### Auswahlbibliographie zur Mehrebenenanalyse

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Comparisons of Software Packages for Generalized Linear Multilevel Models</th>
</tr>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>ZHOU, Xiao H. PERKINS, Anthony J. HUI, Siu L.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
</tr>
<tr>
<td>YEAR</td>
<td>1999</td>
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<tr>
<td>ABSTRACT</td>
<td>Comparison of five software packages that can fit a generalized linear mixed model for data with more than a two-level structure and a multiple number of independent variables. These five packages are MLn, MLwiN, SAS Proc Mixed (Glimmix Macro), HLM, and VARCL. Discussed are features like data input and data management, statistical model capabilities, output, and user friendliness. Compared are their performance on several simulated datasets.</td>
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<td>TERMS</td>
<td>software multi-level models generalized linear model</td>
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<table>
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<tr>
<th>TITLE</th>
<th>A Comparison of Variance Component Tests</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>BRUYNS, Alexander F.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1999</td>
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<tr>
<td>ABSTRACT</td>
<td>Evaluation of four tests for variance components in a balanced design. Included in the comparison are: the generalized likelihood-ratio test, the adjusted likelihood-ratio test, the exact F-test, and the chi-square approximation of the exact F-test. The actual significance value and power of the asymptotic tests are computed by relating the test statistics to the F-distribution. In the light of these considerations a uniform arrangement of the tests is presented.</td>
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<td>TERMS</td>
<td>multi-level models likelihood-ratio tests for goodness-of-fit F-tests F-distribution power</td>
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<table>
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<tr>
<th>TITLE</th>
<th>Ecometrics: Toward a Science of Assessing Ecological Settings with Application to the Systematic Social Observation of Neighborhoods</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>RAUDENBUSH, Stephen W. SAMPSON, Robert J.</td>
</tr>
<tr>
<td>LANGUAGE</td>
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<tr>
<td>YEAR</td>
<td>1999</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>On survey-based and observation-based assessments of social and physical properties of ecological settings. Described are measures constructed from interviews, direct observations and videotapes of Chicago neighborhoods. Presented is a three-level hierarchical model that identifies sources of error in aggregating across items. Convergent and divergent validity are evaluated by studying associations between observational measures and theoretically related measures obtained from the U.S. Census.</td>
</tr>
<tr>
<td>TERMS</td>
<td>ecological research survey research observation multi-level analysis multi-level models convergent validity</td>
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</table>
### An Evaluation of a Typology of Respondents with a Multilevel-Multinomial Logit Model

**TITLE**
An Evaluation of a Typology of Respondents with a Multilevel-Multinomial Logit Model

**AUTHORS**
PICKERY, Jan
LOOSVELDT, Geert

**LANGUAGE**
English

**YEAR**
1999

**IN**
Bulletin de Méthodologie Sociologique, (1999)63 (July), 47-61

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Second part on a typology of survey respondents, based on reports of the interviewers. Evaluated are the respondent's motivation and ability to answer questions. The constructed typology with three types of respondents is validated using a multilevel-multinomial logit model, thus controlling for interviewer bias. Results show significant interviewer effects, which raises doubts about the usefulness of the reports of interviewers to create a typology of respondents.

**TERM**
respondents
typology
validity testing
interviewer effect
multi-level models

### Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling

**TITLE**
Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling

**AUTHORS**
SNIJDERS, Tom A.B.
BOSKER, Roel J.

**LANGUAGE**
English

**PUBLISH**
London: Sage

**YEAR**
1999

**PAGES**
272

**ISBN**
0-7619-5889-4

**REVIEW IN**
From Publicity Material (Sage), 1999

**INDEXED ON**
Indexed on Review

**ABSTRACT**
Introduction to methods and techniques of multilevel analyses. Discussed are topics like: research design, sampling, testing, specification and interpretation of multilevel models. Included is a guide to available software.

**TERM**
multi-level analysis
multi-level models
research design
model testing
software

### Simulation in Sociology

**TITLE**
Simulation in Sociology

**AUTHORS**
HALPIN, Brendan

**LANGUAGE**
English

**YEAR**
1999

**IN**

**SPEC_ISSUE**
Special Issue: Computer Simulation in the Social Sciences

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Review of the role simulation has played in sociology, its current contributions and future potential. First, the history of computer simulation in sociology is briefly described. Next, an overview of existing research is given, considering specific areas such as system dynamics, cellular automata, iterated game theory, distributed artificial intelligence, neural networks, multilevel simulation, simulation of social networks and organizations, and microsimulation. Finally, the prospects for simulation in sociology are discussed.

**TERM**
simulation models
game theory
multi-level models
social network analysis

### An Introduction to Latent Variable Growth Curve Modeling: Concepts, Issues, and Applications

**TITLE**
An Introduction to Latent Variable Growth Curve Modeling: Concepts, Issues, and Applications

**AUTHORS**
DUNCAN, Terry E.
DUNCAN, Susan C.
STRYCKER, Lisa A.

**LANGUAGE**
English

**PUBLISH**
Mahwah (NJ): Erlbaum
Introduction to Latent Variable Growth Curve Modeling (LGM), a statistical method for analyzing repeated measures. The statistical basis for LGM and its various methodological extensions are presented. It includes topics such as accelerated designs, testing interaction effects in LGM, missing data models, multilevel longitudinal approaches and latent variable models of LGM power estimation. With examples using EQS with supplemental notation for AMOS and LISREL structural equations models programs.

Terms
- structural equations models
- repeated measures design
- missing data
- power
- latent variable models

Distribution-Free Estimation of the Random Coefficient Dummy Endogenous Variable Model

Chen, S.N.

Abstract

Describing School Effects with Residual Terms: Modeling the Interaction between School Practice and Student Background

Pituch, Keenan A.

Abstract

Using Group Mean Centering for Computing Adjusted Means by Site in a Randomized Experimental Design: The Case of California's Work Pays Demonstration Project

Lewin, Alisa C.
Mitchell, Michael N.

Abstract

On the problem of pooling data from multiple sites. When analyzing data from a randomized experiment that is replicated across multiple sites and includes covariates, the covariates can adjust for differences from either the grand mean or the group (site) mean. The analysis strategy determines the reference point. Pooling the sites and using a standard analysis of covariance adjusts for differences around the grand mean, whereas analyzing each site separately adjusts for differences around each group (site) mean. It is demonstrated that group mean centering permits pooling data from multiple sites into a single analysis while still using...
the group mean as a reference point for evaluating the covariate.

TERMS
- complex experimental designs
- statistical analysis
- mean
- analysis of covariance
- multi-level models

TITLE
A User's Guide to MLwiN

AUTHORS
GOLDSTEIN, H.
RASBASH, J.
PLEWIS, I.

LANGUAGE
English

PUBLISH
London: Institute of Education

YEAR
1998

INDEXED ON
Indexed on Title

ABSTRACT
- software
- multi-level models

TITLE
Triple-Goal Estimates in Two-Stage Hierarchical Models

AUTHORS
SHEN, W.
LOUIS, T.A.

LANGUAGE
English

YEAR
1998

IN
Journal of the Royal Statistical Society, Series B (Statistical Methodology), 60(1998), 455-471

INDEXED ON
Indexed on Title

ABSTRACT
- estimation
- multi-level models

TITLE
A Hierarchical Linear Model for Estimating Gender-Based Earnings Differentials

AUTHORS
HABERFELD, Yitchak
SEMIONOV, Moshe
ADDI, Audrey

LANGUAGE
English

YEAR
1998

IN
Work and Occupations, 25(1998)1 (Febr.), 97-112

SPEC_ISSUE
Complete abstract available in Sociological Abstracts. Document Delivery: SOCIOLOGY Express. Fax: (415) 259-5058; E-mail: order@ebscodoc.com

INDEXED ON
Sociological Abstracts 1986-1999/03 (Internet Version)

ABSTRACT
- multi-level models
- demographic research

TITLE
A Cross-Domain Model for Growth in Adolescent Alcohol Expectancies

AUTHORS
SAYER, Aline G.
WILLETT, John B.

LANGUAGE
English

YEAR
1998

IN

SPEC_ISSUE
Indexed on Publication

ABSTRACT
Article on cross-domain analysis of inter-individual differences in change. First, the general cross-domain model is reviewed. Specifically, level-1 (within person) growth models that represent individual change over time in two domains are specified and combined into a composite cross-domain model for individual change. A level-2 (between person) model is formulated for inter-individual differences in change that describes average growth in each domain as well as heterogeneity in change across multiple domains. Illustrated is how the level-1 and level-2 models of the individual growth modeling framework map smoothly onto the general LISREL model with mean structures. As an example, an application of the cross-domain model to adolescent alcohol expectancies is described.

TERMS
- individual analysis
TITLE A Multilevel Thresholds of Change Model for Analysis of Stages of Change Data
AUTHORS HEDEKER, Donald MERMELSTEIN, Robin J.
LANGUAGE English
YEAR 1998
INDEXED ON Indexed on Publication
ABSTRACT Presentation of a multilevel logistic regression model with ordinal outcomes, used for analyzing stages of change data. The model is termed the multilevel thresholds of change model and focuses on modeling the K-1 thresholds that delineate membership in the K ordered stages. In addition to the explanatory variables of the model, random effects are included to account for the multilevel structure of the data. A Maximum Marginal Likelihood (MML) solution is described using Gauss-Hermite quadrature to numerically integrate over the distribution of normally-distributed random effects. Included is an example of the application of the model in a skin cancer prevention study.

TITLE Analyzing Measurement Models of Latent Variables through Multilevel Confirmatory Factor Analysis and Hierarchical Linear Modeling Approaches
AUTHORS LI, Fuzhong DUNCAN, Terry E. HARMER, Peter
LANGUAGE English
YEAR 1998
INDEXED ON Indexed on Publication
ABSTRACT Presentation of the utility of multilevel confirmatory factor analysis and hierarchical linear modeling methods in testing measurement models in which the underlying attribute may vary as a function of various levels of observation. An illustrative example using a real dataset is provided in which an unconditional model specification and parameter estimates from both methods are shown. The article demonstrates the comparability of the two methods in estimating measurement parameters of interest.

TITLE Comparisons of Two Statistical Approaches to Study Growth Curves: The Multilevel Model and the Latent Curve Analysis
AUTHORS CHOU, Chih P. BENTLER, Peter M. PENTZ, Mary A.
LANGUAGE English
YEAR 1998
INDEXED ON Indexed on Publication
ABSTRACT Comparison of two statistical approaches for modeling growth across time: the multilevel model and Latent Curve Analysis (LCA). These two approaches were compared in terms of the estimation of growth profiles represented by the parameters of initial status and the rate of growth. A longitudinal data set obtained from a school-based substance-use prevention...
trial for adolescents was used to illustrate the similarities and differences between the two approaches. The results indicated that the two approaches yielded very compatible results. The multilevel model is easier for model specification and is more efficient computationally in yielding results. The LCA approach, however, has the advantage of providing model evaluation, that is, an overall test of goodness-of-fit, and is more flexible in modeling and hypothesis testing.

**TERMS**
- analysis of change
- multi-level models
- structural equations models
- estimation
- model specification
- model testing

**TITLE**
Multilevel Covariance Structure Analysis of Sibling Antisocial Behavior

**AUTHORS**
DUNCAN, Terry E.
ALPERT, Anthony
DUNCAN, Susan C.

**LANGUAGE**
English

**YEAR**
1998

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Presentation of multilevel covariance structure analysis. Conventional covariance structure analysis is often applied to data that are obtained in a hierarchical fashion, such as siblings observed within families. Multivariate modeling of such data, however, is most frequently done as if the data were obtained as a simple random sample from a single population. An alternative specification is presented that explicitly models the within-level and between-level covariance matrices in familial antisocial behavior. Results demonstrate homogeneity in antisocial behavior within sibling clusters but heterogeneity across families. These analyses highlight potential pitfalls of ignoring issues of independence and demonstrate how conventional covariance structure software can be easily adapted to handle hierarchical models, providing a large set of new analysis possibilities for multilevel data.

**TERMS**
- structural equations models
- multi-level models
On the SAS PROC MIXED program for fitting multilevel models, hierarchical linear models, and individual growth models. It is shown how to fit the two most common multilevel models: a) school effects models, designed for data on individuals nested within naturally occurring hierarchies (e.g. students within classes); and, b) individual growth models, designed for exploring longitudinal data (on individuals) over time. Also discussed is how these ideas can be extended straightforwardly to the case of three level models. An appendix presents general strategies for working with multilevel data in SAS and for creating data sets at several levels.

**Terms**
- model testing
- multi-level models
- educational research
- process models
- software

**Title**
Using Hierarchical Linear Modeling to Analyze Grouped Data

**Authors**
NEZLEK, John B.
ZYZNIEWSKI, Linda E.

**Language**
English

**Year**
1998

**In**

**Abstract**
Discussion on how to use hierarchical linear modeling to analyze data collected within groups. Described is how to use this technique to examine group- and individual-level phenomena, including examination of how individual-level relationships vary as a function of group characteristics. A comparison of hierarchical linear modeling with traditional, ordinary-least-squares techniques, and a presentation of how to implement analyses to test specific hypotheses are included. Also discussed are issues such as the impact of different centering options, the analysis of categorical variables, distinctions between random and fixed effects, and balanced and unbalanced designs.

**Terms**
- multi-level models
- group analysis

**Title**
Hierarchical Linear Modeling and the "Unit of Analysis" Problem: A Solution for Analyzing Responses of Intact Group Members

**Authors**
POLLACK, Bonnie N.

**Language**
English

**Year**
1998

**In**

**Abstract**
On the use of Hierarchical Linear Modeling (HLM) in group research. First, HLM techniques are reviewed. Next, its advantages over ordinary least squares regression in modeling cross-level data are discussed. Then, its advantages are demonstrated to group researchers.

**Terms**
- multi-level models
- group analysis

**Title**
Levels of Analysis Issues in Group Psychology: Using Efficacy as an Example of a Multilevel Model

**Authors**
MORITZ, Sandra E.
WATSON, Carl B.

**Language**
English

**Year**
1998

**In**

**Abstract**
Description of the use of multilevel models in group
psychology. First, levels of analysis issues are addressed, that are an inherent part of group research. Next, a number of methods that can be used to analyze multilevel data are presented. The methods fall into three categories: a) assessing the extent of agreement within a single group, b) contrasting within-group and between-groups variance, and c) conducting multiple-level analyses. Finally, recommendations are offered for future multilevel research.

TERMS
- group analysis
- psychological research
- multi-level models
- levels of analysis

TITLE
Methodological Advances in the Study of Group Dynamics

AUTHORS
FORSYTH, Donelson R.

LANGUAGE
English

YEAR
1998

IN

SPEC_ISSUE
Special Issue: Research Methods

INDEXED ON
Indexed on Publication

ABSTRACT
Introduction to a special issue on methodological advances in studying group dynamics. The first three articles of this special issue (Mullen et al. 1998; Marcus, 1998; Conway and Schaller, 1998), address the application of research methods that have been used to study individual-level processes to study groups. Seal et al. (1998) review the use of focus groups, while Reicher and Sani (1998) explore intergroup conflict and communication with case study methods and in-depth descriptions of group members' verbal interactions. The final three articles focus on the levels-of-analysis issue. Moritz and Watson (1998) argue that researchers too often ignore valuable information that can be obtained by considering individuals as nested in groups. Pollack (1998) shows how hierarchical linear modeling can be used to understand the group-level concept collective efficacy. Nezlek and Zyzniewski (1998) provide a general summary of the statistical advantages of new data analytic methods.

TERMS
- group analysis
- individual analysis
- group discussion
- case study
- multi-level models

TITLE
Centering Decisions in Hierarchical Linear Models: Implications for Research in Organizations

AUTHORS
HOFMANN, D.A.

GAVIN, M.B.

LANGUAGE
English

YEAR
1998

IN

INDEXED ON
Indexed on Title

ABSTRACT
multi-level models

TERMS
organizational research

TITLE
MLwiN

AUTHORS
WRIGHT, Daniel B.

LANGUAGE
English

YEAR
1998

IN

INDEXED ON
Indexed on Publication

ABSTRACT
Review of the computer package MLwiN for multilevel modelling. Published by the Multilevel Modelling Project at London's Institute of Education.

TERMS
software
multi-level models

TITLE
Accomodating Nonresponse in Multilevel Panel Analysis with Missing Categorical Data

AUTHORS
ENGEL, Uwe

LANGUAGE
English
Estimating Bootstrap Confidence Intervals for Two-Level Models

MEIJER, Erik
BUSING, Frank M.T.A.
LEEDEN, Rien van der

English

1998


Indexed on Publication

On estimation methods for multi-level models. It is argued that multi-level models are generally estimated using maximum likelihood methods. Confidence intervals are then obtained straightforwardly from the estimates and the information matrix. Frequently, however, data are not normally distributed and sample sizes are not large, in which case the maximum likelihood confidence intervals may not be adequate. Bootstrap confidence intervals may be useful alternatives in these cases. Bootstrap confidence intervals are developed for multi-level models and it is shown in a small simulation study that in some cases the performance of the bootstrap confidence intervals is better than the performance of the intervals.

multi-level models
confidence interval
bootstrap
hypothesis testing
maximum likelihood estimators

The Investigation of Variance Homogeneity in a Simple Multilevel Model Using an Order Statistic Evaluated via a Posterior Predictive P-Value

HOIJTINK, Herbert

English

1998


Indexed on Publication

Evaluation of Bayesian estimation and model testing procedures, when applied to a simple multilevel model. Parameter estimation is based on an application of the Gibbs sampler. The goodness of fit evaluation is focused on the homogeneity of residual variances at level 1 across the units at level 2. A goodness of fit statistic with which this model characteristic can be investigated is proposed. A posterior predictive or Bayesian p-value is used to evaluate this goodness of fit statistic. The proposed methods are illustrated using nine measurement of height obtained over a period of time for 26 boys from Oxford. This study is used to gain some knowledge about the frequency properties of the Bayesian methods used in this paper.

multi-level models
Bayesian methods
estimation
model testing
goodness-of-fit indices
probability density function

TITLE Generalizing the Probability Matrix Decomposition Model: An Example of Bayesian Model Checking and Model Expansion
AUTHORS MEULDERS, Michel
                  GELMAN, Andrew
                  MECHELEN, Iven van
LANGUAGE English
YEAR 1998
INDEXED ON Indexed on Publication
ABSTRACT On probability matrix decomposition models used to explain observed associations between two sets of elements. To estimate the parameters of this model, a sample of the posterior distribution is computed with a data augmentation algorithm. The obtained posterior sample can also be used to assess the fit of the model with the technique of posterior predictive checks. The model is applied to data on psychiatric diagnosis. Focus is on the appropriateness of the prior distribution for a set of latent parameters. Based on the posterior distribution for the values of the parameters corresponding to the observed data, it is concluded that a relatively flat prior distribution is inappropriate. In order to solve this problem, a mixture prior density with two Beta distributed components is used to expand the model in a meaningful way.

TERMS multi-level models
model testing
Bayesian methods
prior distribution
posterior distribution
association
estimation

TITLE Assumptions, Robustness, and Estimation Methods in Multivariate Modeling
EDITORS HOX, Joop J.
                  LEEUW, Edith D. de
LANGUAGE English
PUBLISH Amsterdam: TT-Publikaties
YEAR 1998
PAGES 224
ISBN 90-801073-6-0
INDEXED ON Indexed on Publication

TERMS proceedings
multi-level models
structural equations models
estimation
robust estimator

TITLE Instrumental Variables Methods for the Correlated Random Coefficient Model: Estimating the Average Rate of Return to Schooling when the Return Is Correlated with Schooling
AUTHORS HECKMAN, J.
                  VYTLACIL, E.
LANGUAGE English
YEAR 1998
INDEXED ON Indexed on Title
ABSTRACT -
TERMS multi-level models

TITLE Quantitative Analysis of Survey Data
AUTHORS ORNSTEIN, Michael
<table>
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<tr>
<td>YEAR</td>
<td>1998</td>
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<td>IN</td>
<td>Current Sociology, 46(1998)4 (Oct.), 89-114</td>
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<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>This chapter deals with quantitative analysis of survey data, as part of a trendreport on survey research methods. (In: Current Sociology, 46(1998)4, p. 1-143). First, developments in linear models are discussed: multiple regression, structural equation models, models for longitudinal data, and latent variable models. This is followed by sections on multi-level regression models and models for contingency tables. Also issues of nonresponse and error estimates for complex samples are discussed.</td>
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<tr>
<td>TERMS</td>
<td>nonresponse errors trendreport multivariate analysis linear models multiple regression structural equations models longitudinal research latent variable models multi-level models multivariate contingency analysis</td>
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<tr>
<td>TITLE</td>
<td>Mehrebenenanalyse: Grundlagen und Anwendungen des Hierarchisch Linearen Modells</td>
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<tr>
<td>AUTHORS</td>
<td>DITTON, Hartmut</td>
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<td>TITLE</td>
<td>Fitting Multilevel Models using SAS PROC MIXED</td>
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<td>AUTHORS</td>
<td>SINGER, Judith D.</td>
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<td>LANGUAGE</td>
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<td>YEAR</td>
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<td>IN</td>
<td>Multilevel Modelling Newsletter, 10(1998)2 (Nov.), 5-8</td>
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<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>On the SAS computer program PROC MIXED, for the fitting of multi-level models.</td>
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<tr>
<td>TERMS</td>
<td>software multi-level models model testing</td>
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<td>AUTHORS</td>
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<td>INDEXED ON</td>
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<tr>
<td>ABSTRACT</td>
<td>On the computer program MLwiN, the Windows version of MLn for multilevel modeling.</td>
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<tr>
<td>TERMS</td>
<td>software multi-level models</td>
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<td>TITLE</td>
<td>Einführung in die Mehrebenenanalyse: Grundlagen, Auswertungsverfahren und praktische Beispiele</td>
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<tr>
<td>AUTHORS</td>
<td>ENGEL, Uwe</td>
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<td>LANGUAGE</td>
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<td>PUBLISH</td>
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<td>Indexed on Review</td>
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<tr>
<td>ABSTRACT</td>
<td>Introduction to multi-level analysis. Included are</td>
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hierarchical linear models for continuous variables, models for panel data, multivariate analyses, and hierarchical models for categorical variables. It is also shown how to handle missing data in multi-level analysis.

**TERMS**
- multi-level analysis
- multi-level models
- log-linear models
- multivariate analysis
- missing data

**TITLE**
Not Asked and not Answered: Multiple Imputation for Multiple Surveys

**AUTHORS**
Gelman, Andrew
King, Gary
Liu, Chuanhai

**LANGUAGE**
English

**YEAR**
1998

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Presentation of a Bayesian method for analyzing a series of independent cross-sectional surveys in which some questions are not answered in some surveys and some respondents do not answer some of the questions posed. It involves multiply imputing the missing items and questions by adding to existing methods of imputation designed for single surveys a hierarchical regression model that allows covariates at the individual and survey levels. Information from survey weights is exploited by including in the analysis the variables on which the weights were based, and then reweighting individual responses (observed and imputed) to estimate population quantities. Also developed are diagnostics for checking the fit of the imputation model based on comparing imputed data to nonimputed data. Illustrated with the example of a study on pre-election public opinion polls in which not all the questions of interest are asked in all the surveys, so that it is infeasible to impute within each survey separately. With comments and a rejoinder.

**TERMS**
- imputation
- survey research
- nonresponse
- missing data
- multi-level models
- public opinion research
- probability density function
- Bayesian methods
up a cross-classified model, but replacing (0,1) values for unit membership with weights reflecting probabilities of unit membership in cases where membership is randomly missing. The method is illustrated with reference to longitudinal data on students' progress in English.

**ABSTRACT**

Presentation of Bayesian analysis of hierarchically structured data with random intercept and heterogeneous within-group (Level-1) variance. Inferences about all parameters, including the level-1 variance and intercept for each group, are based on their marginal posterior distributions approximated via the Gibbs sampler. Analysis of artificial data with varying degrees of heterogeneity and varying Level-2 sample sizes illustrates the likely benefits of using a Bayesian approach to model heterogeneity of variance (Bayes/Het). Results are compared to those based on now-standard restricted maximum likelihood with homogeneous Level-1 variance (RML/Hom). Bayes/Het provides sensible interval estimates for Level-1 variances and their heterogeneity, and, relatedly, for each group's intercept. RML/Hom inferences about Level-2 regression coefficients appear robust to heterogeneity, and conditions under which such robustness can be expected are discussed. Application is illustrated in a re-analysis of High School and Beyond data.

**REFERENCES**

Bayesian methods
probability density function
multi-level models

**ABSTRACT**

Exploration of implications for determining sample sizes for surveys with nested data analyzed by hierarchical linear models. Next, the sample design and cost function are described. Then, traditional sample size determination is reviewed from the viewpoint of the survey sampler. In the following section, the analytical results on sample sizes are developed.

**REFERENCES**

multi-level models
sample size

**ABSTRACT**

On models for the analysis of time series data across countries in political research. Instead of pooled cross-sectional time series models, Bayesian hierarchical models are presented as an alternative approach to analyze cross-national variation in time series. Statistical advantages of Bayesian hierarchical models are described and illustrated by means of data from studies on economic growth in OECD countries. These models admit substantial causal
heterogeneity among the economic and political determinants of economic growth.

**TITLE**
Multiniveau modellen voor panel data. Een vergelijking van multiniveau regressie- en structurele modellen met gesimuleerde gegevens

**AUTHORS**
HOX, J.J.

**LANGUAGE**
Dutch

**YEAR**
1998

**INDEXED ON**
Kwantitatieve Methoden, 19(1998)58 (mei), 85-102

**ABSTRACT**
On models for the analysis of panel data. Described and compared are applications of multilevel regression models and latent curve models in panel analyses.

**TERMS**
polynomial models
structural equations models

**TITLE**
Multilevel Modeling: When and Why

**AUTHORS**
HOX, J.

**LANGUAGE**
English

**YEAR**
1998

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
On multi-level model for the analysis of structured or clustered data. Described are the characteristics of the multi-level regression model and the accuracy of parameter estimates using full or restricted maximum likelihood estimation procedures. Recent simulation research is reviewed on the robustness and power of the usual estimation procedures with varying sample sizes.

**TERMS**
multi-level models
validity
maximum likelihood estimators
power
sample size
methodological research

**TITLE**
A Hierarchical Ordinal Probit Model for the Analysis of Life Satisfaction in Italy

**AUTHORS**
RAMPICHINI, Carla
SCHIFINI-D'ANDREA, Silvana

**LANGUAGE**
English

**YEAR**
1998

**IN**
Social Indicators Research, 44(1998)1 (May), 41-69

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
On the individual and contextual determinants of life satisfaction in Italy. Proposed is a variance component model with an ordinal response variable for data with a group structure. The model is applied to Eurobarometer data collected in 1990 and in 1991.

**TERMS**
multi-level models
social indicators

**TITLE**
The Relative Impact of Interviewer Effects and Sample Design Effects on Survey Precision

**AUTHORS**
O’MUIRCHEARTAIGH, Colm
CAMPANELLI, Pamela

**LANGUAGE**
English

**YEAR**
1998

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Discussion of the interviewer as one of the principal sources of error in data collected from structured face-to-face
interviews. The other major component of imprecision in
survey estimates is sampling variance. This paper compares
the relative impact of interviewer effects and sample design
effects on survey precision by making use of an
interpenetrated primary sampling unit-interviewer experiment.
Also the use of a multi-level (hierarchical) approach is
illustrated in which the interviewer and sample design
effects are estimated simultaneously while being incorporated
in a substantive model of interest.

TERMS
interviewer effect
interviewing
design effect
multi-level models

TITLE
Introducing Multilevel Modeling
AUTHORS
KREFT, Ita G.G.
LEEUW, Jan de
LANGUAGE
English
PUBLISH
London: Sage
YEAR
1998
PAGES
160
ISBN
0-7619-5140-7
INDEXED ON
Indexed on Title
ABSTRACT
-

TITLE
Bayesian Statistics: An Introduction
AUTHORS
LEE, P.
LANGUAGE
English
PUBLISH
New York (NY): Wiley
YEAR
1997
PAGES
344
ISBN
0-471-19481-6
REVIEW IN
(Dec.), 1523-1524
INDEXED ON
Indexed on Review
ABSTRACT
Textbook on Bayesian statistical theory. The first seven
chapters focus on Bayesian theory. Chapter 8 introduces
hierarchical models, focusing on normal means and normal
linear models. Chapter 9 considers computational methods for
Bayesian statistics, including the EM algorithm, data
augmentation, the Gibbs sampler, rejection sampling, and the
Metropolis-Hastings algorithm. With exercises.

TERMS
Bayes’ theorem
textbook
multi-level models
EM algorithm
data processing
probability density function

TITLE
Focus on Hierarchical Linear Modeling
EDITORS
VECHHIO, R.P.
LANGUAGE
English
YEAR
1997
IN
Journal of Management, 23(1997)6
SPEC_ISSUE
Special Issue
INDEXED ON
Indexed on Title
ABSTRACT
-

TITLE
Using SAS PROC MIXED to Demystify the Hierarchical Linear
Model
AUTHORS
WANG, J.J.
LANGUAGE
English
YEAR
1997
IN
84-
INDEXED ON
Indexed on Title
ABSTRACT
-

TERMS
multi-level models
software
<table>
<thead>
<tr>
<th>TITLE</th>
<th>Modelling Repeated-Series Longitudinal Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTHORS</td>
<td>HEITJAN, D.F.</td>
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<tr>
<td></td>
<td>SHARMA, D.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
</tr>
<tr>
<td>YEAR</td>
<td>1997</td>
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<tr>
<td>IN</td>
<td>Statistics in Medicine, 16(1997), 347-355</td>
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<td>INDEXED ON</td>
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<td>ABSTRACT</td>
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<td>TERMS</td>
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<td>longitudinal research</td>
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<thead>
<tr>
<th>TITLE</th>
<th>An Overview of the Logic and Rationale of Hierarchical Linear Models</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>HOFMANN, D.A.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
</tr>
<tr>
<td>YEAR</td>
<td>1997</td>
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<td>IN</td>
<td>Journal of Management, 23(1997)6, 723-744</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Title</td>
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<tr>
<td>ABSTRACT</td>
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<td>TERMS</td>
<td>multi-level models</td>
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<table>
<thead>
<tr>
<th>TITLE</th>
<th>Multiniveau modellen voor panel data: Een vergelijking van regressie- en structurele modellen</th>
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</thead>
<tbody>
<tr>
<td>AUTHORS</td>
<td>Hox, J.J.</td>
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<td></td>
<td>ROELEVELD, J.</td>
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<tr>
<td>LANGUAGE</td>
<td>Dutch</td>
</tr>
<tr>
<td>PUBLISH</td>
<td>Amsterdam: Universiteit van Amsterdam, SCO-Kohnstamm Institutu</td>
</tr>
<tr>
<td>YEAR</td>
<td>1997</td>
</tr>
<tr>
<td>PAGES</td>
<td>30</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>On the analysis of panel data by means of multi-level models. Described and compared are the results of the multi-level regression model and the latent curve model, applied to educational research data. Also considered are estimation procedures and the impact of missing data on both models.</td>
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<tr>
<td>TERMS</td>
<td>multi-level models</td>
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<td></td>
<td>panel study</td>
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<td></td>
<td>regression analysis</td>
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<td>structural equations models</td>
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<td>educational research</td>
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<td></td>
<td>estimation</td>
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<td></td>
<td>missing data</td>
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</tbody>
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<tr>
<th>TITLE</th>
<th>On Two Stage Least Squares Estimation of the Average Treatment Effect in a Random Coefficient Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTHORS</td>
<td>WOOLDRIDGE, J.M.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1997</td>
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<td>IN</td>
<td>Economics Letters, 56(1997)2 (Oct. 17), 129-134</td>
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<td>INDEXED ON</td>
<td>Indexed on Title</td>
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<tr>
<td>ABSTRACT</td>
<td>-</td>
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<tr>
<td>TERMS</td>
<td>least-squares estimators</td>
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<td>multi-level models</td>
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<tr>
<th>TITLE</th>
<th>Multilevel Models for Multiple Category Responses: A Simulation</th>
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<tr>
<td>AUTHORS</td>
<td>YANG, Min</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1997</td>
</tr>
<tr>
<td>IN</td>
<td>Multilevel Modelling Newsletter, 9(1997)1 (June), 9-15</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>Report of a brief simulation study carried out to examine the estimates given by the program MLn on both unordered and ordered multilevel multinomial models. It is found that implemented by MLn macros the non-linear approximation procedure for multilevel binary responses performs satisfactorily for multilevel multiple categorical responses.</td>
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<td>TERMS</td>
<td>multi-level models</td>
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<td>software</td>
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<tr>
<th>TITLE</th>
<th>Terminology and Definition in Multilevel Models Analysis</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>PLEWIS, Ian</td>
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</table>


Note aimed at initiating a discussion on terminology and definition in multi-level models analysis. A list of terms used in this area of applied statistics is set out. It consists of two main sections: (A) vocabulary, and (B) modelling. Section A has three sub-sections: structures, models and heterogeneity. Section B consists of the subsections model specification, estimation method, and software.

**TERMS**
- multi-level models
- estimation
- software

**TITLE**
An Application of Hierarchical Linear Models to Meta-Analysis in Nursing Research

**AUTHORS**
WU, Y.W.B.

**LANGUAGE**
English

**YEAR**
1997

**IN**

**INDEXED ON**
Indexed on Title

**ABSTRACT**
Exploration of methods for the analysis of multivariate changes in relationships between different variables. It is shown how the multi-level modeling framework, often used to study univariate change, can be extended to the multivariate case. Also considered are extensions of latent curve models to multivariate data. Finally, the relationships between multi-level models and latent curve models, applied to multivariate changes, are described.

**TERMS**
- analysis of change
- multi-level models

**TITLE**
Hierarchical Models for Repeated Measurements

**AUTHORS**
LEEDEN, Rien van der

**LANGUAGE**
English

**YEAR**
1997

**IN**
Kwantitatieve Methoden, 18(1997)56 (okt.), 21-39

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Overview of the multilevel analysis approach to repeated measures data. A simple application to growth curves is provided as an illustration. It is argued that multilevel analysis of repeated measures data is a powerful and attractive approach for several reasons, such as flexibility, and the emphasis on individual development.

**TERMS**
- multi-level models
- repeated measures design

**TITLE**
A Model for Triadic Relations

**AUTHORS**
BOND, Charles F.
HORN, Elizabeth M.
KENNY, David A.

**LANGUAGE**
English

**YEAR**
1997

**IN**
Psychological Methods, 2(1997)1 (March), 79-94

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Development of a triadic relations model based on Kenny's (1994) model for two-person social phenomena. First, Kenny's dyadic model is reviewed. Then, a univariate version of this
model and its application to perceptions of attraction among 72 college-student acquaintances are described. The model can estimate 7 variances and 16 covariances from a round-robin of third-person interactions. Also considered is a bivariate version of the model that can interrelate these third-person perceptions to actual levels of attraction. Some potential applications of the model, some alternative methods, and some assumptions of the current method are discussed.

**TITLE**
Extra-Binomial Variation in Multilevel Logistic Models with Sparse Structures

**AUTHORS**
WRIGHT, Daniel B.

**LANGUAGE**
English

**YEAR**
1997

**IN**
British Journal of Mathematical and Statistical Psychology, 50(1997)1 (May), 21-29

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Exploration of the impact of sparsity on estimates of binomial variation, using simulation techniques. This exploration demonstrates that sparsity leads to extra-binomial variation. The results are discussed in relation to recent data on eyewitness line-ups, an example with a sparse data structure.

**TERMS**
multi-level models
logistic regression
binomial distribution

**TITLE**
Metagraphs in Hierarchical Modeling

**AUTHORS**
BASU, A.
BLANING, R.W.
SHTUB, A.

**LANGUAGE**
English

**YEAR**
1997

**IN**
Management Science, 43(1997)5 (May), 623-639

**INDEXED ON**
Indexed on Title

**ABSTRACT**
- 

**TERMS**
multi-level models
types of graphs

**TITLE**
The Neighborhood History Calendar: A Data Collection Method Designed for Dynamic Multilevel Modeling

**AUTHORS**
AXINN, William G.
BARBER, Jennifer S.
GHIMIRE, Dirgha J.

**LANGUAGE**
English

**YEAR**
1997

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Presentation of a new data collection method, called the Neighborhood History Calendar, designed to collect event histories of community-level changes over time. The need for and the uses of this method are discussed. Issues related to the design of instruments, collection of data, and data entry are described. Detailed examples from an application of this method to the study of marriage, contraception, and fertility in rural Nepal are provided. The paper addresses applications of this same technique to other settings and research problems. The technique is also extended to collection of other forms of contextual-history data, including school histories and health service histories. Finally, it is discussed how Geographic Information System (GIS) technology can be used to link together multiple sources of contextual-history data.

**TERMS**
event history analysis
community study
multilevel models

group interview
survey data archives

TITLE         Hierarchical Poisson Regression Modeling
AUTHORS       CHRISTIANSEN, Cindy L.
              MORRIS, Carl N.
LANGUAGE      English
YEAR          1997
              (June), 618-632
INDEXED ON    Indexed on Publication

ABSTRACT      Proposal of a new approach for Poisson data analysis, Poisson
Regression Interactive Multilevel Modeling (PRIMM), which
features nonexchangeable gamma distributions for individual
parameters, with standard deviations proportional to means. A
relatively uninformative prior distribution for the shrinkage
values eliminates the ill behavior of maximum likelihood
estimators of the variance components. When tested in
simulation studies, the resulting procedure provides better
coverage probabilities and smaller risk than several other
published rules, and thus works well from Bayesian and
frequentist perspectives alike. The computations provide
fast, accurate density approximations to individual
parameters and to structural regression coefficients. The
computer program is publicly available through Statlib.

TERMS         Poisson process models
              multi-level models
              maximum likelihood estimators
              Bayesian methods
              gamma distribution

TITLE         A Nested Frailty Model for Survival Data, with an Application
to the Study of Child Survival in Northeast Brazil
AUTHORS       SASTRY, Narayan
LANGUAGE      English
YEAR          1997
              (June), 426-435
INDEXED ON    Indexed on Publication

ABSTRACT      Presentation of a multivariate hazard model for survival data
that are clustered at two hierarchical levels. The model
provides corrected parameter estimates and standard errors,
as well as estimates of the intragroup correlation at both
levels. The model is estimated using the
expectation-maximization (EM) algorithm. The model is applied
to an analysis of the covariates of child survival using
survey data from northeast Brazil collected via a
hierarchically clustered sampling scheme.

TERMS         hazard rate models
              EM algorithm

TITLE         Regressionsanalyse mit Panel-Daten: Eine Einführung
AUTHORS       ALECKE, Björn
LANGUAGE      German
YEAR          1997
IN            ZA-Information, (1997)40 (Mai), 87-121
INDEXED ON    Indexed on Publication

ABSTRACT      Introduction to existing methods for the investigation of
panel data by means of regression analysis. As models with
constant parameter vectors are mentioned the classical
pooling model and the Kmenta model. In the part on models
with variable regressions are considered the least-squares
dummy variable model and the error components model.

TERMS         panel analysis
              regression analysis

TITLE         Random Effects Models for Count Data
AUTHORS       LEE, Hyun S.
LANGUAGE      English
YEAR          1997
| INDEXED ON                                   | Indexed on Publication                                                      |
| ABSTRACT                                    | On random effects models for count data obtained in a cross or nested classification. The main feature of the proposed models is the use of the additive effects on the original scale in contrast to the commonly used log scale. The rationale behind this approach is given. The estimation of variance components is based on the usual mean square approach. Directly analogous results to those from the analysis of variance models for continuous data are obtained. The usual Poisson dispersion test procedure can be used not only to test for no overall random effects but also to assess the adequacy of the model. Individual variance components can be tested by using the usual F-test. To get a reliable estimate, a large number of factor levels seem to be required. |
| TERMS                                        | random effects model, multi-level models, tests of dispersion, F-tests       |
| TITLE                                        | Moving between Hierarchical Modeling Notations                               |
| AUTHORS                                      | FERRON, John                                                                |
| LANGUAGE                                     | English                                                                    |
| YEAR                                         | 1997                                                                       |
| IN                                           | Journal of Educational and Behavioral Statistics, 22(1997)1 (Spring), 119-123 |
| INDEXED ON                                   | Indexed on Publication                                                      |
| ABSTRACT                                    | On multiple notational representations of hierarchical models. Illustrated is the relationship between hierarchical linear model notation and mixed model notation. |
| TERMS                                        | multi-level models                                                          |
| TITLE                                        | Hierarchical Linear Models for Multivariate Outcomes                       |
| AUTHORS                                      | THUM, Y.M.                                                                  |
| LANGUAGE                                     | English                                                                    |
| YEAR                                         | 1997                                                                       |
| IN                                           | Journal of Educational and Behavioral Statistics, 22(1997)1 (Spring), 77-108 |
| INDEXED ON                                   | Indexed on Publication                                                      |
| ABSTRACT                                    | Development of a class of two-stage models for multiple continuous outcomes: multivariate hierarchical linear models. The stage-one model is a multivariate analysis-of-covariance model for exploring the controlling factors of individual performance. In the stage-two model, individual differences in performance are described by multivariate normal or multivariate t prior distributions. Maximum likelihood estimates are obtained for various members of the multivariate hierarchical linear model. |
| TERMS                                        | multi-level models, multivariate analysis of covariance, maximum likelihood estimators |
| TITLE                                        | Multilevel Item Response Models: An Approach to Errors in Variables Regression |
| AUTHORS                                      | ADAMS, Raymond J., WILSON, Mark, WU, Margaret                               |
| LANGUAGE                                     | English                                                                    |
| YEAR                                         | 1997                                                                       |
| IN                                           | Journal of Educational and Behavioral Statistics, 22(1997)1 (Spring), 47-76 |
| INDEXED ON                                   | Indexed on Publication                                                      |
| ABSTRACT                                    | Presentation of a multilevel perspective on item response modeling, useful in case of latent variables as outcomes in regression analyses. Under a hierarchical perspective, the item response model is casted as a within-student model and the student population distribution as a between-student model. In the two-level case the model employed is formally equivalent to the plausible value procedures used as part of the National Assessment of Educational Progress (NAEP), but the method presented here is developed for a different class |
of measurement models. A simultaneous estimation method is used instead of two-step estimation. The suitability of some approximate procedures used in NAEP is tested too.

**TERMS**
- multi-level models
- item response theory models
- regression analysis
- latent variable models
- estimation
- measurement errors

**TITLE**
Struktureinflüsse in diachroner Perspektive: Eine Mehrebenenanalyse des Arbeitslosigkeitseffektes auf die Beurteilung des regionalen Lebensstandards

**AUTHORS**
ENGEL, Uwe

**LANGUAGE**
German

**YEAR**
1997

**IN**

**ABSTRACT**
On the correct measurement of structural effects in social research. Described are reasons to apply a multi-level approach to research on the effects of unemployment on the regional standard of living. Illustrated to data from the German "Socio-Economic Panel Study".

**TERMS**
- multi-level analysis
- fallacy of wrong level
- panel analysis
- multi-level models

**TITLE**
Combining the Longitudinal Model and the Hierarchical Cross-Sectional Model from the Multilevel Perspective

**AUTHORS**
EEDEN, Pieter van den

**LANGUAGE**
English

**YEAR**
1997

**IN**

**ABSTRACT**
Presentation of a general multi-level model for longitudinal cross-sectional designs. Into the multi-level longitudinal model, cross-classification is brought by adding two types of units that are located on a same level. It is shown in terms of linear equations how the crossed random effects model can be applied to a three-level nesting structure of data, where the longitudinal model refers to the two lowest levels. Illustrated to Dutch educational research data on school effects and cohort effects on students' school careers.

**TERMS**
- multi-level models
- complex experimental designs
- process models
- educational research
- structural equations models

**TITLE**
Ein Mehrebenenmodell in der Personalfunktion

**AUTHORS**
BETZIN, Jörg

**LANGUAGE**
German

**YEAR**
1997

**IN**

**ABSTRACT**
Presentation of a multi-level model with categorical data. Described and illustrated are the features of path modeling with the partial least-squares algorithm for hierarchical multi-level data. Also considered is the application of correspondence analysis to interpret categorical data in path models, used in personal management research.

**TERMS**
- multi-level models
- organizational research
A Structural Model for Doubly Hierarchical Structures

Hox, Joop J.

English

1997

Hierarchische und dynamische Modellierung: Grundlagen und Anwendungen komplexer Strukturgleichungsmodelle/

Description of a structural equations model for multilevel data when there are two different hierarchies present. An example is family data where one hierarchy is formed by the children nested within the families, and the second by the parents nested within the same families. The model used is an extension of the multilevel model discussed in the literature, where the within groups and between groups covariance matrix are simultaneously analyzed using the multigroup option of the conventional software for structural equations models. It is shown how at the family level the between groups matrices for the children and the parents can be linked and analyzed, using a model with two separate within groups models for the children and their parents.

The Multidimensional Random Coefficients Multinomial Logit Model

Adams, Raymond J.
Wilson, Mark
Wang, Wen Ch.

English

1997

Applied Psychological Measurement, 21(1997)1 (March), 1-23

Presentation of a multidimensional Rasch-type item response model, the multidimensional random coefficients multinomial logit model. The model is developed in a form that permits generalization to the multidimensional case of a wide class of Rasch models, including the simple logistic model, masters' partial credit model, Wilson's ordered partition model, and Fischer's linear logistic model. Moreover, the model includes several existing multidimensional models as special cases, including Whately's multicomponent latent trait model, Andersen's multidimensional Rasch model for repeated testing, and Embretson's multidimensional Rasch model for learning and change. Marginal maximum likelihood estimators for the model are derived and the estimation is examined using a simulation study. Implications and applications of the model are discussed and an example is given.

A Didactic Example of Multilevel Structural Equation Modeling Applicable to the Study of Organizations

Kaplan, David
Elliott, Pamela R.

English

1997


Marginal maximum likelihood estimators for the model are derived and the estimation is examined using a simulation study. Implications and applications of the model are discussed and an example is given.
Presentation of a didactic example and application of new developments in structural equation modeling (SEM) that allow for the modeling of multilevel data. First an overview of the basic ideas of SEM and multilevel linear regression is given. The synthesis of both methods developed by Muthén (1994) is then presented in the simple case of a multilevel path analysis model, in which the variations in within-group level intercepts are modeled as a function of between-group variables following their own path model. An application motivated by a real problem in the field of education that focuses on validating indicators of the quality of science education in the United States follows. The results show that it is possible to statistically capture the salient complexities of organizations through the application of multilevel SEM. The article concludes with a discussion of the utility of multilevel SEM for organizational studies.
Hierarchical Generalized Linear Models

Multilevel Analysis Applications with Specialised Software

The Effects of Interviewer and Respondent Characteristics on Answer Behaviour in Survey Research: A Multilevel Approach

Primacy of Multilevel Analysis with Respect to Hierarchically Organized Data
empirical example.

TITLE Errors in Variables in Multilevel Models
AUTHORS WOODHOUSE, G.
LANGUAGE English
PUBLISH London: Institute of Education
YEAR 1996
INDEXED ON Indexed on Title
ABSTRACT Examination of a negative multinomial regression model for clustered count data. The potential problem for clustered count data is that the multiple counts in the same cluster may not be independent. When they are not independent, Poisson and mixed Poisson models for overdispersed count data including negative binomial models are inappropriate. In contrast, the negative multinomial regression model makes explicit allowance for correlated observations by subjecting the multiple counts in the same cluster to a cluster-specific random effect. A gamma-distributed cluster-specific effect in this formulation leads to the negative multinomial regression model. Maximum likelihood estimation is described and the model is illustrated through examples.

TITLE Objective Measurement: Theory into Practice. Volume 3
EDITORS ENGELHARD, George WILSON, Mark
LANGUAGE English
PUBLISH Norwood (NJ): Ablex
YEAR 1996
REVIEW IN Journal of Educational Measurement, 35(1998)1 (Spring), 82-88
INDEXED ON Indexed on Review
ABSTRACT Collection of papers from the Seventh International Objectives Measurement Workshop, held at Emory University in 1995 on the Rasch measurement model. With parts on: the many-faceted Rasch model, the random coefficients multinomial logits model, and measurement theory.

TITLE Quantile Estimation from Repeated Measurements
AUTHORS OLSSON, J. ROOTZÉN, H.
LANGUAGE English
YEAR 1996
INDEXED ON Indexed on Publication
ABSTRACT Presentation of quantile estimators for a nonparametric components of variance situation, and their consistency and
asymptotic normality. Situations with different numbers of measurements for different subjects are considered. Measurements on separate subjects are assumed to be independent, whereas measurements on the same subject have a fixed dependence. The estimators are obtained by inverting weighted empirical distribution functions. An "optimal" estimator and a simple estimator based on within-subject averages are studied. Small-sample properties are studied by simulation.

**Terms**
- quantiles
- estimator
- repeated measures design
- multi-level models
- nonparametric methods
- properties of estimators

**Title**
The Effect of Improper Priors on Gibbs Sampling in Hierarchical Linear Mixed Models

**Authors**
HOBERT, James P.
CASELLA, George

**Language**
English

**Year**
1996

**In**

**Abstract**
Description of hierarchical linear mixed models with improper priors and their effect on Gibbs sampling. A theorem is given that classifies improper priors according to the propriety of the resulting posteriors. Applications concerning Bayesian analysis of animal breeding data and the location of maxima of unwieldy (restricted) likelihood functions are discussed. Gibbs sampling with improper posteriors is then considered in more generality. The concept of functional compatibility of conditional densities is introduced and is used to construct an invariant measure for a class of Markov chains.

**Terms**
- multi-level models
- prior distribution
- probability density function
- Bayesian methods
- Markov chain
- posterior distribution

**Title**
The Design and Analysis of Social-Interaction Research

**Authors**
KENNY, David A.

**Language**
English

**Year**
1996

**In**
Annual Review of Psychology, 47(1996), 59-86

**Abstract**
Complete abstract available in Sociological Abstracts. Document Delivery: SOCIOLOGY Express. Fax: (415) 259-5058; E-mail: order@ebscodoc.com

**Terms**
- psychological research
- multi-level models
- research design

**Title**
Review of HLM4 for Windows

**Authors**
JONES, Kelvyn

**Language**
English

**Year**
1996

**In**
Multilevel Modelling Newsletter, 8(1996)2 (Dec.), 3-6

**Abstract**
-

**Terms**
- multi-level analysis
- software
- multi-level models
On the analysis of correlated responses repeatedly taken from the same sample of individuals. The unknown covariances among these responses present a problem for statistical inference to parameters of the population from which the samples are drawn. Discussed is this problem for saturated mean response models, i.e. models in which parameters and mean responses are equal in number. In these models the unknown covariances among repeated measures, which are nuisance parameters, are shown to cancel out. This cancellation provides exact tests and estimates for parameters within and between groups by means of Wishart distribution theory. These tests and estimates are illustrated for three different types of repeated measures, each involving a saturated mean response model. The unknown covariances in saturated models are also discussed in relation to the structured covariances in random coefficient models.

**Terms**
- repeated measures design
- hypothesis testing
- estimation
- saturated model
- multi-level models

**Title**
Analysis of Longitudinal Data Using the Hierarchical Linear Model

**Authors**
SNIJDERS, Tom

**Language**
English

**Year**
1996

**In**
Quality & Quantity, 30(1996)4 (Nov.), 405-426

**Abstract**
Presentation of the hierarchical linear model (multi-level model), a linear model with nested random coefficients, for the analysis of longitudinal data, i.e., repeated data on the same subjects. An important advantage of this approach is that differences across subjects in the numbers and spacings of measurement occasions do not present a problem, and that changing covariates can easily be handled.

**Terms**
- multi-level models
- longitudinal research
- repeated measures design

**Title**
Multilevel Analysis of the Changing Relationship between Class and Party in Britain 1964-1992

**Authors**
HEATH, A.
YANG, M.
GOLDSTEIN, H.

**Language**
English

**Year**
1996

**In**
Quality & Quantity, 30(1996)4 (Nov.), 389-404

**Abstract**
Study on the effects of the clustering of samples in the British Election Surveys. To investigate the change in the relationship between class and party in Britain, multi-level models are used to analyse the data and the effects of clustering. Results are compared with those obtained by single-level logistic models. It is shown that multi-level models can take account of the differences in the number of sample points in the different British Election Surveys. Multi-level models can also test for the substantive effects of cluster membership on vote.

**Terms**
- cluster sampling
- political research
- multi-level models

**Title**
Bayesian Analysis in Applications of Hierarchical Models: Issues and Methods

**Authors**
SELTZER, Michael H.
WONG, Wing H.
BRYK, Anthony S.

**Language**
English

**Year**
1996
On full generalization of the Gibbs sampling algorithms presented in Seltzer (1993) to a broad range of settings in which vectors of random regression parameters in hierarchical models are assumed multivariate normally or multivariate t distributed across groups. Through analyses of the data from an innovative mathematics curriculum, it is examined when and why it becomes important to employ a fully Bayesian approach. Also, the need to study the sensitivity of results to alternative prior distributional assumptions for the variance components and for the random regression parameters is discussed.

TERMS
probability density function
multi-level models
Bayesian methods
sensitivity analysis

TITLE
Round-Robin Analysis of Social Interaction: Exact and Estimated Standard Errors

AUTHORS
BOND, Charles F.
LASHLEY, Brian R.

LANGUAGE
English

YEAR
1996

IN
Psychometrika, 61(1996)2 (June), 303-311

ABSTRACT
Presentation of a matrix formulation of the Social Relations model, a variance-components model for dyadic social interaction. This model estimates variances and covariances from a round-robin of two-person interactions. The proposed matrix formulation is used to derive exact and estimated standard errors for round-robin estimates of Social Relations parameters.

TERMS
multi-level models
pair analysis
standard error

TITLE
Statistical Methods for Understanding Cognitive Growth: A Review, a Synthesis and an Application

AUTHORS
PLEWIS, Ian

LANGUAGE
English

YEAR
1996

IN
British Journal of Mathematical and Statistical Psychology, 49(1996)1 (May), 25-42

ABSTRACT
Review of methods for analysing data on cognitive growth, with emphasis on scales which inevitably change over age. Multilevel growth curve and regression models are contrasted. A hybrid model is proposed which shares some of the advantages of these two approaches. The models are applied to a set of longitudinal data on mathematics growth from London primary school pupils. It is found that conclusions about relative growth vary according to the scale adopted. Implications for the design and analysis of growth studies in psychology and education are discussed.

TERMS
process models
multi-level models
regression analysis
longitudinal research
psychological research
educational research

TITLE
Improved Approximations for Multilevel Models with Binary Responses

AUTHORS
GOLDSTEIN, Harvey
RASBASH, Jon

LANGUAGE
English

YEAR
1996

IN

ABSTRACT
Discussion of the use of improved approximations for the
estimation of generalized linear multilevel models where the response is a proportion. Simulation studies by Rodriguez and Goldman (1995) have shown that in extreme situations large biases can occur, most notably when the response in binary, the number of level 1 units per 2 unit is small and the underlying random parameter values are large. An improved approximation is introduced which largely eliminates the biases in the situation described by Rodriguez and Goldman.

**TERMS**
- multi-level models
- dummy variables
- generalized linear model
- pseudo-likelihood estimators
- bias

**TITLE**
- Mehrebenenanalyse von Strukturgleichungsmodellen

**AUTHORS**
- HOX, Joop J.

**LANGUAGE**
- German

**YEAR**
- 1996

**IN**

**INDEXED ON**
- Indexed on Publication

**ABSTRACT**
On the application of structural equations models in multi-level analysis. Described are decomposition models for observed individual data, with a distinction between individual and group components. Also considered is a simplification of the hierarchical model. Examples are provided of hierarchical factor analysis and hierarchical path analysis. Recommended is the use of simplified quasi-likelihood estimation for the analysis of hierarchical structural equations models.

**TERMS**
- structural equations models
- multi-level analysis
- multi-level models
- maximum likelihood estimators

---

**TITLE**
- Evaluating the Structural Validity of Measures of Hierarchical Models: An Illustrative Example Using the Social Problem-Solving Inventory

**AUTHORS**
- CHRISTIANSEN, Neil D.
- LOVEJOY, M.Ch.
- SZYMANSKI, Jeff

**LANGUAGE**
- English

**YEAR**
- 1996

**IN**

**INDEXED ON**
- Indexed on Publication

**ABSTRACT**
On the development of alternative methodology for evaluating the structural validity of hierarchical measures that may be used to complement traditional approaches. The approach outlined here employs Hierarchical Confirmatory Factor Analysis (HCFA) and nested model comparisons to investigate the multidimensional and multi-level structure of a measure. The results suggest that the modest fit of the measurement model under study reported in past research is principally the result of the inclusion of psychometrically poor items rather than a problem with the conceptual model itself. Implications are discussed as related to the organization of social problem-solving dimensions and strategies for evaluating structural validity.

**TERMS**
- multi-level models
- structural validity
- confirmatory factor analysis

---

**TITLE**
- Robustness of Tests for Error Components Models to Nonnormality

**AUTHORS**
- BLANCHARD, P.
- MATYAS, L.

**LANGUAGE**
- English

**YEAR**
- 1996

**IN**
- Economics Letters, 51(1996)2 (May), 162-168

**INDEXED ON**
- Indexed on Title
ABSTRACT

TERMS

multi-level models
robustness of tests

TITLE

Multilevel Modelling in School Effectiveness Research

AUTHORS

HILL, P.W.
ROWE, K.J.

LANGUAGE

English

YEAR

1996

IN

School Effectiveness and School Improvement, 7(1996)1 (March), 1-34

INDEXED ON

Indexed on Title

ABSTRACT

- educational research
multi-level models

TITLE

Integrating Single-Case and Group-Comparison Designs for Evaluation Research

AUTHORS

NUGENT, William R.

LANGUAGE

English

YEAR

1996

IN


INDEXED ON

Indexed on Publication

ABSTRACT

Description of the integration of single-case design and group-comparison methods for evaluation research, to address limitations inherent in each methodology. First, the use of Hierarchical Linear Models (HLM) for analyzing aggregated single-case design data is described. Next, two examples of research that combine single-case and group-comparison methods are presented, with reanalyses of data from these studies conducted using HLM procedures. One reanalysis produces results contradicting those obtained by the original researchers. The advantages and disadvantages of using such integrated approaches are then discussed.

TERMS

case study
complex experimental designs
evaluation research
multi-level models

TITLE

Multilevel Models from a Multiple Group Structural Equation Perspective

AUTHORS

McARDLE, J.J.
HAMAGAMI, F.

LANGUAGE

English

YEAR

1996

IN


INDEXED ON

Indexed on Title

ABSTRACT

- structural equations models

TITLE

Structural Analysis in the Study of Social Change

AUTHORS

ENGEL, Uwe
MEYER, Wolfgang

LANGUAGE

English

YEAR

1996

IN


INDEXED ON

Indexed on Publication

ABSTRACT

On the use of hierarchical growth curve modeling to estimate the influence of society's social structure by means of multi-level change analysis. This approach is applied to data from a modified crossed-lagged panel design. Also discussed is a model-based two-step imputation procedure to handle nonrandomly missing panel data. The log-linear model using the EM algorithm and simulation of the posterior probability distribution and the imputation for missing values are used to handle panel mortality in a study on the...
conflict-preventing function of social structure.

**METHODS**

- Structural system analysis
- Panel analysis
- Multi-level models
- Log-linear models
- Maximum likelihood estimators
- Missing data
- Panel mortality
- Imputation
- EM algorithm

**ABSTRACT**

On multi-level analysis of panel data. Described are techniques for specifying and estimating the parameters of multi-level models fitted to repeated measurements, using ML software. At first, parameter estimation of two-level growth curve models is discussed and illustrated, using the iterative generalized least-squares method. Then three-level models (like the variance component model), and multi-level time series models (like the discrete-time first order autoregressive model and its continuous-time analogue), are considered and applied to the analysis of longitudinal data.

**ABSTRACT**

Study on the effects of both interviewer and respondent ethnicity and gender on survey response quality. A hierarchical regression model is applied to analyze the simultaneous effects of Hispanic and Anglo interviewer and respondent ethnicity and gender. Although few significant main effects were found, response quality was affected significantly by interaction effects of respondent and interviewer ethnicity and gender. For the most part, ethnically homophilous and gender-heterophilous interviews generate the highest response quality. Both Hispanic and Anglo respondents deferred to an interviewer of a different ethnic background when queried about the interviewer’s culture, but not when asked noncultural, albeit sensitive, questions.

**ABSTRACT**

Study on advanced structural equation modeling: Issues and Techniques. The editors are MARCOULIDES, George A. and SCHUMACKER, Randall E.

**ABSTRACT**

Study on the effects of both interviewer and respondent ethnicity and gender on survey response quality. A hierarchical regression model is applied to analyze the simultaneous effects of Hispanic and Anglo interviewer and respondent ethnicity and gender. Although few significant main effects were found, response quality was affected significantly by interaction effects of respondent and interviewer ethnicity and gender. For the most part, ethnically homophilous and gender-heterophilous interviews generate the highest response quality. Both Hispanic and Anglo respondents deferred to an interviewer of a different ethnic background when queried about the interviewer’s culture, but not when asked noncultural, albeit sensitive, questions.
ABSTRACT
Textbook on advanced structural equation modeling techniques, at graduate level. Issues included: models for multitrait-multimethod matrix analysis, nonlinear structural equation models, multilevel models, process models, time series models, bootstrapping techniques, incomplete data, inference problems, and incremental fit indices.

TITLE
An Application of Hierarchical Linear Models to Longitudinal Studies

AUTHORS
WU, Y.W.B.

LANGUAGE
English

YEAR
1996

IN
Research in Nursing & Health, 19(1996)1 (Febr.), 75-82

INDEXED ON
Indexed on Title

TERMS
multi-level models
longitudinal research

TITLE
Why Choose One Level of Analysis? And Other Issues in Multilevel Research

AUTHORS
LEVINE, Douglas W.

LANGUAGE
English

YEAR
1996

IN
Environment and Behavior, 28(1996)2 (March), 237-255

INDEXED ON
Indexed on Title

TERMS
multi-level models

TITLE
Papers and Publications of the Department of Statistical Methods, January-December 1995

EDITORS
OLGERS, Aranka

LANGUAGE
English

PUBLISH
Voorburg: Central Bureau of Statistics (C.B.S.)

YEAR
1996

PAGES
44

SERIALS
Research Paper, No. 9604

INDEXED ON
Indexed on Publication

ABSTRACT
Abstracts of papers and articles published by the staff of the Department of Statistical Methods of Statistics Netherlands in 1995. Discussed are: statistical disclosure control, random coefficient models, field experiments, survey research and computer programs. Also considered are: methodological research, informed consent, missing data, data collection, editing, model testing criteria, the structure of a questionnaire, and data processing.

TERMS
software
methodological research
public records
informed consent
research ethics
multi-level models
missing data
field experiment
data collection
survey research
data processing
structure of questionnaire
model testing criteria
editing

TITLE
Bootstrap Methods for Two-Level Models

AUTHORS
LEEDELIEN, R. van der
<table>
<thead>
<tr>
<th>Title</th>
<th>Applied Multilevel Modeling</th>
</tr>
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<tbody>
<tr>
<td>Authors</td>
<td>Hox, J.J.</td>
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<tr>
<td>Language</td>
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<tr>
<td>Publish</td>
<td>Amsterdam: TT-Publikaties</td>
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<td>Year</td>
<td>1995</td>
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<td>Terms</td>
<td>multi-level models</td>
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<table>
<thead>
<tr>
<th>Title</th>
<th>An Assessment of Estimation Procedures for Multilevel Models with Binary Responses</th>
</tr>
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<tbody>
<tr>
<td>Authors</td>
<td>Rodriguez, G. Goldman, N.</td>
</tr>
<tr>
<td>Language</td>
<td>English</td>
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<tr>
<td>Year</td>
<td>1995</td>
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<td>Terms</td>
<td>estimation, multi-level models</td>
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<table>
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<tr>
<th>Title</th>
<th>De effecten van interviewer- en respondentkenmerken op antwoordgedrag in survey-onderzoek: Een multilevel benadering</th>
</tr>
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<tbody>
<tr>
<td>Authors</td>
<td>Smit, Johannes H. Eedoen, Pieter van den Deeg, Dorly J.H.</td>
</tr>
<tr>
<td>Language</td>
<td>Dutch</td>
</tr>
<tr>
<td>Year</td>
<td>1995</td>
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<tr>
<td>Journal</td>
<td>Sociologische Gids, 42(1995)4-5, 285-300</td>
</tr>
<tr>
<td>Indexed On</td>
<td>Indexed on Publication</td>
</tr>
<tr>
<td>Abstract</td>
<td>On measurement errors due to interviewer effects. Examined is the conditioning influence of the interviewer characteristics on the respondent's answering process, using a random coefficient model. First, the answering process is described at the level of the respondent. Subsequently, respondent-specific parameters are related to interviewer-specific variables. This two-level model is applied to data collected in the Longitudinal Aging Study Amsterdam (Lasa).</td>
</tr>
<tr>
<td>Terms</td>
<td>multi-level analysis, interviewer effect, respondents, survey research, multi-level models, measurement errors</td>
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<tr>
<th>Title</th>
<th>Multilevel Modeling with MIMOSE: Experience from a Social Science Application</th>
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<tr>
<td>Authors</td>
<td>Saam, Nicole J.</td>
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<tr>
<td>Language</td>
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<tr>
<td>Publish</td>
<td>München: (s.n.)</td>
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<td>1995</td>
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<td>Abstract</td>
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<td>Terms</td>
<td>multi-level models</td>
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<tr>
<th>Title</th>
<th>Micro-Macro Linkages in Sociological Analysis: Theory, Method and Substance</th>
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<tr>
<td>Authors</td>
<td>Jones, F.L.</td>
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<tr>
<td>Language</td>
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<tr>
<td>Year</td>
<td>1995</td>
</tr>
<tr>
<td>Journal</td>
<td>The Australian and New Zealand Journal of Sociology,</td>
</tr>
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</table>
Dr. Wolfgang Langer – Methoden V: Mehrebenenanalyse – WiSe 2000/2001

Abstract: Discussion of methods that simultaneously model the data and the drop-out process in longitudinal studies within a unified model-based framework. Models are classified into two broad classes, depending on how the joint distribution of the data and drop-out mechanism is factored: random-coefficient selection models and random-coefficient pattern mixture models. Inference is likelihood-based, via maximum likelihood or Bayesian methods. A number of examples in the literature are placed in this framework, and possible extensions outlined. Data collection on the nature of the drop-out process is advocated to guide the choice of model. In cases where the drop-out mechanism is not well understood, sensitivity analyses are suggested to assess the effect on inferences about target quantities of alternative assumptions about the drop-out process.

Terms: longitudinal research, missing data, multi-level models, maximum likelihood estimators, Bayesian methods, sensitivity analysis

An Assessment of Estimation Procedures for Multilevel Models with Binary Responses

Evaluation of two software packages that are available for fitting multilevel models to binary response data, namely VARCL and ML3, by using a Monte Carlo study designed to represent quite closely the actual structure of a data set used in an analysis of health care utilization in Guatemala. It was found that the estimates of fixed effects and variance components produced by the software packages are subject to very substantial downward bias when the random effects are sufficiently large to be interesting. In fact, the fixed effect estimates are no better than the estimates obtained by using standard logit models that ignore the hierarchical structure of the data. The estimates of standard errors appear to be reasonably accurate and superior to those obtained by ignoring clustering, although one might question their utility in the presence of large biases. It is
concluded that alternative estimation procedures need to be
developed and implemented for the binary response case.

**TITLE**
Random Coefficient Models

**AUTHORS**
LONGFORD, N.T.

**LANGUAGE**
English

**YEAR**
1995

**IN**
Handbook of Statistical Modeling for the Social and
Behavioral Sciences/ edited by G. ARMINGER, C.C. CLOGG, and

**INDEXED ON**
Indexed on Title

**ABSTRACT**
Presentation of a procedure for assessing the variability of
covariance structures of respondent variables between
interviewers, and the explanation of that variability by
interviewer characteristics. The data of illustration are
adopted from the Longitudinal Aging Study Amsterdam. It
turned out that both interviewer age and boldness cause a
decrease in the original between-interviewer covariances.

**TERMS**
multi-level models

covariance

**TITLE**
Interviewer Effects on Covariance Structures of Respondents:
An Application of the Multilevel Model

**AUTHORS**
EEDEN, Pieter van den
SMIT, Johannes H.

**LANGUAGE**
English

**YEAR**
1995

**IN**
Proceedings of the International Conference on Survey

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
On the interpretation of two estimators for random
coefficient models, that arise because of stochastic
constraints on the parameters of a model. One estimator, a
Hildreth-Houck estimator, is derived by estimating the model
after substitution of the constraints. The other estimator is
derived by first estimating the model without constraints and
then estimating the unknown parameters of the constraints;
for random-coefficient models with panel data it leads
naturally to Swamy’s estimator. It is also shown how both
estimators can be regarded as simplifications derived from
the scoring algorithm for computing maximum likelihood
estimates. (Document delivery by C.B.S., Voorburg, The
Netherlands; e-mail: AOLS@cbs.nl).

**TERMS**
estimator

**TITLE**
The Effect of Interviewer Variance on Domain Comparisons

**AUTHORS**
DAVIS, Peter
SCOTT, Alastair

**LANGUAGE**
English

**YEAR**
1995
<p>| IN | Survey Methodology, 21(1995)2 (Dec.), 99-106 |
| INDEXED ON | Indexed on Publication |
| ABSTRACT | Examination of the effects of interviewing and of clustering on estimated contrasts between subgroups in multistage sampling designs. Developed is a correlated components of variance model to identify factors that determine the size of the effects. Data from a multi-wave survey on dental health show that the impact of interviewer effects was two to three times as great for the ethnic contrasts as it was for the gender comparison. There is considerable potential for damage when using a small group of interviewers. |
| TERMS | interviewer effect, multi-level models, multistage sampling, panel study, design effect |
| TITLE | The Estimation of School Effects |
| AUTHORS | RAUDENBUSH, Stephen W. WILLS, J.D. |
| LANGUAGE | English |
| YEAR | 1995 |
| INDEXED ON | Indexed on Publication |
| ABSTRACT | On the application of hierarchical linear models to school evaluations. Considered are the specification and estimation of school effects, the variability of effects across schools, and the proportion of variation in student outcomes attributable to differences in school context and practice. Presented is a statistical model that defines two different types of school effect: one appropriate for parents choosing schools for their children, the second for agencies evaluating school practice. Studies of both types of effect are viewed as quasi-experiments posing obstacles to valid causal inference. The potential for unbiased estimation depends on the type of effect under consideration because the two types of school effect have markedly different data requirements. Commonly used estimators of each effect are shown to be biased and, in some cases, inconsistent. Analyses of survey data from Scotland illustrate the recommended techniques. |
| TERMS | educational research, multi-level models, evaluation research, estimation, causality, unbiased estimator |
| TITLE | An Approximate Generalised Linear Model with Random Effects for Informative Missing Data |
| AUTHORS | FOLLMANN, D. WU, M. |
| LANGUAGE | English |
| YEAR | 1995 |
| IN | Biometrics, 51(1995), 151-168 |
| INDEXED ON | Indexed on Title |
| ABSTRACT | Short description of two types of hierarchical generalized linear models: a subject-specific or unit-specific model and a population average or marginal model. |
| TERMS | multi-level models, missing data |
| TITLE | Multilevel Unit Specific and Population Average Generalised Linear Models |
| AUTHORS | GOLDSTEIN, Harvey |
| LANGUAGE | English |
| YEAR | 1995 |
| IN | Multilevel Modelling Newsletter, 7(1995)3 (Dec.), 4-5 |
| INDEXED ON | Indexed on Publication |
| ABSTRACT | Short description of two types of hierarchical generalized linear models: a subject-specific or unit-specific model and a population average or marginal model. |
| TERMS | multi-level models, generalized linear model |</p>
<table>
<thead>
<tr>
<th>TITLE</th>
<th>Multilevel Covariance Structures for Family Data</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>HOX, J.J.  JACOBS, M.E.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
</tr>
<tr>
<td>YEAR</td>
<td>1995</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>On the application of covariance structure analysis to multilevel family data. Attention is focused on a simplified statistical model proposed by Muthén (1994). First, the basic decomposition model for a hierarchical population is described. Next, attention is paid to multilevel exploratory factor analysis and to a simple confirmative path model.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multi-level models  family research  structural equations models  exploratory factor analysis  path model</td>
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<table>
<thead>
<tr>
<th>TITLE</th>
<th>Multilevel Models for Family Data</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>SNIJDERS, Tom A.B.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1995</td>
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<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>On the use of multilevel regression models for family data. It is shown how the multilevel model can be specified in such a way that it adequately reflects the complexity of family data. First, a brief introduction to multilevel models is given. Next, a method for analyzing data about individuals in families is described, taking into account the various positions or roles. The methods are illustrated using data from studies about intelligence in families and on recollections about parental rearing behaviour.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multi-level models  family research  multiple regression</td>
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<tr>
<th>TITLE</th>
<th>Advances in Family Research</th>
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<tr>
<td>EDITORS</td>
<td>HOX, J.J.  MEULEN, B.F. van der JANSSENS, J.M.A.M.</td>
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<tr>
<td>LANGUAGE</td>
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<tr>
<td>PUBLISH</td>
<td>Amsterdam: Thesis Publishers</td>
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<tr>
<td>YEAR</td>
<td>1995</td>
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<td>PAGES</td>
<td>299</td>
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<tr>
<td>ISBN</td>
<td>90-5170-322-8</td>
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<td>SPEC ISSUE</td>
<td>5th Symposium of the Research Committee on Empirical Family Research, Amsterdam, 8-9 December, 1994</td>
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<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>Collection of rewritten papers delivered at a symposium on &quot;Advances in Family Research&quot;, held in Amsterdam, 8-9 December 1994. The contributions discuss the current state of research on family issues, such as parenting, educational goals, family interactions, therapeutic intervention, and methodological issues in family research. The methodological oriented chapters address the application of multilevel models to family data and the interviewing of children.</td>
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<tr>
<td>TERMS</td>
<td>applied research  family research  multi-level models  interviewing special respondents  proceedings</td>
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<table>
<thead>
<tr>
<th>TITLE</th>
<th>The Analysis of Change</th>
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<tr>
<td>EDITORS</td>
<td>GOTTMAN, John M.</td>
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<td>LANGUAGE</td>
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<tr>
<td>PUBLISH</td>
<td>Hillsdale (NJ): Erlbaum</td>
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<tr>
<td>YEAR</td>
<td>1995</td>
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<tr>
<td>PAGES</td>
<td>528</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>Indexed on Review</td>
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<tr>
<td>TERMS</td>
<td>Presentation of designs and analysis of change that occur within a unit over time. The book outlines the use of time series analysis, chaos theory, and structural equation modeling, and refers to other techniques.</td>
</tr>
<tr>
<td>TITLE</td>
<td>Multilevel Statistical Models</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>GOLDSTEIN, H.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>PUBLISH</td>
<td>London: Arnold</td>
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<tr>
<td>YEAR</td>
<td>1995</td>
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<td>PAGES</td>
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<td>SERIALS</td>
<td>Kendall's Library of Statistics, No. 3</td>
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<tr>
<td>REVIEW IN</td>
<td>From Publicity Material (Arnold), 1995</td>
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<td>INDEXED ON</td>
<td>Indexed on Review</td>
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<tr>
<td>ABSTRACT</td>
<td>Introduction to the statistical modelling and analysis of hierarchically structured data. Discussed are the basic linear multilevel model, the multivariate multilevel model, and nonlinear multilevel models. Also considered are models for repeated measures data, for discrete response data and for cross-classifications. Described are the characteristics of multilevel models with measurement errors and multilevel event history models. Finally, information is provided on software for multilevel modelling, missing data and multilevel structural equation models.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multi-level models</td>
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<tr>
<td>TITLE</td>
<td>Hierarchical Models for Educational Data: An Overview</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>MORRIS, Carl N.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1995</td>
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<tr>
<td>IN</td>
<td>Journal of Educational and Behavioral Statistics, 20(1995)2 (Summer), 190-200</td>
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<tr>
<td>SPEC_ISSUE</td>
<td>Special Issue: Hierarchical Linear Models: Problems and Prospects</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>Examination of the use of hierarchical models for educational data. Emphasis is on the need to not diminish hard thinking about data and iterative model checking when fitting hierarchical models. The need for more and better software, the need to test methods to assure their proper calibration, and the need to produce supporting materials to aid analysts and users of hierarchical modeling methods are also mentioned. With discussion.</td>
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<tr>
<td>TERMS</td>
<td>multi-level models</td>
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<td>AUTHORS</td>
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<td>LANGUAGE</td>
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<td>ABSTRACT</td>
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<td>TERMS</td>
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Discussion on practical problems with multi-level techniques. These problems have to do with terminology, computer programs employing different algorithms, and interpretations of the coefficients in one or two steps. The usefulness of the hierarchical linear model in the most common situation in education — that of a large number of relatively small groups — is discussed. Also situations where the more complicated hierarchical models can be replaced with simpler models, are explained. It is concluded that more studies need to be done to establish the claimed superiority of restricted versus unrestricted maximum likelihood, to study the effects of shrinkage on the estimators, and to explore the merits of simpler methods such as weighted least-squares. Finally, distinctions must be made between choice of model, choice of technique, choice of algorithm, and choice of computer program. With discussion.

Terms
multi-level models
educational research
maximum likelihood estimators

Longitudinal panel data examples are used to illustrate estimation methods for individual growth curve models. These examples constitute one of the basic multilevel analysis settings, and they are used to illustrate issues and concerns in the application of hierarchical modeling estimation methods, specifically, the widely advertised HLM procedures of Bryk and Raudenbush. One main expository purpose is to demystify these analyses by showing equivalences with simpler approaches. Perhaps more importantly, these equivalences indicate useful data analytic checks and diagnostics to supplement the multi-level estimation procedures. In addition, we recommend the general use of standardized canonical examples for the checking and exposition of the various multi-level procedures; as part of this effort, methods for the construction of longitudinal data examples with known structure are described. With discussion.

Terms
longitudinal research
estimation
multi-level models

Inference and Hierarchical Modeling in the Social Sciences

On statistical inference and hierarchical models. Three levels of inferential strength supported by typical social science data-gathering methods, are examined, when
hierarchical and other models are applied. The use of hierarchical models in school effectiveness studies and in meta-analysis is reconsidered from the perspective of causal inference. Recommended is the increased use of Gibbs sampling and other Markov-chain Monte Carlo (MCMC) methods in the application of hierarchical models in the social sciences. With discussion.

**TERMS**
- statistical inference
- multi-level models
- educational research
- meta analysis
- causality
- probability density function
- Markov chain
- Monte Carlo method

**TITLE**
Introduction

**AUTHORS**
KREFT, Ita G.G.

**LANGUAGE**
English

**YEAR**
1995

**IN**
Journal of Educational and Behavioral Statistics, 20(1995)2 (Summer), 109-113

**SPEC_ISSUE**
Special Issue: Hierarchical Linear Models: Problems and Prospects

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Guest editor's introduction to the special issue on hierarchical linear models. Random coefficient linear regression models and modeling tools are discussed by statisticians, practitioners, and software developers. This issue is a result of a conference organized at the RAND Corporation in Santa Monica (October, 1993). With contributions of Draper, Rogosa and Saner, De Leeuw and Kreft, and Morris. The discussion contains several comments and replies.

**TERMS**
- multi-level models
- models

**TITLE**
Estimation of Factor Scores in a Two-Level Confirmatory Factor Analysis Model

**AUTHORS**
LEE, Sik Y.
POON, Wai Y.

**LANGUAGE**
English

**YEAR**
1995

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Development of two approaches for estimation of the between-group and the within-group factor scores in a two-level confirmatory factor model. The first approach, based on the model of group means, leads to the best results.

**TERMS**
- confirmatory factor analysis
- factor estimation
- multi-level models

**TITLE**
The Use of Multilevel Modeling for Analysing Personal Networks: Networks of Cocaine Users in an Urban Area

**AUTHORS**
SNIJDERS, Tom
SPREEN, Marinus
ZWAAGSTRA, Ronald

**LANGUAGE**
English

**YEAR**
1995

**IN**

**SPEC_ISSUE**
Complete abstract available in Sociological Abstracts.

**ABSTRACT IN**

**INDEXED ON**
Indexed on Title

**TERMS**
- multi-level models
- social network analysis

**TITLE**
Covariance Components Analysis of the Multitrait-Multimethod Matrix

**AUTHORS**
WOITHE, Werner
Dr. Wolfgang Langer – Methoden V: Mehrebenenanalyse – WiSe 2000/2001

Development of Covariance Components Analysis (CCA) for analyzing a multitrait-multimethod matrix. The logic of MANOVA is applied to factorial measurement designs. Discussed are fixed and scale-free CCA models, identification, fully correlated, block-diagonal, and diagonal covariance structures. Two examples are described. With comparisons among CCA, direct product models, and factor analysis models.

**Terms**
- multitrait-multimethod matrix
- multi-level models
- multivariate analysis of variance
- factorial design
- factor analysis

**Title**
Another Look at the Instrumental Variable Estimation of Error-Components Models

**Authors**
ARELLANO, M.

**Language**
English

**Year**
1995

**In**

**Indexed On**
Indexed on Title

**Abstract**
On the modelling of segregation indices, using bootstrap resampling along with multi-level models. Examples are provided from measurements of social-class segregation among Scottish secondary-school pupils. The modelling shows that some of the differences in segregation between communities can be attributed to characteristics of the communities. Extensions of the model would allow the tracking of changes in segregation over time, for example, to assess the impact of policies to reduce segregation.

**Terms**
- social policy research
- bootstrap
- multi-level models
- educational research

**Title**
A Multilevel Model for Community Segregation

**Authors**
WILLMS, J.D.
PATERSO, Lindsay

**Language**
English

**Year**
1995

**In**

**Indexed On**
Indexed on Publication

**Abstract**
Description of the use of hierarchical linear modeling (HLM) for analyzing longitudinal complex evaluation studies. The presentation is organized around the specific example of the Boys Town Follow-Up Study. First the design of this study is described. Then the HLM statistical model is presented, pointing out its similarities to repeated-measures analysis of variance. Four types of hierarchical linear models for program evaluation are discussed: basic growth curve model; change from baseline; combining gradual and discontinuous program effects; and variation by length of treatment. The approach defines well-focused parameters that yield meaningful effect-size estimates and significance tests, efficiently combining all waves of data available for each
MATLAB software is particularly well adapted for the computations. With an application on real data.

**TEMS**
- linear regression
- estimation
- eigen value
- multi-level models

**TITLE**
Hierarchical Linear Models

**AUTHORS**
RAUDENBUSH, S.W.
BRYK, A.S.

**LANGUAGE**
English

**YEAR**
1994

**IN**
The International Encyclopedia of Education: Research and Studies (Second Edition), (1994), 2590-2596

**INDEXED ON**
Indexed on Title

**TEMS**
- multi-level models

**TITLE**
HLM: Hierarchical Linear Modeling with the HLM/2L and HLM/3L Programs

**AUTHORS**
BRYK, A.S.
RAUDENBUSH, S.W.
CONGDON, R.T.

**LANGUAGE**
English

**PUBLISH**
Chicago (IL): Scientific Software International

**YEAR**
1994

**INDEXED ON**
Indexed on Title

**TEMS**
- multi-level models
- software

**TITLE**
Random Coefficient Linear Regression Models

**AUTHORS**
KREFT, I.G.G.
LEEDEN, R. van der

**LANGUAGE**
English

**PUBLISH**
Leiden: Leiden University, Department of Psychometrics and Research Methodology

**YEAR**
1994

**SERIALS**
PRM 94-03

**INDEXED ON**
Indexed on Title

**TEMS**
- multi-level models

**TITLE**
Estimation in Generalized Mixed Models

**AUTHORS**
McGILCHRIST, C.A.

**LANGUAGE**
English

**YEAR**
1994

**IN**

**INDEXED ON**
Indexed on Title

**TEMS**
- estimation
- multi-level models

**TITLE**
A Random Effects Ordinal Regression Model for Multilevel Analysis

**AUTHORS**
HEDEKER, D.
GIBBONS, R.D.

**LANGUAGE**
English

**YEAR**
1994

**IN**
Biometrics, 50(1994), 933-944

**INDEXED ON**
Indexed on Title

**TEMS**
- multi-level models

**TITLE**
First Iteration Versus IGLS/RIGLS Estimates in Two-Level Models: A Monte Carlo Study with ML3

**AUTHORS**
LEEDEN, R. van der
BUSING, F.M.T.A.

**LANGUAGE**
English

**PUBLISH**
Leiden: University of Leiden, Department of Psychometrics

**YEAR**
1994

**SERIALS**
Technical Report, No. PRM 94-02

**INDEXED ON**
Indexed on Title

**TEMS**
- multi-level models
- software
TITLE TERRACES: An XLISP-STAT Package for Multilevel Modeling with Diagnostics
AUTHORS HILDEN-MINTON, J.
LANGUAGE English
PUBLISH Los Angeles (CA): University of California, Department of Statistics
YEAR 1994
SPEC_ISSUE Technical Report
INDEXED ON Indexed on Title
TERMS multi-level models
software

TITLE Longitudinal Multilevel Models: Understanding Educational Progress in Relation to Changes in Curriculum Coverage
AUTHORS PLEWIS, Ian
LANGUAGE English
YEAR 1994
INDEXED ON Indexed on Publication
ABSTRACT On the analysis of hierarchically structured longitudinal data by means of multi-level models. Discussed are the specification and estimation of multi-level models, illustrated by data on the link between curriculum coverage and progress. Also mentioned are available computer programs for multi-level modelling.
TERMS analysis of change
multi-level models
educational research
software
estimation

TITLE A Random-Coefficients Logit Brand-Choice Model Applied to Panel Data
AUTHORS JAIN, Dipak C.
VILCASSIM, Naufel J.
CHINTAGUNTA, Pradeep K.
LANGUAGE English
YEAR 1994
INDEXED ON Indexed on Title
TERMS multi-level models
marketing research

TITLE Contextueel onderzoek
AUTHORS TACQ, Jacques J.A.
LANGUAGE Dutch
YEAR 1994
IN FACTA, 2(1994)5 (sept.), 32-35
INDEXED ON Indexed on Publication
ABSTRACT Reply to a question on the contextual analysis of educational research data. Discussed are aspects of research design and data analysis that have to be considered. As possibilities to analyse contextual data are mentioned: contextual analysis at microlevel, and at macrolevel. A two-steps analysis procedure, and multi-level analysis by means of the hierarchical linear model are also considered.
TERMS contextual analysis
educational research
research design
multi-level analysis
multi-level models

TITLE Efficient Analysis of Mixed Hierarchical and Cross-Classified Random Structures Using a Multilevel Model
AUTHORS RASBASH, J.
GOLDSTEIN, H.
LANGUAGE English
YEAR 1994
Description of a procedure for specifying and estimating parameters of general mixed models which contain both hierarchical and crossed random factors. This is done using a model formulated for purely hierarchically structured data and generalizes the results of Raudenbush. The exposition is for the continuous response linear model with natural extensions to generalized linear, nonlinear, and multivariate models.

### Terms
- multi-level models
- least-squares estimators
- generalized linear model
- nonlinear models

### Title
A Comparison of Nonresponse in Mail, Telephone, and Face-to-Face Surveys: Applying Multilevel Modeling to Meta-Analysis

### Authors
- HOX, Joop J.
- LEEUW, Edith D. de

### Language
English

### Year
1994

### In
Quality & Quantity, 28(1994)4 (Nov.), 329-344

### Abstract
Report of a meta analysis of 45 studies that explicitly compare the response obtained using a mail, telephone or face-to-face survey. The data analysis uses a generalized hierarchical linear model. Sampling procedure, saliency of topic, and research organization had an effect on the response. On the average, the face-to-face condition achieved the highest completion rate, the telephone survey the next highest, and the mail survey the lowest. There is a significant interaction with the year of publication: the response to face-to-face and telephone surveys is going down in the period covered by this analysis (1947 to 1992), but the response to mail surveys is going up slightly. Finally, the main results of the meta analysis are discussed.

### Terms
- meta analysis
- nonresponse
- types of interviews
- response rate
- telephone interview
- multi-level models

### Title
Analyzing Social and Political Change: A Casebook of Methods

### Editors
- DALE, Angela
- DAVIES, Richard B.

### Language
English

### Year
1994

### Pages
229

### ISBN
0-8039-8298-4

### Abstract
On the analysis of change in cross-sectional and longitudinal data. Discussed are methodological features, limitations and constraints of various analysis procedures. With chapters on: the logistic model and log-linear models, structural equations models, multilevel models, event history analysis, mixed Markov models, and time series techniques.

### Terms
- analysis of change
- longitudinal research
- cross-section research
- log-linear models
- structural equations models
- multi-level models
- event history analysis
- mixed Markov models
- time series techniques

### Title
Design and Analysis Issues in Community Trials

### Authors
- MURRAY, David M.
- MCKINLAY, Sonja M.
- MARTIN, Don

### Language
English
Abstracts of seven contributions to a conference on the design and analysis issues in community trials on March 23, 1992, in Bethesda (MD). The first three presentations consider the basic issues of cohort vs. cross-sectional designs, matched vs. unmatched designs and dichotomous vs. continuous response variables. The fourth presentation is on an alternative method of estimating intervention effects as departures from secular trends and on estimating power. The fifth presents an illustration of the previous issues by describing a research project. The sixth paper describes hierarchical linear models as an approach of analysis of data from nested designs. The final paper presents a commentary on the design and analysis issues in community trials from the perspective of the survey sampling statistician.

**Abstracts**

**Analysis of Longitudinal Data: Random Coefficient Regression Modelling**

RUTTER, C.M.
ELASHOFF, R.M.

**Statistics in Medicine, 13 (1994), 1211-1232**

Indexed on Title

**Multilevel Time Series Models with Applications to Repeated Measures Data**

GOLDSTEIN, H.
HEALY, M.J.R.
RASBASH, J.

**Statistics in Medicine, 13 (1994), 1643-1656**

Indexed on Title

**Trends and Perspectives in Empirical Social Research**

BORG, Ingwer
MOHLER, Peter P.

**Berlin: De Gruyter**

Indexed on Review

**Abstract on the state of the art in empirical social research. With chapters on: social indicators, social surveys, multinational surveys, survey measurement, census data, computer-assisted interviews, sampling, statistics, scaling, facet theory, causal modeling, attitude measurement, multi-level models, phenomenology, hermeneutic approaches, and content analysis.**

**Terms**

- item scaling
- facet design
- trend report
- empirical research
- causal models
- social indicators
TITLE         Comments on "Estimating Macro-Relationships Using Micro-Data: A One-Stage Approach"
AUTHORS       WANG, Jichuan
FISHER, James H.
LANGUAGE      English
YEAR          1994
IN            Sociological Methods & Research, 22(1994)4 (May), 520-531
INDEXED ON    Indexed on Publication
ABSTRACT      Comment on the article by Krivo & Kaufman (1990) on alternative approaches to multilevel studies. Krivo & Kaufman introduced an error components model which is identical to Judge et al's transformed ordinary least squares (OLS) model. Three points of confusion in Krivo & Kaufman's application of the transformed OLS model are discussed. Also some errors in the formulas used in their article are noticed.
TERMS         multi-level models
ordinary least-squares estimator

TITLE         Studying Variation in Program Success. A Multilevel Modeling Approach
AUTHORS       SELTZER, Michael H.
LANGUAGE      English
YEAR          1994
IN            Evaluation Review, 18(1994)3 (June), 342-361
INDEXED ON    Indexed on Publication
ABSTRACT      On the usefulness of multilevel modeling techniques for multisite evaluation studies. Discussed is the application of the hierarchical linear model to measure variation, and identify factors of educational programs. Illustrated by means of data on a mathematical curriculum.
TERMS         multi-level models
educational research
evaluation research

TITLE         A Distribution Free Approach for Analysis of Two-Level Structural Equation Model
AUTHORS       POON, Wai Y.
LEE, Sik Y.
LANGUAGE      English
YEAR          1994
IN            Computational Statistics & Data Analysis, 17(1994)3 (March), 265-275
INDEXED ON    Indexed on Publication
ABSTRACT      Development of a distribution-free method for the analysis of two-level covariance structure models. Discussed are a two-stage estimation procedure and a two-stage model fitting procedure. Derived are asymptotic distributions of the estimates and goodness-of-fit test statistics for the evaluation of the model adequacy.
TERMS         multi-level models
structural equations models
estimation
goodness-of-fit indices
model testing
nonparametric methods

TITLE         Logistic Regression with Random Coefficients
AUTHORS       LONGFORD, N.T.
LANGUAGE      English
YEAR          1994
IN            Computational Statistics & Data Analysis, 17(1994)1 (Jan.),
Indexed on Publication

ABSTRACT
Examination of logistic regression with random coefficients. The likelihood for generalized linear models with random coefficients is approximated, and illustrated on logistic regression with one-way classification. First random coefficient models are described and some algorithms for fitting such models for binary data are presented. Then an exact maximum likelihood procedure is discussed. The next section presents a procedure based on an approximation to the log-likelihood. Extensions of this method for more complex data structures, for other generalized linear models, and for approximate restricted maximum likelihood estimation, are outlined.

TERMS
- multi-level models
- maximum likelihood estimators
- logistic regression
- generalized linear model

TITLE
Improved Estimation for Logit and Loglinear Multilevel Models

AUTHORS
GOLDSTEIN, Harvey

LANGUAGE
English

YEAR
1994

IN
Multilevel Modelling Newsletter, 6(1994)1 (March), 2

Indexed on Publication

ABSTRACT
Presentation of an improved estimation procedure for fitting logit and loglinear multilevel models.

TERMS
- estimation
- logit model
- log-linear models
- multi-level models
- model testing

TITLE
The Bilevel Reticular Action Model for Path Analysis with Latent Variables

AUTHORS
McDONALD, Roderick P.

LANGUAGE
English

YEAR
1994

IN
Sociological Methods & Research, 22(1994)3 (Febr.), 399-413

SPEC_ISSUE
Special Issue: Multilevel Analysis Methods

Indexed on Publication

ABSTRACT
Description of a two-level (hierarchical) model for path analysis with latent variables together with some properties of a computer program written to implement the model. A simple illustrative example is given.

TERMS
- multi-level models
- path model
- software
- latent variable models

TITLE
Multilevel Covariance Structure Analysis

AUTHORS
MUTHÉN, Bengt O.

LANGUAGE
English

YEAR
1994

IN
Sociological Methods & Research, 22(1994)3 (Febr.), 376-398

SPEC_ISSUE
Special Issue: Multilevel Analysis Methods

Indexed on Publication

ABSTRACT
Introduction to some new techniques for multilevel covariance structure modeling with latent variables. Although these techniques only incorporate a subset of models that are relevant to multilevel data, the techniques do provide a large set of new analysis possibilities and have the advantage that they only require conventional structural equation modeling software. With an illustrative example.

TERMS
- multi-level models
- structural equations models
- latent variable models
- software

TITLE
Multilevel Cross-Classified Models

AUTHORS
GOLDSTEIN, Harvey

LANGUAGE
English

YEAR
1994
<table>
<thead>
<tr>
<th>IN</th>
<th>Sociological Methods &amp; Research, 22(1994)3 (Febr.), 364-375</th>
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<tr>
<td>SPEC_ISSUE</td>
<td>Special Issue: Multilevel Analysis Methods</td>
</tr>
<tr>
<td>INDEXED_ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>Introduction to random cross-classifications of units which can arise at any level of a data hierarchy. The analysis of such models is illustrated by an application to a real data set concerning parents' choice of secondary schools in England.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multi-level models, random effects model</td>
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<tr>
<td>TITLE</td>
<td>Modeled Variance in Two-Level Methods</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>SNIJDERS, Tom A.B., BOSKER, Roel J.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1994</td>
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<tr>
<td>IN</td>
<td>Sociological Methods &amp; Research, 22(1994)3 (Febr.), 342-363</td>
</tr>
<tr>
<td>SPEC_ISSUE</td>
<td>Special Issue: Multilevel Analysis Methods</td>
</tr>
<tr>
<td>INDEXED_ON</td>
<td>Indexed on Publication</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>Review of the concept of explained proportion of variance in the situation of the random effects hierarchical two-level model. It is argued that the proportion reduction in (estimated) variance components is not an attractive parameter to represent the joint importance of the explanatory (independent) variables for modeling the dependent variable. It is preferable instead to work with the proportional reduction in mean squared prediction error for predicting individual values (for the modeled variance at level 1) and the proportional reduction in mean squared prediction error for predicting group averages (for the modeled variance at level 2). It is shown that when predictors are added, the proportion of modeled variance defined in this way cannot go down in the population if the model is correctly specified, but can go down in a sample; the latter situation then points to the possibility of misspecification.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multi-level models, random effects model, model specification, proportional reduction in error</td>
</tr>
<tr>
<td>TITLE</td>
<td>The Gender Gap in Earnings: A Two-Way Nested Multiple Regression Analysis with Random Effects</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>KREFT, Ita G.G., LEEUW, Jan de</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
</tr>
<tr>
<td>YEAR</td>
<td>1994</td>
</tr>
<tr>
<td>IN</td>
<td>Sociological Methods &amp; Research, 22(1994)3 (Febr.), 319-341</td>
</tr>
<tr>
<td>SPEC_ISSUE</td>
<td>Special Issue: Multilevel Analysis Methods</td>
</tr>
<tr>
<td>INDEXED_ON</td>
<td>Indexed on Publication</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>Presentation of multilevel analysis applied to the gender income gap, a much debated subject both at an analytical and economic level. Considered are both, but emphasis is on the different ways the data can be analyzed. The authors show that a hierarchical linear model is the best way to evaluate male-female wage differentials. Both interindustry and intraindustry wage disparities between men and women are measured by using a technique that assumes that observations within the same industry have correlated error terms. By simultaneously testing human capital factors and environmental factors, the analysis model serves as a link between theory and empirical factors.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multiple regression, random effects model, multi-level analysis, multi-level models</td>
</tr>
<tr>
<td>TITLE</td>
<td>Hierarchical Regression Models for Interviewer and Respondent Effects</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>HOX, Joop J.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1994</td>
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<td>IN</td>
<td>Sociological Methods &amp; Research, 22(1994)3 (Febr.), 300-318</td>
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<tr>
<td>SPEC_ISSUE</td>
<td>Special Issue: Multilevel Analysis Methods</td>
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<tr>
<td>INDEXED_ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>Presentation of an application of the hierarchical regression model in the analysis of interviewer effects. The hierarchical regression model offers an elegant way of analyzing the simultaneous effects of specific interviewer and respondent characteristics. It is especially attractive if the research design does not provide for a random assignment of respondents to interviewers, because it allows the researcher to use statistical rather than experimental control by modeling the interviewer effects conditional on the respondent effects.</td>
</tr>
<tr>
<td>TERMS</td>
<td>multiple regression, interviewer effect, response style, multi-level models, research design</td>
</tr>
<tr>
<td>TITLE</td>
<td>Multilevel Analysis Methods</td>
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<tr>
<td>AUTHORS</td>
<td>HOX, Joop J. KREFT, Ita G.G.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1994</td>
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<td>IN</td>
<td>Sociological Methods &amp; Research, 22(1994)3 (Febr.), 283-299</td>
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<td>Special Issue: Multilevel Analysis Methods</td>
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<tr>
<td>ABSTRACT</td>
<td>Introduction to a special issue about the analysis of data collected at different levels of observation, such as groups and individuals within these groups, and about the methodological problems that are present when natural experimentation and observations nested within existing social groups are the object of study. The methodological problems are summarized in the term multilevel problems. Some traditional approaches to the analysis of multilevel data and their statistical shortcomings are discussed. The random coefficient linear model is presented, which resolves many of these problems, and the currently available software is discussed. Next, some more general developments in multilevel modeling are discussed. An overview of this special issue is presented. With articles by Hox, Kreft and De Leeuw, Snijders and Bosker, Goldstein, Muthén, and McDonald.</td>
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<tr>
<td>TERMS</td>
<td>multi-level analysis, random effects model, software, multi-level models</td>
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<tr>
<td>AUTHORS</td>
<td>LONGFORD, N.T.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>PUBLISH</td>
<td>Groningen: iec ProGAMMA</td>
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<tr>
<td>YEAR</td>
<td>1993</td>
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<tr>
<td>TERMS</td>
<td>software</td>
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<td>TITLE</td>
<td>Analysis of Multilevel Models. Part 1: Theoretical Aspects</td>
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<tr>
<td>AUTHORS</td>
<td>TOIT, S.H.C. du</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>PUBLISH</td>
<td>Pretoria: Human Sciences Research Council (HSRC)</td>
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<tr>
<td>YEAR</td>
<td>1993</td>
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<td>INDEXED_ON</td>
<td>Indexed on Title</td>
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<tr>
<td>TERMS</td>
<td>multi-level models, analysis of variance</td>
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<tr>
<td>TITLE</td>
<td>Advanced Linear Models: Theory and Applications</td>
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<tr>
<td>AUTHORS</td>
<td>WANG, Song G. CHOW, Shein Ch.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>PUBLISH</td>
<td>New York (NY): Marcel Dekker</td>
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<tr>
<td>YEAR</td>
<td>1993</td>
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<td>PAGES</td>
<td>538</td>
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INDEXED ON  Indexed on Review
ABSTRACT  Textbook for a graduate course in linear models. The first part of the book gives mathematical backgrounds: matrix algebra and the multivariate normal and related distributions. Part 2 is on statistical inferences: parameter estimation, hypothesis testing and confidence intervals for linear models. Part 3 includes chapters on analysis of variance and of covariance, variance component models, and linear regression.
TERMS  multi-level models
        linear regression
        textbook
        linear models
        multivariate normal distribution
        statistical inference
        estimation
        hypothesis testing
        confidence interval
        analysis of variance
        analysis of covariance

TITLE  Models for Multitrait-Multimethod Matrices
AUTHORS  BROWNE, M.W.
LANGUAGE  English
YEAR  1993
REVIEW IN  Structural Equation Modeling, 3(1996)2, 151
INDEXED ON  Indexed on Review
ABSTRACT  Comparison of models for MTMM matrices: a restricted factor analysis model; a components of covariance model; and a direct product model. It is suggested that a restricted factor analysis models provides best fit, even though it contains many meaningless parameter estimates and boundary solutions. Fit of the other two models was similar.
TERMS  multitrait-multimethod matrix
        factor analysis
        multi-level models

TITLE  Bayesian Analysis in Applications of Hierarchical Models: Issues and Methods
AUTHORS  SELTZER, Michael H.
        WONG, Wing H.
        BRYK, Anthony S.
LANGUAGE  English
PUBLISH  Los Angeles (CA): University of California
YEAR  1993
SERIALS  Technical Report, No. 114
INDEXED ON  Indexed on Title
TERMS  probability density function
        multi-level models

TITLE  Distribution Characteristics of Variance Estimates in Two-Level Models: A Monte Carlo Study
AUTHORS  BUSING, F.M.T.A.
LANGUAGE  English
PUBLISH  Leiden: Leiden University, Department of Psychometrics and Research Methodology
YEAR  1993
SERIALS  Technical Report, Nr. PRM 93-04
INDEXED ON  Indexed on Title
TERMS  variance

TITLE  Models for Repeated Measurements
AUTHORS  LINDSEY, J.K.
LANGUAGE  English
PUBLISH  New York (NY): Oxford University Press
YEAR  1993
Outline of a variety of methods for analyzing repeated-measures data. The book is composed of three parts, based on three types of response data: general continuous data; categorical data; and survival or duration data. The key sections are on nonnormal data. Chapters are on: basic concepts; fundamentals of modeling (exponential family models, generalized linear models, univariate probability models); models for continuous responses (including random effects and random coefficient models); longitudinal data (autoregressive models, growth curve models); models for repeated categorical responses (log-linear models, marginal models, conjugate compound models, nested models); models for longitudinal discrete data (Markov chain, autoregressive log-linear models); and models for duration data. With an extensive bibliography.

On two-level hierarchical linear models applied in educational research. Examined are changes in inferences produced by assuming outliers by means of a Bayesian approach. The marginal posterior distributions of parameters of interest are recalculated under the assumption of heavy tailed errors. This strategy is implemented in the hierarchical model setting via Gibbs sampling.

The Analysis of Designs in which Individuals Are in more than One Group

On the analysis of designs in which individuals are in multiple groups: generations and rotation. Conformity and stability of parameters were estimated. Regression analysis was used for the generations design and two types of rotation designs were analyzed using a variance decomposition approach.

Random Coefficient Models

On multilevel modeling. After an introductory chapter on basic concepts, a chapter on variance component models follows. Next two-level models are described. Later chapters introduce multiple levels of nesting, generalized linear models with random coefficients and factor analysis models. Some datasets are used as examples throughout the book. Also statistical software packages for multilevel analysis are mentioned.
YEAR          1993
IN            Applied Analysis of Variance in Behavioral Science/ edited by
Textbooks and Monographs, Volume 137
INDEXED ON   Indexed on Title
TERMS         experimental design
multi-level models
TITLE         Estimating Individual Cross-Section Coefficients from the
Random Coefficient Regression Model
AUTHORS       LEONE, Robert P.
OBERLHELMAN, H.D.
MULHERN, Francis J.
LANGUAGE      English
YEAR          1993
IN            Journal of the Academy of Marketing Science,
21(1993)(Winter), 45-51
INDEXED ON   Indexed on Title
TERMS         multi-level models
estimation
TITLE         Application of a Hierarchical Linear Model to the Study of
Adolescent Deviance in an Overlapping Cohort Design
AUTHORS       RAUDENBUSH, S.W.
CHAN, W.S.
LANGUAGE      English
YEAR          1993
(Dec.), 941-951
INDEXED ON   Indexed on Title
TERMS         multi-level models
TITLE         Multilevel Path Models
AUTHORS       LEEUW, Jan de
KREFT, Ita G.G.
LANGUAGE      English
PUBLISH       Los Angeles (CA): University of California
YEAR          1993
SERIALS       UCLA Statistical Series, Nr. 123
INDEXED ON   Indexed on Title
TERMS         multi-level models
path model
TITLE         Gissen en mikken
AUTHORS       SNIJDERS, Tom A.B.
LANGUAGE      Dutch
PUBLISH       Groningen: Rijks Universiteit Groningen,
Universiteitsdrukkerij
YEAR          1993
PAGES         22
SPEC_ISSUE    Rede uitgesproken bij de aanvaarding van het ambt van
hoogleraar in de Stochastische Modellen in de Gedrags- en
Maatschappijwetenschappen aan de Rijksuniversiteit Groningen
INDEXED ON   Indexed on Publication
ABSTRACT      Text of an inaugural speech on stochastic models in the
social sciences. Attention is given to the meaning of
concepts like: stochastic, chance, probability, and
inferential statistics. Discussed are the roles of
stochastics in view of hypothesis testing and analysis of
statistical data. Finally, the meaning and content of
theory-driven stochastic models, like multilevel models and
network models, are considered.
TERMS         probabilistic models
inferential statistics
probability
hypothesis testing
statistical analysis
multi-level models
relational analysis
TITLE         Stability of the MH D-DIF Statistics across Populations
AUTHORS       LONGFORD, Nicholas T.
HOLLAND, Paul W.
THAYER, Dorothy T.

LANGUAGE            English
YEAR                1993

SPEC_ISSUE          Abstract available from PsycINFO and full text article is available from EBSCO Document services, E-mail: order@ebscodoc.com
ABSTRACT IN        Psychological Abstracts, 80(1993)8 (Aug.), 3344-3345
INDEXED ON         Indexed on Abstract
ABSTRACT            Investigation of the stability of the Mantel-Haenszel differential item functioning for specific population or item characteristics or attributes. It is also shown how to use random effect or variance components models to aggregate differential item functioning (DIF) results for groups of items. Also administration differences are examined.

TERMS               stability testing
                    Mantel-Haenszel procedure
                    random effects model
                    multi-level models
                    differential item functioning

TITLE               A General Model for Two-Level Data with Responses Missing at Random
AUTHORS             McDONALD, Roderick P.
LANGUAGE            English
YEAR                1993
IN                   Psychometrika, 58(1993)4 (Dec.), 575-585
INDEXED ON          Indexed on Publication
ABSTRACT            Presentation of a two-level model for linear structural relations. The model combines regressions on fixed explanatory variables with structured residual covariance matrices. The model allows multivariate responses at both levels, components of which are possibly missing at random. It allows a variety of models to be developed, for example: path models with latent variables, and time series models with various forms of replications.

TERMS               multi-level models
                    structural equations models
                    covariance
                    responses
                    path model
                    time series analysis

TITLE               A Crossed Random Effects Model for Unbalanced Data with Applications in Cross-Sectional and Longitudinal Research
AUTHORS             RAUDENBUSH, Stephen W.
LANGUAGE            English
YEAR                1993
INDEXED ON          Indexed on Publication
ABSTRACT            Presentation of a two-way crossed random effects model for unbalanced, hierarchically structured data in educational research. Described is a Bayesian estimation procedure for a hierarchical linear model, combining Lindley and Smith's concepts of exchangeability between and within regression, to formulate a crossed random effects model. Provided are maximum likelihood estimates via the EM algorithm.

TERMS               multi-level models
                    random effects model
                    Bayes' estimator
                    EM algorithm
                    educational research

TITLE               Using Multilevel Models for Survey Analysis
AUTHORS             JONES, Kelvyn
LANGUAGE            English
YEAR                1993
IN                   Journal of the Market Research Society, 35(1993)3 (July), 249-265
ABSTRACT
Overview of developments in the application of multilevel models to survey data analysis. After a presentation of the graphs of two-level models, equations, and extensions are described. As advantages of multilevel models are mentioned: contextuality, the capacity to tease out compositional from contextual differences, and a link to qualitative research. As more technical advantages are finally discussed: the handling of autocorrelation, the examination of higher-level variables, and precision-weighted estimation. A description of the computer program MC 3 is also provided.

TERMS
multi-level models
survey research
autocorrelation
estimation
software

ABSTRACT
Presentation of exact Bayesian methods for modeling categorical response data. The idea of data augmentation is used to analyze binary and polychotomous response data. The probit regression model for binary outcomes is seen to have an underlying normal regression structure on latent continuous data. Values of the latent data can be simulated from suitable truncated normal distributions. If the latent data are known, the posterior distribution of the parameters can be computed using standard results from normal linear models. Draws from this posterior are used to sample new latent data. The process is iterated with Gibbs sampling. This procedure can be used to analyze binary regression models and to fit Bayesian hierarchical models.

TERMS
Bayesian methods
regression analysis
latent variable models
discrete models
probit model
probability density function
multi-level models

ABSTRACT
Comparative analysis of response rates in mail, telephone, and face-to-face surveys. By means of a meta analysis of 45 studies, the effects of data collection method on response are examined and the interaction effects of background variables on data collection methods. The data are analyzed by means of generalized linear multilevel models and Longford's program VARCL. Results: the highest response rate is achieved by the face-to-face interviews, followed by telephone interviews, and mail questionnaires. Positive effects on response rate were found for sampling procedure, saliency of topic, and researcher's background. And: response rates for face-to-face interviews and telephone interviews are going down, whereas the cooperation to mail surveys is raising slightly.

TERMS
response rate
nonresponse
software
types of interviews
TITLE     Multilevel Methods for Estimation in Surveys with Complex Sampling Design
AUTHORS   LONGFORD, N.T.
LANGUAGE   English
YEAR      1993
IN        Multilevel Modelling Newsletter, 5(1993)1 (March), 5-7
INDEXED ON Indexed on Publication
ABSTRACT  On estimation methods for surveys using stratified clustered designs. Three approaches are proposed for estimation when using stratified single-stage clustered sampling designs with unequal sampling weights. A framework for assessing importance of the stochastic nature of the weight adjustment is given. The three methods are based on the jackknife, the variance components method, and an ANOVA-like method.

TERMS     stratified cluster sampling
          weighting
          jackknife
          estimation of variance components
          analysis of variance
          estimation
          multi-level models

TITLE     HISYS: A Program for the Measurement and Scaling of Hierarchical Systems
AUTHORS   STAUFENBIEL, T.
          BORG, I.
LANGUAGE   English
YEAR      1992
INDEXED ON Indexed on Publication
ABSTRACT  On the computer program HISYS (Hierarchical Scaling System) for the collection, scaling and presentation of data for hierarchical models. The original context of this approach is Saaty's analytic hierarchy process. HISYS is programmed in Turbo-Pascal and runs on all IBM PC compatible computers, with a minimum of 512 KB memory and a VGA, EGA or ATT graphics card. Also required is a mouse for controlling its graphics.

TERMS     multi-level models
          software

TITLE     Growth Curve Analysis in Accelerated Longitudinal Designs
AUTHORS   RAUDENBUSH, Stephen W.
          CHAN, Wing S.
LANGUAGE   English
YEAR      1992
SPEC_ISSUE Abstract available from PsycINFO and full text article is available from EBSCO Document services, E-mail: order@ebscodoc.com
ABSTRACT  In Psychological Abstracts, 80(1993)6 (June), 2408
INDEXED ON Indexed on Abstract
ABSTRACT  On the application of growth curve analysis to results from an accelerated longitudinal design with use of a hierarchical linear model. It is aimed to show the change in attitudes of youth towards deviance by means of linking data of two cohorts of the National Youth Survey after 5 years of observation. It is shown that the procedure enhances control for time-varying and time-invariant covariates and tests for cohort effects and cohort-by-age interactions.

TERMS     cohort analysis
          longitudinal research
covariance
public records
cohort study
multi-level models

TITLE     New Statistical Methods for Analyzing Social Structures: An Introduction to Multilevel Models
AUTHORS   PATERSON, L.
          GOLDSTEIN, H.
LANGUAGE   English
YEAR      1992
INDEXED ON Indexed on Title
TERMS     multi-level models

TITLE     People, Places, Regions: Exploring the Use of Multilevel Modelling in the Analysis of Electoral Data
AUTHORS   JONES, K.
          JOHNSTON, R.J.
          PATTIE, C.J.
LANGUAGE   English
YEAR      1992
IN        British Journal of Political Science, 22(1992), 343-380
INDEXED ON Indexed on Title
TERMS     multi-level models

TITLE     Nonlinear Regression with Variance Components
AUTHORS   GUMPERTZ, Marcia L.
          PANTULA, Sastry G.
LANGUAGE   English
YEAR      1992
INDEXED ON Indexed on Publication
ABSTRACT  Examination of the nonlinear model with variance components, which combines a nonlinear model for the mean with additive random effects, applicable to split-plot and nested experiments. Proposed are two methods of estimating the parameters of the nonlinear model for the mean: estimated generalized least squares and maximum likelihood by the method of scoring. It is shown that both estimators are consistent, asymptotically normal, and asymptotically efficient.
TERMS     nonlinear regression analysis
          multi-level models
          complex experimental designs
          generalized least-squares estimator
          maximum likelihood estimators
          consistent estimator
          efficient estimator
          fractional factorial design
          hierarchical design

TITLE     Factor Analysis for Clustered Observations
AUTHORS   LONGFORD, N.T.
          MUTHÉN, B.O.
LANGUAGE   English
YEAR      1992
IN        Psychometrika, 57(1992)4 (Dec.), 581-597
INDEXED ON Indexed on Publication
ABSTRACT  Presentation of a two-level model for factor analysis of clustered vectors of observations. Derived are formulas for the Fisher scoring algorithm for maximum likelihood estimation in this multilevel model. A simple noniterative method is discussed, based on a decomposition of the total sums of squares and crossproducts. Indicated are extensions for multiple levels of nesting.
TERMS     factor analysis
          multi-level models
          maximum likelihood estimators

TITLE     Zur Analyse von Paneldaten mit SPSS/PC: Die EGLS-Schätzung
On panel analysis with SPSS/PC. Discussed is the error component model for ordinary least squares regression. Program listings for SPSS/PC commands are provided.

TITLE: Bayesian Designs for Maximizing Information and Outcome
AUTHORS: VERDINELLI, Isabella KADANE, Joseph B.
LANGUAGE: English
YEAR: 1992
IN: Journal of the American Statistical Association, 87(1992)418 (June), 510-515
INDEXED ON: Indexed on Publication
ABSTRACT: Presentation of a utility function for optimal Bayesian experimental designs. The utility function described is a generalization of the utility used in Bayesian D-optimal designs. Considered are implications of using this utility function in deriving experimental designs in the context of hierarchical linear models in general, and designs for one-way ANOVA models and straight-line models specifically.

TITLE: Comparison of Efficiency of Jackknife and Variance Component Estimators of Standard Errors
AUTHORS: LONGFORD, Nicholas T.
LANGUAGE: English
PUBLISH: Princeton (NJ): Educational Testing Service (ETS)
YEAR: 1992
PAGES: 31
INDEXED ON: Indexed on Publication
ABSTRACT: Exploration of the jackknife procedures used in a large scale survey of United States' primary and secondary schools. By means of simulations it is shown, that these procedures can be replaced by computationally more efficient methods for the calculation of standard errors of subpopulation on means based on variance component analysis.

TITLE: Exponential Families and Variance Component Models
AUTHORS: CLASON, Dennis L. MURRAY, Leigh W.
LANGUAGE: English
YEAR: 1992
IN: The American Statistician, 46(1992)1 (Febr.), 29-31
INDEXED ON: Indexed on Publication
ABSTRACT: Presentation of two exponential families, the first following the Lehmann-Scheffé theorem, and the second is due to Gautschi's lemma. The second family is needed for some cross-classified variance component models, which is demonstrated for the twofold nested and randomized complete block models.

TITLE: Modeling Interviewer Effects with Multilevel Models
AUTHORS: HOX, J.J.
On the application of the multilevel regression model to analyze interviewer effects. Discussed and illustrated are advantages in using the hierarchical regression model for research on the effects of specific interviewer- and respondent characteristics in survey research. In an example on model selection, a controlled field experiment on mode effects is described. Respondent- and interviewer effects are examined in three types of data collection methods: face-to-face interviews, telephone interviews, and computer-assisted telephone interviews.

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Plea for an adequate specification of models of multilevel analysis in accordance with multilevel theories. Examined is, in what regard multilevel theories and multilevel models can profit from each other. Formation of multilevel theories with a conditional structure, and construction of random coefficient models are considered. This theory assumes that a higher level characteristic influences a process of the lower level. Applied is Dar and Resh's educational theory of enrichment of learning environment, and provided are recommendations on the extension of multilevel theories in the direction of multilevel models.

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On models with variance components. Discussed are the estimation of variance components by means of maximum likelihood and restricted maximum likelihood under normality. Other procedures like MINQUE and MIVQUE are also considered.

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On models with variance components. Discussed are the estimation of variance components by means of maximum likelihood and restricted maximum likelihood under normality. Other procedures like MINQUE and MIVQUE are also considered.
INDEXED ON
Terms
Panel analysis
Multi-level models

Title
Monte-Carlo Results on Several New and Existing Tests for the Error Component Model

Authors
Baltagi, B.H.
Lim, Q.

Language
English

Year
1992

In

Indexed on
Title
Terms
Multi-level models

Title
Logistic Regression with Random Coefficients

Authors
Longford, N.T.

Language
English

Year
1992

In

Indexed on
Title
Terms
Multi-level models
Logistic regression

Title
An Introduction to Hierarchical Linear Models

Authors
Arnold, Carolyn L.

Language
English

Year
1992

In

Indexed on
Title
Terms
Multi-level models

Title
Hierarchical Linear Models: Applications and Data Analysis Methods

Authors
Bryk, Anthony S.
Raudenbush, Stephen W.

Language
English

Publisher
London: Sage

Year
1992

Pages
288

ISBN
0-8039-4627-9

Serials
Advanced Qualitative Techniques in the Social Sciences Series, Volume 1

Indexed on
Publication

Abstract
Introduction to the theory and applications of two- and three level hierarchical linear models. Discussed are statistical methods for estimation of effects at individual level and for estimation and hypothesis testing of cross-level effects. The partitioning of variance and covariance components among levels is also considered. Applications in organizational research, in research on individual developments, and in meta analyses are described as illustrations. The logic of multilevel models is discussed by means of concepts from regression analysis and random effects models. And the logic of statistical inference in hierarchical linear models is discussed by means of basic assumptions, and consequences of violation of these assumptions. Within the framework of the general Bayes' linear model are distinguished: random-effects models, randomly varying slope models, nonrandomly varying slope models, and the slopes- and intercepts-as-outcomes models. And discussed are point, interval and maximum likelihood estimation of fixed-effects, of random level-1 coefficients and of variance-covariance components. Both single and multi-parameter by hypothesis tests are considered.

Terms
Multi-level models
Estimation
Hypothesis testing
Random effects model
Estimation of variance components
organizational research
meta analysis
individual analysis

TITLE Multilevel Modeling in an Indicator System
AUTHORS FITZ-GIBBON, C.T.
LANGUAGE English
YEAR 1991
INDEXED ON Indexed on Title
TERMS multi-level models

TITLE A Review of Two Different Approaches for the Analysis of Growth Data Using Longitudinal Mixed Linear Models: Comparing Hierarchical Linear Regression (ML/3, HLM) and Repeated Measures Design with Structured Covariance Matrices (BMDP-5V)
AUTHORS LEEDEN, R. van der
VRIJBURG, K.
LEEUW, J. de
LANGUAGE English
PUBLISH Los Angeles (CA): University of California, Department of Statistics
YEAR 1991
INDEXED ON Indexed on Title
TERMS multi-level models

TITLE Maximum Likelihood Estimation of a Set of Covariance Matrices under Lower Order Restrictions with Applications to Balanced Multivariate Variance Components Models
AUTHORS CALVIN, J.A.
DIJKSTRA, R.L.
LANGUAGE English
YEAR 1991
INDEXED ON Indexed on Title
TERMS maximum likelihood estimators
multi-level models

TITLE Multilevel Modelling of Survey data
AUTHORS GOLDSTEIN, H.
LANGUAGE English
YEAR 1991
IN Journal of the Royal Statistical Society, Series D (The Statistician), 40(1991), 235-244
INDEXED ON Indexed on Title
TERMS multi-level models

TITLE Rates of Convergence for Gibbs Sampling for Variance Component Models
AUTHORS ROSENTHAL, J.S.
LANGUAGE English
PUBLISH Cambridge (MA): Harvard University, Department of Mathematics
YEAR 1991
SPEC_ISSUE Technical Report
INDEXED ON Indexed on Title
TERMS unfolding techniques
multi-level models

TITLE Nonlinear Multilevel Models with an Application to Discrete Response Data
AUTHORS GOLDSTEIN, H.
LANGUAGE English
YEAR 1991
IN Biometrika, 78(1991), 45-51
INDEXED ON Indexed on Title
TERMS multi-level models
discrete models

TITLE Generalized Variance Component Models for Clustered
### Categorical Response Variables

**AUTHORS**
MILLER, M.E.
LANDIS, J.R.

**LANGUAGE**
English

**YEAR**
1991

**IN**
Biometrics, 47(1991), 33-44

**INDEXED ON**
Indexed on Title

**TERMS**
multi-level models

**TITLE**
Contextually Specific Effects and other Generalizations of the Hierarchical Linear Model for Comparative Analysis

**AUTHORS**
WONG, George Y.
MAISON, William M.

**LANGUAGE**
English

**YEAR**
1991

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
On substantive and methodological problems in multilevel analysis due to contextual specific variables. A generalization of the hierarchical linear model for multiple level analysis is proposed, using restricted maximum likelihood estimation and empirical Bayes.

**TERMS**
multi-level analysis
contextual analysis
pseudo-likelihood estimators
Bayesian methods
multi-level models

### Least Squares Estimation of Covariance Matrices in Balanced Multivariate Variance Components Models

**AUTHORS**
CALVIN, James A.
DYKSTRA, Richard L.

**LANGUAGE**
English

**YEAR**
1991

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
On estimating covariance matrices in balanced multivariate variance components models. An iterative estimation procedure is developed, satisfying a least squares criterion and producing guaranteed nonnegative definite estimates.

**TERMS**
multi-level models
covariance
least-squares estimators

### The Effect of Interviewer and Respondent Characteristics on the Quality of Survey Data: A Multilevel Model

**AUTHORS**
HOX, Joop J.

**LANGUAGE**
English

**YEAR**
1991

**IN**

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Presentation of a multilevel model for analyzing the joint effects of interviewer and respondent characteristics on data quality. Examined is the impact of interviewer characteristics like socio-demographic variables, personality traits, social skills, and opinions and attitudes on responses. Response variability, attributable to the interviewers, is estimated by means of a hierarchical linear model (also called random component model, or variance component model). Discussed are the results of a study on loneliness and well-being in which both face-to-face and telephone interviews are used. Special attention to between-interviewer effects on nonresponse, on acquiescence, on respondents' feelings about the interview, and on interview evaluation by the respondents. Appendix: available software on multilevel models.

**TERMS**
acquiescence
interviewer effect
data quality
respondents
interviewer appearance
behavior of interviewer
software
multi-level models
interviewing
telephone interview
nonresponse

TITLE Using Hierarchically Linear Models to Analyze Multilevel Data
AUTHORS KREFT, Ita G.G.
LANGUAGE English
YEAR 1991
IN ZUMA-Nachrichten, 15(1991)29 (Nov.), 44-56
INDEXED ON Indexed on Publication
ABSTRACT On multiple level analysis by means of the hierarchically linear model (also called the random coefficient model or the Bayesian linear model). Developed for the analysis of nested data, collected under non-experimental conditions in stratified samples. Properties and assumptions of this linear model, with individual- and group-level regressors or predictors, and an individual-level dependent variable are considered. The total variance is decomposed into a within- and between-group variance. Illustrated with educational research data.

TERMS multi-level models
stratified sampling
estimation of variance components
educational research

TITLE A Two-Stage Rasch Model Approach to Dependent Item Responses: An Application of Constrained Latent Trait Models
AUTHORS ZWINDERMAN, Aeilko H.
LANGUAGE English
YEAR 1991
IN Methodika, 5(1991), 33-46
INDEXED ON Indexed on Publication
ABSTRACT Discussion on constrained Rasch models by an instructive application to diagnosing patients. The Rasch model, linear logistic test models, and logistic regression models with random components are linked in an example from medical practice.

TERMS latent trait models
logistic regression
multi-level models
one-parameter logistic model

TITLE On the Estimated Variances of Regression Coefficients in Misspecified Error Components Model
AUTHORS DESCHAMPS, Philippe J.
LANGUAGE English
YEAR 1991
IN Econometric Theory, 7(1991)3 (Sept.), 369-384
INDEXED ON Indexed on Publication
ABSTRACT On error components models. Equivalent representations of the covariance matrix of disturbances by linear combinations of matrices are used to the derivation and interpretation of the inconsistency of the estimated coefficient variances in misspecified models.

TERMS multi-level models
properties of estimators
model specification

TITLE The Analysis of Factorial Surveys
AUTHORS HOX, Joop J.
KREFT, G.G.
HERMKENS, Piet L.J.
LANGUAGE English
YEAR 1991
IN Sociological Methods & Research, 19(1991)4 (May), 493-510
INDEXED ON Indexed on Publication
ABSTRACT On the multiple level analysis of factorial survey data. In
this type of research, data are analyzed at both the respondent level and at the vignette level (responses to descriptions of a constructed world in which important factors are built in experimentally). The advantages of hierarchical linear models are described and illustrated to (Dutch) research data on judgments about fairness of incomes, applying Bryk’s HLM-program.

**TERMS**
- factorial design
- survey research
- indirect questions
- multi-level analysis
- software
- linear regression
- multi-level models
- vignette technique

**TITLE**
VARCL: Software for Variance Component Analysis of Data with Nested Random Effects (Maximum Likelihood)

**AUTHORS**
LONGFORD, N.T.

**LANGUAGE**
English

**PUBLISH**
Princeton (NJ): Educational Testing Service (ETS)

**YEAR**
1990

**INDEXED ON**
Indexed on Title

**ABSTRACT**
On the development of a multilevel model for the analysis of trends in repeated cross-sectional surveys from the same context. After discussing the algebra of standard multilevel models, a mixed estimator for a model based on a simple first order autoregressive process is developed. The model is then extended to a three-level model that allows for within-group differences in sensitivity to structural change. With an example using data from the General Social Survey.

**TERMS**
- multi-level analysis
- cross-section research
- trend analysis
- multi-level models
- autoregressive process model

**TITLE**
Sozialwissenschaftliche Mehrebenenmodelle und Gentrification

**AUTHORS**
HUININK, Johannes

**LANGUAGE**
German

**YEAR**
1990

**IN**

**INDEXED ON**
Indexed on Title

**ABSTRACT**
Description and comparison of the algorithms of four computer programs for multilevel analysis and contextual analysis: GENMOD, HLM version 2.0, ML2 (apart from the statistical
package NANOSTAT), VARCL 3 and VARCL 9.
software
multi-level analysis
contextual analysis
multi-level models

TITLE
Variance Component Models and Observational Data

AUTHORS
LONGFORD, Nick T.

LANGUAGE
English

YEAR
1990

IN

INDEXED ON
Indexed on Publication

ABSTRACT
Presentation of variance component models for the analysis of research data, based on the analysis of covariance with grouping categories, arising from a random process. Special attention to bias in the statistical analysis of research data, due to the violation of the assumption of random allocation. An extension of variance component models to analysis of non-normally distributed data is also considered, using the VARCL-computer program.

TITLE
Dynamic Models of School and Teacher Effects on Student Learning

AUTHORS
RAUDENBUSH, Stephen W.

LANGUAGE
English

YEAR
1990

IN

INDEXED ON
Indexed on Publication

ABSTRACT
Presentation of appropriate theoretical and statistical models to study the educational effects on student developments. Described and illustrated are the characteristics of dynamic, multilevel models, suited for the analysis of repeated measures of both school effects and teacher effects on pupils developments.

TITLE
Factorial Surveys: An Example of Multilevel Design

AUTHORS
HOX, Joop
KREFT, G.G.
HERMKENS, Piet

LANGUAGE
English

YEAR
1990

IN

INDEXED ON
Indexed on Publication

ABSTRACT
On the application of multilevel models within the context of factorial survey designs, using vignettes in questionning. Discussed are statistical problems in both single-level and two-step analyses of factorial data, due to violations of assumptions of fixed effects linear regression models. Instead, the hierarchical linear model and the computer program HLM of Raudenbush and Bryk are applied to these multilevel data, in which two regression equations are posed: one modeling the vignette effects within respondents, and the other modeling respondents effects between respondent.

TERMS
multi-level models
factorial design
types of questions
linear regression
<table>
<thead>
<tr>
<th>TITLE</th>
<th>Theory and Analysis of Multilevel Processes and Effects: A Two-Level Example on Pupil Achievement, Competence, and Orientation</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>MOOIJ, Ton JANSEN, Ronald</td>
</tr>
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<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1990</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>On some recent theoretical, methodological and analytical developments in multilevel research, illustrated by research on the effects of the educational system on pupils. Described are research data on the Dutch educational system, studied by means of an multilevel approach. Data are analyzed by secondary analyses of longitudinal, multilevel data, using variance component analysis. An adequate selection of variables, and the avoidance of multicollinearity and suppressor effects seem important.</td>
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<tr>
<td>TERMS</td>
<td>multi-level analysis educational research secondary analysis longitudinal research multicollinearity suppressor variables multi-level models</td>
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<table>
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<tr>
<th>TITLE</th>
<th>Theories and the &quot;Underspecification&quot; of Models in Multilevel Research</th>
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<tbody>
<tr>
<td>AUTHORS</td>
<td>EEDEN, Pieter van den</td>
</tr>
<tr>
<td>LANGUAGE</td>
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<td>1990</td>
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<tr>
<td>ABSTRACT</td>
<td>Examination of the advancements in theory formation and modelling in multilevel research, and the conditions under which theories and models may profit from each other. Considered are theories with a conditional structure for formulation of hypotheses, and the random coefficient model for theory testing. Illustrated to research data of the effects of the educational system on the recruitment and school careers of pupils. It is concluded that advancements in multi-level theory formation proceed slower than those in model construction.</td>
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<td>TERMS</td>
<td>multi-level models theory formation model building educational research theory testing</td>
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<th>TITLE</th>
<th>Preliminary Notes</th>
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<tr>
<td>AUTHORS</td>
<td>HOX, Joop EEDEN, Pieter van den HAUER, Joost</td>
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<td>LANGUAGE</td>
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<td>YEAR</td>
<td>1990</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>Introduction to a collection of workshop papers on convergence and divergence in multilevel theories and models. Described are the features of multilevel research, based on multi-stage sampling. With special...</td>
</tr>
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</table>
attention to the various kinds of fallacies the researcher must be aware of.

**TERMS**
- multi-level models
- theory
- multistage sampling
- fallacy of wrong level

**TITLE**
Comparing Four Different Statistical Packages for Hierarchical Linear Regression: GENMOD, HLM, ML2 and VARCL

**AUTHORS**
KREFT, G.G.
LEEUN, J. de
KIM, K.S.

**LANGUAGE**
English

**PUBLISH**
Los Angeles (CA): University of California

**YEAR**
1990

**SERIALS**
UCLA Statistics Series, Nr. 50

**INDEXED ON**
Indexed on Title

**TERMS**
- multi-level models
- software

**TITLE**
Multi-niveau programmatuur: Enige gegevens

**AUTHORS**
ANONYMOUS

**LANGUAGE**
Dutch

**YEAR**
1990

**IN**
Tijdschrift voor Onderwijsresearch, 15(1990)5 (nov.), 332-333

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Discussion of four computer programs for multilevel research: VARCL (Variance Component Analysis); HLM (Hierarchical Linear Modelling); ML (Multilevel); GENMOD (GENeral MODelling) and a journal: The Multilevel Modelling Newsletter. With information on addresses.

**TERMS**
- multi-level models
- software

**TITLE**
Statistische aspecten van multi-niveau onderzoek

**AUTHORS**
BOSKER, Roel J.
SNIJDEERS, Tom A.B.

**LANGUAGE**
Dutch

**YEAR**
1990

**IN**
Tijdschrift voor Onderwijsresearch, 15(1990)5 (nov.), 317-329

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Review of the random coefficient hierarchical model for multilevel research. Attention is given to parameter estimation, using generalized and ordinary least square estimation and empirical Bayesian methods, procedures for testing regression parameters and variance- and covariance components. Approximate formulas for standard errors in two-level models with random intercepts are given.

**TERMS**
- multi-level analysis
- ordinary least-squares estimator
- Bayesian methods
- multi-level models
- standard error

**TITLE**
Theory and Model in Multilevel Research: Convergence or Divergence?

**EDITORS**
EEDEN, Pieter van den
HOX, Joop
HAUER, Joost

**LANGUAGE**
English

**PUBLISH**
Amsterdam: Stichting Interuniversitair Instituut voor Sociaal-Wetenschappelijk Onderzoek (SISWO)

**YEAR**
1990

**PAGES**
194

**ISBN**
90-6706-091-7

**SERIALS**
SISWO-Publikatie, No. 351

**INDEXED ON**
Indexed on Publication

**ABSTRACT**
Collection of workshop papers on developments in multilevel analysis. Both theories and models are discussed, with emphasis on analysis by means of the random coefficient model and its computer programs. The workshop was organized by the Dutch Multilevel Research Group (Nijmegen, June 1988).

**CONTENTS**
Raudenbush, S.W. 1990
Mooij, T. et al. 1990
Longford, N.T. 1990
Kreft, I.G.G. et al. 1990
Iversen, G.R. 1990
Hox, J. et al. 1990
Eeden, P. van den 1990

Keywords: multi-level analysis
linear regression
theory
software
multi-level models
proceedings

Title: Robust Regression, Analysis and Applications
Editors: LAWRENCE, Kenneth D.
ARThUR, Jeffrey L.

Volume: 287

Language: English

Publication: New York (NY): Marcel Dekker

Year: 1990

Abstract: Collection of articles on robust regression. The first part describes new developments in Bayesian estimation, Lp-estimators, and robust non-linear regression. The second part examines methods for robust regression. Attention is paid to outliers and L1-regression, iterative reweighted least-squares, robustness of the L1-estimator and residuals in variance components models. The third part is devoted to the role of robust regression in forecasting, with issues such as robust time series analysis, input-output models, outlier detection. Also a comparison of classical regression and robust alternatives is made in a case study. The last part on ridge regression deals with the simultaneous handling of outliers and multicollinearity and comparison of classical and ridge regression in a case study.

Keywords: multicollinearity
regression analysis
ridge regression
outliers
Bayesian methods
nonlinear regression analysis
weighted least-squares estimator
multi-level models
forecasting
time series analysis
multiple regression

Title: Multivariate Variance Component Analysis: An Application in Test Development
Authors: LONGFORD, Nicholas T.

Volume: 91-112

Language: English

Publication: Journal of Educational Statistics, 15(1990)2 (Summer)

Year: 1990

Abstract: Presentation of a multilevel variance component analysis of data from the pilot stage of pretesting an educational test. First the studied test instrument and research problem are presented, followed by an overview of variance component models. Also data, procedures and results are described.

Keywords: multi-level models
educational research

Title: Factorial Surveys: Multilevel by Design
Authors: HOX, J.J.
KREFT, G.G.
HERMKENS, P.L.J.

Volume: 67-88

Language: English

Publication: Kwantitatieve Methoden, 11(1990)33 (febr.)

Year: 1990

Abstract: Presentation of models for the analysis of factorial surveys...
data. Experimental designs are combined with the sample survey. Models for analysis should reflect both the individual level and the "vignette" level of the collected data. Discussed and illustrated are random coefficients models, to be applied in multilevel analysis of factorial surveys.

**TERMS**
- multi-level models
- survey research
- factorial design
- random effects model
- vignette technique

**TITLE**
Simple Estimators for the Linear Random Coefficient Regression Model and the Nonlinear Model with Variance Components

**AUTHORS**
GUMPERTZ, M.L.

**LANGUAGE**
English

**PUBLISH**
Chapel Hill (NC): North Carolina State University, Department of Statistics

**YEAR**
1989

**INDEXED ON**
Indexed on Title

**TERMS**
- multi-level models

**TITLE**
Multilevel Aspects of Varying Parameters in Structural Models

**AUTHORS**
MUTHÉN, B.
SATORRA, A.

**LANGUAGE**
English

**YEAR**
1989

**IN**

**REVIEW IN**
The British Journal of Mathematical and Statistical Psychology, 44(1991)1 (May), 135

**INDEXED ON**
Indexed on Review

**ABSTRACT**
Discussion of multilevel structural equation models with a hierarchical nesting of sampling units similar to the random effects general linear model.

**TERMS**
- multi-level models
- structural equations models
- general linear model

**TITLE**
Ethnicity, Comparative Analysis and Generalization of the Hierarchical Normal Linear Model for Multilevel Analysis

**AUTHORS**
WONG, G.Y.
MASON, W.M.

**LANGUAGE**
English

**PUBLISH**
Ann Arbor (MI): University of Michigan, Population Studies Center

**YEAR**
1989

**SERIALS**
Research Report, No. 89-138

**INDEXED ON**
Indexed on Title

**TERMS**
- multi-level models

**TITLE**
Models for Multilevel Response Variables with an Application to Growth Curves

**AUTHORS**
GOLDSTEIN, H.

**LANGUAGE**
English

**YEAR**
1989

**IN**

**INDEXED ON**
Indexed on Title

**TERMS**
- multi-level models
- analysis of change

**TITLE**
Analysis of Complex Surveys

**AUTHORS**
SKINNER, C.J.
HOLT, D.
SMITH, T.M.F.

**LANGUAGE**
English

**PUBLISH**
New York (NY): Wiley

**YEAR**
1989

**PAGES**
309

**ISBN**
0-471-92377-X
| INDEXED ON | Indexed on Review |
| ABSTRACT | On complex survey analysis. The book consists of three parts: Part A examines the effect of complex samples on the estimation of sample variances and significance tests. Part B describes potential biases in regression, logistic regression, and other multivariate techniques due to complex selection and estimation methods. Part C discusses model building and testing for multilevel, multivariate, and logistic models with complex survey designs. |
| TERMS | multi-level models, multivariate contingency analysis, elaboration, research design, logistic regression, types of sampling, multivariate analysis, multiple regression, estimation, bias, model building, model testing |

| TITLE | Fisher Scoring Algorithm for Variance Component Analysis of Data with Multilevel Structure |
| AUTHORS | LONGFORD, N.T. |
| LANGUAGE | English |
| YEAR | 1989 |
| INDEXED ON | Indexed on Title |
| TERMS | multi-level models, multi-level analysis |

| TITLE | Balanced Versus Unbalanced Designs for Linear Structural Relations in Two-Level Data |
| AUTHORS | McDONALD, Roderick P. GOLDSTEIN, Harvey |
| LANGUAGE | English |
| YEAR | 1989 |
| INDEXED ON | Indexed on Publication |
| ABSTRACT | Description of a general two-level statistical model for multivariate data. The general model is illustrated by two specializations: a common factor model and a path model with latent variables. The latter is an extension of McArdle's RAM model. Attention is given to estimation procedures and goodness-of-fit tests. |
| TERMS | multi-level models, path model, common factor analysis, goodness-of-fit tests, estimation, latent variable models, structural equations models |

| TITLE | Pooled Time Series Analysis |
| AUTHORS | SAYRS, Lois W. |
| LANGUAGE | English |
| PUBLISH | Newbury Park (CA): Sage |
| YEAR | 1989 |
| PAGES | 80 |
| ISBN | 0-8039-3160-3 |
| SERIALS | Quantitative Applications in the Social Sciences Series, Volume 70 |
| INDEXED ON | Indexed on Review |
| ABSTRACT | On the pooling of time series data. Four methods for regression analysis of pooled time series data are discussed: the constant coefficients model, the LSDV model, the random coefficient model, and the structural equation model. |
Review of contextual effect models. First a scheme of possible interactions between contexts and individuals is presented. Five major linear models are abstracted from these relationships: 1. individual-effects model; 2. macro-effects model; 3. ANOVA or conditional probability model; 4. contextual-effects model; 5. multilevel contextual-effects model. Four methods for operationalizing contexts prior to analysis are discussed: adjectival transformations; multiple indicators and latent constructs; quasi-experimental designs; and fuzzy set theory.

Introduction to multilevel system modelling, as used for theoretical and empirical analysis of complex open systems.

Toward a more Appropriate Conceptualization of Research on School Effects: A Three-Level Hierarchical Linear Model.

Description and illustration of the characteristics of a general multilevel model; a generalization of Goldstein's model. The presented model contains the following special cases: multiple time series models, longitudinal data models, multiple matrix sampling models, generalizability theory models, multilevel common factor models, multilevel latent variable models, and variance and covariance component models.

**Terms:**
- multi-level models
- matrix sampling
- time series analysis
- common factor analysis
- latent variable models
- analysis of variance
- analysis of covariance

**Title:** A Generalized Error Component Model with Heteroscedastic Disturbances

**Authors:** Baltaği, B.H.

**Language:** English

**Year:** 1988

**Index on:** International Economic Review, 29(1988) (Nov.), 745-753

**Terms:**
- multi-level models
- heteroscedasticity

**Title:** A Transformation for Heteroscedastic Error Components in Regression Models

**Authors:** Randolph, W.C.

**Language:** English

**Year:** 1988

**Index on:** Economics Letters, 27(1988)4, 349-354

**Terms:**
- regression analysis
- multi-level models

**Title:** Estimating Generalizability in Systematic Observation Studies

**Authors:** Plewis, Ian

**Language:** English

**Year:** 1988

**Index on:** The British Journal of Mathematical and Statistical Psychology, 41(1988)1 (May), 53-62

**Terms:**
- estimation of variance components
- generalizability
- observation
- time sampling
- multi-level models

**Title:** Educational Applications of Hierarchical Linear Models: A Review

**Authors:** Raudenbush, Stephen W.

**Language:** English

**Year:** 1988

**Index on:** Journal of Educational Statistics, 13(1988)2 (Summer), 85-116

**Terms:**
- multi-level models
- estimation
Dr. Wolfgang Langer – Methoden V: Mehrebenenanalyse – WiSe 2000/2001

<table>
<thead>
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<th>TITLE</th>
<th>Optimal Experimental Design for Error Components Models</th>
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<tr>
<td>AUTHORS</td>
<td>AIGNER, Dennis J. BALESTRA, Pietro</td>
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<tr>
<td>YEAR</td>
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<td>TERMS</td>
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<th>TITLE</th>
<th>Estimation of Variance Components and Applications</th>
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<tr>
<td>AUTHORS</td>
<td>RAO, C.R. KLEFFE, J.</td>
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<td>LANGUAGE</td>
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<tr>
<td>PUBLISH</td>
<td>Amsterdam: North-Holland</td>
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<td>SERIALS</td>
<td>North-Holland Series in Statistics and Probability, 3</td>
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<tr>
<td>INDEXED ON</td>
<td>Indexed on Review</td>
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<tr>
<td>ABSTRACT</td>
<td>Monograph on variance components model. With introductory chapters on linear algebra, asymptotic distributions of quadratic forms, general variance and covariance component models and their identifiability and estimability, and to the MINQE-principle and properties of MINQE-estimators. Other topics are: replicated models; uniformly best unbiased estimators; computation of variance component estimators; the relationship between the iterated MINQE-estimator and the maximum likelihood principle; asymptotic theory of MINQE-estimators; and minimum variance quadratic estimation. The last chapter deals with applications of variance component models. With exercises.</td>
</tr>
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<td>TERMS</td>
<td>random effects model asymptotic distribution analysis of covariance identification properties of estimators unbiased estimator maximum likelihood estimators estimation of variance components multi-level models</td>
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<th>TITLE</th>
<th>Multilevel Covariance Components Models</th>
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<tr>
<td>AUTHORS</td>
<td>GOLDSTEIN, H.</td>
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<tr>
<td>YEAR</td>
<td>1987</td>
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<td>IN</td>
<td>Biometrika, 74(1987)2, 430-431</td>
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<td>TERMS</td>
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<tr>
<td>TITLE</td>
<td>Het schatten van school effecten. Problemen bij de keuze van het model en de techniek</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>KREFT, G.G. LEEUW, J. de</td>
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<td>LANGUAGE</td>
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<td>YEAR</td>
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<td>IN</td>
<td>Tijdschrift voor Onderwijsresearch, 12(1987)2, 75-85</td>
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<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>On statistical aspects of different models used in multilevel analysis, the role of theory, and the choice of an appropriate model. The distinction between modelling and estimation techniques is clarified in order to make the distinction between &quot;one-step&quot; and &quot;two-step&quot; procedures understandable. Various versions of the linear regression model are compared. With an empirical example from educational research, concerning the estimation of school effects on educational achievement. Within the framework of contextual analysis, a random coefficient model is proposed.</td>
</tr>
<tr>
<td>TERMS</td>
<td>model building model solving multi-level analysis procedures</td>
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general linear model
educational research
contextual analysis
multi-level models

TITLE Multilevel Models in Educational and Social Research
AUTHORS GOLDSTEIN, Harvey
LANGUAGE English
PUBLISH London: Griffin
YEAR 1987
PAGES 96
ISBN 0-85264-288-1
INDEXED ON
ABSTRACT On multiple level analysis. The first part of the book is devoted to the general multilevel model. In the second part applications are given of the multilevel procedure to other types of structured data. Attention is given to process models based on longitudinal and repeated measures design. Applications are presented to multivariate data, to traditional multivariate techniques and models for proportions, including logit and loglinear models.

TITLE An Intraclass Correlation Model for Analyzing Multilevel Data
AUTHORS SINGER, Judith D.
LANGUAGE English
YEAR 1987
IN The Journal of Experimental Education, 55(1987)4 (Summer), 219-228
SPEC_ISSUE Abstract available from PsycINFO and full text article is available from EBSCO Document services, E-mail: order@ebscodoc.com
ABSTRACT IN Psychological Abstracts, 75(1988)9 (Sept.), 2283
INDEXED ON Indexed on Abstract
ABSTRACT Presentation of a two-stage generalized least-squares model for estimating the linear regression of an individual outcome on a group characteristic in multilevel research. The model assumes intraclass correlation among errors with groups, and is compared with more traditional analytic approaches.

TITLE Statistical Modelling of Data from Hierarchical Structures Using Variance Component Analysis
AUTHORS LONGFORD, N.T.
LANGUAGE English
PUBLISH Lancaster (UK): Lancaster University, Center for Ad Statistics
YEAR 1986
INDEXED ON Indexed on Title
TERMS multi-level models

TITLE Modelling Multilevel Effects
AUTHORS EEDEN, P. van den
LANGUAGE English
YEAR 1986
INDEXED ON Indexed on Title
TERMS multi-level models

TITLE A Hierarchical Model of Studying School Effects
AUTHORS RAUDENBUSH, S.W.
BRYK, A.S.
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<th>LANGUAGE</th>
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<td>TITLE</td>
<td>Multilevel Mixed Linear Model Analysis Using Iterative Generalized Least-Squares</td>
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<tr>
<td>AUTHORS</td>
<td>GOLDSTEIN, H.</td>
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<td>YEAR</td>
<td>1986</td>
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<tr>
<td>IN</td>
<td>Biometrika, 73(1986)1, 43-56</td>
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<tr>
<td>TERMS</td>
<td>multi-level models</td>
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<tr>
<td>TITLE</td>
<td>Conditional Forecasting with a Multivariate Time Series Model</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>KNOOP, H.S. van de</td>
</tr>
<tr>
<td>YEAR</td>
<td>1986</td>
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<td>TERMS</td>
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<tr>
<td>TITLE</td>
<td>Random Coefficient Models for Multilevel Analysis</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>LEEUW, Jan de KREFT, G.G.</td>
</tr>
<tr>
<td>YEAR</td>
<td>1986</td>
</tr>
<tr>
<td>IN</td>
<td>Journal of Educational Statistics, 11(1986) (Spring), 57-85</td>
</tr>
<tr>
<td>INDEXED ON</td>
<td>Indexed on Publication</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>On a statistical model for multilevel analysis. Two types of equations are used for the model. The first type specifies an individual level within-group regression model for each group. The second type relates within-group regression coefficients to contextual variables describing the group. Several estimation procedures for the model are compared.</td>
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<td>TERMS</td>
<td>multi-level models</td>
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<tr>
<td>TITLE</td>
<td>Optimal Block Designs under a Hierarchical Linear Model</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>GIOVAGNOLI, A. VERDINELLI, I.</td>
</tr>
<tr>
<td>LANGUAGE</td>
<td>English</td>
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<td>YEAR</td>
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<td>TERMS</td>
<td>incomplete block design</td>
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<tr>
<td>TITLE</td>
<td>The Hierarchical Logistic Regression Model for Multilevel Analysis</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>WONG, George Y. MASON, William M.</td>
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<tr>
<td>LANGUAGE</td>
<td>English</td>
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<tr>
<td>YEAR</td>
<td>1985</td>
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<tr>
<td>IN</td>
<td>Journal of the American Statistical Association, 80(1985)391 (Sept.), 513-524</td>
</tr>
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<td>INDEXED ON</td>
<td>Indexed on Publication</td>
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<tr>
<td>ABSTRACT</td>
<td>On multiple level analysis and multivariate contingency analysis. Proposition of a hierarchical logistic regression model for analyzing data with group structure and a binary, response variable. At micro-level the logistic regression model is defined for each context. At macro-level micro coefficients are treated as functions of macro regressors. Coefficients are estimated by Bayes' estimators. Provided are formulas for large-scale data analysis and algorithm for estimates of covariance components using the method of maximum likelihood. With application to World Fertility</td>
</tr>
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Survey Data.

**TITLE** Cross-Level Interaction in Multilevel Models

**AUTHORS** TATE, Richard L.

**LANGUAGE** English

**YEAR** 1985

**IN** The Journal of Applied Behavioral Science, 21(1985)2, 221-234

**INDEXED ON** Indexed on Publication

**ABSTRACT** On multiple level analysis in behavioral research. Described are applications of interactive multilevel models to educational research data, with attention to the occurrence of cross-level interactions of variables.

**TERMS** multi-level models

educational research

interaction

behavioral research

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**TITLE** Variance Component Models with Binary Response: Interviewer Variability

**AUTHORS** ANDERSON, D.A.

AITKIN, M.

**LANGUAGE** English

**YEAR** 1985


**INDEXED ON** Indexed on Title

**TERMS** interviewer effect

multi-level models

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**TITLE** Contextual Analysis through the Multilevel Linear Model

**AUTHORS** MASON, William M.

WONG, George Y.

ENTWISLE, Barbara

**LANGUAGE** English

**YEAR** 1984


**INDEXED ON** Indexed on Publication

**ABSTRACT** Presentation of a general linear model for multiple level analysis. Specification of a general linear multilevel model for contextual analysis and for analysis of comparative research. Estimation by means of the REML/Bayes estimation procedure is discussed. Application of the developed model to comparative research data as illustration.

**TERMS** general linear model

multi-level models

contextual analysis

comparative research estimation

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**TITLE** Multi-Level Analysis in Educational Research

**AUTHORS** GRAAF, Cees de

**LANGUAGE** English

**YEAR** 1984


**INDEXED ON** Indexed on Publication

**ABSTRACT** On multiple level analysis in educational research. Review of a number of models for analyzing multi-level data and discussion of some methodological problems.

**TERMS** multi-level analysis

educational research

multi-level models
Random Versus Non-Random Coefficient Models for Multilevel Analysis

AUTHORS: TATE, R.L.
WONGBUNDHIT, Y.

YEAR: 1983

IN: Journal of Educational Statistics, 8(1983), 103-120

TITLE: A Variance Components Model for Measurement Procedures Associated with a Table of Specifications

AUTHORS: JARJOURA, D.
BRANNAN, R.L.

YEAR: 1982

IN: Applied Psychological Measurement, 6(1982)2 (Spring), 161-172

TITLE: Estimation in Covariance Components Models

AUTHORS: DEMPSTER, A.P.
RUBIN, D.B.
TSUTAKAWA, R.K.

YEAR: 1981

IN: Journal of the American Statistical Association, 76(1981)374 (June), 341-353

ABSTRACT: On covariance and estimation. Description and illustration of computational methods required for estimation in covariance components models. Presentation of Bayesian theory for the joint estimation of fixed and random effects when the variances and covariances are known. Description and application of the EM algorithm for maximum likelihood estimation from incomplete data to the problem of computation of point estimates of the unknown variances and covariances.

TITLE: Ecological Inference

AUTHORS: LANGBEIN, Laura I.
LICHTMAN, Allan J.

YEAR: 1978

ISBN: 0-8039-0941-1

SERIALS: Quantitative Applications in the Social Sciences Series, Volume 10

ABSTRACT: p. 1-70: On ecological estimation procedures in contextual analysis with emphasis on sources of ecological fallacy. Description of the impact of forms of grouping and of specification errors at both levels of analysis. Also on the causal structure of models for explaining individual behavior. p. 38-62: Consideration of several techniques for coping with ecological fallacy; computational methods, the manipulation of grouping procedures and ecological regression analysis are described.

TITLE: Regression with Random Coefficients

AUTHORS: JOHNSON, L.W.

LANGUAGE: English
YEAR       1978
IN          Omega: The International Journal of Management Science,
            6(1978)1, 71-81
INDEXED ON Indexed on Title
TERMS       multi-level models
TITLE       Pooling Issues and Methods in Regression Analysis: Some
            Further Reflections
AUTHORS     BASS, Frank M.
            WITTINK, Dick R.
LANGUAGE    English
YEAR       1978
IN          Journal of Marketing Research, 15(1978)2 (May), 277-279
COMMENT     Comments on Pooling Issues and Methods in Regression
            Analysis/ R. BROBST and R. GATES. - In: Journal of Marketing
            Research, 14(1977)4 (Nov.), 598-600
INDEXED ON Indexed on Publication
ABSTRACT    Reply to Brobst and Gates' comment on appropriate tests for
            pooling in regression analysis of time series and of
            cross-sectional data. Consideration of the testing for
            homogeneity, the operationalization of Wallace's trade-off
            argument and discussion of the random coefficients regression
            models.
TERMS       regression analysis
            multi-level models
TITLE       Some Estimation Methods for a Random Coefficient Model
AUTHORS     HSIAO, C.
LANGUAGE    English
YEAR       1975
IN          Econometrica, 43(1975)2 (March), 305-325
INDEXED ON Indexed on Title
TERMS       estimation
            multi-level models
TITLE       Application of Random Coefficient Regression Models to the
            Aggregation Problem
AUTHORS     AKKINA, K.R.
LANGUAGE    English
YEAR       1974
IN          Econometrica, 42(1974)2 (March), 369-375
INDEXED ON Indexed on Title
TERMS       aggregative analysis
            multi-level models
TITLE       Some Formal Bayes Estimators of Variance Components in the
            Balanced Three-Stage Nested Random Effects Model
AUTHORS     SAHAI, H.
LANGUAGE    English
YEAR       1974
IN          Communications in Statistics, 3(1974)3, 233-242
INDEXED ON Indexed on Title
TERMS       Bayes' estimator
            multi-level models