
Description: Latent Variable Models and Factor Analysis provides a comprehensive and unified approach to factor analysis and latent variable modeling from a statistical perspective. This book presents a general framework to enable the derivation of the commonly used models, along with updated numerical examples. Nature and interpretation of a latent variable is also introduced along with related techniques for investigating dependency.

This book:

- Provides a unified approach showing how such apparently diverse methods as Latent Class Analysis and Factor Analysis are actually members of the same family.
- Presents new material on ordered manifest variables, MCMC methods, non-linear models as well as a new chapter on related techniques for investigating dependency.
- Includes new sections on structural equation models (SEM) and Markov Chain Monte Carlo methods for parameter estimation, along with new illustrative examples.
- Looks at recent developments on goodness-of-fit test statistics and on non-linear models and models with mixed latent variables, both categorical and continuous.

No prior acquaintance with latent variable modelling is pre-supposed but a broad understanding of statistical theory will make it easier to see the approach in its proper perspective. Applied statisticians, psychometricians, medical statisticians, biostatisticians, economists and social science researchers will benefit from this book.

Contents:

Preface xi

Acknowledgements xv

1 Basic Ideas and Examples 1

1.1 The statistical problem 1

1.2 The basic idea 3

1.3 Two Examples 4

1.4 A broader theoretical view 6

1.5 Illustration of an alternative approach 8

1.6 An overview of special cases 10

1.7 Principal components 11

1.8 The historical context 12

1.9 Closely related fields in Statistics 17

2 The General Linear Latent Variable Model 19

2.1 Introduction 19

2.2 The model 19

2.3 Some properties of the model 20
3.17 Examples 74
4 Binary Data: Latent Trait Models 83
4.1 Preliminaries 83
4.2 The logit/normal model 84
4.3 The probit/normal model 86
4.4 The equivalence of the response function and underlying variable approaches 88
4.5 Fitting the logit/normal model: the E-M algorithm 90
4.6 Sampling properties of the maximum likelihood estimators 94
4.7 Approximate maximum likelihood estimators 95
4.8 Generalised least squares methods 96
4.9 Goodness of fit 97
4.10 Posterior analysis 100
4.11 Fitting the logit/normal and probit/normal models: Markov Chain Monte Carlo 102
4.12 Divergence of the estimation algorithm 109
4.13 Examples 109
5 Polytomous Data: Latent Trait Models 119
5.1 Introduction 119
5.2 A response function model based on the sufficiency principle 120
5.3 Parameter interpretation 124
5.4 Rotation 124
5.5 Maximum likelihood estimation of the polytomous logit model 125
5.6 An approximation to the likelihood 126
5.7 Binary data as a special case 134
5.8 Ordering of categories 136
5.9 An alternative underlying variable model 144
5.10 Posterior analysis 147
5.11 Further observations 148
5.12 Examples of the analysis of polytomous data using the logit model 149
6 Latent Class Models 157
6.1 Introduction 157
6.2 The latent class model with binary manifest variables 158
6.3 The latent class model for binary data as a latent trait model 159
6.4 Latent Classes within the GLLVM 161
6.5 Maximum likelihood estimation 162
6.6 Standard errors 164
6.7 Posterior analysis of the latent class model with binary manifest variables 166
6.8 Goodness of Fit 167
6.9 Examples for binary Data 167
6.10 Latent class models with unordered polytomous manifest variables 170
6.11 Latent class models with ordered polytomous manifest variables 171
6.12 Maximum likelihood estimation 172
6.13 Examples for unordered polytomous data 174
6.14 Identifiability 178
6.15 Starting values 180
6.16 Latent class models with metrical manifest variables 180
6.17 Models with ordered latent classes 181
6.18 Hybrid models 182
7 Models and Methods for Manifest Variables of Mixed Type 191
7.1 Introduction 191
7.2 Principal results 192
7.3 Other members of the exponential family 193
7.4 Maximum likelihood estimation 195
7.5 Sampling properties and Goodness of Fit 201
7.6 Mixed latent class models 202
7.7 Posterior analysis 203
7.8 Examples 204
7.9 Ordered categorical variables and other generalisations 208
8 Relationships Between Latent Variables 213
8.1 Scope 213
8.2 Correlated latent variables 213
8.3 Procrustes methods 215
8.4 Sources of prior knowledge 215
8.5 Linear structural relations models 216
8.6 The LISREL model 218
8.7 Adequacy of a structural equation model 221
8.8 Structural relationships in a general setting 222
8.9 Generalisations of the LISREL model 223
8.10 Examples of models which are indistinguishable 224
8.11 Implications for analysis 227
9 Related Techniques for Investigating Dependency 229
9.1 Introduction 229
9.2 Principal Components Analysis, (PCA) 229
9.3 An alternative to the normal factor model 236
9.4 Replacing latent variables by linear functions of the manifest variables 238
9.5 Estimation of correlations and regressions between latent variables 240
9.6 Q-Methodology 242
9.7 Concluding reflections of the role of latent variables in statistical modelling 244
References 247
Software appendix 247
References 249
Author Index 265
Subject Index 271

Ordering:  
Order Online - http://www.researchandmarkets.com/reports/2180886/
Order by Fax - using the form below
Order by Post - print the order form below and send to

Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

| Web Address: | http://www.researchandmarkets.com/reports/2180886/ |
| Office Code: | SCD4CYY3 |

Product Format
Please select the product format and quantity you require:

- **Quantity**
  - Hard Copy (Hard Back): [ ]
  - USD 88 + USD 28 Shipping/Handling

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in **BLOCK CAPITALS**

| Title: | Mr [ ] Mrs [ ] Dr [ ] Miss [ ] Ms [ ] Prof [ ] |
| First Name: | __________________________ | Last Name: | __________________________ |
| Email Address: | * | |
| Job Title: | __________________________ |
| Organisation: | __________________________ |
| Address: | __________________________ |
| City: | __________________________ |
| Postal / Zip Code: | __________________________ |
| Country: | __________________________ |
| Phone Number: | __________________________ |
| Fax Number: | __________________________ |

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:
Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:
Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: ________________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:
(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World