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Quantitative Methods in Education and the Behavioral Sciences: Issues, Research, and Teaching

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Jeffrey R. Harring, *University of Maryland*

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Quantitative Methods in Education and the Behavioral Sciences: Issues, Research, and Teaching is a unique book series sponsored by the American Educational Research Association's Special Interest Group - Educational Statisticians. Motivated by the group's central purpose ? to increase interaction among educational researchers interested in the theory, applications, and teaching of statistics in the social sciences ? the new series is devoted to didactically oriented presentations that introduce, extend, and clarify state-of-the-art quantitative methods for students and researchers in the social and behavioral sciences. As such, the current series aims to present selected topics in a technically sophisticated, yet didactically oriented format. This allows for the individual volumes to be used to enhance the teaching of quantitative methods in course sequences typically taught in graduate behavioral science programs. Although other series and journals exist that routinely publish new quantitative methodologies, this book series is dedicated to both the teaching and applied research perspectives of specific modern quantitative research methods through each volume's relevant and accessible topical treatments. In line with this educational commitment, royalties from the sale of series' volumes will be used in large part to support student participation in annual special interest group conference activities.

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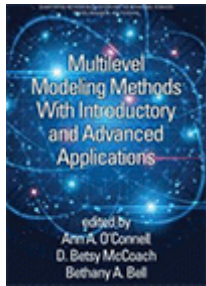
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Multilevel Modeling Methods with Introductory and Advanced Applications

Ann A. O'Connell, Ohio State University; D. Betsy McCoach, University of Connecticut; Bethany A. Bell, University of Virginia

2022. Paperback 978-1-64802-871-7 \$65.99. Hardcover 978-1-64802-872-4 \$95.99. eBook 978-1-64802-873-1 \$74.

Multilevel Modeling Methods with Introductory and Advanced Applications provides a cogent and comprehensive introduction to the area of multilevel modeling for methodological and applied researchers as well as advanced graduate students. The book is designed to be able to serve as a textbook for a one or two semester course in multilevel modeling. The topics of the seventeen chapters range from basic to advanced, yet each chapter is designed to be able to stand alone as an instructional unit on its respective topic, with an emphasis on application and interpretation.

In addition to covering foundational topics on the use of multilevel models for organizational and longitudinal research, the book includes chapters on more advanced extensions and applications, such as cross-classified random effects models, non-linear growth models, mixed effects location scale models, logistic, ordinal, and Poisson models, and multilevel mediation. In addition, the volume includes chapters addressing some of the most important design and analytic issues including missing data, power analyses, causal inference, model fit, and measurement issues. Finally, the volume includes chapters addressing special topics such as using large-scale complex sample datasets, and reporting the results of multilevel designs.

Each chapter contains a section called Try This!, which poses a structured data problem for the reader. We have linked our book to a website (<http://modeling.uconn.edu>) containing data for the Try This! section, creating an opportunity for readers to learn by doing. The inclusion of the Try This! problems, data, and sample code eases the burden for instructors, who must continually search for class examples and homework problems. In addition, each chapter provides recommendations for additional methodological and applied readings.

CONTENTS: Acknowledgments. Introduction to Multilevel Modeling Methods: Pedagogy and Context, *Ann A. O'Connell, D. Betsy McCoach, and Bethany A. Bell.* **SECTION I: ORGANIZATIONAL DATA.** Introduction to Multilevel Models for Organizational Data, *Bethany A. Bell and Jason A. Schoeneberger.* Evaluation of Model Fit and Adequacy, *D. Betsy McCoach, Sarah D. Newton, Anthony J. Gambino.* Causal Inference in Multilevel Settings, *Chris Rhoads and Eva Yujia Li.* Statistical Power for Linear Multilevel Models, *Jessaca Spybrook, Benjamin M. Kelcey, and Nianbo Dong.* Cross-Classified Random-Effects Models, *Audrey J. Leroux and S. Natasha Beretvas.* Multilevel Logistic and Ordinal Models, *Ann A. O'Connell, Meng-Ting Lo, Jessica Goldstein, H. Jane Rogers, and C.-Y. Joanne Peng.* Single and Multilevel Models for Counts, *Ann A. O'Connell, Nivedita Bhaktha, and Jing Zhang.* **SECTION II: LONGITUDINAL DATA.** Individual Growth Curve Models for Longitudinal Data, *D. Betsy McCoach, Bethany A. Bell, and Aarti P. Bellara.* Modeling Nonlinear Longitudinal Change With Mixed Effects Models, *Jeffrey R. Harring and Shelley A. Blozis.* Within-Subject Residual Variance-Covariance Structures in Longitudinal Data Analysis, *Minjung Kim, Hsien-Yuan Hsu, and Oi-man Kwok.* Modeling Variation in Intensive Longitudinal Data, *Donald Hedeker and Robin J. Mermelstein.* **SECTION III: DESIGN AND SPECIAL ISSUES.** Using Large-Scale Complex Sample Datasets in Multilevel Modeling, *Laura M. Stapleton and Scott L. Thomas.* Common Measurement Issues in a Multilevel Framework, *Brian F. French, W. Holmes Finch, and Thao Vo.* Missing Data Handling for Multilevel Data, *Craig K. Enders and Timothy Hayes.* Multilevel Mediation Analysis, *Nicholas J. Rockwood and Andrew F. Hayes.* Reporting Results of Multilevel Designs, *John M Ferron, Yan Wang, Zhiyao Yi, Yue Yin, Eunsook Kim, and Robert F. Dedrick.* About the Contributors.



Structural Equation Modeling A Second Course (2nd ed.)

Gregory R. Hancock, University of Maryland; Ralph O. Mueller, University of Hartford

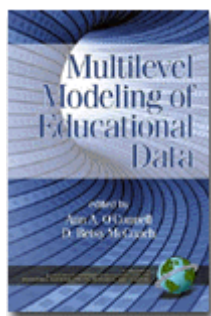
2013. Paperback 9781623962449 \$75.99. Hardcover 9781623962456 \$125.99. eBook 9781623962463 \$74.

Sponsored by the American Educational Research Association's Special Interest Group for Educational Statisticians

This volume is the second edition of Hancock and Mueller's highly-successful 2006 volume, with all of the original chapters

updated as well as four new chapters. The second edition, like the first, is intended to serve as a didactically-oriented resource for graduate students and research professionals, covering a broad range of advanced topics often not discussed in introductory courses on structural equation modeling (SEM). Such topics are important in furthering the understanding of foundations and assumptions underlying SEM as well as in exploring SEM, as a potential tool to address new types of research questions that might not have arisen during a first course. Chapters focus on the clear explanation and application of topics, rather than on analytical derivations, and contain materials from popular SEM software.

CONTENTS: Introduction to Series, *Ronald C. Serlin*. Preface, *Richard G. Lomax*. Dedication. Acknowledgements. Introduction, *Gregory R. Hancock & Ralph O. Mueller*. **Part I: Foundations.** The Problem of Equivalent Structural Models, *Scott L. Hershberger & George A. Marcoulides*. Reverse Arrow Dynamics: Feedback Loops and Formative Measurement, *Rex B. Kline*. Partial Least Squares Path Modeling, *Edward E. Rigdon*. Power Analysis in Structural Equation Modeling, *Gregory R. Hancock & Brian F. French*. **Part II: Extensions.** Evaluating Between-Group Differences in Latent Variable Means, *Marilyn S. Thompson & Samuel B. Green*. Conditional Process Modeling: Using Structural Equation Modeling to Examine Contingent Causal Processes, *Andrew F. Hayes & Kristopher J. Preacher*. Structural Equation Models of Latent Interaction and Quadratic Effects, *Herbert W. Marsh, Zhonglin Wen, Kit-Tai Hau, & Benjamin Nagengast*. Using Latent Growth Modeling to Evaluate Longitudinal Change, *Gregory R. Hancock, Jeffrey R. Harring, & Frank R. Lawrence*. Mean and Covariance Structure Mixture Models, *Dena A. Pastor & Phill Gagné*. Exploratory Structural Equation Modeling, *Alexandre J. S. Morin, Herbert W. Marsh, & Benjamin Nagengast*. **Part III: Assumptions.** Nonnormal and Categorical Data in Structural Equation Modeling, *Sara J. Finney & Christine DiStefano*. Analyzing Structural Equation Models with Missing Data, *Craig K. Enders*. Multilevel Structural Equation Modeling with Complex Sample Data, *Laura M. Stapleton*. Bayesian Structural Equation Modeling, *Roy Levy & Jaehwa Choi*. Use of Monte Carlo Studies in Structural Equation Modeling Research, *Deborah L. Bandalos & Walter Leite*. About the Authors.



Multilevel Modeling of Educational Data

Ann A. O'Connell, Ohio State University; D. Betsy McCoach, University of Connecticut

2008. Paperback 978-1-59311-684-2 \$65.99. Hardcover 978-1-59311-685-9 \$95.99. eBook 9781607527299 \$74.

(sponsored by the Educational Statisticians, SIG)

Multilevel Modeling of Educational Data, co-edited by Ann A. O'Connell, Ed.D., and D. Betsy McCoach, Ph.D., is the next volume in the series: Quantitative Methods in Education and the Behavioral Sciences: Issues, Research and Teaching (Information Age Publishing), sponsored by the Educational Statisticians' Special Interest Group (Ed-Stat SIG) of the American Educational Research Association. The use of multilevel analyses to examine effects of groups or contexts on individual outcomes has burgeoned over the past few decades. Multilevel modeling techniques allow educational researchers to more appropriately model data that occur within multiple hierarchies (i.e.- the classroom, the school, and/or the district). Examples of multilevel research problems involving schools include establishing trajectories of academic achievement for children within diverse classrooms or schools or studying school-level characteristics on the incidence of bullying. Multilevel models provide an improvement over traditional single-level approaches to working with clustered or hierarchical data; however, multilevel data present complex and interesting methodological challenges for the applied education research community.

In keeping with the pedagogical focus for this book series, the papers this volume emphasize applications of multilevel models using educational data, with chapter topics ranging from basic to advanced. This book represents a comprehensive and instructional resource text on multilevel modeling for quantitative researchers who plan to use multilevel techniques in their work, as well as for professors and students of quantitative methods courses focusing on multilevel analysis. Through the contributions of experienced researchers and teachers of multilevel modeling, this volume provides an accessible and practical treatment of methods appropriate for use in a first and/or second course in multilevel analysis. A supporting website links chapter examples to actual data, creating an opportunity for readers to reinforce their knowledge through hands-on data analysis. This book serves as a guide for designing multilevel studies and applying multilevel modeling techniques in educational and behavioral research, thus contributing to a better understanding of and solution for the challenges posed by multilevel systems and data.

CONTENTS: Series Introduction, *Ronald C. Serlin*. Acknowledgements. **Part I: Design Contexts for Multilevel Models.** Introduction, *Ann A. O'Connell and D. Betsy McCoach*. The Use of National Datasets for Teaching and Research, *Laura M. Stapleton and Scott L. Thomas*. Using Multilevel Modeling to Investigate School Effects, *Xin Ma, Lingling Ma,*

and Kelly D. Bradley. Modeling Growth Using Multilevel and Alternative Approaches, Janet K. Holt. Cross-Classified Random Effects Models, S. Natasha Beretvas. Multilevel Logistic Models for Dichotomous and Ordinal Data, Ann A. O'Connell, Jessica Goldstein, H. Jane Rogers, and C. Y. Joanne Peng. **Part II: Planning and Evaluating Multilevel Models.** Evaluation of Model Fit and Adequacy, D. Betsy McCoach and Anne C. Black. Power, Sample Size, and Design, Jessica Spybrook. **Part III: Extending the Multilevel Framework.** Multilevel Methods for Meta-Analysis, Sema A. Kalaian and Rafa M. Kasim. Multilevel Measurement Modeling, Kihito Kamata, Daniel J. Bauer, and Yasuo Miyazaki. **Part IV: Mastering the Technique.** Reporting Results from Multilevel Analyses, John M. Ferron, Kristin Y. Hogarty, Robert F. Dedrick, Melinda R. Hess, John D. Niles, and Jeffrey D. Kromrey. Software Options for Multilevel Models, J. Kyle Roberts and Patrick McLeod. Estimation Procedures for Hierarchical Linear Models, Hariharan Swaminathan and H. Jane Rogers.



Real Data Analysis

Shlomo S. Sawilowsky, Wayne State University

2007. Paperback 978-1-59311-564-7 \$65.99. Hardcover 978-1-59311-565-4 \$95.99. eBook 9781607525783 \$74.

The invited authors of this edited volume have been prolific in the arena of Real Data Analysis (RDA) as it applies to the social and behavioral sciences, especially in the disciplines of education and psychology. Combined, this brain trust represents 3,247 articles in refereed journals, 127 books published, US \$45.3 Million in extramural research funding, 34 teaching and 92 research awards, serve(d) as Editor/Assistant Editor/Editorial Board Member for 95 peer reviewed journals, and provide (d) ad hoc reviews for 362 journals. Their enormous footprint on real data analysis is showcased for professors, researchers, educators, administrators, and graduate students in the second text in the AERA/SIG ES Quantitative Methods series.

CONTENTS: Preface. Shlomo S. Sawilowsky. **PART I: FOUNDATIONS.** The Co-Evolution of Statistics and Hz, Joseph M. Hilbe. Effective Sample Size: A Crucial Concept, Thomas R. Knapp. Advances in Missing Data Methods and Implications for Educational Research, Chao-Ying Joanne Peng, Michael Harwell, Show-Mann Liou, Lee H. Ehman. Methods for Simulating Real World Data for the Psycho-Educational Sciences, Todd Christopher Headrick. How and Why I Use Real, Messy Data to Investigate Theory and Inform Decision Making, Ted Micceri. **PART II: STATISTICAL METHODS.** Using E-Mail Messages to Help Students Prepare for a Statistics Exam, Schuyler Huck. Randomization Tests: Statistical Tools for Assessing the Effects of Educational Interventions When Resources are Scarce, Joel R. Levin. A Skipped Multivariate Measure of Location: One- And Two-Sample Hypothesis Testing, Rand R. Wilcox, H. J. Keselman. Robust Step-Down Tests for Multivariate Group Differences, Lisa M. Lix, Ian Clara, Aynslye Hinds, Charles Bernstein. Dunn-Sidak Critical Values and p Values, Roger E. Kirk, Joel Hetzer. Controlling Experiment-wise Type I Errors: Good Advice for Simultaneous and Sequential Hypothesis Testing, Shlomo S. Sawilowsky, Patric R. Spence. Robustness and Power of Ordinal d for Paired Data, Du Feng. Factorial ANOVA in SPSS: Fixed-, Random-, and Mixed-Effects Models, Richard G. Lomax, Stacy Hughey Surman. ANOVA: Effect Sizes, Simulating Interaction vs. Main Effects, and a Modified ANOVA Table, Shlomo S. Sawilowsky. ANCOVA and Quasi-Experimental Design: The Legacy of Campbell and Stanley, Shlomo S. Sawilowsky. **PART III: MEASUREMENT:** Thinking About Item Response Theory from a Logistic Regression Perspective: A Focus on Polytomous Models, Amery D. Wu, Bruno D. Zumbo. Some Practical Uses of Item Response Time to Improve the Quality of Low-Stakes Achievement Test Data, Steven L. Wise, Xiaojing Kong. Using Moving Averages to Detect Exposed Test Items in Computer-Based Testing, Ning Han, Ronald K. Hambleton. An Empirical Calibration of the Effects of Multiple Sources of Measurement Error on Reliability Estimates for Individual Differences Measures, Frank L. Schmidt, Huy Ahn Le. Latent Structure of Attitudes toward Abortion, C. Mitchell Dayton. **PART IV: DATA ANALYSIS.** Hierarchical Linear Models and the Estimation of Students' Mathematics Achievement, Kathrin A. Parks, Dudley L. Poston, Jr. Grade Inflation: An Examination at the Institutional Level, Sharon L. Weinberg. Using Discrete-Time Survival Analysis to Study Gender Differences in Leaving Mathematics, Suzanne E. Graham, Judith D. Singer. Nonparametric procedures for testing for dropout rates on University courses with application to an Italian case study, Rosa Arboretti Giancristofaro, Fortunato Pesarin, Luigi Salmaso, Aldo Solari. Nonparametric Approaches for Multivariate Testing with Mixed Variables and for Ranking on Ordered Categorical Variables with an Application to the Evaluation of Ph. D. Programs, Rosa Arboretti Giancristofaro, Fortunato Pesarin, Luigi Salmaso. Randomized Replicated Single-case Experiments: Treatment of Pain-related Fear by Graded Exposure In Vivo, Patrick Onghena, Johan W. S. Vlaeyen, Jeroen de Jong. Whole Brain Correlations: Examining Similarity Across Conditions of Overall Patterns of Neural Activation in fMRI, Arthur Aron, Susan Whitfield, Wemara Lichty. Principal Component Analysis of Senate Voting Patterns. Jan de Leeuw



Structural Equation Modeling A Second Course

Ralph O. Mueller, University of Hartford; Gregory R. Hancock, University of Maryland

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