

Selected List of Computer Software for Item Analyses: Descriptions and Features

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We collected following software information from

- 1) Psychometric software exchange website by Gary Skaggs
<https://www.psychsoft.soe.vt.edu/index.php>
- 2) NCME software database
<http://www.ncme.org/resources/database>
- 3) R: Psychometric models and methods
<https://cran.r-project.org/web/views/Psychometrics.html>

Item Analysis

- jMetrik
- Iteman 4.4
- TAP: Test Analysis Program
- LERTAP 5.10: Laboratory of Educational Research Test Analysis Package
- CITAN 1.41: Classical Item Analyzer
- CITAS: Classical Item and Test Analysis Spreadsheet

Differential Item Functioning

- DIFAS 5.0: Differential Item Functioning Analysis System
- IRT DIF Graphing Tool
- STDIF: Standardization-DIF analysis program

R packages

- CTT: Classical Test Theory Functions
- psychometric: Applied Psychometric Theory
- ShinyItemAnalysis: Test and Item Analysis via Shiny
- CTTShiny: Classical Test Theory via Shiny
- difR: Collection of Methods to Detect Dichotomous DIF
- lordif: Logistic Ordinal Regression DIF using IRT
- DFIT: Differential Functioning of Items and Tests
- DIFLNR: DIF and DDF Detection by Non-Linear Regression Models

SAS and PASW (Previously SPSS)

- SAS: Applied Psychometrics using SAS (Finch, French, & Immekus, 2014)
- SPSS: Applied Psychometrics using SPSS (Finch, Immekus, & French, 2016)

Please send any comments, updates, or corrections to hyoo@ets.org.

Created by June 28, 2019

jMetrik

Capability:

An open source program for implementing comprehensive psychometric methods including classical item analysis, reliability, item response models, and DIF.

Features:

- Available at no cost.
- Statistics from CTT and IRT are available.
- DIF analysis and distractor analysis are available.
- Polytomous and dichotomous item types can be handled.
- Runs on Windows, Mac, and Linux.

Download:

<https://itemanalysis.com/jmetrik-download/>

References:

- Meyer, J. P. (2014). *Applied measurement with jMetrik*. New York, NY: Routledge.
- <https://www.youtube.com/watch?v=cnmkeTCpDNo>

Iteman 4.4

Capability:

- A program designed to provide detailed item and test analysis reports using CTT.

Features:

- Commercially available, but free version is also available (limited to 100 items and 100 examinees).
- Statistics from CTT are available.
- DIF analysis and distractor analysis are available.
- Polytomous and dichotomous item types can be handled.
- Runs on Windows.

Download:

<http://www.assess.com/product/iteman-4/>

References:

- Assessment Systems Corporation. (2017). *User Manual for Iteman 4.4*. Minneapolis, MN: ASC.
- http://www.assess.com/media/Running_Iteman/Running_Iteman.html

TAP: Test Analysis Program

Capability:

- A program performs test analyses and item analyses based on CTT along with examinee analysis and options analysis.

Features:

- Available at no cost.
- Statistics from CTT are available.
- Distractor analysis is available.
- Dichotomous item type can be handled.
- Runs on Windows.

Download:

<http://www.ohiouniversityfaculty.com/brooksg/#TAP>

References:

- Brooks, G. P., & Johanson, G. A. (2003). TAP: Test Analysis Program. *Applied Psychological Measurement*, 27, 303–304.
- User Guide: http://www.ohiouniversityfaculty.com/brooksg/downloads/tap_user_guide.pdf
- Instructor Guide: http://www.ohiouniversityfaculty.com/brooksg/downloads/tap_instructor_guide.pdf

LERTAP 5.10: Laboratory of Educational Research Test Analysis Package

Capability:

A program works with MS Excel to calculate standard item analysis values.

Features:

- Commercially available, but free version is also available (limited to 100 examinees).
- Statistics from CTT are available.
- DIF analysis and distractor analysis are available.
- Polytomous and dichotomous item types can be handled.
- Runs on Windows, Mac, and Linux (with MS Excel).

Download:

<http://www.larrynelsonstuff.com/lertap/>

References:

- Carr, N. T. (2004). A Review of Lertap 5.2, *International Journal of Testing*, 4, 189 – 195.
- Manual: http://www.larrynelsonstuff.com/lertap/index.html?the_manual.htm

CITAN 1.41: Classican Item Analyzer

Capability:

A program performs a CTT item analysis of selected-response items scored using dichotomous scoring rules.

Features:

- Available at no cost.
- Statistics from CTT are available.
- Distractor analysis is available.
- Dichotomous item type can be handled.
- Runs on Windows, Mac, and Linux (with MS DOS Command Prompt).

Download:

<https://soe.uncg.edu/academics/departments/erm/erm-software/>

References:

- Luecht, R. M. (2011). CITAN: Classical item analyzer, Version 1.41 [Computer Program]. Greensboro, NC: Author.
- Manual: <https://soe.uncg.edu/wp-content/uploads/2015/12/CITAN-UserGuide.pdf>

CITAS: Classical Item and Test Analysis Spreadsheet

Capability:

A MS Excel spreadsheet to statistically analyze small-scale assessments using CTT.

Features:

- Available at no cost (limited to 100 items and 100 examinees).
- Statistics from CTT are available.
- Distractor analysis is available.
- Dichotomous item type can be handled.
- Runs on Windows, Mac, and Linux (with MS Excel).

Download:

<http://www.assess.com/citas/>

Reference:

Assessment Systems Corporation. (2016). Introduction to classical test theory with CITAS. Minneapolis, MN: ASC.

DIFAS 5.0: Differential Item Functioning Analysis System

Capability:

A program computes odds ratio estimates of differential item functioning, differential test functioning, and differential step functioning effects, along with associated tests of significance.

Features:

- Available at no cost.
- DIF, differential test functioning, and differential step functioning are available.
- Polytomous and dichotomous item types can be handled.
- Runs on Windows.

Download:

<https://soe.uncg.edu/academics/departments/erm/erm-software/>

References:

- Penfield, R. D. (2005). DIFAS: Differential item functioning analysis system. *Applied Psychological Measurement*, 29, 150–151.
- Manual: https://soe.uncg.edu/wp-content/uploads/2015/12/DIFASManual_V5.pdf

IRT DIF Graphing Tool

Capability:

A post-hoc tool using MS Excel spreadsheet designed to visualize and evaluate the presence of DIF.

Features:

- Available at no cost.
- IRT-based DIF is available.
- Dichotomous item type can be handled.
- Runs on Windows, Mac, and Linux (with MS Excel).

Download:

<http://www.assess.com/irt-differential-item-functioning-tool/>

References:

N/A

STDIF: Standardization-DIF analysis program

Capability:

A program to compute DIF indices of conditional p-value differences between two groups of interest.

Features:

- xxxx

Download:

<https://www.umass.edu/remf/software/STDIF.html>

References:

- Robin, F. (2001). *STDIF: Standardization-DIF analysis program* [Computer program]. Amherst, MA: University of Massachusetts, Center for Educational Assessment.
- Zenisky, A. L., Hambleton, R. K., and Robin, F. (2003). Detection of differential item functioning in large-scale state assessments: A study evaluating a two-stage approach. *Educational and Psychological Measurement*, 63, 49–62.
- Manual: https://www.umass.edu/remf/software/STDIF/STDIFUserGuide_6-15-09.pdf

CTT in R: Classical Test Theory Functions

Capability:

A collection of common test and item analyses from a CTT framework.

Features:

- Available at no cost.
- Statistics from CTT are available.
- Distractor analysis is available.
- Polytomous and dichotomous item types can be handled.

Download:

<https://cran.r-project.org/web/packages/CTT/index.html>

Reference:

<https://cran.r-project.org/web/packages/CTT/CTT.pdf>

psychometric in R: Applied Psychometric Theory

Capability:

A package contains functions useful for correlation theory, meta-analysis (validity-generalization), reliability, item analysis, inter-rater reliability, and classical utility.

Features:

- Available at no cost.
- Statistics from CTT are available.
- Dichotomous item type can be handled.

Download:

<https://cran.r-project.org/web/packages/psychometric/index.html>

Reference:

<https://cran.r-project.org/web/packages/psychometric/psychometric.pdf>

ShinyItemAnalysis in R: Test and Item Analysis via Shiny

Capability:

Interactive shiny application for analysis of educational tests and their items.

Features:

- Available at no cost.
- Statistics from CTT and IRT are available.
- DIF, differential distractor functioning, and distractor analysis are available.
- Dichotomous item type can be handled.

Download:

<https://cran.r-project.org/web/packages/ShinyItemAnalysis/index.html>

References:

- Martinkova, P., Drabinova, A., & Houdek, J. (2017). ShinyItemAnalysis: Analýza přijímacích a jiných znalostních či psychologických testů [ShinyItemAnalysis: Analyzing admission and other educational and psychological tests]. TESTFORUM, 6(9), 16–35.
- Manual: <https://cran.r-project.org/web/packages/ShinyItemAnalysis/ShinyItemAnalysis.pdf>

CTTShiny in R: Classical Test Theory via Shiny

Capability:

Interactive shiny application for running CTT (item analysis).

Features:

- Available at no cost.
- Statistics from CTT are available.
- Distractor analysis is available.
- Dichotomous item type can be handled.

Download:

<https://cran.r-project.org/web/packages/CTTShiny/index.html>

References:

- <https://cran.r-project.org/web/packages/CTTShiny/CTTShiny.pdf>
- <http://kylehamilton.net/shiny/CTTShiny/>

difR in R: Collection of Methods to Detect Dichotomous DIF

Capability:

A collection of standard methods to detect DIF among dichotomously scored items.

Features:

- Available at no cost.
- Statistics from CTT and IRT are available.
- DIF analyses (e.g., Mantel-Haenszel, Standardization, Logistic regression, SIBTEST, and Likelihood ratio) are available.
- Dichotomous item type can be handled.

Download:

<https://cran.r-project.org/web/packages/difR/index.html>

References:

Magis, D., Bèland, S., Tuerlinckx, F., & Boeck, P. (2010). A general framework and an R package for the detection of dichotomous differential item functioning. *Behavior Research Methods*, 42, 847–862.

<https://cran.r-project.org/web/packages/difR/difR.pdf>

DIFLNR in R: DIF and DDF Detection by Non-Linear Regression Models

Capability:

A package contains method for detection of DIF and differential distractor functioning (DDF) based on non-linear regression.

Features:

- Available at no cost.
- Statistics from CTT are available.
- DIF and DDF analyses (non-linear regression) are available.
- Dichotomous item type can be handled.

Download:

<https://cran.r-project.org/web/packages/difNLR/index.html>

References:

- Drabinová, A. and Martinková, P. (2017), Detection of DIF with Nonlinear Regression: A Non-IRT Approach Accounting for Guessing. *Journal of Educational Measurement*, 54, 498–517.
- Manual: <https://cran.r-project.org/web/packages/difNLR/difNLR.pdf>

lordif in R: Logistic Ordinal Regression DIF using IRT

Capability:

A package contains DIF analysis using an iterative hybrid of ordinal logistic regression and IRT.

Features:

- Available at no cost.
- Statistics from IRT are available.
- DIF analysis (e.g., logistic regression) is available.
- Polytomous and dichotomous item types can be handled.

Download:

<https://cran.r-project.org/web/packages/lordif/index.html>

References:

- Choi, S. W., Gibbons, L. E., Crane, P. K. (2011). lordif: An R Package for Detecting DIF Using Iterative Hybrid Ordinal Logistic Regression/Item Response Theory and Monte Carlo Simulations. *Journal of Statistical Software*, 39, 1–30.
- Manual: <https://cran.r-project.org/web/packages/lordif/lordif.pdf>

DFIT in R: Differential Functioning of Items and Tests

Capability:

A set of functions to perform Differential Functioning of Items and Tests (DFIT) analyses.

Features:

- Available at no cost.
- Statistics from IRT are available.
- DIF analysis (noncompensatory, compensatory, and test level differential functioning) is available.
- Polytomous and dichotomous item types can be handled.

Download:

<https://cran.r-project.org/web/packages/DFIT/index.html>

References:

- Cervantes, V. (2017). DFIT: An R Package for Raju's Differential Functioning of Items and Tests Framework. *Journal of Statistical Software*, 76, 1–24.
- Manual: <https://cran.r-project.org/web/packages/DFIT/DFIT.pdf>