

This book provides an outstanding introduction to one approach, using *association models* developed primarily by Leo Goodman. Association models are most informative when used with ordinal variables. The ones of greatest practical use are loglinear in form. They treat the variables symmetrically, unlike logit-type models, which distinguish between response and explanatory variables. Unlike ordinary loglinear models, association models are rich in variety, yielding models for two-way tables that are more complex than the independence model, but still unsaturated. They also permit more powerful inference than models that treat all variables as nominal-scale.

The simplest and perhaps the most useful association model, the linear-by-linear interaction model, describes a table using a single parameter that determines all odds ratios for 2x2 subtables. The user must supply sets of ordered scores for the rows and the columns. The first half of this text presents this model and generalizations of it (row and column effects models) that allow parameter scores. One chapter presents special symmetry-type versions of the models that apply to square tables having the same row and column categories. These chapters are clearly written, and provide the reader with an excellent introduction to the main advantages of association models. Unfortunately, the authors do not provide much guidance about fitting association models using standard software packages.

In the second half of the text, the authors discuss two generalizations of the basic models. One type deals with multiple dimensions of association. The association is decomposed into a sum of terms, each successive term explaining a smaller portion. Though this model structure is mathematically appealing, I found most applications rather unconvincing. One example requires at least 20 parameters to describe a cross-classification of nine groups with a six-category schooling measure. It is unclear that this analysis tells us more than a simple summary of means and standard deviations of schooling for the nine groups. The second generalization deals with association models for bivariate association in multiple groups. These describe the association between two variables while controlling for a third. The authors also combine the two generalizations, providing multiple-group models with multiple dimensions of associa-

tion. They do not provide the full data on which this chapter's example is based.

The final chapter summarizes an alternative approach—logit models that treat one ordinal variable as a response. A model based on logits of adjacent response categories has connections with association models. A model based on logits of cumulative probabilities is currently the statistical community's favorite regression model for ordinal response variables. It can handle several explanatory variables, which may be continuous or categorical. Logit models are more useful than association models for regression-type analyses. This chapter provides a fine introduction to them and also provides a fitting ending, perhaps whetting the reader's appetite for learning about other ways of analyzing ordinal data.

This well-written book provides a careful and generally clear introduction to association models. It requires some background in loglinear models, but most of the text is written at a relatively low technical level. The text is somewhat limited in scope, giving main emphasis to association models and relatively little attention to logit models, correlation models, or correspondence analysis, but it makes up for this by covering the charted territory in considerable depth. In particular, it discusses several major advances in association models made since publication of my 1984 book, *Analysis of Ordinal Categorical Data* (New York: Wiley).

Overall, the authors have achieved their aims well. They make a strong case for the usefulness of association models in a variety of applications. Clogg himself has been a prolific contributor to this literature, and he and Shihadeh have provided sociologists with an introduction filled with wise advice about analyzing associations between ordinal variables.

Handbook of Statistical Modeling for the Social and Behavioral Sciences, edited by **Gerhard Arminger**, **Clifford C. Clogg**, and **Michael E. Sobel**. New York: Plenum Press, 1995. 592 pp. \$59.95 cloth. ISBN: 0-3006-44805-X.

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The ideal reader of this book has a problem, a data set, and the tools available to fit a range

of models to the data. In this handbook, that reader may be able to find a discussion of the rationales for using various models, a list of references on implementation, and examples of the models.

Let me first say what this book is not. It is not a collection of methods, but of models. The reader will find essentially no discussion of graphical methods, nonparametric methods, or other nonmodel-based approaches. The book is a handbook, not a cookbook, which is both good and bad: There is extensive discussion about the theory relating to the models, but not quite enough detail for the user to be able to fit these models to data without additional help. For the reader with adequate software, that will not be a problem; other readers will have to go to the cited references.

The handbook has 10 unrelated chapters; I will focus on the four whose titles suggest some relevance to my research in political science, which involves analyzing election returns and surveys on voting preferences.

The chapter on causal inference, by M. E. Sobel, is interesting reading, and provides an excellent overview of several ideas about causal inference. Unfortunately, it does not connect well with the later chapters: When can inferences based on the complicated models discussed in this book be considered “causal”? Reading this chapter would not help me select a model for estimating the causal effect of incumbency in congressional elections.

R. J. A. Little and N. Schenker follow with a chapter on models for missing data in surveys and databases, and computational issues arising in multiple imputation. In my analysis of elections, simple methods of handling missing data suffice, and Little and Schenker's discussion of concepts and naive approaches provides useful perspective. When analyzing sample surveys, I encounter much larger missing data problems, and the treatment here of the multivariate normal and related models is detailed and enlightening. An important strategy when modeling missing data is to include enough covariates so that a missing-at-random model can be assumed; it would have been nice to see a discussion of hierarchical models, which naturally arise when setting up regression models with many covariates.

The third chapter, by G. Arminger, is a

presentation of regression from an econometric perspective. The chapter has a strong theoretical focus and covers a range of topics in maximum likelihood and pseudo-maximum-likelihood estimation and testing for linear and nonlinear models. In my regression analyses of electoral data, the first section of this chapter—on normal linear regression—would be relevant, but the rest would not be, because in our research, the difficulties in analysis arise not from nonlinearity or identifiability, but because estimands of interest are nonlinear functions of predictions (for example, the number of legislative seats won by the Democratic party, in an analysis in which the units are legislative districts and the outcome variable is the proportion of votes won by the Democrats in each district), rather than regression coefficients. For these purposes, I would have liked to see a discussion of computational methods based on predictive simulation, in addition to point estimates of parameters.

I now skip to the handbook's final chapter, by N. T. Longford, on random coefficient (hierarchical) models. These models are very important in my research, arising when I need to combine several sources of information (for example, in analyzing data from several national elections), and I was happy to see here a clear and extensive discussion of hierarchical regression models, concluding with a nice example, with numerical and graphical summaries. This chapter discusses both conceptual and computational issues, and I expect it will be useful to many readers. From the perspective of a researcher in political science, I would add to this chapter a note that hierarchical data structures can arise without hierarchical design (for example, there is no random sampling involved in a study of election returns, and the 50 states can often be usefully modeled hierarchically, even though they are not a sample from a larger population of states).

The book's major gap is with simpler models and methods. Of course, the most standard topics, such as simple analysis of variances, are covered in many textbooks, but in this handbook I would have liked to have seen discussions of the following topics that are often ignored in introductory texts:

1. Graphical presentation—this is not strictly “modeling” but is crucial in devel-

oping models. The relation between scatterplots and regression models, in particular, is important. For example, graphs can be useful in determining which interactions to fit in a regression model and suggesting ways in which a model can be improved.

2. Prediction (for example, using regression). From the perspective of a political scientist, this topic is worth a chapter.

3. Models for data collection. This is an important topic when, for example, analyzing sample surveys. The chapter by Little and Schenker discusses methods for missing data, but it would be nice to have a section in the handbook about analyzing complete survey data—for example, how to incorporate sampling and poststratification weights into regression models.

On the whole, the four chapters whose titles suggest relevance to my research contain a lot of useful material and pointers to further references. I expect this handbook to be useful to a wide range of social scientists involved in data analysis using advanced quantitative methods. Perhaps a second volume can be compiled focusing on some of the important simpler models that were skipped over here.

New Directions in Attitude Measurement, edited by **Dagmar Krebs** and **Peter Schmidt**. New York and Berlin: Walter de Gruyter, 1993. DM198. ISBN: 3-11-013871-9.

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In the opening paragraph of the preface, editors Krebs and Schmidt write, "The main goal of this book is the side-by-side presentation of relevant approaches to attitude theory, measurement and analysis. . . . This seems to be especially important with respect to the growing gap between the fast progress in technical sophistication of measurement techniques on the one hand and comparatively slow progress in attitude theory on the other hand" (p. v). This is indeed what the contributors, many of them well-regarded scholars, have brought to this volume. The reader will find useful discussions of theoretical approaches to attitude formation and change, as well as of empirical

and statistical issues. This edited volume is separated into five sections: historical perspectives and state of the art; social structure, attitudes, and social action; measurement theory and scaling; latent variable models; foundations and statistical issues; effects of systematic bias in measuring social life feelings and attitudes.

However, the implicit goal stated above—to somehow, and to some degree, close the widening gap between theory and technique—is, unfortunately, not achieved. This failure is, perhaps, not all that surprising given that few of the chapters are oriented toward a precise specification of a theory involving the concept attitudes. In order to bring together theory and technique, one would be compelled at least to provide precise definitions of, and linkages among, concepts. Without these, how can we hope to derive any empirical/statistical technique strongly linked to a theory? By focusing on the concept independent of the theory in which it is embedded, as does, for example, Melvin Seeman in the first chapter, one can easily fall into the trap of reification, which can give rise to a misguided attempt to discern "the basic, or at least discriminable, coordinates of that concept" (p. 4), as if the concept had independent empirical existence.

Similarly, focusing on an empirical/statistical technique independent of some theoretical context can lead, for example, to a discussion of measurement issues without reference to any concept being measured (e.g., the chapter by Arminger and Rothe). To be sure, such work often is useful in its own right. However, in a text involving issues of attitude measurement, ignoring the concept of attitudes altogether appears odd.

More positively, if one did not focus on closing the theory/technique gap, then this text provides some useful pieces. The above criticism notwithstanding, Seeman's chapter, a historical overview of attitude/alienation research, provides useful insights into why attitude researchers today have the same problems as they had years ago. Ajzen provides a useful and interesting discussion of the relation between attitudes and behavior, and of the theory of planned behavior. Similarly, Borg and Staufenbiel provide an interesting discussion of facet theory. Indeed, each chapter offers something useful to those