

Multivariate And Mixture Distribution Rasch Models Extensions And Applications Statistics For Social And Behavioral Sciences

Intended to bridge the gap between the latest methodological developments and cross-cultural research, this interdisciplinary resource presents the latest strategies for analyzing cross-cultural data. Techniques are demonstrated through the use of applications that employ cross-national data sets such as the latest European Social Survey. With an emphasis on the generalized latent variable approach, internationally prominent researchers from a variety of fields explain how the methods work, how to apply them, and how they relate to other methods presented in the book. Syntax and graphical and verbal explanations of the techniques are included. Online resources, available at www.routledge.com/9781138690271, include some of the data sets and syntax commands used in the book. Applications from the behavioral and social sciences that use real data-sets demonstrate: The use of samples from 17 countries to validate the resistance to change scale across these nations How to test the cross-national invariance properties of social trust The interplay between social structure, religiosity, values, and social attitudes A comparison of anti-immigrant attitudes and patterns of religious orientations across European countries. The second edition includes six new chapters and two revised ones presenting exciting developments in the literature of cross-cultural analysis including topics such as approximate measurement invariance, alignment optimization, sensitivity analyses, a mixed-methods approach to test for measurement invariance, and a multilevel structural equation modeling approach to explain noninvariance. This book is intended for researchers, practitioners, and advanced students interested in cross-cultural research. Because the applications span a variety of disciplines, the book will appeal to researchers and students in: psychology, political science, sociology, education, marketing and economics, geography, criminology, psychometrics, epidemiology, and public health, as well as those interested in methodology. It is also appropriate for an advanced methods course in cross-cultural analysis.

This handbook provides an overview of major developments around diagnostic classification models (DCMs) with regard to modeling, estimation, model checking, scoring, and applications. It brings together not only the current state of the art, but also the theoretical background and models developed for diagnostic classification. The handbook also offers applications and special topics and practical guidelines how to plan and conduct research studies with the help of DCMs. Commonly used models in educational measurement and psychometrics typically assume a single latent trait or at best a small number of latent variables that are aimed at describing individual differences in observed behavior. While this allows simple rankings of test takers along one or a few dimensions, it does not provide a detailed picture of strengths and weaknesses when assessing complex cognitive skills. DCMs, on the other hand, allow the evaluation of test taker performance relative to a potentially large number of skill domains. Most diagnostic models provide a binary mastery/non-mastery classification for each of the assumed test taker attributes representing these skill domains. Attribute profiles can be used for formative decisions as well as for summative purposes, for example in a multiple cut-off procedure that requires mastery on at least a certain subset of skills. The number of DCMs discussed in the literature and applied to a variety of assessment data has been increasing over the past decades, and their appeal to researchers and practitioners alike continues to grow. These models have been used in English language assessment, international large scale assessments, and for feedback for practice exams in preparation of college admission testing, just to name a few. Nowadays, technology-based assessments provide increasingly rich data on a multitude of skills and allow collection of data with respect to multiple types of behaviors. Diagnostic models can be understood as an ideal match for these types of data collections to provide more in-depth information about test taker skills and behavioral tendencies.

This volume presents contributions on handling data in which the postulate of independence in the data matrix is violated. When this postulate is violated and when the methods assuming independence are still applied, the estimated parameters are likely to be biased, and statistical decisions are very likely to be incorrect. Problems associated with dependence in data have been known for a long time, and led to the development of tailored methods for the analysis of dependent data in various areas of statistical analysis. These methods include, for example, methods for the analysis of longitudinal data, corrections for dependency, and corrections for degrees of freedom. This volume contains the following five sections: growth curve modeling, directional dependence, dyadic data modeling, item response modeling (IRT), and other methods for the analysis of dependent data (e.g., approaches for modeling cross-section dependence, multidimensional scaling techniques, and mixed models). Researchers and graduate students in the social and behavioral sciences, education, econometrics, and medicine will find this up-to-date overview of modern statistical approaches for dealing with problems related to dependent data particularly useful.

This international anthology aims at researchers and practitioners interested in the dynamic developments of research on higher education teaching and learning in Europe and beyond. It includes ten chapters covering a wide array of topics and methodologies used by researchers in the Special Interest Group 'Higher Education' (SIG4) of the European Association for Research on Learning and Instruction (EARLI). The volume consists of three main sections: the first section includes three chapters addressing different practice- and research-based challenges related to students' transitions into higher education and their teaching internship. The following four chapters investigate the assessment and development of students' study paths and skills in a variety of disciplines. The final three chapters present research on student emotions and cultural perspectives, including mixed and multi-method empirical approaches. A key text for those keeping up with the current advances in the field.

The goal of this book is to emphasize the formal statistical features of the practice of equating, linking, and scaling. The book encourages the view and discusses the quality of the equating results from the statistical perspective (new models, robustness, fit, testing hypotheses, statistical monitoring) as opposed to placing the focus on the policy and the implications, which although very important, represent a different side of the equating practice. The book contributes to establishing "equating" as a theoretical field, a view that has not been offered often before. The tradition in the practice of equating has been to present the knowledge and skills needed as a craft, which implies that only with years of experience under the guidance of a knowledgeable practitioner could one acquire the required skills. This book challenges this view by indicating how a good equating framework, a sound understanding of the assumptions that underlie the psychometric models, and the use of statistical tests and statistical process control tools can help the practitioner navigate the difficult decisions in choosing the final equating function. This book provides a valuable reference for several groups: (a) statisticians and psychometricians interested in the theory behind equating methods, in the use of model-based statistical methods for data smoothing, and in the evaluation of the equating results in applied work; (b) practitioners who need to equate tests, including those with these responsibilities in testing companies, state testing agencies, and school districts; and (c) instructors in psychometric, measurement, and psychology programs.

This book is open access under a CC BY-NC 2.5 license.?? This book describes the extensive contributions made toward the advancement of human assessment by scientists from one of the world's leading research institutions, Educational Testing Service. The book's four major sections detail research and development in measurement and statistics, education policy analysis and evaluation, scientific psychology, and validity. Many of the developments presented have become de-facto standards in educational and psychological measurement, including in item response theory (IRT), linking and equating, differential item functioning (DIF), and educational surveys like the National Assessment of Educational Progress (NAEP), the Programme of international Student Assessment (PISA), the Progress of

International Reading Literacy Study (PIRLS) and the Trends in Mathematics and Science Study (TIMSS). In addition to its comprehensive coverage of contributions to the theory and methodology of educational and psychological measurement and statistics, the book gives significant attention to ETS work in cognitive, personality, developmental, and social psychology, and to education policy analysis and program evaluation. The chapter authors are long-standing experts who provide broad coverage and thoughtful insights that build upon decades of experience in research and best practices for measurement, evaluation, scientific psychology, and education policy analysis. Opening with a chapter on the genesis of ETS and closing with a synthesis of the enormously diverse set of contributions made over its 70-year history, the book is a useful resource for all interested in the improvement of human assessment.

Addresses the impact on international marketing of major trends in the external and internal environment of the firm: technology-enabled international marketing research, global account management, procurement and international supplier networks, internationalization of small and entrepreneurial firms, and outsourcing and offshoring.

This latest volume in the series Psychological Assessment – Science and Practice describes the current state-of-the-art in test development and construction. The past 10-20 years have seen substantial advances in the methods used to develop and administer tests. In this volume many of the world's leading authorities collate these advances and provide information about current practices, thus equipping researchers and students to successfully construct new tests using the best modern standards and techniques. The first section explains the benefits of considering the underlying theory when designing tests, such as factor analysis and item response theory. The second section looks at item format and test presentation. The third discusses model testing and selection, while the fourth goes into statistical methods that can find group-specific bias. The final section discusses topics of special relevance such as multi-trait multi-state analyses and development of screening instruments.

This open access book presents a large number of innovations in the world of operational testing. It brings together different but related areas and provides insight in their possibilities, their advantages and drawbacks. The book not only addresses improvements in the quality of educational measurement, innovations in (inter)national large scale assessments, but also several advances in psychometrics and improvements in computerized adaptive testing, and it also offers examples on the impact of new technology in assessment. Due to its nature, the book will appeal to a broad audience within the educational measurement community. It contributes to both theoretical knowledge and also pays attention to practical implementation of innovations in testing technology.

In this issue, psychometrics researchers were invited to make reanalyses or extensions of a previously published dataset from a recent paper by Myszkowski and Storme (2018). The dataset analyzed consisted of responses to a multiple-choice logical reasoning nonverbal test, comprising the last series of Raven's (1941) Standard Progressive Matrices. Although the original paper already proposed several modeling strategies, this issue presents new or improved procedures to study the psychometrics properties of tests of this type.

This book applies Rasch measurement theory to the fields of education, psychology, sociology, marketing and health outcomes in order to measure various social constructs. The chief focus is on first principles of both the theory and its applications. Because software is readily available to carry out analyses of real data, numerous small examples are provided in the book. The software used in these examples, and which is helpful in working through the text, is RUMM2030 (Rasch unidimensional models for measurement). The book's main goals are to equip researchers with the confidence they need in order to be in control of the analysis and interpretation of data, and to make professional rather than primarily statistical decisions mechanically. Because statistical principles are necessarily involved, reviews of the requisite statistics are provided in the Appendix. The content is based on courses that have been taught both online and in intensive form for over two decades. Although first principles are emphasised, much of the book is based on research conducted by the two authors and their colleagues.

The new generation of tests is faced with new challenges. In the K-12 setting, the new learning targets are intended to assess higher-order thinking skills and prepare students to be ready for college and career and to keep American students competitive with their international peers. In addition, the new generation of state tests requires the use of technology in item delivery and embedding assessment in real-world, authentic, situations. It further requires accurate assessment of students at all ability levels. One of the most important questions is how to maintain test fairness in the new assessments with technology innovative items and technology delivered tests. In the traditional testing programs such as licensure and certification tests and college admission tests, test fairness has constantly been a key psychometric issue in test development and this continues to be the case with the national testing programs. As test fairness needs to be addressed throughout the whole process of test development, experts from state, admission, and licensure tests will address test fairness challenges in the new generation assessment. The book chapters clarify misconceptions of test fairness including the use of admission test results in cohort comparison, the use of international assessment results in trend evaluation, whether standardization and fairness necessarily mean uniformity when test-takers have different cultural backgrounds, and whether standardization can insure fairness. More technically, chapters also address issues related to how compromised items and test fairness are related to classification decisions, how accessibility in item development and accommodation could be mingled with technology, how to assess special populations with dyslexia, using Blinder-Oaxaca Decomposition for differential item functioning detection, and differential feature functioning in automated scoring. Overall, this book addresses test fairness issues in state assessment, college admission testing, international assessment, and licensure tests. Fairness is discussed in the context of culture and special populations. Further, fairness related to performance assessment and automated scoring is a focus as well. This book provides a very good source of information related to test fairness issues in test development in the new generation of assessment where technology is highly involved.

Measurement Error in Longitudinal Data tackles the important issue of how to understand and estimate change in the context of imperfect data.

Integrating Timing Considerations to Improve Testing Practices synthesizes a wealth of theory and research on time issues in assessment into actionable advice for test development, administration, and scoring. One of the major advantages of computer-based testing is the capability to passively record test-taking metadata—including how examinees use time and how time affects testing outcomes. This has opened many questions for testing administrators. Is there a trade-off between speed and accuracy in test taking? What considerations should influence equitable decisions about extended-time accommodations? How can test administrators use timing data to balance the costs and resulting validity of tests administered at commercial testing centers? In this comprehensive volume, experts in the field discuss the impact of timing considerations, constraints, and policies on valid score interpretations; administrative accommodations, test construction, and examinees' experiences and behaviors; and how to implement the findings into practice. These 12 chapters provide invaluable resources for testing professionals to better understand the inextricable links between effective time allocation and the purposes of high-stakes testing.

This volume offers insights from modelling measures of parental involvement and their relationship with student reading literacy across countries, exploring and incorporating cultural differences. This is a significant contribution to a field where cross-cultural comparisons from a triangulated perspective are sparse. For readers interested in exploring the relationship between parental involvement and student attainment, the literature review provides a useful starting point. Meanwhile, for the more methodologically interested reader, this report presents state-of-the-art ways to identify and model cultural differential item functioning in international large-scale assessment (ILSA), illustrating the extent to which the parental involvement construct may be influenced by cultural differences and how this may affect the outcomes of cross-cultural comparisons. The framework is generic and should provide a solid foundation for future ILSA practices and secondary analyses. ILSA studies like the IEA's Progress in

International Reading Literacy Study (PIRLS) provide valuable data, containing both student achievement data and contextual background data from schools, teachers, students and parents for over 41 countries.

The current volume, *Advances in Latent Variable Mixture Models*, contains chapters by all of the speakers who participated in the 2006 CILVR conference, providing not just a snapshot of the event, but more importantly chronicling the state of the art in latent variable mixture model research. The volume starts with an overview chapter by the CILVR conference keynote speaker, Bengt Muthén, offering a “lay of the land” for latent variable mixture models before the volume moves to more specific constellations of topics. Part I, *Multilevel and Longitudinal Systems*, deals with mixtures for data that are hierarchical in nature either due to the data’s sampling structure or to the repetition of measures (of varied types) over time. Part II, *Models for Assessment and Diagnosis*, addresses scenarios for making judgments about individuals’ state of knowledge or development, and about the instruments used for making such judgments. Finally, Part III, *Challenges in Model Evaluation*, focuses on some of the methodological issues associated with the selection of models most accurately representing the processes and populations under investigation. It should be stated that this volume is not intended to be a first exposure to latent variable methods. Readers lacking such foundational knowledge are encouraged to consult primary and/or secondary didactic resources in order to get the most from the chapters in this volume. Once armed with the basic understanding of latent variable methods, we believe readers will find this volume incredibly exciting.

Technological and statistical advances, along with a strong interest in gathering more information about the state of our educational systems, have made it possible to assess more students, in more countries, more often, and in more subject domains. *The Handbook of International Large-Scale Assessment: Background, Technical Issues, and Methods of Data Analysis* brings together recognized scholars in the field of ILSA, behavioral statistics, and policy to develop a detailed guide that goes beyond database user manuals. After highlighting the importance of ILSA data to policy and research, the book reviews methodological aspects and features of the studies based on operational considerations, analytics, and reporting. The book then describes methods of interest to advanced graduate students, researchers, and policy analysts who have a good grounding in quantitative methods, but who are not necessarily quantitative methodologists. In addition, it provides a detailed exposition of the technical details behind these assessments, including the test design, the sampling framework, and estimation methods, with a focus on how these issues impact analysis choices.

This book addresses problems and challenges that face educational measurement at a time when multipurpose usage of observational data from educational assessments, tests and international surveys has become a growing global trend. While the construction of educational measures and use of educational data offer many opportunities, they also require awareness of the numerous threats to validity and methods of reducing such threats. Written by leading international scholars, the book demonstrates the complexity of educational measurement by addressing three broad and interrelated topics. The first part discusses cognitive abilities, including studies on fluid intelligence, its improvement and its links to aptitude tests for admission to higher education. The second part focuses on the effects of school and teacher-related factors on school outcomes at individual and group levels, and uses international studies to analyze causes. The third part presents analytical techniques and measurement methods to improve reliability, for example factor analysis using Bayesian estimators, bi-factor analysis, model misfit and solutions, and discusses balance issues in reporting test results. The book provides examples of state-of-the-art analytical techniques for pursuing fundamental research problems, and the latest advances in measurement methods, with a focus on validity improvement. Eminent researchers discuss and provide insights into questions such as: Is it possible to train individuals to think at a higher level than normal for their age? What determines prospective preschool teachers’ skill to perceive mathematics-related preschool situations? Can international indicator design and instruments be improved to use trends and national context variables more efficiently? Can indicator data at national, school and class levels be compared easier? Are value-added measures of teacher effectiveness valid when it comes to hiring and promoting teachers? Is money better spent on teacher training than on smaller class-size? How do theory and empirical statistical data intertwine in building structures of understanding? This book is inspired by the career and personal influence of the Swedish scholar Professor Jan-Eric Gustafsson, renowned for his research on individual differences, especially the structure of cognitive abilities, and on the effects of education on knowledge and skills.

Endorsed by the International Society of Sport Psychology, this classic reference draws on an international roster of experts and scholars in the field who have assembled state-of-the-art knowledge into this thorough, well-rounded, and accessible volume. It is completely updated to reflect the latest research and is an indispensable resource for any student or professional interested in the field of sport psychology.

The 78th Annual Meeting of the Psychometric Society (IMPS) builds on the Psychometric Society's mission to share quantitative methods relevant to psychology. The chapters of this volume present cutting-edge work in the field. Topics include studies of item response theory, computerized adaptive testing, cognitive diagnostic modeling, and psychological scaling. Additional psychometric topics relate to structural equation modeling, factor analysis, causal modeling, mediation, missing data methods, and longitudinal data analysis, among others. The papers in this volume will be especially useful for researchers in the social sciences who use quantitative methods. Prior knowledge of statistical methods is recommended. The 78th annual meeting took place in Arnhem, The Netherlands between July 22nd and 26th, 2013. The previous volume to showcase work from the Psychometric Society’s Meeting is *New Developments in Quantitative Psychology: Presentations from the 77th Annual Psychometric Society Meeting* (Springer, 2014).

This book introduces current perspectives on Rasch measurement theory with an emphasis on developing Rasch-based scales. Authors George Engelhard Jr and Jue Wang introduce Rasch measurement theory step by step, with chapters on scale construction, evaluation, maintenance, and use. Points are illustrated and techniques are demonstrated through an extended example: The Food Insecurity Experience (FIE) Scale.

Research today demands the application of sophisticated and powerful research tools. Fulfilling this need, The Oxford Handbook of Quantitative Methods is the complete tool box to deliver the most valid and generalizable answers to today's complex research questions. It is a one-stop source for learning and reviewing current best-practices in quantitative methods as practiced in the social, behavioral, and educational sciences. Comprising two volumes, this handbook covers a wealth of topics related to quantitative research methods. It begins with essential philosophical and ethical issues related to science and quantitative research. It then addresses core measurement topics before delving into the design of studies. Principal issues related to modern estimation and mathematical modeling are also detailed. Topics in the handbook then segway into the realm of statistical inference and modeling with chapters dedicated to classical approaches as well as modern latent variable approaches. Numerous chapters associated with longitudinal data and more specialized techniques round out this broad selection of topics. Comprehensive, authoritative, and user-friendly, this two-volume set will be an indispensable resource for serious researchers across the social, behavioral, and educational sciences.

Statistical Analysis of Questionnaires: A Unified Approach Based on R and Stata presents special statistical methods for analyzing data collected by questionnaires. The book takes an applied approach to testing and measurement tasks, mirroring the growing use of statistical methods and software in education, psychology, sociology, and other fields.

Drawing on the work of internationally acclaimed experts in the field, Handbook of Item Response Theory, Volume One: Models presents all major item response models. This first volume in a three-volume set covers many model developments that have occurred in item response theory (IRT) during the last 20 years. It describes models for different response formats or response processes, the need of deeper parameterization due to a multilevel or hierarchical structure of the response data, and other extensions and insights. In Volume One, all chapters have a common format with each chapter focusing on one family of models or modeling approach. An introductory section in every chapter includes some history of the model and a motivation of its relevance. Subsequent sections present the model more formally, treat the estimation of its parameters, show how to evaluate its fit to empirical data, illustrate the use of the model through an empirical example, and discuss further applications and remaining research issues.

Drawing on the work of internationally acclaimed experts in the field, Handbook of Item Response Theory, Volume Two: Statistical Tools presents classical and modern statistical tools used in item response theory (IRT). While IRT heavily depends on the use of statistical tools for handling its models and applications, systematic introductions and reviews that emphasize their relevance to IRT are hardly found in the statistical literature. This second volume in a three-volume set fills this void. Volume Two covers common probability distributions, the issue of models with both intentional and nuisance parameters, the use of information criteria, methods for dealing with missing data, and model identification issues. It also addresses recent developments in parameter estimation and model fit and comparison, such as Bayesian approaches, specifically Markov chain Monte Carlo (MCMC) methods.

Multivariate and Mixture Distribution Rasch Models Extensions and Applications Springer Science & Business Media

In an era of curricular changes, experiments, and high-stakes testing, educational measurement and evaluation are more important than ever. In addition to expected entries covering the basics of traditional theories and methods, The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation also covers important sociopolitical issues and trends influencing the future of that research and practice. Textbooks, handbooks, monographs, and other publications focus on various aspects of educational research, measurement, and evaluation, but to date, there exists no major reference guide for students new to the field. This comprehensive work fills that gap, covering traditional areas while pointing the way to future developments. Key Features: Nearly 700 signed entries are contained in an authoritative work spanning four volumes and available in electronic and/or print formats. Although organized A-to-Z, front matter includes a Reader's Guide grouping entries thematically to help students interested in a specific aspect of education research, measurement, and evaluation to more easily locate directly related entries. Back matter includes a Chronology of the development of the field; a Resource Guide to classic books, journals, and associations; and a detailed Index. Entries conclude with Further Readings and cross-references to related entries. The Index, Reader's Guide themes, and cross-references combine to provide a robust search-and-browse in the electronic version.

Item response theory (IRT) is a latent variable modeling approach used to minimize bias and optimize the measurement power of educational and psychological tests and other psychometric applications. Designed for researchers, psychometric professionals, and advanced students, this book clearly presents both the "how-to" and the "why" of IRT. It describes simple and more complex IRT models and shows how they are applied with the help of widely available software packages. Chapters follow a consistent format and build sequentially, taking the reader from model development through the fit analysis and interpretation phases that one would perform in practice. The use of common empirical data sets across the chapters facilitates understanding of the various models and how they relate to one another.

Statistics in Psychology covers all statistical methods needed in education and research in psychology. This book looks at research questions when planning data sampling, that is to design the intended study and to calculate the sample sizes in advance. In other words, no analysis applies if the minimum size is not determined in order to fulfil certain precision requirements. The book looks at the process of empirical research into the following seven stages: Formulation of the problem Stipulation of the precision requirements Selecting the statistical model for the planning and analysis The (optimal) design of the experiment or survey Performing the experiment or the survey Statistical analysis of the observed results Interpretation of the results.

Several key developments challenge the field of educational measurement today: demands for tests at larger scales with higher stakes, an improved understanding of how people develop capabilities, and new technologies for interactive digital assessments. Sociocognitive Foundations of Educational Measurement integrates new developments in educational measurement and educational psychology in order to provide researchers, testing professionals, and students with an innovative sociocognitive perspective on assessment. This comprehensive volume begins with a broad explanation of the sociocognitive perspective and the foundations of assessment, then provides a series of focused applications to major topics such as assessment arguments, validity, fairness, interactive assessment, and a conception of "measurement" in educational assessment. Classical test theory, item response theory, categorical models, mixture models, cognitive diagnosis models, and Bayesian networks are explored from the resulting perspective. Ideal for specialists in these areas, graduate students, developers, and scholars in both educational measurement and fields that contribute to a sociocognitive perspective, this book consolidates nearly a decade of research into a fresh perspective on educational measurement.

(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 in 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.

This volume, representing a compilation of authoritative reviews on a multitude of uses of statistics in epidemiology and medical statistics written by internationally renowned experts, is addressed to statisticians working in biomedical and epidemiological fields who use statistical and quantitative methods in their work. While the use of statistics in these fields has a long and rich history, explosive growth of science in general and clinical and epidemiological sciences in particular have gone through a sea of change, spawning the development of new methods and innovative adaptations of standard methods. Since the literature is highly scattered, the Editors have undertaken this humble exercise to document a representative collection of topics of broad interest to diverse users. The volume spans a cross section of standard topics oriented toward users in the current evolving field, as well as special topics in much need which have more recent origins. This volume was prepared especially keeping the applied statisticians in mind, emphasizing applications-oriented methods and techniques, including references to appropriate software when relevant. The contributors are internationally renowned experts in their respective areas. This volume addresses emerging statistical challenges in epidemiological, biomedical, and pharmaceutical research. It features: methods for assessing Biomarkers, analysis of competing risks; clinical trials including sequential and group sequential, crossover designs, cluster randomized, and adaptive designs; and, structural equations modelling and longitudinal data analysis.

Quantitative Data Analysis for Language Assessment Volume II: Advanced Methods demonstrates advanced quantitative techniques for language assessment. The volume takes an interdisciplinary approach and taps into expertise from language assessment, data mining, and psychometrics. The techniques covered include Structural Equation Modeling, Data Mining, Multidimensional Psychometrics and Multilevel Data Analysis. Volume II is distinct among available books in language assessment, as it engages the readers in both theory and application of the methods and introduces relevant techniques for theory construction and validation. This book is highly recommended to graduate students and researchers who are searching for innovative and rigorous approaches and methods to achieve excellence in their dissertations and research. It is also a valuable source for academics who teach quantitative approaches in language assessment and data analysis courses.

The concept of competencies is crucial for evaluating educational systems as well as for basic research in education. This book covers current theoretical, psychometric, and practical issues related to the assessment of competencies in a variety of educational settings. Leading researchers from around the world contribute their expertise from different research fields. The first part of the book provides theoretical perspectives on the concept of competencies in educational contexts, as well as on developmental models. The second part deals with psychometric models for assessing and predicting competencies and measuring change. In addition, practical issues such as test construction, computer-based assessment, feedback options, and the implementation of assessment tools in school contexts are addressed. Also discussed is large-scale assessment of competencies for the monitoring of educational quality. The book provides a valuable tool for researchers interested in the theoretical and psychometric background of assessment as well as for readers interested in practical aspects of assessment and evaluation in educational or vocational contexts, such as policy makers, teachers, and school administrators.

In recent years, our world has experienced a profound shift and progression in available computing and knowledge sharing innovations. These emerging advancements have developed at a rapid pace, disseminating into and affecting numerous aspects of contemporary society. This has created a pivotal need for an innovative compendium encompassing the latest trends, concepts, and issues surrounding this relevant discipline area. During the past 15 years, the Encyclopedia of Information Science and Technology has become recognized as one of the landmark sources of the latest knowledge and discoveries in this discipline. The Encyclopedia of Information Science and Technology, Fourth Edition is a 10-volume set which includes 705 original and previously unpublished research articles covering a full range of perspectives, applications, and techniques contributed by thousands of experts and researchers from around the globe. This authoritative encyclopedia is an all-encompassing, well-established reference source that is ideally designed to disseminate the most forward-thinking and diverse research findings. With critical perspectives on the impact of information science management and new technologies in modern settings, including but not limited to computer science, education, healthcare, government, engineering, business, and natural and physical sciences, it is a pivotal and relevant source of knowledge that will benefit every professional within the field of information science and technology and is an invaluable addition to every academic and corporate library.

This book examines extensions of the Rasch model, one of the most researched and applied models in educational research and social science. This collection contains 22 chapters by some of the most renowned international experts in the field. They cover topics ranging from general model extensions to applications in fields as diverse as cognition, personality, organizational and sports psychology, and health sciences and education.

This two-volume set (CCIS 201 and CCIS 202) constitutes the refereed proceedings of the International Conference on Computer Science and Education, CSE 2011, held in Qingdao, China, in July 2011. The 164 revised full papers presented in both volumes were carefully reviewed and selected from a large number of submissions. The papers address a large number of research topics and applications: from artificial intelligence to computers and information technology; from education systems to methods research and other related issues; such as: database technology, computer architecture, software engineering, computer graphics, control technology, systems engineering, network, communication, and other advanced technology, computer

