=7,414) extracted from the results of the 1972 Oxford Mobility Survey (note that a small minority (about 2%) of the cases were couples who were not married at the survey date). The major advantage of using data from this source was that it allowed the straightforward comparison of the results with the Hope-Goldthorpe (reputational) prestige scale (Goldthorpe and Hope, 1974), since the 36 occupational categories used were Hope-Goldthorpe categories.

Clearly one would not expect the set of scores produced by correspondence analysis relating to the most empirically important dimension underlying the table to be perfectly correlated with the Hope-Goldthorpe scale, as the two scales were designed to measure different things. However, one would expect 'reputational prestige' and 'associational social status' to be reasonably highly correlated. (The correlation of the first dimension scores produced by a 'relational' analysis such as correspondence analysis with the Cambridge scale of Stewart et al, 1980, would be expected to be even higher). In fact, it is feasible that any major disparities between the first dimension scores and the HG scale are a function of the scaling technique rather than of genuine differences between the underlying 'social status-related' dimensions measured by the HG scale and correspondence analysis.

As expected, for both the male and female social origin categories the category scores on the first dimension produced by the correspondence analysis were highly correlated with the corresponding Hope-Goldthorpe (HG) scale scores. However, both the second and third dimension scores produced by the correspondence analysis were also correlated with the HG scale (see Tables A2/1 and A2/2). The three agricultural categories (HG's 11, 24 and 31) have extreme scores on the second dimension produced by the correspondence analysis, and a comparison of the ranked positions of the scores for these categories on the first dimension produced by the correspondence analysis and on the HG scale shows that the first dimension scores for these categories are higher than one would expect if the first dimension was simply related to 'social status'. It could be argued that the HG scale does not correctly measure the 'social status' of agricultural categories, but a much more obvious conclusion is that the first dimension produced by the

correspondence analysis cannot be correctly interpreted as simply being a 'social status' dimension. It is interesting to note that the scores on the third dimension produced by the correspondence analysis for each sex are dominated by HG category 27, which has the lowest score on the first dimension produced by the correspondence analysis, nine places away from its ranked position on the HG scale (see Table A2/2).

If one performs an OLS linear regression for each sex of the HG scale on the scores for the first three dimensions produced by the correspondence analysis, one finds that in both cases the first two dimensions have significant t-values (see Table A2/3). The fact that the t-values for the third dimension are small should not, however, be seen as an indication that one can safely ignore the third dimension. What the results of the regressions show is that if one accepts the validity of the HG scale as a calibrating instrument, the most appropriate 'social status' scale that can be extracted from the results of the correspondence analysis corresponds to an axis which is neither parallel nor orthogonal to any of the first three dimensions.

In other words it is clear that without the use of a 'calibrating instrument' such as the HG scale, the values for those categories which have extreme scores on 'non-status-related' dimensions produced by the correspondence analysis on any 'social status' scale constructed from the results of the correspondence analysis are going to be of dubious validity.

While the results of the correspondence analysis would not appear to be a particularly appropriate basis for the construction of a social status scale, a comparison of the fitted values from the regressions with the HG scale (i.e. an analysis of the residuals from the regressions) does throw up some interesting points (see Table A2/4).

Some of the categories have very small residuals, e.g. higher grade salaried professionals (HG category 2) and semi-skilled workers in manufacturing (HG category 26). Among the larger residuals are those for lower grade self-employed professionals; intermediate service workers (sales staff; HG category 28); supervisors of sales personnel (HG category 16) ; and non-manual employees in administration and commerce (HG category 21) and their supervisors (HG category 12). The four lowest prestige categories according to the HG scale all have large negative residuals.

What do these residuals indicate? It seems much more reasonable to assume that they reflect the fact that the HG scale and the 'scale'

produced here measure different things than it does to assume that the differences are due to 'measurement error'.

The large residuals noted earlier suggest that though high grade and low grade self-employed professional jobs differ in prestige, it makes little difference in the 'marriage market' whether one has a high grade or a low grade self-employed professional father. Rather more interestingly, the residuals also suggest that the extra prestige of a non-manual supervisory job may be irrelevant to one's offspring's marital prospects, since the scale scores for supervisors of clerical workers and for supervisors of sales personnel are very similar to those for clerical workers and sales staff.

The large residuals for the four lowest prestige HG categories are part of a broader phenomenon evident in the fitted values from the regression. The range of HG scale values for the obviously 'manual' categories is 29; the fitted ranges (for men and women) are 10.6 and 17.9. Hence the HG categories in Goldthorpe classes V to VII are predicted as having much more homogeneous scale values than they actually do. At the other 'end' of the class structure, the predicted gap between the HG scale values for categories in Goldthorpe classes I and II is somewhat wider than the actual gap. Overall, the implication would seem to be that the range of 'social origin status' of those from service class backgrounds is larger, and that of those from manual backgrounds smaller than would have been expected on the basis of the HG scale.

If one ignores the possibility that the above results are artefactual, then they seem to suggest that the prestige attached to a man's occupation is of limited relevance to the life-chances of his offspring.

The use of the Hope-Goldthorpe scale as a 'calibrating instrument' in the above analysis should not be interpreted as implying that this author views it as a 'paragon of virtue'. In looking at either the HG scale or the results of the above correspondence analysis one should ask oneself "To what extent are the results a methodological artefact of the scale construction?" and "What is the scale actually measuring?". Neither of these questions is straightforward to answer.

TABLE A2/1: Row and column scores for the first three underlying dimensions produced by a correspondence analysis of a 36x36 table of husband's and wife's fathers' occupational categories (Data from the 1972 Oxford Mobility Survey)

Hope-Goldthorpe category	Dimension 1		Dimension 2		Dimension 3	
	Husband (rows)	Wife (cols)	Husband (rows)	Wife (cols)	Husband (rows)	Wife (cols)
1	3.16	2.87	2.12	0.59	1.63	0.81
2	2.54	2.28	1.59	1.39	0.71	0.91
3	2.07	2.28	0.98	1.48	0.88	1.14
4	1.71	1.44	0.80	0.45	0.69	0.38
5	0.69	1.39	0.18	0.48	0.77	-0.04
6	1.74	0.64	1.20	1.12	-0.36	-1.73
7	2.16	2.64	1.30	1.37	0.50	1.15
8	1.77	2.02	0.94	0.41	2.68	1.07
9	2.58	2.79	1.72	1.74	1.03	1.47
10	1.41	1.34	0.62	0.97	0.04	0.55
11	2.19	2.10	-2.11	-2.18	-0.58	-0.39
12	0.15	0.26	0.53	1.02	1.61	0.23
13	0.88	0.70	-0.28	0.19	-0.10	-0.17
14	0.94	0.69	0.51	0.70	0.51	0.17
15	-0.31	0.36	0.44	0.58	-0.89	-0.67
16	0.07	-0.03	1.03	-0.14	-1.48	0.99
17	-0.21	-0.17	0.21	0.19	0.22	0.01
18	-0.17	-0.39	0.55	0.48	-0.52	-0.79
19	-0.18	0.35	-0.06	-0.31	-0.81	-0.38
20	-0.18	0.54	0.22	0.31	-0.43	-0.65
21	0.69	0.61	0.64	0.85	-0.29	0.36
22	-0.79	-0.42	0.13	0.33	-0.29	-0.60
23	-0.26	-0.33	0.06	0.06	-0.65	-0.46
24	1.31	1.41	-6.04	-5.47	1.30	1.15
25	-0.85	0.14	0.40	0.56	0.36	0.18
26	-0.63	-0.57	0.31	0.12	-0.43	-0.25
27	-1.24	-1.22	-0.09	-0.20	2.67	2.64
28	-0.18	0.52	0.44	0.19	0.53	-0.54
29	0.10	-0.42	-0.85	0.44	-0.24	-0.41
30	-0.80	-0.71	0.17	0.16	-0.63	-0.58
31	-0.13	0.11	-1.66	-1.86	-0.87	-1.14
32	-1.13	-1.06	-0.51	-0.23	0.23	-0.17
33	-0.35	-0.61	0.18	0.08	-0.74	-0.73
34	-0.18	-0.72	0.35	-0.16	-0.70	0.06
35	-0.76	-0.91	-0.21	-0.23	-0.62	-0.50
36	-0.66	-0.44	0.25	0.19	-0.48	-0.78

TABLE A2/2: Rankings of row and column scores for the first three underlying dimensions produced by a correspondence analysis of a 36x36 table of husband's and wife's fathers' occupations (Data from the 1972 Oxford Mobility Survey)

Hope-Goldthorpe category	Dimension 1		Dimension 2		Dimension 3	
	Husband (rows)	Wife (cols)	Husband (rows)	Wife (cols)	Husband (rows)	Wife (cols)
1	1	1	1	10	3	9
2	3	4	3	3	9	8
3	6	5	7	2	7	5
4	9	8	9	15	10	11
5	14	10	24	14	8	18
6	8	14	5	5	22	36
7	5	3	4	4	13	4
8	7	7	8	17	1	6
9	2	2	2	1	6	2
10	10	11	11	7	17	10
11	4	6	35	35	27	23
12	16	20	13	6	4	13
13	13	12	31	21	18	19
14	12	13	14	9	12	15
15	27	18	16	11	35	31
16	18	23	6	28	36	7
17	25	24	22	20	16	17
18	20	26	12	13	26	34
19	24	19	28	33	33	22
20	22	16	21	19	23	30
21	15	15	10	8	21	12
22	32	28	26	18	20	29
23	26	25	27	27	30	25
24	11	9	36	36	5	3
25	34	21	17	12	14	14
26	29	30	19	25	24	21
27	36	36	29	30	2	1
28	23	17	15	22	11	27
29	17	27	33	16	19	24
30	33	32	25	24	29	28
31	19	22	34	34	34	35
32	35	35	32	31	15	20
33	28	31	23	26	32	32
34	21	33	18	29	31	16
35	31	34	30	32	28	26
36	30	29	20	23	25	33

TABLE A2/2 (continued):

Correlations of row and column scores produced by the correspondence analysis with the Hope-Goldthorpe scale:

Dimension 1:	Male	0.84 (0.80)
	Female	0.83 (0.85)
Dimension 2:	Male	0.40 (0.63)
	Female	0.38 (0.67)
Dimension 3:	Male	0.43 (0.48)
	Female	0.37 (0.46)

(Figures in parentheses are Spearman's rank correlations).

TABLE A2/3: Results of OLS regressions of the Hope-Goldthorpe scale on the row and column scores for the first three underlying dimensions produced by a correspondence analysis of a 36x36 table of husband's and wife's fathers' occupations (Data from the 1972 Oxford Mobility Survey)

Husbands

$$\text{HG score} = 41.3 + 9.4x_1 + 2.8x_2 + 2.1x_3$$
$$(t=8.0)\ (t=2.9)\ (t=1.5)$$

(Correlation between predicted values and HG scale= 0.88)

Wives

$$\text{HG score} = 40.5 + 10.3x_1 + 3.3x_2 + 0.6x_3$$
$$(t=8.1)\ (t=3.0)\ (t=0.3)$$

(Correlation between predicted values and HG scale= 0.87)

TABLE A2/4: Residuals from the OLS regressions of the Hope-Goldthorpe scale on the row and column scores for the first three underlying dimensions produced by a correspondence analysis of a 36x36 table of husband's and wife's fathers' occupations (Data from the 1972 Oxford Mobility Survey)

Hope-Goldthorpe category	Raw residual (Male)	(Female)
1	-5.5	2.6
2	-0.2	2.0
3	3.5	-0.5
4	4.9	9.0
5	15.0	8.7
6	3.7	14.2
7	-3.4	-9.8
8	-4.4	-1.2
9	-10.7	-13.7
10	5.6	4.3
11	3.2	3.4
12	9.3	10.3
13	8.4	8.7
14	0.3	3.0
15	13.2	5.2
16	6.2	7.7
17	6.6	7.6
18	5.9	8.3
19	5.3	0.2
20	2.6	-4.7
21	-9.0	-9.8
22	4.3	1.0
23	0.3	1.0
24	-2.5	-0.5
25	1.7	-6.9
26	0.7	1.1
27	0.9	7.2
28	-7.0	-11.1
29	-4.3	-2.4
30	0.0	-0.4
31	-2.6	-3.8
32	0.2	1.2
33	-9.0	-6.1
34	-12.2	-5.6
35	-14.3	-12.1
36	-16.8	-18.2

3. Data sources

This section of the Appendix briefly describes the sources of data used in this thesis, discussing the original purpose of the data collection, the sampling method, and the relevant data collected.

1976 Family Formation Survey [ESRC Data Archive Study No. 1900]

This survey collected data (by oral interview) on the marriage and fertility patterns of 6,589 women in England, Wales and Scotland. It was carried out for OPCS (see Dunnell, 1979). The target population was all women aged between 16 and 49. The sampling frame consisted of addresses on the Electoral Register, the primary sampling units being parliamentary constituencies, 90 of which were selected with probability proportional to size (1975 Electorate). Addresses were selected at random from each constituency.

Addresses were first approached by letter (except in Inner London), but half of the addresses not responding to the letter were in any case 'followed up'. The overall response rate was 85%.

The survey collected data on respondent's current marital status, and marital history, including pre-marital cohabitation. Information was also collected on the occupation, education (school-leaving age and further education), and religion of both the respondents and their current husbands/partners/fiancés. If a respondent was a widow, divorced or separated and had no plans to marry, this information was collected for their most recent partner.

An unusual feature of the survey is its 'interval schedule'. This schedule divided each respondent's life into intervals between marriages, separations/spouses' deaths, births, abortions and miscarriages. Data collected in the context of the interval schedule included whether partners had been previously widowed or divorced and whether marriage ceremonies had been religious or civil. Furthermore, the schedule collected some information relating to the employment histories of respondents and their partners, including the pre-marital occupations of respondents and of their first husbands.

Occupations were coded into Registrar General's Social Classes and Socio-economic groups according to the 1970 OPCS Classification of Occupations.

1986/1987 Social Change and Economic Life Initiative

This ESRC-funded multi-team research project collected data on six localities (Aberdeen, Coventry, Kirkcaldy, Northampton, Rochdale and Swindon) chosen to offer contrasting experiences of economic change (see Gallie, 1988). The main survey (1986) consisted of oral interviews with approximately 1,000 adults in each of the localities. The respondents were randomly selected from the overall non-institutional population aged between 20 and 60, though the overall sample included a 'booster' sample of unemployed individuals, which was used to ensure that there were at least 150 currently unemployed respondents in each locality.

The sampling frame used was addresses on the Electoral Register, with a sample of addresses being chosen at random with probability proportional to the number of electors at each address. 'Doorstep enumeration' of 20 to 60-year olds was carried out at each address selected, and one of the eligible residents was randomly chosen for interview. In the 'booster' sample, one of the unemployed eligible residents was randomly chosen. In order to avoid bias through the use of the Electoral Register as the sampling frame, a small sample of non-registered addresses in each locality was identified by the use of a half open-interval technique.

A second large survey (the 1987 Household and Community Survey or HCS) re-interviewed about 300 of the original respondents from each locality, with respondents who were unemployed at the main survey date being deliberately over-sampled.

The main survey collected data on respondent's marital history, and recorded the respondent's partner's occupation as well as that of the respondent, but only recorded details of the respondent's education. Data were also collected on the respondent's father's occupation when the respondent was 14, and on the respondent's mother's occupation before she had children. The respondent was also asked both his/her own and his/her partner's attitude to trade unions.

The HCS collected data on the work histories of respondent s' partners, which together with the work histories of respondents (collected in the main survey; updated in the HCS) forms a valuable data set of joint work histories. Both HCS respondents and their partners completed self-completion questionnaires covering attitudes to family formation, the domestic division of labour, leisure activities and voting intention.

Occupational data were coded into both Registrar General's Social Classes ~~Class~~ and eleven-category Goldthorpe classes.

1972 Oxford Mobility Survey [ESRC Data Archive Study No. 1097]

The purpose of this survey was to enquire into patterns of inter- and intra-generational social mobility. The target population was men aged between 20 and 64 resident in England or Wales. Groups of electoral wards and parishes (selected in strata by population density) were used as primary sampling units, and the Electoral Register for each primary unit was used as the sampling frame for a randomly selected sample of individuals. Oral interviews of 10,309 respondents were achieved.

For both respondents and their wives data were collected relating to primary, secondary and tertiary education and to father's occupation when they were 14. (The education data included school type as well as school-leaving age and qualifications). Unfortunately, data ~~was~~ were not collected regarding wife's occupation.

Respondent's marital status and the year of the respondent's current marriage were also recorded.

Occupational data were coded into 36 Hope-Goldthorpe categories (and hence into 7 Goldthorpe classes) using the 1970 OPCS Classification of Occupations.

1987 British Election Study [ESRC Data Archive Study No. 2568]

This study was a collaborative venture between Nuffield College, Oxford, and Social and Community Planning Research, funded jointly by the Sainsburys Trusts, the Economic and Social Research Council and Pergamon Press. It is the latest in a series of studies spanning the last eight General Elections, whose aim has been to uncover the social and political origins of electoral behaviour and change (see Heath et al, 1985).

The target population of the main survey was the electorate in England, Wales and Scotland south of the Caledonian canal. Parliamentary constituencies were stratified according to percentage Labour vote in the 1983 General Election and according to population density within the broader context of Registrar General's Standard Regions. 250 constituencies were selected from these strata with probability proportional to size of electorate. Within each constituency one polling district was selected with probability proportional to electorate, and a systematic random sample of 24 electors was selected from the Electoral Register for that district. The response rate among those who had not

died, emigrated or moved to an unknown location was 70%, giving a sample of 3,826 electors.

The survey collected information on the current/last employment both of respondents and of their partners. Additionally, the survey collected information on the party political identification of the two people with whom each respondent discussed politics the most during the election campaign, which in 1,801 cases (i.e. for over two-thirds of the married respondents) included the respondent's partner.

Occupational data were coded into Registrar General's Social Classes, Socio-economic groups, and Heath-Goldthorpe classes (Heath, 1990) according to the 1980 OPCS Classification of Occupations.

1974 Reading Marriage Survey [ESRC Data Archive Study No. 1578]

The purpose of this survey (carried out by Dr. D.A. Coleman with sponsorship from the ESRC) was to describe and analyse geographical and social aspects of marital choice in modern Britain and to investigate their likely genetical import.

A simple random sample of 1,491 marriages was taken from a sampling frame consisting of all marriages celebrated in the Registration Districts of Reading, Wokingham, Bradfield and Henley-on-Thames between September 1972 and August 1973. The achieved sample of oral interviews was 946 (a response rate of 63%).

The survey collected data on husbands' and wives' previous marital status, occupations at marriage, fathers' occupations at marriage, terminal ages of education, religions of upbringing and geographical origins. Detailed information was also collected relating to the place and circumstances of the spouses' meeting. Spouses' occupations and their fathers' occupations at the time at which the spouses first met were also recorded.

Occupational data were coded into Registrar General's Social Classes and Hope-Goldthorpe scale scores using the 1970 OPCS Classification of Occupations.

1987 British Social Attitudes Survey [ESRC Data Archive Study No. 2567]

This survey (which was funded by the Sainsbury Family Charitable Trusts) is one of an annual series of surveys carried out by Social and Community Planning Research which aim to monitor public attitudes to a wide variety of social, economic, political and moral issues in the 1980's and 1990's (see Jowell et al, 1988).

151 parliamentary constituencies were selected from all those in England, Wales and Scotland (excluding those Scottish constituencies

north of the Caledonian canal). Constituencies were stratified according to Registrar General's Standard Region, population density and the percentage of homes that were owner-occupied. Constituencies were then selected systematically with probability proportional to size of electorate. Alternate constituencies were allotted to one of two questionnaires.

Within each selected constituency, one polling district was selected with probability proportional to size of electorate. 29 addresses were selected from each polling district using systematic random sampling of electors, addresses thus being chosen with probability proportional to the number of electors at the address. At addresses where the household composition had changed, a randomly selected elector was interviewed, otherwise the elector identified by the systematic random sampling procedure was interviewed.

2,847 interviews were achieved, a response rate of 67% among 'in scope' members of the sample. One of the two questionnaires (which 1,437 respondents answered) included a question as to whether divorce should be made more easy or more difficult, and also questions as to whether maintenance payments should be made to divorced women under given sets of circumstances. Questions were also asked in this questionnaire regarding the actual and ideal domestic division of labour.

Note that the 1986 BSAS included some additional marriage-related questions.

General Household Survey (1979-1985) [ESRC Data Archive Study No. 33090/33124]

This annual, high-quality survey "aims to provide a means of examining relationships between the most significant variables with which social policy is concerned and, in particular, of monitoring changes in these relationships over time" (General Household Survey report, 1987, p1). Gilbert et al (1983) promote the survey as being highly suitable for secondary analysis, and it is the most obvious general source of data on marriage and social stratification in Britain.

The survey has been carried out since 1971 by OPCS. The GHS sample is of private households in Great Britain. Interviews are sought (and normally achieved) with all adult members (aged 16 or over) in each household, a more satisfactory situation than the usual one in which a single respondent reports details of other household members. The sample design, referred to elsewhere in this thesis, is relatively complex and is described in the 1987 report (pp 203-205). The effective number of

households in the 1987 sample was 11,903 (compared with an effective sample of 13,437 in 1979). The response rate, judged in terms of households for whom nearly all the required information was obtained, has varied between 81% and 85%.

Since 1979 the survey has collected data on female marital histories and on cohabitation, with male marital histories being collected from 1986 onwards. Data relating to husbands and wives as individuals can be linked, and the survey thus collects data on the joint occupations, educations and fathers' occupations of married (and cohabiting) couples.

The educational data include school-leaving age, terminal age of education and detailed information on types and numbers of qualifications obtained. The occupational data focus on current or last occupation(s). Father's 'usual' job as reported by the respondent was recorded for respondents aged 16 to 49 (unless, of course, the father was part of the household!).

All the occupational data are coded into Socio-economic groups (and hence into Registrar General's Social Classes) according to the relevant version of the OPCS Classification of Occupations).

Data from the 1973 to 1982 General Household Surveys have been converted into SPSS-X system files with individuals as cases by members of the Department of Sociology at the University of Surrey, a task subsequently performed by OPCS themselves.

1949 Social Mobility Inquiry [ESRC Data Archive Study No. 33031]

This inquiry (see Glass and Hall, 1954) was part of a programme of research carried out by the London School of Economics concerned with the processes of social selection and differentiation in Britain, with the formation of social strata, and with the nature, composition and functions of those strata. The fieldwork for the study was carried out by the Government Social Survey (who also designed the sampling scheme).

The survey consisted of a two-stage, stratified random sample of persons (of both sexes) aged 18 years and over in Great Britain. The sampling frame was the set of 'live' cards maintained in the various local offices of the National Registration system. The primary sampling units were local government administrative districts, which were stratified by civil defence region and an urban/rural dichotomy. Urban areas of less than 140,000 in population and rural areas were further stratified by population size. Systematic random samples of individuals

were drawn from the high population urban areas and from districts selected at random from the low population urban/rural area strata.

An initial response rate of 77.5% was achieved from the original sample of 10,000, but randomly selected substitutes brought the number of interviews up to 9,296.

Unfortunately, the only currently available version of the data from the 1949 study consists only of male respondents in England and Wales (about 40% of the sample).

The survey collected data on its respondents' marital status, whether they had been previously married, and the years of their last marriages. Data were also collected on the occupations of respondents, their spouses, their fathers and their fathers-in-law. Data were also collected on the education (including school-type, examinations passed, and further education) of respondents and their spouses.

The occupational data were coded into a 'Standard Classification' of seven status categories, the classification having been prepared with the object of distinguishing between occupations in terms of their social prestige (see Moser and Hall, 1954).

1989 Gallup/New Woman study

This study was conducted on behalf of "New Woman" monthly magazine by Social Surveys (Gallup Poll) Ltd., as part of one of their multi-purpose 'Omnibus' surveys. The quota sample was of adults (aged 16 or over) and was stratified by Registrar General's Standard Region and by town size. Interviewers were given quotas for sex, age, class and employment of their respondents, and over 100 separate sampling points were covered.

The fieldwork for the survey was carried out from 6th to 10th January 1989, and 863 of the respondents questioned were married or living as married. Data collected included responses to the question "Where did you meet your current partner?", and respondent's occupation (and/or the occupation of the chief wage-earner in the respondent's household). The occupational data were coded according to a non-standard schema (described in Chapter 3).

An article describing the results of the study appeared in the April 1989 edition of "New Woman".

Other data sources: used and unused

Other data analysed in this thesis come from the Registrar General's annual review of marriages and divorces in England and Wales (OPCS Series FM2: Marriage and divorce statistics). This useful

publication includes data on marriage and divorce rates, the seasonality of marriage, mean/median ages at marriage, spouses' ages in combination at marriage, manner of solemnisation of marriages, spouses' ages in combination at divorce, and fact proven at divorce.

Tables previously analysed by Penn and Dawkins (1983: table derived from doctoral research [Penn, 1981]) and by Hout (1982: table derived from U.S. Current Population Survey data) are re-analysed. It is worth noting that the re-analysis of these tables was straightforward only because they were published in the form of frequency tables; sometimes authors annoyingly publish tables of percentages, from which the original frequencies cannot always be determined, or do not publish the tables that they analyse at all!

The 1980 Department of Employment/OPCS Women and Employment Survey [ESRC Data Archive Study No. 1746] provides data for a data analysis example ~~later~~ earlier in this chapter. This survey of 5,588 women aged 16 to 59 in Britain collected data on the employment and education both of its respondents and of their husbands (see Martin and Roberts, 1984). A sub-sample of 800 husbands was also interviewed, resulting in data on both spouses' attitudes to women's employment and the domestic division of labour.

The 1974 Survey on Marriage [ESRC Data Archive Study No. 434] conducted by Dr. R. Chester of the University of Hull, which focused on contraception and sexuality, is briefly used. Another general marriage survey, for which data are not easily available, was carried out by the Population Investigation Committee in 1959-1960.

The OPCS National Labour Force Survey [ESRC Data Archive Study No. 33132] (now annual), which collects data on the occupations and qualifications of its respondents and their spouses, has a much larger sample size than the General Household Survey but collects very little specifically marriage-related data and relies on interviewing only one respondent per household. The Central Statistical Office's Family Expenditure Survey [ESRC Data Archive Study No. 33057], sounds useful, but collects little information of relevance to this thesis.

The OPCS Longitudinal Study, which links records from the 1971 and 1981 Censuses, contains some relevant information on couples, but is constrained by the limitations of the data collected by the Census (see Brown and Fox, 1984).

The National Child Development Study [ESRC Data Archive Study No. 33004], which has followed up a sample of individuals born in 1958,

contains information on the occupations and terminal ages of education of the parents of the individuals in the sample, which could possibly be used to look at the relationship between assortative marriage and marital dissolution.

The British Household Panel Survey currently being carried out by the ESRC Centre for the Study of Micro-Social Change at the University of Essex will inevitably produce some useful marriage-related data.

CHAPTER 3: The preludes of marriage: from place of first meeting to the marriage ceremony

1. Introduction and literature review

This chapter focuses on what one might term the 'partner selection' period of the life-cycle, i.e. the period starting with an individual's entry into the 'marriage market' and ending with their first marriage ceremony. The major issues of interest are the circumstances and timing of the individual's first meeting with their eventual marriage partner, and the nature and timing of their marriage ceremony.

1.1. Homogamy, propinquity and structural constraints on intermarriage

A considerable amount of geographical-orientated research has been published on the subject of the relationship between class/status homogamy, propinquity (i.e. geographical proximity) and social segregation. Catton and Smircich (1964) argue that

"It is possible that propinquity produces a substantial degree of homogamy, and that the familiarity of homogamous marriages gives rise to homogamy norms" [p529],

i.e. people marry people who live close to them and hence who are similar to them (given social segregation), and the resulting tendency towards marriages between similar people becomes institutionalized and encapsulated in a social norm requiring individuals to marry partners who are similar to them.

However, Ramsoy (1966) found there to be no correlation between homogamy and propinquity, though her methodology has been criticised by Peach (1974). Morgan (1981) found no evidence of a relationship between geographical distance and homogamy, but did find that social segregation appeared to condition the choice of a mate. Overall, the literature would seem to suggest that homogamy and propinquity are independent tendencies affecting choice of spouse, but that variation in the class composition of different residential areas may be related to homogamy.

A separate but related strand of research in the recent American sociological literature is concerned with structural constraints on interpersonal relations. At the centre of this strand of research is the macrosociological theory due to Blau (1977a; 1977b; Blau et al, 1984),

which has the central theorem that "intersecting social differences promote intergroup relations". This theorem is based on the underlying assumption that social structure exerts constraints on people's interpersonal interactions (c.f. Durkheim, 1938), and relies heavily on Simmel's ideas relating to the intersection of "social circles" (Simmel, 1955).

Feld (1984) theorises that the social contexts from which associates are drawn are more important determinants of their characteristics than are the deliberate choices of individuals to interact with others with certain social characteristics. A less strong conclusion based on research on friendship was drawn by Huckfeldt (1983), who reported that

"Regardless of strong associational preferences, the formation of friendships is circumscribed by the opportunities and constraints of context. Individual preference is overwhelmed by factors relating to supply" [p665].

Both Blau et al (1982) and Rytina (1982) examined the relationship between the degree of social heterogeneity for a range of marriage-related variables in various U.S. areas and the corresponding rates of intermarriage, and they each found that there was more intermarriage in the more heterogeneous areas. However, as in all the empirical research in the Blau 'mould', the social heterogeneity of an area was based simply on the distribution within each area of the variable under consideration. Neither of the two strands of research discussed above have attempted to examine the effects of social heterogeneity at a micro-sociological level. Ideally, in order to distinguish between the effects of preference and of social structure on patterns of marriage, one would analyse data relating to interactions within the social contexts in which couple relationships are formed.

1.2. The social contexts of spouses' first meetings

A few British surveys have collected data on spouses' place of first meeting, but the most impressive set of data yet constructed relating to this issue was collected by two French surveys carried out by the Institut National d'Etudes Demographiques [INED] (Girard, 1974; Bozon and Heran, 1987 and 1988).

Girard's research consisted of a wide-ranging study of choice of marriage partner based on a sample of 1,646 couples who were interviewed in 1959. An open question was asked on the subject of the circumstances under which each pair of spouses first met. The answers to the question were coded into ten categories, and Girard briefly considered variations in circumstances of meeting according to age at marriage, region, occupation and education.

Bozon and Heran (1987) showed themselves to be interested in the dichotomy of structure and preference by identifying three 'causes' of homogamy: unconscious dispositions towards individuals with similar tastes and "habitus" (Bourdieu, 1985), strategic aims, and the constraints of the social framework. Their research was based on 2,957 individuals interviewed in 1983/1984. Additionally, they re-categorized Girard's data on place/circumstances of meeting to make his dataset comparable with their own, which allowed them to examine trends in circumstances of meeting over a period of sixty years. By the early 1980's, about a quarter of first meetings occurred in the context of "sociabilitée privée" (i.e. in the houses of parents or of friends), a further fifth in public places, and another fifth in workplaces/places of study, with the remaining third of meetings occurring at dances, associations/group activities, vacations, excursions/events and in the local neighbourhood.

In the second of their two linked papers (Bozon and Heran, 1988) focused on the relationship between place/circumstances of first meeting and the French occupational structure. Bozon and Heran noted [p121] that the more 'closed' a place of meeting was, the more it tended to be associated with the 'higher classes'. Places/events which had explicit or implicit selection procedures, such as place of study, social club events, cultural/sporting activities and holiday resorts, tended to be geared towards these classes. Interestingly, members of 'higher' classes who possessed cultural (intellectual) capital were found to be geared towards associations/sporting activities, while those with financial capital were found to be geared towards 'private socialising'.

Conversely, the unqualified part of the 'working classes' were highly likely to have met their spouses at public dances or in public places, with the more well-off/well-qualified part of the 'working classes' leaning towards 'semi-public' places such as night clubs.

On the basis of the results of their research, Bozon and Heran suggested that the apparently diverse range of place of meeting can be divided into groups of functional equivalents, and proposed a trichotomy

consisting of "Lieux publics, Lieux réservés, and Lieux privés" [p125], i.e. public places, 'select' places and private places.

Bozon and Heran concluded from the relationships of social class with the primary dichotomy of public places and select places and with the secondary dichotomy of select places and private places that the multiplicity of types of place of first meeting forces a degree of homogamy without the necessity for any homogamy-orientated strategy on the part of those in the marriage market [p127]. They then went on to compare their focus on the place of first meeting with the focus on geographical distance central to the homogamy/propinquity debate, and concluded that the former approach was an improvement on the latter approach, because what is most relevant is the 'social circles' that people are part of, rather than simply their spatial relationship with other individuals.

The example of dancing was then used to prove two important points. According to a survey on French leisure activities, there is no relationship between the class of young men and the frequency with which they went to dances. However, in the INED surveys many more 'lower class' than 'higher class' men were found to have met their spouses at dances. Bozon and Heran noted that the social context of the dances differed with class, i.e. the 'lower class' men attended public dances, while the 'higher class' men went to dances in private settings. Furthermore, the public dances attended by the 'lower class' men would appear to have had a greater "rendement matrimonial" (marital relevance) for them than the dances in private settings had for the 'higher class' men. Thus it is clear that superficially similar circumstances of meeting may in fact occur in rather different social contexts, and that these different scenarios can have different degrees of 'marital relevance' for the people who attend them.

Bozon and Heran made two other points of particular relevance. Firstly, while a 'high class' man who met his wife at a public dance was found to be more likely to be married to a 'lower class' wife than a comparable man who met his wife while studying, it was not clear whether this reflected the structural effect of the meeting place or whether it was a reflection of unobserved heterogeneity within the set of 'high class' men. Secondly, Bozon and Heran observed that it is not an entirely straightforward task to separate the effects of preference and of social structure, e.g. a 'high class' man who met his wife at a dance was likely given the context to have married a 'lower class' woman, but he clearly chose to attend the dance and to 'court' his wife!

Leonard (1980) comments that

"asking people 'where did you meet?' as one of a number of specific questions in a highly structured interview is likely to produce simple unambiguous replies, however complex the situation may have been" [p89].

It is clearly important to get a broad impression of the circumstances and social contexts in which the partner selection process occurs. The relevant literature relating to Britain includes Slater and Woodside (1951), Leonard (1980), Roberts (1983), Gillis (1985), Neale (1985) and Mansfield and Collard (1988).

1.3. Age at first marriage

As noted earlier, Girard found that there was a relationship between place of first meeting and age at marriage, e.g. as husband's age at marriage increased, the probability of him meeting his spouse at a dance decreased (Girard, 1974, p112). Clearly, just as the social contexts in which an individual may meet his or her spouse are stratified to some extent by social class, they are also stratified to some extent by age. Thus the circumstances of first meeting make a similar contribution to age homogamy to the one they make to class homogamy. Furthermore, since age at marriage is related to education (Kiernan and Eldridge, 1987; Teachman et al, 1987), marriage timing must make a small contribution to educational homogamy. (Note that there is an implicit assumption in the above that age at marriage is very highly correlated with age at first meeting).

Apart from any contribution that age at marriage (first meeting) may make to homogamy, the relationship between age at marriage and education/social class is of interest in its own right, as marriage is an important life-cycle event often acting as a symbol of adulthood and independence (Leonard, 1980, p260).

Many authors (e.g. Dixon, 1979; Gillis, 1985) see the feasibility of marriage at a particular age as being largely dependent on the possibility of financial and residential independence. Rapoport (1965) saw a decrease over time in the average age at marriage of engineers partly as a function of their affluence and earlier independence.

Roberts (1983) noted that middle-class couples have a disincentive from early marriage if they intend to be owner-occupiers, but that

"manual workers, by contrast, usually reach their maximum earning power in their early 20's. Those seeking independent accommodation in the rented, council housing sector have little incentive to delay and save" [p86].

The recent empirical examination of female age at first marriage in Britain carried out by Kiernan and Eldridge (1987) demonstrated that mother's age at marriage, level of highest qualification obtained and occupation at marriage are important variables in this context. Referring to the cohort of women from the 1946 National Survey of Health and Development which they examined in their paper, Kiernan and Eldridge observed

"The chances of marrying appear to decrease with increases in the availability and attractiveness of alternatives to the married state up to a certain point when what might be described as a 'lemming effect' takes over. At this point eligible women plunge into marriage very rapidly. The age at which this point occurs appears to vary amongst different groups of women" [p59].

(c.f. Lees, 1986, pp 86-95, who examined the reasons for getting married put forward by teenage girls).

Oppenheimer (1988) constructed an economic theory of marriage timing, wherein she argued that trends and differentials in marriage timing result in part from variations in the degree of difficulty that people encounter in mating assortatively. Both Oppenheimer and the economic theorist Becker conceive of marriage partner selection as a search process wherein individuals marry earlier if they are 'lucky' (i.e. they quickly find an appropriate spouse), or when they are pessimistic about their chances of finding a high quality partner, or when they meet someone at an early stage whose qualities they over-estimate! (Becker, 1974, p337). According to Oppenheimer

"The fact that an early marriage may preclude a pre-marital matching on adult attributes that have not yet emerged is undoubtedly an important

reason for the observed high frequency of "mismatches" and marital instability among earlier marriers" [p572].

While Oppenheimer is referring to 'earlier marriers' in the context of age at marriage, an 'early marriage' in the context of a specific courtship would also be associated with a higher probability of a mismatch according to the Becker/Oppenheimer type of theory. Courtship is regarded as part of the search process, and a short courtship is thought to possibly indicate that the searcher has married before he or she has had time to realise that they are involved in a mismatch!

Additionally, Becker et al (1977) note that a pre-marital conception can curtail the search process and increase the probability of a mismatch. Whether an increase in the probability of a mismatch is synonymous with an increase in the probability of a marriage which is heterogamous for a particular characteristic remains to be seen.

1.4. 'Traditional' vs 'Modern' marriages, pre-marital cohabitation, and civil marriage ceremonies

Marriage is a heterogeneous institution, and researchers have increasingly shown an interest in variations in the internal organization of marriage (e.g. the domestic division of labour), and in variations in couples'/individuals' attitudes towards marriage as an institution. Kellerhals et al (1985) contrast "traditional" marriages with "modern" marriages. The characteristics of "traditional" marriages are the primacy of the family over the couple/individual, strictly differentiated sex roles and a close social 'fusion' of spouses. Conversely, "modern" marriages involve the primacy of the couple over the family, minimal sex roles, and a degree of autonomy of spouses with respect to each other. Additionally, "modern" marriages place less emphasis on sexual faithfulness and on marriage being 'for life'.

One plausible hypothesis is that the greater flexibility of 'modern' marriages might be consistent with a higher level of heterogamy than 'traditional' marriages. However, a more pressing task would seem to be to identify the relationship (if any) between social class and something akin to Kellerhals et al's "traditional/modern" dichotomy.

One demonstration of a disregard for 'traditional' norms regarding marriage is pre-marital cohabitation. One might have expected there to have been a noticeable relationship between social class and pre-marital cohabitation, but rather surprisingly Haskey and Coleman (1986) found

there to be no strong relationship of this sort when they analysed data from three General Household Surveys.

Another piece of behaviour which contradicts 'traditional' marriage norms is marriage by civil ceremony. Both pre-marital cohabitation and register office marriage have been found to be associated with an increased risk of marital dissolution (Bumpass et al, 1989; Murphy, 1985), which might be interpreted as the consequence of a rejection of the traditional ideal of life-long marriage.

2. Class, Social Status and Spouses' Place of First Meeting

2.1. Sources of data

Several surveys have collected data on the places where (and/or circumstances in which) spouses first met. In 1989 "New Woman" monthly magazine paid Gallup to include four questions in one of their 'Omnibus' surveys (see Section 3 of the Appendix to Chapter 2). One of the questions was "Where did you meet your current partner?".

Gallup weighted the table of results that they produced for "New Woman" to give the 'correct' proportion by class within region, but (for a fee) they were able and willing to supply the author of this thesis with data at the individual level. The data supplied by Gallup contained data on the respondent's occupation and the occupation of the chief wage-earner in the respondent's household. The latter data were coded according to the schema given in Table 3/1. Gallup also supplied data corresponding to other 'demographic' questions (e.g. tenure; terminal age of education; age group; etc.).

The Reading Marriage Survey (see Section 3 of the Appendix to Chapter 2), which was carried out by Dr D.A.Coleman, collected detailed information on married couples' places and circumstances of first meeting, and also collected information on the occupations of both spouses and of the fathers of both spouses. However the data is specific to couples married in Reading in 1972/1973.

The 1974 marriage survey of Dr R.Chester aimed to be nationally representative and recorded place of meeting, but this survey only considered respondent's class/social status in the form of a crude 'ABC1 vs C2DE' dichotomy.

Thus the results of the Gallup survey represent the best available nationally representative dataset for the examination of the relationship between class and place of spouses' first meeting.

2.2. An analysis of data from the 1989 Gallup survey

The data to be analysed consist of 863 cases. In advance of the data collection fifteen categories had been 'thought up' into which the respondents' responses to the question "Where did you meet your current partner?" were expected to fall, though the sensible precautionary measure was taken of allowing interviewers to note down responses falling outside all of these categories. In fact so many of these 'Other' responses were related to school/university/college as a place of first meeting that this was added as an extra category at the coding stage. The responses were therefore coded into seventeen categories (see Table 3/2), though (perhaps unsurprisingly) none of the respondents had met their spouses on a 'Special Singles Holiday'! (A few respondents gave answers which fell into more than one category, but for simplicity these respondents have each been allocated to a single category throughout the analyses).

Table 3/3 allows a comparison to be made between the Gallup data and Chester's data. Bearing in mind the 15 year gap between the surveys and the use of different categories the results appear to be remarkably similar. (It should be remembered that the 1989 data contains cohabitees and probably a higher percentage than in the 1974 data of respondents in their second or later marriages - unfortunately the Gallup 'Omnibus' survey did not collect data on the respondents' marital histories).

Table 3/4 is a crosstabulation of place of first meeting against the occupational category of the chief wage-earner in the respondent's household. It contains a large number of zero cells, because some of the row totals and one of the column totals are very small, but it seemed sensible to carry out a preliminary analysis of the table before arbitrarily aggregating or removing categories.

The main hypothesis to be tested is the one put forward by Bozon and Heran that says that ~~those~~ couples of 'high' social class are likely to meet in restricted, 'Select' places (e.g. schools/colleges; clubs; workplaces) while those of 'low' social class are likely to meet in public, 'Open' places (e.g. in the street; pubs; dance halls).

TABLE 3/1: Occupational schema used by the 1989 Gallup 'Omnibus' survey.

Non-manual occupations

1. Professional - lawyer, accountant, etc.
2. Director, manager in business or industry.
3. Administrator in business/industry/social services, e.g. department/junior manager - divisional police officer.
4. Office worker, Salesman.
5. Other non-manual.

Manual occupations

6. Skilled.
7. Semi-skilled.
8. Unskilled.

9. Never Worked.

TABLE 3/2: Response categories to question 'Where did you meet you present partner?' in the 1989 Gallup 'Omnibus' survey.

Place of meeting

0. At school/college/university.
1. At work.
2. Through a friend's introduction.
3. At a disco or dance.
4. At a pub or wine bar.
5. Through a dating agency or small/personal ad.
6. At a dinner party or party.
7. On a blind date.
8. While you were at an evening class.
9. While you were engaged in some sport.
10. At church.
11. At a social club.
12. At charity fund-raising events.
13. At a wedding.
14. On holiday.
15. On a special 'singles' holiday.
16. Other.

TABLE 3/3: Spouses' place of first meeting: a comparison of the results of the 1989 Gallup 'Omnibus' survey with the results of Chester's 1974 marriage survey.

	Gallup (1989)	Chester (1974)
School, etc.	63 (7.3%)	62 (6.5%)
Work	146 (16.9%)	139 (14.5%)
Friends	91 (10.5%)	171 (17.9%)
Disco/Dance	146 (16.9%)	198 (20.7%)
Pub/Wine Bar	109 (12.6%)	90 (9.4%)
Social Club	37 (4.3%)	51 (5.5%)
Ad./Agency	6 (0.7%)	--- -------
(Dinner) Party	33 (3.8%)	--- -------
Blind date	15 (1.7%)	--- -------
Evening class	1 (0.1%)	--- -------
Sport	12 (1.4%)	--- -------
Church	9 (1.0%)	--- -------
Charity event	2 (0.2%)	--- -------
Wedding	6 (0.7%)	--- -------
Holiday	21 (2.4%)	--- -------
Parents intro.	--- -------	35 (3.7%)
Other	166 (19.2%)	--- -------
Casual meeting	--- -------	209 (22.0%)
TOTAL	863	955

TABLE 3/4: 1989 Gallup 'Omnibus' survey: Spouses' place of first meeting (rows) by chief wage-earner's occupational category (columns)(see Tables 3/1 and 3/2).

	1.	2.	3.	4.	5.	6.	7.	8.	9.
0.	17	6	4	3	10	15	3	5	0
1.	25	16	11	9	10	45	13	17	0
2.	6	5	3	8	10	34	14	11	0
3.	9	12	12	21	12	44	14	21	1
4.	5	6	9	5	10	37	12	24	1
5.	2	1	0	1	0	1	1	0	0
6.	3	6	6	6	3	4	1	4	0
7.	0	1	1	0	2	6	4	1	0
8.	0	1	0	0	0	0	0	0	0
9.	2	2	1	2	0	5	0	0	0
10.	2	0	2	0	2	3	0	0	0
11.	4	1	6	4	1	13	5	3	0
12.	2	0	0	0	0	0	0	0	0
13.	1	0	1	0	0	4	0	0	0
14.	1	0	5	2	0	12	0	1	0
15.	0	0	0	0	0	0	0	0	0
16.	16	9	18	14	16	53	20	20	0

TABLE 3/5: Deviances of association models fitted to a (12x8) table of spouses' place of first meeting by occupation (a reduced version of Table 3/4).

Model	Deviance	d.f.	
RC(0)	140.9	77	P<0.001
RC(1)	91.0	60	P<0.01
RC(2)	58.5	45	P>0.05
RC(3)	34.9	32	P>0.05

Goodman's RC(0), RC(1) and RC(2) models were fitted to Table 3/4. The scores for the occupational categories and for the places of meeting resulting from the RC(1) model were consistent with a relationship between the 'higher' occupational categories and 'Select' meeting places and between the 'lower' occupational categories and 'Open' meeting places. The two sets of scores resulting from the RC(2) model divided the place of meeting categories into a main cluster and four outlying categories, three of which were the two smallest and equal third smallest categories. Because there seemed no reasonable way in which to aggregate these very small categories with other categories, the four smallest categories were excluded from further consideration. The occupational category consisting of the two respondents whose households contain no wage-earner was aggregated with the lowest 'genuine' occupational category. This reduced (12X8) table was then reanalysed.

RC(M) models were again fitted, this time for M=0 to 3. Table 3/5 shows the deviances of the models. The RC(0) (independence) model very clearly did not fit the data, and this was also the case with the RC(1) model. The deviance of the RC(2) model just avoided being significant at the 5% level. If one were comparing two conventional log-linear models, then the difference between the deviances of the RC(2) and RC(3) models would just be significant at the 5% level, but (as noted in Section 2.11 of Chapter 2) it is likely that some of this difference is simply the result of the efficiency of the third dimension at explaining 'noise' in the data.

Table 3/6 shows the row and column scores for RC(1) and RC(2) models. The scores for the second dimension of the RC(2) model are similar to the scores from the RC(1) model. An examination of Table 3/6 suggests that the closer fit to the data of the RC(2) model as compared to the RC(1) model is largely due to the more elaborate model taking account of the fact that neither any 'Other non-manual' nor any 'Semi-skilled manual' couples met when on holiday or when in engaged in some sport. (Note that both the holiday and the sport categories are quite small).

Regardless of which set of scores one examines, the impression is given that, broadly speaking, there is a relationship between occupational social class and place of meeting along the lines of Bozon and Heran's differentiation between 'Select' and 'Open' places. The 'Other' meeting place category may consist largely of meetings in 'Open'/public places (e.g. in the street; public transport; etc.).

TABLE 3/6: Row and Column scores for the RC(1) and RC(2) models fitted to a 12x8 table of spouses' place of first meeting by occupation (a reduced version of Table 3/4).

Row scores:

Dimension	RC(1) 1	RC(2) 1	RC(2) 2
0. School, etc.	-0.73	-0.40	-0.77
1. At work.	-0.28	-0.18	-0.32
2. Friend's intro.	0.45	-0.47	0.32
3. Disco/dance.	0.20	-0.22	0.14
4. Pub/Wine bar.	0.60	-0.43	0.50
6. (Dinner) party.	-0.45	0.03	-0.47
7. Blind date.	1.07	-0.74	0.86
9. Sport.	-0.61	1.22	-0.64
10. At church.	-0.66	-0.32	-0.62
11. Social club.	0.12	0.10	0.17
14. On holiday.	0.17	1.71	0.75
16. Other.	0.14	-0.30	0.08

Column scores:

Dimension	RC(1) 1	RC(2) 1	RC(2) 2
1. Professional.	-1.25	0.22	-1.24
2. Director/manager.	-0.60	0.32	-0.64
3. Administrator.	-0.12	0.94	0.17
4. Office/Salesman.	0.01	0.75	0.12
5. Other non-manual.	-0.03	-1.80	-0.37
6. Skilled.	0.37	0.55	0.55
7. Semi-skilled.	0.94	-0.78	0.75
8+9. Unskilled, etc.	0.69	-0.22	0.66

(Note that the row and column scores have been multiplied by $\sqrt{\phi_k}$, where ϕ_k is the parameter corresponding to the k-th dimension of the model which measures the 'strength' of the association between the row and column scores for that dimension [see Section 2.8 of Chapter 2]).

If one had to form a dichotomous meeting place variable on the basis of this analysis, a reasonable division of the categories would seem to be :-

(i) School/College; Church; Sport; Work; Dinner Party/Party, and

(ii) Disco/Dance; Social Club; Holiday; Friends; Pub/Club; Blind Date; Other.

A few points are worth noting regarding the scores/occupational distributions for some of the meeting place categories. It is interesting that 'blind dates' are heavily skewed towards the manual occupations. This may be related to what Neale (1985) observed when studying the marriage process of eleven couples from a working class district in Leeds:

"Perhaps the essential characteristics of these initial social contacts is their occurrence between pairs or groups of girls and boys rather than between two isolated individuals [p133]..... mixed sex groups sometimes arrange and rearrange.....several couples were initially paired off by friends who wanted to make their own dating activities viable by establishing a foursome [p136]".

'Social clubs' do not appear to be the 'Select' places that one might have expected them to have been. The term 'social club' is, however, a broad one. Chester's survey included a 'youth club' category (into which the places of meeting of quite a number of couples fell), while Neale notes that in the part of Leeds she studied

"Social life for the 15+ age group revolves around the local pubs, with their discos and live music; social clubs, which are the main focus for family outings, and certain city centre pubs which are frequented on Friday and Saturday evenings" (Neale, 1985, p132).

Clearly a 'Social club' category is different from what one might expect a 'Clubs and Societies' category to be like.

Finally, one should note that if one could have divided the 'Other' category into meetings in public places and other meeting places, the

first of the two categories might well have had an occupational distribution even more weighted towards manual occupations.

The Gallup data cannot provide evidence for or against the existence of a relationship between occupation or social class and the likelihood of a 'Private' place of meeting, since the place of meeting categories are inadequate for this purpose.

2.3. An analysis of data from the 1974 Reading Marriage Survey

A more detailed examination of the relationship between social status and place of first meeting, but one which is limited to a single, possibly atypical, locality, can be carried out using data from the Reading Marriage Survey. Coleman (1979; 1982) has noted that the data show class differences in the proportions of couples meeting in different categories of places, e.g. ~~it~~ they show workplace meetings to be somewhat 'middle-class' and casual encounters in the street to be somewhat 'working-class'.

A similar analysis was performed using the Reading data to the one done on the Gallup data. Place of meeting was crosstabulated against the husband's Registrar General's Social Class (see Table 3/7; the class of the husband's first job was used if he was not employed at the time of the first meeting). Nearly half the cases fell into the RGSC IIIM category.

When the RC(1) model was fitted to Table 3/7 it was found to have a deviance of 109.5 on 80 degrees of freedom ($P<0.05$), but the RC(2) model was found to fit the table adequately (with a deviance of 60.9 on 57 degrees of freedom, $P>0.05$). Table 3/8 gives the row and column scores from the two models. The scores for the occupational categories from the RC(1) model give the strong appearance of being related to social status.

The extra dimension in the RC(2) model appears to take account of observed idiosyncrasies (whether substantively genuine or resulting from sampling error) of RGSC's IV and V. All five of the standardised residuals of magnitude greater than two corresponded to these RGSC's.

No couples where the husband was in RGSC IV met at college/university, and no RGSC IV couples met when they lived in the same house/next door to each other. As a consequence, the first dimension scores from the RC(2) model for RGSC IV and for the college/university and same house/next door categories were respectively large and positive and large and negative.

TABLE 3/7: Spouses' place of first meeting by husband's Registrar General's Social Class at the time of the first meeting. (Data from the 1974 Reading Marriage Survey).

Place of meeting	I	II	IIINM	IIIM	IV	V
Dance hall	4	14	23	81	8	5
Husband's (or joint) workplace	10	43	33	40	26	2
Wife's workplace	0	5	4	19	5	4
Husband's home	1	3	1	8	2	0
Wife's home	2	8	7	25	2	4
Other private house	5	21	7	33	13	1
School	2	8	5	8	1	0
College/University	11	12	7	5	0	1
Church/Church hall	3	2	4	3	1	0
Youth Club/Y.H.A./Working Man's Club	1	4	4	19	5	0
Other Club, including Sport	1	9	6	12	2	0
Community Centre, Social Club	1	5	5	14	5	2
Cafe, Restaurant, Hotel	1	3	2	16	2	3
Public House	3	8	8	60	11	8
Street, Park, Public Place	1	4	1	20	9	2
Public Transport	0	3	0	5	1	1
'Same neighbourhood'	1	3	0	8	3	1
'Lived Next Door/Same House'	1	2	2	1	0	2
'Always known'	0	0	2	9	4	0
Sports or other outdoor activity	3	4	6	17	3	0
Other	3	8	5	11	3	2
No response	2	0	4	6	1	1

TABLE 3/8: Place of meeting categories for 1974 Reading Marriage Survey and corresponding scores from RC(1) and RC(2) models applied to a table of place of meeting by husband's Registrar General's Social Class (Table 3/7).

ROW SCORES:	RC(1)	RC(2)	RC(2)
Dimension	1	1	2
Place of meeting			
Dance hall	0.32	0.07	0.30
Husband's (or joint) workplace	-0.47	0.24	-0.95
Wife's workplace	0.51	0.30	0.47
Husband's home	0.05	0.29	-0.19
Wife's home	0.21	-0.18	0.36
Other private house	-0.15	0.29	-0.49
School	-0.55	-0.18	-0.63
College/University	-1.34	-1.53	-0.34
Church/Church hall	-0.87	-0.26	-0.85
Youth Club/Y.H.A./Working Man's Club	0.26	0.40	0.00
Other Club, including Sport	-0.31	0.01	-0.49
Community Centre, Social Club	0.13	0.27	0.00
Cafe, Restaurant, Hotel	0.59	0.10	0.64
Public House	0.63	0.32	0.58
Street, Park, Public Place	0.53	0.66	0.34
Public Transport	0.31	0.14	0.28
'Same neighbourhood'	0.26	0.41	0.10
'Lived Next Door/Same House'	-0.35	-1.87	0.70
'Always known'	0.63	0.80	0.37
Sports or other outdoor activity	-0.05	0.10	-0.15
Other	-0.28	-0.09	-0.23
No response	0.07	-0.28	0.21

COLUMN SCORES:	RC(1)	RC(2)	RC(2)
Dimension	1	1	2
Husband's RGSC			
I	-1.38	-1.23	-0.75
II	-0.73	-0.51	-0.74
IIINM	-0.49	-0.52	-0.44
IIIM	0.89	0.42	0.53
IV	0.32	2.35	-0.36
V	1.39	-0.52	1.76

(Note that the row and column scores have been multiplied by $\sqrt{\phi_k}$ - see note to Table 3/6).

Conversely, two of the standardised residuals from the RC(1) model of magnitude greater than two corresponded to a single RGSC V couple who met at college or university, and two RGSC V couples who met when they lived in the same house or next door to each other. Another of the 'large' standardised residuals from the RC(1) model corresponded to RGSC IV couples who met at the husband's workplace or their joint workplace. This 'explains' the large disparity between the two scores from the RC(2) and RC(1) models for this category.

It seems quite likely that the second dimension of the RC(2) model does account for some genuine underlying effect. However, the unerring way in which extra dimensions in association models 'target' themselves on large residuals means that one should beware of falling into the trap of over-interpreting one's data! The following paragraphs are based on the results from the RC(1) model, though the results from the RC(2) model are not inconsistent with the conclusions drawn.

Unsurprisingly, meeting at college/university was associated very strongly with being in a non-manual category. In general the relationship between place of meeting and 'social status' appeared similar to that shown by the Gallup data, with meetings at school or church being more frequent among the non-manual categories and meetings in dance halls, pubs, streets, the neighbourhood, etc., being more common among the manual categories.

Several interesting differences between categories were evident. Meetings at the husband's/joint workplace appeared much more 'non-manual' than those at the wife's workplace. This is probably because customer/client meetings are fairly public ('Open') encounters, while meetings between employees are more 'Select'. Meetings at youth clubs/YHA/working men's clubs and at community centres/social clubs were more frequent among the manual categories, while the converse was true for the 'Other clubs' category. It seems reasonable to suppose that the latter set of clubs was more 'Select' than the former two sets.

Meetings in private houses (i.e. the wife's and husband's homes and other private houses) fell somewhere between the obviously 'Select' and the obviously 'Open' categories in terms of the non-manual/manual balance. Table 3/9 shows the non-manual/manual balance for a crude 'Select/Private/Open' trichotomy of meeting places. The odds ratio corresponding to the 2x2 non-manual/manual by 'Select/Open' table is 4.04.

Clearly, a relationship between social status and place of first meeting might be expected to partly explain, in a statistical sense at least, some of the tendency towards social status homogamy. One can easily calculate the levels of homogamy that one would expect if social status and type of meeting place were related but there was no assortative marriage for social status within any of the categories of meeting place. However, for places of first meeting to of themselves induce assortative marriage for social status there must be a relationship between social status and place of first meeting for <u>both</u> sexes.

The odds ratio of the 2x2 table corresponding to non-manual/manual categories of wife's job at first meeting cross-classified by 'Select/Open' place of meeting is 1.45. (If one treats those women who were still at school as non-manual, the odds ratio rises to 1.61). However, it is well-known that women's jobs are not ideal measures of their social status. If one replaces wife's job at meeting by wife's father's occupation, the corresponding odds ratio is a little higher at 1.72, though this is still small in comparison with 4.04.

The 2x2 table of husband's class at meeting against wife's father's class has an odds ratio of 3.43. If one calculates the 2x2 table that one would expect on the basis of the relationships between type of meeting place and husband's class, and between meeting place and wife's father's class, but assuming no within-meeting-place interaction between husband's class and wife's father's class, it turns out to have an odds ratio of only 1.10. So the place of first meeting trichotomy can explain very little of the relationship between husband's class and wife's father's class (see Table 3/10; see Section 3 of Chapter 2 for a discussion of the decomposition of odds ratios).

A woman's education is possibly a better measure of her social status than either her occupation or her father's occupation. The Reading data include both spouses' terminal ages of education, so it was possible to examine the extent to which the place of meeting trichotomy induced educational homogamy. Terminal age of education was divided into three categories: Less than or equal to 16, 17 to 20, and 21 plus.

TABLE 3/9: 1974 Reading Marriage Survey: a place of meeting trichotomy by husband's occupation.

Place of meeting	Husband's occupation. Non-manual	Manual
Public/Open	115	333
Private	55	88
Select	169	121

Elements of the trichotomy:

PUBLIC/OPEN: Dance hall, Wife's workplace, Youth club/YHA/Working man's club, Community centre/Social club, Cafe/restaurant/hotel, Public house, Street/park/public place, Public transport, 'Same neighbourhood', 'Lived next door/Same house','Always known'.

PRIVATE: Husband's home, Wife's home, Other private house.

SELECT: Husband's (or joint) workplace, School, College/university, Church/church hall, Other club (including sport), Sport or other outdoor activity.

TABLE 3/10: Husband's occupation by wife's father's occupation. (Data from 1974 Reading Marriage Survey).

Actual table (Odds ratio=3.43):

Husband's occupation	Wife's father's occupation Non-manual	Manual
Non-manual	204	148
Manual	154	383

Predicted table assuming class variation in place of meeting, but no assortative marriage within places of meeting, using the place of meeting trichotomy (Odds ratio=1.11)

Husband's occupation	Wife's father's occupation Non-manual	Manual
Non-manual	147.1	204.9
Manual	210.9	326.1

Table 3/11 shows the relationships between husbands' and wives' terminal ages of education and the place of meeting trichotomy. The odds ratios from the two sub-tables formed by the 16 or less/17 to 20 and 'Open/Select' dichotomies are 1.99 for the husbands and 1.65 for the wives. Comparing the 21+ category with the other two categories with respect to the 'Open/Select' dichotomy gives odds ratios of 4.99 and 4.70 respectively. The relationship between education and place of meeting therefore appears similar for the two sexes.

The odds ratios corresponding to the table produced by cross-classifying the 16 or less/17 to 20 dichotomy for each sex is 3.31. The odds ratio corresponding to cross-classifying the 20 or less/21 plus dichotomy for each sex is 35.93. The data therefore show a considerable degree of assortative marriage with respect to terminal age of education. However, the odds ratios corresponding to these two produced to show the extent to which the place of meeting trichotomy induces educational homogamy turned out to be 1.05 and 1.48 respectively.

It is clear that despite the existence of a reasonably strong relationship for both sexes between education and the place of meeting trichotomy, these relationships are responsible for no more than a minimal part of the tendency towards educational homogamy visible in the data.

One must remember, however, that each category in the place of meeting trichotomy is an aggregation of places of meeting which are superficially similar, but which may differ considerably in terms of the status distribution of individuals who can be found in those specific locations. For example, though a wide range of couples meet for the first time in private houses, the private houses presumably vary considerably in terms of the social status of the people that one is likely to meet in them, given that there is a strong association between peoples' own social status and that of their friends and kin. Similarly, there can be considerable social status differences between schools and probably also between social networks within schools. The same clearly applies to workplaces. Hence the crude place of first meeting trichotomy examined here is unlikely to have taken account of more than a fraction of the constraints on marriage patterns placed by social segregation.

TABLE 3/11: Husband's terminal age of education by wife's terminal age of education by place of first meeting. (Data from 1974 Reading Marriage Survey).

Public/Open:

	Wife's TAE		
Husband's TAE	<=16	17-20	21+
16 or less	290	49	7
17 to 20	45	20	4
21 plus	4	9	7

Private:

	Wife's TAE		
Husband's TAE	<=16	17-20	21+
16 or less	71	18	3
17 to 20	14	11	0
21 plus	5	9	11

Select:

	Wife's TAE		
Husband's TAE	<=16	17-20	21+
16 or less	137	26	1
17 to 20	30	24	10
21 plus	4	14	37

Do heterogamous couples meet in different places to homogamous couples? In 102 of the 946 couples in the Reading data, there was a disparity between both the educational levels (based on the trichotomy of terminal ages of education used earlier) and the social origins (manual vs non-manual) of the spouses. In 64 of these couples, the disparities were in the same direction. However, the distribution of places of first meeting of these doubly heterogamous couples did not appear particularly unusual, though it was somewhat biased towards the 'Select' category of the place of meeting trichotomy.

Given that a high level of graduate endogamy exists, the distribution of places of first meeting for the 58 couples who both left the education system at age 21 or more was examined. Only 7 (12%) of these couples first met in 'Open' places, as compared with approximately 48% of all the Reading couples. 20 (35%) of the 58 couples met at college or university.

So far it has not been established which of social origin, education and occupation is most important in 'determining' place of meeting for men. (In the female case, the strongest relationship is clearly between education and place of meeting). Table 3/12 is a four-way table of occupation by education by social origin by place of meeting. Hierarchical log-linear models were fitted to the table, and the model finally selected included the three two-factor interactions between social origin, education and occupation, together with the interactions between occupation and place of meeting and between education and place of meeting. It is not possible to precisely compare the strength of the last two interactions in any substantively meaningful way, but they appear to be of roughly similar magnitude, in as much as the difference between 'non-manually occupied' men and 'manually occupied' men in terms of their tendency meet in 'Select' rather than 'Open' places is slightly more than the difference between men in the lowest and men in the middle educational categories, but less than the difference between men in the lowest and men in the highest educational categories.

The interaction between social origin and place of meeting was not included in the model finally selected, as it did not significantly improve the fit of the model to the data. Men from non-manual origins were marginally more likely than men from manual origins to first meet their spouses in 'Select' rather than 'Open' places, but the magnitude of this effect was very much smaller than the magnitudes of those for education and occupation.

At this stage there is finally some evidence that the 'Private' category of meeting place is of different relevance to individuals of different social status. The observed log-odds ratios given in the second part of Table 3/12 indicate that men with a terminal age of education of 21 or more are more likely than those with lower terminal ages to meet their spouses in both Select and Private places, as opposed to Open/Public ones. Men in non-manual occupations with a terminal age of education of twenty or less appear not much more likely than manually occupied men to meet in a Private place as opposed to an Open/Public one. This suggests that the highly educated have distinct patterns of 'marriage market' behaviour.

TABLE 3/12: Husband's occupation by husband's terminal age of education by husband's social origin by place of meeting [trichotomy; see Table 3/9]. (Data from the 1974 Reading Marriage Survey)

Husband's occupation: Non-manual.

Husband's social origin	Non-manual			Manual		
Husband's TAE	21+	17-20	16-	21+	17-20	16-
Open/Public	10	27	19	5	12	39
Private	16	12	6	2	2	13
Select	33	29	30	15	17	35

Husband's occupation: Non-manual.

Husband's social origin	Non-manual			Manual		
Husband's TAE	21+	17-20	16-	21+	17-20	16-
Open/Public	2	12	50	1	6	227
Private	2	3	13	3	7	59
Select	1	8	18	2	9	77

The deviance of a log-linear model of the above table including the three two-factor interactions between occupation, education and social origin, and the interactions between education and place of meeting and between occupation and place of meeting was 19.4 on 18 degrees of freedom [P>0.05] (addition of the interaction between social origin and place of meeting changed the deviance only by 0.1 for the loss of a degree of freedom).

TABLE 3/12 (continued):

Observed log-odds ratios for some of the interactions in the four-way table of husband's occupation by husband's terminal age of education by husband's social origin by spouses' place of first meeting

Education/place of meeting interaction:

Education:	21+	17-20	16-
Place:			
Open/Public	(18)	(57)	(335)
	-1.11 [0.40]	-0.44 [0.27]	
Private	(23)	(24)	(91)
	0.17 [0.35]	-0.40 [0.27]	
Select	(51)	(63)	(160)

Occupation/place of meeting interaction:

Occupation:	Non-Manual	Manual
Place:		
Open/Public	(97)	(295)
	-0.20 [0.24]	
Private	(33)	(82)
	-0.90 [0.25]	
Select	(111)	(112)

(Figures in square brackets are standard errors for the parameter estimates. Figures in round brackets are observed frequencies).

3. Expected and actual age at marriage and age at 'going steady'.

3.1. Expected age at marriage

Respondents to the 1976 Family Formation Survey (FFS) were asked the question "What do you think is the best age for women like yourself to get married these days?". Table 3/13 is based on the answers given by respondents who were unmarried and who were born in 1958 or later (i.e. who were aged 16-18 at the survey date). It can be seen from Table 3/13 that there is a small amount of variation in the reported 'best age' according to respondent's father's Registrar General's Social Class. Variation is also visible according to whether respondents left school at the age of 16. In general, as one might have expected, higher levels of social/educational status are linked to a higher reported 'best age' (see also Dunnell, 1976). It is interesting that the relationship between social status and the perceived 'ideal' age at marriage reflects the relationship between social status and actual age at marriage.

3.2. Age at first marriage

Table 3/14 contains coefficients obtained from OLS regressions (carried out using SPSS-X) of age at marriage on various covariates both for spinsters and for bachelors. The data used in the regressions came from the 1982 General Household Survey and ~~consisted of~~ corresponded to men and women aged 30 to 39 still married to their first spouses. The limited age range was chosen so that period/cohort changes in age at marriage could be reasonably safely ignored.

There are several problems with the data: firstly, they exclude individuals whose first marriages had ended by the survey date (since before 1986 the GHS did not collect male marital histories), secondly, they under-represent late marriages (even with the relatively high lower age bound used), and thirdly, the occupational data used correspond to the respondent at the survey date rather than at the date of marriage.

The effects of highest qualification on age at first marriage appears to differ between the sexes. For men, the effect of having 'A' levels was found to be an average increase of about nine months. For women, having 'O' levels resulted in an average increase of about nine months, with having 'A' levels or better resulting in an additional average increase of about a year.

TABLE 3/13: 'Best age' for women to marry at according to a sample of respondents (aged 16 to 18) to the 1976 Family Formation Survey.

Category	Median age	Mean age	S.E.	N
All women	21	21.7	2.2	500
Father in RGSC I	24	23.4	2.0	39
Father in RGSC II	22	22.1	2.0	103
Father in RGSC IIINM	21	21.7	2.2	44
Father in RGSC IIIM	21	21.4	2.1	180
Father in RGSC IV	21	21.4	2.4	83
Father in RGSC V	22	22.0	2.1	22
Father RGSC II & TAS 17+	23	22.9	1.8	31
Father RGSC II & TAS <17	22	21.6	2.0	24
Father RGSC IIIM & TAS 17+	21	22.2	2.0	23
Father RGSC IIIM & TAS <17	21	21.3	2.3	64

RGSC = Registrar General's Social Class
TAS = Terminal age of schooling
(Second part of table restricted to respondents aged 17/18).

TABLE 3/14: The dependency of age at first marriage (in months) on social status: Parameter estimates from OLS regressions for samples of married men and women aged 30 to 39 from the 1982 General Household Survey.

	Men (N=1,125)		Women (N=1,224)	
Covariate	Estim.	t-value	Estim.	t-value
'0' levels	---	---	8.6	3.0
'A' levels or above	8.7	3.0	21.9	7.1
Non-manual occupation (including farmers)	6.9	2.3	9.0	3.8
Father non-manual (including farmers)	7.6	2.6	6.9	2.8
CONSTANT	280.9		251.1	
R-squared	0.038		0.098	

(Note that all four covariates are dummy variables. The covariates are based on the variables SEG, FATHRSEG and HEDQUAL in the Surrey subset of the 1982 GHS, with non-manual implying SEG's 1 to 9 and 16, '0' levels implying categories 7 to 9 of HEDQUAL, and 'A' levels or above implying categories 1 to 6 of HEDQUAL The above analyses exclude individuals where occupation/father's occupation was in the 'armed forces' SEG or unknown, and individuals whose highest qualification was foreign or unknown).

The average male age at marriage is a couple of years higher than the average female age at marriage, so it is unsurprising that education has a smaller effect on male age at marriage, since by the time of marriage a high proportion of men are 'well clear' of the educational system.

The effects of occupation were found to be broadly similar for the two sexes, with non-manually employed men having an age at marriage on average about seven months higher than manually employed men, the corresponding figure for women being about nine months. For both men and women, having a non-manual father was found to be associated with an age at marriage on average about seven months higher than having a manual father

The collinearity of occupation, education and social origin means that the standard errors of the parameter estimates are quite large, hence one should be cautious about placing too much reliance on the apparent relative contributions of the three variables to age at marriage. The effects of the interactions between the three variables were also tested for statistical significance, but, somewhat surprisingly, none of them ~~was~~ were significant.

The analyses were repeated using data from the 1979 GHS, with the results from the replication confirming the difference between the sexes in the importance of education, and also confirming that all three variables have an effect net of each other for each sex.

It should be stressed that the above analysis is somewhat crude. The distributions of the residuals from the regressions are left skewed, with a number of large residuals corresponding to (relatively) late marriages. Performing log transformations on the dependent variables slightly improved this situation, and additionally resulted in slight improvements in R-squared, but did not have much effect on the patterns and significance of the parameter estimates.

Age at marriage is in any case probably better examined in the context of a 'hazard' model which allows changes in the effects of covariates on the 'risk' of marriage as an unmarried individual ages, since, for example, the effect of staying on at school past the minimum leaving age may diminish with age.

The above findings are consistent with those of Kiernan and Eldridge (1987), who found that in a sample of women born in 1946 age at marriage depended on the women's occupations at marriage, their highest educational qualifications, and their mothers' ages at marriage.

3.3. Age at 'going steady'

If one is interested in the process by which couples form, then one should be more interested in the age at which the couple relationship between eventual marriage partners starts than the age at which legal marriage takes place. Ever-married respondents to the FFS were asked the question "How long did you go steady with your husband before you got married?". By using this information in combination with data on age at marriage one can estimate the ages at which the couple relationships leading to marriage were initiated. (Unfortunately the permitted answers to the 'going steady' question were a set of pre-determined intervals, e.g. "3 years but less than 4 years"). Of course, the date at which the couple relationship formed will be considerably later in some cases than the date at which the couple first met.

The median length of time going steady fell into the category "2 years but less than 3 years", with the estimated mean length being about 33 months. The estimated mean length going steady for teenage marriages was about six months lower than this, but otherwise length of time going steady appeared to vary little with age at marriage. Similarly, length of time going steady varied little between marriage cohorts between the mid-1950's and the mid-1970's, and no evidence was found of any relationship between length of time going steady and terminal age of education. However, a significant relationship was found between Registrar General's Social Class (based on the respondent's own occupation) and length of time going steady (see Table 3/15), though the range of variation is not large.

Table 3/16 contains the percentiles for the age at which FFS respondents in the 1960-1969 marriage cohorts started going steady with their eventual first husbands, according to terminal age of education and Registrar General's Social Class at marriage (own occupation). It can be seen from Table 3/16 that respondents whose terminal age of education was 18+ and respondents whose job at the survey date was in RGSC I or II on average started going steady with their husbands a couple of years later than the other respondent. Of the other respondents, about 50% were going steady with their husbands by their eighteenth birthday.

TABLE 3/15: Estimated mean length of time (in months) spent going steady before marriage of respondents to the 1976 Family Formation Survey according to Registrar General's Social Class at marriage (according to own occupation).

Job at marriage	Mean length	S.E.	N
RGSC I or II	33.5	25.2	695
RGSC IIINM	35.8	25.1	2271
RGSC IIIM	34.4	25.0	593
RGSC IV or V	31.3	24.2	1232

TABLE 3/16: Age at going steady, education and occupation: percentiles corresponding to estimated age at which respondent started going steady with eventual husband for married respondents to the 1976 Family Formation Survey belonging to the 1960-1969 marriage cohorts.

Percentile	TAE <16	TAE 16-17	TAE >17
10	14y 9m	15y 2m	16y 9m
20	15y 9m	16y 1m	17y 11m
30	16y 6m	16y 10m	18y 8m
40	17y 1m	17y 6m	19y 9m
50	17y 11m	18y 3m	20y 6m
60	18y 7m	19y 1m	21y 6m
70	19y 5m	20y 2m	22y 7m
80	20y 6m	21y 5m	24y 0m
90	23y 2m	23y 4m	26y 11m

Percentile	RGSC I/II	RGSC IIINM	RGSC IIIM	RGSC IV/V
10	16y 4m	15y 1m	14y 8m	14y 8m
20	17y 6m	15y 11m	15y 7m	15y 11m
30	18y 6m	16y 7m	16y 6m	16y 7m
40	19y 6m	17y 3m	17y 2m	17y 2m
50	20y 4m	18y 1m	18y 0m	17y 11m
60	21y 3m	18y 9m	18y 9m	18y 8m
70	22y 7m	19y 7m	19y 11m	19y 7m
80	24y 3m	20y 10m	20y 11m	20y 8m
90	27y 1m	23y 0m	24y 3m	23y 2m

RGSC = Registrar General's Social Class
TAE = Terminal age of education

It is interesting to compare these results with the research of Leonard, which relates to marriages in Swansea in the late 1960's. She observed that

"In outline, courtship appeared to start between the ages of twelve and fourteen for both sexes, (i.e. before leaving school). Girls entered a courting relationship at about sixteen and boys at eighteen, and after 2-4 such relationships, women started a relationship with their eventual husband at eighteen, became engaged at nineteen, and married at twenty-one" (Leonard, 1980; p72).

4. Heterogamy and the circumstances of marriage

This section examines the relationships between patterns of assortative marriage and three variables which are associated with the circumstances of marriage and which have been suggested to be related to heterogamy. (Section 1.2 of the Appendix to Chapter 2 discusses the type of log-linear model used in this section).

4.1. Age at marriage and social origin homogamy

This subsection examines the hypothesis that female age at first marriage and the probability of social origin heterogamy are negatively correlated, a hypothesis derived from the Becker/Oppenheimer theory that an early marriage increases the risk of a 'mismatch'.

The data which ~~was~~ were examined in the first instance came from the 1982 General Household Survey. For the sake of simplicity, social origin (based on father's occupation) was coded into the dichotomy described in the note to Table 3/14. The sample of marriages was restricted to marriages still in existence at the survey date and where the wife was aged between 30 and 39 and still in her first marriage (i.e. the same data used in the age at marriage analysis in Section 3.3 of this chapter).

At first sight, a comparison of teenage marriages with marriages at age twenty or older appeared strongly contradictory of the hypothesis. 27% of the teenage marriages were found to be heterogamous with respect to the social origin dichotomy, as opposed to 37% of the other marriages.

However, an inevitable consequence of the relationship demonstrated earlier between social status and age at marriage is that teenage

marriages include a high proportion of homogamous 'working class' marriages. In order to properly test the hypothesis one needs to take into account this social status/age at marriage relationship.

One possible approach would have been to have used log-linear models to examine a three-way table of husband's social origin by wife's social origin by wife's age at marriage. However, in order to avoid losing information by having to aggregate age at marriage (which was estimated to the nearest month) into categories, OLS regressions of wife's age at marriage on husband's and wife's social origins in combination were carried out (using SPSS-X).

The first regression had as its sole independent variable a dummy variable corresponding to heterogamous marriages. The corresponding parameter estimate was positive and statistically significant, which is consistent with the two percentages presented a few paragraphs ago. However, when husband's social origin and wife's social origin were also included as independent variables, the parameter estimate changed sign, and hence became consistent with the hypothesis, but was not statistically significant.

A further regression was carried out including all the covariates used in the regressions of husband's age at marriage on husband's social status/wife's age at marriage on wife's social status carried out in Section 3.3. The parameter estimates from this regression are given in Table 3/17. Wife's age at marriage appears to be dependent on both her own and her husband's social status characteristics, but there is no evidence of a relationship between wife's age at marriage and social origin heterogamy.

The above analyses were repeated using data from the 1979 GHS, and the replication produced results consistent with those described above.

Educational homogamy was also examined using an approach similar to that used above, but once again there was no evidence of a relationship with age at marriage net of the effects of husband's and wife's social status characteristics.

TABLE 3/17: The dependency of wife's age at marriage (in months) on the social status characteristics of herself and her husband: parameter estimates from an OLS regression using data from the 1982 General Household Survey (N=1,055).

R-squared=0.119

Covariate	Parameter estimate	t-value
CONSTANT	248.6	
Wife has 'O' levels	4.4	1.4
Wife has 'A' levels or above	15.4	4.5
Husband has 'A' levels or above	9.9	3.5
Wife's occupation non-manual	6.3	2.4
Husband's occupation non-manual	3.0	1.1
Wife's social origin non-manual	4.1	1.5
Husband's social origin non-manual	6.3	2.4
Social origin heterogamy	-2.2	-0.9

4.2. Heterogamy and time spent 'going steady'.

Just under a sixth of ever-married respondents to the 1976 Family Formation Survey reported that they had 'gone steady' with their first husbands for less than a year before marriage. Murphy (1985) found that, once adjustments had been made for the effects of age at marriage, year of marriage and pre-marital conceptions, the risk of marital dissolution for these individuals was about twice as large as the risk for individuals who 'went steady' for two or three years.

One plausible hypothesis is that short courtships indicate a lack of care in the choice of a marriage partner. If one further assumes that such a lack of care leads to heterogamous couples, then one would expect that marriages following such courtships would on average be more heterogamous than other marriages.

This last hypothesis was tested using data from the FFS. Respondents were divided into three categories according to whether they had gone steady for less than six months, for six to eleven months, or for over a year.

Table 3/18 shows the Registrar General's Social Classes of the jobs before marriage of the FFS respondents and their husbands according to the length of time that they spent going steady. A log-linear model including all three possible two-factor interactions was fitted to Table 3/18, and was found to have a deviance of 16.1 on 18 degrees of freedom ($P>0.05$). There was no apparent pattern to the residuals and it therefore appeared that there was no relationship of any great strength between the extent of occupational class homogamy and length of time spent going steady.

However, a more detailed examination of the distribution of 'extremely' heterogamous couples (i.e. husbands in classes I to IIINM with wives in classes IIIM to V, and wifes in classes I and II with husbands in classes IIIM to V) showed that this type of couple was disproportionately likely to have a short duration spent 'going steady', but this could be seen to be explicable in terms of a tendency for men and women in classes I and II, and classes IV and V, to go steady for a shorter length of time than men and women in classes IIINM and IIIM (c.f. Table 3/15).

It could, however, be argued that the tendency for men and women in these classes to have gone steady for a shorter length of time is the result of the distribution of 'extremely' heterogamous couples rather than its cause.

TABLE 3/18: Registrar General's Social Classes in combination of the pre-marriage jobs of respondents to the 1976 Family Formation Survey and their husbands according to length of time spent going steady (N=4,570).

Going steady for less than 6 months.

Respondent's RGSC	Husband's RGSC I or II	IIINM	IIIM	IV or V
I or II	25	14	1	4
IIINM	3	4	2	6
IIIM	9	28	18	51
IV or V	7	14	6	30

Going steady for 6 to 11 months.

Respondent's RGSC	Husband's RGSC I or II	IIINM	IIIM	IV or V
I or II	38	49	7	8
IIINM	11	34	5	11
IIIM	25	102	54	92
IV or V	10	33	10	49

Going steady for 12 or more months.

Respondent's RGSC	Husband's RGSC I or II	IIINM	IIIM	IV or V
I or II	224	300	42	54
IIINM	76	356	25	60
IIIM	158	965	303	560
IV or V	51	283	99	254

TABLE 3/19: School-leaving ages in combination of respondents to the 1976 Family Formation Survey and their husbands according to length of time spent going steady (N=4,269).

Going steady for less than 6 months.

Respondent's school-leaving age	Husband's school-leaving age				
	14	15	16	17	18
14 or less	35	15	4	0	2
15	4	57	16	4	3
16	3	11	6	3	3
17	0	5	8	4	5
18 or more	3	6	4	5	7

Going steady for 6 to 11 months.

Respondent's school-leaving age	Husband's school-leaving age				
	14	15	16	17	18
14 or less	77	24	10	5	3
15	3	128	29	4	7
16	9	28	24	14	9
17	2	7	7	6	5
18 or more	7	4	12	3	23

Going steady for 12 or more months.

Respondent's school-leaving age	Husband's school-leaving age				
	14	15	16	17	18
14 or less	489	225	82	22	6
15	64	1210	239	59	26
16	53	208	246	65	46
17	17	69	47	66	34
18 or more	6	54	73	78	122

Table 3/19 shows the school-leaving ages of respondents and their husbands according to length of time spent going steady for respondents whose first marriages had not ended by the survey date (since first husband's school-leaving age was recorded for these respondents). A log-linear model including all three possible two-factor interactions was fitted to Table 3/19 and was found to have a deviance of 56.5 on 32 degrees of freedom ($P<0.05$). Much of this deviance could be seen to relate to a significant tendency for an extremely heterogamous set of couples, i.e. couples where one spouse left school at age 14 or less and one spouse left school at age 18 or more, to have gone steady for less than a year. When account was taken of this relationship, the deviance was reduced to 39.5 on 30 degrees of freedom ($P>0.05$). (It should be noted that the rise in the minimum school leaving age from 14 to 15 means that the couples in question belong exclusively to the 'older half' of the sample).

There was also some evidence that couples who went steady for more than a year were more likely to have exactly the same school-leaving age, but this relationship was only on the borderline of significance at the 5% level.

Table 3/20 shows the importance (at the survey date) of religion to respondents and their husbands according to length of time spent going steady. Table 3/20 is restricted firstly to respondents whose first marriages had not ended by the survey date, and secondly to couples where neither spouse was of a non-Christian religion. Once again, a log-linear model including all three possible two-factor interactions was fitted to the table, the deviance of the model being found to be 49.0 on 32 degrees of freedom ($P<0.05$). Much of this deviance could be seen to be associated with a disproportionately large number of couples (eight!) who went steady for less than six months in which the respondent reported religion as being considerably more important to her husband than it was to her. The inclusion in the model of a parameter to take account of these couples reduced the deviance to 34.1 on 31 degrees of freedom ($P>0.05$). Interestingly, couples where religion was reported as more important to the husband were much more unusual than the converse.

It would appear from Tables 3/18 to 3/20 that some forms of heterogamous couple are unusually likely to have spent less than a year going steady.

TABLE 3/20: The importance of religion to Christian respondents to the 1976 Family Formation Survey and their husbands according to length of time spent going steady (N=4,242).

Going steady for less than 6 months.

Importance	Importance to husband				
to respondent	VI	MI	RUI	CUI	AN
Very important	18	5	2	2	1
Moderately important	0	52	13	11	5
Rather unimportant	2	1	38	5	2
Completely unimportant	2	4	2	10	1
Atheist/no religion	0	0	1	1	11

Going steady for 6 to 11 months.

Importance	Importance to husband				
to respondent	VI	MI	RUI	CUI	AN
Very important	25	12	11	4	4
Moderately important	6	154	34	15	8
Rather unimportant	2	1	77	19	8
Completely unimportant	0	0	4	30	2
Atheist/no religion	0	2	5	1	22

Going steady for 12 or more months.

Importance	Importance to husband				
to respondent	VI	MI	RUI	CUI	AN
Very important	267	112	47	16	23
Moderately important	57	1226	293	121	93
Rather unimportant	7	46	725	111	53
Completely unimportant	4	14	16	201	19
Atheist/no religion	2	7	12	7	128

However, the evidence is somewhat tenuous, and the observed relationships do not appear strong enough to give much support to the hypothesis that marriages after short courtships have a higher risk of dissolution because they tend to be more heterogamous than other marriages.

4.3. Pre-marital conceptions and homogamy/heterogamy.

Becker et al (1977) suggest that

"a pre-marital conception increases the probability of dissolution because it raises the cost of finding a suitable mate" (p1164)

and also that

"an increase in search costs can be said to increase the frequency of dissolutions because it increases the incidence of mismatches" (p1149)

Table 3/21 shows the Registrar General's Social Classes of husband's pre-marital occupation and respondent's pre-marital occupation in combination for two groups of respondents to the 1976 Family Formation Survey, i.e. ever-married respondents whose first child (including still-born children) was born between zero and eight months after the date of their first marriage, and respondents whose first child was born nine or more months after the date of their first marriage.

A log-linear model including the three possible two-factor interactions was fitted to a collapsed version of Table 3/21 (aggregating RGSC's I and II and excluding those cases where the respondent and/or husband did not have a Registrar General's Social Class), and was found to have a deviance of 13.5 on 16 degrees of freedom ($P>0.05$). Thus Table 3/21 provides no evidence of variation in assortative marriage for occupation according to the existence of a pre-marital conception.

It is arguable that pre-marital conception-induced 'mismatches' are less likely to have unusually high levels of occupational heterogamy than they are to have unusually high levels of educational or social origin heterogamy. For this reason a sample of couples from the 1979 General Household Survey was also examined. Table 3/22 shows the

patterns of assortative marriage for educational qualifications of two groups of GHS couples similar to the two groups of FFS respondents and their spouses in Table 3/21. (However, unlike Table 3/21, Table 3/22 only contains couples where the wife was still in her first marriage at the survey date).

A log-linear model including the three possible two-factor interactions was fitted to Table 3/22, and was found to have a deviance of 3.9 on 9 degrees of freedom ($P>0.05$). Thus Table 3/32 provides no evidence of a link between pre-marital conceptions and educational heterogamy. (It is clear from Table 3/22, however, that there is a significant relationship between educational qualifications and the probability of a pre-marital conception, i.e. the probability is higher for those with less qualifications).

Table 3/23 shows the patterns of assortative marriage for father's occupation of the GHS couples. A log-linear model including the three possible two-factor interactions was fitted to Table 3/23, and was found to have a deviance of 16.8 on 9 degrees of freedom ($0.10>P>0.05$). However, if one excludes from attention the couples where one or both spouses came from agricultural or Armed Forces backgrounds, the corresponding deviance is 9.1 on 1 degree of freedom ($P<0.01$).

The odds ratio corresponding to marriages between a 'working class' or 'middle class' husband and a 'working class' or 'middle class' wife are 1.29 for couples with pre-marital conceptions and 3.32 for couples where the wife's first child was born nine or more months after marriage. Thus Table 3/23 suggests that pre-marital conceptions are associated with a significantly higher level of heterogamy of social origin than first births nine or more months after marriage.

To check that this last result was 'genuine', an analogous table to Table 3/23 was constructed using data from the 1982 General Household Survey. An analysis of this table suggested that the result from the 1979 data was in fact a Type I Error, since the two odds ratios for the 1982 data were 2.62 and 3.21, and the model which had a deviance of 9.1 on 1 degree of freedom when applied to the 1979 data only had a deviance of 0.4 on 1 degree of freedom ($P>>0.05$) when applied to the 1982 data.

The above is a classic example of the dangers of placing much emphasis on a single statistically significant test statistic in research where many test statistics have been produced!

TABLE 3/21: Registrar General's Social Class of husband's pre-marital occupation by the Registrar General's Social Class of respondent's pre-marital occupation for two groups of respondents to the 1976 Family Formation Survey (N=4,129).

Respondents giving birth for the first time zero to eight months after the date of their first marriage

Husband's RGSC	Respondent's RGSC I	II	IIINM	IIIM	IV	V	No RGSC
I	0	1	8	1	0	0	1
II	2	9	27	4	4	1	5
IIINM	0	6	27	5	9	0	3
IIIM	0	21	165	61	129	5	16
IV	0	11	39	15	57	5	10
V	0	1	26	10	23	2	4
No RGSC	0	1	6	8	8	1	9

Respondents giving birth for the first time nine or more months after the date of their first marriage

Husband's RGSC	Respondent's RGSC I	II	IIINM	IIIM	IV	V	No RGSC
I	6	77	90	11	5	1	7
II	5	110	157	25	42	0	24
IIINM	1	63	289	22	52	0	13
IIIM	2	139	762	261	464	10	36
IV	0	39	171	56	153	7	19
V	0	7	39	20	45	4	4
No RGSC	2	34	47	9	20	2	31

TABLE 3/22: Husband's highest qualification by wife's highest qualification for two groups of couples from the 1979 General Household Survey.

Wives giving birth for the first time zero to eight months after the date of their first marriage

	Wife			
Husband	None	'O'	'A'	Degree
No relevant qual.	390	48	9	1
'O' level/SCE	34	19	3	2
'A' level/Higher	7	5	3	0
Univ/CNAA degree	4	3	4	2

Wives giving birth for the first time nine or more months after the date of their first marriage

	Wife			
Husband	None	'O'	'A'	Degree
No relevant qual.	1468	235	43	9
'O' level/SCE	185	111	34	7
'A' level/Higher	44	45	28	7
Univ/CNAA degree	36	43	38	34

TABLE 3/23: Husband's father's occupation by wife's father's occupation for two groups of couples from the 1979 General Household Survey.

'Middle class' : SEG's 1 to 9
'Working class': SEG's 10 to 15
Agricultural : SEG's 16 to 18
Armed Forces : SEG 19

Wives giving birth for the first time zero to eight months after the date of their first marriage

	Wife's father			
Husband's father	Middle	Working	Agric.	A.F.
Middle class	18	64	7	2
Working class	55	252	14	6
Agricultural	3	19	17	2
Armed Forces	4	3	0	0

Wives giving birth for the first time nine or more months after the date of their first marriage

	Wife's father			
Husband's father	Middle	Working	Agric.	A.F.
Middle class	277	283	30	14
Working class	290	984	63	27
Agricultural	34	63	48	4
Armed Forces	13	26	1	3

4.4. Overview

The above three subsections do not provide much evidence that marriages which are 'hurried' or 'forced' in some sense are more heterogamous (for social status and religion) than other marriages.

Note that for all the three-way tables examined in this section, attempts were made to model parsimoniously the three-way interaction in terms of the relationship between the 'distance' between husband and wife (c.f. the 'social distance' models of mobility tables discussed by Hout, 1983, pp 27-36) and the third variable defining the table. Models including this type of interaction are not reported in the text either because the interaction improved the fit of the model to a negligible extent, or because the variation 'picked up' by this form of interaction was more parsimoniously or more straightforwardly explained in some other fashion (see Section 1.2 of the Appendix to Chapter 2).

5. Social status and the marriage ceremony

This section examines the relationship between social status and the marriage ceremony. The nature and timing of the marriage ceremony might be expected to depend on the extent to which 'traditional' marriage norms are seen as important and adhered to, and/or on economic considerations.

5.1. The dichotomy of civil and religious marriage ceremonies.

By the late 1970's almost exactly half of the marriages in England and Wales had civil rather than religious ceremonies. The proportion of marriages between bachelors and spinsters which had civil rather than religious ceremonies was considerably smaller than this, reflecting the very high proportion of second marriages with civil ceremonies, but was still quite large (just over 30%).

Apart from the significance of the ritual attached to religious marriage ceremonies, the dichotomy of church and register office marriages is also interesting in as much as it has been found to have a strong bearing on the risk of marital dissolution. Murphy (1985) found that marriages with civil ceremonies had about twice the risk of dissolution of marriages with religious ceremonies. Clearly it is unlikely that the ceremonies themselves have more than a minor influence on the outcome of marriages, with the real importance of the dichotomy being that it distinguishes between two rather different groups of couples.

After its re-introduction in the mid-nineteenth century, civil marriage was mostly used by couples of low social status. Furthermore, Leonard (1980) found that "In the late 60s in Swansea, civil marriage was still a 'lower caste mode of alliance'". It is therefore unsurprising that Table 3/24, which corresponds to marriages of spinsters between the late 1940's and mid 1970's, shows a significant relationship between type of ceremony and the Registrar General's Social Classes of the jobs at marriage of both wives and husbands. (The source of data is the 1976 Family Formation Survey). Particularly notable is the high percentage of register office marriages among husbands with jobs in RGSC V.

However, Leonard's comment is related more to a notion of 'deviance' among those couples who marry in a register office than it is to their social class. She noted that in her sample of couples two major categories of couples marrying in register offices were those where one or both partners had had a previous marriage dissolved and those where the wife was pregnant at marriage. Other reported reasons for register office marriages were the inability or unwillingness of parents to meet the cost of the weddings, the desire to get married quickly, and atheism/contempt for religious ritual. However, according to Leonard "The only acceptable reason for wanting to marry in the register office and not the church is a dislike of 'too much fuss'", (Leonard, 1980; p208).

Between the early 1960's and the mid 1970's the percentage of marriages between bachelors and spinsters which took place in register offices rose from rather less than 20% to just over 30%. This suggests that during this period there may have been a decline in the stigma attached to register office marriages. However, since the mid 1970's the percentage has remained more or less constant, suggesting that some form of equilibrium may have been reached.

TABLE 3/24: The first marriages of respondents to the 1976 Family Formation Survey: Register office and church weddings according to the Registrar General's Social Classes of the occupations at marriage of the respondents/the respondents' husbands.

RGSC of respondent's occupation	Register Office weddings		Church weddings	
I	7	(23%)	23	(77%)
II	109	(17%)	539	(83%)
IIINM	409	(18%)	1833	(82%)
IIIM	141	(24%)	448	(76%)
IVNM	71	(27%)	191	(73%)
IVM	262	(29%)	630	(71%)
V	19	(39%)	30	(61%)
Inadequately described	4	(44%)	5	(56%)
Not employed	97	(42%)	133	(58%)

RGSC of husband's occupation	Register Office weddings		Church weddings	
I	37	(14%)	226	(86%)
II	123	(23%)	417	(77%)
IIINM	81	(13%)	526	(87%)
IIIM	534	(22%)	1888	(78%)
IVNM	14	(32%)	30	(68%)
IVM	185	(29%)	447	(71%)
V	90	(41%)	129	(59%)
Inadequately described	12	(21%)	44	(79%)
Not employed	44	(27%)	121	(73%)

Clearly the strength of a couple's religious beliefs is likely to influence whether they have a civil ceremony or a religious ceremony. However, research by Mansfield and Collard (1988) suggests that many couples who are not particularly religious are attracted to church weddings because they feel that the ritual involved is an important part of one of the symbolic functions of the marriage ceremony (i.e. the function of 'uniting' the couple). A decline in the stigma attached to register office marriages and an increasingly secular population are only likely to combine to reduce the proportion of religious ceremonies beyond a certain point if they are accompanied by a decline in the proportion of couples who feel that religious ceremonies serve an important function.

In order to examine in more detail the dependency of type of marriage ceremony on the various factors described above a logit model was fitted to data from the Family Formation Survey, with type of marriage ceremony as the binary dependent variable.

The data used relate to the first marriages of a majority of the ever-married FFS respondents. Respondents whose first husbands were not bachelors were excluded from consideration, as were respondents who did not specifically report that they had been married <u>either</u> in a register office <u>or</u> a church (some respondents reported being married in both). Furthermore, respondents who belonged to a religion other than Christianity were excluded, though atheists and respondents with no religion were included. (A small number of respondents were excluded as a result of missing values on covariates).

The analysis that follows thus relates to a sample of 4,652 marriages, of which 955 (20.5%) took place in register offices.

Table 3/25 shows the parameter estimates from a logit model including covariates relating to the relationships discussed by Leonard (1980). Note that if parsimony had been an important consideration it would have been possible to have reduced the number of parameters in the model considerably either by representing the effects of several dummy variables by a single covariate, or by aggregating categories. However, since the primary aim of the analysis was descriptive, it seemed reasonable to present the parameter estimates for all the categories (dummy variables).

The importance of Christianity to the respondent can be seen to be of crucial importance, with the odds of a nominal Christian to whom religion is completely unimportant getting married in a register office

being several times shorter than the odds for a Christian to whom religion is very important. (Note, however, that the importance of religion was not recorded retrospectively, and one is therefore assuming that the importance of religion to the respondent was the same at their first marriage as at the survey date).

Both pre-marital births and pre-marital conceptions can also be seen to shorten considerably the odds of a register office marriage. The same applies to two covariates relating to the 'haste' of the marriage, i.e. age at marriage and length of time spent going steady. (Note that age at marriage and the square of [age at marriage minus 16] were both included as covariates).

Changes between marriage cohorts in the odds of a register office marriage can also be seen to be significant. The parameter estimates for the two cohort-related covariates (date of marriage and the square of [date of marriage minus 1945]) are consistent with a doubling of the percentage of register office marriages between the early 1960's and mid 1970's).

Respondent's RGSC at marriage and husband's RGSC at marriage were both found to have a significant effect on the odds of a register office marriage net of all the other covariates. The corresponding parameter estimates can be seen to be strongly related to the percentages in Table 3/24, indicating that little of the relationship between social class and type of marriage ceremony can be explained in terms of the other covariates. The parameter estimates show register office marriages to be disproportionately likely when respondents or their husbands belong to RGSC's IV or V.

Several other status-related covariates were found to be related to type of marriage ceremony. Respondent's school-leaving age was included in the model as a three category factor, with the categories being 15 or less, 16 to 17, and 18 or more. Respondents in the first category were nearly twice as likely to marry in a register office than respondents in the third category, all other thing being equal.

The last two covariates related to whether the respondent's husband had been pre-maritally unemployed, and whether his job at marriage was judged (retrospectively) by the respondent to have been 'rather insecure'. Either of these covariates could have been removed from the model without a significant change in likelihood, but the change in likelihood if both were removed was significant.

TABLE 3/25: Parameter estimates from a logit model of the dependency of type of marriage ceremony on various covariates: data from the 1976 Family Formation Survey.

Covariate	P.E.	S.E.	%change
Constant	-0.11		
Religion very important	0.00		
Religion moderately important	0.40		49
Religion rather unimportant	0.66		93
Religion completely unimportant	1.16		319
Atheist/no religion	2.09		808
Date of marriage (Base=December 1944)	-0.63	(0.23)	#
Date of marriage squared	0.26	(0.07)	#
Age at marriage (Base= 16 years 0 months)	-1.78	(0.32)	#
Age at marriage squared	0.86	(0.18)	#
Pre-marital birth	1.51	(0.20)	453
Pre-marital conception	1.30	(0.10)	367
Going steady for less than 3 months	0.00		
Going steady for 3 to 5 months	-0.25		-22
Going steady for 6 to 11 months	-0.83		-56
Going steady for 1 year	-1.36		-74
Going steady for 2 years	-1.55		-79
Going steady for 3 years	-1.68		-81
Going steady for 4 years	-1.72		-82
Going steady for 5 to 9 years	-1.94		-86
Going steady for over 10 years	-0.63		-47
Respondent's pre-marital job in RGSC I	0.00		
Respondent's pre-marital job in RGSC II	0.14		15
Respondent's pre-marital job in RGSC IIINM	0.08		8
Respondent's pre-marital job in RGSC IIIM	0.20		22
Respondent's pre-marital job in RGSC IVNM	0.43		54
Respondent's pre-marital job in RGSC IVM	0.43		54
Respondent's pre-marital job in RGSC V	0.61		84
Respondent's pre-marital job inadequately described	0.68		97
Respondent pre-maritally non-employed	0.63		88

P.T.O.

TABLE 3/25: (continued): parameter estimates from a logit model of type of marriage ceremony

Covariate	P.E.	S.E.	%change
Husband's pre-marital job in RGSC I	0.00		
Husband's pre-marital job in RGSC II	0.21		23
Husband's pre-marital job in RGSC IIINM	-0.41		-34
Husband's pre-marital job in RGSC IIIM	0.03		3
Husband's pre-marital job in RGSC IVNM	0.18		20
Husband's pre-marital job in RGSC IVM	0.31		36
Husband's pre-marital job in RGSC V	0.54		72
Husband's pre-marital job inadequately described	-0.10		-10
Husband pre-maritally non-employed	0.38		46
Respondent's school-leaving age <16	0.00		
Respondent's school-leaving age 16 or 17	-0.40		-33
Respondent's school leaving age >17	-0.70		-50
Husband pre-maritally unemployed	0.29	(0.18)	34
Husband's job at marriage insecure	0.31	(0.17)	36

NOTES:

(Dependent variable: 1=Register Office, 0=Church)

P.E. = Parameter estimate.

S.E. = Standard error (not given for groups of dummy variables).

%change = percentage change in odds of a register office ceremony (lower bound= -100; upper bound= infinity).

Deviance of model = 3807.9

Change in deviance through addition of covariates = 915.2 on 38 degrees of freedom.

Age at marriage and date of marriage are in units of 10 years (120 months).

Given the substantive similarity of the two covariates this is unsurprising, and both covariates were included, seeing as their parameter estimates were both found to be indicative of a tendency towards register office marriages among those on the 'fringes' of the labour force.

The results from above could be interpreted as evidence that couples of low social status (and/or their parents) cannot afford, or at least decide to avoid, the expense of a wedding with 'all the trimmings'. An alternative hypothesis is that these couples have less respect for marriage as an institution than couples of moderate to high social status, but it seems more plausible that 'poor' couples simply cannot afford the 'binding ritual' of a traditional wedding.

5.2. Class and the seasonality of marriage

Table 3/26 shows the month of marriage cross-classified by the Registrar General's Social Class of husband's pre-marital occupation for married respondents to the 1976 Family Formation Survey. The 'seasonality' of marriage is clearly visible, with the two 'peak' months for marriage being March and September.

A log-linear model including only the two main effects was fitted to Table 3/26. The resulting deviance was found to be 106.6 on 33 degrees of freedom ($P<0.001$). Clearly, Table 3/26 demonstrates the existence of a strong relationship between husband's pre-marital RGSC and month of marriage. Table 3/27 shows the standardised residuals of the model, and gives a clear indication that much of the relationship relates to March in particular, and a fair proportion of the rest to August/September.

The seasonality of marriage has an interesting history. In contrast to Table 3/26, by 1987 the seasonality of marriage in England and Wales (as shown by OPCS Marriage and Divorce Statistics, 1987: Table 3.16) consisted simply of a gradual increase in marriage frequency through the year from January through to a peak in August/September, followed by a rather more abrupt decrease in frequency through October to November/December. In fact, the contemporary seasonality of marriage gives the strong impression of being determined by weather conditions and/or honeymoon possibilities.

The popularity of March marriages in the FFS sample is easy to explain. Until the implementation of the 1968 Budget, couples marrying just before the end of the financial year (5th April) were entitled to

the Married Man's Tax Allowance for the whole of that financial year. The gain for a couple marrying in March 1968 (when over 80,000 couples married in England and Wales, the highest number ever marrying in a single month) as opposed to mid or late April 1968 is likely to have been £120 (the difference between the Married Man's and Personal Tax Allowances) multiplied by 33/96 (the standard tax rate in 1968), i.e. 41 pounds and 6 shillings. Getting married can be an expensive business and forty pounds in 1968 would have gone some way towards offsetting the costs involved!

Other research has also suggested that the marriage ritual is sometimes governed by financial pragmatism. Anglican marriages are preceded either by the publication of banns or by the acquisition of a marriage licence (the latter being the case in less than 10% of marriages). In the early 1970's the former cost £1.05 and the latter £4.50 (Law Commission, 1972). Haskey (1985) has shown that for Anglican marriages in the 1970's, the higher the bridegroom's social class the more likely were the couple to marry by licence rather than after the publication of banns. More importantly, Haskey also showed that variations in the proportions marrying by licence and after banns were related to variations in the Retail Prices Index.

Returning to the subject of seasonality, Table 3/28 shows changes between marriage cohorts in the percentage of couples marrying in March according to husband's pre-marital RGSC. A huge fall is visible in the post-1968 marriage cohorts, which is clearly a direct consequence of the fact that the 1968 Budget limited the Married Man's Tax Allowance in the financial year of marriage to a proportion of the normal figure relating to the fraction of the financial year during which the couple was actually married.

Table 3/28 shows that though the percentage of couples marrying in March dropped after 1968 for all categories of husband's RGSC, the change was greatest for husband's in RGSC's IIIM to V, who had also been considerably more likely to marry in March in the early to mid-1960's than husbands in RGSC's I to IIINM. An obvious conclusion is that the (more or less fixed) financial incentive to marry in March was of greater significance to working class couples than to middle class couples.

The popularity of August marriages for RGSC I or II husbands and of September marriages for RGSC IIIM husbands is less easy to explain, though the fact that these effects are visible in all three groups of marriage cohorts examined in Table 3/28 suggests that they are not

simply the results of sampling error. One hypothesis is that these effects reflect if, when and for how long couples could go away on a honeymoon. Thornes and Collard (1979) found a strong relationship between social class and having a honeymoon, with all their RGSC I respondents having honeymoons but only about a third of their RGSC IV and V respondents. About half of those who did not go on a honeymoon said it was through lack of money (though pre-marital pregnancy was also an important factor). Additionally, the contemporary popularity of August/September marriages suggests that they might be viewed as some sort of 'ideal', possibly one that was more easily achievable for the higher class couples in the FFS sample.

A final point of interest is that Table 3/26 shows May marriages to have been particularly infrequent in the FFS sample as compared to the late 1980's. Apparently May marriages used to be considered unlucky, so it is possible that this superstition used to hold down the number of May marriages but has now died out.

TABLE 3/26: Month of marriage by Registrar General's Social Class of husband's pre-marital occupation for a sample of married respondents to the 1976 Family Formation Survey (N=4,834)

	Husband's RGSC			
Month	I or II	IIINM	IIIM	IV or V
January	41	19	108	29
February	49	44	150	54
March	72	78	433	161
April	74	47	157	84
May	53	31	135	49
June	75	72	211	85
July	85	49	232	82
August	113	59	221	76
September	101	111	320	94
October	67	55	216	78
November	37	27	113	46
December	60	30	174	77

TABLE 3/27: Month of marriage by Registrar General's Social Class of husband's pre-marital occupation for a sample of married respondents to the 1976 Family Formation Survey: standardised residuals of the independence model applied to Table 3/26.

	Husband's RGSC			
Month	I or II	IIINM	IIIM	IV or V
January	1.26	-1.26	0.73	-1.36
February	-0.25	0.94	-0.14	-0.30
March	-4.90	-1.81	2.71	1.70
April	1.53	0.06	-2.06	1.87
May	1.06	-0.59	-0.17	-0.24
June	-0.09	1.99	-1.02	0.13
July	0.95	-0.14	0.20	-0.30
August	3.66	-0.17	-1.20	-1.36
September	-0.59	3.39	0.01	-2.25
October	-0.49	0.20	0.24	-0.08
November	-0.19	-0.32	-0.09	0.58
December	0.22	-2.09	-0.02	1.55

TABLE 3/28: Percentages of couples marrying in March, August and September according to Registrar General's Social Class of husband's pre-marital occupation and marriage cohort. (Data from the 1976 Family Formation Survey).

	Marriage cohort		
Husband's RGSC	Up to 1959	1961-1968	1969-1975
MARCH			
I or II	14.7	7.9	6.4
IIINM	14.2	13.8	9.5
IIIM	19.4	22.8	12.9
IV or V	19.6	24.0	12.8
AUGUST			
I or II	12.3	13.8	15.1
IIINM	6.9	10.1	12.8
IIIM	8.4	8.1	11.4
IV or V	8.8	6.6	9.7
SEPTEMBER			
I or II	11.3	15.1	13.5
IIINM	16.4	22.2	18.4
IIIM	14.6	14.5	12.4
IV or V	10.5	11.2	13.3

6. Summary to Chapter 3

This chapter showed that what Bozon and Heran found was the case for France is also true for Britain, i.e. there is a tendency for individuals of high social status to meet their future partners in closed or restricted ('Select') settings and for individuals of low social status to meet their future partners in public ('Open') settings. Both occupation and educational level were shown to be significantly related to a place of meeting trichotomy consisting of 'Select', 'Open' and 'Private' categories. In spite of the fact that the relationships between the place of meeting trichotomy and occupation and between the place of meeting trichotomy and educational level were both reasonably strong, the trichotomy only explained a fraction of the relationship between spouses' social status characteristics, i.e. the place of meeting trichotomy is not a major contributor to social status homogamy.

Age at marriage, like place of meeting, was found to be related to both occupation and education. Moreover, it was also found to be related to social origin. Wife's age at marriage was shown to be related to both her own and her husband's characteristics. While it is arguable that social origin is acting as a proxy for another variable, or variables, (c.f. Kiernan and Eldridge, 1987), it seems likely that an individual's age at marriage depends on their general social status.

The duration for which couples 'went steady' was shown to vary a small but statistically significant amount according to the wife's social class at marriage, and the age at which women started 'going steady' with their eventual husbands was shown to be higher on average for women with high status occupations and women who stayed on at school until age 18 than for other women.

From analyses of age at marriage, duration spent 'going steady', and the timing of first births, a very limited amount of evidence was found that early or 'rushed' marriages are more heterogamous for social status than other marriages.

Some evidence that financial/economic considerations are of relevance in the context of marital formation was provided by two analyses. The first showed register office marriages to be disproportionately frequent among those with occupations in the lower few Registrar General's Social Classes and among those who were unemployed or had insecure jobs at marriage, once account had been taken of various other covariates. The second analysis suggested that a (pre-1968) tax incentive to marry in March was of much more consequence to

couples where the husband had a manual job than to couples where the husband had a non-manual job.

CHAPTER 4: Assortative marriage for social status

1. Introduction

1.1. Assortative marriage for social origin, education and occupation

This chapter examines patterns of assortative marriage in Great Britain according to a trio of variables relating to social status, i.e. social origin, education and occupation.

Early U.S. studies such as Burgess and Wallin (1943), Centers (1949) and Hollingshead (1950) demonstrated that there was a tendency towards homogamy for these variables. Berent (1954) described patterns of marriage according to social origin (father's occupation) and educational level for England and Wales, and Girard (1974) did the same for France, though he considered assortative marriage for qualifications as well as for level of schooling. Blau and Duncan (1967) provide post-war information on the patterns of assortative marriage for social origin and schooling in the United States, and Coleman (1977) provides a more recent look at assortative marriage for terminal age of education in Great Britain.

Assortative marriage for occupation has been somewhat less of a focus of attention. This is partly a result of an apparent reluctance to place much emphasis on wife's occupation, and a consequent tendency for comparisons to have been made between husband's occupation and wife's father's occupation (e.g. Girard, 1974; Coleman, 1977). This comparison forms the basis of studies of female 'marital mobility' (see, for example, Goldthorpe, 1987). Recently, tables of husbands' and wives' occupations in combination have come into prominence in the context of the debate as to whether wife's occupation should be taken into account when one is defining the social class of a couple (Goldthorpe, 1983; Britten and Heath, 1983; Prandy, 1986).

Recent research more genuinely related to occupational assortative marriage include Hope (1972), Hout (1982), Haskey (1983) and Lampard (1987), though husbands' and wives' occupations in combination also briefly feature in Murphy (1985) and Mascie-Taylor (1990). Additionally, Murgatroyd (1984) used a table of husbands' and wives' occupations in combination as the basis for her construction of a set of occupational classes for women.

Assortative marriage also exists for variables related to the trio considered above. Kerckhoff (1978), in a reference to an analysis of Oxford Mobility Survey data by Ridge (1974), comments that assortative

marriage for type of school is probably at least as important in Great Britain as assortative marriage for educational attainment. Furthermore, Harrison et al (1976) and Mascie-Taylor and Vandenburg (1988) have described data showing strong assortative marriage for IQ. Airey (1985) described data showing assortative marriage for the industries in which spouses work.

Surprisingly little attention has been paid to the relative importance of assortative marriage for the three variables, and to the extent to which the three forms of assortative marriage overlap. Berent (1954) noted that education appeared more important than social origin in the context of assortative marriage, a finding repeated (for the United States) by Blau and Duncan (1967), who concluded that assortative marriage occurs primarily for achieved status. Coleman (1977) carried out a factor analysis of husbands' and wives' characteristics (using husband's occupation and wife's father's occupation as measures of 'class'), and found that class and terminal age of education appeared together in a single factor. He also noted that more of the 'marital mobility' correlation was explicable in terms of assortative marriage for terminal age of education than vice-versa.

1.2. Between-group differences/Trends in assortative marriage for social status

It is interesting to compare between two or more groups the strength of assortative marriage for a particular characteristic. Hall (1954) briefly compared the levels of social origin homogamy in England and Wales and in the United States, and concluded that they were approximately the same. Kerckhoff (1978) carried out a similar comparison and concluded that in the United States education was more important relative to social origin than was the case in Great Britain. One motivation for such cross-national comparisons is that levels of social status homogamy, like levels of social mobility, can be interpreted as measures of societal openness. Along these lines, Ultee and Luijkx (1990) have recently carried out a comparison of educational homogamy/heterogamy in 23 industrial nations.

Dean and Gurak (1978) compared the levels of educational, age and religious homogamy of women in first marriages and women in second marriages in the United States. Several contradictory hypotheses exist relating to the relationship between remarriage and homogamy. Firstly, individuals may 'benefit' from the experience of a heterogamous first

marriage in the sense that they 'learn' to choose a more suitable spouse. Secondly, the heterogeneity of the 'remarriage market' may force second marriages to be more heterogamous. Thirdly, individuals who are inclined to marry heterogamously may also be more prone to marital dissolution, thus leading to a selection effect whereby individuals marrying for a second time are more inclined to marry heterogamously.

Dean and Gurak found second marriages to be markedly less educationally homogamous than first marriages. Support for the third of the above hypotheses appeared to be given by the fact that the women in second marriages had had first marriages which were more educationally heterogamous than those of women still in their first marriages.

Kerckhoff (1963) compared the levels of educational assortative 'mating' among female students, their fiancés, and their 'ex-beaux' (ex-boyfriends), and observed a trend towards less educational hypogamy ('female-high' heterogamy). However, this could easily be a straightforward consequence of the selective nature of his sample.

If one regards the level of homogamy as a measure of societal openness, then trends in homogamy are clearly of interest. Using data relating to Rochdale between the mid-nineteenth and mid-twentieth centuries, Penn and Dawkins (1983) found no evidence of any trend in the level of social origin homogamy. However, Berent (1954) found evidence of downwards trends in the levels of both social origin and educational homogamy during the first half of the twentieth century.

Research relating to trends in the levels of educational homogamy in the United States has been carried out by Michielutte (1972) and Rockwell (1976). Both authors noted that there had been a huge decline since the turn of the century in the percentage of couples who were exactly educationally homogamous, but that this was a more or less inevitable consequence of the fact that there had been changes in the educational distributions for both sexes.

Van Tulder (1972) found that the level of social origin homogamy in the Netherlands decreased during the 1950's/1960's, while Sixma and Ultee (1984) found that the level of educational homogamy in the Netherlands decreased during the 1960's but stabilized during the early 1970's. Some of the cross-national data analysed by Ultee and Luijkx (1990) allowed trends in the level of educational homogamy to be examined. Overall, Ultee and Luijkx found slight support for a decrease in the level of educational homogamy, but some nations went against this

trend. (The data examined mostly corresponded to the 1960's and/or 1970's).

Much of the above research relied on primitive statistical techniques such as the comparison of observed and expected percentages of homogamous couples, and the examination of correlations, or indices of association, or contingency coefficients. The problem with these techniques is that they do not make it at all easy to differentiate between the effects of changes in the distributions among husbands and wives of the characteristic under consideration, and the effects of changes in preferences and/or the constraints of social segregation. A similar problem existed in the study of mobility tables, which was resolved by the use of log-linear models (see Goldthorpe, 1987, pp 94-98), and log-linear models were used by Sixma and Ultee (1984) and Ultee and Luijkx (1990). However, not all authors agree that the effects of the marginal distributions can be neatly removed in this way when one is studying patterns of marriage (see Rust and Seed, 1985, who put forward what they regard as suitable measures of endogamy with respect to nominal level characteristics).

2. A note on collapsing two-way tables by aggregating categories

Breiger (1981; 1982) and Goodman (1981; 1982) discussed the aggregation of categories in two-way contingency tables. The major issue is how one can test whether a significant amount of information is lost when two or more rows and/or two or more columns in a table are combined. (See also Section 4 of Chapter 2).

The most straightforward and conservative test is what Breiger (1981) refers to as 'Strict Collapsibility'. The test statistic for this test consists of the difference between the deviance of the independence model applied to the original table and the deviance of the independence model applied to the 'collapsed' table. The number of degrees of freedom corresponding to the statistic is

$$(I_1-1)(J_1-1)-(I_2-1)(J_2-1),$$

where I_1 and J_1 are the numbers of rows and columns in the original table and I_2 and J_2 are the numbers of rows and columns in the collapsed table.

In assessing whether categories in a symmetric table can reasonably be aggregated, one may wish to ignore the diagonal cells. For example, when using social mobility tables to examine the class structure, one may wish to focus on 'movers' and ignore 'stayers' (e.g. Breiger, 1982;

Frankel, 1989). A test which ignores the diagonal cells was proposed by Goodman (1981; 1982) and christened 'Collapsibility' by Marsden (1985). The number of degrees of freedom of the Collapsibility test statistic is equal to

$$(I_1-1)^2-(I_2-1)^2-K,$$

where K is the number of categories which are aggregated with one or more other categories in the collapsed table.

3. Assortative marriage for social origin

In recent years several authors (e.g. Marsden, 1985; Snipp, 1985; Frankel, 1989) have used inter- and intra-generational mobility tables as bases for the examination of the underlying class structure. If one is interested in social structure in the context of the way in which and the extent to which the class/status of an individual's family background influences their 'choice' of marriage partner, then a table of husband's social origin by wife's social origin is of more relevance. This section is concerned with the analysis of this sort of table.

Education and occupation are likely to act as intervening variables between family background and choice of marriage partner. However, if one is primarily interested in the overall 'life-chances' of someone from a particular background rather than in marital choice as a social process, such intervening variables can reasonably be ignored.

3.1. A re-analysis of Penn and Dawkin's data

This subsection re-analyses some previously presented data on assortative marriage for social origin, partly as a demonstration of the usefulness of quasi-association models (see Section 2.9 of Chapter 2) in this context.

Penn and Dawkins (1983) analysed a three-way table of bride's father's occupation by groom's father's occupation by period. The data analysed came from a sample of Anglican and Non-Conformist churches in Rochdale for a series of five decennial periods spread (irregularly) over the last half of the 19th Century and the first two-thirds of the 20th Century. The table was analysed using hierarchical log-linear models and Penn and Dawkins correctly concluded that there was no significant variation over the five periods in the interaction between bride's father's occupation and groom's father's occupation. However, they also commented that their analysis "suggested that the main lines of class cleavage occurred between the bourgeoisie and the unskilled

manual working class and the remainder of the class categories. Conventional dichotomies associated with notions of a middle class/working class axis of class cleavage or a non-manual/manual axis were not relevant to an explanation of the data presented", (Penn and Dawkins, 1983; p506).

Table 4/1 is the three-way table analysed by Penn and Dawkins collapsed over the five periods.

Penn and Dawkins conclusions relating to 'class cleavages' were based on an examination of the standardized residuals from a model fitted to their three-way table which assumed independence between bride's father's occupation and groom's father's occupation. An examination of the standardized residuals (given in Table 4/2) for Table 4/1 under this model shows that the two largest standardized residuals do indeed correspond to the bourgeoisie/bourgeoisie and unskilled manual working class/unskilled manual working class cells, and these residuals do suggest a high level of both 'bourgeois endogamy' and 'unskilled manual working class endogamy'.

Goodman's RC(1) association model (Model 1) was fitted to Table 4/1. The resulting deviance was 34.7 on 25 degrees of freedom ($0.05<P<0.10$). However, an examination of the standardized residuals of Model 1 (see Table 4/3) suggested that the model was not fitting the leading diagonal of Table 4/1 adequately (since all the residuals were positive), so the model was re-fitted including extra parameters to fit the leading diagonal exactly. This quasi-RC(1) model (Model 2) was found to have a deviance of 13.5 on 18 degrees of freedom and therefore fitted the data adequately ($P>0.10$).

Table 4/4 shows the parameter estimates from the two models. The leading diagonal parameter estimates clearly reflect the high levels of bourgeois and unskilled manual working class endogamy noted earlier.

The row and column scores from Model 2 (scaled so as to range from zero to one) suggest large cleavages for each sex between the bourgeoisie and the other six classes, and between the unskilled manual working class and the other six classes in the case of the groom's father. However, both sets of scores also suggest a cleavage of equal or greater significance between the three manual classes and the other four classes.

TABLE 4/1: Bride's father's occupation by groom's father's occupation (extracted from Penn and Dawkins, 1983).

Bride's father	Groom's father: B	PB	Co	RWC	Sk	S-Sk	Unsk
1.Bourgeoisie	7	7	2	4	11	3	1
2.Petty Bourgeoisie	4	15	19	5	48	21	11
3.Coordinator	4	23	34	17	66	19	16
4.Routine White-Collar	2	6	10	9	33	10	5
5.Skilled Manual	7	45	46	31	268	130	71
6.Semi-skilled Manual	1	20	18	10	122	90	34
7.Unskilled Manual	1	8	6	5	88	53	58

TABLE 4/2: Standardised residuals of the independence model applied to Table 4/1.

Bride's father	Groom's father: B	PB	Co	RWC	Sk	S-Sk	Unsk
1.Bourgeoisie	8.3	2.5	-0.6	1.6	-0.9	-1.6	-1.7
2.Petty Bourgeoisie	1.3	1.6	2.5	-0.6	-0.5	-1.0	-1.2
3.Coordinator	0.5	2.2	4.6	2.4	-1.0	-3.1	-1.5
4.Routine White-Collar	0.6	0.0	1.3	2.5	0.3	-1.5	-1.5
5.Skilled Manual	-1.0	-0.5	-1.0	-0.1	1.2	0.2	-0.7
6.Semi-skilled Manual	-1.8	-0.8	-1.6	-1.4	-0.1	3.4	-0.6
7.Unskilled Manual	-1.4	-2.3	-3.0	-1.9	0.4	0.9	5.6

TABLE 4/3: Standardised residuals of Goodman's RC(1) association model applied to Table 4/1.

Bride's father	Groom's father: B	PB	Co	RWC	Sk	S-Sk	Unsk
1.Bourgeoisie	0.9	0.6	-2.0	-0.1	0.5	0.3	0.1
2.Petty Bourgeoisie	0.3	0.3	0.8	-1.4	-0.4	0.2	0.4
3.Coordinator	-1.3	0.1	1.4	0.3	-0.5	-1.3	1.4
4.Routine White-Collar	-0.3	-1.0	-0.1	1.2	0.5	-0.5	-0.2
5.Skilled Manual	0.5	-0.3	-0.5	0.2	0.4	0.0	-0.3
6.Semi-skilled Manual	-0.4	0.4	-0.1	-0.4	-0.5	2.1	-1.7
7.Unskilled Manual	1.4	0.2	-0.3	0.3	0.2	-1.4	1.2

TABLE 4/4: Parameter estimates from the RC(1) and quasi-RC(1) models applied to Table 4/1.

Diagonal parameter estimates
(from Model 2, the quasi-RC(1) model).

Bourgeoisie	1.72 (0.49)
Petty Bourgeoisie	0.01 (0.30)
Coordinator	0.32 (0.23)
Routine White Collar	0.51 (0.38)
Skilled Manual	-0.05 (0.11)
Semi-skilled manual	0.38 (0.15)
Unskilled manual	0.76 (0.18)

(standard errors in parentheses).

	Row and column scores			
	Quasi-RC(1) model (Model 2)		RC(1) model (Model 1)	
	Bride's father	Groom's father	Bride's father	Groom's father
Bourgeoisie	1.00	1.00	1.00	1.00
Petty Bourgeoisie	0.71	0.71	0.60	0.54
Coordinator	0.82	0.74	0.69	0.59
Routine White Collar	0.70	0.72	0.64	0.58
Skilled Manual	0.38	0.23	0.39	0.27
Semi-skilled manual	0.28	0.00	0.26	0.12
Unskilled manual	0.00	0.08	0.00	0.00

(Note that Φ for the RC(1) model is 6.94 and Φ for the quasi-RC(1) model is 3.49, with the RC(1) model having the form $\log(F_{ij}) = \alpha_i+\beta_j+\Phi v_i v_j$).

TABLE 4/5: Losses of information through the aggregation of categories in Table 4/1 (Strict Collapsibility test statistics).

Partition	Loss of information
(1)(2-6)(7)	117.7 on 32 d.f.
(1)(2-4)(5-7)	81.1 on 32 d.f.
(1-4)(5-6)(7)	62.8 on 32 d.f.

It could be argued that by including parameters for the leading diagonal one is dividing into two 'portions' the cleavages between the 'extreme' classes and the other classes, and hence over-emphasising the relative significance of the third cleavage. However, the row and column scores for Model 1 (see Table 4/4) suggest that this is not the case.

Furthermore, Table 4/5 shows the losses of information (i.e. the Strict Collapsibility test statistics) resulting from three different aggregations of the seven classes which each 'reduce' the 7x7 table to a 3x3 table. It can be seen that the two aggregations which retain a non-manual/manual cleavage result in a smaller loss of information than the aggregation suggested by Penn and Dawkins (see Penn and Dawkins, 1983; p515).

The loss of information resulting from an aggregation when measured in this way is related to the size of the categories being aggregated. Thus, all other things being equal, less information is lost by the aggregation of the bourgeoisie with other classes than would be the case with any of the other classes, simply because of the small marginal frequencies corresponding to the bourgeoisie. However, it is clear from Tables 4/4 and 4/5 that though Penn and Dawkins are correct to identify class cleavages between the bourgeoisie and the other classes and between the unskilled manual working class and the other classes, a cleavage of comparable or greater magnitude exists between the three manual classes and the other four classes. The data would seem to suggest a four-class class structure rather than the three-class class structure which Penn and Dawkins propose.

3.2. Collapsing a 36x36 table of husbands' and wives' social origins

In order to obtain a clear and detailed view of the structure underlying patterns of assortative marriage for social origin one needs to examine a table based on social origin categories which are reasonably internally homogeneous. However, the larger the number of categories there are in a table's margins the more cells the table has and the more sparsely the cases are spread across it!

The 1972 Oxford Mobility Survey has husbands' and wives' fathers' occupations coded into 124 occupational categories which can be aggregated into 36 Hope-Goldthorpe categories, which in turn can be aggregated into 7 Goldthorpe classes. The 36x36 table of husbands' and wives' fathers' Hope-Goldthorpe categories based on the OMS sample is the table which was analysed using correspondence analysis in Section 2

of the Appendix to Chapter 2. This table is analysed again in this section, since it seems reasonable to assume that the Hope-Goldthorpe categories are adequately internally homogeneous.

While basing the table on a relatively large number of occupational categories may avoid an unnecessary loss of detail, analysing a 36x36 table would seem to be pointless if the information in this table can be adequately represented by a table based on a smaller number of categories. Hence before fitting models to a 36x36 table it would seem sensible to check whether substantively reasonable aggregations of categories can be found which do not result in a significant loss of information (see Section 4 of Chapter 2).

Since the 'exact' homogamy evident in the diagonal cells of the table is an important part of assortative marriage, there would seem to be no justification for using Collapsibility rather than Strict Collapsibility (see Section 2 of this chapter) as a test of whether a particular set of aggregations results in the loss of a significant amount of information.

Frankel (1989) has produced software (called 'PORSC') which can be used to examine the losses of information when a table is collapsed in various ways. One of the features of the software is that it can produce empirically the partition of the categories which minimises the Strict Collapsibility test statistic given that the collapsed table is to have a specific number of categories.

However, a major objection to collapsing a table entirely empirically is that two substantively dissimilar categories may superficially appear similar through sampling error.

It is also questionable whether one should use a single test statistic to test the loss of information through several aggregations of categories. A significant loss of information resulting from the combination of two categories may be hidden from view by being considered simultaneously with negligible losses of information resulting from the combination of other categories.

A cautious approach to collapsing tables, used here, is the examination one by one of a series of substantively plausible aggregations of two categories (or aggregates of categories) into a single category. This has the dual advantages of ensuring sensible aggregates and making certain that no aggregations of significantly different categories occur. (It is, however, possible that two 'significantly different' categories might end up in the same aggregate

as the result of the aggregation of two aggregates, each of which contained one of these two categories). Thus the process of collapsing the 36X36 table under consideration here consists of the reduction of the number of categories one by one by aggregating pairs of categories, or aggregates of categories, with the Strict Collapsibility test statistic for each aggregation being non-significant. (There is no absolute reason why the same categories should be simultaneously aggregated in both margins of the table; this is done here simply to retain a symmetric table with the same categories for each sex).

Several sensible combinations of categories suggested themselves when the descriptive titles of the 36 Hope-Goldthorpe categories were considered (Goldthorpe and Hope, 1974; pp134-143). The first set of aggregations considered only involved the aggregation of categories which belonged to the same one of the seven Goldthorpe classes. Most of the aggregations considered met the Strict Collapsibility criterion, and hence were carried out, and the steps by which the number of categories was reduced from 36 to 28 are given in Table 4/6A.

Frankel's software adds a small constant to any zero cells before collapsing a table in accordance with comments made by Clogg and Eliason (1987). In fact this approach appears to increase the probability of aggregations meeting the Strict Collapsibility criterion, and was therefore not adopted here.

Tables 4/6A and 4/7 show that at this stage only categories with similar descriptive titles (e.g. 'professionals'; 'managers'; 'skilled manual workers in manufacturing') were aggregated. A few of the aggregations considered did not meet the Strict Collapsibility criterion, or had values for the test statistic which were close to significance at the 5% level, and were for this reason ignored.

The next set of aggregations considered involved the aggregation of categories with similar titles belonging to different Goldthorpe classes, and the aggregation of categories belonging to the same Goldthorpe class but with dissimilar descriptive titles. Some of the more 'obvious' aggregations did not meet the Strict Collapsibility criterion (i.e. the aggregation of the two grades of 'Administrators and officials'; that of the two grades of 'Technicians'; and that of 'Large' and 'Small' proprietors). The number of categories was reduced from 28 to 20 by the series of steps shown in Table 4/6B.

TABLE 4/6: Collapsing a 36x36 table of the Hope-Goldthorpe categories of the social origins of husbands and wives.

TABLE 4/6A

Categories to be aggregated	Deviance of aggregated table	d.f.	Change in deviance	d.f.
-----	2758.2	1225	----	--
1 + 2	2681.7	1156	76.5	69
9 + 10	2614.0	1089	67.7	67
8 + 14	2548.3	1024	65.7	65
12 + 16	2494.7	961	53.6	63
25 + 28	2438.1	900	56.6	61
19 + 29	2388.6	841	49.5	59
(19 +29) + 36	2332.6	784	56.0	57
22 + 30	2277.9	729	54.7	55

TABLE 4/6B

Categories to be aggregated	Deviance of aggregated table	d.f.	Change in deviance	d.f.
(1+2) + (9+10)	2218.1	676	59.8	53
4 + (8+14)	2164.1	625	54.0	51
(12+16) + 21	2116.9	576	47.2	49
(4+8+14) + 5	2083.3	529	33.6	47
(1+2+9+10) + 3	2034.3	484	49.0	45
(1+2+3+9+10) + 7	1984.5	441	49.8	43
32 + 35	1945.7	400	38.8	41
26 + 33	1912.8	361	32.9	39

TABLE 4/6C

Categories to be aggregated	Deviance of aggregated table	d.f.	Change in deviance	d.f.
(22+30) + 18	1863.4	324	53.9	37
17 + 20	1816.5	289	46.9	35
(25+28) + 34	1771.8	256	44.7	33

Isolation of Hope-Goldthorpe category 7:

-------	1799.2	289	+27.4	+33

TABLE 4/7: The 18 aggregates of the 36 Hope-Goldthorpe categories used to reduce a 36x36 table of the Hope-Goldthorpe categories of husbands' and wives' social origins to an 18x18 table.

1). 1: Self-Employed Professionals (Higher)
2: Salaried Professionals (Higher)
3: Administrators and Officials (Higher)
9: Self-Employed Professionals (Lower)
10: Salaried Professionals (Lower)

2). 4: Industrial Managers: Large Enterprises
5: Administrators and Officials (Lower)
8: Industrial and Business Managers: Small Enterprises
14: Managers in Services and Small Administrative Units

3). 6: Technicians (Higher)

4). 7: Large Proprietors

5). 11: Farmers and Farm Managers

6). 12: Supervisors of Non-manual workers (Higher)
16: Supervisors of Non-manual workers (Lower)
21: Non-manual workers in Administration and Commerce

7). 13: Small Proprietors

8). 15: Technicians (Lower).

9). 17: Supervisors of Manual Employees (Higher)
20: Supervisors of Manual Employees (Lower)

10). 18: Skilled Manual Workers: Manufacturing: Higher
22: Skilled Manual Workers: Manufacturing: Intermed.
30: Skilled Manual Workers: Manufacturing: Lower

11). 19: Self-Employed Workers (Higher)
29: Self-Employed Workers (Intermediate)
36: Self Employed Workers (Lower)

12). 23: Skilled Manual Workers: Construction

13). 24: Smallholders without Employees

14). 25: Service Workers (Higher)
28: Service Workers (Intermediate)
34: Service Workers (Lower)

15). 26: Semi-Skilled Workers: Manufacturing
33: Semi-Skilled Workers: Transport, Communication and Services

16). 27: Skilled Manual Workers: Transport, Communication, Services and Extraction

17). 31: Agricultural Workers

18). 32: Semi-Skilled Workers: Construction and Extraction
35: Unskilled Manual Workers

The number of categories was further reduced to 17 by the steps shown in Table 4/6C. These steps produce Strict Collapsibility test statistic values which are not significant but which are close to significance at the 5% level.

Since the 'Small proprietors' category was not combined with any other during the aggregation process, it seemed sensible to consider the 'Large proprietors' category as an individual entity as well. Thus the collapsed version of the 36x36 table which was chosen for further analysis was the 18x18 table defined by the aggregates of categories given in Table 4/7.

3.3. Modelling the collapsed version of the 36X36 table of husbands' and wives' social origins.

The first model that was fitted to the 18X18 table of husband's father's occupation by wife's father's occupation was Goodman's RC(1) association model. This model (Model 1) would have fitted the data well had the pattern of assortative marriage in the table been just the result of a single underlying dimension. To have expected this would, however, have been naive given the types of models which have been found necessary to fit social mobility tables adequately (for example see Hout, 1983). In fact Model 1 has a deviance of 911.8 on 256 degrees of freedom, which represents a considerable reduction from the deviance corresponding to the independence model (1799.2 on 289 degrees of freedom), but which still leaves much of the pattern of assortative marriage unexplained.

Of the absolute standardised residuals from Model 1, 55 out of 324 are greater than 2.0. This includes 16 out of the 18 residuals corresponding to cells on the table's leading diagonal. There is nothing surprising about this, as it simply reflects a specific tendency for spouses to be 'exactly' homogamous with respect to father's occupation, i.e. for the two father s to have had similar enough jobs for them to both fall into the same occupational category. It is not immediately obvious whether this is a result of preference or of social/geographical constraints, though one would suspect the latter.

To take account of this 'exact' homogamy, a model (Model 2) consisting of the RC(1) model plus parameters to fit the leading diagonal cells exactly (i.e. the quasi-~~RC~~RC(1)(2) model) was fitted to the data. The deviance of Model 2 is 427.8 on 238 degrees of freedom. Once again, this model represents a considerable improvement on the preceding one, but it still does not fit the data at all well.

Fitting the diagonal cells exactly may have detrimental effects on the row and column scores. In the absence of any particular tendency towards 'exact' homogamy the diagonal cells would by no means be empty, and one might therefore consider cases in the leading diagonal to be either 'stayers' or 'movers', where 'stayers' purposefully marry someone from an 'exactly' similar background, and 'movers' marry someone according to a set of 'rules' which do not differentiate between an individual's precise social origin and social origins of comparable social status. Fitting the diagonal cells exactly may 'bias' the row and column scores by making them over-dependent on the off-diagonal cells, e.g. the scores for the 'professional' social origin category may become closer to 'average' than they should be, due to an under-emphasis on couples where both partners are of professional social origins. (1268 [17%] of the sample are in the cells of the leading diagonal).

The residuals from the last model (Model 2) suggest that a further improvement to the model could easily be made. Of the 18 standardised residuals with magnitude greater than 2.0, six residuals (including the three largest) corresponded to the off-diagonal cells relating to couples who are not 'exactly' homogamous, but <u>are</u> homogamous in the sense that both partners come from agricultural social origins. Hope (1972) also found this tendency towards agricultural endogamy, which one would presume is largely the result of geographical/social constraints rather than of personal preference. Once again one should be wary of the consequences of fitting cells exactly, since of the 907 marriages involving at least one spouse from an agricultural background, 132 (15%) are on the leading diagonal and 201 (22%) are agriculturally endogamous. It would not seem entirely reasonable to assume that agricultural endogamy/exogamy is unrelated to social status, so placing too much emphasis on exogamous marriages may seriously bias the row and column scores for the agricultural categories.

Fitting all the cells corresponding to agricultural endogamy exactly gives a new model (Model 3) with a deviance of 330.4 on 232 degrees of freedom. At this stage the residuals ceased to be of much help, since though for example there would seem to be a substantively interpretable tendency for individuals from categories 10 and 15 to marry each other (standardised residuals of 2.59 and 1.60), it is difficult to tell whether this is not simply a piece of substantively interpretable noise in the data! The poor fit of Model 3 suggests that there is something left to explain which is not noise, but it is also

possible that excess deviance has arisen as a consequence of the design of the OMS sample.

The most obvious way forward is to add another dimension to the model, i.e. to fit a Goodman's RC(2) model plus parameters to fit the leading diagonal and agriculturally endogamous cells exactly. The resulting model (Model 4) has a deviance of 246.8 on 201 degrees of freedom, i.e. the change in deviance was 83.6 on 31 degrees of freedom. The addition of a third dimension results in a model (Model 5) with a deviance of 188.6 on 172 degrees of freedom, a change in deviance from Model 4 of 58.2 on 29 degrees of freedom.

As reported in Chapter 2, changes in deviance through the addition of extra dimensions cannot easily be tested for significance. However, Table 4/8 shows the deviance of all the models fitted above, and it can be seen that only Model 5 fits the data adequately (at a 5% level of significance), which implies that the underlying structure in the data, excluding the 'exact' homogamy and agricultural endogamy, needs to be represented by at least three dimensions. It is by no means impossible that adding even further dimensions would significantly improve the fit of the model.

If rather than using the deviance one were using the BIC criterion (proposed by Raftery, 1986) to select a model, one would choose the model including only <u>one</u> underlying dimension (Model 3). It will be shown later that there is sufficient symmetry between the row and column scores of the first <u>two</u> dimensions to suggest that using BIC in this way leads to selecting a model which is <u>too</u> parsimonious. On the other hand, the values of the BIC statistic for the various models do suggest that more parameters than are necessary are being estimated. To an extent this is the inevitable consequence of adding dimensions which can each involve losing near enough a degree of freedom per marginal category.

It seems likely that many of the row scores and/or column scores could ~~can~~ be set equal without worsening the fit of the model. Such an approach is suggested by Goodman (1986). However, setting scores equal on a post-hoc basis seems of dubious value. Hout (1982; 1983) analysed a table of husbands' and wives' occupations and found that the quasi-RC(1) model did not fit his data significantly better than a model where the row score and the column score for each occupational category were set equal (this model being referred to by Hout as Quasi-Homogeneous-Model II). If one believes that the 'social meaning' of belonging to a particular occupational category is the same for each sex then setting the scores equal is simply a sensible way of obtaining a more

parsimonious model. However, if one believes that there may be subtle differences in the 'social meaning' for each sex of belonging to some occupational categories then one should remember that a comparison of the fit of two models in one of which the scores are set equal and in one of which they are not is a test of the 'global' equivalence of the row and column scores of all the occupational categories, and that a 'global' test of this sort may mask differences between a small number of pairs of categories.

Table 4/9 shows the row and column scores obtained from Model 5. The row and column scores for the first dimension have broadly similar orderings, with the categories differing most in rank being category 8 (Lower Technicians) and category 13 (Smallholders). Category 3 (Higher Technicians) has rather different row and column scores. The ordering of the other pairs of scores is intuitively reasonable, with categories 1, 2, 4 and 5 at one extreme, followed by categories 6 and 7, followed at a distance by categories 9, 11 and 14, followed by categories 10, 12, 15, 16 and 17, with category 18 being at the other extreme. This crude set of groupings is consistent with the usual schema of a 'Service' class, a 'Working' class, and one or more 'Intermediate' classes. In the male case, categories 8 and 13 seem to belong to the 'Working' class while in the female case they seem to belong to the 'Intermediate' classes. Category 3 clearly belongs to the 'Service class' in the male case, but is more akin to categories 6 and 7 in the female case.

It should be noted that categories 3, 13 and 8 are the smallest, third smallest and fourth smallest categories respectively. One should therefore be cautious of reading too much into differences between their row and column scores. An examination of the row and column scores for the second and third dimensions suggests that these extra dimensions may be related to specific properties of these three categories, since some of the most extreme scores on these dimensions correspond to them.

The row and column scores for the second dimension show some degree of symmetry. In each case, the two categories of technicians and the routine non-manual category (category 6) have scores at/towards one extreme. However, the row and column scores for the third dimension show few signs of symmetry. If anything, the categories whose third dimension scores catch one's eyes most are the same ones as before, i.e. categories 3, 6, 8 and 13, though in addition to this categories 2, 5 and 16 each have an extreme value in one of the sets of scores.

The ordering of the row and column scores for the first dimension differs very little between Models 3 and 5, with the scores remaining

consistent with the crude set of groupings given earlier. Only category 8 in the male case changes rank by more than one place. However, there are considerable differences between the models in the row and column scores for the second dimension. This is, perhaps, unsurprising given the Φ_k coefficients for the three dimensions (given in Table 4/9). There appears little to choose between the second and third dimensions in terms of their contributions to the fit of the model.

Clearly interpreting the row and column scores for the second and third dimensions is not straightforward. Various plausible substantive differences between categories which might be reflected in these dimensions come to mind fairly easily: educational differences, urban/rural differences in the occupational structure, possibly even differences in employment status.

One approach to clarifying the 'meaning' of the second and third dimensions is to re-examine the residuals of the 'unidimensional model' (Model 3), paying particular attention to the residuals corresponding to the categories which appeared important in the context of the second and third dimension row and column scores. In fact, what an examination of the residuals makes clear is that part of the gain in fit resulting from the addition of the second and third dimensions is due to the second dimension 'dealing' with the largest standardised residual and both the second and third dimensions 'dealing' with the second largest standardised residual.

However this does not deny that the patterns of scores for the second and third dimensions are of significance. One possibility is that the agricultural endogamy noted in the data is simply one part of a more general 'urban/rural dimension', and that treating the agricultural endogamy separately confuses the issue (see Sections 2.9 and 2.10 of Chapter 2). On this basis the quasi-RC(2) model (Model 6) was fitted to the data. This model was found to have a deviance of 266.4 on 207 degrees of freedom. Thus taking account of the agricultural endogamy after fitting a second underlying dimension results in a change in deviance of 19.6 on 6 degrees of freedom as compared to a change of 97.4 on 6 degrees of freedom when agricultural endogamy was 'dealt with' first. The fact that the second dimension when fitted first accounts for most of the 'non-exact' agricultural homogamy is unsurprising, but as suspected the second dimension row and column scores for categories 3, 6 and 8 obtained from Model 6 show that the pattern of agricultural endogamy is largely part of a more general 'urban/rural' division. The scores for category 10 (and to some extent category 15) indicate that

the children of manufacturing workers lean towards the 'urban' part of this division, which seems intuitively reasonable.

It seems likely that this model can be improved upon, since Model 5 has a deviance of 77.8 less for the loss of only 35 degrees of freedom, so once again a third dimension was added to the model. The deviance of the resulting model (Model 7) is 211.1 on 178 degrees of freedom, a change of 55.5 on 29 degrees of freedom. However, Model 7 has a deviance which differs from that of Model 5 by 22.5 on 6 degrees of freedom. The row and column scores for the third dimension suggest that its primary functions are to deal with one of the large residuals from Model 6 (a residual corresponding to husbands from category 2 and wives from category 16), and to deal with further idiosyncrasies of the two technician categories (see Table 4/10). Once again, it is possible that one is modelling variation which has more to do with the sample design than with 'genuine' relationships in the population.

What conclusions can one draw from the above models? Firstly, it is clear that the 'strongest' dimension underlying the data is one which appears to be related to social status, though the crude set of groupings of the 18 occupational categories appears to have as much or more in common with the Goldthorpe class schema as it does with the values of the Hope-Goldthorpe scale. Secondly, it is clear that 'exact' homogamy of social origin is particularly common, though the strength of the tendency towards 'exact' homogamy varies between social origin categories. Thirdly, it is clear that agricultural endogamy and what might be interpreted as a more general 'urban/rural' divide are responsible for some of the remaining structure in the table.

It is not impossible that there are other substantively interesting aspects of the structure of the data which are present in the second and third dimension scores but which are not striking enough to force this author to interpret them. Perhaps what is most important for one to learn from the above models is that human geography appears to be playing an important role in determining the patterns observed in the data.

The sets of row and column scores for the second and third dimensions of the preceding model are dominated by extreme scores for the agricultural and technician categories. It is not really clear whether the other categories differ in any way other than according to the 'main' underlying social status dimension. Models were therefore fitted to the 13x13 table obtained by excluding the agricultural and technician categories. The leading diagonal cells were fitted exactly in

all three models used; with the models being quasi- RC(1), quasi-RC(2) and quasi-RC(3) models respectively. The quasi-RC(2) model fitted the data adequately while the quasi-RC(1) model did not demonstrating that the thirteen categories considered could not be adequately represented by a single underlying dimension (see Table 4/11). However, the row and column scores for the second dimension of the quasi-RC(2) model were not readily interpretable.

The underlying structure of the 18x18 table clearly cannot all be explained in terms of 'exact' homogamy, an underlying 'social status' dimension, and rural/agricultural/urban differences. However, the remaining variation does not appear to be easy to summarize, and one should remember that with large sample sizes, substantively 'small' effects can cause a model which adequately summarises the major features of the data not to fit the data.

Once again, it is possible that some of the remaining variation reflects over-dispersion.

Figures 4/1 and 4/2 are plots of the first and second dimension row and column scores from Model 7 (see Table 4/10; plotted values in Figures 4/1 and 4/2 are scaled by $\sqrt{\Phi_1}$ and $\sqrt{\Phi_2}$).

TABLE 4/8: Deviances of models of an 18x18 table of husbands' and wives' social origins (data from the 1972 Oxford Mobility Survey).

Model:	Contents:	Deviance:	d.f.	P	BIC
	Independence	1799.2	289	<0.001	-776
1	RC(1)	911.8	256	<0.001	-1369
2	Quasi-RC(1)	427.8	238	<0.001	-1693
3	Quasi-RC(1) + agric	330.4	232	<0.001	-1737
4	Quasi-RC(2) + agric	246.8	201	<0.05	-1544
5	Quasi-RC(3) + agric	188.6	172	>0.05	-1344
6	Quasi-RC(2)	266.4	207	<0.01	-1578
7	Quasi-RC(3)	211.1	178	<0.05	-1375

agric is a set of parameters to fit agricultural endogamy exactly.

BIC is deviance minus $d\log_e n$, where d is the number of degrees of freedom and n is the sample size.

TABLE 4/9: Row and Column Scores, etc. from Model 5: Table analysed is an 18x18 table of husbands' and wives' social origins (data from the 1972 Oxford Mobility Survey).

	Row Scores			Column Scores			Diagonal
	Dim 1	Dim 2	Dim 3	Dim 1	Dim 2	Dim 3	P.E.'s
Category:							
1	-2.43	0.25	-0.17	-2.17	-0.26	0.57	0.13
2	-1.50	1.47	2.11	-1.45	0.11	-0.29	0.36
3	-2.00	0.70	-0.50	-0.99	1.47	-1.50	1.49
4	-2.36	-1.73	-1.97	-2.33	-1.31	0.77	1.16
5	-1.33	-2.57	-0.96	-1.29	-0.23	1.90	2.34
6	-0.99	1.00	-1.36	-0.97	1.30	-1.68	0.09
7	-0.83	-1.67	1.09	-0.87	-0.28	-1.27	0.67
8	0.43	3.82	-2.25	-0.59	1.59	0.17	0.27
9	0.03	0.49	1.12	-0.32	-0.23	-0.04	0.34
10	0.70	0.30	-0.23	0.36	0.57	-0.76	0.35
11	0.17	-0.65	-0.02	-0.20	0.04	-0.51	0.17
12	0.25	-0.60	-0.82	0.29	0.15	1.06	0.49
13	0.83	0.47	1.93	-0.56	-5.11	1.18	4.08
14	0.24	0.77	0.09	0.00	-1.48	0.51	0.61
15	0.43	0.32	-0.39	0.68	-0.15	-0.29	0.19
16	0.57	-0.91	-1.27	0.83	1.27	1.98	2.01
17	0.85	0.01	0.34	0.53	0.19	0.86	2.03
18	1.32	-0.63	1.24	1.72	-1.23	-0.68	-0.06

Φ_k coefficients:

Dimension 1: 0.299
2: 0.133
3: 0.110

Agricultural endogamy parameter estimates

0.02
1.74
1.46
2.20
1.13
1.52

Diagonal P.E.'s and agricultural endogamy parameter estimates correspond to the parameters used to fit some of the cells in the table exactly.

TABLE 4/10: Row and Column Scores from Model 7: Table analysed is an 18x18 table of husbands' and wives' social origins (data from the 1972 Oxford Mobility Survey).

	Row Scores			Column Scores			Diagonal
	Dim 1	Dim 2	Dim 3	Dim 1	Dim 2	Dim 3	P.E.'s
Category:							
1	-2.58	-0.49	0.60	-2.31	-0.21	0.77	-0.24
2	-1.34	0.29	1.38	-1.38	-0.01	-0.48	0.45
3	-1.82	-1.60	1.29	-0.93	-2.64	-1.59	1.36
4	-2.26	-0.24	-1.90	-2.18	0.83	0.17	1.46
5	-1.22	1.94	-2.82	-1.10	2.28	1.88	1.99
6	-0.89	-0.76	-1.11	-0.89	-1.52	-0.62	0.32
7	-0.81	1.24	0.27	-0.83	-0.06	-1.56	0.65
8	0.30	-2.10	-2.15	-0.65	-0.52	1.20	1.09
9	0.02	-0.12	1.25	-0.30	0.02	-0.38	0.39
10	0.67	-0.73	0.59	0.36	-1.00	-0.20	0.29
11	0.18	0.40	-1.54	-0.16	0.47	-1.55	-0.10
12	0.29	0.00	-1.44	0.29	0.22	0.73	0.49
13	0.37	4.99	0.98	-0.40	4.50	-0.81	-0.01
14	0.20	-0.43	0.22	0.00	0.52	0.00	0.49
15	0.42	-0.60	-0.12	0.66	-0.34	0.23	0.18
16	0.71	-0.17	-0.61	0.74	0.24	1.92	1.61
17	0.61	1.66	0.36	0.37	2.00	-1.98	1.50
18	1.36	0.75	0.42	1.78	0.38	-0.59	-0.14

Φ_k coefficients:

Dimension 1: 0.308
2: 0.165
3: 0.102

Diagonal P.E.'s correspond to the parameters used to fit the cells in the leading diagonal of the table exactly.

TABLE 4/11: Deviances of models of a 13x13 table of husbands' and wives' social origins (data from the 1972 Oxford Mobility Survey).

Model:	Deviance:	d.f.:	
Quasi-RC(1)	136.8	108	(P<0.05)
Quasi-RC(2)	93.9	87	(P>0.05)
Quasi-RC(3)	60.1	68	(P>0.05)

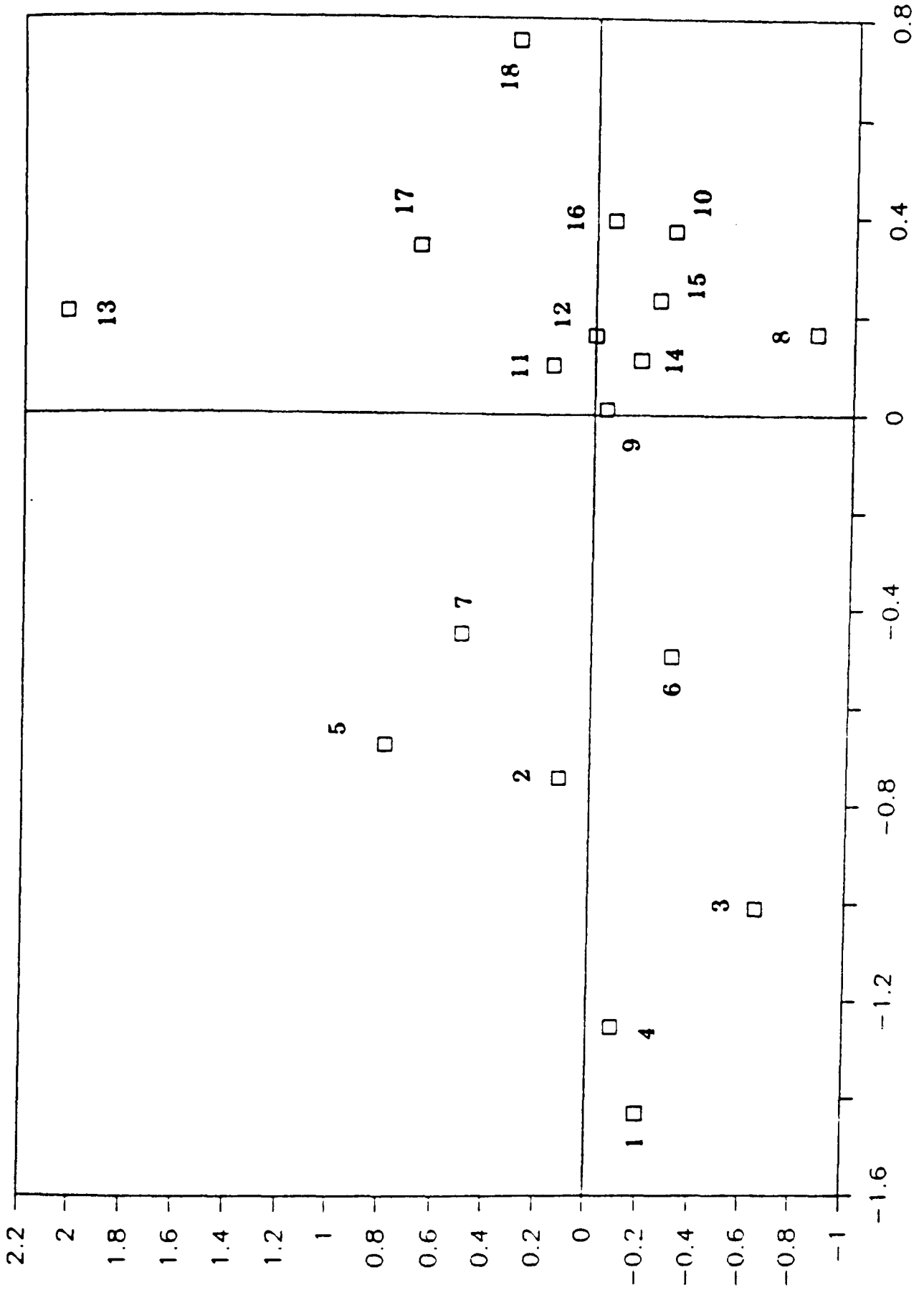


FIGURE 4/1: Display of first and second dimension row scores from a model (Model 7) of an 18x18 table of husbands' and wives' social origins: data from the 1972 Oxford Mobility Survey (see Table 4/7 for a description of the categories used)

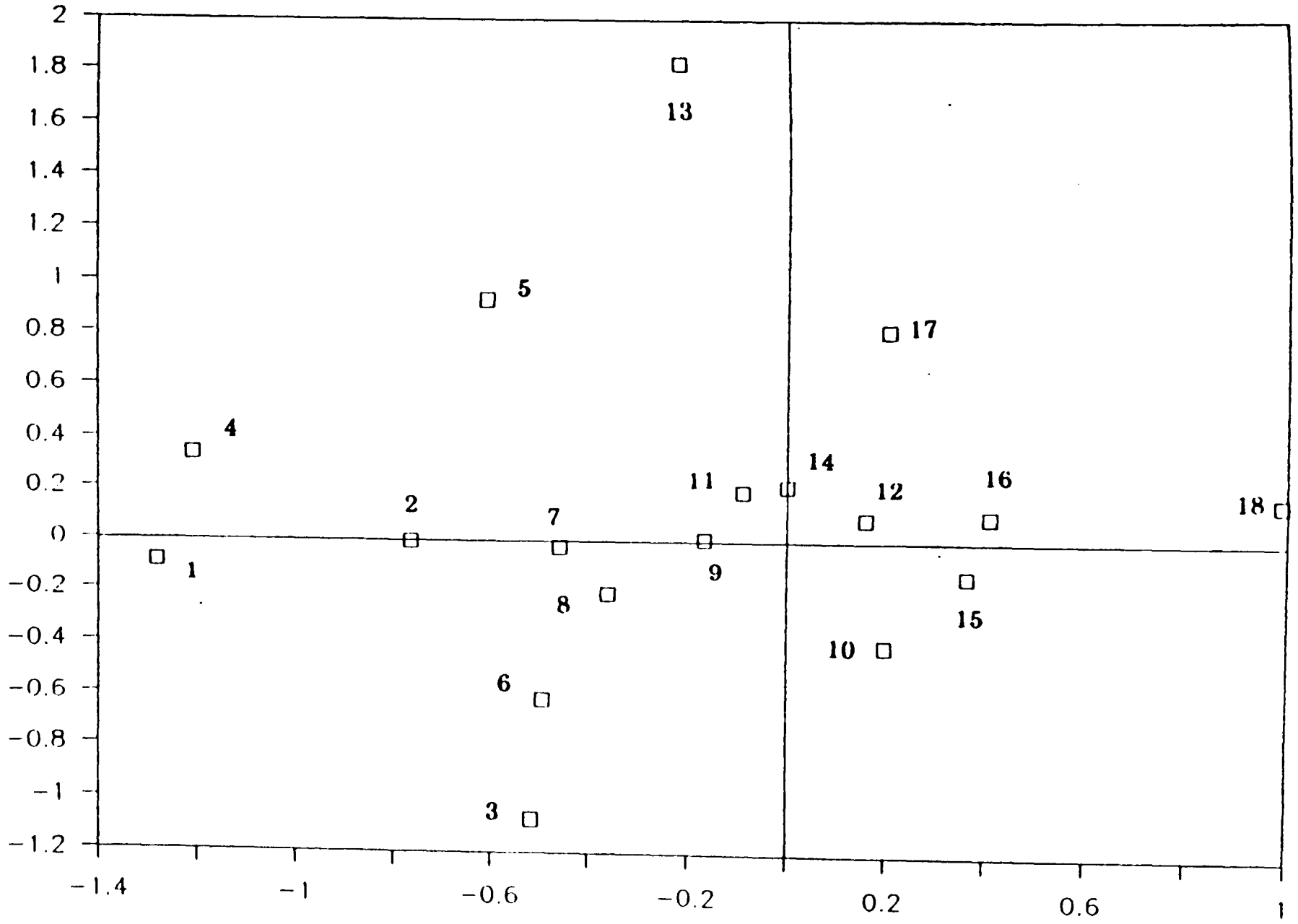


FIGURE 4/2: Display of first and second dimension column scores from a model (Model 7) of an 18x18 table of husbands' and wives' social origins: data from the 1972 Oxford Mobility Survey (see Table 4/7 for a description of the categories used)

3.4. Between-cohort changes in assortative marriage for social origin: an analysis of data from the 1972 Oxford Mobility Survey

Goldthorpe (1987) examined changes between cohorts in patterns of intergenerational occupational mobility in England and Wales by fitting log-linear models to a three-way table of father's Goldthorpe class by son's Goldthorpe class by cohort. He concluded from his analysis that there had been little change in 'relative' social mobility (i.e. mobility that could not be explained by changes between cohorts in the occupational structure).

However, as noted earlier, Berent (1954) found that the extent of social origin endogamy in England and Wales declined in the first half of the twentieth century. If one views social origin endogamy as a measure of the strength of the class structure in a similar fashion to the way in which sociologists view religious and ethnic endogamy as measures of the strength of religious and ethnic differences (e.g. Blau et al, 1984; Blum, 1985), then Berent's finding suggests that the salience of social status in the context of social relations may have changed. (Berent's finding is confirmed by a re-analysis of his data using log-linear models in the appendix to this chapter).

In this section Oxford Mobility Survey data are analysed to see whether Berent's finding can be extended to the post-war period. The same sample of couples is used as was analysed in the last section, but the categories used in this analysis are the seven Goldthorpe classes. It seemed more sensible to use the Goldthorpe classes as social origin categories rather than aggregations of the 18 categories in Table 4/7, because Goldthorpe classes are familiar 'tools' for the sociologist studying social stratification and because their use makes the analysis as similar as possible to Goldthorpe's analysis of changes in intergenerational occupational mobility.

The sample of couples obtained from the Oxford Mobility Survey was divided into four broad cohorts according to the husband's age (20-34, 35-44, 45-54 and 55-64; see Table 4/12). Clearly all of the variation in social origin homogamy/heterogamy between these cohorts cannot necessarily be attributed to birth cohort, since the older cohorts will have been 'worn down' by death, separation, divorce and emigration, but will also have been 'built up' by remarriages and immigration.

TABLE 4/12: Husband's father's Goldthorpe class by wife's father's Goldthorpe class by husband's age: data from the 1972 Oxford Mobility Survey

Husband's father's class	Husband's age	Wife's father's class I	II	III	IV	V	VI	VII
I	20-34	43	26	10	28	18	33	30
	35-44	34	17	9	16	10	17	16
	45-54	30	14	7	17	10	15	14
	55-64	28	9	8	15	11	11	7
II	20-34	27	18	16	17	16	26	28
	35-44	14	6	11	13	12	16	14
	45-54	9	15	9	17	8	12	14
	55-64	9	7	5	13	4	23	16
III	20-34	20	14	15	15	23	41	49
	35-44	17	8	14	16	14	30	38
	45-54	7	9	11	16	12	34	23
	55-64	9	10	14	23	15	29	18
IV	20-34	27	28	27	61	24	63	55
	35-44	14	15	21	75	15	43	43
	45-54	14	19	12	81	33	49	53
	55-64	21	14	16	74	25	55	58
V	20-34	18	14	27	19	42	51	57
	35-44	13	11	13	29	37	36	43
	45-54	13	6	11	28	16	43	42
	55-64	11	7	11	30	21	23	27
VI	20-34	34	38	47	45	94	209	161
	35-44	22	24	22	50	64	165	151
	45-54	14	23	36	84	58	197	134
	55-64	14	25	28	52	72	225	132
VII	20-34	22	24	30	53	75	170	157
	35-44	16	14	29	55	58	145	184
	45-54	19	14	36	88	48	160	172
	55-64	7	17	22	51	29	149	174

Furthermore the youngest cohort does not yet contain a large number of couples which will later be formed by the marriage of as yet unmarried respondents aged 20-34. Finally, all those couples for whom either husband's social origin or wife's social origin was missing were excluded.

The table to be analysed (husband's father's class by wife's father's class by husband's age cohort) thus consisted of 7x7x4=196 cells. A log-linear model consisting of the three main effects plus the interactions between husband's social origin and cohort, and between wife's social origin and cohort was initially fitted (Model 1; see Table 4/13), and then various more complicated models were fitted in an attempt to find a parsimonious representation of the interaction between husband's social origin and wife's social origin (see Section 1.2 of the Appendix to Chapter 2).

The results in the previous section and previous research (e.g. by Hope, 1972) suggest that two primary forms of assortative marriage for social origin might be present, i.e. a positive correlation between the social statuses relating to the spouses' social origins, and an additional tendency towards 'exact' homogamy, i.e. a greater than expected number of couples with social origins that were 'identical' given the specific class categorization used. The interaction between husband's social origin and wife's social origin was therefore represented in the more complicated models by two factors: the first one dividing the cells of the table into categories according to their 'distance' from the leading diagonal of the husband's social origin by wife's social origin sub-table, and the second one distinguishing the cells on this leading diagonal from one another and, more importantly, from the off-diagonal cells (see Table 4/14 for a diagrammatic representation of the two factors).

While most of the interaction between husband's social origin and wife's social origin could be explained by a model including both of the two above factors (Model 2), the model which fitted the husband's social origin by wife's social origin sub-table exactly (Model 3) fitted the data significantly better. This was almost certainly the result of both the complexity of the data <u>and</u> the crudity of the attempt to represent it more parsimoniously. Model 3 having been accepted as a 'base' model, attention was now turned to testing for differences between cohorts in the pattern of assortative marriage for social origin.

In order to test for trends in homogamy a parsimonious representation of the three-factor interaction was needed. To this end

the factors shown in Table 4/14 were used again, this time in interactions with cohort. Model 4 includes the interaction between the first factor and cohort, and Model 5 contains the interaction between the second factor and cohort. Both models can be seen to fit the data significantly better than Model 3. Attempts were made to represent these interactions parsimoniously; Model 6 is equivalent to Model 4 except that the first factor was treated as a variate, and it can be seen that Model 4 does not fit the data significantly better than Model 6. An attempt to be more parsimonious by reducing the second factor to a dichotomy between on and off-diagonal cells produced a model which fitted the data significantly worse than Model 5.

A model more parsimonious than Model 5 was, however, produced (Model 7). This model was obtained by treating cohort as a variate in the interaction between the second factor and cohort.

While both the interaction between the first factor and cohort and between the second factor and cohort could be used separately to produce better models than Model 3, when Model 6 and Model 7 were combined to give Model 8 it was found that this Model was neither a significant improvement on Model 7 nor on Model 6. Clearly, some of the change in fit between Model 3 and Model 6 and of the change in fit between Model 3 and Model 7 'overlaps'. (This is unsurprising when one realises that the first factor is an approximate measure of the extent of the social origin difference between spouses and that the second factor is in part an 'exact' homogamy/heterogamy dichotomy; see Section 2.9 of Chapter 2).

The parameter estimates for Models 6, 7 and 8 which correspond to the above interactions show the way in which the interactions 'overlap' (see Table 4/15). The changes in the estimates for the parameters common to Models 7 and 8 are uniformly negative (when the off-diagonal cell category's estimate is fixed at zero in both models). Similarly the changes in the estimates for the parameters common to Models 6 and 8 are all negative (with the oldest cohort's estimate fixed at zero in both models).

The overlap between the two interactions can therefore be seen to be associated with a trend towards increased social origin heterogamy.

TABLE 4/13: Description of Models 1, 2 and 3 as fitted to a table of husband's social origin by wife's social origin by husband's age cohort (data from the 1972 Oxford Mobility Survey)

Model 1:

$$\log m_{ijk} = u_i + u_j + u_k + u_{ij} + u_{ik}$$

Model 2:

$$\log m_{ijk} = u_i + u_j + u_k + u_{ij} + u_{ik} + v_p + w_q$$

where p is an index equal to the absolute value of (j-k)
and q is equal to j if j-k and is zero otherwise.

Model 3:

$$\log m_{ijk} = u_i + u_j + u_k + u_{ij} + u_{ik} + u_{jk}$$

where j and k are husband's social origin and wife's social origin and i is husband's age cohort

TABLE 4/14: Diagrammatic representation of two factors (v_p and w_q in Table 4/13; Model 2) used in models of a table of husband's social origin by wife's social origin (data from the 1972 Oxford Mobility Survey)

Factor 1:							Factor 2:						
1	2	3	4	5	6	7	2	1	1	1	1	1	1
2	1	2	3	4	5	6	1	3	1	1	1	1	1
3	2	1	2	3	4	5	1	1	4	1	1	1	1
4	3	2	1	2	3	4	1	1	1	5	1	1	1
5	4	3	2	1	2	3	1	1	1	1	6	1	1
6	5	4	3	2	1	2	1	1	1	1	1	7	1
7	6	5	4	3	2	1	1	1	1	1	1	1	8

The parameter estimates for Model 7 show that the extent of endogamy within the various Goldthorpe classes neither uniformly increased nor uniformly decreased across the four cohorts. One of the two categories which became more endogamous was Goldthorpe class IV, i.e. the petty bourgeoisie. At the other extreme, Goldthorpe class I shows the greatest trend towards exogamy. It may be of significance that the two increasingly endogamous classes are two of the intermediate classes.

The parameter estimates for Model 6 do not show a smooth trend. However, if one remembers the fact that the men in the second cohort are likely to have married just before, during or immediately after the Second World War it seems possible that this cohort might have been more heterogamous than social norms would otherwise have dictated.

Correctly interpreting the models fitted above is not straightforward. What <u>is</u> clear is that patterns of spouses' social origins do vary significantly between the cohorts.

3.5. Between-cohort changes in assortative marriage for social origin; a comparison of results from the 1972 Oxford Mobility Survey and from the 1973, 1979 and 1985 General Household Surveys

For comparison data from the 1973 General Household Survey (GHS) were now examined. Father's current/last occupation was recorded in this survey for married individuals aged less than 50. There was therefore an overlap of twenty-nine years between the cohorts of couples available from the two surveys. In fact the difference between the periods when the interviewing for the two surveys took place (i.e. approximately a year) is probably small enough to be negligible, and therefore the samples of couples including husbands aged between 20 and 49 in each survey were divided into six five-year cohorts (husband aged 20-24; 25-29; 30-34; 35-39; 40-44 and 45-49).

Father's occupation as recorded by the 1973 GHS was coded into Socio-Economic Groups, resulting in a problem as how to compare the data from the two surveys. The simplest solution seemed to be to restrict attention to approximately comparable subsets of the data. Therefore only Goldthorpe classes I, II, VI and VII were considered, along with SEG's 1-4,5,6,7,10,12,13,14 and 18 (see Table 4/16).

TABLE 4/15: Deviances and parameter estimates from models applied to a table of husband's social origin by wife's social origin by husband's age cohort (data from the 1972 Oxford Mobility Survey)

Model	Deviance	d.f.	Change in deviance	Model
1	1386.2	164		[HC][WC]
2	472.9	152	(1 to 2: 913.3 on 12 d.f.)	+[A][B]
3	132.6	108	(2 to 3: 340.3 on 44 d.f.)	+[HW]
4	99.4	90	(3 to 4: 33.2 on 18 d.f.)	+[HW][AC]
5	90.6	87	(3 to 5: 42.0 on 21 d.f.)	+[HW][BC]
6	114.4	105	(3 to 6: 18.2 on 3 d.f.)	+[HW][D]
			(6 to 4: 15.0 on 15 d.f.)	
7	107.4	101	(3 to 7: 25.2 on 7 d.f.)	+[HW][E]
			(7 to 5: 16.8 on 14 d.f.)	
8	101.1	98	(6 to 8: 14.3 on 7 d.f.)	+[HW][D][E]
			(7 to 8: 5.9 on 3 d.f.)	

[H] =husband's social origin
[W] = wife's social origin
[C] = husband's age cohort
[A] = First factor (see Table 4/14)
[B] = Second factor (see Table 4/14)
[D] = Interaction between cohort and first factor treated as a variate
[E] = Interaction between second factor and cohort treated as a variate

Model 6 parameter estimates: interaction between Factor 1 treated as a variate and cohort = [D].

Cohort	Estimate
1	0.094
2	0.028
3	0.054
4	0.000 (base)

P.T.O.

TABLE 4/15: (continued)

Model 7 parameter estimates: interaction between Factor 2 and cohort treated as a variate - [E].

Level	Estimate
1	0.000 (base)
2	0.297
3	0.080
4	0.170
5	-0.108
6	-0.066
7	0.057
8	0.158

Model 8 parameter estimates: Interaction between Factor 1 treated as a variate and cohort - [D].

Cohort	Estimate
1	0.047
2	-0.003
3	0.038
4	0.000 (base)

Model 8 parameter estimates: Interaction between Factor 2 and cohort treated as a variate - [E].

Level	Estimate
1	0.000 (base)
2	0.239
3	0.040
4	0.139
5	-0.126
6	-0.080
7	0.045
8	0.130

TABLE 4/16: Descriptions of Socio-Economic Groups (as recorded in General Household Surveys)

SEG	Description
1	Employers (large establishments)
2	Managers (large establishments)
3	Employers (small establishments)
4	Managers (small establishments)
5	Professionals: self-employed
6	Professionals: employees
7	Intermediate non-manual
8	Foremen supervising non-manual workers
9	Junior non-manual
10	Personal service workers
11	Manual foremen and supervisors
12	Skilled manual workers
13	Semi-skilled manual workers
14	Unskilled manual workers
15	Non-professional own-account workers
16	Farmers: managers
17	Farmers: self-employed
18	Agricultural workers

TABLE 4/17: Between-cohort trends in odds ratios corresponding to social origin endogamy (data from the 1972 Oxford Mobility Survey and the 1973 General Household Survey)

	1972 OMS			1973 GHS		
Age cohort	Odds ratio	Log-odds ratio	S.E.	Odds ratio	Log-odds ratio	S.E.
20-24	3.01	1.10	0.38	2.78	1.02	0.38
25-29	5.32	1.67	0.25	4.00	1.39	0.22
30-34	8.92	2.19	0.28	5.11	1.63	0.24
35-39	7.68	2.04	0.29	4.70	1.55	0.25
40-44	12.07	2.49	0.31	7.78	2.05	0.25
45-49	15.39	2.73	0.33	10.24	2.33	0.28
50-54	9.66	2.27	0.30	---	---	---
55-59	9.86	2.29	0.31	---	---	---
60-64	11.04	2.40	0.36	---	---	---

(Standard errors are for the log-odds ratios)

Class of origin was dichotomized in each survey (classes I and II versus classes VI and VII in the OMS, and SEG's 1-4,5,6 and 7 versus SEG's 10,12,13,14 and 18 in the GHS) and the data were thus reduced to two sets of six 2x2 tables. The odds ratios for these tables relate to the chances of heterogamous 'service class'/'working class' marriages as opposed to homogamous 'service class' or 'working class' marriages. Table 4/17 shows that the trends in the odds ratios are remarkably similar for the two surveys, notwithstanding the fact that the odds ratios for the OMS are uniformly higher than those for the GHS.

Log-linear models were fitted to the four-way table produced by simultaneously considering both sets of six 2X2 tables, and this modelling process confirmed the existence of significant differences between the odds ratios for the different cohorts. The difference in magnitude between the odds ratios of the two surveys was also found to be significant, but there was (unsurprisingly) no significant between-survey variation in the patterns of the odds ratios for the different cohorts.

The odds ratios suggest an increasing likelihood of heterogamous marriages as one moves from men aged 45-49 in 1972/73 through to men aged 20-24. Given that the similarity of the odds ratios obtained from the two surveys suggests one can have some confidence in the patterns exhibited by sets of odds ratios of this sort, it seemed possible that more could be learned about trends in assortative marriage for social origin by comparing the odds ratios from the 1973 GHS with similar odds ratios obtained from more recent General Household Surveys.

Table 4/18 shows odds ratios calculated for the same six age cohorts using data from the 1979 and 1985 General Household Surveys (the 1985 survey being the latest available). Rising ages at marriage in the 1970's/1980's mean that the youngest age cohorts contain fewer couples and also samples of couples more greatly biased towards 'early' marriages.

Broadly speaking the four sets of odds ratios seem consistent with a trend towards greater heterogamy as one moves from men born in about 1925 through to those born in about 1950. However there would appear to be a kink in this trend corresponding to men born around about 1940. While the pattern of the odds ratios can scarcely be described as 'clear-cut', and interpretation needs to be cautious, one should at least note that there is very little overlap between the odds ratios corresponding to post-1945 cohorts and those belonging to pre-1945 cohorts.

TABLE 4/18: Between-cohort trends in odds ratios corresponding to social origin endogamy (data from the 1979 and 1985 General Household Surveys)

	1979 OMS			1985 GHS		
Age cohort	Odds ratio	Log-odds ratio	S.E.	Odds ratio	Log-odds ratio	S.E.
20-24	0.93	-0.07	0.48	3.38	1.22	0.45
25-29	3.32	1.20	0.23	7.89	2.07	0.26
30-34	3.88	1.36	0.21	2.67	0.98	0.22
35-39	6.13	1.81	0.24	3.50	1.25	0.20
40-44	3.18	1.16	0.23	6.25	1.83	0.24
45-49	7.78	2.05	0.28	7.39	2.00	0.29

(Standard errors are for the log-odds ratios)

Figure 4/3 is a graph of the odds ratios from the four surveys considered. In summary it would seem reasonable to conclude that, judged by the odds ratios for tables based on the 'service class' versus 'working class' dichotomy for each spouse's father, heterogamy of social origin increased markedly from the 1930 male birth cohort (an odds ratio of about 8-12) to the 1950 male birth cohort (an odds ratio of about 3-4). This apparent increase in heterogamy may however be less a reflection of a reduction in the strength of assortative marriage for social origin overall than a reflection of a decreasing tendency for spouses to come from identical or near-identical social origins (see Section 2.9 of Chapter 2).

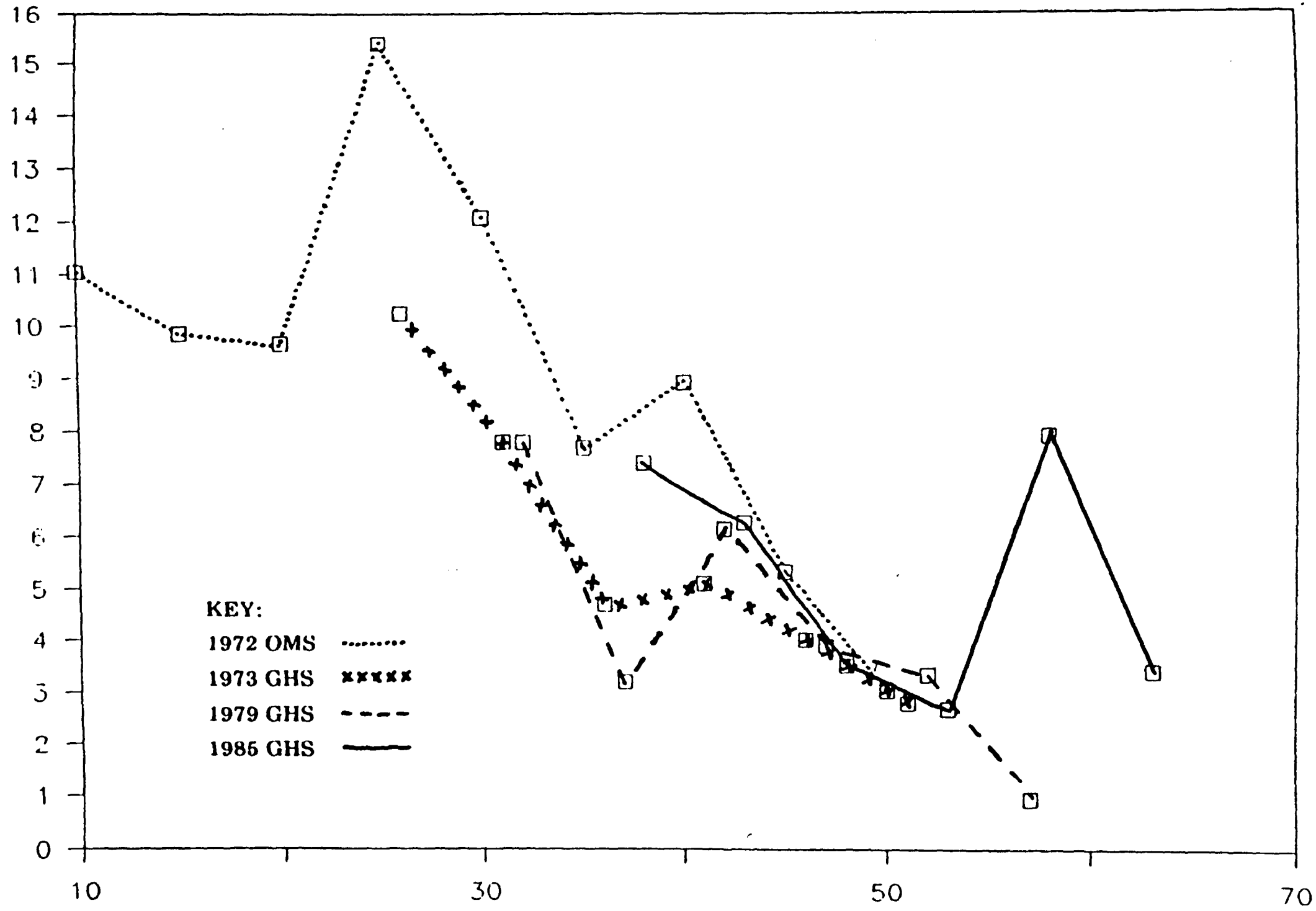


FIGURE 4/3: Odds ratios corresponding to social origin heterogamy according to husband's birth cohort (five-year cohorts): data from the 1972 Oxford Mobility Survey and the 1973, 1979 and 1985 General Household Surveys.

4. Assortative marriage for education

Berent (1954), Blau and Duncan (1967) and Coleman (1977) all emphasise the importance of assortative marriage for education. There is strong assortative marriage in Great Britain with respect to both years of schooling and educational qualifications obtained. It could be argued that this is the result of partner selection according to 'intelligence', but an alternative hypothesis is that education in this context should be seen as a 'cultural' variable and hence that the patterns of assortative marriage reflect a tendency for individuals to associate with/marry individuals who are culturally similar to themselves. (In the context of this thesis it is not possible to distinguish between the two possibilities).

4.1. An examination of assortative marriage for school type using Oxford Mobility Survey data

In addition to years of schooling and qualifications obtained another education-related variable for which there is strong assortative marriage is type of secondary school. Table 4/19 shows the types of secondary schools of respondents to the 1972 Oxford Mobility Survey and their spouses. The categories are those used by Halsey, Heath and Ridge (1980).

The quasi-RC(1) model was fitted to Table 4/19. The model has a deviance of 19.8 on 18 degrees of freedom ($P>0.05$), hence it is an adequate model of the data. Table 4/20 shows the row and column scores from the model. The scores are similar for the two sexes, and suggest that one sensible aggregation of the categories would be:-

(i) Secondary Modern/Comprehensive/Technical

(ii) Grammar

(iii) Private and Direct Grant

The simple RC(1) association model fitted the data badly (deviance=472.1 on 25 degrees of freedom). This can be readily understood by an examination of the leading diagonal parameter estimates from the quasi-RC(1) model (see Table 4/21). The largest of these estimates is for Comprehensive schools, which is partially a reflection of the recent introduction of these schools and their unequal geographical dispersion. The second largest of the estimates is for Technical schools. The row and column scores for these two categories differ considerably between the quasi-RC(1) and RC(1) models (see Section 2.9 of Chapter 2). In the latter model the diagonal cells force

the scores for Comprehensive and Technical schools further apart from those for Secondary Modern schools (see Table 4/20).

Collapsing the seven categories of schools into the three categories mentioned above to give a 3x3 table does not cause a significant reduction in information from that contained in the 7x7 table according to the Collapsibility criterion (change in deviance=34.0 on 26 degrees of freedom; see Section 2 of this chapter). However, when the Strict Collapsibility criterion is used, the loss of information is highly significant (change of deviance=546.4 on 32 degrees of freedom). This is a consequence of the diagonal cell frequencies. When Technical schools are kept as a separate category, the change in deviance for Strict Collapsibility reduces to 119.8 on 27 degrees of freedom. Though information is lost by collapsing the 7x7 table into a 4x4 table, the 4x4 table is clearly more acceptable in terms of loss of information than the 3x3 table.

It is arguable that the row and column scores in Table 4/20 suggest that Comprehensive schools should be aggregated with Technical schools rather than with Secondary Modern schools. However, the Comprehensive school scores are close to the Technical schools scores as a result of the frequencies in the Comprehensive/Grammar cells in Table 4/19, i.e. there is no particular similarity between Comprehensive and Technical schools. Combining the (very small) Comprehensive school category with the Secondary Modern category seems the most sensible course of action.

To conclude, strong assortative marriage for school-type exists including a very high level of 'exact' school-type homogamy, which may reflect the role of schools as mini marriage markets. Most of the assortative marriage can be explained in terms of four categories of school.

4.2. Social origin and assortative marriage for school type

To what extent do family background similarities underly assortative marriage for school type? A four-way table (Table 4/23) consisting of the 4x4 table from above cross-classified by two dichotomous variables representing the spouses' fathers' occupations was examined (see Table 4/22 for the two categories of these variables).

TABLE 4/19: Husband's school type by wife's school type: couples from the 1972 Oxford Mobility Survey.

Husband's school type	Wife's school type						
	S.M.	Comp	Tech	Gram	N/HMC	DG	HMC
Secondary Modern	4585	60	330	531	89	37	25
Comprehensive	37	16	4	14	0	0	0
Technical	545	7	277	119	25	5	3
L.A.Grammar	607	19	103	449	85	20	28
Non HMC Private	86	1	15	46	41	6	9
Direct Grant	40	2	9	36	16	8	4
HMC Private	51	1	10	50	35	6	21

TABLE 4/20: Row and column scores from two models of a table of husband's school type by wife's school type (Table 4/19): Data from the 1972 Oxford Mobility Survey.

Model:	Quasi-RC(1)		RC(1)	
	Male	Female	Male	Female
School-type:				
Secondary Modern	1.00	1.00	1.00	1.00
Comprehensive	0.89	0.85	0.66	0.71
Technical	0.94	0.77	0.62	0.57
L.A.Grammar	0.52	0.52	0.38	0.41
Non-HMC Private	0.32	0.12	0.23	0.14
Direct Grant	0.20	0.35	0.19	0.35
HMC Private	0.00	0.00	0.00	0.00

TABLE 4/21: Leading diagonal parameter estimates from a quasi-RC(1) model of a table of husband's school type by wife's school type (Table 4/19): Data from the 1972 Oxford Mobility Survey.

School-type:		
Secondary Modern	0.50	(0.08)
Comprehensive	2.95	(0.31)
Technical	1.50	(0.10)
L.A.Grammar	0.52	(0.08)
Non-HMC Private	0.64	(0.19)
Direct Grant	0.92	(0.39)
HMC Private	0.47	(0.28)

(Figures in parentheses are standard errors).

TABLE 4/22: Definition of a dichotomous social origin schema based on Hope-Goldthorpe categories.

Category 1:
Hope-Goldthorpe categories 1 to 14, 16 and 21.

Category 2:
Hope-Goldthorpe categories 15, 17 to 20, and 22 to 36.

TABLE 4/23: Four-way table of husband's and wife's school types and husband's and wife's social origins: Data from the 1972 Oxford Mobility Survey.

Husband and wife both from 'higher' half of social origin dichotomy

	Wife's school type			
Husband's school type	SM/C	Tech	Gram.	Priv.
Sec. Mod./Comp.	168	17	45	37
Technical	27	13	21	10
Grammar	71	18	115	63
Private	66	9	72	96

Husband from 'higher' half of social origin dichotomy, wife from 'lower' half

	Wife's school type			
Husband's school type	SM/C	Tech	Gram.	Priv.
Sec. Mod./Comp.	447	35	54	14
Technical	73	33	7	6
Grammar	135	18	86	21
Private	55	11	30	14

Wife from 'higher' half of social origin dichotomy, husband from 'lower' half

	Wife's school type			
Husband's school type	SM/C	Tech	Gram.	Priv.
Sec. Mod./Comp.	435	44	112	37
Technical	47	31	27	6
Grammar	75	15	83	35
Private	11	2	11	12

Husband and wife both from 'lower' half of social origin dichotomy

	Wife's school type			
Husband's school type	SM/C	Tech	Gram.	Priv.
Sec. Mod./Comp.	2886	192	265	46
Technical	336	160	47	8
Grammar	258	39	131	8
Private	28	5	7	9

Hierarchical log-linear models were fitted to the four-way table. The model including all six possible two-factor interactions (Model 1) fits the data (having a deviance of 39.6 on 33 degrees of freedom [P>0.05]), and it cannot be significantly improved upon by the addition of any of the four three-factor interactions. None of the two-factor interactions can be removed without the model ceasing to fit the data. The magnitude of the change in deviance when the husband's school type/wife's school type interaction is removed (829.1 on 9 degrees of freedom) acts as a clear indication that much of the assortative marriage for school type is not explicable in terms of assortative marriage for social origin, or in terms of the relationships between one spouse's social origin and the other's school type.

Adjusting for the effects of social origin homogamy and school type homogamy, an individual from a 'high' social origin is more likely than an individual from a 'low' social origin to be married to a spouse with a 'high' school type.

Attention was focused on three odds ratios relating to assortative marriage for school type. The first of these is the odds ratio corresponding to couples where both spouses attended either a secondary modern/comprehensive or a technical school. The observed odds ratio is 6.7. The corresponding parameter estimate from Model 1 is 1.90 (standard error=0.10; exp[1.90]=6.7). In other words, husband's and wife's social origin explain virtually none of the tendency towards technical school homogamy.

The second odds ratio examined is the one corresponding to couples where both spouses attended a grammar school or a direct grant/private school. The observed odds ratio is 3.6. The relevant parameter estimate from Model 1 is 0.99 (standard error=0.17; exp[0.99]=2.7). Hence it can be seen that spouses' social origins can explain <u>some</u> of the tendency towards 'public school' homogamy, but only a part of it. (It is, perhaps, better to look at log-odds ratios in this context; in this case the observed log-odds ratio was 1.27, so the parameter estimate of 0.99 suggests that one might regard the social origin/social origin and social origin/school type interactions as capable of explaining about a fifth of the 'public school' homogamy ([1.27-0.99]/1.27 = 0.22).

Perhaps the most obvious odds ratio to examine is one corresponding to a division of school types into a group consisting of secondary modern/comprehensive/technical schools and a group consisting of grammar/direct grant/private schools. This dichotomy might be seen as a division of schools into a low prestige group and a high prestige group.

Examining this odds ratio requires categories of the two school type variables in the four-way table to be aggregated, so Model 1 was fitted to a 'collapsed' version of the original four-way table (see Table 4/24). The observed odds ratio is 6.5 (log[6.5]=1.87). The relevant parameter estimate from Model 1 is 1.50 (standard error=0.07; exp[1.50]=4.5). The parameter estimate from Model 1 suggests that just over one-fifth of the tendency towards school type 'prestige' homogamy is explained by the interactions between the spouses' social origins and between one spouse's social origin and the other's school type ([1.87-1.50]/1.87 = 0.20).

The conclusions drawn above from examinations of parameter estimates can be verified by examinations of observed odds ratios. (See Section 3 of Chapter 2 for a discussion of the decomposition of observed odds ratios).

The above shows that assortative marriage for social origin can only explain a fraction of assortative marriage for school type. However, the statistical significance of the relationships between one spouse's school type and the other's social origin merits attention. One possibility is that these relationships are acting as proxies for the relationships between spouses' educational attainments.

Table 4/24 shows that 92.0% of the couples are homogamous for at least one of the social origin and school-type dichotomies, i.e. only 8.0% of the couples are 'doubly heterogamous, (as compared to the 17.5% that would be expected to be so under a model of independence), and only 5.5% of the couples consist of one spouse with a 'higher' social origin and a 'higher prestige' school type and another spouse with a 'lower' social origin and a 'lower prestige' school type (compared with an expected level of 14.7%)

4.3. Assortative marriage for educational attainment

In order to assess the extent to which assortative marriage for educational attainment contributes to assortative marriage for school type, or vice versa, one need to produce a set of categories relating to educational attainment. The Oxford Mobility Survey collected data on both extra years of education/school-leaving age and qualifications obtained. Constructing a variable which adequately summarizes this data is not entirely straightforward. For a start, the minimum school leaving age varies between 14 and 15 in different cohorts of the OMS sample.

Additionally one has to cope with a variety of academic and vocational qualifications.

The approach taken here, which results in a reasonable but by no means perfect variable, is as follows. Extra years of education are divided into three categories, namely zero years, one to two years, and three or more years. Thus the school-leaving ages of the members of the three categories are in the ranges 14-15, 15-17 and 17+ respectively. In the case of qualifications, four categories are considered, these being no qualifications, school exams equivalent to 'O' level or above, level 'B' and 'C' qualifications, and degrees/diplomas. Therefore twelve (3x4) combinations of extra years of schooling and qualifications are considered in all.

A 12x12 table of husband's educational attainment against wife's educational attainment was produced based on the above schema. (Note that for husband post-compulsory years of <u>education</u> is considered as opposed to post-compulsory <u>schooling</u> in the case of the wife). This table was explored using correspondence analysis and Goodman's association models in an attempt to identify sensible aggregations of the twelve categories. The exploration suggested that one should retain a separate category for those individuals (a majority for each sex) with no extra years of schooling or relevant qualifications. At the other extreme the exploration suggested a category of graduates plus those with 3+ years of post-compulsory education and a level 'B' or 'C' qualification. In between these extremes there seemed justification for aggregating categories into three intermediate groups (see Table 4/25) with the most problematic category consisting of those individuals with no extra years of schooling but a level 'B' or 'C' qualification, who seemed to be more 'prestigious' if male than if female. This category, however, only included about 1% of the respondents and just over 1% of their wives.

Table 4/26 is the 5x5 table obtained by collapsing the 12x12 table. The loss of information resulting from the aggregation of categories is not significant at the 5% level according to the Collapsibility criterion, but this is largely because one of the original categories was very small. However, only a small proportion of the information in the off-diagonal part of the 12x12 table is lost.

The only justification for the use of the Collapsibility criterion rather than the Strict Collapsibility criterion is that the information contained in the leading diagonal of the table is somehow of less interest or relevance than that contained in the rest of the table. It

is debatable whether this is true in the case being examined here, but it could be argued that since the aim of the analysis is in effect to produce a set of ordered educational categories, one should be more interested in heterogamous couples than in homogamous ones as a high level of endogamy for anything other than an extreme or near-extreme category is likely to be indicative of the influence of factors not specifically related to educational attainment.

4.4. The role played by assortative marriage for educational attainment in assortative marriage for school type.

The four-way table defined by the two four category school-type variables and the two five category educational attainment variables defined above was now examined. It quickly became apparent that neither educational attainment homogamy/heterogamy nor the interactions between one spouse's educational attainment and the other's school type played a significant role in explaining either 'technical school homogamy' or 'public school homogamy'. The two school type variables were therefore once again collapsed into dichotomies, and attention was focused on the resulting 'reduced' four-way table.

A model analogous to Model 1 in the previous section is fitted to this table. The observed school type/school type odds ratio is 6.3. The corresponding parameter estimate from the model is 1.16 (standard error=0.10; exp[1.16] = 3.2). A comparison of the observed log-odds ratio with the parameter estimate suggest that about a third of the school type 'prestige' homogamy is explicable in terms of assortative marriage for educational attainment and the relationships between one spouse's educational attainment and the other's school type [(1.84-1.16)/1.84 = 0.37]. (See Section 3 of Chapter 2).

Clearly some of the high prestige/low prestige school type odds ratio can be explained in terms of assortative marriage for educational attainment and the relationships between one spouse's educational attainment and the other's school type. However, the size of the school type/school type parameter estimate from the model (compared with its standard error) shows that assortative marriage for school type 'prestige' exists to an extent which is far from negligible even when the educational attainment interactions have been taken into account.

TABLE 4/24: 2^4 table of husband's and wife's school type and husband's and wife's social origin: Data from the 1972 Oxford Mobility Survey.

Wife's social origin		High	High	Low	Low
Wife's school type		High	Low	High	Low
Husband's social origin	Husband's school type				
High	High	346	164	151	219
High	Low	113	225	81	588
Low	High	141	103	155	330
Low	Low	182	557	366	3574

TABLE 4/25: Educational categories based on years of post-compulsory schooling and qualifications: data from the 1972 Oxford Mobility Survey.

Category 1:

No post-compulsory schooling and no relevant qualifications.

Category 2:

One to two years of post-compulsory schooling and no relevant qualifications or

No post-compulsory schooling but school exams or

No post-compulsory schooling but level B or C qualifications.

Category 3:

Three plus years of post-compulsory education and no relevant qualifications or

One to two years of post-compulsory education and school exams.

Category 4:

One to two years of post-compulsory education and level B or C qualifications or

Three plus years of post-compulsory education and school exams.

Category 5:

Three plus years of post-compulsory education and level B or C qualifications or

Degree/diploma.

TABLE 4/26: Table of husband's and wife's educational categories according to a five category schema (described in Table 4/25: data from the 1972 Oxford Mobility Survey).

		Wife's educational category				
		1	2	3	4	5
Husband's educational category	1	4088	607	330	77	45
	2	949	352	181	58	30
	3	397	164	166	63	39
	4	149	118	136	70	43
	5	79	73	130	100	175

4.5. Assortative marriage for school type, educational attainment and social origin.

An obvious next step is a simultaneous examination of assortative marriage for school type, educational attainment and social origin. To this end a six-way table (Table 4/27) was constructed from the two school type dichotomies, the two social origin dichotomies, and the two five-category educational attainment variables.

Various models were fitted to this table, from which it became clear that much, but by no means all, of the school type 'prestige' homogamy (an observed odds ratio of 6.5) is explicable in terms of other interactions. Similarly, much of the social origin homogamy (an observed odds ratio of 3.7) can be explained in other ways.

Table 4/28 show some of the parameter estimates from a model containing all of the possible two-factor interactions between the six variables plus the two three-factor interactions which only involve variables corresponding to one of the spouses. (This model has a deviance of 360.1 on 325 degrees of freedom and thus does not differ significantly from the data).

The parameter estimate of 1.17 (standard error=0.11) for the school type/school type interaction compares with an observed log-odds ratio of 1.87 ([1.87-1.17]/1.87=0.37). The parameter estimate of 0.69 (standard error=0.07) for the social origin/social origin interaction compares with an observed log-odds ratio of 1.30 ([1.30-0.69]/1.30)=0.47). Thus significant homogamy of school type 'prestige' and of social origin remains once assortative marriage for educational attainment and various other interaction effects have been taken into account (see Section 3 of Chapter 2). However, a comparison of these parameter estimates with those relating to assortative marriage for educational attainment suggests that assortative marriage for educational attainment is the strongest of three forms of assortative marriage, though the higher categories of educational attainment contain a relatively small proportion of the sample.

The relationships between one spouse's social origin and the other spouse's school type observed in an earlier analysis have disappeared, suggesting that the relationships were indeed 'proxying' assortative marriage for educational attainment.

TABLE 4/27: Six-way table of husband's and wife's school type, husband's and wife's social origin, and husband's and wife's educational category: Data from the 1972 Oxford Mobility Survey.

Part 1: Husband and wife both have lower social origin

		Wife's educational category									
Husband's educational category	Husband's school type	1		2		3		4		5	
		Wife's school type									
		Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi
1	Low	2504	74	261	64	58	86	9	23	3	14
	High	54	11	5	1	1	7	0	1	0	0
2	Low	444	16	115	20	20	26	7	4	0	9
	High	64	7	14	15	5	11	2	1	1	1
3	Low	81	4	17	3	8	7	1	3	1	1
	High	83	6	17	10	3	18	3	7	0	5
4	Low	18	1	11	2	4	2	1	1	0	0
	High	27	2	13	4	5	9	3	7	2	7
5	Low	4	0	3	0	2	3	1	1	1	2
	High	17	2	4	2	3	4	2	4	2	13

Part 2: Husband has lower social origin, wife has higher social origin.

		Wife's educational category									
Husband's educational category	Husband's school type	1		2		3		4		5	
		Wife's school type									
		Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi
1	Low	316	20	49	37	19	40	1	11	4	6
	High	10	3	3	2	1	2	1	1	0	0
2	Low	76	3	27	9	9	15	4	6	0	2
	High	11	5	7	6	1	5	1	5	0	0
3	Low	17	1	7	1	9	8	0	3	1	4
	High	15	1	3	8	2	14	1	9	1	1
4	Low	4	0	3	3	4	6	1	0	0	1
	High	8	1	7	6	2	17	3	7	0	4
5	Low	4	1	0	0	1	1	0	2	1	2
	High	8	1	5	5	5	10	4	13	4	15

P.T.O.

TABLE 4/27: (continued)

Part 3: Husband has higher social origin, wife has lower social origin.

Husband's educational category	Husband's school type	Wife's educational category 1 Wife's school type Lo	Hi	2 Lo	Hi	3 Lo	Hi	4 Lo	Hi	5 Lo	Hi
1	Low	310	5	45	13	13	16	2	7	0	4
	High	22	1	1	3	0	3	0	3	1	1
2	Low	78	0	41	8	9	6	0	2	0	3
	High	29	3	11	6	1	4	0	1	0	0
3	Low	39	2	10	1	10	2	3	2	1	0
	High	39	7	18	8	9	15	1	6	0	5
4	Low	7	1	6	0	3	4	0	1	0	0
	High	32	2	14	9	5	19	2	6	1	4
5	Low	4	1	4	0	2	1	1	2	0	0
	High	11	0	9	3	4	12	3	7	6	23

Part 4: Both husband and wife have higher social origin.

Husband's educational category	Husband's school type	Wife's educational category 1 Wife's school type Lo	Hi	2 Lo	Hi	3 Lo	Hi	4 Lo	Hi	5 Lo	Hi
1	Low	65	10	16	20	5	11	1	4	2	3
	High	5	0	3	2	0	5	0	0	1	0
2	Low	30	2	15	7	4	4	4	6	1	4
	High	14	2	5	8	2	17	2	6	0	5
3	Low	19	1	15	3	8	6	3	7	2	2
	High	19	2	16	13	5	21	3	5	2	11
4	Low	8	2	2	1	0	1	2	0	0	2
	High	15	4	8	14	12	26	2	26	3	11
5	Low	5	2	5	2	4	1	2	2	7	10
	High	9	1	10	14	16	47	4	41	8	65

TABLE 4/28: Parameter estimates for between-spouse two-factor interactions from a model of the six-way table (Table 4/27) of husband's and wife's social origin, husband's and wife's school type and husband's and wife's educational category: Data from the 1972 Oxford Mobility Survey.

		Wife					
Husband		Education category				School type	Social origin
		2	3	4	5		
Education	2	0.88	0.72	1.08	0.93	-0.27	0.31
category		(0.09)	(0.13)	(0.21)	(0.27)	(0.11)	(0.08)
	3	0.83	1.39	1.72	1.82	-0.52	0.53
		(0.13)	(0.16)	(0.24)	(0.28)	(0.14)	(0.11)
	4	1.27	1.91	2.46	2.43	-0.47	0.71
		(0.17)	(0.19)	(0.26)	(0.31)	(0.16)	(0.13)
	5	1.33	2.36	3.26	4.39	-0.57	1.25
		(0.20)	(0.21)	(0.27)	(0.29)	(0.17)	(0.14)
School type		-0.07	-0.12	0.00	-0.15	1.17	0.07
		(0.11)	(0.13)	(0.18)	(0.20)	(0.11)	(0.09)
Social origin		0.46	0.43	0.48	0.72	0.00	0.69
		(0.08)	(0.11)	(0.15)	(0.16)	(0.09)	(0.07)

(Figures in parentheses are standard errors. Note that educational category 1, the lower school type and the lower social origin act as base categories for the above interactions, i.e. the parameter estimates for all interaction terms involving one or more of these categories are set to zero).

Significant and substantively quite strong relationships are, however, apparent between one spouse's educational attainment and the other's social origin. These relationships could be proxying for occupational homogamy, but it seems more likely that social origin and educational attainment both act as 'proxies' for some more general form of social status.

Finally, a peculiar relationship is evident between husband's education and wife's school type. Once everything else has been adjusted for, husbands with no extra years of schooling and no relevant qualifications appear disproportionately likely to be married to wives who attended 'high prestige' schools. One explanation for this could be that some of these husbands may have been upwardly socially mobile despite their lack of schooling/qualifications, but it is not clear why they should then have specifically married wives from 'high prestige' schools! (Of course, the significance of the relationship may be a Type I error).

4.6. Trends in assortative marriage.

In Section 3 of this chapter it was shown that the strength of assortative marriage for social origin appears to diminish as one moves from the cohorts who married just after the Second World War through to the cohorts who married in the 1960's and 1970's. Once one has crudely established the relative strengths of assortative marriage for social origin and for two aspects of education, it would seem an interesting idea to examine whether there have been changes in the relative importance of assortative marriage for social origin as compared with assortative marriage for education. One straightforward hypothesis is that the relative importance of social origin diminishes, as a result of the movement away from an emphasis on 'ascribed' characteristics towards an emphasis on 'achieved' characteristics.

In the first instance the joint characteristics of couples corresponding to three ten-year cohorts of the OMS data (respondents aged 35 to 44, 45 to 54, and 55 to 64) were examined. A seven-way table was constructed, using the school type and social origin dichotomies described earlier for each spouse, plus an educational attainment dichotomy for each spouse produced by the aggregation of the four highest categories of the five-category variable used earlier. The seventh variable used was, of course, cohort.

When hierarchical log-linear models were fitted to the seven-way table, no significant variation between cohorts was found for any of the interactions between the husband's characteristics and the wife's characteristics. However, this was not greatly surprising, since only the youngest of the three cohorts married during the observed period of decline in assortative marriage for social origin, and the strength of assortative marriage for social origin in this cohort had been shown to be similar to that in the oldest cohort, who mostly married in the period between the wars. (Assortative marriage for social origin appears to have peaked for those individuals marrying just after the end of the Second World War).

A fourth cohort, corresponding to OMS respondents aged 25 to 34, was therefore added to the analysis. This cohort had been initially omitted on the grounds that a significant proportion of this cohort who would eventually marry had not married by the survey date in 1972, biasing the couples in the cohort towards early marriages. (The median age at first marriage of bachelors marrying in the late 1960's/early 1970's was less than 24, so a clear majority of those OMS respondents aged 25 who would ever marry should have been married. In fact, over 69% of the OMS respondents aged 25 were or had been married).

The bias towards early marriages in this fourth cohort is clearly of relevance only if marriages at different ages show different patterns of assortative marriage for social origin and education. (Unfortunately, since age at marriage is related to education and possibly also to social origin, this possibility cannot be ruled out without further investigation).

The three original cohorts were aggregated, and log-linear models were fitted to the data to compare the pattern of assortative marriage in this aggregation with the pattern in the additional cohort. The model used as a base (Model 1; see Table 4/29) contains parameters to take account of the distribution of husbands' characteristics, the distribution of wives' characteristics, and changes between cohorts in these distributions. Model 2 also includes the nine two-factor interactions between one of the husband-related variables and one of the wife-related variables. Model 3 consists of Model 2 plus extra parameters to allow for changes between the two cohorts in these nine interactions.

TABLE 4/29: Models of a seven-way table of husband's and wife's school type, husband's and wife's social origin, husband's and wife's educational achievement, and cohort: Data from the 1972 Oxford Mobility Survey.

Model	Description	Deviance	d.f.
1	[ABCG][DEFG]	1948.2	98
2	[ABCG][DEFG][AD][BE][CF] [AE][BF][CD][AF][BD][CE]	124.2	89
3	[ABCG][DEFG][ADG][BEG][CFG] [AEG][BFG][CDG][AFG][BDG][CEG]	106.2	80
4	[ABCG][DEFG][ADG][BEG][CFG] [AE][BF][CD][AF][BD][CE]	111.1	86

A is husband's social origin
B is husband's school type
C is husband's educational level
D is wife's social origin
E is wife's school type
F is wife's educational level
G is cohort (based on husband's age)
(Note: all of the above are dichotomies).

TABLE 4/30: Parameter estimates from Model 4 in Table 4/29 corresponding to changes with cohort in some of the interactions.

Interaction	Parameter estimate
School type/School type	0.273 (0.153)
Social origin/Social origin	0.256 (0.141)
Education/Education	0.265 (0.132)

(Figures in parentheses are standard errors).

The change in deviance between Models 2 and 3 is just significant at the 5% level. However, further model-fitting showed that the majority of this change in deviance corresponded to changes between the cohorts in the educational attainment/educational attainment, social origin/social origin and school type/school type interactions. Model 4 excludes the other six husband/wife/cohort interactions, and the change in deviance between Models 3 and 4 is highly non-significant. The difference in deviance between Models 2 and 4 is significant at the 1% level.

The estimated changes between the cohorts in the three relevant husband/wife interactions obtained from Model 4 are given in Table 4/30. Somewhat surprisingly they all have the same sign, indicating a simultaneous decrease in the strength of all three forms of assortative marriage from the aggregation of the original cohorts to the additional cohort.

It appears that the strength of assortative marriage in general decreased during the period following the Second World War. In combination with Berent's findings that both social origin and educational endogamy decreased during the first half of the 20th century (findings which are verified in the Appendix to this chapter), the findings in this chapter suggest a downwards trend in the extent of social status endogamy during the first two-thirds of the twentieth century.

4.7. A detailed examination of assortative marriage for educational qualifications

Examining in detail assortative marriage for educational level measured in terms of qualifications is not as straightforward as examining most other forms of assortative marriage, since there are a large number of possible combinations of qualifications which need to be aggregated into a manageable number of categories. Of course, many individuals have 'standard' combinations of qualifications, and some qualifications fall into a 'natural' hierarchy (e.g. 'O' levels, 'A' levels and university degrees), but the co-existence of 'academic', vocational and professional qualifications poses a comparability problem.

A standard approach to the aggregation problem is to rank all the qualifications being considered (possibly allowing ties), and to categorise individuals according to their 'highest' qualification.

Sometimes particular combinations of qualifications are treated as if they were a single qualification (e.g. the General Household Survey highest educational qualification variable has one category which corresponds to '0' levels plus clerical/commercial qualifications).

While it would seem likely that most qualifications have a 'cultural significance' which is similar to their 'socio-economic significance', hierarchies of educational qualifications which are constructed as explanatory tools in a socio-economic context are not necessarily appropriate for use in a 'social interaction' context. The General Household Survey introductory report (1973) describes the functions of the GHS's Education Section as being

"to relate education to other aspects of people's lives, such as housing, jobs, earnings and health .... to compare the educational standing of different generations, to monitor changes in the type and amount of education, and to develop measures of unfulfilled need. .... educational data is also used as a classifying variable in sample surveys to help in the analysis of other data collected in the course of an interview" [p222].

If a hierarchy of qualifications is 'appropriate' for use in the context of marital selection, then one would expect the 'average' level of spouse's education for individuals at a particular level in the hierarchy to be higher than the corresponding averages for all the lower levels, but lower than the averages for all the higher levels. Hence if one were to analyse a crosstabulation of husband's highest qualification by wife's highest qualification using correspondence analysis or association models, then one would expect the first dimension scores for the two sets of educational levels to increase (or decrease) monotonically.

A table of husband's highest qualification by wife's highest qualification (Table 4/31) was extracted from the results of the 1979 GHS. (Attention was restricted to wives aged 30-39 in their first marriages, and couples with missing educational data were excluded, giving a sample size of 1,480). After a few categories had been aggregated because of small marginal frequencies, the table was analysed using correspondence analysis and quasi-association models. The two techniques gave similar results with the first dimension row and column scores bearing a very strong relationship to the hierarchical ordering.

The high proportion of individuals with no qualifications who were part of a homogamous couple, plus the inclusion in the quasi-association models of a parameter corresponding to these couples, resulted in row and column scores for unqualified individuals from the models which were unreasonably high (see Section 2.9 of Chapter 2). Drawing an analogy with mover/stayer models, the above result probably reflects a higher proportion of movers among homogamous unqualified couples than among other types of homogamous couple. Thus, for ease of interpretation, Table 4/33 presents the scores from the correspondence analysis only.

An identical table from the 1982 GHS (Table 4/32; N=1,233) was analysed, resulting in very similar sets of row and column scores, though the orderings differed slightly between the two years, probably as a result of sampling error.

In general, the analyses suggest that the GHS highest educational qualification variable is reasonably appropriate for use in the context of marital selection.

However, when a table of husband's highest educational qualification by wife's highest educational qualification which had been extracted from the results of the 1984 Labour Force Survey (see Lampard, 1987, pp 69-71) was analysed using correspondence analysis/quasi-association models, the results did <u>not</u> correspond particularly well to the hierarchy of qualifications. In particular, both ONC/D's and City and Guilds were above 'O'/'A' levels in the hierarchy, but had lower row and column scores.

It is, perhaps, unsurprising that such discrepancies were not apparent in the analyses of Tables 4/31 and 4/32, since the GHS highest educational qualification variable has ONC/D's aggregated with 'A' levels and City and Guilds aggregated with either HNC/D's or 'A' levels or 'O' levels according to the precise level of City and Guilds held.

As well as recording highest educational qualification, the GHS does however also code the first seven qualifications mentioned, so sufficient data exist to allow discrepancies of this sort to be discovered. The problem is how to analyse the data <u>without</u> introducing a subjective hierarchy.

One solution is to use as the basic units of analysis pairs of qualifications rather than couples, i.e. to treat each type of qualification of each individual separately. It is fairly straightforward to construct a table of husband's qualifications by wife's qualifications where cell frequencies refer to the number of

couples in which the husband possesses the type of qualification corresponding to the row and the wife possesses the type of qualification corresponding to the column. However, this type of table is not a conventional contingency table, since the observations are clearly not independent of each other, since individuals can be counted more than once.

However the reciprocal averaging procedure on which correspondence analysis has been shown to be based would still seem to be reasonably appropriate, i.e. it does not seem unreasonable to give a qualification a score based on the average score of all the qualifications of the spouses of individuals with that qualification.

One possible problem with analysing a table of the sort described above is that each couple contributes to the table a number of observations equal to the number of different types of qualification possessed by the husband multiplied by the number of different types of qualifications possessed by the wife. In particular, couples where one or both of the spouses have no qualifications do not contribute to such a table. This last problem can be solved by treating an absence of qualifications as an extra type of qualification. One way in which the more general problem could be dealt with would be the weighting of couples by the reciprocal of the product of their numbers of types of qualifications. However, it is not clear whether this more general 'problem' is a problem!

A crosstabulation of the above sort (i.e. unweighted, but with an absence of qualifications treated as a additional form of qualification) based on the 31 types of qualification recorded by the GHS was constructed using data from the 1979 GHS. The data corresponded to couples where the wife was between 20 and 44. (In practice the number of types of qualification was reduced to 27+1=28, because of the very small numbers of individuals with graded 'O' levels or graded SCE Ordinary examinations).

When the first version of the crosstabulation was analysed using correspondence analysis, Scottish school qualifications dominated the second dimension of the solution, making it very difficult to compare the relative 'cultural significance' of these qualifications with their English/Welsh equivalents. For ease of interpretation, these qualifications were treated as equivalent to 'comparable' English/Welsh qualifications, and the crosstabulation was adjusted accordingly. When the adjusted crosstabulation was analysed, foreign qualifications dominated the second dimension of the solution. Foreign degrees appeared

to be broadly equivalent to British degrees, but for ease of interpretation foreign qualifications were removed from the crosstabulation (in effect excluding from consideration couples where one or both spouses had foreign qualifications but no British qualifications).

Table 4/34 is the final, 23x23, version of the crosstabulation. When Table 4/34 was analysed using correspondence analysis, the eigenvalue corresponding to the first dimension of the solution contributed 69.2% of the sum of all the eigenvalues. The eigenvalue corresponding to the second dimension contributed a further 13.3%. Therefore the first two dimensions of the solution explain 82.5% of the association in the table.

Table 4/35 gives the row and column scores for the first two dimensions of the solution. The first dimension, as expected, gives the appearance of being related to the 'value' or 'level' of the qualifications, with university and teaching qualifications at one extreme and apprenticeships and no qualifications at the other extreme. The second dimension appears to contrast high level 'academic' qualifications partly with 'vocational' qualifications but especially with CSE's. The no qualifications category does not lie at either extreme of the second dimension.

The third dimension, which contributed 5.4% of the sum of the eigenvalues, appears to compensate for some of the distance between CSE's and university qualifications in the second dimension. The fourth dimension (3.4%) is less easy to interpret, but appears to be related to school certificates and the two types of university diploma.

Overall, it does not seem unreasonable to interpret the first dimension scores as measures of the 'cultural value' (in the context of marriage) of the different type of qualifications, though the extreme position of CSE's on the second dimension should make one wary of placing too much reliance on the CSE scores on the first dimension.

The sets of first dimension scores for the two sexes are broadly similar to each other, and together suggest a possible set of groups of qualifications as follows:

(i) University qualifications (15;16;17;20),

(ii) Teaching qualifications (13); 'A' levels (5#); Other Level B qualifications (19); School Certificates (3#),

(iii) 'O' levels (4#); ONC/D (10); HNC/D (11); Nursing qualifications (12); Other Level C qualifications (21)

(iv) Clerical/commercial qualifications (6); City and Guilds (7,8,9); CSE's (1,2,22); Other qualifications (18),

(v) Apprenticeships (14),

(vi) No qualifications (23).

# indicates that Scottish qualifications make up part of the category.

Table 4/36 is a cross-classification of husband's highest educational qualification by wife's highest educational qualification according to the hierarchy of educational qualifications described above. The sample of couples examined is the same one as was used to derive the hierarchy, but with all of the couples where one or both of the partners had any foreign qualifications excluded.

Goodman's RC(1) association model was fitted to Table 4/36, with a resulting deviance of 40.7 on 16 degrees of freedom ($P<0.001$). Two of the three absolute standardised residuals greater than 2 correspond to the two cells relating to marriages between someone with university qualifications and somebody with no qualifications. As expected, both the row scores and the column scores are monotonic (see Table 4/37)

The quasi-RC(1) association model was fitted to Table 4/36, with a resulting deviance of 15.9 on 10 degrees of freedom ($P>0.05$). The parameter estimates indicate that the improvement in fit is primarily a consequence of the exact fitting of the cells corresponding to no qualification endogamy and university qualification endogamy.

TABLE 4/31: Husband's highest educational qualification by wife's highest educational qualification: data from the 1979 General Household Survey for couples where the wife was aged 30 to 39

Husband's highest qualification	Wife's highest qualification												
	1/2	3	4	5	6	7	8	9	10	12	13	14	15
1	11	3	0	5	2	2	0	1	0	1	2	1	2
2	26	20	9	15	7	17	8	7	13	0	6	2	14
3	3	6	1	3	1	1	1	0	0	0	1	0	2
4	9	8	3	9	4	18	8	13	15	1	3	4	39
6	3	5	2	8	7	19	6	11	13	2	3	4	45
7	1	7	0	5	7	30	5	13	17	5	0	4	59
9	1	2	2	3	3	7	6	4	12	1	1	3	32
12	0	2	2	3	3	10	2	6	23	6	0	3	90
13	1	0	0	2	2	1	0	1	5	0	7	0	13
14	0	1	0	4	1	1	1	2	8	4	1	9	26
15	5	6	7	15	8	32	17	21	50	17	5	17	497

1. Higher degree (Census Level A)

2. First degree/university diploma or certificate/qualifications obtained from colleges of further education or from professional institutions etc. of degree standard (Census Level B)

3. Non-graduate teaching qualifications (Census Level C)

4. HNC/HND/BEC/TEC Higher/City & Guilds Full Technological Certificate/university diploma or certificate/qualifications obtained from colleges of further education or from professional institutions etc. below degree level but above GCE 'A' level standard (Census Level C)

5. Nursing qualifications (Census Level C standard)

6. GCE 'A' level/SCE Higher/SUPE Higher/Higher School Certificate/SLC Higher; City & Guilds Advanced or Final; ONC/OND; Certificate of Sixth Year Studies/BEC/TEC National/General/Ordinary

7. 5 or more subjects at GCE 'O' level obtained before 1975 or in grades A-C if obtained later; 5 or more subjects at SCE Ordinary obtained before 1973 or in bands A-C if obtained later; 5 or more subjects at CSE Grade 1, or at School Certificate/SLC Lower/SUPE Lower/; City & Guilds Craft or Ordinary

8. 1-4 subjects at GCE 'O' level etc. with clerical or commercial qualifications

9. As for level 8 but without clerical or commercial qualifications

(continued on next page)

TABLE 4/31: (continued)

10. Clerical and commercial qualifications without GCE 'O' level, etc.
11. CSE grades 2-5; GCE 'O' level obtained 1975 or later in grades D or E, or SCE Ordinary obtained 1973 or later in bands D or E
12. Apprenticeship
13. Foreign qualifications (awarding institution outside UK)
14. Other qualifications
15. No qualifications/CSE ungraded/DK grade

(Note that in the case of wives level 1 was aggregated with level 2, and in the case of husbands level 8 was aggregated with level 9, level 5 was aggregated with level 14, and level 10 was aggregated with level 14. In both cases level 11 was aggregated with level 14. Very few cases were involved in these aggregations).

TABLE 4/32: Husband's highest educational qualification by wife's highest educational qualification: data from the 1982 General Household Survey for couples where the wife was aged 30 to 39

Husband's highest qualification	Wife's highest qualification												
	1/2	3	4	5	6	7	8	9	10	12	13	14	15
1	9	3	0	1	3	2	0	0	2	1	0	1	1
2	34	20	11	16	14	20	7	9	12	0	4	2	15
3	1	6	1	1	4	0	0	1	1	0	0	0	2
4	4	10	4	9	6	30	9	13	23	3	1	7	26
6	4	4	2	9	10	13	12	12	11	2	2	11	40
7	4	0	3	3	11	17	6	6	17	3	0	6	53
9	0	1	3	1	6	10	1	7	9	3	1	2	26
12	2	1	1	0	4	3	3	8	21	5	0	3	75
13	0	2	1	1	2	1	1	0	1	0	4	0	6
14	0	0	2	4	1	2	4	2	4	1	1	2	20
15	0	5	4	11	4	30	14	29	39	8	0	14	354

(See Table 4/31 for descriptions of levels).

TABLE 4/33: First dimension row and column scores from correspondence analyses of Tables 4/31 and 4/32 (which are tables of husband's highest educational qualification by wife's highest educational qualification derived from the 1979 and 1982 General Household Surveys).

	Husband			Wife	
Level	1979	1982	Level	1979	1982
1	1.69	1.54			
2	1.20	1.14	1/2	1.71	1.62
3	1.54	1.20	3	1.18	1.21
4	0.40	0.32	4	0.72	0.70
5	----	----	5	0.73	0.60
6	0.18	0.14	6	0.50	0.68
7	0.02	-0.05	7	0.27	0.28
8	----	----	8	0.26	0.12
9	0.00	0.01	9	0.16	-0.02
10	----	----	10	-0.04	-0.02
12	-0.34	-0.40	12	-0.35	-0.23
13	0.29#	0.58#	13	0.85#	0.97#
14	-0.22	-0.15	14	-0.13	-0.04
15	-0.40	-0.50	15	-0.40	0.49

(See Table 4/31 for description of levels).

Note that level 13 (foreign qualifications) has extreme scores for each sex and each year on the second dimension of the solution.

TABLE 4/34: A table of the number of couples where the husband possessed the row qualification and the wife possessed the column qualification: data from the 1979 General Household Survey for couples where the wife was aged 25 to 44

Husband's qual.	Wife's qualification 1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.	11	14	0	28	12	18	2	1	0	1	1
2.	18	31	0	45	15	23	5	1	1	2	1
3.	0	0	10	41	29	18	4	2	1	0	1
4.	28	51	3	465	184	200	26	3	2	15	9
5.	8	19	13	249	151	60	10	1	1	6	5
6.	1	3	0	7	2	6	0	0	0	0	0
7.	19	33	3	96	19	55	16	4	0	2	2
8.	13	21	1	59	13	31	6	3	0	1	0
9.	5	11	1	36	7	27	8	0	1	1	1
10.	3	9	3	75	28	41	3	0	1	6	4
11.	6	9	1	64	21	40	4	0	0	6	4
12.	0	0	0	1	0	1	0	0	0	0	0
13.	1	5	2	66	43	13	0	0	0	0	1
14.	17	31	3	134	28	129	17	6	2	2	2
15.	0	0	2	6	7	1	1	0	0	0	0
16.	2	5	9	157	113	31	6	1	1	4	4
17.	0	1	3	37	28	4	2	0	0	1	0
18.	10	11	3	89	25	63	7	1	1	2	1
19.	4	3	5	91	41	37	3	0	0	6	6
20.	0	0	2	6	3	2	1	1	0	0	0
21.	3	9	1	81	24	34	2	1	1	2	0
22.	1	1	0	2	1	3	1	0	0	0	1
23.	17	38	2	153	32	140	23	5	2	2	4

P.T.O.

TABLE 4/34: (continued)

Husband's qual.	Wife's qualification 12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1.	0	7	2	0	3	0	5	0	0	0	0	18
2.	2	11	3	0	2	0	6	1	0	0	0	31
3.	5	15	1	1	9	0	9	6	1	4	0	20
4.	51	114	14	3	65	8	82	16	5	20	7	173
5.	24	89	4	4	61	7	37	12	6	13	2	36
6.	0	1	1	0	2	0	1	0	0	0	0	5
7.	12	15	10	0	0	0	39	1	1	2	3	142
8.	8	10	5	0	2	0	16	0	1	1	2	75
9.	5	6	7	0	2	0	9	1	0	2	1	44
10.	9	13	5	0	9	1	17	3	1	1	1	59
11.	12	9	3	0	6	1	13	2	0	1	3	35
12.	3	0	0	0	0	0	1	0	0	0	0	3
13.	5	42	0	1	18	1	9	1	0	2	0	6
14.	21	17	24	0	5	0	58	4	1	6	4	330
15.	0	3	0	1	4	1	0	0	0	1	0	1
16.	14	70	1	2	51	7	19	10	5	7	0	13
17.	5	14	2	0	18	5	3	2	2	1	0	3
18.	14	11	13	0	5	0	45	3	1	3	3	118
19.	21	21	1	0	16	3	12	9	2	6	0	27
20.	2	3	0	0	1	0	2	0	1	1	0	0
21.	8	18	3	1	8	0	14	5	0	5	2	25
22.	0	0	0	0	0	0	0	0	0	0	0	6
23.	26	15	29	1	7	1	56	1	0	3	2	906

(See Table 4/35 for descriptions of the qualifications)

TABLE 4/35: First and second dimension row and column scores from a correspondence analysis of Table 4/34.

	Row scores (husband)		Column scores (wife)	
Category	Dim 1	Dim 2	Dim 1	Dim 2
1. CSE Grade 1	0.016	0.587	-0.194	0.764
2. CSE Grades 2-5	-0.047	0.706	-0.176	0.629
3. Sch. Cert./Matr. (a)	0.454	-0.284	0.696	-0.527
4. GCE 'O' level (b)	0.298	0.103	0.304	0.073
5. GCE 'A' level (c)	0.634	-0.124	0.637	-0.159
6. Clerical/Commercial	-0.011	0.356	-0.100	0.193
7. City & Guilds (d)	-0.320	0.271	-0.155	0.191
8. City & Guilds (e)	-0.257	0.306	-0.329	0.222
9. City & Guilds (f)	-0.228	0.269	-0.050	0.107
10. ONC/OND	0.062	0.053	0.379	0.280
11. HNC/HND	0.110	0.246	0.294	0.098
12. Nursing quals.	-0.366	-0.071	0.167	0.012
13. Teaching quals.	0.755	-0.193	0.668	-0.132
14. Apprenticeship	-0.486	0.047	-0.490	0.172
15. University diploma	0.940	-0.705	0.859	-0.610
16. Univ/CNAA 1st degree	0.778	-0.269	0.843	-0.359
17. Univ/CNAA Higher deg.	0.851	-0.431	0.989	-0.612
18. Other quals. NEC	-0.226	0.120	-0.067	0.148
19. Other B Level quals.	0.451	-0.053	0.647	-0.156
20. C level Univ. Diploma	0.646	-0.200	0.792	-0.345
21. Other C level quals.	0.290	0.147	0.515	-0.127
22. CSE Ungraded/DK grade	-0.476	0.273	-0.105	0.451
23. No qualifications	-0.862	-0.280	-0.812	-0.201

(a) includes SLC Lower Grade and SUPE Lower/Ordinary Grade

(b) includes SCE Ordinary Grade

(c) includes SLC/SCE/SUPE Higher Grade and Certificate of Sixth Year Studies (Scotland)

(d) Craft/Intermediate/Ordinary/Part I

(e) Advanced/Final/Part II

(f) Full Technological/Part III

Goodman's RC(2) model was also fitted to Table 4/36, with a resulting deviance of 5.6 on 9 degrees of freedom (P>0.05). Table 4/37 shows that the second dimension row scores and column scores seem primarily to be taking into account the excess (as judged by the RC(1) model) of marriages between individuals with university qualifications and individuals with no qualifications.

The implication of both the quasi-RC(1) model and the RC(2) model is that it is the university qualification and no qualification categories which are responsible for the poor fit of the RC(1) model. The high level of graduate endogamy is well-known, but the peculiarity of the no qualifications categories would seem to reflect not only a high level of endogamy at the lower end of the 'educational distribution', but also a considerable degree of heterogeneity amongst those with no qualifications.

4.8. Graduate Endogamy and Social Origin Homogamy.

It is tempting to believe that achieving the status of being a graduate frees an individual from the social constraints of his or her family background. This hypothesis can be partially tested by an examination of the patterns of marriage with respect to social origin of graduates as opposed to non-graduates.

Within the limits imposed by the historical imbalance between the sexes, British graduates have tended to be highly endogamous, whether through preference or through opportunity. A sample of 2,465 couples extracted from the 1985 General Household Survey data (consisting of couples who were both in their first marriage, who were both aged 49 or less and whose fathers' occupations were neither missing or in the 'Armed Forces' Socio-Economic Group) confirms this: the odds ratio for the 2x2 table formed by crosstabulating the graduate/non-graduate dichotomy for husbands against that for wives is 26.2, with 62% of married female graduates being married to male graduates. (Graduate in this context means someone who has a university or CNAA first or higher degree).

TABLE 4/36: A cross-classification of husband's highest educational qualification by wife's highest educational qualification according to the six-category hierarchy derived in this chapter: Data from the 1979 General Household Survey (married women aged 20-44; N=2,882)

Husband's highest qualification	Wife's highest qualification					
	1	2	3	4	5	6
1	57	73	42	17	0	15
2	16	59	80	46	1	54
3	9	56	135	109	7	169
4	1	14	92	92	10	211
5	0	9	27	47	9	168
6	7	32	117	173	22	906

TABLE 4/37: Parameter estimates of various models of Table 4/36 (a table of husband's highest educational qualification by wife's highest educational qualification derived from the 1979 General Household Survey).

	RC(1)	Quasi-RC(1)	RC(2)	
Row scores				
1	-2.54	-2.56	-2.45	-1.31
2	-1.33	-1.54	-1.48	0.01
3	-0.65	-0.50	-0.70	0.67
4	0.02	0.40	0.22	1.79
5	0.59	1.25	0.76	0.76
6	0.81	0.53	0.74	-0.80
Column scores				
1	-2.81	-2.59	-2.45	-3.83
2	-1.78	-2.08	-1.86	-0.54
3	-0.87	-0.82	-0.96	1.20
4	-0.28	-0.05	-0.25	0.89
5	0.62	1.61	1.09	1.69
6	0.80	0.71	0.80	-0.41
Φ_k coefficients:				
1	0.65	0.49	0.58	
2	----	----	0.16	
Diagonal parameter estimates				
1	----	1.01 (0.25)	----	
2	----	-0.17 (0.18)	----	
3	----	0.12 (0.12)	----	
4	----	-0.04 (0.13)	----	
5	----	-0.30 (0.38)	----	
6	----	0.83 (0.09)	----	

(Figures in parentheses are standard errors)

Hierarchical log-linear models were fitted to the four-dimensional table (Table 4/38) of the graduate/non-graduate dichotomy for each spouse by father's occupation for each spouse (which was coded into a trichotomy roughly equivalent to Goldthorpe's 'Service', 'Intermediate' and 'Working' classes: see Table 4/39). Adding terms by forwards selection led to a model containing the main effects and all the two-factor interactions. This model has a deviance of 17.3 on 16 degrees of freedom ($P>0.05$). The residuals from this model do not suggest that the extent of homogamy/heterogamy varies according to the levels of the husband's and wife's graduate/non-graduate dichotomies, and the addition of interactions designed to take account of such effects do not result in models which fit the data significantly better than this one.

The above model does not provide evidence in support of the hypothesis that assortative marriage for social origin is 'weaker' among homogamous graduate couples than among other couples.

TABLE 4/38: Husband's educational category by wife's educational category by husband's social origin category by wife's social origin category: data from the 1985 General Household Survey.

HUSBAND NON-GRADUATE, WIFE NON-GRADUATE:

Husband's social origin	Wife's social origin		
	Service	Intermediate	Working
Service	118	140	144
Intermediate	142	272	284
Working	131	281	693

HUSBAND NON-GRADUATE, WIFE GRADUATE:

Husband's social origin	Wife's social origin		
	Service	Intermediate	Working
Service	12	6	4
Intermediate	5	8	3
Working	5	2	3

HUSBAND GRADUATE, WIFE NON-GRADUATE:

Husband's social origin	Wife's social origin		
	Service	Intermediate	Working
Service	32	23	14
Intermediate	18	10	9
Working	11	4	14

HUSBAND GRADUATE, WIFE GRADUATE:

Husband's social origin	Wife's social origin		
	Service	Intermediate	Working
Service	37	9	5
Intermediate	6	7	4
Working	3	2	4

TABLE 4/39: A schema for a three class social origin variable based on socio-economic groups

Social origin schema

Service class: SEG's 1, 2, 4 to 8

Intermediate class: SEG's 3, 9, 11, 15 to 17

Working class: SEG's 10, 12 to 14, 18.

5. Assortative marriage for occupation

Several authors have presented/examined cross-classifications of husband's occupational category by wife's occupational category. Some authors have presented such tables to demonstrate the strength of 'class endogamy/homogamy' (e.g. McRae, 1986; Mascie-Taylor, 1990).

The tables presented often correspond to the current occupations of a cross-section of (dual-earner) couples with a variety of marriage durations. The existence of a considerable amount of intragenerational occupational mobility, especially for married women, means that two couples with identical combinations of occupations may in fact only appear similar because they are at different stages of the life-cycle. Additionally, if couples where one or both spouses are non-employed are excluded, such tables are clearly unrepresentative of the married population as a whole.

Haskey (1983) presented a cross-classification of the Registrar General's Social Classes of a sample of couples married in 1979 according to the occupations recorded on their marriage certificates. This type of table does not suffer from life-cycle effects, and also has the advantage of focusing on a point in time which is highly relevant if one is interest in occupational homogamy in the context of partner selection.

5.1. A critical re-analysis of a table first analysed by Hout

A notable analysis of a table of husband's occupation by wife's occupation was carried out by Hout (1982). He fitted various models to a 5x5 table of husband's occupation by wife's occupation for a sample of dual-earner families (Table 4/40), and interpreted the parameter estimates for a quasi-homogeneous row and column effects (I) model (see De Graaf, 1985; p1079) which fitted the data adequately. (Note that Hout's table was constructed by manipulating US Census Bureau population estimates and should be treated with some caution).

De Graaf (1985) criticised Hout's interpretation of the parameter estimates and interpreted instead the results of a re-parameterization of the same model. While Hout's rejoinder (Hout, 1985) suggests that most of the Hout/De Graaf dispute is merely a matter of semantics, it is clear that Hout regards the most substantively important part of the table's underlying structure as an "important boundary between clerical-sales workers and blue-collar workers"', (Hout, 1985; p1087), whereas De

Graaf felt there to be three important 'status boundaries' underlying the structure of the table.

One major criticism of Hout's 1982 paper is his choice of model. While the row and column effects (I) model fitted the data better than the corresponding row and column effects (II) model (i.e. a quasi-homogeneous Goodman RC(1) model), the fact remains that the former model contains prior information relating to the ordering of the categories while the latter does not (see Table 4/41). In other words Hout is assuming that it is substantively reasonable to give the occupational categories the interval-level 'scores' given in Table 4/41. Conversely, as Goodman (1982) notes, association models are invariant under switches in the order of the row and/or column categories. This is precisely because they do not contain implicit assumptions about the 'status ordering' of the categories.

Hout's interpretation of his results is further complicated by his exact fitting of the diagonal cells. While in a larger table the diagonal cells would tend to be less important, in a 5x5 table such as this the diagonal cells contain a high proportion of the 'information' in the table relating to assortative marriage for occupational status. Dividing the association in the table between two overlapping sets of parameters can make the interpretation of the estimates difficult, and it is interesting that at one stage in his paper Hout uses fitted odds ratios as an aid to the interpretation of his models.

Neither the RC(1) association model nor the RC(2) association model fitted Table 4/40 adequately, so the RC(3) model (Model 1) was fitted to the table. The deviance of this model is 5.0 on 1 degree of freedom. Since the row and column scores from the model are very similar for all three dimensions, the homogeneous RC(3) model (Model 2) was fitted to the data (i.e. the row and column scores were set equal). The change in deviance from Model 1 was minimal, and Model 2 fits the data well (deviance=5.9 on 7 degrees of freedom).

Model 2 can be interpreted by an examination of the three sets of scores, one set per dimension (see Table 4/42). The categories with the extreme scores on the first dimension are the professional/managerial and blue-collar categories. The intermediate scores seem consistent with the interpretation of the first dimension as corresponding to occupational status, with the farming and clerical/sales categories being closer to the professional/managerial category than the service category. The second set of scores serves to contrast the farming category with the other categories, especially the clerical-sales

category, hence one might see the second dimension as being an urban versus rural dimension. De Graaf (1985; p1081) seems to regard this farm/non-farm dichotomy as related to status; my own feeling is that it probably reflects geographical constraints. The third set of scores contrasts the service category with the farm category, and contributes to the explanation of the large farm/service odds ratio noted by both Hout and De Graaf.

The first set of scores possibly sheds some light as to the relative importance of the two 'status boundaries' between the professional/managerial and clerical/sales categories and between the clerical/sales and blue-collar categories. The difference between the scores of the first pair of categories is 0.60 as compared to a difference of 0.99 between the second pair. The implication would appear to be that the second 'boundary' is of greater magnitude than the first, supporting Hout's belief in the pre-eminence of the white collar/blue collar divide (note that it is the squared difference between scores which is of most relevance, adding further strength to Hout's argument). However, De Graaf's conclusion that there are three 'status boundaries' evident in the table also appears to be supported, given that one accepts that 'status boundaries' are a sensible way of conceptualising the structure underlying the observed frequencies. The concept of status 'boundaries' is not necessarily a very useful one, since it tends to reinforce the idea that the occupational categories used are internally homogeneous and distinct from each other with respect to the dimensions underlying the table. This is unlikely to be the case.

The final section of De Graaf's comment on Hout's paper is a demonstration of the unnerving effects that the use of different aggregations can have on the apparent size and position of status 'boundaries'. Using a concept of status 'distances' instead of status 'boundaries' would seem to be the solution, in combination with the use of a reasonably disaggregated set of occupational categories. Perhaps the most obvious criticism of Hout's analysis is simply that the use of only five occupational categories is likely to obscure effects which would be visible if less heterogeneous categories were used. Furthermore, it is debatable whether parameter estimates which measure the 'social distance' or the magnitude of the 'boundary' between two categories are of much substantive interest if the categories are large and heterogeneous.

TABLE 4/40: Husband's occupation by wife's occupation (taken from Hout, 1982: Data from the US Census Bureau).

Husband \ Wife	P/M	C/S	Blue	Serv	Farm
Professional/Managerial	1708	1872	236	416	26
Clerical/Sales	405	836	142	192	3
Blue-collar	741	2242	1297	1125	34
Service	149	279	112	245	3
Farming	62	97	34	67	114

TABLE 4/41: Implied scores for occupational categories in the row and column effects model (I) applied to Table 4/40 by Hout (1982).

Professional/Managerial	5
Clerical Sales	4
Blue Collar	3
Service	2
Farming	1

TABLE 4/42: Row/Column scores from the homogeneous RC(3) model applied to Table 4/40

Dimension:	1	2	3
Professional/Managerial	-0.86	0.01	-0.09
Clerical Sales	-0.26	0.51	0.06
Blue Collar	0.73	0.02	-0.04
Service	0.25	-0.23	0.76
Farming	-0.27	-1.96	-0.23

(Note that the Φ_k's for each dimension have been incorporated into the scores by multiplying each score by $\sqrt{\Phi_k}$ [See Section 2.8 of Chapter 2]).

5.2. A cross-classification of husbands' and wives' pre-marital occupations

As noted earlier, an interest in the relationship between assortative marriage for occupation and partner selection would seem to call for an examination of the pre-marital occupations of spouses. Only surveys which either focus on marriage or collect retrospective work-history information for couples (rather than just for single respondents) are likely to provide the data necessary to construct a table similar to that presented by Haskey (1983). One such survey is the 1976 Family Formation Survey (FFS), which collected data on the pre-marital occupations of its respondents and their husbands. Table 4/43 is a cross-classification of the Socio-Economic Groups (SEG's) of the FFS respondents and their first husbands, excluding couples where the occupations of one or both spouses were in the Armed Forces, inadequately described, or missing.

Table 4/43 has the disadvantage, compared with Haskey's table, of corresponding to a sample of couples who were married over a thirty year period rather than in a single year. However, it has the advantage of the extra detail afforded by the use of SEG's rather than Registrar General's Social Classes, which is the reason why the data ~~is~~ are used here.

Clearly a very high proportion of the cases in Table 4/43 are concentrated into a small number of cells (e.g. 22% of them fall in to the single cell corresponding to skilled manual husbands (SEG 9) with junior non-manual wives (SEG 6)). Conversely, Table 4/43 contains a large number of sampling zeros and other cells with very low frequencies. In fact, several of the SEG's have sufficiently low marginal frequencies that it would seem sensible to collapse the table by aggregating them with other SEG's, given that there are other SEG's that it makes substantive sense to aggregate them with.

Before aggregating categories in Table 4/43 it would seem sensible to gain an empirical insight into assortative marriage for occupation from a similar table based on the current occupations of dual-earner couples.

Table 26B in the 1981 Census Household and Family Composition report is a cross-classification of the currents SEG's of husbands and wives in a 10% sample of the Census. The sub-table corresponding to couples where both spouses are currently employed is henceforth referred to as Table C1. (Note that Table 4/43 and Table C1 are both 15x15 tables based on the same set of SEG's, but that the coding of occupations into

the SEG's was carried out using the 1970 Classification of Occupations in the case of Table 4/43 and the 1980 Classification of Occupations in the case of Table C1).

Murgatroyd (1984) used multidimensional scaling (in the form of the MDSX program MINISSA) to examine a table similar to Table C1, but more detailed, which she extracted from the results of the 1971 Census. Her intention was to produce a set of occupational groups for women based on Socio-Economic Groups, since she (correctly) argued that the set of Registrar General's Social Classes is an inappropriate set of categories to be used in the context of women's occupations.

The analysis of Table C1 carried out here uses adaptations of association models, which Chapter 2 suggests are superior to multidimensional scaling in this context. Murgatroyd excluded the agricultural SEG's from her analysis because they "tended to obscure the relationship among the other categories", (Murgatroyd, 1984; p484). Whereas Murgatroyd's use of multidimensional scaling applied to distances calculated using Blau and Duncan's dissimilarity index meant that she either had to interpret a multidimensional solution including an agricultural dimension or exclude the agricultural categories, the use of adapted association models allowed the effects of agricultural endogamy to be removed from consideration by the inclusion of parameters to fit exactly the cells corresponding to agricultural endogamy (see Section 2.9 of Chapter 2).

Table 4/44 shows the deviances of various models fitted to Table C1. Unsurprisingly, given that Table C1 has a sample size of over 500,000, none of the models fits the data. More relevant than the fit of the model is the proportion of the original deviance accounted for by successive models. It can be seen from Table 4/44 that the quasi-RC(1) model uses 21% of the original degrees of freedom to account for about 95% of the original deviance. Over half of the remaining deviance can be explained by the inclusion of an extra half-a-dozen parameters to take account of agricultural endogamy. A quarter of the deviance remaining after the agricultural parameters have been added can be accounted for by ten parameters corresponding to marriages between individuals from four 'self-employment/petty bourgeois' SEG's (SEG's 2, 12, 13 and 14).

Adding a second underlying dimension (giving a quasi-RC(2) model plus parameters for agricultural and 'self-employment/petty bourgeois' endogamy) accounts for most of the remaining variation. However, the parameter estimates corresponding to the second dimension of this model are not at all symmetric for the two sexes and have no straightforward

interpretation. Therefore it does not seem unreasonable to focus on the preceding model, i.e. the quasi-RC(1) model plus parameters to take account of agricultural and 'self-employment/petty bourgeois' endogamy. Table 4/45 contains the row and column scores from this model.

Bearing in mind the marginal totals of Table 4/44 and the inclusion in the model of Table C1 of parameters corresponding to the agricultural and 'self-employment/petty bourgeois' SEG's, the scores in Table 4/45 seem to suggest that the following aggregations of SEG's would be reasonably sensible

(i) SEG's 3 and 4

(ii) SEG's 1 and 5

(iii) SEG's 13 and 14

(iv) SEG's 2 and 12

(v) SEG's 8 and 9

It is interesting to compare the above suggested aggregations with the aggregation of SEG's into pseudo-Goldthorpe categories put forward by Heath (1990), the aggregation of SEG's into Women's Occupational Groups put forward by Murgatroyd (1984), and the aggregation of SEG's into the Registrar General's Social Classes.

Aggregation (i) suggested above occurs in all three of the above schemes. Aggregation (ii) suggested above occurs in Murgatroyd's scheme and the Registrar General's Social Classes scheme. Aggregations (iii) and (iv) suggested above occur in Heath's scheme and in the Registrar General's Social Classes scheme, and were not considered by Murgatroyd. Aggregation (v) suggested above occurs in the Registrar General's Social Classes scheme.

Table 4/43 is now collapsed to give a more manageable and less sparse table. The above five aggregations of SEG's can be made for a change in deviance of 107.1 on 115 degrees of freedom ($P>>0.05$; see Section 2 of this chapter). However, it should be noted that the large number of sampling zeros involved may make only a small contribution to the change in deviance. Moreover, the aggregations of SEG's 8 and 9 and of SEG's 1 and 5 do individually result in changes in deviance which are just significant at the 5% level.

Two further aggregations corresponding to SEG's with small marginal frequencies are the aggregation of SEG's 1, 3, 4 and 5 and the

aggregation of SEG's 10 and 11. The results of the analysis of Table C1 (see Table 4/45) show SEG's 3 and 4 (the professional SEG's) to have 'status' scores which are considerably higher than those of SEG's 1 and 5, but the small number of women in Table 4/43 who belong to SEG's 3 and 4 would seem to provide some justification for this aggregation (which results in something akin to Goldthorpe's 'Service' class), though it should be noted that this aggregation obscures the (unsurprisingly) high level of professional endogamy visible in Table 4/43. Few women in Table 4/43 belong to SEG 11, and the aggregation of SEG's 10 and 11 is consistent with the results in Table 4/45 (though the 'distance' between SEG 10 and SEG 11 is similar for each sex to the 'distance' between SEG 9 and SEG 10).

Table 4/46 is the collapsed version of Table 4/43 resulting from the above seven aggregations. The quasi-RC(1) model plus extra parameters to take account of agricultural and 'self-employment/petty bourgeois' endogamy was fitted to Table 4/46 with a resulting deviance of 33.3 on 26 degrees of freedom ($P>0.05$). Table 4/47 shows the parameter estimates from this model. It can be seen that the diagonal parameter estimates show high levels of endogamy for five of the eight occupational categories, and that the agricultural and 'self-employment/petty bourgeois' parameter estimates are more than twice their standard errors <u>despite</u> the small numbers of cases falling into the relevant cells.

The row and column scores are much as one would have expected, with the 'Service' class category at one extreme and the semi-skilled and unskilled manual workers at the other extreme. SEG 7 ('Personal services') lies between the non-manual and the manual categories.

The results in Table 4/46 show strong similarities to the results of the analysis of Hout's table. However, the use of an 8x8 table instead of a 5x5 table allows the 'self-employment/petty bourgeois' effect to be visible, along with differences between farmers and agricultural workers, and differences between manual categories.

An even better picture of the structure of occupational homogamy might be forthcoming if data were analysed which had a 'split' SEG 2 (as in the pseudo-Goldthorpe schema of Heath, 1990) and disaggregated versions of SEG's 6 and 7 - both very much 'female' SEG's!

TABLE 4/43: A cross-classification of the Socio-Economic Groups (see schema at foot of table) of the husbands' and wives' pre-marital occupations of a sample of couples from the 1976 Family Formation Survey (N=4,200).

	Wife's SEG														
Husband's SEG	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1.	7	4	1	5	34	67	4	1	5	7	0	0	0	0	0
2.	1	8	0	1	23	57	10	0	7	14	0	1	0	1	0
3.	0	0	0	0	5	10	1	0	1	0	0	0	0	0	0
4.	5	5	1	9	72	107	5	0	5	3	1	1	0	0	0
5.	3	4	0	2	92	90	17	1	4	6	1	0	0	0	1
6.	3	7	0	3	82	405	19	0	20	50	1	1	0	0	1
7.	0	1	0	1	4	17	13	0	3	5	0	0	0	0	0
8.	2	1	0	1	4	27	5	2	4	8	2	0	0	0	1
9.	2	20	0	1	140	893	117	11	217	446	16	3	1	1	13
10.	1	3	0	0	33	190	31	5	45	150	7	1	0	0	5
11.	0	0	0	0	10	71	20	1	30	61	9	0	0	0	1
12.	0	1	0	0	8	43	6	0	1	14	0	0	0	0	0
13.	0	2	0	0	4	15	3	0	1	2	0	0	0	0	2
14.	0	0	0	0	3	10	2	0	0	0	1	0	0	1	1
15.	0	0	0	0	13	50	16	0	10	15	4	1	0	0	13

SEG 1: Employers and managers: Large establishments
2: Employers and managers: Small establishments
3: Professional: Self-employed
4: Professional: Employees
5: Intermediate non-manual (including non-manual supervisors)
6: Junior non-manual
7: Personal service
8: Foreman and supervisors (manual)
9: Skilled manual
10: Semi-skilled
11: Unskilled
12: Non-professional self-employed
13: Farmers (employers and managers)
14: Farmers (own-account)
15: Agricultural workers

TABLE 4/44: The deviances of various models fitted to a 15x15 table (Table C1) of wife's current occupation's Socio-Economic Group by husband's current occupation's Socio-Economic Group (extracted from Table 26B in the 1981 Census Household and Family Composition report; see Table 4/43 for the Socio-Economic Group schema).

Model	Deviance	d.f.	%
Independence	153,629	196	100.0
Quasi-independence	64,799	181	42.2
RC(1)	56,160	169	36.6
Quasi-RC(1)	8,490	154	5.5
Quasi-RC(1) + agric	3,670	148	2.4
Quasi-RC(1) + agric + self-emp	2,793	138	1.8
Quasi-RC(2) + agric + self-emp	883	113	0.6

agric = parameters corresponding to agricultural endogamy

self-emp = parameters corresponding to 'self-employment/petty bourgeois' endogamy

% = percentage remaining of the deviance of the independence model

TABLE 4/45: Row and column scores of the quasi-RC(1) model, plus extra parameters to take account of agricultural and 'self-employment/petty bourgeois' endogamy, applied to Table C1 (a sub-table of Table 26B in the 1981 Census Household and Family Composition report)

Socio-Economic Group (see Table 4/43)	Row score (wife)	Column score (husband)
1	1.00	1.00
2	0.95	0.89
3	2.11	1.70
4	1.63	1.29
5	1.10	0.99
6	0.82	0.78
7	0.35	0.39
8	0.29	0.34
9	0.23	0.29
10	0.16	0.17
11	0.00	0.00
12	0.97	0.54
13	1.36	0.97
14	1.28	0.84
15	0.41	0.22

Note that the scores for SEG's 1 and 11 are constrained to 0 and 1, and that $\Phi=2.87$ (see Section 2.8 of Chapter 2)

TABLE 4/46: A cross-classification of husbands' and wives' occupational categories (obtained by collapsing Table 4/43).

	Wife's category							
Husband's category	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
(i)	10	33	100	16	8	28	1	0
(ii)	14	236	274	27	17	18	0	1
(iii)	8	88	405	19	20	51	0	1
(iv)	1	5	17	13	3	5	0	0
(v)	24	150	920	122	234	472	2	14
(vi)	4	44	261	51	81	227	0	6
(vii)	2	7	25	5	1	3	1	3
(viii)	1	13	50	16	10	19	0	13

Categories

(i) SEG's 2 and 12
(ii) SEG's 1, 3, 4 and 5
(iii) SEG 6
(iv) SEG 7
(v) SEG's 8 and 9
(vi) SEG's 10 and 11
(vii) SEG's 13 and 14
(viii) SEG 15

(see schema in Table 4/43)

TABLE 4/47: Parameter estimates for the quasi-RC(1) model, plus extra parameters to take account of agricultural and 'self-employment/petty bourgeois' endogamy, applied to a table of husband's and wife's occupational categories (Table 4/46).

Category	Husband's score	Wife's score	Diagonal P.E.
(i)	1.00	1.00	1.11 (0.35)
(ii)	2.07	1.29	0.06 (0.14)
(iii)	1.20	0.72	0.60 (0.10)
(iv)	0.84	0.54	1.73 (0.34)
(v)	0.28	0.19	0.16 (0.12)
(vi)	0.00	0.00	0.14 (0.10)
(vii)	1.17	0.30	4.07 (1.19)
(viii)	0.60	0.07	3.01 (0.36)

Φ = 1.49 (see Section 2.8 of Chapter 2)

Agricultural endogamy parameter estimate = 2.65 (0.64)

'Self-employment/petty bourgeois' endogamy parameter estimate = 1.23 (0.61)

P.E.= Parameter estimate

Figures in parentheses are standard errors

5.3. The effects of parents' occupations in combination on the probability of an individual having a 'Service' class job.

As well as being of interest in the context of partner selection, husbands' and wives' occupations in combination are of relevance if one is of the opinion that family class should be based on the occupations of both spouses. Perhaps the classic example of the use of family class as an independent variable is in studies of social mobility.

Studies such as Goldthorpe (1987) and Payne (1987) examine male intergenerational social mobility by comparing the social classes of sons' occupations with the social classes of their fathers' occupations. However, other elements of family background over and above father's occupation are likely to have a substantial effect on sons' work histories. In particular, there seems to be no obvious reason why mother's occupation should not be of consequence.

Data relating to mother's occupation have not often been collected by surveys. However, the 1986 Social Change and Economic Life Initiative (SCELI) main survey asked its respondents what their mothers' occupations had been before their mothers first had children. The data collected by SCELI therefore allow one to examine the relationship between a respondent's occupation and the occupations of both his or her parents (with the proviso that the limitation of SCELI to six study areas means that one cannot be absolutely certain that any relationships observed exist in the same form in the rest of Britain).

Classes I and II of Goldthorpe's seven-class occupational schema (Goldthorpe, 1987) are sometimes collectively referred to as the 'Service' class. An example of a study focusing on the service class is Mills and Payne (1989), which examines the attainment of a service class job from a worklife perspective. Mills and Payne justify paying specific attention to the service class by its favourable work and market conditions. The same justification applies to the analyses which follow, which each have as their dependent variable a dichotomy of respondents' occupations consisting of the 'Service' class on one hand, and the 'Intermediate' and 'Working' classes (i.e. all other occupations) on the other hand.

The sample for the first analysis consisted of 1,606 male respondents to SCELI who were employed or self-employed at the survey date and for both of whose parents occupations had been recorded. The analysis consisted of a logit model (fitted using GLIM), with the achievement of a Service class job as the response variable and the

Goldthorpe classes of the two parents' occupations as explanatory variables. Initially, father's occupation was categorized into the usual seven Goldthorpe classes, while Goldthorpe classes I and II were aggregated and class III was split into classes IIIa and IIIb in the case of mother's occupation. (The aggregation was made because of the small number of mothers with occupations in class I).

Both father's occupation and mother's occupation made significant contributions to the fit of the initial model. However, it was evident that the differences between some of the parameter estimates were not statistically significant. In the case of father's occupation it was clear that the parameter estimates for classes I to III differed from the parameter estimates for classes IV to VII, but not that the parameter estimates within each of these groups varied significantly. In actual fact, the change in the model's fit through the aggregation of classes I to III was not significant, but classes IV to VII could not be aggregated without a significant worsening of the fit. However, it did prove possible to aggregate classes IV and V and to aggregate classes VI and VII.

In the case of mother's occupation, classes IIIb to VII could be aggregated without a significant worsening of the model's fit. Beyond this, the parameter estimate for class I/II was clearly distinct from those of the other classes. While class IIIa could be aggregated with classes IIIb to VII without the fit of the model worsening significantly (at the 5% level), the relevant change in deviance (3.0 on 1 degree of freedom) was sufficiently large to suggest that such an aggregation might 'hide' a difference of substantive significance.

The overall change in deviance resulting from the above aggregations was 2.9 on 8 degrees of freedom. Table 4/48 shows the parameter estimates from the model obtained after the aggregations had been performed. It is clear from Table 4/48 that having a father in Goldthorpe classes I to III or a mother in classes I to II has a very strong positive effect on the probability of a male respondent being in a service class job. Table 4/49 shows the percentages of male respondents in service class jobs according to father's and mother's aggregated classes. Male respondents with fathers in Goldthorpe classes I to III and mothers in classes I to II were considerably more likely to be in service class jobs than male respondents in any other category, though it should be noted that no significant interaction between the effects of mother's class and father's class was found.

The above analysis is clearly fairly crude, in as much as the respondents are of a variety of ages but no attempt has been made to take account of intragenerational mobility. However, the problem of male respondents' intragenerational mobility is minor compared with the problem of the intergenerational mobility of female respondents.

The way in which the problem was dealt with was to divide female respondents into two groups according to whether they had ever had a service class job. In fact, 32% of the 2,168 women for both of whose parents occupations had been recorded had at some point had a service class job. (This figure is not vastly different from the 34% of (employed/self-employed) men who had service class jobs at the survey date).

Thus in the analysis of female intergenerational mobility, the dependent variable is based on 'highest' rather than current occupation. Once again, a logit model was fitted (using GLIM) and the two seven-category parental variables were initially included as explanatory variables. Classes with similar parameter estimates were again aggregated, with the patterns of parameter estimates suggesting aggregations which were gratifyingly similar to those carried out in the male analysis. The change in deviance resulting from the aggregations was 1.1 on 6 degrees of freedom.

In fact the aggregated categories in the female analysis differ from those in the male analysis only because Goldthorpe class VII could not be aggregated with any of the other classes for either parent. Table 4/50 shows the parameter estimates from the final model in the female analysis.

It is clear that having a mother in Goldthorpe classes I to II or a father in classes I to III has a very strong positive effect on the probability of a female respondent ever having had a service class job, while the converse is true for female respondents with a father or mother in Goldthorpe class VII. An interesting point to note is that having a a mother in class IIIa is associated with a significantly higher probability of a female respondent having had a service class job than is having mother in classes IIIb to VI. The most interesting point to note is, however, that the effects of the class of mother's occupation are as strong as the effects of the class of father's occupation. This suggests that mother's occupation exerts a stronger influence on daughter's occupation than it does on son's occupation relative to the influence of father's occupation.

Table 4/51 shows the percentages of female respondents ever having had a service class job according to the (aggregated) classes of mothers' and fathers' occupations. As in the male analysis, the interaction between the effects of the classes of the mothers' and fathers' occupations was not significant.

TABLE 4/48: Parameter estimates from a logit model of the probability of male respondents to the Social Change and Economic Life Initiative main survey having a service class job at the survey date.

Covariate	Parameter estimate	Standard error
(Constant)	0.713	0.196
Father's occupation		
Goldthorpe classes I to III	0.000 (base)	
Goldthorpe classes IV and V	-0.763	0.167
Goldthorpe classes VI and VII	-1.071	0.131
Mother's occupation		
Goldthorpe classes I and II	0.000 (base)	
Goldthorpe class IIIa	-0.546	0.221
Goldthorpe classes IIIb to VII	-0.786	0.204

TABLE 4/49: Percentages of male respondents to the Social Change and Economic Life Initiative main survey with service class jobs at the survey date according to (aggregated) classes of their mothers' and fathers' occupations (N=1,606).

Goldthorpe class of father's occupation	Goldthorpe class of mother's occupation: I to II		IIIa		IIIb to VII	
I to III	70%	(50/71)	53%	(77/144)	48%	(95/200)
IV and V	44%	(8/18)	37%	(23/63)	30%	(57/188)
VI and VII	37%	(12/33)	29%	(35/120)	24%	(187/769)

TABLE 4/50: Parameter estimates from a logit model of the probability of female respondents to the Social Change and Economic Life Initiative main survey ever having had a service class job.

Covariate	Parameter estimate	Standard error
(Constant)	0.610	0.173
Father's occupation		
Goldthorpe classes I to III	0.000 (base)	
Goldthorpe classes IV and V	-0.495	0.136
Goldthorpe class VI	-0.775	0.134
Goldthorpe class VII	-1.142	0.139
Mother's occupation		
Goldthorpe classes I and II	0.000 (base)	
Goldthorpe class IIIa	-0.492	0.193
Goldthorpe classes IIIb to VI	-0.796	0.191
Goldthorpe class VII	-1.061	0.192

TABLE 4/51: Percentages of female respondents to the Social Change and Economic Life Initiative main survey ever having had service class jobs according to (aggregated) classes of their mothers' and fathers' occupations.

Goldthorpe class of father's occupation	Goldthorpe class of mother's occupation							
	I to II		IIIa		IIIb to VI		VII	
I to III	67%	(61/91)	50%	(102/204)	48%	(72/150)	39%	(42/108)
IV and V	42%	(16/38)	48%	(44/92)	28%	(39/139)	31%	(48/153)
VI	67%	(8/12)	27%	(25/91)	30%	(61/205)	22%	(56/250)
VII	33%	(4/12)	34%	(24/70)	21%	(39/189)	15%	(57/364)

6. The Joint Occupations, Educational Levels and Social Origins of Married Couples.

Earlier in this chapter it was shown that educational level appears to be of more salience in the context of partner selection than social origin (measured in terms of father's occupation). However, an individual's achieved social status is more often measured in terms of their occupation than it is in terms of their educational level and it would seem worthwhile to examine the relative importance of educational level, social origin and occupation. Hence, this section examines the relationships between six variables, i.e. the occupations, educational levels and social origins (fathers' occupations) of married couples. Since a major interest of this thesis is assortative marriage, attention is focussed on the 'between-partner' relationships, e.g. the relationship between husband's occupation and wife's occupation.

This section is concerned with association rather than dependency. It focuses on pairs of variables, and then on the association between two groups of variables (c.f. canonical correlation analysis).

While occupation, social origin and education are clearly temporally ordered in the context of a single individual, no such temporal ordering applies to two of these variables applying to two different individuals

Fifteen different pairs of variables can be chosen from the six variables of interest (see Table 4/52). Six of these are 'within-individual' pairs, i.e. they each consist of two variables which correspond to a single individual (e.g. husband's occupation and husband's educational level). Of the other nine pairs, which consist of one variable corresponding to each partner, three are 'symmetric' (e.g. husband's educational level and wife's educational level) and six are 'asymmetric' (e.g. husband's occupation and wife's social origin).

The three 'symmetric' pairs of variables relate to occupational, educational and social origin homogamy. By examining these pairs of variables in the context of a six-way table of spouses' occupations, educational levels and social origins, one can observe the extent to which the three forms of homogamy overlap, and can also observe their relative strengths once adjustments have been made to take account of these overlaps.

The six 'asymmetric' pairs of variables are also of considerable interest. Given that occupation, educational level and social origin all contribute to some 'general' form of social status, one would expect the

log-odds ratios corresponding to these six pairs of variables to be positive. Together with the log-odds ratios for the three 'symmetric' pairs of variables, these six log-odds ratios can be used to assess the relative contributions of occupation, educational level and social origin to assortative marriage for social status.

There is no obvious reason why the relative contributions should be the same for both sexes, and a between-sex comparison of the relative contributions of occupation, educational level and social origin to social status in the context of marriage is clearly of interest.

Data from the 1979 and 1982 General Household Surveys were used to construct six-way tables corresponding to the six variables of interest. (The 'rolling sample' nature of the GHS means that the 1980 and 1981 surveys share some primary sampling units with the 1979 survey). In order to keep the analyses as simple as possible each variable was reduced to a dichotomy, and this also kept the number of cells in the tables down at a manageable level. (A six-dimensional table based on six dichotomies has 2^6=64 cells; see Section 4 of Chapter 2 for a discussion of the operationalization of concepts as dichotomies).

The occupation and social origin dichotomies were based on Socio-economic Groups, with one half of the dichotomy in each case being primarily non-manual, and the other half of the dichotomy being primarily manual (see Table 4/53).

The educational dichotomy was based on the possession of qualifications equivalent to or better than 'O' levels. Clerical and commercial qualifications were treated as equivalent to 'O' levels (see Table 4/53).

Couples were excluded if either partner's occupation, or either partner's father's occupation, belonged to the armed forces socio-economic group. Also excluded were couples where either partner had foreign qualifications but no British qualifications of 'O' level standard or above. Finally, only couples where none of the six variables ~~was~~ were missing were included, though in those cases where an individual was not currently employed their last occupation was taken to be an adequate substitute.

Since the General Household Survey collects information only on father's occupation for respondent's aged 49 or less, only couples where both partners were aged 49 or less were included. Attention was also restricted to couples where both partners were in their first legal marriage.

6.1. An analysis of six-way tables of husbands' and wives' occupations, educational levels and social origins using hierarchical log-linear models

In the first instance a sample of 2,802 couples from the 1979 GHS was examined. Table 4/54 contains the 2x2 tables corresponding to the three 'symmetric' pairs of variables. The odds ratios for these tables can be thought of as measures of homogamy for occupation, for education, and for social origin. The odds ratio for education is the largest of the three, but it is worth remembering that the odds ratios are dependent on the choices of dichotomies. (The marginal distributions of the three 2x2 tables show that the six dichotomies are reasonably well 'balanced', i.e. at least 25% of the sample belongs to each half of each dichotomy).

Hierarchical log-linear models were fitted to the six-way table corresponding to the 1979 GHS sample (Table 4/55).

The first model (Model 1) included the six main effects and the six 'within-individual' two-factor interactions. Model 1 thus allowed for interactions between the three variables relating to the husbands, and between the three variables relating to the wives, but not for interactions which included variables corresponding to both spouses. (The two 'within-individual' three-factor interactions were not included because they were found to be statistically insignificant).

Unsurprisingly, Model 1 does not fit the data well (see Table 4/57). The three 'symmetric' two-factor interactions were therefore added to Model 1 to give Model 2. Model 2 is a significant improvement on Model 1 but still does not fit the data well.

By exponentiating the parameter estimates from Model 2 for the three 'symmetric' two-factor interactions 'partial odds ratios' were obtained which can usefully be compared with the odds ratios derived from the 2x2 tables in Table 4/54 (see Section 3 of Chapter 2 for a discussion of partial odds ratios). These partial odds ratios are adjusted to take account of the overlap between different forms of homogamy, e.g. the partial odds ratio corresponding to occupational homogamy has been adjusted to take account of educational homogamy. Partial odds ratios are analogous to partial correlations.

These partial odds ratios (see Table 4/58) are somewhat smaller than the odds ratios in Table 4/54, which reflects the fact that some of the homogamy visible in the 2x2 tables is common between the three tables.

The six 'asymmetric' two-factor interactions were added to Model 2 to give Model 3. Model 3 is a significant improvement on Model 2, and only one of the six 'asymmetric' two-factor interactions can be removed from Model 3 without a significant deterioration in the fit of the model. Exponentiating the parameter estimates from Model 3 for the three 'symmetric' two-factor interactions to give partial odds ratios demonstrates (see Table 4/58) that the inclusion of the 'asymmetric' interactions further reduces the extent to which the association in the 2x2 tables in Table 4/54 can be seen as homogamy relating distinctly to the variables defining each 2x2 table.

The fact that Model 3 fits the data significantly better than Model 2 indicates that the 'asymmetric' pairs of variables do interact to a significant extent, and therefore one cannot reasonably examine occupational, educational and social origin homogamy without also considering the 'asymmetric homogamy' implicit in the positive correlation between a 'high' level on one status-related variable and a 'high' level on a different status-related variable.

The fitted values from Model 3 only just differ significantly from the data at the 5% level. However, a better model (Model 4) was found by adding three-factor interactions to Model 3 using forwards selection. Four three-factor interactions were added in this fashion, of which three only just resulted in an improvement in fit which was significant at the 5% level.

Model 4 fits the data well, but one should be cautious of placing too much reliance on an empirically-derived model of this sort. For this reason, the model-fitting process was repeated using a comparable sample of couples from the 1982 General Household Survey (see Table 4/56).

When Model 3 was fitted to the 1982 data, the extent to which the fitted values differed from the data was again found to be insignificant at the 5% level. However, once again, three-factor interactions were added to Model 3 using forwards selection. The addition of two of the three-factor interactions resulted in a significant improvement in fit and these interactions were therefore added to Model 3 (giving Model 5), but only one of these interactions corresponded to one of the four three-factor interactions included in Model 4, i.e. the interaction between husband's and wife's educational levels and husband's occupation.

Though it can be improved upon for both the 1979 and the 1980 data by the addition of the last-mentioned interaction (giving Model 6),

Model 3 has an elegant structure and fits the data sufficiently well to be worthy of further examination. Therefore Model 3, which contains only two-factor interactions, is the focus for the rest of this sub-section.

For both the 1979 and the 1982 data, the removal from Model 3 of the interaction between husband's social origin and wife's occupation does not significantly worsen the fit of the model, but it seems reasonable to retain this interaction, because its parameter estimates are positive as expected and because one might have expected it to have been the 'weakest' of the nine interactions. For the 1982 data only, the husband's education/wife's occupation interaction also had a statistically insignificant parameter estimate.

Table 4/55 is a two-way version of the six-way table corresponding to the 1979 data. The top left-hand and bottom right-hand corners of this table contain couples who are homogamous for occupation, for education and for social origin, with the top left-hand corner corresponding to couples wherein both partners belong to the 'higher' category of each of the variables, and the bottom right-hand corner corresponding to couples wherein both partners belong to the 'lower' category of each of the variables.

Conversely, the bottom left-hand and top right-hand corner cells contain highly heterogamous couples, where one partner belongs to the 'higher' category of each of the variables and the other partner belongs to the 'lower' category of each of the variables.

One possible summary measure of the strength of 'social status' homogamy in the data is the odds ratio corresponding to the four corner cells of Table 4/55. The fitted version (from Model 3) of this odds ratio has the property of being the product of the exponentiated parameter estimates for the three 'symmetric' and the six 'asymmetric' two-factor interactions. In other words, the fitted version of the summary measure described above can be decomposed into contributions from the nine possible interactions between one husband-related variable and one wife-related variable.

If one was presented with two very high status individuals, one of each sex, and two very low status individuals, one of each sex, and one was told that the four individuals could be divided into two married couples, then one would almost certainly assume that the two high status individuals were married to each other and that the two low status individuals were married to each other. The measure proposed above in effect says how reasonable such an assumption would be. Decomposing the

measure answers the question of why the assumption is reasonable by showing the extent to which educated men marry educated women, men with high status occupations marry educated women, women from high status backgrounds marry men with high status occupations, etc. (c.f. Section 3 of Chapter 2).

Table 4/59 shows the exponentiated parameter estimates obtained from Model 3 applied to the 1979 data for the nine 'between-individual' interactions. All nine numbers are greater than one, which implies that the 'higher' level of each husband-related variable is positively correlated with the 'higher' level of each wife-related variable. Table 4/60 shows the corresponding exponentiated parameter estimates from Model 3 applied to the 1982 data. The patterns in Tables 4/59 and 4/60 can be seen to be broadly similar.

The 1979 data and 1982 data were combined to give a seven-dimensional table and a log-linear model was fitted to this table to compare the nine 'between-individual' two-factor interactions. The change in deviance resulting from relaxing an assumption that the nine interactions were the same for both years is not significant, indicating that the patterns of 'between-partner' interaction do not differ significantly between the two years.

The leading diagonals of Tables 4/59 and 4/60 show that a tendency towards homogamy exists independently for occupation, for education and for social origin. Once all the other 'between-individual' interactions have been adjusted for, educational homogamy appears to be strongest, followed at a distance by occupational homogamy and social origin homogamy.

The off-diagonal entries in Tables 4/59 and 4/60 demonstrate that, while they are weaker than the 'symmetric' two-factor interactions, the interactions between 'asymmetric' pairs of variables are by no means negligible. In particular the relationship between husband's occupation and wife's social origin once all the other interactions have been adjusted for appears to be quite strong, in contrast with the relationship between husband's social origin and wife's occupation, which is not strong enough to be statistically significant.

The numbers in parentheses in the margins of Tables 4/59 and 4/60, which are obtained by multiplying together the scores in a row or in a column, and which multiply together to give the fitted version of the summary measure, also contain interesting information. If one compares the magnitude of the three elements in each margin, one is in effect

assessing the relative contributions of occupation, education and social origin to the overall tendency towards 'social status' homogamy. In the case of the husbands, occupation and education make contributions which are larger than the contribution made by social origin. In the case of wives, the contribution of education is by far the largest, with occupation and social origin making similar, smaller contributions. Occupation thus seems to be a much less important factor in the determination of female social status than it is in the determination of male social status in this context.

This last result is not particularly surprising, given the tendency for married women to occupy jobs of a lower social status after childbearing than the jobs that they had at marriage. If women's pre-marital occupation had been used in the analysis the contribution of women's occupations would have almost certainly been greater. Furthermore, the large number of women in routine non-manual jobs is bound to narrow the social status 'gap' between women in the non-manual half of the occupational dichotomy and women in the manual half.

The definition of each dichotomy determines the implicit unit of measurement corresponding to that variable. For example, in the case of husband's occupation, the difference between the two halfs of the dichotomy (which is the implicit unit of measurement) is the difference between the 'average' occupation of the non-manual husbands, and the 'average' occupation of the manual husbands. When one says that husband's occupation and husband's education make similar contributions to 'social status' homogamy, one is saying that the contributions of one occupational unit and one educational unit are similar (where the unit of measurement for education is the difference between the 'average' educational level of those with 'O' levels or better and the 'average' educational level of those with no qualifications or qualifications inferior to 'O' levels).

The problem of the different units of measurement for the different variables would be worse if, for example, the education variable was a graduate/non-graduate dichotomy. Since the proportions of cases falling into the two categories of each dichotomy are not too dissimilar, the problem of the different units of measurement is not too serious, so long as one is aware that one is not comparing like with like.

It is also possible that the use of dichotomies, which inevitably results in categories which are rather heterogeneous, results in one variable acting as a proxy for aspects of another variable which are not evident in its dichotomous version (see Section 4 of Chapter 2).

TABLE 4/52: The fifteen possible two-variable interactions between husband's and wife's occupation, educational level and social origin.

	HOC	HED	HSO	WOC	WED	WSO
Husband's occupation	-	W	W	BS	BA	BA
Husband's educational level		-	W	BA	BS	BA
Husband's social origin			-	BA	BA	BS
Wife's occupation				-	W	W
Wife's educational level					-	W
Wife's social origin						-

W = 'Within-individual' interaction.
BA= 'Between-individual', 'asymmetric' interaction.
BS= 'Between-individual', 'symmetric' interaction.

TABLE 4/53: Definitions of the occupational, educational level and social origin dichotomies used in Section 6 of Chapter 4.

Occupation/social origin
HIGH: SEG's 1 to 9 and 16.
LOW: SEG's 10 to 15, 17 and 18.
(see Table 4/16 for descriptions of the SEG's)

Educational level
HIGH: HEDQUAL categories 1 to 10
LOW: HEDQUAL categories 11, 12, 14 and 15.
(HEDQUAL is the General Household Survey Highest Educational Qualification variable; see Table 4/31)

TABLE 4/54: 2x2 tables relating to occupational, educational and social origin homogamy in a sample of couples from 1979 General Household Survey.

Wife's occupation		HIGH	LOW
Husband's occupation	HIGH	893	277
	LOW	733	899

Wife's educational level		HIGH	LOW
Husband's educational level	HIGH	841	429
	LOW	417	1115

Wife's social origin		HIGH	LOW
Husband's social origin	HIGH	367	457
	LOW	433	1545

TABLE 4/55: Six-way table of husbands' and wives' occupations, educations, and social origins (1979 General Household Survey data; N=2,802) [see Table 4/53 for definitions of categories]

			Social Origin							
			HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	LOW
			Education							
			HIGH	HIGH	LOW	LOW	HIGH	HIGH	LOW	LOW
			Occupation							
			HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
SO	Ed	Occ								
HI	HI	HI	203	22	15	9	130	14	33	20
HI	HI	LOW	17	5	6	6	23	9	18	17
HI	LOW	HI	21	3	12	11	21	4	27	13
HI	LOW	LOW	15	3	6	13	25	9	29	65
LOW	HI	HI	115	11	15	9	115	22	63	43
LOW	HI	LOW	43	8	14	16	77	27	56	89
LOW	LOW	HI	22	2	24	8	37	10	40	76
LOW	LOW	LOW	40	15	38	53	134	56	192	508

TABLE 4/56: Six-way table of husbands' and wives' occupations, educations, and social origins (1982 General Household Survey data; N=2,250) [see Table 4/53 for definitions of categories]

			Social Origin							
			HIGH	HIGH	HIGH	HIGH	LOW	LOW	LOW	LOW
			Education							
			HIGH	HIGH	LOW	LOW	HIGH	HIGH	LOW	LOW
			Occupation							
			HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
SO	Ed	Occ								
HI	HI	HI	176	21	13	6	120	16	23	14
HI	HI	LOW	17	4	2	4	25	6	11	18
HI	LOW	HI	18	2	7	3	23	2	20	9
HI	LOW	LOW	5	5	6	8	17	10	19	43
LOW	HI	HI	103	17	14	12	124	28	51	26
LOW	HI	LOW	23	10	10	7	74	27	44	84
LOW	LOW	HI	18	4	13	7	36	9	49	39
LOW	LOW	LOW	34	13	26	38	102	34	145	356

TABLE 4/57: Deviances of various models fitted to Tables 4/55 and 4/56 (six-way tables of husbands' and wives' occupations, educations, and social origins using data from the 1979 and 1982 General Household Surveys)

	1979 GHS		1982 GHS	
Model	Deviance	d.f.	Deviance	d.f.
1	876.9	51	773.6	51
2	171.6	48	147.7	48
3	55.2	42	38.1	42
4	30.7	38	-----	--
5	-----	--	27.7	40
6	43.8	41	32.6	41

Model descriptions

O = Husband's occupation

E = Husband's educational level

S = Husband's social origin

P = Wife's occupation

F = Wife's educational level

T = Wife's social origin

Model 1 = [OE][OS][ES][PF][PT[FT]

Model 2 = Model 1 + [OP][EF][ST]

Model 3 = Model 2 + [OF][OT][EP][ET][SP][SF]

Model 4 = Model 3 + [OEF][EFT][SPT][OSF]

Model 5 = Model 3 + [OEF][PFT]

Model 6 = Model 3 + [OEF]

TABLE 4/58: Observed odds ratios corresponding to a sample of married couples from the 1979 General Household Survey and related exponentiated parameter estimates ('Partial Odds Ratios') from models of a six-way table based on the sample (Table 4/55).

Husband	Wife	Obs.	M2	M3
Occupation	Occupation	3.95	2.95	2.04
Educational level	Educational level	5.24	4.18	2.87
Social origin	Social origin	2.87	2.38	1.72

Obs. = Observed odds ratio from 2x2 table in Table 4/54

M2 & M3 = Corresponding exponentiated parameter estimates from Models 2 and 3 respectively (see Table 4/57) applied to Table 4/55

(See Section 3 of Chapter 2 for a discussion of partial odds ratios).

TABLE 4/59: Exponentiated parameter estimates ('Partial Odds Ratios') from Model 3 (see Table 4/57) applied to Table 4/55, and products of the exponentiated parameter estimates.

Wife / Husband	Occupation	Educational level	Social origin	
Occupation	2.04	1.47	1.78	(5.33)
Educational level	1.49	2.87	1.39	(5.95)
Social origin	1.21	1.48	1.72	(3.08)
	(3.68)	(6.23)	(4.26)	(97.81)

(See Section 3 of Chapter 2 for a discussion of partial odds ratios).

TABLE 4/60: Exponentiated parameter estimates ('Partial Odds Ratios') from Model 3 (see Table 4/57) applied to Table 4/56, and products of the exponentiated parameter estimates.

Wife / Husband	Occupation	Educational level	Social origin	
Occupation	2.57	1.67	1.96	(8.41)
Educational level	1.16	3.18	1.31	(4.83)
Social origin	1.18	1.58	1.70	(3.17)
	(3.52)	(8.39)	(4.36)	(128.77)

(See Section 3 of Chapter 2 for a discussion of partial odds ratios).

6.2. An analysis of six-way tables of husbands' and wives' occupations, educational levels and social origins using association and constrained association models

Modelling six-way tables of husbands' and wives' occupations, educational levels and social origins with hierarchical log-linear models does not take advantage of the fact that the six variables are sensibly divisible into two triads. Furthermore, this modelling approach is not specifically geared towards the relationship of substantive interest, i.e. assortative marriage for social status as encapsulated in the relationship between the two triads of variables.

As can be seen from Tables 4/55 and 4/56, the 2^6 table resulting from the representation of each variable as a dichotomy can be presented as an 8x8 table with the husband-related variables in one margin and the wife-related variables in the other margin (see Section 2.12 of Chapter 2). It is the interaction within this two-way table which is of substantive interest. Fitting the marginal frequencies of this table exactly (i.e. fitting the independence model to this table) is equivalent to the inclusion of the six main effects, six within-individual two-factor interactions and two within-individual three-factor interactions in a hierarchical model of the six-way table.

The interaction within the two-way table is equivalent to all the other terms included in a saturated hierarchical log-linear model of the six-way table. If one wishes to model the interaction between the two triads of variables by analysing the two-dimensional table, the interaction parameters must be constrained in some way. In other words, if the model of the two-dimensional table is

$$\log m_{ij} = u + u_{1(i)} + u_{2(j)} + u_{12(ij)}$$

then $u_{12(ij)}$ needs to be constrained in some way. One possible constraint is as follows

$$u_{12(ij)} = w_{1(i)}w_{2(j)}$$

This constraint reduces the number of degrees of freedom of the interaction term from $(I-1)(J-1)=49$ to $(I+J-\cancel{1})=\cancel{15}$ 13, but at the cost of moving the model out of the log-linear framework. The resulting model is in fact the RC(1) association model, with the w_1's being row scores and the w_2's being column scores.

If one accepts the premise that marriage patterns are determined by individuals' positions on a single underlying dimension (e.g. 'social status') then this is a sensible model to fit to the table. However, while much of the association in the table may be related to an underlying dimension of this sort, it would seem sensible to allow for three underlying dimensions, since there is a triad of variables, if highly correlated ones, for each spouse (see Section 2.10 of Chapter 2). This suggests the following model (Model G)

$$\log m_{ij} = u + u_{1(i)} + u_{2(j)} + \sum_{k=1}^{3} w_{k1(i)} w_{k2(j)}$$

This is the RC(3) association model, which has (I-3)(J-3)=16 degrees of freedom. Hence for the RC(3) model, 33 degrees of freedom are used to model the association in the table. (In fact, an 8x8 table allows models up to RC(7) to be fitted).

One of the hierarchical log-linear models which was fitted to Tables 4/55 and 4/56 in the last sub-section, i.e. Model 3, is in fact close to being a constrained version of the RC(3) model. The model in question included all the main effects and all the two-factor interactions. The RC(3) association model of the two-dimensional table implicitly contains the two within-individual three-factor interactions, but apart from these extra two interactions, which it already has been noted are not involved with the relationship of substantive interest, the RC(3) model is simply a more flexible version of the hierarchical model.

The hierarchical model (including the two within-individual three-factor interactions) can be written as (Model H)

$$\log m_{ij} = u + u_{1(i)} + u_{2(j)} + \sum_{k=1}^{3} \left(\sum_{p=1}^{3} w_{kp1(i)} \right) \left(\sum_{q=1}^{3} w_{kq2(j)} \right)$$

where for a particular k, s and t, $w_{kst(v)}$ can only take two values, according to which half of the dichotomy indexed by s (either education, occupation or social origin) the v-th category belongs to (k is the dimension; t indicates whether rows or columns are being considered).

Model H has (I-1)(J-1)-9=40 degrees of freedom, and the constraints have thus reduced the number of degrees of freedom relating to the interaction term from 33 to 9.

The deviances of models G and H as applied to Table 4/55 and 4/56 are given in Table 4/61. For both the 1979 and the 1982 data both models do not differ significantly from the data at the 5% level. However, one is less interested in the relative goodness-of-fit of Models G and H than in the different ways in which they represent the interaction within the tables when compared with the hierarchical log-linear models.

The deviances of the RC(2) and RC(1) association models fitted to the two tables are also shown in Table 4/61. In both cases the RC(2) model does not differ significantly from the data at the 5% level. Since the third dimension parameter estimates from the RC(3) model (Model G) applied to the 1979 data bear no obvious relationship to the third dimension parameter estimates from the RC(3) model fitted to the 1982 data, there would seem to be no justification for preferring the RC(3) model to the RC(2) model.

The RC(1) model <u>does</u> differ significantly from the 1979 data at the 5% level, and the RC(1) model also nearly differs significantly from the 1982 data at the 5% level. Additionally, the second dimension parameter estimates from the RC(2) model have very similar patterns for the 1979 data and 1982 data. Hence the RC(2) model is the preferred association model of Tables 4/55 and 4/56. Parameter estimates (row and column scores, etc.) from the model are given in Table 4/62.

The first dimension row and column scores in Table 4/62 might be regarded as social status scores. The second dimension reflects differences between educational level on one hand, and occupation and (in the case of women) social origin on the other hand. The scores for the second dimension are high for individuals with non-manual occupations but the lower educational level, and low for individuals with manual occupations but the higher educational level. These scores reflect a tendency for 'like' to be married to 'like' over and above what would be predicted on the basis of the first dimension scores.

One can produce adapted versions of the RC(2) model wherein row and column scores are constrained in a similar way to the way they are constrained in Model H.

The model in which the scores for one of the two dimensions are constrained (Model J) can be written as follows

$$\log m_{ij} = u + u_{1(i)} + u_{2(j)} + w_{1(j)}w_{2(j)} + \left(\sum_{p=1}^{3} v_{p1(i)}\right)\left(\sum_{q=1}^{3} v_{q2(j)}\right)$$

The model in which the scores for both dimensions are constrained (Model K) can be written

$$\log m_{ij} = u + u_{1(i)} + u_{2(j)} + \sum_{k=1}^{2}\left(\sum_{p=1}^{3} v_{p1(i)}\right)\left(\sum_{q=1}^{3} v_{q2(j)}\right)$$

The deviances of both Models J and K as applied to the 1979 and 1982 data are shown in Table 4/61. However, the differences in deviance between the models and the unconstrained RC(2) model for the 1979 data are sufficiently large that the unconstrained model is preferred here. (It is not clear whether the differences in deviance between the constrained and unconstrained models can be used as test statistics and be formally tested against the chi-square distribution on the appropriate number of degrees of freedom).

6.3. Conclusions

From a statistical viewpoint Section 6 has demonstrated interesting similarities between association models and hierarchical log-linear models of a six-way table. From a substantive point of view, interpretations of the parameter estimates from the two sets of models have shown the relative contributions of occupation, education and social origin to 'social status homogamy', with education and male occupation being of most importance. The models have also shown that 'social status homogamy' cannot be explained in terms of a single underlying social status dimension.

TABLE 4/61: Deviances of various models applied to Tables 4/55 and 4/56 (Six-way tables of husbands' and wives' occupations, educational levels and social origins: data from the 1979 and 1982 General Household Surveys)

	Deviance		
Model	1979	1982	d.f.
Model H (#1)	54.7	36.3	40
RC(3) (Model G)	11.7	10.5	16
RC(2)	27.3	18.8	25
RC(1)	55.3	50.5	36
Model J (#2)	44.7	35.5	33
Model K (#3)	60.1	41.5	41

(#1) Hierarchical model including all two-factor interactions plus two within-individual three-factor interactions, which is equivalent to the RC(3) + 3 constraints model.

(#2) RC(2) model with scores for one dimension constrained

(#3) RC(2) model with scores for both dimensions constrained

TABLE 4/62: Parameter estimates for the RC(2) model applied to Tables 4/55 and 4/56 (Six-way tables of husbands' and wives' occupations, educational levels and social origins: data from the 1979 and 1982 General Household Surveys)

Row scores:

			1979		1982	
SO	Ed	Oc	Dim 1	Dim 2	Dim 1	Dim 2
HI	HI	HI	1.74	-0.26	1.63	-0.15
HI	HI	LO	0.34	0.13	0.20	-1.08
HI	LO	HI	0.44	3.64	0.48	2.91
HI	LO	LO	-0.55	0.12	-0.74	-0.78
LO	HI	HI	0.90	-0.37	0.83	-0.10
LO	HI	LO	-0.02	-0.93	-0.32	-1.47
LO	LO	HI	-0.38	1.97	-0.23	2.06
LO	LO	LO	-0.99	-0.30	-1.05	0.11

Column scores:

			1979		1982	
SO	Ed	Oc	Dim 1	Dim 2	Dim 1	Dim 2
HI	HI	HI	1.56	0.14	1.48	0.19
HI	HI	LO	0.91	-0.94	0.71	-1.50
HI	LO	HI	0.08	3.22	0.10	1.93
HI	LO	LO	-0.38	1.55	-0.45	0.51
LO	HI	HI	0.67	-0.75	0.61	-0.44
LO	HI	LO	-0.04	-1.67	0.11	-2.05
LO	LO	HI	-0.23	0.75	-0.37	1.61
LO	LO	LO	-1.24	-0.34	-1.36	-0.44

		1979	1982
Φ_k Coefficients:	Dimension 1:	0.642	0.697
	Dimension 2:	0.087	0.113

7. Assortative marriage and assortative remarriage

Though this thesis is orientated towards the patterns and outcomes of first marriages, the last few decades have seen a dramatic increase in the proportion of all marriages which are remarriages, and an examination of assortative remarriage for social status-related variables would therefore seem to be of importance for this reason if for no other.

Perhaps the most obvious question to ask is whether remarriages tend to be more homogamous or more heterogamous than first marriages. Table 4/63 is based on data from the 1976 Family Formation Survey and shows the school-leaving ages in combination of spouses in two sub-samples of couples: one where the wife was in her first marriage and one where the wife was in her second marriage following a divorce. A log-linear model including the three possible two-factor interactions was fitted to Table 4/63, and was found to have a deviance of 10.3 on 9 degrees of freedom ($P>0.05$). This is not suggestive of a strong relationship between marriage order and the strength of assortative marriage for school-leaving age. However, an examination of the standardised residuals from the model showed that there were disproportionate numbers of second marriages including extreme disparities in school-leaving age between spouses. Fitting the bottom-left-hand corner cell and the and the top-right-hand corner cell in the two sub-tables of Table 4/63 exactly results in a change in deviance from the original model of 6.2 on 2 degrees of freedom ($P<0.05$; see Section 1.2 of the Appendix to Chapter 2).

Table 4/64 consists of the Registrar General's Social Class of the husband's current occupation cross-classified by the Registrar General's Social Class of the wife's occupation before her first marriage for the two sub-samples of couples. A log-linear model including the three possible two-factor interactions was fitted to Table 4/64 and was found to have a deviance of 13.0 on 9 degrees of freedom ($P>0.05$). Once again, this is not suggestive of a relationship of a substantively significant magnitude between marriage order and assortative marriage, and on this occasion the residuals are not suggestive of any substantively interesting effects.

The Family Formation Survey did not collect data on the social origins of its married respondents and their spouses, so data from the 1985 General Household Survey ~~was~~ were used to check for a relationship between marriage order and assortative marriage for social origin.

Table 4/65 shows the social origins in combination of spouses in two sub-samples of couples extracted from the 1985 GHS, in one of which the wife was in her first marriage, and in the other of which she was in her second marriage, having been previously divorced. Social origin was defined by the division of father's current/last occupation into three categories, these being, broadly speaking, a non-manual category, a petty bourgeois category, and a manual category (the categories are defined in terms of Socio-Economic Groups in Table 4/65 - see also Table 4/43). Since father's occupation was only recorded for GHS respondents aged 49 or less, all the spouses in Table 4/65 comply with this restriction.

A log-linear model containing the three possible two-factor interactions was fitted to Table 4/65 and was found to have a deviance of 4.6 on 4 degrees of freedom ($P>0.05$).

Tables 4/63 to 4/65 show that there are no gross differences in the patterns of assortative marriage according to whether a wife is in her first marriage or her second marriage after a divorce. However, the samples of couples examined here where the wife was in her second marriage are quite small. An examination of data from several years of the General Household Survey suggested that marriages where the wife has been previously divorced may be slightly more heterogamous with respect to social origin than marriages where the wife has not been previously divorced (though this result was not quite statistically significant at the 5% level).

Overall it would appear that the factors affecting choice of husband are similar for spinsters and for divorcees, at least to the extent that they combine to produce similar patterns of assortative marriage.

It should be noted that the above analyses focus on wives because of the constraints of data availability. Once data from the 1986 GHS become available it will be possible to carry out similar analyses for men's second marriages.

The Family Formation Survey collected data relating to <u>each</u> of the husbands of remarried women. It therefore provides a rare opportunity for the occupations of first and second husbands to be compared <u>within</u> individuals (wives). (For a similar comparison, see the analysis of OPCS Longitudinal Study data by Ní Bhrolcháin, 1988). Table 4/66 is a cross-classification of first husband's pre-marital Registrar General's Social Class (RGSC) by second husband's current RGSC for FFS respondents who

were in their second marriage and whose first marriages had ended in divorce. Table 4/66 shows that there is a strong relationship between the RGSC's of the two husbands, but also that quite a number of women married second husbands who were (superficially at least) quite dissimilar to their first husbands.

Table 4/66 does not take account of the considerable amount of male intragenerational social mobility. Table 4/67 shows the intragenerational mobility (between marriage and the survey date) of the husbands of FFS respondents who married before 1960 and were still in their first marriages at the survey date. It can be seen from Table 4/67 that many husbands had 'climbed' from RGSC IIIM to RGSC's I or II, which explains the otherwise surprisingly large cell frequency in Table 4/66 corresponding to RGSC IIIM first husbands and RGSC I or II second husbands.

Intragenerational mobility cannot, however, explain the sizeable number of women whose first husbands were in RGSC's I to IIINM and whose second husbands were in RGSC's IIIM to V. One might well ask whether the second marriages of the sample of women are more heterogamous than their first marriages. Table 4/68, which shows the patterns of assortative marriage in the women's first and second marriages, does not suggest that this is the case.

Table 4/69 divides Table 4/66 into two sub-samples according to whether the wife had a pre-first marriage occupation in RGSC's I to IIINM or in RGSC's IIIM to V. Wives in the first category were rather less likely than wives in the second category to have a first husband in RGSC's I to IIINM and a second husband in RGSC's IIIM to V, while wives in the second category were rather less likely than wives in the first category to have a first husband in RGSC's IIIM to V and a second husband in RGSC's I to IIINM. (Only the second of two effects is significant at the 5% level).

This last pair of effects might be seen as a consequence of women 'reverting to type' in their second marriages, after a heterogamous first marriage. However, an alternative interpretation is that apparently gross disparities between the RGSC's of first and second husbands simply reflect the internal heterogeneity of the Registrar General's Social Classes, i.e. the two husbands in one of these pairs of marriages are more similar in some sense than their RGSC's suggest.

The last paragraph highlights an important question that should be borne in mind when one is looking at a cross-classification of husband s'

and wives' characteristics, i.e. to what extent is heterogamy in the cross-classification the consequence of a willingness to marry someone 'different' to oneself, and to what extent is it simply a consequence of the internal heterogeneity of the categories defining the table with respect to the 'underlying factor' (or factors) determining the patterns of marriage?

In the case of Table 4/66, it seems reasonable to conclude that some of the disparities between first and second husbands are the consequence of the fact that Registrar General's Social Class is a relatively poor measure of 'social status', but that some of the disparities reflect a willingness on the part of at least some women to marry first and second husbands of rather different social statuses.

TABLE 4/63: School-leaving ages in combination of respondents to the 1976 Family Formation Survey and their husbands

Respondents currently in their first marriages (N=4,319)

Respondent's school-leaving age	Husband's school leaving age			
	15 or less	16	17	18 or more
15 or less	2,353	317	100	84
16	384	278	63	90
17	94	83	78	86
18 or more	49	60	44	156

Respondents currently in their second marriages whose first marriages ended in divorce (N=237)

Respondent's school-leaving age	Husband's school leaving age			
	15 or less	16	17	18 or more
15 or less	155	10	4	9
16	17	13	3	5
17	3	2	1	1
18 or more	6	1	1	6

TABLE 4/64: Registrar General's Social Class of husband's current occupation by Registrar General's Social Class of respondent's occupation before her first marriage (data from the 1976 Family Formation Survey)

Respondents currently in their first marriages (N=4,095)

Respondent's RGSC	Husband's RGSC			
	I or II	IIINM	IIIM	IV or V
I or II	361	60	146	47
IIINM	603	271	836	263
IIIM	85	34	289	95
IV or V	150	56	557	242

Respondents currently in their second marriages whose first marriages ended in divorce (N=237)

Respondent's RGSC	Husband's RGSC			
	I or II	IIINM	IIIM	IV or V
I or II	7	3	10	2
IIINM	26	8	46	13
IIIM	5	2	12	10
IV or V	6	7	39	20

TABLE 4/65: Social origins in combination of a sample of couples (with both spouses aged 49 or less) from the 1985 General Household Survey

Respondents currently in their first marriages (N=2,600)

	Husband's social origin		
Wife's social origin	Non-man.	Pet.Bour.	Manual
'Non-manual'	260	94	299
'Petty Bourgeois'	117	95	186
'Manual'	293	170	1,086

Respondents currently in their second marriages whose first marriages ended in divorce (N=208)

	Husband's social origin		
Wife's social origin	Non-man.	Pet.Bour.	Manual
'Non-manual'	18	8	27
'Petty Bourgeois'	6	1	12
'Manual'	27	13	96

'Non-manual' = SEG's 1, 2.2, 3, 4, 5 and 6
'Petty Bourgeois' = SEG's 2.1, 12, 13 and 14
'Manual' = SEG's 7, 8, 9, 10, 11 and 15

TABLE 4/66: First husband's pre-marital Registrar General's Social Class by second husband's current Registrar General's Social Class for respondents to the 1976 Family Formation Survey who were in their second marriage at the survey date and whose first marriages had ended in divorce (N=212)

	Second husband's RGSC			
First husband's RGSC	I or II	IIINM	IIIM	IV or V
I or II	10	1	10	2
IIINM	8	3	10	2
IIIM	23	11	61	24
IV or V	3	5	23	16

TABLE 4/67: Intragenerational social mobility of husbands of respondents to the 1976 Family Formation Survey who were married in 1959 or earlier and who were still in their first marriage at the survey date (N=1,547)

	Husband's current RGSC			
Husband's pre-marital RGSC	I or II	IIINM	IIIM	IV or V
I or II	155	9	16	9
IIINM	88	78	17	5
IIIM	133	45	578	118
IV or V	42	17	103	134

TABLE 4/68: Assortative marriage for Registrar General's Social Class among twice married respondents to the 1976 Family Formation Survey (N=201)

FIRST MARRIAGES	Husband's pre-marital RGSC			
Respondent's pre-marital RGSC	I or II	IIINM	IIIM	IV or V
I or II	4	2	9	3
IIINM	10	13	53	12
IIIM	2	4	14	8
IV or V	4	3	38	22

SECOND MARRIAGES	Husband's current RGSC			
Respondent's pre-marital RGSC	I or II	IIINM	IIIM	IV or V
I or II	5	3	8	2
IIINM	24	8	43	13
IIIM	5	1	12	10
IV or V	6	7	35	19

TABLE 4/69: First husband's pre-marital Registrar General's Social Class by second husband's current Registrar General's Social Class for respondents to the 1976 Family Formation Survey who were in their second marriage at the survey date and whose first marriages had ended in divorce

Respondents with an occupation before their first marriage in RGSC's I to IIINM (N=106)

	Second husband's RGSC			
First husband's RGSC	I or II	IIINM	IIIM	IV or V
I or II	6	1	6	1
IIINM	6	2	6	1
IIIM	15	5	32	10
IV or V	2	3	7	3

Respondents with an occupation before their first marriage in RGSC's IIIM to V (N=95)

	Second husband's RGSC			
First husband's RGSC	I or II	IIINM	IIIM	IV or V
I or II	2	0	3	1
IIINM	2	0	4	1
IIIM	7	6	25	14
IV or V	0	2	15	13

8. Summary to Chapter 4

This chapter shows that assortative marriage exists for a variety of social status-related variables, and that though these different forms of assortative marriage overlap, they also exist independently of each other.

The patterns of assortative marriage for social origin were examined in some detail. A very high proportion of these patterns of can be explained in terms of a tendency towards 'exact' homogamy (i.e. marriage between individuals from very similar social origins), rural/urban/agricultural differences, and (most importantly) a single underlying social status dimension. The non-manual/manual 'boundary' was shown to be of considerable significance, refuting the assertion to the contrary by Penn and Dawkins. A downwards trend in the extent of social origin homogamy was found for post-war marriage cohorts.

When attention was turned to assortative marriage for educational variables, a high level of school-type endogamy was found to remain once account had been taken of assortative marriage for educational level (based on examinations passed and school-leaving age) and for social origin. When the three forms of assortative marriage were examined simultaneously, assortative marriage for educational level was found to be stronger than both assortative marriage for school-type and assortative marriage for social origin.

The downwards trend in social origin homogamy in the post-war marriage cohorts was found to be part of a more general trend also applying to school-type assortative marriage and educational level assortative marriage.

A detailed examination of husbands' and wives' qualifications in combination suggested that vocational qualifications are of less value in the marriage market than in the job market, and a hierarchy of qualifications suitable for use in the context of social relations was therefore derived. Some evidence was found that the group of individuals with no qualifications is quite a heterogeneous one with respect to the underlying dimension 'determining' educational homogamy.

It was thought that endogamous graduate couples might be less homogamous for social origin than other couples, but this was not found to be the case.

A detailed examination of patterns of occupational assortative marriage found that they could be adequately represented by a certain amount of 'exact' homogamy, agricultural endogamy, the ubiquitous

underlying social status dimension, and a previously undiscovered tendency towards assortative marriage for employment status/petty bourgeois endogamy.

The importance of using both spouses' occupations to measure the social position of the family unit was demonstrated by an analysis showing that both parents' occupations affect their offsprings' chances of attaining high class jobs.

The relative contributions of occupation, education and social origin to assortative marriage for social status were examined. For husbands, occupation and education were of much more importance than social origin. For wives, education was much more important than the other two variables, though this might have been less the case had the analysis been based on wife's pre-marital occupation rather than wife's current occupation.

It was shown that the structure underlying assortative marriage for the three social status-related variables is not unidimensional, i.e. though it is reasonable to think of occupation, education and social origin as factors contributing to an individual's social status, in the context of marriage occupation and education are not interchangeable quantities, since higher levels of occupational homogamy and educational homogamy exist than would be expected if they both just reflected a more general form of social status.

No evidence was found of a significant relationship between remarriage and the extent of assortative marriage for social status. A comparison of first and second husbands' occupations suggested that women who marry twice are prepared to marry husbands of somewhat different social statuses, though no evidence was found that the second marriages of such women are more heterogamous than their first marriages.

APPENDIX TO CHAPTER 4

1. Trends in social origin and educational level assortative marriage; a re-analysis of data from the 1949 Mobility study

As mentioned in the main body of this chapter, Berent (1954) found evidence of a decline in the extent of social endogamy in the first half of the twentieth century. However, his conclusions were based on indices of association and the percentages of exactly homogamous couples in tables, both measures which could feasibly be affected by changes in the marginal distributions in such a way as to falsely give the impression of a trend in endogamy.

The tables which Berent analysed are not given in his article, hence in order to verify his conclusions it was necessary to reconstruct the tables from the raw data of the 1949 Mobility study (see Glass, 1954). Unfortunately, since the data currently available consist only of the male respondents to the study, the sample sizes of the tables which could be constructed were less than half the sample sizes of Berent's tables.

Table A4/1 (c.f. Table 4, Berent, 1954, p328) gives the social groups in combination of the occupations of the fathers of respondents and of the fathers of their wives for the sample divided into three groups according to marriage cohort. A log-linear model including the three possible two-factor interactions was fitted to Table A4/1. The deviance of this model is 29.7 on 18 degrees of freedom ($P<0.05$).

A four-level factor was constructed based on the distance of each cell in the table from the leading diagonal. Changes in the strength of assortative marriage were modelled by the inclusion of the interaction between cohort and this factor. The resulting change in deviance is 13.4 on 6 degrees of freedom ($P<0.05$). Most of this change in deviance (9.9 on 1 degree of freedom) is due to a disproportionately large number of cases in the latest cohort being two or three cells away from the leading diagonal (see Section 1.2 of the Appendix to Chapter 2).

Table A4/2 (c.f. Table 5, Berent, 1954, p329) gives the education levels in combination of married respondents and their wives for the sample divided into the same three marriage cohorts as in Table A4/1. (For a definition of the educational levels see Berent, 1954, p323). A log-linear model including the three possible two-factor interactions was fitted to Table A4/2. The deviance of this model is 45.4 on 18 degrees of freedom ($P<0.001$).

The addition of the interaction between cohort and the same four-level factor as used earlier results in a change in deviance of 26.3 on 6 degrees of freedom ($P<0.001$). Most of this change in deviance (20.5 on 2 degrees of freedom) is due to a decline in exact homogamy both from the first cohort to the second cohort and from the second cohort to the third cohort. A further reduction in deviance of 6.8 on 2 degrees of freedom ($P<0.05$) can be obtained by adding a parameter to take account of a dramatic decline in "secondary" educational level homogamy.

In spite of the reduced sample sizes, the above analyses confirm Berent's conclusion that social (status) endogamy declined in the first half of the twentieth century. However, some of the social origin heterogamy in the latest marriage cohort may be a reflection of war-time marriages (which have been shown to be especially prone to dissolution), and the trends in educational assortative marriage are in the context of rapidly changing marginal distributions, the effects of which even log-linear models may not necessarily separate from 'genuine' trends in assortative marriage, since the assumption that the 'social meaning' of each educational level remains constant may be false.

TABLE A4/1: Social groups in combination of the occupations of respondents' fathers and of respondents' wives' fathers: data from the 1949 Mobility Study (male respondents only)

Pre-1915 marriage cohorts

Respondent's father's occupation	Wife's father's occupation			
	HGNM	LGNM	SM/RNM	SSM/UM
Higher grade non-manual (a)	11	8	5	1
Lower grade non-manual (b)	0	32	31	12
Skilled manual/Routine non-manual	4	27	77	34
Semi-skilled/Unskilled manual	1	7	25	36

1915-1939 marriage cohorts

Respondent's father's occupation	Wife's father's occupation			
	HGNM	LGNM	SM/RNM	SSM/UM
Higher grade non-manual (a)	33	38	14	8
Lower grade non-manual (b)	21	114	136	49
Skilled manual/Routine non-manual	16	104	273	123
Semi-skilled/Unskilled manual	2	37	120	115

Post-1939 marriage cohorts

Respondent's father's occupation	Wife's father's occupation			
	HGNM	LGNM	SM/RNM	SSM/UM
Higher grade non-manual (a)	19	22	15	4
Lower grade non-manual (b)	8	54	61	43
Skilled manual/Routine non-manual	7	59	177	69
Semi-skilled/Unskilled manual	5	31	82	68

(a) Professional, high administrative, managerial and executive
(b) Inspectory, supervisory and other non-manual

TABLE A4/2: Educational levels in combination of respondents' fathers and of respondents' wives' fathers: data from the 1949 Mobility Study (male respondents only)

Pre-1915 marriage cohorts

Respondent's educational level	Wife's educational level			
	Elem.	Sec.	F.Ed.	H.Ed.
Elementary	258	4	7	0
Secondary	4	8	0	0
Further education	41	6	8	0
Higher education	2	5	0	3

1915-1939 marriage cohorts

Respondent's educational level	Wife's educational level			
	Elem.	Sec.	F.Ed.	H.Ed.
Elementary	810	19	54	2
Secondary	24	22	13	4
Further education	195	27	61	8
Higher education	14	11	13	4

Post-1939 marriage cohorts

Respondent's educational level	Wife's educational level			
	Elem.	Sec.	F.Ed.	H.Ed.
Elementary	359	22	45	2
Secondary	25	6	10	1
Further education	137	14	41	4
Higher education	5	6	9	6

(See Berent, 1954, p323, for a description of the educational levels)

CHAPTER 5: Assortative marriage for religious and political beliefs

1. Introduction

It seems reasonable to assume that assortative marriage for social status is the consequence both of structural constraints and of individual preferences. These individual preferences are presumably largely based on the desire for a partner who is culturally similar and/or has similar beliefs and values to those of the individual in question. Two forms of assortative marriage which would seem to be even more obviously the consequence of such a desire are assortative marriage for political identification and assortative marriage for religion (though the latter may also be a function of religious prescription).

These forms of assortative marriage differ from assortative marriage for social status in as much as party political identification and (to a lesser extent) religion are not 'fixed' quantities, and observed marriage patterns are likely to reflect the spouses' influences upon each others' attitudes, i.e. it would seem more likely that patterns observed a number of years after marriage (or meeting) would be different from those which existed at marriage (or meeting).

The two forms of assortative marriage differ from each other in as much as an individual's party political identification might be seen as a crude summary measure of a range of socio-political attitudes, whereas an individual's religion might be seen as the source of some of their attitudes. Furthermore, religious endogamy has strong similarities to ethnic endogamy, which relates to a set of reasonably clearly-defined categories, whereas assortative marriage for party political identification is more akin to assortative marriage for education or social origin, where the 'meanings' of the categories are not as clear-cut, since the categories can reasonably be thought of as containing individuals with a range of scores on some underlying dimension(s).

These two forms of assortative marriage are of interest in their own right, but an additional justification for examining them in this thesis is that they provide a comparative perspective from which one may be able to gain extra insight into assortative marriage for social status. The 'salience' of political identification and of religion in the context of partner selection is of particular interest, as studying this might provide information helpful to the assessment of the role of preferences in determining assortative marriage for social status.

In contrast to the United States, research on religious and ethnic endogamy in Britain is sparse. Hornsby-Smith (1987) considered Catholic endogamy/exogamy, and Coleman (1985) examined ethnic intermarriage using data from the 1981 National Labour Force Survey. Somewhat surprisingly, research on spouses' joint political identifications appears to be non-existent, with the exception of McRae's examination of the political identifications of her (small) sample of cross-class couples (McRae, 1986).

Many of the models used in this chapter are of a sort described in Section 1.2 of the Appendix to Chapter 2.

2. Party political assortative marriage

2.1. Similarities/differences between spouses' party political identifications

Table 5/1 shows the party political identifications of a sub-sample of respondents from the 1987 British General Election Study in combination with the party political identifications of their spouses/partners. Spouse's party political identification was recorded only for those respondents whose spouses were one of the two people the respondents discussed politics with the most during the 1987 election campaign. Table 5/1 is further restricted (for simplicity) to couples where both partners had political identifications which were Conservative, Labour or Liberal/Social Democrat Alliance and it also includes only those couples wherein the respondent was known to have definitely voted or to have definitely not voted

Table 5/1 shows that there is a high level of homogamy with respect to party political identification in British couples. This homogamy may reflect both the tendency of individuals with similar social values to marry each other and the influence of the spouses on each others' values within the context of the marital relationship. (Note that spouse's party political identification is as reported by the respondent rather ~~that~~ than by the spouse him or herself).

Respondents to the 1987 British General Election Study were also asked about their attitudes to the four major parties (Liberal and SDP being considered separately). This allows one to use the BES data to examine the relationship between (married) respondents' feeling towards each party with which they do not identify and the likelihood of their reporting their spouse as identifying with that party.

Table 5/2 shows the relationship between respondent's attitude to the Labour party and spouse's party political identity for 'Conservative' respondents. The more negative the respondent is about the Labour party, the less likely they are to report being married to someone who identifies with the Labour party.

Table 5/3 shows that the same result is obtained when the attitudes of 'Labour' respondents to the Conservative party are examined. In fact, the same result holds for 'Alliance' respondents and their attitudes to both the Labour and Conservative parties, and for 'Conservative' and 'Labour' respondents and their attitudes towards the Liberal Party and the SDP, though the result is unsurprisingly at its weakest for the attitudes of 'Conservative' respondents to the centre parties.

The figures in Tables 5/2 and 5/3 support the hypothesis that the more antipathetic an individual is towards the policies/values of a political party, the less likely that it is that they are married to someone who identifies with those policies or values. This might be taken as an example of a general tendency for individuals to avoid the intimate company of those whose values are considerably different to their own.

A clear indication of the party political consensus between spouses is the following. Of a sample of 1591 couples from the BES, in only 377 cases (24%) were the spouses' party political identities reported as differing, and in 277 (73%) of these cases the respondent was not strictly against the party with which their spouse identified, leaving only 100 cases (6%) where the spouse's party political identification as given was with a party which the respondent was against. 60 of these cases were Conservative/Labour differences, which is just over half (52%) of all the (116) Conservative/Labour differences.

Since the sample examined here excludes couples where the respondent did not discuss politics with their spouse during the 1987 General Election campaign, and since a proportion of respondents may have misreported their spouses' party political identities, one cannot be sure that 6% is an accurate estimate of the percentage of couples where there is a 'genuine' Labour/Conservative discrepancy, but even if it is a considerable underestimate the proportion of couples where party political differences are likely to stimulate conflict seems to be very small. (6% is in fact a lower bound on the percentage of genuine discrepancies, since in a certain number of cases where the respondent is not against the party their spouse identifies with, their spouse will be against the party that the respondent identifies with!).

TABLE 5/1: Respondent's party political identification by spouse's party political identification for a sample of respondents to the 1987 British General Election Study

		Spouse's party political identification		
Respondent's party political identification		Conservative	Labour	Alliance
	Con	616	51	72
	Lab	57	345	51
	All	90	45	195

TABLE 5/2: The attitudes of Conservative respondents towards the Labour party and the party political identifications of their spouses: data from the 1987 British General Election Study

	Attitude towards Labour Party				
Spouse's identity	Strongly For	For	Neither	Against	Strongly Against
Conservative	2	5	58	271	305
Labour	1	10	13	19	11
Alliance	0	0	8	35	30

TABLE 5/3: The attitudes of Labour respondents towards the Conservative party and the party political identifications of their spouses: data from the 1987 British General Election Study

	Attitude towards Conservative Party				
Spouse's identity	Strongly For	For	Neither	Against	Strongly Against
Conservative	3	13	16	18	12
Labour	3	11	61	117	177
Alliance	1	1	12	18	18

2.2. Voting turnout and spouses' party political identifications in combination

One hypothesis frequently considered in previous research states that 'large' differences between spouses with respect to variables for which homogamy is the norm are positively correlated with marital instability and/or the risk of marital dissolution. However, it can be argued that this is only likely to be true when the variable under consideration is one which is highly 'salient' for one or both spouses (see Blau et al, 1984). The existence within a society of a high level of assortative marriage for a variable does not necessarily imply that the variable is necessarily of the same salience to all members of that society.

A resulting hypothesis therefore states that on average differences between spouses with respect to a particular variable are smaller in couples where the variable is of considerable salience for one or both partners than in couples where the variable is of limited salience for either partner.

One possible measure of an individual's 'strength of feeling' about politics is whether that individual turns out to vote in a General Election. Subsequent to the 1987 survey, information was collected as to whether the respondents had actually voted (see Swaddle and Heath, 1989). Table 5/4 is the result of splitting Table 5/1 according to 'turnout'.

Table 5/4 shows that though the percentage of respondents voting varied a little according to both respondent's party political identification and respondent's spouse's party political identification, the most striking variation in the table is between the percentages of homogamous couples voting and the corresponding percentages for heterogamous couples.

A log-linear model including the interaction between spouses' party political identifications and between each spouse's party political identification and turnout was fitted to Table 5/4 (see Table 5/5). The model differs significantly from the data, indicating a significant interaction between turnout and spouses' party political identifications in combination.

TABLE 5/4: Respondent's party political identification by spouse's party political identification according to whether respondent voted in the 1987 General Election for a sample of respondents to the 1987 British General Election Study

RESPONDENT VOTED		Spouse's party political identification		
Respondent's party political identification		Conservative	Labour	Alliance
	Con	548 (40.8)	38 (2.8)	63 (4.7)
	Lab	46 (3.4)	309 (23.0)	42 (3.1)
	All	80 (6.0)	36 (2.7)	182 (13.5)

Total heterogamous = 305/1344 = 22.7%

RESPONDENT DID NOT VOTE		Spouse's party political identification		
Respondent's party political identification		Conservative	Labour	Alliance
	Con	68 (38.2)	13 (7.3)	9 (5.1)
	Lab	11 (6.2)	36 (20.2)	9 (5.1)
	All	10 (5.6)	9 (5.1)	13 (7.3)

Total heterogamous = 61/178 = 34.3%

(Figures in parentheses are percentages of the total in the relevant sub-table).

TABLE 5/5: Details of model of a table (Table 5/4) of respondent's party political identification by spouse's party political identification according to whether respondent voted in the 1987 General Election for a sample of respondents to the 1987 British General Election Study

Model	Deviance	d.f.	P
[RP][RT][PT]	17.5	4	<0.01
[RP][RT][PT][HT]	3.0	3	>0.05
Change in deviance	14.5	1	<0.001

R is the respondent's party political identification

P is the respondent's spouse's party political identification

T is respondent's turnout at the 1987 General Election

H is a binary variable contrasting the diagonal and off-diagonal cells of the RxP table (i.e. contrasting homogamous couples and heterogamous couples)

When a term consisting of the interaction between turnout and a binary variable contrasting couples who were homogamous for party political identification with those who were heterogamous for party political identification is added to the model, the resulting model fits the data very well, and the change in deviance between the two models is highly significant. Hence respondents belonging to couples who are heterogamous for party political identification are significantly less likely to have voted.

Turnout was lowest for those combinations of partners which included one partner with a Labour political identification and one with either a Conservative or a Liberal/Social Democrat political identification. Turnout for Conservative/Alliance pairings was virtually the same as for homogamous Conservative pairings, but lower than for homogamous Alliance pairings who had the highest percentage turnout of all. The above is consistent with a hypothesis which states that on average the political 'differences' between those with Conservative identitifications and those with Alliance political identitifications are 'smaller' that the differences between those with Labour identitifications and those with either Conservative or Alliance political identitifications.

It is possible that political differences between spouses cause marital conflict and hence the likelihood of the respondent voting was reduced as voting was felt to be likely to cause unnecessary conflict. On the other hand, the above results could also be interpreted as supporting the hypothesis that differences between spouses' political identitifications are more prevalent amongst couples for whom political identification is of low salience, and who are therefore less likely to vote.

2.3. Graduate couples and differences between spouses in party political identification/voting intention

91% of respondents to the 1987 British General Election Study (BES) who had university/CNAA degrees discussed politics with someone during the 1987 General Election campaign, as compared to 75% of other BES respondents. This appears to support a hypothesis that politics are of more salience to graduates than to other people.

The Social Change and Economic Life Initiative (SCELI) collected data on its respondents' educational qualifications but not on those of its respondents' partners. However, a certain amount of information on this

subject can be gleaned from the partners' work histories collected by the Household and Community follow-up (HCS). In particular one can deduce the terminal ages of full-time education of the partners, and periods as a full-time student following this point appear as work history events. Therefore it is possible to identify a subset of partners who are very likely to be 'graduates', because their terminal ages of full-time education are greater than or equal to 21, or because they spent three academic years as a student at a later date. Of those respondents in the HCS sample who had University/CNAA degrees, 46 had partners who appeared very likely to be graduates. It is possible that a few of these partners failed their degrees or trained for non-graduate qualifications, but it seems reasonable to treat the 46 couples as a sample of homogamous graduate couples.

SCELI collected information on the voting intentions of its respondents and also of their partners, the relevant questions being "If there was a general election tomorrow would you vote?" and "Which political party would you vote for?". The questions were in self-completion booklets and interviewers were instructed not to allow collaboration between spouses in answering these questions.

In 37 out of the 46 homogamous 'graduate' couples both partners said that they would vote for one of the major parties, i.e. Conservative, Labour or Alliance (or Liberal or SDP). In 29 of these 37 couples the partners specified exactly the same party, while in a further 6 couples the two answers both belonged to the Alliance/Liberal/SDP trichotomy. Thus there were only two couples who clearly had different voting intentions, and neither of these couples contained both a Conservative voter and a Labour voter.

Table 5/6 compares the above patterns with those for all the other couples in the HCS where both partners said that they would vote for one of the three major parties. 31 of these 701 other couples contain a Conservative/Labour discrepancy and 184 contain some discrepancy between the spouses' voting intentions (if the Alliance/Liberal/SDP trichotomy is treated as a single party). The difference between the two groups in terms of the percentage of all couples with <u>any</u> discrepancy (2/37=5% and 184/701=26%) is significant at the 1% level. An alternative test based on a log-linear model applied to a suitably collapsed version of Table 5/6 gave a similar, highly significant result. Thus one might conclude that the voting intentions of homogamous graduate couples are more consistent than those of other couples.

The above result seems to support the hypotheses that politics are generally of more salience to graduates than to non-graduates, and that there therefore is a stronger motivation for graduates than for non-graduates to be married to politically like-minded spouses. These hypotheses further suggest that all couples involving a graduate should be more homogamous than other couples in terms of their party political identification, thought this depends on the assumption that politics are of greater salience to all graduates, regardless of whether they are married to other graduates or not.

Drawing firm conclusions solely on the basis of a sample like that of SCELI which is not nationally representative and where the graduate status of respondents' partners is uncertain is dangerous. One way of providing supporting evidence for the above finding is to examine (nationally representative) data from the 1987 British General Election Study.

Table 5/7 shows the party political identifications of a subsample of the 1987 British General Election Study respondents and of their spouses, divided into three groups according to the education of the respondent. The first group corresponds to respondents who had neither a degree nor 'O' levels, the second to respondents who had 'O' levels but not a degree, and the third to respondents who had a degree. Unfortunately ~~this~~ these data do not support the conclusion drawn from the SCELI data.

A log-linear model including the three possible two-factor interactions was fitted to Table 5/7. The resulting deviance of this model is 7.3 on 8 degrees of freedom ($P>0.05$), which does not provide evidence of a significant interaction between spouses' party political identifications in combination and respondent's educational level. However, when a term consisting of the interaction between respondent's educational level and a binary variable contrasting homogamous couples and heterogamous couples is added to the model, the resulting change in deviance is 5.6 on 2 degrees of freedom, which is close to significance at the 5% level. The closeness to significance of this interaction can be seen to reflect a lower level of Conservative out-marriage among couples where the respondent did not have 'O' levels or a degree than among couples where the respondent had 'O' levels, with couples where the respondents had degrees lying in between the other two groups in this respect.

TABLE 5/6: Spouses' voting intentions in combination; a comparison of homogamous graduate couples with other couples (data from the 1986 Social Change and Economic Life Initiative).

Homogamous graduate couples

	Partner				
Respondent	CON	LAB	ALL	LIB	SDP
CON	6	0	0	0	0
LAB	0	16	0	0	0
ALL	2	0	7	1	1
LIB	0	0	1	0	1
SDP	0	0	1	1	0

Other couples

	Partner				
Respondent	CON	LAB	ALL	LIB	SDP
CON	195	22	21	10	6
LAB	9	177	16	7	5
ALL	32	23	35	18	11
LIB	11	6	13	35	3
SDP	8	8	15	6	9

TABLE 5/7: Respondent s' reports of their own and their spouse's party political identifications according to respondent's educational level: data from the 1987 British General Election Study.

Respondent has neither degree nor 'O' levels

	Partner		
Respondent	CON	LAB	ALL
CON	333	22	29
LAB	36	243	31
ALL	40	24	93

Respondent has 'O' levels but no degree

	Partner		
Respondent	CON	LAB	ALL
CON	267	29	37
LAB	21	103	15
ALL	40	19	73

Respondent has a degree

	Partner		
Respondent	CON	LAB	ALL
CON	41	3	8
LAB	5	23	5
ALL	10	5	36

However BES respondents reported both their own and their spouses' political identities, and also the marginal distributions of the third (graduate) group are very different from those of the SCELI group of homogamous graduate couples. Additionally the BES was concerned with party political identification rather than voting intention per se. Therefore, though it does not support the hypothesis that homogamous graduate couples have less differences in voting intention than other couples, the BES data do not conclusively disprove it. (In future research analyses focusing on homogamous service class couples rather than homogamous graduate couples might be interesting and informative).

2.4. Husbands' and wives' occupational classes and assortative marriage for political identification/voting intention

Marshall et al (1988) and De Graaf and Heath (1990) have examined the relationship between voting behaviour and the occupational classes of husbands and wives in combination. Marshall et al found both spouses' voting behaviour to be dependent only on the husband's class, while De Graaf and Heath found wife's voting behaviour to also be dependent on wife's class.

Two datasets, i.e. the British Election Study (BES) of 1987 and the 1986 Social Change and Economic Life Initiative (SCELI), allow one to look for a relationship between spouses' occupational classes in combination and assortative marriage for political identification/voting intention.

As before in this chapter, the data from the 1987 BES corresponds to those respondents whose spouses were in each case one of the two people with whom the respondent discussed politics most during the election campaign. For reasons of simplicity, attention is further restricted here to couples where the current/last occupations of both spouses belong to Goldthorpe classes I, II, VI and VII (i.e. the 'service class' and the 'working class'). Attention is also restricted to couples where respondents and their spouses both had political identifications within the set of Conservative, Labour, and Alliance (including explicit Liberal and SDP supporters). Table 5/8 has four dimensions, defined by the spouses' occupational classes and the spouses' political identitifications. (Respondent's sex was found not to interact with any of these four variables, and hence was ignored).

Various log-linear models were fitted to Table 5/8 (see Table 5/10). As one would expect, spouses' political identifications were

found to be strongly related to each other, as were spouses' classes. When the relationship between class and political identification was considered, the interaction between husband's class and husband's political identification was found to be significant, as was the interaction between wife's class and wife's political identification. The model including the above four interactions (Model 1) has a deviance of 34.0 on 20 degrees of freedom ($P<0.05$). The interaction between husband's class and wife's political identification was also found to be significant, but the interaction between wife's class and husband's political identification was not even close to significance at the 5% level. Addition of the former interaction (to give Model 2) results in a change in deviance of 10.2 on 1 degree of freedom ($P<0.01$).

A binary variable was constructed to contrast couples who were homogamous for political identification with heterogamous couples. Adding the interaction between this variable and the interaction between spouses' classes to Model 2 (giving Model 3) results in a change in deviance of 5.4 on 1 degree of freedom ($P<0.05$).

One implication of Model 3 for the relationship between class and political identification is that wife's class cannot reasonably be ignored in the context of wife's political identification. In fact the magnitude of the parameter estimates from Model 3 suggests that the spouses' classes are of approximately equal importance in this context. This is consistent with the findings of De Graaf and Heath (whose data also in part came from the 1987 BES), but not with those of Marshall et al. The implication of the interaction between political identification homogamy and spouses' classes is that couples consisting of service class wives and working class husbands are on average unusually homogamous for political identification.

In order to test the validity of the last result, and to attempt to verify the importance of wife's class using data from a source other than the 1987 BES, data ~~was~~ were analysed from the Household and Community Survey follow-up to the main SCELI survey. Once again, attention was restricted to the three main parties and to the 'service' and 'working' classes.

Table 5/9 shows spouses' voting intentions cross-classified by spouses' classes (based on current/last occupations). Models 1 to 3 were fitted to Table 5/9. The difference in deviance between Models 2 and 3 is 0.0 on 1 degree of freedom ($P>0.05$), and the difference in deviance between Models 1 and 2 is 1.8 on 2 degrees of freedom ($P>0.05$). None of the interactions in Model 1 can be removed without a significant change

in deviance. The addition of an interaction between homogamy/heterogamy of voting intention and husband's class (giving Model 4) results in a change in deviance from Model 1 of 4.8 on 1 degree of freedom ($P<0.05$), Model 4 having a deviance of 18.2 on 19 degrees of freedom ($P>0.05$).

The implication of the above modelling of Table 5/9 is that the SCELI data support the hypothesis that wife's class affects wife's voting intention, and, somewhat surprisingly, suggest that husband's class is of less significance than wife's class in this context. The implication of the inclusion of the extra interaction in Model 4 is that couples including service class husbands are more homogamous for voting intention than couples including working class husbands. However, the fact that the BES data support one interaction between class and political identification homogamy/heterogamy and that the SCELI data support a different interaction between class and voting intention homogamy/heterogamy suggests that in either or both cases the significance of the interaction may be a Type I error.

What is more interesting is the difference between the two datasets regarding the importance of husband's occupational class in the context of wife's political identity/voting intention. The SCELI data support an individual-based voting intention which is very different from the husband-dominated model of Marshall et al, and the BES data demonstrate the importance of wife's occupational class in the context of wife's party political identification.

TABLE 5/8: Husbands' and wives' occupational classes in combination according to husbands' and wives' political identifications (data from the 1987 British General Election Study)

HUSBAND AND WIFE BOTH SERVICE CLASS

Husband's political identification	Wife's political identification		
	Conservative	Alliance	Labour
Conservative	73	14	1
Alliance	17	32	0
Labour	6	9	19

HUSBAND SERVICE CLASS, WIFE WORKING CLASS

Husband's political identification	Wife's political identification		
	Conservative	Alliance	Labour
Conservative	33	0	4
Alliance	9	9	2
Labour	3	1	15

HUSBAND WORKING CLASS, WIFE SERVICE CLASS

Husband's political identification	Wife's political identification		
	Conservative	Alliance	Labour
Conservative	18	1	1
Alliance	1	7	1
Labour	1	1	14

HUSBAND AND WIFE BOTH WORKING CLASS

Husband's political identification	Wife's political identification		
	Conservative	Alliance	Labour
Conservative	34	4	11
Alliance	8	23	7
Labour	11	8	112

TABLE 5/9: Husbands' and wives' occupational classes in combination according to husbands' and wives' voting intentions (data from the 1986 Social Change and Economic Life Initiative)

HUSBAND AND WIFE BOTH SERVICE CLASS

Husband's voting intention	Wife's voting intention		
	Conservative	Alliance	Labour
Conservative	32	9	3
Alliance	6	29	2
Labour	1	4	21

HUSBAND SERVICE CLASS, WIFE WORKING CLASS

Husband's voting intention	Wife's voting intention		
	Conservative	Alliance	Labour
Conservative	10	3	2
Alliance	0	11	1
Labour	1	0	10

HUSBAND WORKING CLASS, WIFE SERVICE CLASS

Husband's voting intention	Wife's voting intention		
	Conservative	Alliance	Labour
Conservative	8	1	1
Alliance	2	8	2
Labour	0	3	7

HUSBAND AND WIFE BOTH WORKING CLASS

Husband's voting intention	Wife's voting intention		
	Conservative	Alliance	Labour
Conservative	19	6	3
Alliance	7	18	13
Labour	7	8	65

TABLE 5/10: Details of various log-linear models as applied to Tables 5/8 and 5/9

Model	Model description	Deviance/d.f. BES data	SCELI data
1	$[H_cW_c][H_vW_v][H_cH_v][W_cW_v]$	34.0 on 20*	23.0 on 20
2	$[H_cW_c][H_vW_v][H_cH_v][W_cW_v]$ $[H_cW_v]$	23.8 on 18	21.2 on 18
3	$[H_cW_c][H_vW_v][H_cH_v][W_cW_v]$ $[H_cW_v][X]$	18.4 on 17	21.2 on 17
4	$[H_cW_c][H_vW_v][H_cH_v][W_cW_v]$ $[Y]$	32.7 on 19*	18.2 on 19

H_c: Husband's class

W_c: Wife's class

H_v: Husband's voting intention/political identification

W_v: Wife's voting intention/political identification

X: Interaction between homogamy/heterogamy of political identification/voting intention and wife's occupational superiority

Y: Interaction between homogamy/heterogamy of political identification/voting intention and husband's class

*: $P<0.05$

3. Religious assortative marriage

3.1. Religious assortative marriage and education

Some individuals are strongly disinclined to marry anyone who does not share their religious beliefs, indeed religions sometimes include endogamy as part of their doctrine. It is likely that for some individuals religion is a more important factor influencing their assessment of a potential spouse that education is. One plausible hypothesis is that couples who are homogamous for religion are less educationally homogamous that other couples, because they have chosen their partners for their religious rather than their educational attributes.

However, an equally plausible hypothesis is that couples who are homogamous for religion are more educationally homogamous because education and religion are sufficiently similar attributes that an individual who is inclined to marry an educationally similar spouse will also be inclined to marry a spouse with similar religious beliefs, and vice-versa. In other words, if one assumes that some individuals have a greater tendency towards homogamy for any 'cultural' variable, then the two forms of homogamy should be positively correlated.

The 1976 Family Formation Survey (FFS) collected information on the school leaving ages and religions of its (female) respondents, and also on the school-leaving ages and religions of their spouses. In addition to the religions of the respondents and their spouses, data were collected on the importance of the respondents'/spouses' religions to them. Note that all the information was given by the respondents, and not by their spouses.

By restricting attention to respondents born between 1937 and 1956 one ensures that the minimum legal school leaving age was the same (i.e. 15) for all the respondents in the constrained sample, and for all but a very few of their spouses. The FFS collected data for Scotland as well as for England and Wales, but for simplicity only data relating to England and Wales are used in most of the following analyses (more or less excluding the Church of Scotland from consideration). The couples considered are those who were legally married at the survey date.

Table 5/11 is a crosstabulation of the religions of the FFS respondents against the religions of their husbands. The non-Christian religions are highly endogamous. A much higher proportion of the respondents (10.8%) reported their husbands as being atheists or having

no religion than reported themselves to be atheists or to have no religion (6.2%). 80% of the respondents who reported themselves to be atheists or to have no religion reported the same thing about their husbands.

Although 55% of respondents described themselves and their husbands as both being Church of England, in the majority of these cases religion was described as rather or completely unimportant to at least one of the spouses. Thus in only 42% of the Church of England couples was religion described as moderately or very important to both spouses, which compares with 66% of Roman Catholic couples and 69% of the (somewhat heterogeneous) couples who both belonged to other Christian denominations (including the Church of Scotland).

The odds ratio from Table 5/11 corresponding to Church of England and Roman Catholic respondents and Church of England and Roman Catholic husbands is 9.0. The corresponding odds ratios relating to intermarriage between these denominations and other Christian denominations are 37.9 for the Church of England and 47.6 for Roman Catholicism. When attention is restricted to couples where religion is moderately or very important to both spouses, the odds ratios rise to 25.6, 62.0 and 348.6. In all three cases, the odds ratios corresponding to couples where religion is moderately or very important to both spouses are significantly higher at the 5% level than the odds ratios for other couples.

Some of the magnitude of the above odds ratios can be explained in terms of geographical variation in the proportions of the population belonging to particular denominations. However, the magnitude of the last odds ratio indicates that for some Christians precise religious denomination is a highly important factor in determining the suitability of a potential spouse (though one should not, of course, forget the constraints imposed by the field of eligible spouses that an individual actually encounters).

In order to examine the relationship between religious assortative marriage and assortative marriage for education, a four-way table of the religions and school-leaving ages of the FFS respondents and their husbands was constructed (Table 5/12).

School-leaving age was divided into three categories: less than or equal to 15, 16, and 17 or over. Because the number of respondents and husbands who were members of non-Christian religions was small, and these non-Christian respondents and husbands were highly endogamous, attention was restricted to atheists/those with no religion, 'members'

of the Church of England, Roman Catholics and a residual category of other Christians.

Thus Table 5/12 has 3x3x4x4=144 cells. Hierarchical log-linear models were fitted to Table 5/12. The model including all six two-factor interactions (Model 1) has a deviance of 123.5 on 96 degrees of freedom ($P<0.05$). Including the three-factor interaction between the spouses' religions and respondent's school-leaving age results in a change in deviance of 37.3 on 18 degrees of freedom ($P<0.01$). The inclusion of the three-factor interaction between husband's school-leaving age and the spouses' religions resulted in a further change in deviance of 25.5 on 18 degrees of freedom ($P>0.05$). Though this change in deviance only borders on significance at the 10% level, the significance of the other three-factor interaction plus the large number of degrees of freedom relating to the two interactions suggested that it would be useful to examine the model including the two interactions.

The last model from above (Model 2), which includes two three-factor interactions, and which cannot be improved upon by the addition of either of the other two three-factor interactions, has a deviance of 60.7 on 60 degrees of freedom ($P>0.05$) and therefore fits the data well.

The parameter estimates from the above model suggest that several distinct effects underlie the relationship between respondent's school-leaving age and the spouses' religions. However it is not easy to 'translate' the parameter estimates into substantively interpretable effects.

The most noticeable and easily interpretable effects involve marriages between Catholics and members of the Church of England. A model (Model 3) was fitted to Table 5/12 consisting of Model 1 plus interactions between respondent's education and Catholic/Anglican marriages and between husband's education and Catholic/Anglican marriages. The difference in deviance between this model and the model containing just the six two-factor interactions is 18.6 on 4 degrees of freedom ($P<0.01$). Table 5/13 gives the parameter estimates corresponding to the two extra interactions from Model 3. As the school-leaving age of either spouse rises, 'mixed' Catholic/Anglican marriages become more infrequent. This effect is of much the same magnitude when attention is restricted to couples where religion is very or moderately important to both spouses.

TABLE 5/11: Religions in combination of married Family Formation Survey respondents and their husbands (England and Wales; N=2,756).

	Husband's religion								
Respondent's religion	A/N	CoE	CoS	RC	OP/NC	J	H	M	Oth
Atheist/None	137	19	1	7	6	0	0	0	1
Ch. of Eng.	92	1528	15	158	66	1	1	0	3
Ch. of Scot.	4	4	7	2	1	0	0	0	0
Roman Cath.	29	136	5	126	17	2	1	1	0
Oth.Prot./NC#	36	87	4	20	171	0	1	0	2
Jewish	0	0	0	0	0	6	1	0	0
Hindu	0	0	0	0	0	0	19	0	0
Moslem	0	0	0	0	0	0	0	18	0
Other	1	1	0	0	0	0	1	0	18

Non-conformist

TABLE 5/12: Four-way table of the school-leaving ages and religions of a sub-sample of married Family Formation Survey respondents and their husbands (N=2,647).

Husband's Rel.		Atheist/None			Ch. of Eng.			Roman Cath.			Other Chr.		
Husband's SLA		<16	16	17+	<16	16	17+	<16	16	17+	<16	16	17+
Resp.'s Rel	Resp.'s SLA												
Atheist/None	<16	39	12	5	4	0	3	3	0	2	0	1	1
	16	16	10	9	1	4	0	1	0	1	0	0	1
	17+	7	9	28	0	2	5	0	0	0	0	1	3
Church of England	<16	36	7	4	823	122	63	87	12	8	27	7	4
	16	8	9	4	147	114	46	19	8	6	8	10	8
	17+	8	2	14	40	51	106	4	1	6	1	4	10
Roman Catholic	<16	10	4	2	75	16	3	44	9	11	9	2	1
	16	2	2	3	10	10	5	12	10	7	0	1	2
	17+	0	3	3	4	5	5	8	6	15	1	3	3
Other Christian	<16	19	1	1	38	13	5	9	0	0	69	17	18
	16	4	2	1	8	5	1	5	1	0	22	16	13
	17+	0	3	8	4	4	10	2	1	4	2	10	23

TABLE 5/13: Details of log-linear models applied to Table 5/12.

Model 1 - [RS][EF][RE][SF][RF][SE]
Model 2 - Model 1 + [RSE][RSF]
Model 3 - Model 1 + AC/E + AC/F

R is husband's religion
S is respondent's religion
E is husband's education
F is respondent's education

AC/E is an interaction between husband's education and a binary variable contrasting Anglican/Catholic (and Catholic/Anglican) marriages with other marriages, and AC/F is an interaction between respondent's education and a binary variable contrasting Anglican/Catholic (and Catholic/Anglican) marriages with other marriages

Parameter estimates from Model 3

School-leaving age	AC/F	AC/E
<16	0.00	0.41 (0.24)
16	-0.20 (0.20)	0.29 (0.27)
17+	-0.69 (0.27)	0.00

(The figures in parentheses are standard errors)
Note that the parameter estimates correspond to the likelihood of Anglican/Catholic marriages.

One might hypothesize that as school-leaving age increases the desire for religious similarity becomes a more salient factor influencing choice of spouse. However, religiously 'mixed' marriages of types other than Catholic/Anglican do not appear to become more infrequent as either respondent's or husband's school-leaving age rises.

The residuals from the above models do not supply any evidence of an interaction between homogamy/heterogamy of religion and homogamy/heterogamy of school-leaving age. However, it does seem that a relationship exists between school-leaving age and religious homogamy/heterogamy, though this is probably limited to a decreased tendency towards Anglican/Catholic heterogamy as school-leaving age increases.

3.2. Trends in religious assortative marriage.

Since the sample of respondents examined above corresponds to women aged between 19 and 39, the younger part of the sample is severely biased towards early marriages. Since age at marriage and religious assortative marriage may be related, the sample was split into two ten-year cohorts to see whether the pattern of marriage according to religion varied between the cohorts.

Table 5/14 shows the patterns in the two cohorts. In fact the difference between the two cohorts in the association between respondent's religion and husband's religion is significant (deviance=18.4 on 9 degrees of freedom; $P<0.05$). Virtually all of the difference is due to different levels of Catholic endogamy in the two cohorts. In the younger cohort the odds ratio corresponding to a Roman Catholic/other Christian dichotomy is 4.3, as compared with 14.6 in the older cohort.

There are at least three ways in which the above difference could have come about. Firstly, as suggested above, a relationship between religious assortative marriage and age at marriage could induce such an effect. Secondly, the difference could be the result of genuine variation in religious assortative marriage according to cohort or according to period. Thirdly, it is possible that the attrition which the older cohort has suffered through marital dissolution has been differential with respect to couples' joint religions. Murphy (1985; p457) shows that the difference between the rates of marital dissolution according to respondent's religion in the FFS data are not large, but it is possible that the rate for endogamous Catholic marriages is low and

that for exogamous Catholic marriages is high, resulting in an overall rate which differs little from those of other religions. This is, in fact, exactly the finding reported for Iowa (U.S.) by Burchinal and Chancellor (1963), who found that the seven-year survival rate for mixed Catholic-Protestant marriages was 80%, significantly less than both the survival rates for homogamous Protestant marriages (86%) and homogamous Catholic marriages (96%).

Table 5/15 shows the patterns of marriage between Catholics and those of other Christian denominations according to respondent's age at marriage. A log-linear model containing the three possible two-factor interactions was fitted to Table 5/15. The deviance of this model, which corresponds to the interaction between age at marriage and Catholic endogamy/exogamy is 5.5 on 9 degrees of freedom ($P>0.05$). There is no obvious trend in the endogamy/exogamy as age at marriage changes, so it would appear that the observed trend in Catholic endogamy is not a reflection of variation in Catholic endogamy with respect to age at marriage. (Interestingly, however, the highest level of exogamy is observed for an age at marriage of 18 or less, and the difference between this category and the categories relating to older ages at marriage is close to significance at the 5% level [deviance=3.5 on 1 degree of freedom]).

Table 5/16 shows Catholic endogamy/exogamy according to respondent's birth cohort. A log-linear model containing the three possible two-factor interactions was fitted to Table 5/16. The deviance of this model, which corresponds to the interaction between birth cohort and endogamy/exogamy is 27.7 on 9 degrees of freedom ($P<0.001$). Most of this deviance can be explained by a linear trend (deviance=16.0 on 1 degree of freedom; $P<0.001$). The parameter estimate corresponding to the trend is 0.223 (standard error=0.057).

As noted earlier, attrition of the sample through marital dissolution probably contributes to the observed trend away from Catholic endogamy. However, it is not difficult to show that even fairly extreme differences in rates of dissolution cannot explain more than a small proportion of the magnitude of the above parameter estimate.

Table 5/17 shows the patterns of Catholic endogamy/exogamy in a hypothetical cohort of couples at two durations of marriage, assuming that the dissolution rates for the intervening period are 20% for heterogamous Christian couples, 10% for homogamous non-Catholic Christian couples, and 0% for homogamous Catholic couples. The ratio of the odds ratios for the two durations is 1.41 (log odds ratio=0.34). A

similar ratio calculated from the FFS sample split into two ten-year cohorts is 3.05 (log odds ratio=1.12). If the changes in Catholic endogamy in the observed sample were due to attrition through dissolution then one would have expected the two ratios to have been broadly similar.

In fact, the observed decline in Catholic endogamy is consistent with the results described in Hornsby-Smith (1987), which are based on a national quota sample of 1,023 Catholics in 1978, the interviews for which were conducted by Social Surveys (Gallup Poll) Ltd. Hornsby-Smith found that the proportion of marriages of Catholics which were to other Catholics declined considerably for marriages contracted in the 1960's and early 1970's as compared to the 1950's and earlier (Hornsby-Smith and Lee, 1979, p232). He also developed a typology of marriages involving Catholics and discussed the reasons for the decline in endogamy (Hornsby-Smith, 1987, pp88-115).

Hornsby-Smith's explanation is that before the 1960's the Catholic Church "manifested the characteristics of a fortress" by discouraging marriages with non-Catholics and "reinforcing the salience of the Catholic belief and value systems by means of a pervasive Catholic social and religious environment", but that by the end of the 1970's there had been "a breakdown of the fortress model with its distinctive subculture" (Hornsby-Smith, 1987, p91).

Referring to the link between exogamous marriages and religious practice, Hornsby-Smith supports the conclusion of Haerle (1969) that inter-faith marriages are more common among Catholics whose religious practice is limited. Furthermore, he notes that a higher proportion of those Catholics in his data set who were in mixed marriages had been divorced or separated, but, very importantly, that this difference was almost entirely due to a high probability of previous dissolution for Catholics in 'invalid' marriages (i.e. marriages not solemnised by a priest). In another paper (Hornsby-Smith et al, 1985), it is shown that Catholics who enter into inter-faith marriages are disproportionately likely to have had an early 'lapsation' from the practice norms of the Church.

Apart from being another example of the increase in the likelihood of a heterogamous marriage with respect to a variable as the salience of that variable decreases, Hornsby-Smith's findings are an example of a set of circumstances where heterogamous marriages are likely to disproportionately contain individuals with a below-average commitment

to marriage as an institution, since a rejection of Catholic norms is likely to include a rejection of the 'sanctity' of marriage.

The relevance of the above point is that it shows that one cannot assume an increased rate of marital dissolution amongst heterogamous couples is necessarily the consequence of conflict resulting from heterogamy.

Table 5/18 shows for four five-year birth cohorts the pattern of assortative marriage according to the importance of Christianity to respondents/their spouses. Table 5/18 includes Scottish respondents and atheists/people without a religion, but excludes couples where one or both spouses had a non-Christian religion.

Fitting a log-linear model including the three possible two-factor interactions to Table 5/18 gives a deviance of 63.2 on 48 degrees of freedom, which is not quite statistically significant at the 5% level. Most of the between-cohort variation appears to be due to the youngest cohort, though this cohort does not appear to differ in any <u>systematic</u> way from the other cohorts. In general, there is no evidence from the residuals of the log-linear model fitted to Table 5/18 that there is any systematic variation between cohorts.

There is therefore no evidence that the extent to which prospective partners see Christianity as important has declined as a factor influencing Christians' choices of marriage partners (though one should remember that the information in the FFS on <u>both</u> partners' religions is reported by the wife). Overall, it would appear that during the period in question the salience of being Christian in general did not alter in the way in which the salience of being Catholic in denomination did.

4. <u>Religion, voting intention and assortative remarriage</u>

Table 5/19 shows the patterns of assortative marriage for religion of married Family Formation Survey respondents (including those living in Scotland) according to whether they were in their first marriage, or in a second or later marriage following a first marriage which ended in divorce or separation. (Respondents whose first marriages ended with the death of their spouses are excluded from Table 5/19, as are all respondents with a non-Christian religion or a non-Christian spouse).

TABLE 5/14: Respondent's and husband's religions in combination for two birth cohorts of respondent (1937-1946 and 1947-1956): data from the 1976 Family Formation Survey

1937-1946 cohort	Husband's religion			
Respondent's religion	A/N	CoE	RC	Oth
Atheist/None	63	11	4	4
Church of England	44	917	76	44
Roman Catholic	13	63	80	9
Other Christian	19	55	9	100

1947-1956 cohort	Husband's religion			
Respondent's religion	A/N	CoE	RC	Oth
Atheist/None	74	8	3	3
Church of England	48	611	82	37
Roman Catholic	16	73	46	13
Other Christian	21	36	13	83

TABLE 5/15: Respondent's age at marriage for endogamous Christian couples according to respondent's and husband's denominations in combination: data from the 1976 Family Formation Survey

Respondent's age at marriage	<19	19	20	21	22	23	24	25	26	27+
Partners' denominations										
Both Catholic	16	21	22	16	19	10	7	6	2	7
Respondent Catholic	30	22	26	22	22	8	10	6	3	8
Husband Catholic	42	28	27	28	28	14	7	4	5	7
Neither Catholic	349	302	329	293	212	132	105	48	36	77
Odds ratio	4.4	10.3		6.5		10.5		4.8		
		10.3		7.6		11.8		12.0		9.6

TABLE 5/16: Respondent's birth cohort for endogamous Christian couples according to respondent's and husband's denominations in combination: data from the 1976 Family Formation Survey

Respondent's birth cohort	37/ 38	39/ 40	41/ 42	43/ 44	45/ 46	47/ 48	49/ 50	51/ 52	53/ 54	55/ 56
Partners' denominations										
Both Catholic	16	12	21	17	14	15	15	4	8	4
Respondent catholic	12	13	15	16	16	17	29	18	17	5
Husband Catholic	22	20	15	9	19	25	25	10	26	9
Neither Catholic	200	220	237	246	223	226	201	151	118	71
Odds ratio	12.1	22.1		10.3		4.2		2.1		
		10.2		29.0		8.0		3.4		6.3

TABLE 5/17: Patterns of Catholic endogamy/exogamy in a hypothetical cohort of couples at two durations of marriage, with attrition occurring through marital dissolution

	Duration 1	Duration 2
Both partners Catholic	20	20
Wife catholic	20	16
Husband Catholic	20	16
Neither partner Catholic	200	180
Odds ratio (Catholic endogamy)	10.0	14.1

TABLE 5/18: The importance of Christianity to respondents and their husbands according to respondent's birth cohort: data from the 1976 Family Formation Survey

1937-41 birth cohort

Husband	VI	MI	RUI	CUI	A/N
Wife					
C'nity very important	58	24	7	6	7
C'nity moderately important	7	259	70	29	15
C'nity rather unimportant	1	9	152	24	9
C'nity completely unimportant	0	5	3	39	4
Atheist/no religion	1	1	4	2	29

1942-46 birth cohort

Husband	VI	MI	RUI	CUI	A/N
Wife					
C'nity very important	54	31	12	3	7
C'nity moderately important	16	277	77	25	27
C'nity rather unimportant	1	14	188	31	13
C'nity completely unimportant	1	5	1	52	3
Atheist/no religion	0	1	5	6	34

1947-51 birth cohort

Husband	VI	MI	RUI	CUI	A/N
Wife					
C'nity very important	37	16	5	5	5
C'nity moderately important	5	227	68	33	30
C'nity rather unimportant	2	9	181	38	26
C'nity completely unimportant	3	4	4	74	9
Atheist/no religion	1	3	2	2	57

1952-56 birth cohort

Husband	VI	MI	RUI	CUI	A/N
Wife					
C'nity very important	12	1	1	0	0
C'nity moderately important	6	103	27	22	13
C'nity rather unimportant	2	8	116	22	3
C'nity completely unimportant	0	1	8	47	3
Atheist/no religion	0	4	3	0	27

A log-linear model including the three possible two-factor interactions was fitted to Table 5/19. The deviance of this model is 19.4 on 16 degrees of freedom ($P>0.05$). However, an examination of the residuals suggested that there was a disproportionate number of marriages between a Catholic and a non-Catholic. An interaction corresponding to Catholic exogamy was added to the model, with a resulting change in deviance of 6.3 on 1 degree of freedom ($P<0.05$). (A further interaction corresponding to marriages between a Christian and an atheist/someone with no religion was added to the model, but this resulted in an insignificant change in deviance [2.9 on 1 degree of freedom; $P>0.05$]).

One possibility is that religion is of less salience to Catholics who remarry than to other Catholics. However, 23 out of 32 (72%) of the remarried Catholic respondents reported that religion was moderately or very important to them, this being only slightly less than the corresponding percentage for Catholic respondents still in their first marriages (78%). Of these 23 respondents, 17 (74%) were married to non-Catholics, as compared to 6 (67%) of the other 9 remarried Catholic respondents.

Table 5/20 shows husband's voting intention by wife's voting intention for couples from the HCS follow-up to SCELI according to whether the respondent was in his or her first marriage or in a second or later marriage having been divorced at least once. (Table 5/20 excludes couples where one or both spouses did not intend to vote Conservative, Labour or Alliance).

A log-linear model containing the three possible two-factor interactions was fitted to Table 5/20. The deviance of this model is 15.5 on 4 degrees of freedom ($P<0.01$). An examination of the residuals indicated that there was a disproportionate number of Conservative/Labour, and of Labour/Conservative, remarriages. When an interaction corresponding to these marriages is added to the model, the resulting change in deviance is 11.2 on 1 degree of freedom ($P<0.01$).

Both the above analyses show a significant positive relationship between remarriage and heterogamy, and even stronger relationships might have been evident had the analyses taken into account whether the spouses of respondents still in their first marriages had been previously married.

The above results are consistent with the theory that individuals who have a tendency towards heterogamy also have a tendency towards

marital dissolution with the consequence that there is a disproportionate number of 'heterogamy-orientated' individuals in the 'remarriage market'. However, other explanations of the above results are clearly possible.

TABLE 5/19: Assortative marriage and assortative remarriage for religion in a sample of respondents to the 1976 Family Formation Survey and their spouses (N=4,612)

Respondents in their first marriages

Respondent's religion	Husband's religion				
	N/A	CoE	CoS	RC	OC
None/atheist	163	21	2	8	7
Church of England	119	2310	25	200	106
Church of Scotland	14	12	238	17	3
Roman Catholic	37	189	21	265	24
Other Christian	52	127	5	29	312

Respondents in second or later marriages following a first marriage which ended in divorce or separation

Respondent's religion	Husband's religion				
	N/A	CoE	CoS	RC	OC
None/atheist	17	4	0	2	1
Church of England	10	159	2	18	7
Church of Scotland	3	0	12	2	0
Roman Catholic	4	14	2	8	1
Other Christian	4	4	1	0	12

TABLE 5/20: Assortative marriage and assortative remarriage for voting intention in a sample of respondents to the Household and Community Survey follow up to the 1986 Social Change and Economic Life Initiative main survey and their spouses (N=699)

Respondents in their first marriages

Wife's voting intention	Husband's voting intention		
	Con	All	Lab
Conservative	171	35	7
Alliance	41	139	32
Labour	11	27	165

Respondents in second or later marriages (following at least one divorce)

Wife's voting intention	Husband's voting intention		
	Con	All	Lab
Conservative	23	4	4
Alliance	7	13	2
Labour	5	0	13

5. Summary of Chapter 5

Several of the findings in this chapter relate to the salience of party political identification. The more negative an individual is about a party with which they do not identify, the less likely they are to be married to someone who does identify with that party. Individuals who belong to couples which are heterogamous for party political identification are less likely to vote. Finally, there is some evidence that homogamous graduate couples are unusually homogamous with respect to voting intention.

No evidence was found that occupational homogamy is related to homogamy for party political identification or for voting intention. However, the importance of wife's occupation in determining wife's vote (an issue of some previous contention) was clearly demonstrated.

The two main findings regarding religious heterogamy are both related to the salience of religion. As school-leaving age increases (for either spouse), Anglican/Catholic heterogamy becomes less likely. During the 1960's and 1970's the level of Catholic endogamy decreased, possibly as a consequence of a more liberal attitude to intermarriage taken by the Catholic church authorities, though this change of attitude may have been 'forced' on the church by the behaviour of its members!

Significant positive relationships were found between remarriage and the extent of heterogamy both for religion and for voting intention, suggesting that religion and voting intention may be of less salience to women marrying for a second time.

The odds ratios corresponding to Church of England endogamy (11.9) and Labour party political identification endogamy (32.7) are somewhat higher than the odds ratios considered in Chapter 4 corresponding to various social status dichotomies (Grammar/Direct Grant/Public schools vs Other schools; 'O' levels and above vs Lower/No qualifications; Middle class vs Working class social origins; Manual vs Non-manual occupations). This might be interpreted as indicating that preference has a strong role in religious/party political assortative marriage that it lacks in assortative marriage for social status.

CHAPTER 6: Occupation, education, social origin and marital dissolution

1. Introduction

This chapter examines the relationship between marital dissolution and occupation, education and social origin. In fact, this trio of status-related variables is potentially linked to marital dissolution in two distinct ways. Not only may an individual's risk of marital dissolution depend on his or her own occupation, education and social origin and those of his or her spouse, but it may also be dependent on the interaction between the individual's characteristics and those of his or her spouse.

Several authors have constructed theoretical frameworks within which the contributions of specific factors to marital dissolution can be examined. Becker et al (1977) constructed an economic framework wherein factors make positive or negative contributions to the utility expected from a marriage, and "couples separate when the utility expected from remaining married falls below the utility expected from divorcing and possibly remarrying" [p1142]. In her sociological study of divorce, Hart (1976) divides factors linked to marital dissolution into 'commitment-reducing' factors, 'conflict-generating' factors, and 'opportunity-increasing' factors [p62]. Thornes and Collard (1979) contrast barriers to and sanctions against divorce with factors creating marital stress.

An ideological commitment to marriage as an institution is likely to form a barrier to divorce, and the frequency and intensity of such a commitment may vary between social/educational strata. Furthermore, the social stigma attached to divorce may also vary between different strata. Another difference between social/educational strata may be the extent to which individuals possess the interpersonal skills necessary to avoid 'unnecessary' marital conflict.

However, probably the most obvious differences between social/educational strata are differences in status and income, and these differences are of relevance if status and/or "socio-economic adequacy" (Lewis and Spanier, 1979) affect the utility of marriage.

Differences between spouses with respect to occupation, education or social origin could affect the risk of dissolution either by generating conflict (because of differing values, attitudes, or interests), or by increasing the likelihood of one of the spouses locating (or envisaging) a more 'compatible' partner.

The idea of an invidious comparison being drawn between an individual's actual spouse and a more 'suitable' spouse points to the possible importance of an individual's expectations of their spouse. Social mobility may cause the mobile spouse to have a notion of an 'ideal' spouse to which their current spouse cannot live up (c.f. Blau, 1956), or an individual (especially a husband) may not achieve the level of income/status that their spouse expects of them, both scenarios being likely to lead to marital difficulties.

1.1. Empirical research on the relationship between marital dissolution and occupation, education, and social origin

The relevant existing research can be divided into two categories, one of which focuses on 'marital quality', i.e. the dependent variable is based on some subjective evaluation of a married couple's relationship, and the other of which focuses on 'marital instability', i.e. the dependent variable is a binary variable indicating whether or not a marriage is intact (c.f. Lewis and Spanier, 1979). The latter category of research is strictly speaking of greater relevance to the study of marital dissolution, but focusing on marital quality is of some relevance, given the intuitive reasonableness of a strong link between marital quality and marital stability.

(i) Research on the effects of husband's characteristics and/or wife's characteristics

Research in the United States has identified positive relationships between 'marital quality' and occupational status, education and income (see Lewis and Spanier, 1979, pp 277-279). However, Becker et al (1977) found no clear relationship between education and marital instability once the relationship between age at marriage and marital instability had been accounted for. Bumpass and Sweet (1972) found that college-educated men had a decreased risk or marital instability. College-educated women did not, however, have a decreased risk. Coombs and Zumeta (1970) found that divorced women were disproportionately likely to consider their ex-husband's income as having been inadequate, while Ross and Sawhill (1975) found that men whose incomes were much below what would be predicted on the basis of their occupation and education had an increased rate of marital instability.

In Britain, Noble (1970) examined the relationship between socio-economic group and divorce (using Census data on marital status and SEG)

and concluded that there was not the same 'straightforward' relationship between social status and divorce that there appeared to be in the U.S. Gibson (1974) compared a sample of 598 divorcing couples with Census data on married couples and found that men from Registrar General's Social Classes IIINM and V were over-represented in the divorcing sample. Thornes and Collard (1979) suggest on the basis of their (West Midlands) study comparing 520 divorced individuals with 570 continuing married individuals that a high rate of divorce for RGSC V men could be interpreted in terms of the "relatively acute and widespread environing disadvantage among this group", and that RGSC IIINM men possibly suffered from "stress arising from their aspirations, 'marginality' and ambiguity of social position" [pp 40-47; p58]. They also found that marriages in which the husband was highly educated appeared to be unusually stable. Marriages in which the wife was highly educated, however, were not unusually stable [p51]. A higher proportion of Thornes and Collard's divorced husbands than of their continuing married husbands had been unemployed during marriage. The difference was especially large in the context of long-term unemployment (2+ years). Ross and Sawhill (1975) found that husbands who had had serious unemployment problems in the last three years were twice as likely to divorce [U.S. data].

Haskey (1984) examined the relationship between socio-economic groups/social class and divorce by calculating Standardised Divorce Ratios (SDR's) based on a sample of 2,164 divorces from 1979 and on data from the OPCS Labour Force Survey. The SDR's of men in RGSC's II to IV were found to be reasonably similar, but the SDR of RGSC I was found to be half the average while the SDR for RGSC V was found to be twice the average. The SDR for unemployed men was very similar to that for men in RGSC V.

Murphy (1985) examined the relationship between husband's RGSC and marital breakdown in a sample of 5,049 ever-married women from the 1976 Family Formation Survey. His results were similar to those of Haskey, but he found that when respondent's age at marriage had been controlled for, the low risk for RGSC I relative to the other RGSC's disappeared.

Ermisch (1986) examined the relationship between wife's years of post-compulsory education and the risk of marital dissolution using a sample of 3,865 ever-married women from the 1980 Women and Employment Survey, but did not find a straightforward relationship (though highly educated women appeared to have a disproportionately high risk of dissolution at long marriage durations).

Two studies (Haskey, 1986; Davis and Murch, 1988) have demonstrated that a strong relationship exists between husband's RGSC and choice of 'fact' as grounds for divorce. In both studies the proportion of cases in which the divorce was on the grounds of 'adultery' decreased from about half for RGSC I husbands to about a quarter for RGSC V husbands. Conversely, the proportion of cases in which the divorce was on the grounds of 'behaviour' increased from about a quarter for RGSC I husbands to over a half for RGSC V husbands. However, Davis and Murch are careful to point out that these differences may be more a function of middle class couples, or their lawyers, having chosen the (apparently) less stigmatic of the two options than it is a reflection of underlying class differences in marriage.

(ii) Research on the effects of assortative marriage

Most of the existing research relating assortative marriage for occupation, education and social origin to marital 'problems' has been carried out in the United States.

According to Glenn et al (1974), social origin heterogamy is frequently assumed to be detrimental in the context of marriage because "Persons who receive their early socialization at different social levels are unlikely ever to be compatible marriage partners" [p544]. In their critical review of the literature, Glenn et al found only three studies which directly related to the effects of social origin heterogamy. Two of these, Burgess and Cottrell (1939) and Roth and Peck (1951) drew different conclusions from different codings of the same data (with Roth and Peck rejecting Burgess and Cottrell's conclusion that social origin heterogamy was related to 'marital maladjustment' (a measure of quality). The third study, Scanzoni (1968), compared a sample of intact marriages with a sample of disrupted marriages and found that the latter contained a higher proportion of couples with dissimilar social origins. However, Glenn et al suggest that Scanzoni's finding may be a reflection of the effects of underlying occupational or educational heterogamy.

A common hypothesis is that the effects of hypogamy and hypergamy are not the same, e.g. when comparing the classes at marriage of spouses, Roth and Peck commented that "The wife-high [hypogamous] cases seem to be more unfavourable to marital adjustment than the husband-high [hypergamous] cases" [p481] (though it should be noted that their comment was based on a test with a highly non-significant result!).

Pearlin (1975) provided some evidence that hypogamy with respect to status background can be a source of marital maladjustment.

A considerable amount of research exists relating to the effects of assortative marriage for the 'achieved' variables, i.e. education and occupation. Coombs and Zumeta (1970), who studied marital dissolution over a five-year period using data from a longitudinal study of fertility, noted that husbands in continuing marriages were more likely to be better educated than their wives as compared to husbands in dissolved marriages [p97]. However, they did not publish the figures on which this comment was based. Bumpass and Sweet (1972) examined the effects of educational, age and religious heterogamy on marital instability using dummy variable multiple regressions and concluded that their results did not generally support the association of educational heterogamy with a high rate of marital instability, though they noted a high rate of instability among extremely hypogamous couples (though it is not clear whether this result was statistically significant).

Jorgensen and Klein (1979) found no evidence of any relationship of note between social origin, education or occupational heterogamy and value consensus/role consensus/frequency and intensity of conflict in a sample of 120 married couples. However, in a previous paper based on the same source of data, Jorgensen concluded that "there is a positive relationship between social class hypogamy and the wife's perception of marital conflict frequency given that she values status advancement at the same time" (Jorgensen, 1977, p659). Jorgensen was in fact trying to replicate/extend the work of Pearlin (1975), who suggested that the effects of status inequality on marriage depend on the salience of status.

In their recent paper, Rogler and Procidano (1989) found no evidence of any effect of educational heterogamy on the marital quality of 200 Puerto Rican families in New York. Even more recently, Tynes (1990) concluded from her research that educational hypogamy has a positive effect on marital satisfaction. (However, her sample consisted of only 97 couples, of which a quarter were sampled because the wife was a professional. She also used a 10% level of statistical significance throughout her paper!)

In her small-scale (British) study of wives' occupational superiority, McRae (1986) noted that male occupational supremacy is both a norm and the typical pattern of family and work organization, and that "it is also an ideology" [p73]. Hence one might expect occupational hypogamy to be more likely to have a negative effect on marriage than

occupational hypergamy. However, Richardson (1979) found no support (from a sample of over 1550 couples) for the hypothesis that wife's occupational equity/superiority had a negative effect on marital happiness. Philliber and Hiller (1983) did not find a significant link between occupational hypogamy and marital dissolution (in a longitudinal study of 984 couples), though they noted that the residuals from their model were consistent with such a link. Kellerhals et al (1985) found slight evidence of a relationship between 'socio-professional hypogamy' and marital dissolution (in their longitudinal study of 557 Swiss couples). McRae also concluded from her research that occupational hypogamy "can only be accommodated harmoniously between husband and wife through some form of normative agreement which explains each spouse's place in family life" (McRae, 1986, p231).

A parallel hypothesis to the one linking social status heterogamy with an increased risk of marital maladjustment/instability links age heterogamy with the same increased risk. Some evidence in support of this hypothesis is provided by Schmitt (1969), who compared the ages in combination of marrying and divorcing couples in Hawaii, and by Teachman (1982), who included an age difference covariate in his model of marital dissolution.

2. A proportional hazards model of marital dissolution

This section uses proportional hazards models (see Cox, 1972) to examine the dependency of marital dissolution on occupation, educational qualifications, social origin, and various other covariates. The most notable of these other covariates is one which is related to occupation, i.e. unemployment. In the U.S. Ross and Sawhill (1975) included "serious unemployment" in a model of marital dissolution, but otherwise no attempt seems to have been made to quantify the effects of unemployment on the risk of marital dissolution. Much of the research in this section was carried out in the context of a quantitative study of the relationship between unemployment and marital dissolution (Lampard, 1990).

The data used in this section relate to the sample of 6,111 adults in six localities obtained by the main survey of the 1986 Social Change and Economic Life Initiative (SCELI). The risk that a couple's marriage will dissolve is likely to be dependent on characteristics of both the spouses. However, most surveys, the SCELI main survey included, do not collect data on the ex-spouses of respondents and therefore the

resulting datasets only contain information on one spouse for each recorded dissolution.

2.1. Defining marital dissolution

Marital dissolution from a sociological perspective (as opposed to a legal perspective) precedes the 'decree absolute' in divorce by a significant period in most cases where couple eventually become legally divorced. An obvious landmark to use as an estimate of the point at which a marriage really breaks down is the date at which the couple ceases to live together. An examination of Table 4.8 in the 1987 OPCS annual report on Marriage and Divorce Statistics, together with an examination of the distributions of the durations of pre-divorce separation of the SCELI respondents, indicates that separation pre-dates petitions for divorce in a large proportion of cases.

Approximately 60% of the SCELI respondents whose first marriages had ended in divorce reported themselves as having separated from their spouses before they became divorced. (Since the marriages of individuals who have already been divorced once are disproportionately likely to end in divorce, it is sensible to restrict attention to first marriages). Of the 40% who did not report a distinct separation date, just over a fifth (i.e. about 8% of the total) could be seen to have separated from their spouses in or before the calendar years preceding the years of their divorces. A large number of respondents (approximately 23% of the total) did not report a distinct separation date but could be seen to have separated from their spouses in the calendar years of their divorces. The above distinctions are made on the basis of the data collected by SCELI on living arrangements, which include information on whether a respondent was living with a partner or not. Unfortunately, only the year (and not the month) when a change in living arrangements occurred was recorded.

If one is to use the date of each divorced respondent's separation as an estimate of the date at which their marriage broke down, then in order to be consistent one cannot consider as being intact the marriages of respondents who declare themselves to be separated from their spouses. The possibility exists that some respondents who define themselves as separated will achieve reconciliations with their spouses, but a comparison of the distribution of the duration of separation for these individuals with the distribution of the duration of the pre-divorce period of separation for those respondents whose first marriage

ended in divorce indicates that it is likely that separation will lead to divorce in the vast majority of cases, and the existence in the SCELI sample of a small number of respondents who had been separated for a considerable length of time without being divorced suggests that a further small minority of respondents were permanently separated from their spouses at the survey date.

The choice of the date of separation as an estimate of the point of marital breakdown also allows those SCELI respondents who were widowed having separated from their spouses but not having been divorced to be included in the sample of 'broken first marriage' respondents.

A small number of SCELI respondents (nineteen) appear to have remarried after a period of separation without having been divorced. This might possibly be due to a failure to report the date of divorce and in any case it does not seem unreasonable to include these cases in the 'broken first marriages' sample. Overall, the 6111 SCELI respondents can be sub-divided into the 1207 never-married respondents, 3801 respondents with surviving first marriages, 157 respondents whose first spouses died before any marital dissolution had occurred, 943 respondents in the 'broken first marriages' sample and 3 'problem cases' (whose recorded life-histories merit their exclusion from any marriage-related analyses). Of the 943 respondents in the 'broken first marriages' sub-sample, about three-quarters have separation dates to an accuracy of one month. The remainder have separation dates which consist simply of a calendar year, either because their separation is a 'de facto' one derived from living arrangement histories, or because they were unable to recall their separation dates to the required accuracy.

Of the 943 SCELI respondents who reported having divorced/separated from their first spouse, 341 were men and 602 were women. Note that the respondent's first spouse may have been previously married.

At first sight the large disparity between the number of men in the sample whose first marriage ended in dissolution and the corresponding number of women is alarming, especially since U.S. researchers have noted a tendency for divorced men to misreport their marital histories.

However, most of the disparity can be explained fairly simply. Firstly, the number of female respondents in the SCELI sample is disproportionately large. Secondly, an examination of 1981 Census data roughly corresponding to the six SCELI areas suggests that the number of ever-divorced women in the SCELI age range is noticeably larger than the corresponding number of ever-divorced men, which is at least partly a

reflection of the average disparity of two or three years between husbands' and wives' ages.

However, a comparison of the current marital status distributions in the samples for the six areas with 1981 Census data suggests that the numbers of currently divorced men in the samples for some of the six areas are disproportionately low. This could be the result of respondents misreporting their marital status, but could also simply reflect a tendency for currently divorced men to be a difficult group to sample, since they are quite likely to be geographically mobile, even if only over short distances.

The issue of the geographical mobility of divorced people is an interesting one. The relationship between the 'outcome' of the SCELI respondents' first marriages and whether they were living in the same area as they had been at age 14 was briefly examined. Male divorcees/separated men had been slightly more geographically mobile in this respect that their female counterparts. When variables relating to residence at age 14 were included in the analyses performed later in this section, the results suggested that divorced/separated men were more likely to have been geographically mobile than other ever-married men or any ever-married women, but the difference was not statistically significant (and the fact that the men may have moved before or after dissolution makes the analysis of dubious validity in any case).

2.2. Occupation, education, social origin and the risk of dissolution

Table 6/1 shows the percentages of ever-married SCELI respondents of each sex whose first marriages had survived to the survey date, according to the Registrar General's Social Classes and Goldthorpe classes of the respondent's occupations, according to their highest educational qualifications, and according to their fathers' Goldthorpe classes (The 157 respondents whose first marriages ended with their spouses' deaths are not included in Table 6/1). In general Table 6/1 suggests that the risk of dissolution decreases as social status increases.

2.3. Approaches to modelling marital dissolution

Two main modelling approaches have been used in recent literature examining the determinants of marital dissolution. One approach consists of the use of a set of 'static' logit models where in each model the probability of marital dissolution in a particular interval of time is

specified as a function of a number of explanatory variables (Becker, Landes and Michael, 1977; Ermisch, 1986). The other approach consists of the use of a proportional hazards model (see Cox, 1972), wherein the probability of marital dissolution at a specific point in time is equal to the product of a time-varying hazard rate common to all cases and an individual-specific factor. This constant factor is a function of the values for that individual of a set of covariates (Teachman, 1982; Murphy, 1985; Balakrishnan et al, 1987; Lehrer, 1988).

Three problems which need to be considered are firstly how to deal with time-varying covariates, secondly how to deal with covariates whose effects are thought likely to be time-dependent, and finally how to cope with unobserved heterogeneity in the sample.

By splitting marriage histories into five-year intervals starting at the date of marriage, Ermisch (1986) enables time-varying aspects of women's work and fertility histories to be included as covariates in his models. His approach also has the potential to highlight variation between different marriage durations in the effects of covariates. On the other hand, the choice of the intervals to be considered is arbitrary and by splitting the divorces in his data (the 1980 Women and Employment Survey) into several sub-groups Ermisch makes it more difficult for himself to obtain statistically significant results if the effects of covariates are constant over time. It would not be impossible, however, to specify a single logit model which allowed some covariates to have time-varying effects while holding the effects of other covariates constant; see, for example, Morgan, Lye and Condran (1988). One should note that Ermisch found some evidence of variation over time in some of the effects that he considered.

A proportional hazards model would seem a more appropriate technique for the study of marital dissolution (see Lehrer, 1988, pp196-197), among other reasons because it utilises more information on the timing of events than Ermisch's approach does. Proportional hazards models are of the form

$$h(\underline{z}_i,t) = h_0(t)\exp\{\underline{z}_i^T\underline{\beta}\},$$

where $h(\underline{z}_i,t)$ is the 'hazard' (risk) for individual i at time t, $h_0(t)$ is a common/baseline hazard function applying to all individuals, $\underline{z}_i$ is a vector of covariates for individual i, $\underline{\beta}$ is a vector of coefficients for these covariates, and $\exp\{\underline{z}_i^T\underline{\beta}\}$ is therefore a factor relating to the risk of individual i relative to the baseline hazard.

TABLE 6/1: Percentages of first marriages of SCELI respondents of each sex surviving to the survey date according to their pre-marital Registrar General's Social Classes and Goldthorpe classes, their highest educational qualifications, and their fathers' Goldthorpe classes (N=4,744, which excludes respondents whose first marriages ended in the death of their spouse).

	Male respondents % surviving		Female respondents % surviving	
Registrar General's Social Class				
I	90%	(102/113)	83%	(15/18)
II	87%	(233/268)	85%	(342/404)
IIINM	85%	(191/224)	80%	(931/1167)
IIIM	80%	(587/729)	77%	(266/345)
IV	83%	(298/359)	74%	(454/613)
V	81%	(101/125)	71%	(57/80)
No RGSC	74%	(102/137)	75%	(122/162)
Goldthorpe class (aggregated)				
I or II	89%	(364/410)	84%	(317/379)
IIIa	84%	(119/142)	---	---------
IV	84%	(52/62)	---	---------
IIIa or IV	---	---------	82%	(788/964)
V	78%	(121/156)	73%	(37/51)
IIIb, VI or VII	81%	(925/1141)	72%	(927/1244)
None	75%	(33/44)	78%	(118/151)
Highest educational qualifications				
Degree	93%	(153/165)	87%	(90/103)
'A' levels	84%	(134/159)	83%	(222/268)
'O' levels	87%	(385/455)	81%	(602/741)
None of above	79%	(942/1186)	76%	(1273/1677)
Father's Goldthorpe class (aggregated)				
I or II	85%	(257/302)	79%	(325/411)
IIIa, IV or V	86%	(315/367)	81%	(503/620)
IIIb, VI or VII	81%	(884/1092)	79%	(1134/1439)
None	81%	(158/194)	71%	(225/319)

One can still take account of covariates with time-varying effects when one uses a proportional hazards model. One way in which this can be achieved is by replacing a covariate which is thought to have a time-varying effect by a transformed version of the covariate, where the transformation changes the situation from one where a time-independent covariate has a time-varying effect to one where a time-varying covariate has a constant effect.

As Murphy (1985) noted, the computational costs of including more than a very small number of time-varying covariates may be high. For the purposes of this paper unemployment clearly needs to be represented at least in part by time-varying covariates (in order to take account of post-marital unemployment), and the numerous and sometimes repeated shifts between employment and unemployment of a proportion of the sample, in combination with the sheer size of the sample, are thus potentially a problem.

There is much current research on the issue of unobserved heterogeneity/omitted variables (e.g. Crouchley and Pickles, 1989, Davies and Pickles, 1986, Gonul, 1989). While this chapter makes no attempt to model for unobserved heterogeneity one should at least be aware of its possible effects. The shape of the curve obtained by plotting divorce rates against duration of marriage (see, for example, Haskey, 1988) is possibly partially the result of the 'early' divorce of individuals who have a higher than usual propensity towards marital dissolution for reasons which are unlikely to be adequately represented by the variables collected in SCELI or any other social survey. This form of unobserved heterogeneity is relatively unimportant if one is primarily interested in the effects of covariates on propensity towards marital dissolution, and it is also not impossible that the shape of the curve <u>does</u> represent genuine changes with duration of marriage in the risk of dissolution. Another problem is the possibility that the categories of one of the explanatory variables used in a model of propensity towards marital dissolution may contain different distributions of an important unobserved variable, inducing spurious time-dependency in the relative effects of the different categories.

2.4. Variables affecting the risk of marital dissolution

Earlier quantitative analyses of marital dissolution such as Murphy (1985), Ermisch (1986) and Kiernan (1986), are an obvious source of variables relating to marital dissolution, along with general sociological discussions of factors affecting the risk of marital dissolution such as Hart (1976) and Burgoyne et al (1987).

Such previous research has shown that a very large number of factors affect the risk of marital dissolution. These factors can be grouped into intuitively sensible categories, e.g. 'personal' factors, 'environmental' factors, 'temporal' factors, etc.

Social survey based research on marital dissolution rarely allows assessment of the effects of 'personal' attributes and attitudes on the risk of dissolution. It is clear, however, that religious beliefs affect the risk, and Kiernan (1986) suggests that neuroticism may be associated with an increased risk. Kiernan also found that marital dissolution appears to be 'transmitted intergenerationally', i.e. those individuals whose family histories include one or more marital dissolutions are at an increased risk. (Note that Kiernan's analyses were univariate and that she also confined her attention to teenage marriages).

Murphy (1985) emphasised the effects of 'demographic' factors. Clearly marriage cohort and birth cohort are important determinants of the risk of dissolution, given the rising trend in divorce rates since the turn of the century (see Burgoyne et al, 1987).

Perhaps the most 'important' and well-documented factor affecting the risk is age at marriage. Burgoyne et al suggest that the high dissolution rate associated with teenage marriages may be linked to housing, financial and employment problems, but Murphy found that the effects of age at marriage did not disappear when various other covariates were included in analyses. A 'common sense' argument is that people who marry young are less likely to have adequately assessed their compatibility with their partners, but there is little evidence that couples marrying young are less homogamous than other couples. Another argument suggests that people marrying young are not prepared for the stresses associated with marital relationships. The upturn in risk associated with 'late' marriages is usually explained by one of a variety of 'common sense' arguments, e.g. it is the result of misguided marriages made 'before it is too late', or the result of marriages involving individuals who have unconventional attitudes towards

marriage, or the result of marriages between individuals that 'nobody else wanted'.

The other set of 'demographic' factors which have a well-documented effect on the risk of dissolution are factors related to fertility. Murphy makes several important points on this issue. Firstly he notes that it is difficult to differentiate between the effects of 'large' numbers of children and the effects of early childbearing since the two variables are highly correlated (Ermisch, 1986, found a significant positive relationship between early childbearing and the risk of dissolution, while Kiernan found an increased risk attached to large family sizes). Secondly, he suggests that the well-documented finding that pre-marital conceptions are positively related to the risk of dissolution is symptomatic of a broader relationship between the length of the 'first birth interval' (i.e. the interval between marriage and the first birth) and the risk of dissolution.

Ermisch also found a significant positive relationship between childlessness and the risk of dissolution, which is consistent with the theory of 'marriage-specific capital' (Becker et al, 1977), which suggests that children can add to the 'value' of a marriage and hence act as a disincentive to dissolution.

While all the above-mentioned authors have found that social class and education appear to have little effect on the risk of dissolution once adjustments have been made for other relevant variables, variables relating to 'living conditions' have been found to be related to the risk of dissolution. In particular both Kiernan and Murphy found household tenure to be of significance, with owner-occupiers having a lower risk of dissolution than those with other tenures. Furthermore Kiernan noted a relationship between low income and an increased risk of dissolution.

Finally, Ermisch examined in some detail the relationship between women's work experience and the risk of dissolution, and found that women with more work experience were more likely to divorce, possibly because they were less in a state of economic dependence on their husbands.

2.5. Details of a proportional hazards model of marital dissolution

The data to be modelled consisted of 4,901 cases: the 943 respondents who reported having separated from/divorced their first spouses, together with 157 cases where the respondent's first spouse died during an intact marriage and 3,801 cases where the respondent's first marriage was still intact at the survey date.

The BMDP program P2L was used to fit a proportional hazards model to the data. Bearing in mind the lack of precision of the separation dates of some of the SCELI respondents meant that in some cases the dissolution event was only accurate to the level of calendar year, a sensible reduction of the data which made the model-fitting process less 'expensive' in computer time was to make the basic unit of time considered the calendar year. This reduced drastically the number of time points that the proportional hazards model had to 'consider'. It seems unlikely that the resulting increase in the coarseness of the data will have much obscured the relationship under examination.

The time origin for each case was the year of first marriage, and those cases in which the marriage did not end in dissolution were censored either at 1986 or the year of the spouse's death for those who were widowed (i.e. any respondent whose first spouse died while the marriage was still intact was treated as being 'at risk' up until the year of their spouse's death). The year in which the 'de facto' dissolution of each dissolved marriage occurred was used to mark the 'death' of that marriage.

The modelling approach used consisted of the addition to (and subtraction from) successive versions of the model of relevant covariates/groups of dummy variables. The final version of the model only included covariates/groups of dummy variables which had a statistically significantly effect on the risk of dissolution. Conversely, no covariates which had been found to have a significant effect were excluded from the final version of the model.

Parameter estimates from the final version of the model are given in Table 6/2. The next few subsections describe the covariates used in the analysis, (most of which appear in the final version of the model).

2.6. Covariates included in the model; SCELI study areas, marriage cohort and age at marriage.

Dummy variables were included in all the versions of the model to take account of any differences in the risk of dissolution between the six study areas.

A dummy variable for sex was also included, to take account of the fact that the inclusion of sex-specific covariates and/or covariates which have different effects for the two sexes removes the 'natural' equivalence of the hazard rates for the two sexes. There was little to be gained by fitting separate models for each sex, since interactions could be used to account for sex differences in the effects of covariates. Separate models were fitted 'to be on the safe side' but they did not reveal anything which was not evident from the 'joint' model.

In fact the inclusion of this group of dummy variables significantly improved the fit of the model, indicating that there may be underlying differences in the dissolution rates of the different areas. An examination of 1981 Census data corresponding to the six areas seemed to provide some support for the observed differences, though interpretation of these differences is difficult. It is possible that different geographical 'communities' foster different attitudes towards the social acceptability of marital dissolution, and it is also possible that the between-area differences in the risk of dissolution reflect religious differences between the areas.

Beyond this it was clearly necessary to take account of the increase in the rate of marital dissolution over time; the inclusion of marriage cohort as a covariate was found to do this job well. (Initially a set of dummy variables representing various marriage cohorts was included, but the linear trend apparent in the parameter estimates for these dummies suggested that a single covariate would suffice). An alternative approach would have been to have included a covariate or dummy variables relating to the respondent's birth cohort.

The parameter estimate in the final model suggested a growth in the dissolution rate of 5.5% per year.

As mentioned earlier previous research has shown that for both the U.K. and U.S. a low or a very high age at marriage is related to an increased risk of marital dissolution (for women at least). Once again, one could include a set of dummies relating to various ages at marriage to take account of this effect, but the approach used here was to

include two covariates, one being age at marriage itself (AAM) and the other age at marriage minus twenty-five squared (i.e. $[AAM-25]^2$). Both covariates significantly improved the fit of the model, and the parameter estimates were consistent with the frequently observed U-shaped relationship between age at marriage and dissolution rates, with high rates for young ages at marriage and the rates decreasing with age to a minimum somewhere between the late twenties and late thirties. There were too few 'late' first marriages in the SCELI sample for this paper to confirm the increased risk of dissolution that other authors have found for this group.

Somewhat unusually in this context, the data examined here are for both sexes and one should consider the possibility that the effect of age at marriage is sex-dependent. As it happens, the inclusion of interactions between sex and age at marriage (AAM) and age at marriage minus twenty-five squared ($[AAM-25]^2$) produced statistically insignificant parameter estimates which suggested that there is little difference between the sexes in the effect of age at marriage on propensity to marital dissolution.

When two time-dependent variables designed to take account of changes in the AAM and $[AAM-25]^2$ effects with respect to marriage duration were included in some early versions of the model including few covariates, the parameter estimates, though not statistically significant, were sufficiently large to suggest time-dependency in the effects of age at marriage. However in later versions including more covariates the parameter estimates for these effects became very close to zero. Overall, therefore, it seemed reasonable to assume that the inclusion of AAM and $[AAM-25]^2$ as covariates took adequate account of the effects of age at marriage on the risk of marital dissolution.

2.7. Covariates included in the model: occupation, highest educational qualifications and social origin.

The three 'social status-related' covariates were initially operationalized using the categories shown in Table 6/1, i.e. a four level categorical variable representing highest educational qualification, a four level categorical variable corresponding to father's occupation (aggregations of Goldthorpe classes (see Goldthorpe, 1987) plus a 'residual' category), and a six level categorical variable corresponding to respondent's job at marriage or last job before marriage if they were not in the labour force at the date of marriage

(aggregations of Goldthorpe classes plus a 'residual' category). Note that Goldthorpe sub-class IIIb was amalgamated with class VII throughout, and that those female respondents with class IV occupations were aggregated with class IIIa.

The approach taken was to initially assess the gross effects of education, occupation and social origin on the risk of dissolution, and then to examine their effects net of the effects of other covariates included in the model.

The three variables were first of all included in a version of the model which only otherwise contained as covariates marriage cohort and dummy variables for the six areas. The likelihood ratio statistic for the inclusion of the three variables was highly significant, but an examination of the parameter estimates suggested an 'ad-hoc' reduction in the number of parameters relating to the three variables included in the model, and the inclusion of parameters corresponding only to the following eight effects resulted in only a small reduction in the likelihood ratio statistic corresponding to the inclusion of the variables:

(i) A low risk of dissolution for male graduates,

(ii) A low risk of dissolution for female graduates,

(iii) A high risk of dissolution corresponding to a job in Goldthorpe class V,

(iv) A high risk of dissolution for men with no pre-marital jobs, especially compared with women with no pre-marital jobs,

(v) A low risk of dissolution for men in the 'service class' (i.e. Goldthorpe classes I or II) and for women with non-manual jobs (i.e. jobs in Goldthorpe classes I, II or IIIa),

(vi) A high risk of dissolution for women whose fathers' jobs when they were aged 14 were not given,

(vii) A low risk of dissolution for respondents with fathers in Goldthorpe classes III, IV or V.

(viii) A lower risk of dissolution for men with 'O' levels as their highest educational qualification ~~that~~ than for men with 'A' levels as their highest educational qualification and men with no relevant qualifications.

The above effects bear a strong relationship to what one might have expected from the straightforward percentages presented in Table 6/1. Some of the above effects appear to have little to do with class or social status per se.

When the above effects were included in a version of the model which included age at marriage and age at marriage squared as well as marriage cohort and dummy variables for the study areas, effect (ii) became very close to zero, and effect (v) diminished in strength.

2.8. Covariates included in the model: fertility, housing tenure, etc.

Four covariates included in some versions of the model related to the respondent's fertility history. The first two of these were dummy variables relating to whether the respondent had fathered/given birth to a pre-marital child or had conceived a child pre-maritally, the latter variable being based on the birth of a child within the first eight months of marriage (arguably too long a period; c.f. Ermisch, 1986). The third covariate was a time-dependent dummy variable switching to one at the year following the birth of the respondent's first child. All three of these variables had significantly improved the fit of the final version of the model (see Table 6/2), with pre-marital births and pre-marital conceptions increasing considerably the risk of dissolution, but the birth of a first child decreasing the risk considerably. These results are consistent with those of Murphy, who in addition found that children subsequent to the first had no appreciable effect on the risk of dissolution, and that the negative effect of pre-marital conceptions was largely removed on the addition of a dummy variable relating to whether the marriage ceremony had been a religious ceremony or in a register office (Murphy, 1985: p450 and p458).

Note that SCELI did not collect information on the fertility histories of the respondents' ex-spouses, and therefore this analysis could not take account of the effects of spouses having children by anyone other than the respondents.

Murphy also examined the effect of the length of the first birth interval (i.e. the interval between marriage and first birth) on the risk of dissolution and his findings were similar to those produced here by the addition of a fourth fertility-related variable; a time-dependent covariate set equal to zero until the year following the first birth and set to the length of the first birth interval thereafter. The parameter estimate for this variable was negative, and bordered on significance at

the 5% level, indicating a decreasing risk of dissolution with increasing length of first birth interval. The inclusion of this variable only slightly reduced the magnitude of the effect due to the birth of the first child, and also only slightly reduced the magnitude of the parameter estimates for pre-marital births and pre-marital conceptions.

The effects of pre-marital births and conceptions might have been expected to vary over time, but parameters introduced into the model to allow for linear trends in the effects of these variables had highly non-significant parameter estimates.

The consensus of recent research is that pre-marital cohabitation is associated with an increased risk of marital dissolution (e.g. Balakrishnan et al, 1987, and Burnett et al, 1988, who respectively analysed fairly recent Canadian and Swedish data, see also Bumpass et al, 1989, and Hoem and Hoem, 1988). Since the SCELI data contain information on its respondents' living arrangements since age sixteen it was possible to set up a covariate relating to 'de facto' pre-marital cohabitation (where cohabitation is simply defined as 'living with one's partner'). When this covariate (initially a simple dummy variable) was included in the model its parameter estimate was found to be positive but not statistically significant, though if one took the estimate at face value it suggested a small increase in risk associated with pre-marital cohabitation.

However, the SCELI data allowed pre-marital cohabitation to be further divided into three categories: pre-marital cohabitation in the parental home of one of the spouses (which is not necessarily 'cohabitation' in the conventional sense of the word!), pre-marital cohabitation in the couple's *own* household, and finally pre-marital cohabitation elsewhere. The distinction between the last two categories is a subtle one (linked to the respondent's interpretation of the word 'own'); an examination of some of the completed questionnaires showed that couples in the third category were probably mostly pre-maritally cohabiting in privately rented accommodation rather than (as might have been expected) in more unusual accommodation. When the three 'sub-variables' were included in the model the positive parameter estimate for the original dummy variable could be seen to have been the result of positive estimates for the first category and in particular the third category.

In fact this analysis provides no evidence that 'cohabitation' in the way that it is usually 'defined' (i.e. as a situation where two

people are living as a couple in their own home in a 'marriage-like' relationship) is related to either an increased or a decreased risk of marital dissolution. This cannot, however, be regarded as conclusive evidence <u>against</u> cohabitation being associated with an increased risk of dissolution.

What the above results do suggest is that there may be a relationship between unusual or unsatisfactory living circumstances and the risk of marital dissolution. This somewhat unexpected result, together with the interesting and statistically significant results of Murphy (1985) regarding the effects of tenure at marriage, suggested that attention should be turned to household tenure, data on which were collected by SCELI.

In fact, the inclusion in the model of dummy variables relating to tenure at first marriage (or, to be more precise, at the end of the calendar year in which the marriage took place) did not have much effect on the parameter estimates relating to cohabitation.

Several of the parameter estimates corresponding to different tenures at marriage differed from each other significantly. The parameter estimate corresponding to the highest risk of dissolution belonged to those respondents who fell into the 'Hotel/Hostel/Bed and Breakfast/Institution' category, followed at a distance by those in the category 'Rented from Council/Housing Authority/Development Corporation' and those who fell into the 'Rented privately' category. It can be seen from Table 6/2 that when the effects of the other covariates in the final version of the model were taken into account, these three categories had risks respectively about 80%, 25% and 15% higher than the 'Owner-occupier' category. Those who lived in job-related accommodation and those who fell into none of the afore-mentioned categories had risks which were similar to that of the 'Owner-occupier' category, but slightly lower, and hence these last two categories were aggregated with the 'Owner-occupier' category. In sum, those who were in 'temporary' accommodation or institutions had a very high relative risk of dissolution, and owner-occupiers were at slightly less risk than respondents in local authority housing or respondents renting privately. These results match those of Murphy (1985) in indicating the importance of tenure as a factor influencing the risk of marital dissolution.

Tenure over time, and hence at the point of marital dissolution, might be expected to be an even more relevant covariate than tenure at marriage. Furthermore the distribution of household tenure at marriage has changed dramatically over the last few decades. There would seem to

be scope for useful further research into the relationship between housing and the risk of marital dissolution.

One might hypothesise that owner-occupiers have 'more to lose' by dissolution than tenants do, and that those who start their marriages in very 'unhomelike' circumstances are not starting their married life in conditions favourable to marital stability, given the importance of the 'home' as part of the marriage 'package'.

Tenure at marriage might be expected to be of decreasing salience as duration of marriage increases, not least because tenure will change over time in some cases. This hypothesis was crudely tested by the inclusion of time-dependent covariates set equal to the dummy variable for each tenure multiplied by the duration of marriage. All three of the signs of the resulting parameter estimates were negative, and the magnitude of each estimate appeared related to the magnitude of the effect relating to the corresponding dummy variable. A lack of statistical significance, however, meant that no firm support was obtained for the initial hypothesis, and there is a further possibility that the results were due to unobserved heterogeneity.

A parameter was also included in the final version of the model corresponding to a job at marriage in the armed forces. Note that the parameter estimate for the Hotel/Hostel/Bed and Breakfast/Institution category would have been noticeably higher had not this parameter been included in the model.

A dummy variable was also included in the final model corresponding to respondents of Asian ethnic origin, since these respondents have a low risk of marital dissolution.

2.9. Unemployment, job insecurity and marital dissolution

Why should either unemployment or job insecurity be related to marital dissolution? Qualitative research (e.g. Fagin and Little, 1984; Popay, 1985) has shown that the financial and psychological stresses associated with unemployment can have negative effects on family life. It would seem likely that these stresses also lead to an increased risk of marital breakdown, though Mattinson (1988) argues that loss of work and unemployment 'turn bad' marriages which were already unsatisfactory, but in which work helped to contain immaturities or problems in couples' ways of relating.

Burgoyne argues that poverty increases the risk of marital breakdown, and states that: "the stresses associated with poverty -

insecure employment, financial hardship and unsatisfactory housing - exacerbate the inevitable tensions of early married life" (Burgoyne et al, 1987: p22). One should therefore be cautious about ascribing a high rate of marital dissolution among the unemployed to unemployment itself rather than to other more general factors, e.g. poverty. It is worth noting that Haskey (1984) derived a standardized divorce rate for the male unemployed which was nearly identical to the rate that he derived for unskilled male workers. Furthermore, Burchell (1990) suggests that the psychological consequences of unemployment are similar to the psychological consequences of insecure employment, a hypothesis supported by the study of a factory closure by Beale and Nethercott (1985), which suggested that "the threat of redundancy was a stress equal to, if not greater than, the actual event".

Much evidence exists showing a relationship between male unemployment and marital dissolution. Payne (1989) notes that in 1985 the proportion of widowed, divorced and separated men aged 16-64 who were unemployed was approximately twice the proportion of married men aged 16-64 who were unemployed. (Source: O.P.C.S. General Household Survey, 1985). Other authors, e.g. Daniel (1981); Haskey (1984); Eekelaar and Maclean (1986); Warr (1987); Liem and Liem (1988), have also referred to data showing a relationship between male unemployment and marital dissolution.

Male unemployment and female unemployment both suffer to some extent from definitional problems. Female unemployment is even more difficult to define than male unemployment (see Cragg and Dawson, 1984; Marshall, 1984; Callender, 1985). In the SCELI work histories the respondents were left to decide themselves whether they had been unemployed or non-employed (e.g. a housewife) during any particular period when they were not employed. One result of this was that a significant number of women who had declared themselves to be housewives at the date of the main survey retrospectively 're-classified' themselves as having been unemployed during the identical period when they updated their work histories in the Household and Community Survey (similarly some other women 're-classified' themselves from having been unemployed to having been housewives).

2.10. Covariates included: job insecurity and unemployment

A dummy variable was included in the model corresponding to those respondents whose jobs at marriage were retrospectively described by them as having been 'insecure'. The parameter estimate in Table 6/2 for this covariate is highly significant, indicating that those respondents with 'insecure' jobs at marriage were at a much increased risk of marital dissolution.

The addition of unemployment-related covariates to the model was not an entirely straightforward process. It was necessary to distinguish between various types and durations of unemployment, and to take account of the form of the hypothesised effects of the unemployment. As a starting point covariates were introduced relating to pre-marital unemployment, as the effects of this might be expected to be qualitatively different to those of post-marital unemployment.

Dummy variables corresponding to the existence of any pre-marital unemployment were included for each sex in the model. The parameter estimates for the two sexes were not significantly different from each other, and suggested that pre-marital unemployment was related to a significant increase in the risk of marital dissolution.

One might expect any increase in risk to be dependent on the duration of pre-marital unemployment, so linear and quadratic terms for the duration of pre-marital unemployment were included for each sex. The parameter estimates for the two sexes were once again not significantly different from each other, but the addition of extra parameters relating to the duration of pre-marital unemployment significantly increased the variation explained by the model, and in so doing removed the necessity for the inclusion of the original dummy variable. The parameter estimate for the quadratic term was found to be negative, and that of the linear term positive, resulting in an estimated increased risk reaching a maximum at about two years' duration of pre-marital unemployment and returning to zero at about four years' duration (which reflects the low rate of marital dissolution found among the small number of individuals with at least three years' duration of pre-marital unemployment: 3/41 or about 7%, as opposed to 943/4901 or about 19% of the total sample, and 126/576 or about 21% of those who had been pre-maritally unemployed). Note that the low dissolution rate for those with three-plus years of pre-marital unemployment could easily be the result of the early censoring of the youngest marriage cohorts, whose marriages have coincided with a period of high unemployment levels.

Two types of time-dependent covariate relating to post-marital unemployment were used. Firstly, one covariate was set up to approximately represent the effect of current unemployment on the risk of dissolution. In fact the actual covariate used was a dummy variable relating to the existence of an unemployment event at some point during the preceding calendar year, rather than in the current calendar year. This was necessary because of the possibility of an unemployment event in the calendar year of marital dissolution but subsequent to the dissolution. The parameter estimate for this covariate was highly significant, indicating about a 70% increase in the risk of marital dissolution in the calendar year following a calendar year including at least part of an unemployment event.

However, the occurrence of a post-marital unemployment event could simply be an indication that the respondent was a 'type of person' succeptible to marital dissolution in some sense, rather than the unemployment event itself having any specific consequences. Another possibility is that a post-marital unemployment event might have a permanent and unchanging effect on the respondent's risk of dissolution (though this is perhaps a rather unconvincing hypothesis). If one is interested only in what happens after the post-marital unemployment event then these two possibilities are indistinguishable, since they both involve a characteristic of the respondent which is constant after the post-marital unemployment event.

To cope with these two possibilities a second related covariate (dummy variable) was included which switched from zero to one at the first post-marital unemployment event. The parameter estimate for this second covariate was also found to be statistically significant, but the estimate for the first covariate was scarcely altered, suggesting that post-marital unemployment events have a dual significance, firstly in terms of the specific consequences of being unemployed and secondly in terms of acting as an indicator of an 'underlying tendency' towards marital dissolution.

Some confirmation for the latter hypothesis was found in the fact that when the second covariate was split into two according to whether the respondent had had a pre-marital unemployment event or not, the parameter estimate in the former case was not significantly different from zero. Furthermore the magnitude of the increase in risk associated with the second covariate was not dissimilar to that associated with pre-marital unemployment as represented by a dummy variable). Table 6/2 shows that a post-marital unemployment event for a respondent with no

pre-marital unemployment event was associated with about a 35% increase in the subsequent risk of dissolution.

A test was made of whether the last two covariates had sex-dependent effects, but neither of the differences between the sexes was statistically significant. However, in both cases the increase in risk was higher for female unemployment events than for male events, and the parameter estimates for the sex differences were both about one and a half times their standard errors, so it is possible that there is a greater risk attached to female events.

Of the 943 first marriages in the SCELI sample which ended in dissolution, 58 dissolved in a calendar year following a calendar year in which the respondent had been unemployed. It is obviously impossible to identify which, or precisely how many, of these dissolutions were a consequence of the preceding unemployment periods. However, the parameter estimate in Table 6/2 corresponding to unemployment in the preceding calendar year suggests that 20 or more of the 58 cases might reasonably be considered to be the consequence of that unemployment. (This very crude estimate was obtained by dividing 58 by the exponentiated parameter estimate from Table 6/2 and subtracting the result from 58).

In 26 of the 58 cases the respondent was male and in 32 female. 56 out of the 58 cases involved marriages which dissolved in the 1970's or 1980's. Most of the respondents were in 'working class' occupations at marriage (34 respondents in Goldthorpe classes VI and VII as opposed to 8 in classes I and II). However, nearly half (27) of them had not been unemployed before the crucial period of unemployment. In 38 cases the crucial period of unemployment was at least a year in length, while in 28 cases it lasted over two years.

Perhaps rather unsurprisingly, the mean marriage duration (to dissolution) of the 58 cases in question was substantially lower than that of the other 885 cases where dissolution had occurred (6 years and 7 months as opposed to 9 years and 7 months). This is consistent with the idea that the stresses of unemployment cause some marriages to dissolve somewhat abruptly.

2.11. Notes on the final version of the proportional hazards model of marital dissolution

The effect on all the parameter estimates in the final version of the model of the removal of those cases belonging to the boost sample of unemployed respondents was examined (i.e. those cases arising through the over-sampling of unemployed people were discounted). Fortunately all the parameter estimates remained virtually unchanged when the final version of the model was re-fitted to the reduced sample.

In order to check whether the effects of the various covariates depend on duration of marriage, the final version of the model was fitted separately for the first ten calendar years after the year of marriage, and for eleven-plus calendar years after the year of marriage.

On the whole, there was little difference between the parameter estimates from the two versions of the model. There were signs that the effects of age at marriage and household tenure at marriage diminish with duration of marriage, along with the effects of childlessness/length of first birth interval. Conversely, the negative effect of a pre-marital conception appears to increase with duration.

The most notable change was the disappearance of the reduction in risk of dissolution corresponding to male graduates, suggesting perhaps that the dissolution of some of their marriages are delayed rather than avoided.

The changes in the parameter estimates relating to unemployment and job insecurity were not large enough to suggest any changes with duration of marriage.

TABLE 6/2: Parameter estimates from the final version of a proportional hazards model of marital dissolution: data from the 1986 Social Change and Economic Life Initiative main survey.

Covariate	Parameter estimate	P.E./S.E.	% change in risk
MARRIAGE YEAR	0.054	11.1	5.6
AGE AT MARRIAGE	-0.110	-10.4	(#)
(A.A.M.-25) SQUARED	0.004	4.1	(#)
FEMALE	-0.082	-1.0	-7.9
COVENTRY	0.264	2.1	30.2
KIRKCALDY	0.111	0.9	11.8
NORTHAMPTON	0.374	3.1	45.4
ROCHDALE	0.372	3.1	45.1
SWINDON	0.198	1.6	21.9
PRE MARITAL BIRTH	0.443	2.9	55.7
PRE MARITAL CONCEPTION	0.301	3.1	35.2
MALE GRADUATE	-0.648	-2.2	-47.7
WOMAN: FATHER'S OCCUPATION MISSING	0.297	2.6	34.6
LOCAL AUTHORITY, ETC.	0.215	2.5	24.0
PRIVATE RENTED	0.154	1.8	16.7
HOTEL/HOSTEL/B&B/ETC.	0.599	3.1	82.1
ASIAN	-1.077	-3.5	-65.9
JOB INSECURE AT MARRIAGE	0.349	3.3	41.8
JOB IN ARMED FORCES AT MARRIAGE	0.432	2.1	54.0
BIRTH OF FIRST CHILD	-0.497	-4.7	-39.2
FIRST BIRTH INTERVAL	-0.040	-1.8	-3.9 (&)
PRE MARITAL UNEMP DURATION	0.047	3.0	(#)
DURATION SQUARED	-0.001	-2.3	(#)
UNEMP. DURING PRECEDING CALENDAR YEAR	0.532	6.7	70.2
POST MARITAL UNEMP. FLAG (NO PRE MAR. UNEMP.)	0.313	3.3	36.8
(PRE MAR. UNEMP)	-0.064	-0.3	-6.2

P.E./S.E. = Parameter estimate / Standard Error.
(#) Change in risk varies.
(&) per year.

2.12. Covariates included in the model: a review of the effects of occupation, educational qualifications and social origin

In Section 2.7 of this chapter, eight effects of social stratification-related variables on the risk of dissolution were noted. An examination of Table 6/2 shows that only two of these effects (i.e. the low risk of dissolution for male graduates and the high risk of dissolution for female respondents whose fathers' occupations were not recorded) were included in the final version of the model. The reason why the other six effects were not included is that the inclusion of other covariates rendered them statistically insignificant. Effect (ii), a low risk of dissolution for female graduates, was largely removed by the inclusion of age at marriage. Effects (iii), a high risk of dissolution for respondents with pre-marital occupations in Goldthorpe class V, was largely removed by the inclusion of a covariate corresponding to a pre-marital occupation in the armed forces. Effect (v), a low risk of dissolution for men in the 'service' class and women with non-manual occupations, was largely accounted for by a combination of other covariates, but especially age at marriage.

Covariates corresponding to respondent's Registrar General's Social Class at marriage (in the form of separate dummy variables for each sex) were included in a series of versions of the proportional hazards model designed to show the way in which other covariates can explain the gross differences in the dissolution rates of the different RGSC's. RGSC's I and II were combined, as were RGSC's IIIM and IV (RGSC's IIINM and V were kept separate to allow for comparisons with the findings of Gibson, 1974, and Murphy, 1985).

The first version of the model fitted included year of marriage and dummy variables for the SCELI study areas as additional covariates. The second version of the model included these covariates and also age at marriage and $(AAM-25)^2$. The third version of the model included all the covariates in the final version of the model fitted earlier except the unemployment and job insecurity effects and the fourth version of the model was the final version of the model.

Figures 6/1 and 6/2 are plots of the parameter estimates of the RGSC covariates for each version of the model for each sex. It is clear that some of the general differences between RGSC's in the risk of dissolution are explicable in terms of age at marriage, and that most of the rest of the differences are explicable in terms of the other covariates included in the third version of the model. The parameter estimates of the RGSC covariates do not change much between the third

and fourth versions of the model, with the exception of the estimates corresponding to men in RGSC V and men who had no recorded pre-marital RGSC (which are clearly both categories with a high risk of unemployment), but by this stage the parameter estimates are only a fraction of their standard errors, so the residual variation between RGSC's is likely to be largely a reflection of sampling error.

The implication of Figures 6/1 and 6/2 is that the other covariates considered in the final version of the model explain the vast majority of the gross differences between classes in the risk of marital dissolution. Any residual class differences would seem to be of insufficient magnitude to be estimated accurately given the data available.

More interesting than the residual class differences are the effects of the unemployment and job insecurity related covariates. Social stratification does appear to be 'directly' related to marital dissolution in as much as the risk of dissolution does seem to be especially high for those individuals on the fringes of the labour force.

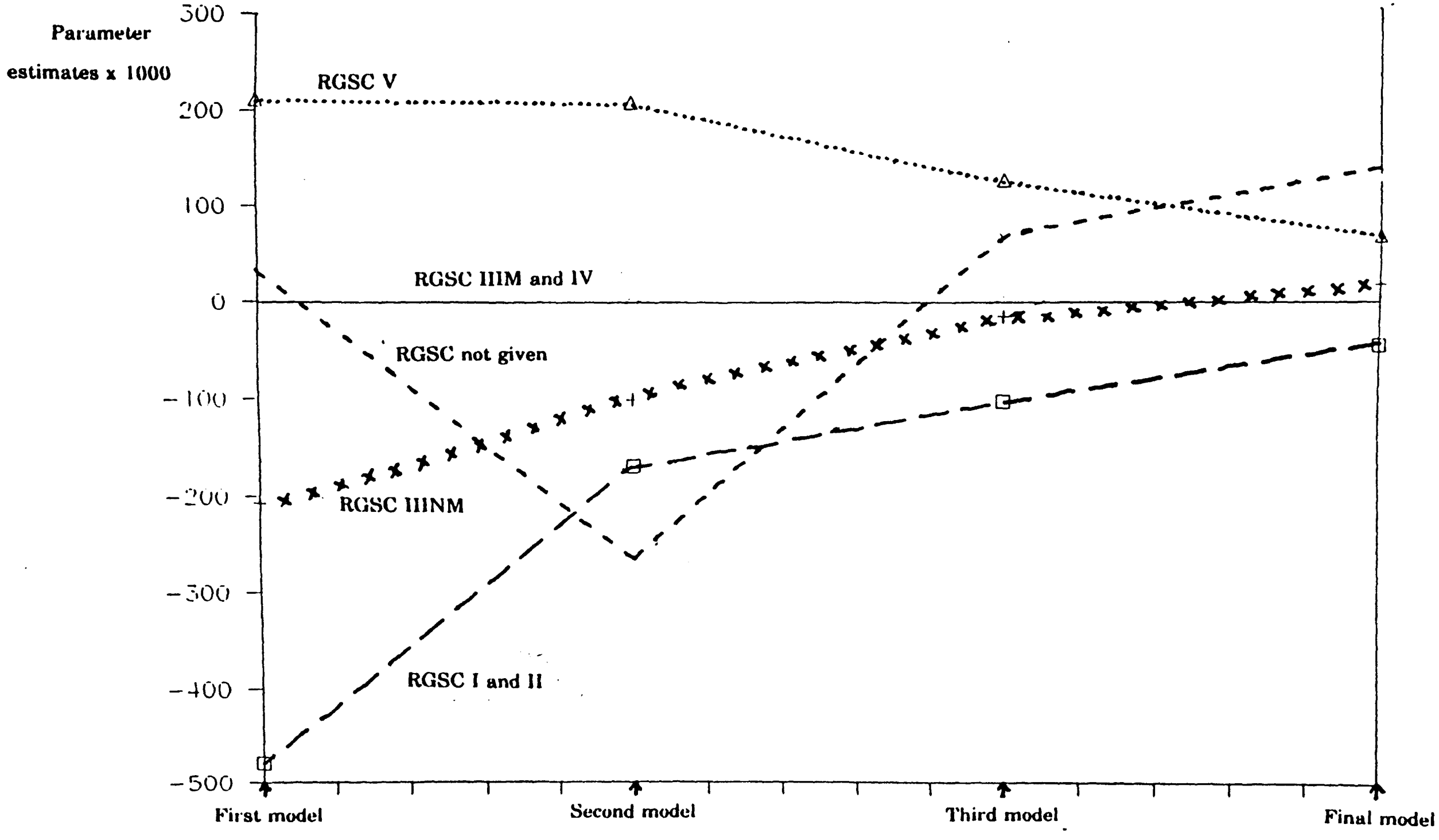


FIGURE 6/2: Parameter estimates from various versions of a proportional hazards model of marital dissolution: the effect of the inclusion of other covariates on the parameter estimates for female respondent's Registrar General's Social Class (data from the 1986 Social Change and Economic Life Initiative main survey)

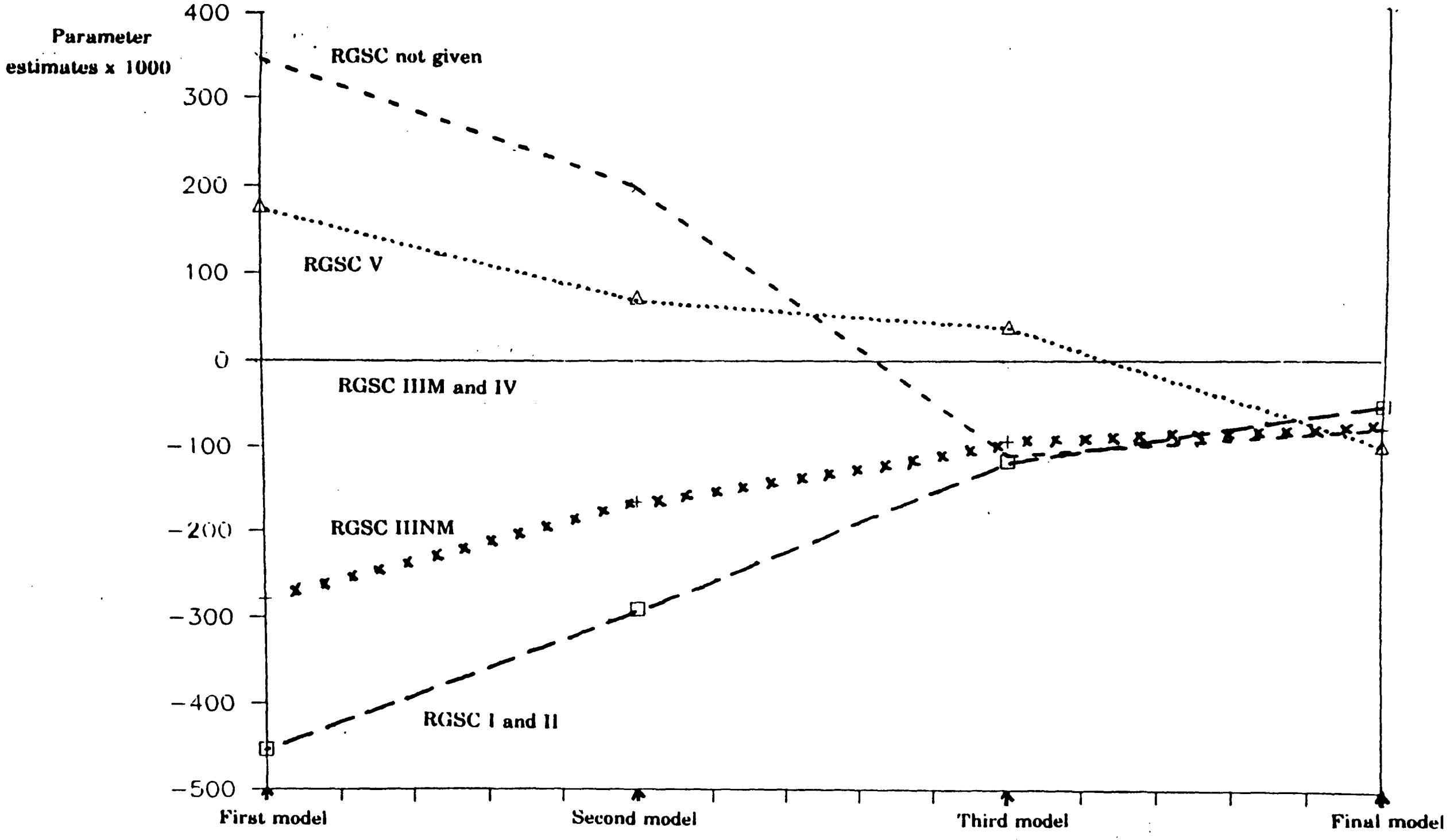


FIGURE 6/1: Parameter estimates from various versions of a proportional hazards model of marital dissolution: the effect of the inclusion of other covariates on the parameter estimates for male respondent's Registrar General's Social Class (data from the 1986 Social Change and Economic Life Initiative main survey)

2.13. The cumulative effect of dissolution-related factors.

This chapter has shown that a number of factors are related to an increased risk of dissolution. However, the analysis does not show whether or to what extent the effects of the various factors are cumulative.

An index was constructed, with respondents scoring one point for each characteristic from the following list which applied to them:

(i) Respondent fathered or gave birth to a child born before their first marriage,

(ii) Respondent or respondent's partner pre-maritally conceived a child which was born after their marriage,

(iii) Respondent married at age 19 or less,

(iv) Respondent's household tenure at marriage was 'unusual' (Hotel, hostel, bed and breakfast, etc.).

(v) Respondent's job at marriage was insecure,

(vi) Respondent's job at marriage was in the armed forces,

(vii) Respondent had a period of unemployment at some time before their marriage.

Since (i) and (ii) were constructed to be mutually exclusive, the theoretical maximum of the index was six. In fact no respondent had a score of greater than four. Almost half of the respondents had a score of at least one, with about a sixth of the respondents having a score of two or more. Table 6/3 shows the results of a proportional hazards model including year of marriage, study area, and the five levels of the index constructed above as covariates.

It appears that the effects of the various factors of which the index is composed are more or less cumulative, with the risk of dissolution being nine times as high for the small number of respondents with a score of four as that for respondents with a score of zero. In fact, of the 21 respondents with a score of four, the marriages of 13 had ended in dissolution, including the marriages of 6 out of the 7 respondents married in 1975 or earlier.

The above analysis shows that it is relatively easy to identify some couples who are very much 'at risk' of marital dissolution. (All the components of the above index can be measured within nine months of the marriage date).

TABLE 6/3: Parameter estimates from a proportional hazards model of marital dissolution using an index constructed from dissolution-related factors as a covariate: data from the 1986 Social Change and Economic Life Initiative main survey.

Covariate	Parameter estimate	Standard error	
Year of marriage	0.054	(0.004)	
Coventry	0.237	(0.123)	
Kirkcaldy	0.229	(0.121)	
Northampton	0.426	(0.119)	
Rochdale	0.331	(0.121)	
Swindon	0.222	(0.123)	
			% of sample
Index=1	0.585	(0.077)	32.5
Index=2	1.083	(0.089)	13.1
Index=3	1.200	(0.162)	2.8
Index=4	2.206	(0.296)	0.4

(Note that Aberdeen and Index=0 were used as base categories).

3. Differences between spouses and the risk of marital dissolution

This section examines the relationship between spouses' characteristics in combination and the risk of marital dissolution. Firstly, a primarily illustrative analysis of the relationship between age heterogamy and divorce is carried out. Secondly, an attempt is made to examine the effects of social origin heterogamy on the risk of dissolution using an 'attritional' approach. Thirdly, a group of divorce/separated couples is compared with a group of still-married couples in an attempt to identify any relationship between educational heterogamy and the risk of dissolution. Finally, the relationship of marital dissolution to husband's occupation in combination with wife's occupation and education is examined in the context of a proportional hazards model.

3.1. Age homogamy/heterogamy and divorce

While it is difficult to find British data suitable for the purpose of analysing the relationship between 'social status' homogamy/heterogamy and divorce, data do exist which are reasonably suited to the purpose of analysing the relationship between propensity to divorce and the age difference between spouses.

The couples considered here are the marriage cohort who were married in England and Wales in 1976 (a total of 351,761 couples). Table 3.7 in the 1976 edition of OPCS's annual 'Marriage and Divorce Statistics' gives the ages of spouses at marriage in combination cross-classified by the combinations of previous marital conditions of the spouses. However, Table 3.7 is limited in as much as sub-tables of ages in combination at marriage are not given for those couples containing a widow or a widower, or both. A table of ages in combination at marriage for couples containing at least one individual who was a widow/widower at the date of marriage can however be derived from Table 3.7 by subtracting the four sub-tables corresponding to marriages between bachelors, spinsters, divorced women and divorced men from the sub-table corresponding to the ages in combination at marriage of all the couples. Table 3.7 can therefore be used as a source of the ages in combination at marriage of all couples married in 1976 subdivided into five groups according to the spouses' previous marital conditions (see Table 6/4). (It is important to take into account heterogeneity between couples with respect to their previous marital conditions, as, for example, divorced

individuals have been shown to be disproportionately likely to get divorced on a second occasion).

Table 4.2 in each edition of OPCS's 'Marriage and Divorce Statistics' between 1976 and 1987 inclusive contains a 6x6 sub-table containing the ages in combination at marriage of couples from the 1976 marriage cohort who divorced during the year in question. Unfortunately the tables in the 1976-1978 volumes are 'contaminated' by the inclusion of couples from other marriage cohorts, but the number of couples from the 1976 marriage cohort divorcing in this period was small (about 1,000) in comparison with both the original number of couples and the number divorcing between 1979 and 1987 inclusive (which was 74,310 - 21.1% of the original total). It therefore seemed reasonable to focus attention on the divorces occurring between 1979 and 1987 inclusive.

Once the summary table of all couples married in 1976 had been extracted from Table 3.7 in the 1976 edition of 'Marriage and Divorce Statistics' and had also been 'compressed' into the same 6x6 format as the tables of divorces (see Table 6/5), and once the nine tables of divorces relating to the 1976 cohort had been extracted from the later editions of 'Marriage and Divorce Statistics' and aggregated (see Table 6/6), one was in a position to analyse the relationship between divorce rates and the ages in combination at marriage of spouses.

The models used in the following analysis are logit models, with the binary dependent variable being divorce between 1979 and 1987 inclusive, and the 'sample' being the 1976 marriage cohort.

One pair of independent variables were

H - Age of husband at marriage,

W - Age of wife at marriage.

Further independent variables were the proportions of marriages in each of the 36 (6x6) categories defined by H and W which were between particular types of spouses, i.e.

BS - The proportion of marriages between Bachelors and Spinsters,

BDW - The proportion of marriages between Bachelors and Divorced Women,

SDM - The proportion of marriages between Spinsters and Divorced Men,

TDP - The proportion of marriages between Two Divorced People.

Finally, one other independent variable was

D - The difference between the spouses' age groups at marriage.

H and W are categorical variables with 6 levels each, BS, BDW, SDM and TDP are continuous and take values between 0 and 1, and D is a categorical variable with 10 levels, defined as shown in Table 6/7.

Table 6/8 shows the deviances of various logit models and the changes between them as extra independent variables were added. The highly significant change in deviance between Models 1 and 2 is unsurprising, as it reflects the well-known fact that propensity to divorce is highly related to age at marriage (it would appear that this is the case for both sexes). The highly significant change in deviance between Models 2 and 3 is due to significant differences between the propensities to divorce of couples with different combinations of previous marital conditions. The highly significant change in deviance between Models 3 and 4 is solely due to the of parameters corresponding to the degree of age homogamy/heterogamy of the couples, and an examination of the parameter estimates for D in Table 6/9, and the fact that Model 4 fits the data well ($P \gg 0.05$), suggest that the relationship between spouses' ages in combination at marriage and propensity to divorce is a simple one once account has been taken of the effects of the individual spouses' ages at marriage and of the effects of the spouses' previous marital conditions in combination, i.e. it appears that the larger the age difference between spouses is, the more prone to divorce a couple is.

TABLE 6/4: The combination of spouses' previous marital conditions in marriages in England and Wales in 1976: data from the 1976 edition of OPCS's annual 'Marriage and Divorce Statistics'.

Total number of marriages	351,761
Bachelors marrying spinsters	226,308 (64%)
Divorced men marrying spinsters	43,439 (12%)
Divorced women marrying bachelors	30,612 (9%)
Divorced women marrying divorced men	34,963 (10%)
Marriages involving a widow or widower	16,439 (5%)

TABLE 6/5: Marriages in England and Wales in 1976: Ages at marriage of husband and wife in combination: data from the 1976 edition of OPCS's annual 'Marriage and Divorce Statistics'

	Husband's age at marriage					
	Under 20	20-24	25-29	30-34	35-44	45 plus
Wife's age at marriage						
Under 20	21,349	51,966	10,249	1,799	637	85
20-24	4,983	82,714	41,523	8,977	3,155	474
25-29	413	10,148	25,089	12,178	6,692	1,293
30-34	68	1,602	6,005	6,795	7,286	2,183
35-44	37	451	1,990	3,577	9,678	7,786
45 plus	2	40	146	390	2,522	24,285

TABLE 6/6: Divorces of members of the 1976 marriage cohort in England and Wales between 1979 and 1987: data from the 1979 to 1987 editions of OPCS's annual 'Marriage and Divorce Statistics'

	Husband's age at marriage					
	Under 20	20-24	25-29	30-34	35-44	45 plus
Wife's age at marriage						
Under 20	7,892	15,400	3,012	570	216	26
20-24	1,672	16,472	7,473	1,807	739	112
25-29	144	2,128	3,807	1,985	1,209	207
30-34	35	395	1,104	1,132	1,162	287
35-44	13	134	424	668	1,517	774
45 plus	1	15	33	72	329	1,344

TABLE 6/7: Levels of a categorical variable D related to the difference between spouses' ages at marriage

	Husband's age at marriage					
Wife's age at marriage	Under 20	20-24	25-29	30-34	35-44	45 plus
Under 20	6	7	8	9	10	1
20-24	5	6	7	8	9	10
25-29	4	5	6	7	8	9
30-34	3	4	5	6	7	8
35-44	2	3	4	5	6	7
45 plus	1	2	3	4	5	6

TABLE 6/8: Deviances of models of the probability of divorce between 1979 and 1987 of couples married in England and Wales in 1976 (see Tables 6/5 and 6/6)

Model	Independent variables	Deviance	d.f.	Change in deviance
1	None	13,052.0	35	----------
2	H,W	702.9	25	12,349 on 10 d.f.
3	H,W,BDW,SDM,TDP,BS	173.1	21	529.8 on 4 d.f.
4	H,W,BDW,SDM,TDP,BS,D	17.5	12	155.7 on 9 d.f.

(see text in Section 3.1 for definitions of the independent variables)

TABLE 6/9: Parameter estimates for factor D (a factor relating to disparity in spouses' ages [see Table 6/7]) from Model 4 (a model of the dependency of divorce on the ages at marriage of husbands and wives in combination and the husbands' and wives' previous marital conditions in combination).

Level of factor D	Parameter estimate
1	0.000 (base)
2	-0.116
3	-0.378
4	-0.772
5	-0.980
6	-1.203
7	-1.110
8	-0.820
9	-0.404
10	-0.046

TABLE 6/10: Percentages of marriages for each combination of husband's age and wife's age where the marriage was between bachelors and spinsters: data for the 1976 marriage cohort in England and Wales from the 1979 to 1987 editions of OPCS's annual 'Marriage and Divorce Statistics'

	Husband's age at marriage					
	Under 20	20-24	25-29	30-34	35-44	45 plus
Wife's age at marriage						
Under 20	99.9	98.6	83.2	54.6	35.8	27.1
20-24	95.5	95.2	80.4	52.4	29.5	16.5
25-29	54.7	66.2	63.0	43.1	22.3	12.9
30-34	23.5	32.5	33.0	27.4	17.1	7.2
35-44	24.3	20.2	17.0	14.8	10.0	5.9
45 plus	0.0	17.5	13.7	6.2	7.2	3.1

TABLE 6/11: Percentages of marriages for each combination of husband's age and wife's age where the marriage included at least one person whose previous status was 'divorced' and nobody whose previous status was 'widowed': data for the 1976 marriage cohort in England and Wales from the 1979 to 1987 editions of OPCS's annual 'Marriage and Divorce Statistics'

	Husband's age at marriage					
	Under 20	20-24	25-29	30-34	35-44	45 plus
Wife's age at marriage						
Under 20	0.1	1.4	16.3	43.8	60.1	50.6
20-24	4.2	4.6	19.1	46.1	66.6	68.1
25-29	44.3	32.5	36.0	54.6	72.6	69.9
30-34	73.5	64.4	64.2	68.2	75.7	72.4
35-44	64.9	74.3	75.6	76.3	76.8	63.4
45 plus	100.0	62.5	63.7	70.5	60.2	29.0

TABLE 6/12: Percentages of marriages for each combination of husband's age and wife's age where the marriage included at least one person whose previous status was 'widowed': data for the 1976 marriage cohort in England and Wales from the 1979 to 1987 editions of OPCS's annual 'Marriage and Divorce Statistics'

	Husband's age at marriage					
	Under 20	20-24	25-29	30-34	35-44	45 plus
Wife's age at marriage						
Under 20	0.0	0.1	0.5	1.6	4.1	22.4
20-24	0.3	0.2	0.5	1.5	3.9	15.4
25-29	1.0	1.3	1.0	2.4	5.1	17.2
30-34	2.9	3.1	2.8	4.4	7.2	20.4
35-44	10.8	5.5	7.4	8.9	13.1	30.7
45 plus	0.0	20.0	22.6	23.3	32.6	67.9

TABLE 6/13: Formulae corresponding to Model 4 (a model of the dependency of divorce on the ages at marriage of husbands and wives in combination and on the husbands' and wives' previous marital conditions in combination; see Table 6/8) and a 'superior', but non-linear, model

Model 4:

$$\log[p/(1-p)] = a_0 + a_{1h}H + a_{2w}W + a_3SDM + a_4BDW + a_5TDP + a_6BS + a_{7d}D$$

Superior model:

$$\log[p/(1-p)] = \log[k/(1-k)] + a_{1h}H + a_{2w}W + a_{7d}D$$

where $k = a_3SDM + a_4BDW + a_5TDP + a_6BS + a_0(1-SDM-BDW-TDP-BS)$

(The 'superior' model assumes that each combination of previous marital conditions has a specific propensity to divorce, and that all combinations of previous marital conditions are susceptible to the same effects due to the ages at marriage of spouses and to the age difference between the spouses).

One point worth noting is that the models fitted were linear, whereas the 'obvious' model to fit is non-linear (see Table 6/13). A possible result of this is that the four 'proportion-based' independent variables may not be adequately representing the contribution to the divorce rate for each category of the different combinations of previous marital conditions (see Tables 6/10 to 6/12 for the distributions of three types of couple across the 36 (6x6) categories of the 1976 Marriage Cohort).

The inclusion of these last four independent variables in a model results in the implicit inclusion of a variable corresponding to the proportion of couples in each of the 36 (6x6) categories which contain a widow or a widower or both.

In summary, there appears to be a positive relationship between degree of age heterogamy and propensity to divorce, but this conclusion is somewhat questionable given that the model fitted may have 'transferred' some of the effects of the spouses' previous marital conditions to the parameter estimates for the factor representing age homogamy/heterogamy.

3.2. Studying the relationship between social origin heterogamy and marital dissolution: an 'attritional' approach

Given that social surveys tend to collect only very limited information relating to the ex-spouses of separated, divorced or twice or more married respondents, examining the relationship between marital dissolution and the joint characteristics of spouses is not straightforward. One indirect approach that can be used to combat this problem is the examination of the 'residual' of the dissolution process, i.e. those couples who remain married. Clearly if a particular combination of spouses' characteristics is linked to an above average risk of dissolution, the proportion of all couples remaining married who have this combination of characteristics will diminish over time. Therefore if two or more surveys collect information on the joint characteristics of spouses in the same marriage cohorts, in theory it is possible to examine which combinations of characteristics are related to an increased risk of marital dissolution by comparing the joint characteristics of spouses in the earliest survey with the joint characteristics of spouses in couples 'surviving' until the later survey or surveys. No panel element is necessary, though the use of a new sample in each successive survey does mean that large samples and strong

underlying effects are pre-requisites of statistically significant results!

The annual General Household Survey (which collects information on couples in private households only) contains sufficient information to be used as a source of data to which the technique described above can be applied. The GHS collects data on its respondents' fathers' current or last occupations, though these data are collected only for respondents aged 49 or less. Unfortunately this variable can clearly change over the respondent's lifetime, but the number of 'dramatic' changes (e.g. between manual and non-manual occupations) is likely to be reasonably small for married respondents. The standard hypothesis in the sociological literature that disparate social origins of spouses are associated with an increased risk of marital dissolution can therefore be tested using data from a minimum of two GHS's.

GHS data from the surveys for the years 1979 to 1985 were used in the analysis. The sample examined for each year consisted of those couples who were married between 1973 and 1977 inclusive (both partners having been previously unmarried) and who were still married at the time of the survey. In order that the samples should be comparable across years, immigrants arriving between 1979 and 1985 were excluded, as were those couples where one spouse would have been over 49 by 1985. Furthermore all couples where father's occupation was not given for one or both spouses were excluded from consideration.

The average sample size across the seven years was just under six hundred, and an examination of a graph in Haskey (1988), showing the percentages of various marriage cohorts who had divorced by specified durations of marriage, suggested that attrition through divorce alone should have reduced the sample size by about 10% between 1979 and 1985. In fact there is a striking change in sample size between 1981 and 1982, due largely to a 14% reduction in the overall GHS sample size (which was an 'efficiency' measure resulting from the 1981 Rayner report on Government Statistical Services), but, this reduction apart, sampling variation obscures any trend, expected or otherwise. (In addition to marital dissolution, migration and death also make minor contributions to the expected downwards trend in sample size).

For simplicity, father's occupation was reduced to a dichotomy - 'Working-Class' (SEG's 10 to 15) against 'Non-Manual' (SEG's 1 to 9), Agricultural (SEG's 16 to 18) and 'Armed Forces' (see Table 4/16 for a description of the SEG's). The data for each year were therefore summarized by a 2x2 table based on this dichotomy for each spouse, and

the odds ratio for the table was taken as a representation of the extent of homogamy in that year's sample.

If the hypothesis that couples from disparate social origins are more prone to marital dissolution is true, then one would expect there to be an upwards trend in the odds ratios. An examination of the odds ratios from the seven samples (see Table 6/14) does not then support the hypothesis, but there appears to be sufficient 'noise' in the odds ratios that one would not necessarily expect any underlying trend to be visible.

An examination of the history of the sample design of the GHS suggests that subtle changes in the sample design are linked to some of the variation noted above. In 1982 the number of Primary Sampling Units (Electoral Wards) was reduced from 168 to 144 as a consequence of the Rayner report. Furthermore, in 1984 the Electoral Ward was replaced as Primary Sampling Unit by the Postcode Address File Sector. In themselves these changes would not necessarily have been expected to increase the amount of 'noise' visible in the set of odds ratios, but a side-effect of these changes was that on both occasions the practice of selecting a third of the Primary Sampling Units each year and using Primary Sampling Units for three successive surveys was suspended, and hence a mechanism designed to reduce the sampling error in estimates of trends was lost. Note that there were also no PSU's in common between the 1984 and 1985 surveys.

This loss of continuity between some years of the GHS may have reduced the efficiency of the 'attritional' technique used here, but the impression that the odds ratios in Table 6/14 create is that the amount of 'noise' visible is a reflection of a 'lack of power' in the technique. Notwithstanding any contributions to the observed 'noise' resulting from interruptions to the GHS's rolling sample design, it would appear that the technique is not sufficiently powerful to allow interesting substantive conclusions to be drawn, given the sample sizes available.

The accuracy of the above impression can be tested fairly easily by examining the technique's ability to identify a 'known' relationship. The most obvious relationship to choose is the relationship between age at marriage and risk of dissolution, since this relationship has been shown in Section 2 of this chapter to be a particularly strong one.

Table 6/15 is based on the same samples used to produce the odds ratios in Table 6/14 and shows for each sample the number of couples who

fell into six categories of wife's age at marriage. The deviance of a log-linear model of Table 6/15 which assumes independence between its rows and its columns is 44.6 on 30 degrees of freedom ($P<0.05$). The inclusion of an interaction effect allowing for (linear) trends in the proportions of the whole sample made up by each of the six categories results in a change in deviance of only 3.6 on 5 degrees of freedom ($P>0.05$), but as Table 6/16 shows, the parameter estimates for the interaction are very much what one would have expected, given that research has tended to find a decreasing trend in the risk of dissolution with rising female age at marriage for the age range wherein the vast majority of first marriages take place, and a slight increase in risk associated with abnormally late first marriages. Indeed, when the interaction is replaced by one which replaces the six-level factor previously used to represent female age at marriage with a covariate representing the expected U-shape, the change in deviance is 2.9 on a single degree of freedom.

It is clear from the above analyses that the technique is potentially a useful one, but also that it is by no means a very powerful one. In a further analysis of the GHS data it also proved unable to establish the link between the age difference between spouses and risk of dissolution demonstrated in Section 3.1 of this chapter.

The results from above of using the relationship between age at marriage and marital dissolution to test the 'attritional' technique cause one to question whether any useful substantive conclusions could have been drawn from the odds ratios in Table 6/14 even if there had been a pattern that was clearly visible through the 'noise'. Section 4 of Chapter 3 shows that woman's age at marriage is related to both her own class of origin and to the class of origin of her husband, hence it is possible that the relationship between female age at marriage and risk of dissolution might induce a trend in the type of odds ratios given in Table 6/14 which is in direct opposition to the trend predicted by 'heterogamy theory', i.e. a concentration of marital dissolutions resulting from 'teenage marriage' in the 'Working Class/Working Class' cell out of the four cells on which the odds ratios are based might produce results suggesting a positive correlation between homogamy of social origin and risk of marital dissolution. Similarly, the relationship between female age at marriage and risk of marital dissolution could equally well induce a positive correlation between educational homogamy and the risk of dissolution.

TABLE 6/14: Odds ratios relating to social origin homogamy in the 1973 to 1977 marriage cohorts: data from the 1979 to 1985 General Household Surveys (corresponding to couples where both spouses were in their first marriages)

Year	Odds ratio	Sample size
1979	2.236	682
1980	2.666	603
1981	2.327	671
1982	2.731	531
1983	1.921	504
1984	2.833	495
1985	2.394	526

TABLE 6/15: Wife's age at marriage in the 1973 to 1977 marriage cohorts: data from the 1979 to 1985 General Household Surveys (corresponding to couples where both spouses were in their first marriages)

	Age at marriage						
Year	<=18	19	20	21-22	23-25	26+	Sample size
1979	147	120	123	165	121	84	760
1980	129	92	90	156	126	69	662
1981	130	103	110	172	120	83	718
1982	121	71	83	135	91	72	573
1983	114	99	68	127	92	65	565
1984	118	74	90	133	87	45	547
1985	73	80	83	139	117	69	561

TABLE 6/16: Estimates for parameters corresponding to trends in the proportion of wives with particular ages at marriage: data for the 1973 to 1977 marriage cohorts from the 1979 to 1985 General Household Surveys (corresponding to couples where both spouses were in their first marriages)

Age at marriage	Parameter estimate	
Under 18	-0.0202	
19	-0.0055	
20	-0.0055	
21 TO 22	0.0156	
23 TO 25	0.0176	
26+	0.0000	(base category).

Obviously this last paragraph does no more than suggest that other variables may need to be controlled for if one is to identify the 'true' relationship between 'social status' heterogamy/homogamy and marital dissolution. However, this kind of 'multivariate' approach has not been used in previous research examining the relationship between homogamy/heterogamy and marital stability/marital dissolution, perhaps because the apparent lack of any relationship at a bivariate level acts as a disincentive to carry out a more detailed examination!

3.3. Educational assortative marriage and marital dissolution: a comparison of a sample of separated/divorced couples with a sample of still-married couples

One survey which did collect some interesting data on its respondents' ex-spouses was the 1976 Family Formation Survey. One of the variables collected was the school-leaving age of the respondent's current/last partner. The school-leaving age of the first ex-spouse of a respondent was therefore recorded for those respondents whose first marriage had ended in separation/divorce and who had not remarried, did not plan to marry their current partner if they had one, and were not living as married.

The school-leaving age of the respondent was also recorded, and thus for a non-random sub-sample of those respondents whose first marriages had ended in separation or divorce both their own and their first partners' school-leaving ages were recorded.

Clearly one cannot necessarily reasonably assume that the joint school-leaving ages of couples in this sub-sample are representative of the joint school-leaving ages of couples in the sample of couples including all the respondents whose first marriage ended in separation/divorce. If there are any women whose first marriages dissolve as a result of educational heterogamy, they may well have distinct 'remarriage patterns'! One should therefore bear in mind the fact that the sample is not strictly a representative one.

Table 6/17 shows the joint school-leaving ages of the couples in the divorced/separated sub-sample and the joint school-leaving ages of couples corresponding to those FFS respondents whose first marriage ended in widowhood or had not ended by the survey date. Table 6/17 excludes couples where one or both spouses' school-leaving ages were missing.

TABLE 6/17: Respondent's school-leaving age by first husband's school-leaving age: data for two sub-samples of the respondents to the 1976 Family Formation Survey

Sample of ever separated/divorced respondents (who have not re-married, have no plans to marry their current partners, if any, and who are not living as married)

Respondent's school-leaving age	Ex-husband's school-leaving age					
	<14	14	15	16	17	18+
<14	1	3	0	1	0	0
14	0	43	5	3	0	3
15	0	12	72	8	2	3
16	0	2	18	23	7	7
17	0	1	4	8	4	6
18+	0	0	4	3	2	8

Sample of still-married respondents

Respondent's school-leaving age	Husband's school-leaving age					
	<14	14	15	16	17	18+
<14	1	18	2	5	0	3
14	12	575	70	61	19	15
15	7	260	1408	251	81	66
16	7	89	288	278	63	90
17	1	26	87	83	78	86
18+	0	12	37	60	44	156

TABLE 6/18: Difference in school-leaving ages between the respondent and the respondent's first husband: data for two sub-samples of respondents to the 1976 Family Formation Survey (Respondent's TAS-Husband's TAS)

Difference	Sample A	Sample B	A/B
Less than -1	19	342	0.056
-1 to +1	220	3671	0.060
More than +1	14	326	0.043

Sample A: Separated/divorced respondents (who have not re-married, have no plans to marry their current partners, if any, and who are not living as married)

Sample B: Still-married respondents

Clearly the two sub-tables are not strictly comparable with each other; the second table is likely to be more heavily weighted to earlier and later marriage cohorts than the first (i.e. cohorts whose early marital life 'pre-dated' the divorce 'boom' and cohorts who have not 'had time to divorce'!). However one might expect any 'peculiarities' in the distribution of the joint school-leaving ages of couples in the divorced/separated sub-sample to be made evident by a comparison of the two sub-tables of Table 6/21.

As it happens there are no obvious differences in the patterns visible in the two sub-tables. A log-linear model including the three possible two-factor interactions was fitted to Table 6/17, but the deviance of this model is 23.4 on 23 degrees of freedom ($P>0.05$) and there was no obvious pattern to the residuals, hence the analysis was not suggestive of any significant relationship between educational heterogamy (as judged by dissimilarity of school-leaving age) and the risk of marital dissolution. An examination of Table 6/18 shows that, if anything, the couples in the sub-sample are more educationally homogamous than those couples who were still married.

3.4. Husband's pre-marital occupation and wife's pre-marital occupation and school-leaving age in combination and the risk of marital dissolution

Murphy (1985) notes (Table 4; p454) that a strong relationship exists between husband's pre-marital Registrar General's Social Class and wife's pre-marital Registrar General's Social Class, but does not report any analysis of the risk of marital dissolution based on a combination of these two variables. Following a hypothesis suggested by McRae (1986), and others, this subsection examines whether wife's 'occupational superiority' is linked to an increased risk of marital dissolution. (A more sophisticated analysis would have considered husband's post-marital work history, but the FFS data ~~is~~ are not particularly well-suited to such an approach, and it would seem unlikely that much is lost by using husband's pre-marital class).

Murphy's main findings were that RGSC V husbands and husbands outside of the six RGSC's had a much higher risk of dissolution than other husbands, and that this continued to be true once year of first marriage and wife's age at marriage/age at marriage squared had been taken into account (Murphy, 1985; p455). A sensible starting point for this analysis therefore seemed to be a model including as covariates

year of first marriage and wife's age at marriage/age at marriage squared, and also including parameters corresponding to husbands in RGSC V and to couples where either spouse did not have a pre-marital RGSC. (This model is referred to as Model 1).

The sample analysed here consisted of 5,043 couples compared with the 5,049 reported by Murphy. The reason for the discrepancy is unclear, and may be related to the fact that Murphy used a data tape obtained direct from OPCS whereas the tape used here was issued by the ESRC Data Archive.

As in Murphy's paper a proportional hazards model was fitted to the data. (Marriages ending in the death of the husbands were censored at the time of the death). Table 6/19 shows the way in which the couples were divided into categories by the variables corresponding to husband's and wife's pre-marital RGSC's in combination which were included in the various models fitted.

86.9% of the cases did not belong to the two 'high risk' groups. Murphy noted that husbands in RGSC IIINM had a higher risk of dissolution than husbands in classes I, II, IIIM and IV, but adding a parameter corresponding to these husbands results in a model (Model 2) which only differs in deviance from Model 1 by 1.38 (P=0.24).

In Model 3 husbands outside the two 'high risk' groups were divided into two groups: RGSC's I, II and IIINM, and RGSC's IIIM and IV (i.e. non-manual and manual groups). Once again the change in deviance is not significant (2.08; P=0.15).

At this stage wife's pre-marital class was brought into consideration. The two groups of husbands produced for Model 3 were each subdivided into two groups according to whether the wife's pre-marital occupation was manual or non-manual. The change in deviance between Model 3 and this model (Model 4) is once again not significant.

However, the parameter estimates of Model 4 are of some interest, because the group shown as having the lowest risk is the one consisting of non-manual wives married to husbands in RGSC's IIIM and IV, which is quite the opposite of what the hypothesis relating to wife's occupational superiority would seem to predict. The symmetric 95% confidence interval of the parameter corresponding to the difference in risk between this group and the group consisting of manual wives and husbands in RGSC's IIIM and IV has an upper bound of 0.05, so it would seem very unlikely that the first group has a risk of dissolution which

is sufficiently greater than the second group's risk to be of substantive interest.

It is unsurprising that the data when examined in this way do not support the hypothesis, because an implicit assumption is being made that non-manual jobs are always superior to manual ones. McRae recognised the fragility of this assumption and focussed attention on wives in RGSC I and II rather than all non-manual wives. The distributions of pre-marital jobs are such that 31.9% of the sample consists of couples where the wife is non-manual and the husband is in RGSC's IIIM or IV, which means that a non-manual/manual disparity of this sort is hardly likely to be perceived of as 'unusual' by either spouse. There are very few couples where the husband had a non-manual pre-marital job and the wife had a manual one (4.5% of the sample). Since the risk of dissolution as judged by the Model 4 parameter estimates seemed virtually identical for this group and the group of couples where both spouses were non-manual, it did not seem reasonable to further consider the two groups separately. Model 5 is therefore identical to Model 4 except for the aggregation of these two groups.

What one really ought to be looking for is a subset of couples where the husband has a manual job in RGSC IIIM or IV and the wife has a non-manual job which is 'clearly' of higher status than a skilled manual job, i.e. one which is not routine and which is not lacking in autonomy. An alternative to McRae's tactic of focussing on RGSC I and II wives is to consider the wife's education, under the assumption that RGSC IIINM jobs possessed by women with more than the minimum legal educational requirement are likely to be superior on average to those belonging to minimally-educated women.

Years of post-compulsory schooling was therefore added to Model 5 as a covariate, and the interaction between this covariate and the three main categories was also included in the new model, Model 6. The inclusion of this interaction enabled the effects of education to be examined separately for each of the categories. Note that the covariate was based on terminal age of schooling rather than terminal age of education because of an apparent tendency for women whose first marriages dissolved to obtain further educational qualifications. For virtually all of the sample the minimum school leaving age was 15.

The effect of post-compulsory schooling for non-manual women married to men in RGSC's IIIM and IV is close to statistical significance in the hypothesised direction (change in deviance=3.00; P=0.08). However, the corresponding effect for manual wives with

husbands in RGSC IIIM or IV is of the same sign and of even greater magnitude, though once again it is not statistically significant (change in deviance=3.55; P=0.06). If one considers the effect of years of post-compulsory schooling on the risk of dissolution of all wives married to husbands in RGSC's IIIM and IV, it is positive and statistically significant (change in deviance=5.56; P=0.018). It would therefore appear that the post-compulsory schooling of wives increases the risk of dissolution in couples where the husband's pre-marital occupation was in RGSC's IIIM or IV.

The effect of post-compulsory schooling for couples where the husband was non-manual was also positive but was very much smaller, and was far from being statistically significant.

It is difficult to know quite how much confidence one should have in the result obtained above. Its implication is that the risk of marital dissolution increases significantly (by about 25%) with each year of post-compulsory schooling for wives married to husbands in RGSC's IIIM or IV. However, since significance was achieved by a 'post-hoc' aggregation of the education effect across two categories which individually had non-significant effects, one is obliged to treat the test of significance with a certain amount of caution.

The result is at least intuitively reasonable. Whereas the original hypothesis relates to occupational status, it would not seem implausible that it is couples wherein the wife is well-educated in which the husband's manual status can cause problems. This is consistent with the theory that states that a married woman's (self-perceived) social status is as much a matter of potential as of current or past occupational status.

An alternative interpretation of the education-related increase in the risk of dissolution of couples including RGSC IIIM and IV husbands is that it is the result of the negative effect of educational hypogamy, i.e. wife's educational superiority. Unfortunately the FFS data ~~is~~ are not well-suited for the testing of this hypothesis, as data on ex-husband's education ~~was~~ were only collected in those instances where the ex-husband had not been superseded by another partner (whether a new husband, fiancee or cohabitee). Of the 556 women in the sample whose first marriage had ended in dissolution, data ~~was~~ were available relating to the ex-husbands of only 232 women. Clearly fitting a proportional hazards model to a sample excluding 324 (58%) of the 'deaths' is not ideal, however this approach seemed the only one available. A model was fitted including as covariates wife's age at marriage/age at marriage squared, year of

marriage and dummy variables for the two 'high-risk' subgroups described earlier, as well as a dummy variable corresponding to wife's educational superiority (set equal to one if wife's school leaving age was greater than that of her husband and zero otherwise). The parameter estimate for this last parameter was found to be positive (i.e. in the expected direction) but not statistically significant. Its magnitude was consistent with about a 20% increase in the risk of dissolution through wife's educational superiority.

Thus, while one can say with limited confidence that the post-compulsory schooling of wives of men whose pre-marital occupations were in RGSC's IIIM and IV increases their risk of marital dissolution, it is not possible from the results of this analysis to judge the extent to which this reflects an increased risk resulting from wife's educational superiority.

TABLE 6/19: The definitions of categorical variables corresponding to husband's pre-marital occupation and wife's pre-marital occupation in combination included in models of marital dissolution: data from the 1976 Family Formation Survey

Model 1 (3 groups)

	Wife's RGSC						
Husband's RGSC	I	II	IIINM	IIIM	IV	V	Else
I	1	1	1	1	1	1	3
II	1	1	1	1	1	1	3
IIINM	1	1	1	1	1	1	3
IIIM	1	1	1	1	1	1	3
IV	1	1	1	1	1	1	3
V	2	2	2	2	2	2	3
Else	3	3	3	3	3	3	3

Model 2 (4 groups)

	Wife's RGSC						
Husband's RGSC	I	II	IIINM	IIIM	IV	V	Else
I	1	1	1	1	1	1	3
II	1	1	1	1	1	1	3
IIINM	4	4	4	4	4	4	3
IIIM	1	1	1	1	1	1	3
IV	1	1	1	1	1	1	3
V	2	2	2	2	2	2	3
Else	3	3	3	3	3	3	3

Model 3 (4 groups)

	Wife's RGSC						
Husband's RGSC	I	II	IIINM	IIIM	IV	V	Else
I	1	1	1	1	1	1	3
II	1	1	1	1	1	1	3
IIINM	1	1	1	1	1	1	3
IIIM	4	4	4	4	4	4	3
IV	4	4	4	4	4	4	3
V	2	2	2	2	2	2	3
Else	3	3	3	3	3	3	3

TABLE 6/19: (continued)

Model 4 (6 groups)

Husband's RGSC	Wife's RGSC I	II	IIINM	IIIM	IV	V	Else
I	1	1	1	5	5	5	3
II	1	1	1	5	5	5	3
IIINM	1	1	1	5	5	5	3
IIIM	4	4	4	6	6	6	3
IV	4	4	4	6	6	6	3
V	2	2	2	2	2	2	3
Else	3	3	3	3	3	3	3

Model 5 (5 groups)

Husband's RGSC	Wife's RGSC I	II	IIINM	IIIM	IV	V	Else
I	1	1	1	1	1	1	3
II	1	1	1	1	1	1	3
IIINM	1	1	1	1	1	1	3
IIIM	4	4	4	5	5	5	3
IV	4	4	4	5	5	5	3
V	2	2	2	2	2	2	3
Else	3	3	3	3	3	3	3

4. Summary of Chapter 6

This chapter confirmed the existence of a gross relationship between the risk of marital dissolution and occupational social status.

Social status-related variables (i.e. occupation, educational level and social origin) were included in a model of the risk of marital dissolution. Once the effects of other covariates had been adjusted for, the effects of the social status-related variables were virtually all statistically insignificant. Some of the relationship between occupation and the risk of dissolution was explained by age at marriage, and much of the rest of the relationship was explained by housing tenure and fertility. Male graduates were found to have a low dissolution rate in the first decade of marriage, otherwise the three social status-related variables did not contribute to the final model of the risk of dissolution.

However, unemployment and job insecurity were found to increase the risk of marital dissolution. An unemployment event was found to significantly increase the risk of dissolution in the following calendar year, while people who had been unemployed or had had an insecure job at marriage were found to be at greater risk in general. Thus it would appear that social status is of relevance to the risk of marital dissolution, if one accepts the social status of those on the fringes of or outside the labour force as being different from those with 'steady' jobs.

Interestingly, the effects of variables associated with an increased risk of dissolution appear to be cumulative, resulting in a small proportion of couples having a very high risk of dissolution.

Age heterogamy was shown to be related to an increased likelihood of divorce. However, no evidence was found of a relationship between social origin heterogamy and marital dissolution, though the technique used to test for this relationship was not a very powerful one. No evidence was found of a relationship between school-leaving age heterogamy and marital dissolution.

However, some evidence was found that women with post-compulsory schooling married to men whose pre-marital occupations were skilled manual or semi-skilled had an unusually high risk of marital dissolution. This finding might possibly be a reflection of the effects of educational hypogamy, but the finding was only statistically significant at the 5% level, and needs to be replicated before it can be entirely trusted.

In an Appendix to this chapter it is shown that an individual's attitude towards the current divorce law is much more strongly related to his or her political, religious and social attitudes than it is to his or her social status, the individual's attitude being unrelated to his or her occupation.

APPENDIX TO CHAPTER 6

Attitudes to the current British divorce law

It is not difficult to construct a variety of plausible hypotheses relating attitudes towards divorce to occupation, education and social origin. For example, the higher divorce rate among working class couples might be thought likely to lesson the stigma attached to divorce by working class people, but on the other hand the supposedly middle class ideal of companionate marriage might be thought likely to make middle class people less negative towards couples whose marriages 'don't work out'.

The 1987 British Social Attitudes Survey (BSAS; see Jowell et al, 1988) asked approximately half of its respondents the following question

"Do you think that divorce in Britain (Scotland) should be...
easier to obtain than it is now,
more difficult,
or - should things remain as they are?"

In this Appendix the relationship of the answers given to the above question to occupation, education and social origin is considered.

The sample examined consisted of 1,325 BSAS respondents, with a small number of respondents having been excluded because they did not answer the above question (35 respondents), or because they did not answer/gave unclear answers to questions on which covariates used in the analyses were based (45 respondents). Furthermore, respondents who belonged to non-Christian religions were also excluded (32 respondents).

Of the 1,325 respondents in the sample which was analysed, 124 (9%) said that divorce should be easier to obtain, 685 (52%) favoured the status quo, and 516 (39%) said it should be more difficult to obtain.

In the 1987 BSAS respondent's occupation was coded according to a 'compressed Goldthorpe schema' described by Jowell et al, 1988, p205. Table A6/1 shows for each sex the relationship between the respondent's answer to the divorce question and his or her occupational class. The deviances of the independence model fitted to the male and female sub-tables of Table A6/1 are 17.5 on 10 degrees of freedom ($P>0.05$) and 7.9 on 10 degrees of freedom ($P>0.05$), so there is no clear evidence of a

relationship between occupation and attitude towards the ease of divorce.

However, Table A6/2 shows that there is a significant relationship between highest educational qualification and attitude to the ease of divorce, since the deviance of the independence model fitted to Table A6/2 is 21.6 on 4 degrees of freedom ($P<0.001$). Table A6/2 shows that graduates/those with professional qualifications are disproportionately unlikely to favour easier divorce, while those whose highest qualifications are 'A' or 'O' levels are disproportionately unlikely to favour more difficult divorce.

A self-reported (and hence crude) class of origin was also collected by the BSAS, but a brief analysis showed there to be no relationship between this variable and attitude towards the ease of divorce, so it was not included in the analyses that follow.

The relationship between various covariates and attitude to the ease of divorce was examined using logit models (fitted using GLIM).

The (binary) dependent variable in the first analysis performed contrasted the small minority of respondents who said that divorce should be easier to obtain with all the other respondents.

Table A6/3 contains the parameter estimates from a model including various covariates which were found to have a significant effect on the easier divorce/other attitude dichotomy. There was no statistical justification for including any parameters corresponding to respondent's occupation, but, as in the examination of Table A6/2, graduate/professionally qualified respondents were found to be less likely to favour easier divorce.

Political party allegiance was found to be very strongly related to the dependent variable, with Conservative party supporters being the least likely to favour easier divorce. Women were also found to be significantly less likely to favour easier divorce, as were Catholic respondents. Respondents who were currently cohabiting or separated/divorced, however, were more likely to favour easier divorce. Finally, respondents who did not think that extra-marital sex was always or mostly wrong were more likely to favour easier divorce!

Rather surprisingly, a respondent's age did not significantly affect the probability of their favouring easier divorce.

A second analysis focused on a (binary) dependent variable contrasting those respondents who favoured more difficult divorce with all the other respondents.

The parameter estimates from a model containing various significant covariates are given in Table A6/4. As one might have expected from an examination of Table A6/2, respondents whose highest qualifications were 'O' or 'A' levels were less likely to favour more difficult divorce than those with higher or lower qualifications. One again, there was no statistical justification for including any parameters relating to occupation.

On this occasion respondent's age was found to be significant, with respondents aged over 50 and (perhaps surprisingly) respondents aged between 18 and 29 favouring more difficult divorce more often than respondents aged between 30 and 49. Conservative party supporters were found to be more likely than other respondents to favour more difficult divorce, as were women, Catholics and Anglicans. One slightly strange effect was that respondents whose homes were not houses were less likely to favour more difficult divorce. Finally, the more 'liberal' an attitude that the respondent took towards extra-marital sex, the less likely they were to favour more difficult divorce.

The results of the two above analyses suggest that there is no substantively significant relationship between one's occupation and one's attitude towards the current divorce laws. However, the analyses provide clear evidence that one's attitude towards the divorce law is related to one's highest educational qualification (though not in a completely straightforward way) and to one's more general social, political and religious beliefs/values, as well as one's age and marital status.

The above analyses provide little evidence that social status is related to attitude towards divorce, and are therefore consistent with the hypothesis that class differences in divorce rates have more to do with material circumstances than with attitudes.

TABLE A6/1: Occupation cross-classified by attitude to the current British divorce laws: data from the 1987 British Social Attitudes Survey

MALE RESPONDENTS

Respondent's occupational category	Respondent's attitude to the ease with which a divorce can be obtained: Things should: be easier	be more difficult	remain as they are
Never had job	1	3	9
Salariat	16	71	130
Routine non-manual	7	14	16
Petty bourgeoisie	7	31	27
Manual foremen	4	17	30
Working class	35	86	119

FEMALE RESPONDENTS

Respondent's occupational category	Respondent's attitude to the ease with which a divorce can be obtained: Things should: be easier	be more difficult	remain as they are
Never had job	4	13	24
Salariat	7	42	60
Routine non-manual	14	117	129
Petty bourgeoisie	3	14	17
Manual foremen	2	5	7
Working class	24	103	117

TABLE A6/2: Highest educational qualification cross-classified by attitude to the current British divorce laws: data from the 1987 British Social Attitudes Survey

Respondent's highest educational qualification	Respondent's attitude to the ease with which a divorce can be obtained: Things should: be easier	be more difficult	remain as they are
Degree/Prof.quals.	15	104	161
'A' or 'O' levels	41	118	206
None of the above	68	294	318

TABLE A6/3: Parameter estimates from a logit model with 'favours easier divorce/does not favour easier divorce' as the binary dependent variable (deviance corresponding to inclusion of covariates = 89.5 on 8 degrees of freedom: data from the 1987 British Social Attitudes Survey)

Covariate	Par.est.	St.error
Labour supporter	1.72	0.28
Alliance supporter	0.92	0.34
Other party/no party	1.58	0.32
Female	-0.55	0.20
Catholic	-1.20	0.47
Cohabiting/Separated/Divorced	0.88	0.28
Graduate/Professional quals.	-0.68	0.30
Extra-marital sex not always or mostly wrong	0.79	0.26

(The base categories corresponding to the above covariates are Conservative supporters, men, non-Catholics, married/single/widowed respondents, respondents without degrees or professional qualifications, and respondents who said that extra-marital sex was mostly or always wrong).

TABLE A6/4: Parameter estimates from a logit model with 'favours more difficult divorce/does not favour more difficult divorce' as the binary dependent variable (deviance corresponding to inclusion of covariates = 105.3 on 13 degrees of freedom: data from the 1987 British Social Attitudes Survey).

Covariate	Par.est.	St.error
Aged 30 to 49	-0.32	0.17
Aged 50 or more	0.25	0.17
Labour supporter	-0.51	0.15
Alliance supporter	-0.30	0.16
Other party/no party	-0.26	0.18
Female	0.23	0.12
Catholic	0.66	0.18
Anglican	0.43	0.15
Other Christian	0.09	0.18
Highest quals. 'O' or 'A' levels	-0.37	0.14
Extra-marital sex mostly wrong	-0.39	0.14
Extra-marital sex not always or mostly wrong	-0.93	0.22
Does not live in a house (#)	-0.38	0.18

(The base categories corresponding to the above covariates are respondents aged 18 to 29, Conservative supporters, men, respondents with no religion, respondents with degrees or professional qualifications or with no relevant qualifications, respondents who said that extra-marital sex was always wrong, and respondents who lived in houses).

(#) i.e. in flats, tenements, or elsewhere.

CHAPTER 7: Conclusions

This thesis is first and foremost a methodological rather than a substantive study. However, the application and evaluation of statistical models was carried out in the context of genuine substantive analyses which produced interesting and worthwhile results. Hence this chapter is concerned both with the methodological aspects of this thesis and with the substantive results of the analyses carried out within it.

The chapter first considers the statistical aspects of the thesis. Issues arising from the use of secondary analysis as the basis of the thesis are then considered, and finally the substantive conclusions are discussed.

1. Statistical aspects of the thesis

The primary methodological aim of this thesis was to apply and evaluate statistical methods, especially methods concerned with the analysis of two-way contingency tables.

This thesis clearly demonstrates some of the merits of association models/quasi-association models. In Chapter 2 association models were shown to be theoretically superior to correspondence analysis and multidimensional scaling using Blau and Duncan's dissimilarity index in the context of the analysis of two-way tables.

Chapter 4 shows that quasi-association models are highly appropriate models to apply to tables of husbands' and wives' characteristics in combination (and also to other symmetrical tables where the row and column categories are the same, e.g. social mobility tables). The re-analysis of the Penn and Dawkins data in Section 3.1 of Chapter 4 demonstrates that quasi-association models can shed a new light on the patterns of association in two-way tables. However, care needs to be taken in interpreting the parameter estimates from such models, since both the set of parameters corresponding to the leading diagonal and the sets of row and column score parameters contribute to the explanation of 'exact' homogamy (see Section 3.10 of Chapter 4).

Many aspects of association models require further development, e.g. it is not a straightforward exercise to assess the number of dimensions that an association model needs to fit a table adequately. In Section 2.11 of Chapter 2 it was shown by means of a simulation that the change in deviance between RC(M) and RC(M+1) association models cannot necessarily be used as a test statistic for the significance of the

(M+1)th dimension (i.e. it cannot be compared with the relevant chi-square distribution for this purpose).

This thesis also demonstrates that association models can be used to analyse multi-way tables in a similar fashion to the way in which canonical correlation analysis is used to analyse groups of interval-level variables. In Chapter 4 it was shown that a particular type of hierarchical log-linear model applied to a six-way table is identical to a constrained version of Goodman's RC(3) association model applied to the six-way table re-expressed in the form of a two-way table.

There are, however, some situations where the use of one of the 'competitors' of association models would seem appropriate. In Chapter 4 correspondence analysis was used to analyse a two-way table wherein the observations were not independent of each other and which would therefore have been difficult to model statistically.

Turning to other statistical techniques, Chapters 3 and 5 of this thesis demonstrate how useful log-linear models are for comparing the association in two-way tables between groups (e.g. comparing social origin homogamy between cohorts; comparing religious endogamy between first marriages and remarriages).

Specific substantive issues sometimes demand the use of individualistic techniques/adaptations of techniques. In Chapter 6 an 'ad hoc' statistical technique (centered around a log-linear model) was used to examine the relationship between social origin heterogamy and marital dissolution. This 'attritional' approach focussed on the association between the social origins of partners in surviving couples, but turned out to be insufficiently powerful to be of practical use.

Also in Chapter 6, a time-varying covariate was included in a proportional hazards model in a (successful) attempt to examine the immediate effects of unemployment on the risk of marital dissolution. This was not only a useful application of the proportional hazards model but also a demonstration of the usefulness of longitudinal as opposed to cross-sectional data (though it should be noted that the data were collected retrospectively, since the study in question was in itself cross-sectional).

On a different note, throughout the thesis there is an emphasis on multivariate analyses as opposed to bivariate analyses. In particular several of the multivariate analyses include occupation, education and social origin in an attempt to distinguish between the effects of these three variables. This emphasis on multivariate analysis reflects the

author's desire to raise the level of sophistication of statistical analyses of sociological data. The applications of statistical methods in this thesis provide strong evidence that statistical techniques such as association models can produce substantively interesting results.

2. Secondary analysis

A consequence of the use of secondary analysis in this thesis was that the choice of issues/hypotheses was determined as much by practical constraints as by theoretical issues. It was not possible to focus the thesis on a narrowly defined substantive issue.

Many questions arising from secondary analyses cannot be answered without the collection of new data, so research based on secondary analysis is unlikely to provide the last word on most substantive issues. For example, though 'common sense' theories can be used to explain the relationship between job insecurity and marital dissolution demonstrated in Chapter 6, further evidence is really needed to support the claim that job insecurity causes marriages to end.

Though there is no a priori reason why secondary analysis should necessarily be based on quantitative data rather than qualitative data, in practice secondary analysis is effectively a quantitative technique. Like quantitative research in general, secondary analysis is possibly better geared towards the demonstration of the existence of relationships rather than the development of anything other than rather crude and speculative causal narratives. Just as secondary analysis can act a stimulus to the collection of further quantitative data, it can also act as a stimulus to the collection of qualitative data which might provide an idea of the social process giving rise to an observed relationship.

Bulmer (1982) describes how policy makers often favour data collected within the framework of an 'engineering' model, i.e. data collected to test a specific hypothesis or to solve a specific problem. He describes how policy makers might utilise qualitative data within an 'enlightenment' model, i.e. one where the data ~~is~~ are used to provide the policy makers with ideas about and/or an orientation to an issue, rather than to provide a 'concrete' solution to a 'concrete' problem.

The secondary analysis of quantitative data, whether in the context of policy making or academic theory, can be used in the same way. Rather than simply acting as a method of testing specific hypotheses it can be used to provide a pool of observed relationships and patterns which

might provide support for existing theories, inspire the construction of new hypotheses, or stimulate further research.

For example, in Chapter 5 it was shown that an individual whose spouse has a different party political identification to them is less likely to vote. This finding can be seen as contributing towards the theory that heterogamy is more likely when a social characteristic is of little salience to an individual.

Also in Chapter 5, it was shown that remarriages have a lower level of homogamy of voting intention than first marriages. This relationship caused the author to construct the hypothesis that remarriages are based more on pragmatic considerations than perceived compatibility.

Finally, the finding in Chapter 6 that age heterogamy is related to the risk of marital dissolution is, perhaps, unsurprising, but does seem to suggest that those interested in heterogamy theory might benefit from a detailed study of <u>why</u> extreme age differences make marriages more vulnerable.

In conclusion, though the use of secondary analysis in this thesis forced it to have a relatively broad focus, the results of the substantive analyses in this thesis (as described in Section 3 of this chapter), though diverse, can be viewed as making a contribution to substantive sociology.

3. <u>The substantive conclusions of this thesis</u>

The chapter summaries at the end of the substantive chapters (Chapter 3 to 6) contain details of the analyses in this thesis and the substantive conclusions drawn from them.

Though this is primarily a methodological thesis, the substantive analyses are intended as more than mere illustrations. This section examines the way in which some of the analyses contribute to theories relating to social stratification and/or marriage.

Data can contribute to theory in three ways. Existing hypotheses can be verified or rejected. More general theories can be bolstered and/or extended by findings which are consistent with the predictions of those theories. Finally, new hypotheses/theories can be developed from the data (c.f. Glaser and Strauss's concept of "grounded theory"; Glaser and Strauss, 1967).

On several occasions in this thesis analyses are carried out in an attempt to verify/reject hypotheses. Perhaps most notable is the analysis in Chapter 6 which provides strong support for the hypothesis

that unemployment causes marital dissolution in some cases. Another hypothesis tested in this thesis states that large age differences between spouses are associated with an increased risk of marital dissolution. This hypothesis had previously been shown to be true for Hawaii in the U.S. and is shown in this thesis to be true for England and Wales.

More than anything else, this thesis provides material which can be used to support and/or develop existing ideas. In Chapter 4 it is shown that there was a post-war decrease in Great Britain in the extent of homogamy for social status. This finding superficially appears to support the argument that 'class' has declined in relevance since the war. However, a more sophisticated analysis consistent with the finding suggests that 'class' has declined in relevance in some social contexts, but not in others. It appears that there has been a degree of 'convergence' in the life-styles of different 'classes', while inequalities in the distribution of income and wealth and the distribution of 'life-chances' (as judged by education, intergenerational occupational mobility, etc.) have persisted.

This thesis also contributes to the debate over the importance of the 'boundary' between non-manual and manual occupations. Analyses of occupational homogamy and social origin homogamy in Chapter 4 verify the historical importance of the boundary in the context of marriage, but also suggest that variations <u>within</u> the 'middle class' and the 'working class' are of equal importance.

One of the main ways in which this thesis allows existing theories to be developed is by utilising a multivariate approach. In Chapter 3 the hypothesis that social status and place of first meeting one's spouse are related, already shown to be true for France by Bozon and Heran, is verified for Great Britain. More importantly, educational level is shown to be significantly related to place of meeting once the relationship between occupational class and place of meeting has been adjusted for. In fact, in the author's opinion one of the most interesting substantive features of this thesis is the way in which education is clearly shown to be as or more important an aspect of social stratification in the context of marriage than occupation is. This is particularly evident in the analysis in Chapter 4 which examines the relative contributions of occupation, education and father's occupation to social status homogamy.

The tendency of British sociologists to focus on occupational class rather than other aspects of social status is possibly linked to the

prominence of studies looking at the relationships between 'class' and work/employment, social mobility and collective political behaviour. Another 'historical' tendency has been to judge the 'class' of a married couple simply in terms of the husband's occupation. This thesis demonstrates that this approach is inadequate in several contexts. In Chapter 3 it is shown that a woman's age at marriage is related both to her own social status characteristics and those of her husband. In Chapter 4 it is shown that both parents' occupations affect a child's likelihood of obtaining a 'service class' occupation. In Chapter 5 it is shown that a wife's occupation affects her own voting intention (and possibly her husband's as well).

While the above analyses emphasise the importance of wife's occupation, an analysis in Chapter 6 suggests that wife's educational level may be vital in the context of the effect of status differences between spouses on the risk of marital dissolution. The analysis gives some support to the hypothesis that the marriages of 'educated' women to men with manual occupations are unusually prone to marital dissolution. However, this hypothesis need to be verified, and it is possible that data suitable for this purpose may be collected by a 'sequel' to the 1980 Women and Employment Survey (Martin and Roberts, 1984).

Another contribution to the extension of existing theory is made by the proportional hazards model of marital dissolution in Chapter 6. This analysis shows that job insecurity at marriage is associated with an increased risk of marital dissolution, which adds weight to the theory that the negative effects associated with unemployment are not unique to unemployment but can also often be found among other individuals 'peripheral' to the labour force, i.e. the insecurely employed.

Three issues mentioned in the introduction to this thesis were the salience of social characteristics in the context of partner selection, the balance between structure and preference in the determination of marriage patterns, and the relative importance of the socio-economic and the social status aspects of social stratification in the context of marital formation and dissolution. With respect to the last of these three issues, this thesis has emphasised that the social status aspect of social stratification is very important in the context of marital formation, but relatively unimportant in the context of marital dissolution. Though many of the analyses in this thesis are related to the issue of structure versus preference, it is difficult to draw any firm conclusions about this issue, though the author's feeling is that the results of the analyses provide limited support for the hypothesis

that structural constraints are responsible for a considerable proportion of the tendency towards social status homogamy.

Out of the three issues listed above it is the issue of salience on which this thesis has most to say. An analysis in Chapter 5 shows that members of couples who are heterogamous for party political identification are less than usually likely to vote, which suggests that the extent to which a potential spouse's party identification is salient to an individual depends on the extent to which party politics is of salience to that individual in general.

Also in Chapter 5, an analysis shows the decline in Catholic endogamy as the views of the Catholic church towards interdenominational marriage became more liberal and hence the salience of a prospective partner's denomination to a Catholic declined.

Analyses in Chapter 5 show that remarriages are less homogamous for voting intention and for religion than first marriages. This might be interpreted as indicating that social/political/religious attitudes are less salient in the 'remarriage market'.

One might have expected social status to have been of relatively low salience for couples involved in unusually 'early' or 'rushed' marriages. However, three analyses in Chapter 3 provide very little evidence of this. This apparent lack of variation in salience might be attributed to the relative unimportance of preference as compared with structure in the determination of social status homogamy!

Finally, two analyses in Chapter 5 lead to the construction of a new, salience-related theory. The first analysis suggests that homogamous graduate couples are unusually homogamous with respect to voting intention. The second analysis suggests that as educational level increases, the likelihood of Anglican/Catholic intermarriage decreases. One might infer from this that similarity of social/political/religious attitudes becomes a more important criterion in partner selection as educational level rises. (One might speculate as to whether this 'explains' the results of analysis in Chapter 4, which somewhat surprisingly showed endogamous graduate couples to be as homogamous for social origin as other couples).

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