This book develops an intuitive understanding of IRT principles through the use of graphical displays and analogies to familiar psychological principles. It surveys contemporary IRT models, estimation methods, and computer programs. Polytomous IRT models are given central coverage since many psychological tests use rating scales. Ideal for clinical, industrial, counseling, educational, and behavioral medicine professionals and students familiar with classical testing principles, exposure to material covered in first-year graduate statistics courses is helpful. All symbols and equations are thoroughly explained verbally and graphically.

This collection of papers provides an up to date treatment of item response theory, an important topic in educational testing.

Two studies were carried out to evaluate the quality of multidimensional item response theory (MIRT) model parameter estimates obtained from the computer program NOHARM. The purpose of the first study was to compute empirical estimates of the standard errors of the parameters. In addition, the parameter estimates were evaluated for bias and the effects of using different starting values and anchor items. The second study was included to compare the performance of NOHARM with the findings of an earlier simulation study which evaluated other MIRT estimation programs. Results were generally good, with fairly small standard errors for most parameter estimates and little indication of bias. Although the estimation procedure appeared to be robust under different starting values, the specific choice of items used to anchor the solution appears to have important effects on the magnitude of the estimated standard errors. The comparison of NOHARM with other programs was very favorable and supports the use of NOHARM for practical MIRT applications.

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.

First thorough treatment of multidimensional item response theory. Description of methods is supported by numerous practical examples. Describes procedures for multidimensional computerized adaptive testing.
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.
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