

Item Response Theory in Scale Development Research: A Critical Analysis

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Tiffany A. Whittaker¹
and Roger L. Worthington²

Abstract

As scale development researchers, we have followed Mallinckrodt and colleagues' work over recent years with significant interest. The scale development process can be challenging and typically demands a large investment of time. However, the end of the process is rewarding when the resulting scale is psychometrically sound. Mallinckrodt, Miles, and Recabarren's contribution in this volume of *The Counseling Psychologist* attempted to help integrate the use of item response theory in the scale development process. Although they are to be commended for this endeavor, there are some limitations inherent in their contribution. This reaction provides a critical evaluation of their work to augment their recommendations.

Keywords

path analysis/SEM, quantitative, scale development

It is an honor to be invited to provide a commentary on Mallinckrodt, Miles, and Recabarren's (2016 [this issue]) work in this volume. In a broad sense, we are in agreement with Mallinckrodt et al. (2016) that scale development research in counseling psychology can be significantly enhanced by the

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Item Response Theory In Scale Development Research

Robert F. DeVellis, Carolyn T. Thorpe



Item Response Theory In Scale Development Research:

Handbook of Item Response Theory Modeling Steven P. Reise, Dennis A. Revicki, 2014-11-20 Item response theory IRT has moved beyond the confines of educational measurement into assessment domains such as personality psychopathology and patient reported outcomes Classic and emerging IRT methods and applications that are revolutionizing psychological measurement particularly for health assessments used to demonstrate treatment effectiveness are reviewed in this new volume World renowned contributors present the latest research and methodologies about these models along with their applications and related challenges Examples using real data some from NIH PROMIS show how to apply these models in actual research situations Chapters review fundamental issues of IRT modern estimation methods testing assumptions evaluating fit item banking scoring in multidimensional models and advanced IRT methods New multidimensional models are provided along with suggestions for deciding among the family of IRT models available Each chapter provides an introduction describes state of the art research methods demonstrates an application and provides a summary The book addresses the most critical IRT conceptual and statistical issues confronting researchers and advanced students in psychology education and medicine today Although the chapters highlight health outcomes data the issues addressed are relevant to any content domain The book addresses IRT models applied to non educational data especially patient reported outcomes Differences between cognitive and non cognitive constructs and the challenges these bring to modeling The application of multidimensional IRT models designed to capture typical performance data Cutting edge methods for deriving a single latent dimension from multidimensional data A new model designed for the measurement of constructs that are defined on one end of a continuum such as substance abuse Scoring individuals under different multidimensional IRT models and item banking for patient reported health outcomes How to evaluate measurement invariance diagnose problems with response categories and assess growth and change Part 1 reviews fundamental topics such as assumption testing parameter estimation and the assessment of model and person fit New emerging and classic IRT models including modeling multidimensional data and the use of new IRT models in typical performance measurement contexts are examined in Part 2 Part 3 reviews the major applications of IRT models such as scoring item banking for patient reported health outcomes evaluating measurement invariance linking scales to a common metric and measuring growth and change The book concludes with a look at future IRT applications in health outcomes measurement The book summarizes the latest advances and critiques foundational topics such as multidimensionality assessment of fit handling non normality as well as applied topics such as differential item functioning and multidimensional linking Intended for researchers advanced students and practitioners in psychology education and medicine interested in applying IRT methods this book also serves as a text in advanced graduate courses on IRT or measurement Familiarity with factor analysis latent variables IRT and basic measurement theory is assumed *Using R for Item Response Theory Model Applications* Insu Paek, Ki Cole, 2019-09-16

Item response theory IRT is widely used in education and psychology and is expanding its applications to other social science areas medical research and business as well Using R for Item Response Theory Model Applications is a practical guide for students instructors practitioners and applied researchers who want to learn how to properly use R IRT packages to perform IRT model calibrations with their own data This book provides practical line by line descriptions of how to use R IRT packages for various IRT models The scope and coverage of the modeling in the book covers almost all models used in practice and in popular research including dichotomous response modeling polytomous response modeling mixed format data modeling concurrent multiple group modeling fixed item parameter calibration modelling with latent regression to include person level covariate s simple structure or between item multidimensional modeling cross loading or within item multidimensional modeling high dimensional modeling bifactor modeling testlet modeling two tier modeling For beginners this book provides a straightforward guide to learn how to use R for IRT applications For more intermediate learners of IRT or users of R this book will serve as a great time saving tool for learning how to create the proper syntax fit the various models evaluate the models and interpret the output using popular R IRT packages

Handbook of Item Response Theory Wim J. van der Linden, 2018-02-19 Drawing on the work of 75 internationally acclaimed experts in the field Handbook of Item Response Theory Three Volume Set presents all major item response models classical and modern statistical tools used in item response theory IRT and major areas of applications of IRT in educational and psychological testing medical diagnosis of patient reported outcomes and marketing research It also covers CRAN packages WinBUGS Bilog MG Multilog Parscale IRTPRO Mplus GLLAMM Latent Gold and numerous other software tools A full update of editor Wim J van der Linden and Ronald K Hambleton s classic Handbook of Modern Item Response Theory this handbook has been expanded from 28 chapters to 85 chapters in three volumes The three volumes are thoroughly edited and cross referenced with uniform notation format and pedagogical principles across all chapters Each chapter is self contained and deals with the latest developments in IRT

Fundamentals of Item Response Theory Ronald K. Hambleton, 1991-07-23 By using familiar concepts from classical measurement methods and basic statistics this book introduces the basics of item response theory IRT and explains the application of IRT methods to problems in test construction identification of potentially biased test items test equating and computerized adaptive testing The book also includes a thorough discussion of alternative procedures for estimating IRT parameters and concludes with an exploration of new directions in IRT research and development

Burns and Grove's The Practice of Nursing Research - E-Book Jennifer R. Gray, Susan K. Grove, 2020-07-21 Winner of the 1st place American Journal of Nursing Book of the Year award in nursing research evidence based practice for 2021 Selected for Doody s Core Titles 2024 with Essential Purchase designation in Research Burns coverage of the research process application for evidence based health care how to analyze data determine outcomes and disseminate research and how to propose and seek funding for research Strong emphasis on evidence based practice addresses this key graduate level QSEN

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Scale Development Robert F. DeVellis, Carolyn T. Thorpe, 2021-09-16 *Scale Development Theory and Applications* by Robert F DeVellis and new co author Carolyn T Thorpe demystifies measurement by emphasizing a logical rather than strictly mathematical understanding of concepts The Fifth Edition includes a new chapter that lays out the key concepts that distinguish indices from scales contrasts various types of indices suggests approaches for developing them reviews validity and reliability issues and discusses in broad terms some analytic approaches All chapters have been updated and the book strikes a balance between including relevant topics and highlighting recent developments in measurement while retaining an accessible user friendly approach to the material covered *The Practice of Nursing Research - E-Book* Susan K.

Grove, Nancy Burns, Jennifer R. Gray, 2012-08-31 *NEW Enhanced emphasis on evidence based practice equips you to generate research evidence and to appraise and synthesize existing research for application to clinical practice Using the ANCC Magnet Recognition Program criteria as a point of focus this book prepares you for today s emphasis on evidence based practice in the clinical setting NEW Expanded emphasis on qualitative research addresses phenomenological research grounded theory research ethnographic research exploratory descriptive research and historical research to support the development of nursing NEW Updated coverage of digital data collection guides you through use of the internet for research and addresses the unique considerations surrounding digital data collection methods NEW Pageburst ebook study guide gives you the opportunity to fully master and apply the text content in a convenient electronic format with integrated interactive review questions *Statistical Guidelines: New Developments in Statistical Methods and Psychometric Tools**

Pietro Cipresso, Jason C. Immekus, 2022-03-25 **Item Response Theory** Charles L. Hulin, Fritz Drasgow, Charles K. Parsons, 1983 The measurement theories considered in this book fall into a sub area of psychometrics These theories are concerned with the specifications of rules for transforming individuals responses to items on a psychological test or scale into estimates of the trait assumed to underlie the observable responses Discussed is a particular class of measurement theories generally called item response theory or latent trait theory This book is designed for those individuals involved in programs of applied testing and measurement whose efforts occasionally bring them into contact with the law and public policy

Scale Development Robert F. DeVellis, 2012 A best seller in its previous editions *Scale Development Theory and*

Applications Third Edition has been extensively updated and revised to address changes in the field and topics that have grown in importance. Widely adopted for graduate courses in departments such as Psychology, Public Health, Marketing, Nursing, and Education, this book will prove beneficial to applied researchers across the social sciences. *The Practice of Nursing Research* Nancy Ann Burns, Susan K. Grove, 2005. With its unique nursing perspective and framework that links nursing research to nursing practice, the 5th edition gives readers the tools they need to successfully evaluate, implement, and conduct research studies. Users will discover balanced and detailed coverage of both quantitative and qualitative research as well as abundant concrete examples from the best research literature available. And practicing nurses, students, and instructors appreciate this book for its clear, direct writing style that makes complex concepts easy to understand. Instructor resources available. Contact your sales representative for details. Websites direct students to an extensive array of information for use in conducting studies. A clear, direct writing style that facilitates learning. Rich and frequent illustration of major points and concepts from the most current research literature. A nursing perspective and framework that links research to the whole of the nursing curriculum. Detailed coverage of both quantitative and qualitative research methodologies. Exciting coverage of evidence-based practice, a topic of vital and growing importance in a health care arena focused on quality and cost effectiveness of patient care. Full color illustrations stimulate the learning experience. Online Author Index makes it easy to look up cited articles by key authors. Access the Evolve Learning System which includes an innovative new Data Set where users can apply data analysis skills. Increased research examples demonstrate principles with concrete examples. Statistical analysis techniques for outcomes research teach readers to analyze health care outcomes. Updated information on online research demonstrates the realities of nursing research today. Enhanced coverage of qualitative research gives readers a balanced research perspective. *The Journal of Rheumatology*, 2003. *Journal of Sport & Exercise Psychology*, 2006.

Handbook of Research Methods in Clinical Psychology Philip C. Kendall, James N. Butcher, Grayson N.

Holmbeck, 1999-01-25. Revising a successful handbook which covers all major areas of clinical research, this edition covers all the relevant aspects and tactics for conducting clinical research. [The International Encyclopedia of Educational Evaluation](#) Herbert J. Walberg, G.D. Haertel, 1990-01-31. The International Encyclopedia of Educational Evaluation provides a current and comprehensive treatment of the major evaluation approaches and methods used in educational research, focusing on themes such as educational needs assessment, measurement, evaluating design, decision making, and educational policy. This single volume is an up-to-date reference work for the beginning student as well as the advanced practitioner and offers educational evaluators access to the range of techniques and disciplines pertinent to good evaluation practice.

Psychological Abstracts Walter Samuel Hunter, 1999. *Current Index to Journals in Education*, 2000. [The SAGE Handbook of Personality Theory and Assessment](#) Gregory John Boyle, Gerald Matthews, Donald H. Saklofske, 2008. About theories, models, and assessment methods used for understanding the many facets of human personality and individual

differences It constitutes an essential resource for shaping the future of the scientific foundation of personality research measurement and practice

Item Response Theory Susan E. Embretson, Steven P. Reise, 2025-11-04 This book provides an intuitive and accessible introduction to item response theory IRT making complex psychometric concepts easier to grasp through graphical displays and familiar analogies It bridges theory and application helping readers interpret and implement IRT models effectively to improve measurement quality in psychology and the social sciences Covering both foundational and advanced topics it offers a clear path for understanding contemporary IRT methods and their relevance in research and practice With a strong focus on applications this book explains contemporary IRT models and estimation methods placing special emphasis on polytomous IRT models which are widely used in psychological assessments and rating scales Applications in various research areas are explored in detail alongside a dedicated chapter on available software to support implementation The final section delves into advanced IRT topics including multidimensional models and explanatory approaches for hypothesis testing making it a valuable resource for those looking to deepen their understanding of psychometric analysis This book is essential for graduate students researchers and practitioners in psychology education and the social sciences It is useful for researchers who are implementing or developing person assessments as well as for professionals in clinical industrial counseling and behavioral medicine fields who need a strong grasp of contemporary psychometric foundations Professors teaching measurement courses will find it an ideal core textbook offering a structured and engaging introduction to IRT and its applications in test development and analysis

Nursing Theorists and Their Work Ann Marriner-Tomey, Martha Raile Alligood, 2006 This textbook provides in depth descriptions and analyses of 31 specific nursing theories This edition offers 2 new chapters and a concise outline and summary of each theory s most significant ideas as well as clarifying content specific vocabulary

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web the whale is alive with color while in the background is a ghostly white three masted whaling vessel turner was seventy years old when he completed whalers for the royal academy exhibition of 1845 turner undertook the painting for a collector who had made his fortune in the whale oil business the painting was returned to him and it

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