World Health Organization

Rasch Resources

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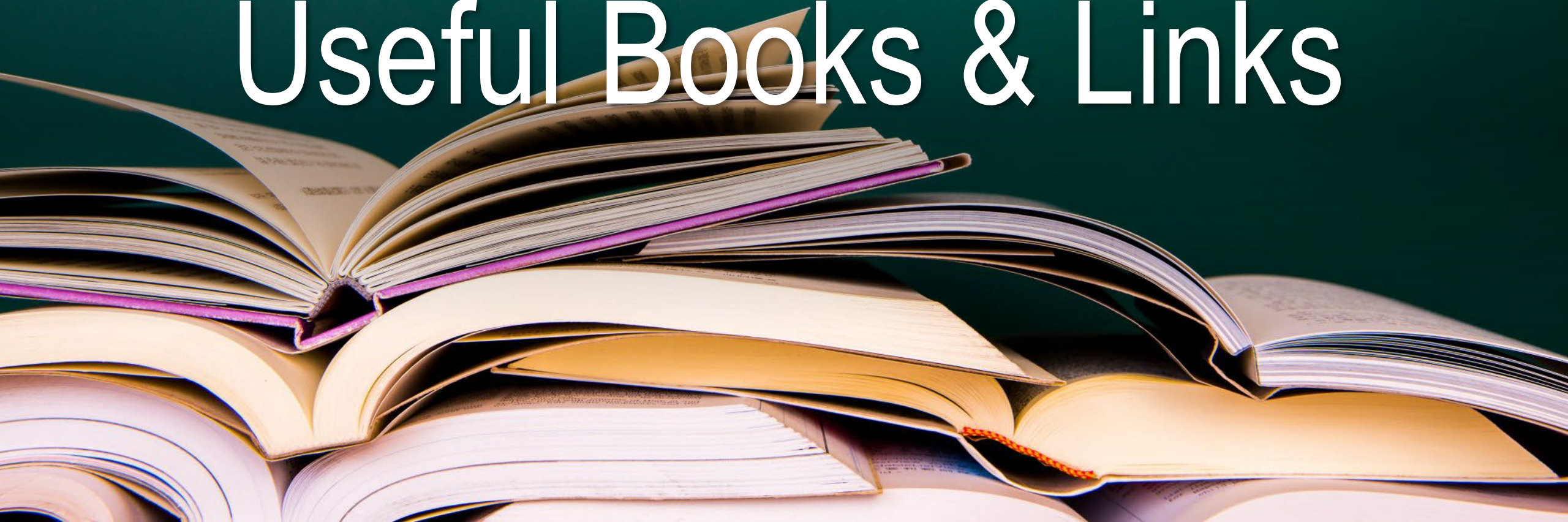
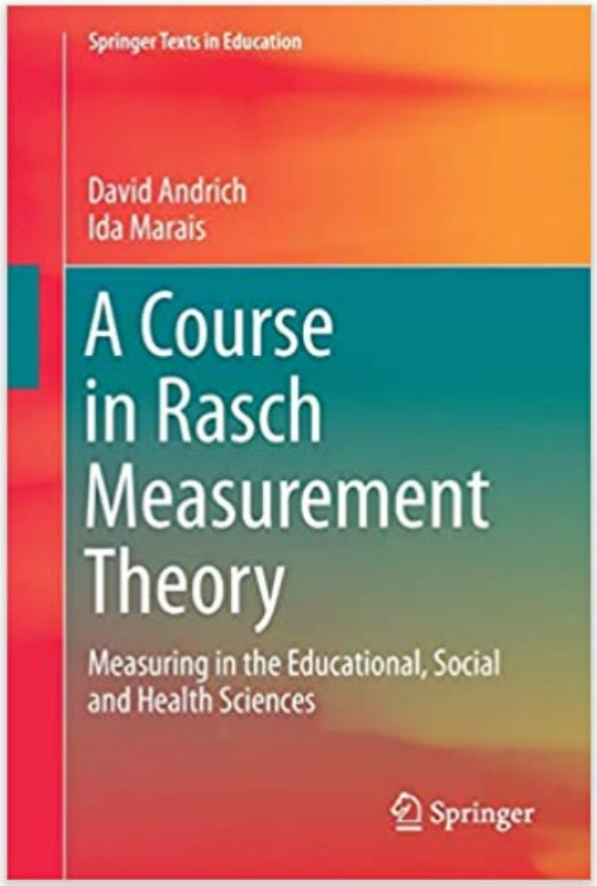
Useful Books & Links



Rasch Theory and Analysis



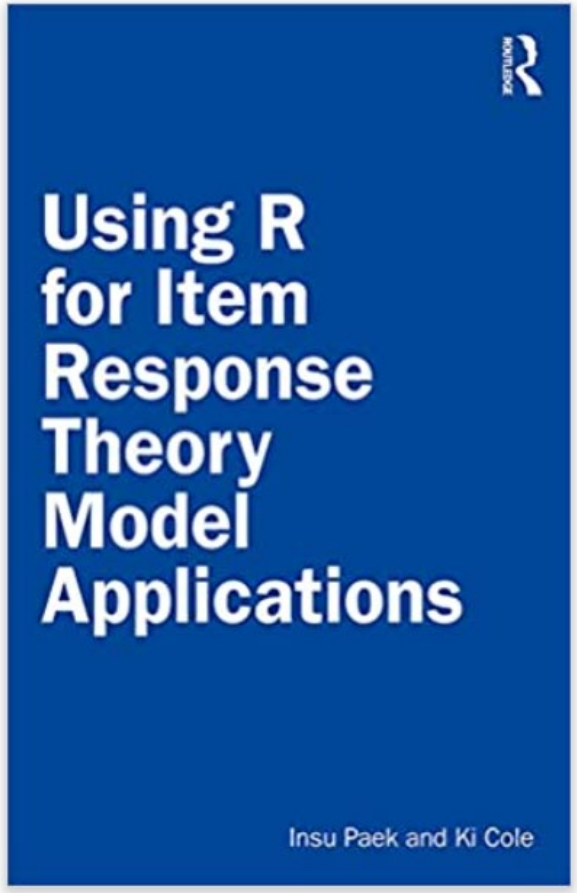
David Andrich & Ida Marais (2019). *A Course in Rasch Measurement Theory: Measuring in the Education, Social, and Health Sciences.* Springer

Content:
I General Principles and the Dichotomous Rasch Model (P3 – P158)
II The Dichotomous Rasch Model: Fit of Responses to the Model (P161-P229)
III Extending the Dichotomous Rasch Model: The Polytomous Rasch Model (P233-P288)
IV Theoretical Justifications and Further Elaborations (P291-P342)

Advantages:
- very comprehensive
- for graduate students and professionals who are engaged in social measurement.
- exercises

Disadvantage:
- Examples with Software RUMM2030

Rasch and IRT with R



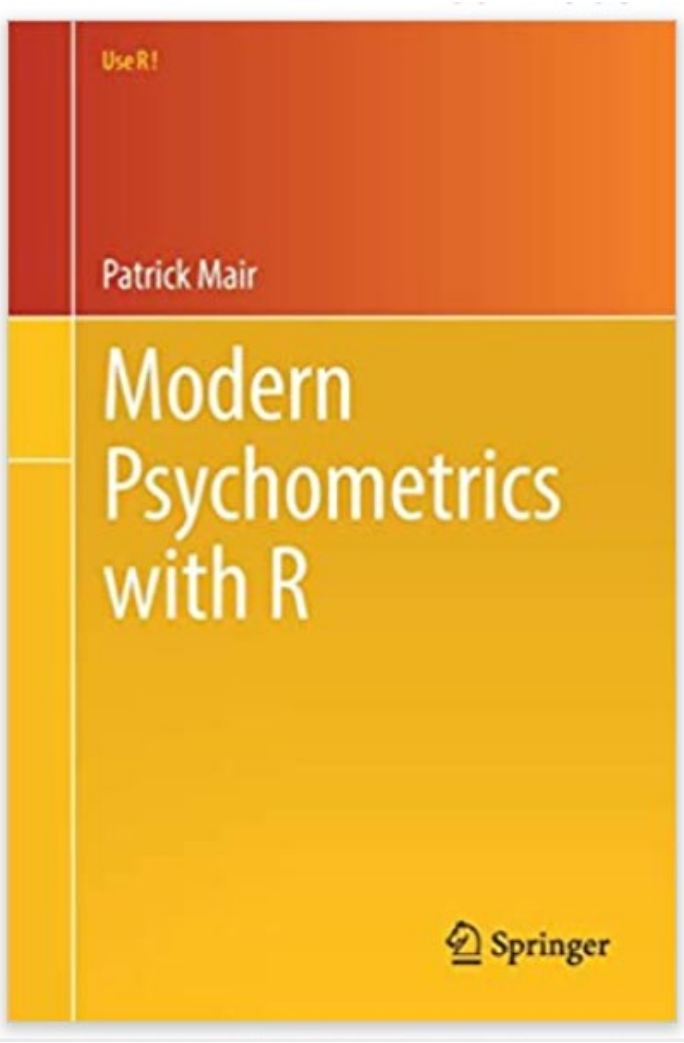
Insu Paek & Ki Cole (2020). *Using R for Item Response Theory Model Applications.* Routledge

Content:
Unidimensional IRT with dichotomous item responses
Unidimensional IRT with polytomous item responses
Unidimensional IRT with other applications
Multidimensional IRT for simple structure
Multidimensional IRT for bifactor structure

Advantages:
- Time-saving tool for learning how to create proper syntax, to evaluate models, interpret outputs
- Examples with R and packages eRm and mirt
- Overview to all types of Rasch and IRT models
- Exercises

Disadvantage:
- Small section only about the polytomous Rasch Model
- Fast increase in model complexity

Psychometrics beyond Rasch with R



Patrick Mair (2018). *Modern Psychometrics with R.* Springer

Content:
Classical Test Theory; **Factor Analysis**: Path Analysis and Structural Equation Models **Item Response Theory**; Preference Modelling; **Principal Component Analysis and Extensions**; Correspondence Analysis; Gifi Methods; Multidimensional scaling; Biplots; Networks; Parametric Cluster Analysis and Mixture Regression; Modeling Trajectories and Time Series; Analysis of fMRI Data.

Advantages:
- R and eRm – code and output interpretation
- Overview to many Psychometric methods with code and illustration
- Examples

Disadvantage:
- Small section only about the dichotomous polytomous Rasch Model with examples in eRm.

Rasch Software

Several software or computer programms exist that allow to run a Rasch analysis.

- https://www.rasch.org/software.htm

- We recommend to use the software  and its user-friendly interface 

-  Download: https://cran.r-project.org/

-  Download: https://www.rstudio.com/products/rstudio/download/

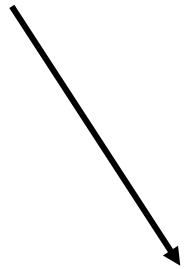
Think of a car…

R - Engine

RStudio - Dashboard

Resources for coding with R

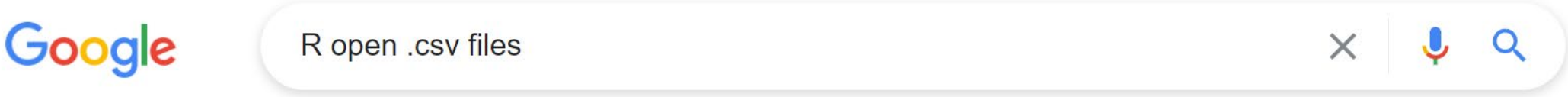
An Introduction to R by W. N. Venables, D. M. Smith and the R Core Team click on "Contributed" under "*Documentation*" in the left menu:



Base-R Cheat Sheet : essential R-code bits and pieces

An Introduction to Statistical Data Sciences via R by C. Ismay and A.Y. Kim – focus on Tidyverse*

YouTube to find many tutorials for R and R-studio



* Base-R is the original way to code in R, Packages from the Tidyverse domain have a slightly different approach to build R-Code and sort of pre-process the base R-functions to use them wrapped in other functions or commands to be used in their domain.

Think of a smartphone…

R - A new phone

R packages - Apps you can download

Packages for Psychometrics and Rasch

An overview to Packages for

https://cran.r-project.org/web/views/Psychometrics.html

Several packages are available to do a Rasch analysis are available.

- **eRm** – most recommended package, given that the Rasch functions runs with CML-algorithm, which makes no assumptions beyond what is observed in the data.
- **mirt or TAM** – have some additional features like multidimensional Rasch analysis, mixed-group Rasch analysis, or anchored analysis and test equating.
- **Additional packages** : ltm, mixRasch, pairwise, pcIRT, RM.weights, sirt

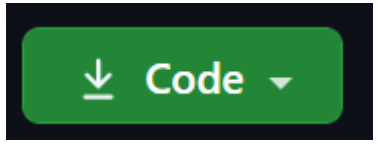
Psychometrics using the Rasch model with R.

Psychologische Institut für psychologische Methodenlehre, Evaluation und Statistik
Psychological Institute for Psychological Methodology, Evaluation and Statistics

Universität Zürich[UZH]

Resource on how to write the R-code for Rasch Analysis as well as detailed explanations on the how to interpret the outputs, numeric and visual approaches, exercises and links to the litterature.

https://github.com/CarolinaFellinghauer/WHO_Training_Rasch



Content:

- Data
  - Stress Related Growth Questionnaire Random Data
  - Model Disability Survey, Capacity, Random Data
- Kursmaterialien - Course Materials (in English)
  - HTML Workbook (cannot be opened directly in Github, needs download of the entire course)
  - Exercises (fill the R-code gaps $$$)
- R Functions
- Litterature

Psychometrics using the Rasch model with R.

Psychologische Institut für psychologische Methodenlehre, Evaluation und Statistik
Psychological Institute for Psychological Methodology, Evaluation and Statistics

Universität Zürich[UZH]

MS1 – Introduction to R, R-Studio and the Rasch Model

MS2 – Some statistics – Rasch versus IRT Models

MS3 – Item Fit

MS4 – Reliability and Targeting

MS5 – Ordering of response options

MD6-MS7 – Local Item Dependencies and Teslets

MS8-MS10 – Multidimensionality (Principal Component Analysis, Multidimensional Rasch Model, T-test for equated dimensions)

MS11-MS12 – Differential Item Functioning, item splitting

MS13 – Computer Adaptive Testing

Package WHOMDS

The package **WHOMDS** is an R-package that was specifically developped to run Rasch analysis with MDS-data.

The package **WHOMDS** is wrapping up all the analyses that are run when doing a Rasch analysis in just one call.

Facilitates running a Rasch analysis with minimal knowledge of R

Requires the user only to interpret the outputs. The documents of the Zürich Rasch course can be helpful for the correct interpretation of outputs.

It is not yet available on cran-r and must be downloaded from Github https://github.com/lindsayevanslee/whomds.

- **THANK YOUR FOR YOUR ATTENTION!**