Package ‘semnova’
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Type Package
Title Latent Repeated Measures ANOVA
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Suggests testthat, knitr, rmarkdown
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Description Latent repeated measures ANOVA (L-RM-ANOVA) is a structural
        equation modeling based alternative to traditional repeated measures ANOVA.
        L-RM-ANOVA extends the latent growth components approach by
        latent variables to repeated measures analysis.
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Description

Comparing the fit of LGC objects.

Usage

```r
## S4 method for signature '1gc'
anova(object, ...)
```

Arguments

- `object`  
  lgc object. An lgc object to be compared against other lgc objects.
- `...`  
  lgc object. More lgc objects to be compared.

create_mmodel  

Specifying a measurement model.

Description

Specifying a measurement model.

Usage

```r
create_mmodel(..., list = NULL, lv_scaling = "effect", invariance = NULL)
```

Arguments

- `...`  
  Named arguments each representing a latent variable. The arguments are character vectors containing the variable names the latent variables are measured by.
- `list`  
  List. Each list element represents a latent variable. List elements are character vectors containing the variable names the latent variables are measured by.
- `lv_scaling`  
  Character vector. Defines the strategy for latent variable scaling. Default is `lv_scaling = "effect"`. Possible strategies are: c("effect","referent").
- `invariance`  
  Not yet implemented.

Value

Object of classe `mmodel`. 
Examples

mmodel <- create_mmodel(
  A1B1 = "var1",
  A2B1 = "var2",
  A3B1 = "var3",
  A1B2 = "var4",
  A2B2 = "var5",
  A3B2 = "var6",
  lv_scaling = "referent"
)

Description

General function to specify a general latent growth components model.

Usage

lgc(
  data, 
  mmodel, 
  C_matrix, 
  hypotheses = NULL, 
  covariates = NULL, 
  groups = NULL, 
  append = NULL, 
  verbose = FALSE, 
  compound_symmetry = FALSE, 
  sphericity = FALSE, 
  multiv_tests = c("wilks", "wald"), 
  univ_tests = NULL, 
  randomization = list(ncores = 1, nsamples = 1000),
  ...
)

Arguments

data Dataframe. Data object to be passed to lavaan.

mmodel Object of class mmodel. If not provided, manifest variables from the formula object will be used. Otherwise, use create_mmodel() to specify measurement model.

C_matrix Contrast matrix. Must be invertible.
hypotheses List of numeric vectors. Each list element represents a hypothesis. For each hypothesis, the contrasts indicated by the elements of the vectors are tested against zero.
covariates Not implemented yet.
groups Not implemented yet.
append Character. Syntax that is to be appended to lavaan syntax.
verbose Boolean. Print details during procedure.
compound_symmetry Boolean. When set to TRUE, compound symmetry is assumed.
sphericity Boolean or formula. When set to TRUE, sphericity is assumed for all effects.
multiv_tests Character vector. Multivariate test statistics that are to be computed. Possible statistics are: c("wilks","wald"). Default is multiv_tests = c("wilks","wald").
univ_tests Character vector. Univariate test statistics that are to be computed. Possible statistics are: c("F"). Default is univ_tests = NULL.
randomization Not yet supported.
... Additional arguments to be passed to lavaan.

Value

Function returns an lgc object. Use summary(object) to print hypotheses. Otherwise use object@sem_obj to get access to the underlying lavaan object.

Examples

set.seed(323412431)
data("semnova_test_data", package = "semnova")

mmodel <- create_mmodel(
  A1B1 = "var1",
  A2B1 = "var2",
  A3B1 = "var3",
  A1B2 = "var4",
  A2B2 = "var5",
  A3B2 = "var6",
  lv_scaling = "referent"
)

hypotheses <- list(
  Intercept = c(1),
  A = c(2, 3),
  B = c(4),
  AB = c(5, 6)
)

C_matrix <- matrix(
  c(1, 1, 0, 1, 1, 0,


```r
1, 0, 1, 1, 0, 1,
1,-1,-1, 1,-1,-1,
1, 1, 0,-1,-1, 0,
1, 0, 1,-1, 0,-1,
1,-1,-1,-1, 1, 1),
nrow=6)

fit_lgc <- lgc(data = semnova_test_data, mmodel, C_matrix, hypotheses)
summary(fit_lgc)
```

---

**lgc-class**

**LGC Class.**

**Description**

LGC Class.

**semnova**

*Latent repeated-measures ANOVA using the LGC approach*

**Description**

Function specifies an LGC model. The idata object is used to create the contrast matrix that is passed to the `lgc()` function. Typical hypotheses are specified as well.

**Usage**

`semnova(
  formula,
  idesign,
  idata,
  data,
  mmodel = NULL,
  covariates = NULL,
  groups = NULL,
  append = NULL,
  icontrasts = c("contr.poly", "contr.sum"),
  verbose = FALSE,
  compound_symmetry = FALSE,
  sphericity = FALSE,
  multiv_tests = c("wilks", "wald"),
  univ_tests = c("F"),
  randomization = list(ncores = 1, nsamples = 1000),
  ...)
)"
Arguments

- `formula`: Formula. Within-subjects design formula.
- `idesign`: Dataframe. The dataframe contains the factorial design.
- `idata`: Dataframe. Data object to be passed to lavaan.
- `data`: Dataframe. Data object to be passed to lavaan.
- `mmodel`: Object of class `mmodel`. If not provided, manifest variables from the formula object will be used. Otherwise, use `create_mmodel()` to specify measurement model.
- `covariates`: Not implemented yet.
- `groups`: Not implemented yet.
- `append`: Character vector. Syntax that is to be appended to lavaan syntax.
- `icontrasts`: Character vector. Use this argument to select the type of contrasts to be used. Default is `c("contr.sum","contr.poly")` (not ordered, ordered).
- `verbose`: Boolean. Print details during procedure.
- `compound_symmetry`: Boolean. When set to TRUE, compound symmetry is assumed among dependent variables.
- `sphericity`: Boolean or formula. When set to TRUE, sphericity is assumed for all effects.
- `multiv_tests`: Character vector. Multivariate test statistics that are to be computed. Possible statistics are: `c("wilks","wald")`. Default is `multiv_tests = c("wilks","wald")`.
- `univ_tests`: Character vector. Univariate test statistics that are to be computed. Possible statistics are: `c("F")`. Default is `univ_tests = NULL`.
- `randomization`: Not yet supported.
- `...`: Additional arguments to be passed to lavaan.

Value

Function returns an `lgc` object. Use `summary(object)` to print hypotheses. Otherwise use `object@sem_obj` to get access to the underlying lavaan object.

Examples

```r
set.seed(323412431)

data("semnova_test_data", package = "semnova")


mmodel <- create_mmodel(
    A1B1 = "var1",
    A2B1 = "var2",
    A3B1 = "var3",
    A1B2 = "var4",
    A2B2 = "var5",
    ...)
```
semmova_test_data

A3B2 = "var6",
lv_scaling = "referent"
)

fit_semmova <-
semmova(
  formula = cbind(A1B1, A2B1, A3B1, A1B2, A2B2, A3B2) ~ 1,
data = semnova_test_data,
  idata = idata,
  idesign = ~ A * B,
mmodel = mmodel
)

summary(fit_semmova)

semmova_test_data

This data set serves for examples and tests.

Description

This is a simulated data set that 100 observation of six normally distributed variables with mean = 0, variance = 1 and covariance 0.5.

Usage

semmova_test_data

Format

A data frame with 100 rows and 6 variables:

summary,lgc-method

Printing the summary for an LGC object.

Description

Printing the summary for an LGC object.

Usage

## S4 method for signature 'lgc'
summary(object, ...)

Arguments

object 1gc object. The object to get a summary about.
... Additional arguments. Currently none supported.
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