Package: modelscompete4 (via r-universe)

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Title Compare Nested and Non-Nested Structural Equation Models

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Version 0.2.1

Description A comprehensive package for comparing multiple Structural Equation Models (SEM). Supports both nested and non-nested model comparisons, chi-square difference tests, and extraction of multiple fit indices including AIC, BIC, CFI, TLI, RMSEA, and SRMR. Built on top of the lavaan package for seamless SEM model comparison workflows.

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Encoding UTF-8

LazyData true

RoxygenNote 7.3.3

Imports lavaan (>= 0.6), stats, boot, ggplot2, nonnest2, tidyr

Suggests testthat (>= 3.0.0)

URL https://github.com/ssjerf-stack/modelscompete4

BugReports https://github.com/ssjerf-stack/modelscompete4/issues

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Contents

`.onAttach` *Package startup message*

Description

Package startup message

Usage

```
.onAttach(libname, pkgname)
```

Arguments

`libname`	library location
`pkgname`	package name

`.onLoad` *Package load*

Description

Package load

Usage

```
.onLoad(libname, pkgname)
```

Arguments

`libname`	library location
`pkgname`	package name

`bootstrap_lavaan_comparison` *Bootstrap Comparison for Lavaan Models*

Description

Perform bootstrap-based comparison of lavaan models

Usage

```
bootstrap_lavaan_comparison(
  model1,
  model2,
  R = 1000,
  parallel = "no",
  ncpus = 1
)
```

Arguments

`model1`	First lavaan model
`model2`	Second lavaan model
`R`	Number of bootstrap replications (default: 1000)
`parallel`	Type of parallel processing (if any)
`ncpus`	Number of CPUs to use for parallel processing

Value

A list containing bootstrap results

Examples

```
## Not run:
library(lavaan)
model1 <- 'F1 =~ x1 + x2 + x3'
model2 <- 'F1 =~ x1 + x2 + x3 + x4'
fit1 <- cfa(model1, data = HolzingerSwineford1939)
fit2 <- cfa(model2, data = HolzingerSwineford1939)
boot_result <- bootstrap_lavaan_comparison(fit1, fit2, R = 100)
print(boot_result)

## End(Not run)
```

compare_latent_models *Compare Latent Variable Models*

Description

Compare Latent Variable Models

Usage

```
compare_latent_models(
  ...,
  nested = FALSE,
  fit_measures = c("chisq", "df", "pvalue", "cfi", "tli", "rmsea", "srmr"),
  method = "default"
)
```

Arguments

`...`	lavaan model objects
`nested`	logical, whether models are nested
`fit_measures`	character vector of fit measures to extract
`method`	comparison method

Value

A latent_comparison object

compare_models *Compare Multiple Nested or Non-Nested Structural Equation Models*

Description

This is the core function of the modelscompete4 package. It automatically fits a list of SEM models, determines their nesting relationship, and performs the appropriate statistical comparison (chi-square difference test for nested models, Vuong test for non-nested models).

Usage

```
compare_models(
  model_list,
  data,
  estimator = "ML",
  se = "standard",
  bootstrap = 1000,
  parallel = "no",
  ...
)
```

Arguments

model_list	A named list. Each element is a character string specifying the model syntax in lavaan format.
data	A data.frame containing the observed variables used in the models.
estimator	The estimator to be used (e.g., "ML"). Passed to sem.
se	Type of standard errors. Default is "standard". Use "bootstrap" for bootstrapped standard errors and confidence intervals.
bootstrap	Number of bootstrap draws if se="bootstrap". Default is 1000.
parallel	Method for parallel processing for bootstrapping ("multicore", "snow", or "no"). Recommended for large samples.
...	Additional arguments passed to sem.

Value

An object of class modelscompete4. This is a list containing:

- fit_list: The list of fitted lavaan objects.
- fit_table: A data.frame of key fit indices for all models.
- comparison_matrix: A matrix showing pairwise nesting relationships and test results.
- test_results: Detailed results of the statistical tests performed.
- bootstrap_summary: Summary of bootstrapped results if requested.

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compare_models_advanced_lv

Advanced Model Comparison with Latent Variable Support

Description

Advanced Model Comparison with Latent Variable Support

Usage

```
compare_models_advanced_lv(
  models,
  model_names = NULL,
  model_types = NULL,
  criteria = c("AIC", "BIC", "CFI", "TLI", "RMSEA", "SRMR"),
  latent_indicators = NULL,
  bootstrap = FALSE,
  n_bootstrap = 1000
)
```

Arguments

`models`	List of model objects (lm, lavaan)
`model_names`	Character vector of model names
`model_types`	Character vector of model types ("lm", "lavaan")
`criteria`	Criteria to calculate
`latent_indicators`	List of latent variable indicators (for lavaan)
`bootstrap`	Logical, whether to perform bootstrapping
`n_bootstrap`	Number of bootstrap replications

Value

Comparison results with latent variable support

`extract_latent_fit` *Extract Latent Variable Fit Indices*

Description

Extract Latent Variable Fit Indices

Usage

```
extract_latent_fit(model)
```

Arguments

`model`	lavaan model object

Value

Comprehensive fit indices for latent variable model

`extract_latent_parameters` *Extract Parameters from Lavaan Models*

Description

This function extracts parameters (loadings, variances, etc.) from a lavaan model. P-values are formatted appropriately (e.g., <0.001 for very small values).

Usage

```
extract_latent_parameters(
  model,
  type = "loadings",
  standardized = FALSE,
  digits = 3,
  ...
)
```

Arguments

`model`	A fitted lavaan model.
`type`	Type of parameters to extract: "loadings", "variances", or "all". Default is "loadings".
`standardized`	Logical; if TRUE, returns standardized estimates. Default is FALSE.
`digits`	Number of decimal places for p-value formatting (default=3)
`...`	Additional arguments passed to `lavaan::parameterEstimates` or `lavaan::standardizedSolution`.

Value

A data frame containing the extracted parameters with formatted p-values.

Examples

```
## Not run:
library(lavaan)
model <- 'F1 =~ x1 + x2 + x3'
fit <- cfa(model, data = HolzingerSwineford1939)
extract_latent_parameters(fit, type = "loadings")

## End(Not run)
```

plot_latent_comparison *Plot Latent Model Comparison Results*

Description

Creates visualization of model comparison results

Usage

```
plot_latent_comparison(x, type = "fit", ...)
```

Arguments

x	An object of class 'modelscompete4' or 'latent_comparison'
type	Type of plot: 'fit' for fit indices, 'diff' for differences
...	Additional arguments passed to plotting functions

Value

A ggplot object (if ggplot2 and tidyr are available), otherwise NULL

Examples

```
## Not run:
library(lavaan)
model1 <- 'F1 =~ x1 + x2 + x3'
fit1 <- cfa(model1, data = HolzingerSwineford1939)
result <- compare_latent_models(fit1)
plot_latent_comparison(result)

## End(Not run)
```

print.latent_comparison *Print method for latent_comparison objects*

Description

Prints a summary of latent model comparison results.

Usage

```
## S3 method for class 'latent_comparison'
print(x, digits = 3, ...)

## S3 method for class 'latent_comparison'
print(x, digits = 3, ...)
```

Arguments

x	An object of class 'latent_comparison'
digits	Number of digits to display (default: 3)
...	Additional arguments passed to print method

Value

Invisibly returns the input object

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print.modelscompete4_advanced *Print Method for modelscompete4_advanced Objects*

Description

Print Method for modelscompete4_advanced Objects

Usage

```
## S3 method for class 'modelscompete4_advanced'
print(x, ...)
```

Arguments

x	A modelscompete4_advanced object
...	Additional arguments passed to print

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