Hints can't figure this out because there is no explicit mention of `lm` in the function or the documentation, and so it misses the function. If the regression had been done using `glm` rather than `lm`, `hints` would have found `coeftest.glm`.

The explanations of what the methods and functions do may be more generic than one might want, if the title of the help page is too generic. In some cases, no explanation is found. For example, `simulate.lm` is shown in Figure 1, but its description is missing. The help page for `simulate` mentions the `lm` class, but no page is available for `simulate.lm`, and so the `hints` function doesn't know where to get documentation. Finally, the hints function can only find hints for S3 objects, not for S4. Nevertheless, this simple function can be a useful tool, if you are willing to take a hint.

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Psychometrics Task View

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Psychometrics is concerned with the design and analysis of research and the measurement of human characteristics. Psychometricians have also worked collaboratively with those in the field of statistics and quantitative methods to develop improved ways to organize and analyze data. In our task view we subdivide "Psychometrics" into the following methodological areas: Item Response Theory (IRT), Correspondence Analysis (CA), Structural Equation Models (SEM) and related methods such as Factor Analysis (FA) and Principal Component Analysis (PCA), Multidimensional Scaling (MDS), Classical Test Theory (CTT), and other approaches related to psychometrics.

Since much functionality is already contained in base R and there is considerable overlap between tools for psychometry and tools described in other views, particularly in `SocialSciences`, we only give a brief overview of packages that are closely related to psychometric methodology. Recently, `Journal of Statistical Software (JSS)` published a special volume on Psychometrics in R in which some new R packages were published. For an overview see de Leeuw and Mair (2007).

Item Response Theory (IRT)

The **eRm** package fits extended Rasch models, i.e. the ordinary Rasch model for dichotomous data (RM), the linear logistic test model (LLTM), the rating scale model (RSM) and its linear extension (LRSM), the partial credit model (PCM) and its linear extension (LPCM) using conditional ML estimation.

The package **ltm** also fits the simple RM. Additionally, functions for estimating Birnbaum's 2- and 3-parameter models based on a marginal ML approach are implemented as well as the graded response model for polytomous data, and the linear multidimensional logistic model.

Item and ability parameters can be calibrated using the package **plink**. It provides various functions for conducting separate calibration of IRT single-format or mixed-format item parameters for multiple groups using the Mean/Mean, Mean/Sigma, Haebara, and Stocking-Lord methods. It includes symmetric and non-symmetric optimization and chain-linked rescaling of item and ability parameters.

The package **plRasch** computes maximum likelihood estimates and pseudo-likelihood estimates of parameters of Rasch models for polytomous (or dichotomous) items and multiple (or single) latent traits. Robust standard errors for the pseudo-likelihood estimates are also computed.

A multilevel Rasch model can be estimated using the package **lme4** with functions for mixed-effects models with crossed or partially crossed random effects.

Other packages of interest are: **mokken** in the JSS special issue as a package to compute non-parametric item analysis, the **RaschSampler** allowing for the construction of exact Rasch model tests by generating random zero-one matrices with given marginals, **mprobit** fitting the multivariate binary probit model, and **irtoys** providing a simple interface to the estimation and plotting of IRT models. Simple Rasch computations such a simulating data and joint maximum likelihood are included in the **MiscPsycho** package.

Gaussian ordination, related to logistic IRT and also approximated as maximum likelihood estimation through canonical correspondence analysis is implemented in various forms in the package **VGAM**.

Two additional IRT packages (for Microsoft Windows only) are available and documented on the JSS site. The package **mlirt** computes multilevel IRT models, and **cirt** uses a joint hierarchically built up likelihood for estimating a two-parameter normal ogive model for responses and a log-normal model for response times.

Bayesian approaches for estimating item and person parameters by means of Gibbs-Sampling are included in **MCMCpack**.

Correspondence Analysis (CA)

Simple and multiple correspondence analysis can be performed using `corresp()` and `mca()` in package **MASS** (and in the corresponding bundle **VR**). The package **ca** comprises two parts, one for simple correspondence analysis and one for multiple and joint correspondence analysis. Within each part, functions for computation, summaries and visualization in two and three dimensions are provided, including options to display supplementary points and perform subset analyses. Other features are visualization functions that offer features such as different scaling options for biplots and three-dimensional maps using the **rgl** package. Graphical options include shading and sizing plot symbols for the points according to their contributions to the map and masses respectively.

The package **ade4** contains an extensive set of functions covering, e.g., principal components, simple and multiple, fuzzy, non symmetric, and decentered correspondence analysis. Additional functionality is provided at `Bioconductor` in the package **made4**.

The **PTAk** package provides a multiway method to decompose a tensor (array) of any order, as a generalisation of SVD also supporting non-identity metrics and penalisations. 2-way SVD with these extensions is also available. Additionally, the package includes some other multiway methods: PCAn (Tucker-n) and PARAFAC/CANDECOMP with extensions.

The package **cocorresp** fits predictive and symmetric co-correspondence analysis (CoCA) models to relate one data matrix to another data matrix.

Apart from several factor analytic methods **FactoMineR** performs CA including supplementary row and/or column points and multiple correspondence analysis (MCA) with supplementary individuals, supplementary quantitative variables and supplementary qualitative variables.

Package **vegan** supports all basic ordination methods, including non-metric multidimensional scaling. The constrained ordination methods include constrained analysis of proximities, redundancy analysis, and constrained (canonical) and partially constrained correspondence analysis.

Other extensions of CA and MCA which also generalize many common IRT models can be found on the `PsychoR` page.

Structural Equation Models (SEM) and related methods

Ordinary factor analysis (FA) and principal component analysis (PCA) are in the package stats as functions `factanal()` and `princomp()`. Additional rotation methods for FA based on gradient projection algorithms can be found in the package **GPArotation**. The package **nFactors** produces a non-graphical solution to the Cattell scree test. Some graphical PCA representations can be found in the **psy** package.

The **sem** package fits general (i.e., latent-variable) SEMs by FIML, and structural equations in observed-variable models by 2SLS. Categorical variables in SEMs can be accommodated via the **polycor** package. The **systemfit** package implements a wider variety of estimators for observed-variables models, including nonlinear simultaneous-equations models. See also the **pls** package, for partial least-squares estimation, the `gR` task view for graphical models and the `SocialSciences` task view for other related packages.

FA and PCA with supplementary individuals and supplementary quantitative/qualitative variables can be performed using the **FactoMineR** package. The **homals** package can do various forms of mixed data PCA whereas **MCMCpack** has some options for sampling from the posterior for ordinal and mixed factor models.

Independent component analysis (ICA) can be computed using the packages **mlica** and **fastICA**. Independent factor analysis (IFA) with independent non-Gaussian factors can be performed with the **ifa** package. A desired number of robust principal components can be computed with the **pcaPP** package.

The package **psych** includes functions such as `fa.parallel()` and `VSS()` for estimating the appropriate number of factors/components as well as `ICLUST()` for item clustering.

Multidimensional Scaling (MDS)

MASS (and the corresponding bundle **VR**) as well as **stats** provide functionalities for computing classical MDS using the `cmdscale()` function. Sammon mapping `sammon()` and non-metric MDS `isoMDS()` are other relevant functions. Non-metric MDS can additionally be performed with `metaMDS()` in **vegan**. Furthermore, **labdsv** and **ecodist** provide the function `nmds()` and other relevant routines can be found in **xgobi**.

Principal coordinate analysis can be computed with `capscale()` in **vegan**; in **labdsv** and **ecodist** using `pco()` and with `dudi.pco()` in **ade4**.

Individual differences in multidimensional scaling can be computed with `indscal()` in the **SensoMineR** package. The package **MLDS** allows for

the computation of maximum likelihood difference scaling (MLDS).

Classical Test Theory (CTT)

The package **psychometric** contains functions useful for correlation theory, meta-analysis (validity-generalization), reliability, item analysis, inter-rater reliability, and classical utility. Cronbach alpha, kappa coefficients, and intra-class correlation coefficients (ICC) can be found in the **psy** package.

A number of routines for scale construction and reliability analysis useful for personality and experimental psychology are contained in the packages **psych** and **MiscPsycho**. Additional measures for reliability and concordance can be computed with the **concord** package.

Other related packages

Latent class analysis can be performed using the function `lca()` from package **e1071**. Further packages are **mmlcr** and **poLCA**. They compute mixed-mode latent class regression and polytomous variable latent class analysis, respectively.

The **cfa** package allows for the computation of simple, more-sample, and stepwise configural frequency analysis (CFA).

Coefficients for interrater reliability and agreements can be computed with the **irr** package. Psychophysical data can be analyzed with the **psyphy** package. Bradley-Terry models for paired comparisons are implemented in the package **BradleyTerry** and in **eba**. The latter allowes also for the computation of elimination-by-aspects models. Confidence intervals for standardized effect sizes can be found in **MBESS**.

Bibliography

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meta: An R Package for Meta-Analysis

by G. Schwarzer

Introduction

The statistical method of meta-analysis can be used to combine two or more individual study results. More specificly, an overall effect is estimated by calculating a weighted average of estimates in individual studies. Various methods of meta-analysis exist that differ mainly in the weighting scheme utilised. Meta-analysis provides a statistical method to evaluate the direction and size of the effect as well as the question whether the effect is consistent across different studies.

The package **meta** is a comprehensive set of functions for meta-analysis. Initially, the package was intended to provide statistical methods for meta-analysis available in Review Manager, Version 4 (RevMan 4), the Cochrane Collaboration's program for preparing and maintaining Cochrane reviews (see `http://www.cc-ims.net/RevMan/`). The statistical capabilities of RevMan 4 have been extended over time.

The package provides methods for meta-analysis of studies comparing two groups with either binary or continuous outcome (function `metabin()` and `metacont()`, respectively). Furthermore, the package can be used in a more general way by using the function `metagen()`, e.g., to combine hazard ratios for survival outcomes.

Statistical methods for fixed effect and random effects models (Fleiss, 1993) are available as well as functions to draw the most commonly used graphical displays (forest plots, funnel plots, and radial plots). Various statistical tests for funnel plot asymmetry, which is often taken as an indication of publication bias, are implemented. Some additional functions are available which will not be described in detail in this article, e.g. the function `trimfill()` for the trim-and-fill method, which can be used to correct for funnel plot asymmetry (Duval and Tweedie, 2000), and the function `read.mtv()` to read data analysis files exported from RevMan 4.

Another package for meta-analysis exists, called **rmeta**, which also provides functions for fixed effect and random effects models. As compared to the package **meta**, functions implementing statistical methods for funnel plot asymmetry, specific methods for continuous outcomes, the Peto method for pooling as well as the additional functions mentioned in the last paragraph are not available in the package **rmeta**.