Package ‘psychtoolbox’

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Title Tools for psychology research and psychometrics

Version 0.0.1

Description This package contains functions helping to analyse psychological data.

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URL https://gitlab.com/lukas.novak/psychtoolbox

Encoding UTF-8

LazyData true

Roxygen list(markdown = TRUE)

RoxygenNote 7.2.1

Imports coin,
docxtractr,
dplyr,
equaltestMI,
foreign,
insight,
lavaan,
magrittr,
rmarkdown,
rstatix,
stats,
tidyr,
expss,
stringr,
tidyselect,
vctrs,
purrr,
reshape2,
janitor,
broom

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

Depends R (>= 2.10)

R topics documented:

`clin_sig_chang` *Clinically significant change*

Description

This easy function calculates Clinically significant change (clinical cut-off scores) as defined by Jacobson and Truax (1991).

Usage

```
clin_sig_chang(SD_0, SD_1, M_1, M_0)
```

Arguments

`SD_0`	standard deviation of the non-clinical population
`SD_1`	standard deviation of the clinical population
`M_1`	mean of the clinical population
`M_0`	mean of the non-clinical population

Format

numeric vector of values

Details

This function computes cut-off score differentiating between the clinical and non-clinical population based on the Jacobson and Truax (1991) formula (p. 13). The mathematical formula can be also found in Biescad & Timulak(2014, p. 150).

Value

numeric vector

Author(s)

Lukas Novak, <lukasjirinovak@gmail.com>

References

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. Journal of Consulting and Clinical Psychology, 59(1), 12-19, DOI: https://doi.org/10.1037/0022-006X.59.1.12

Matus Biescad & Ladislav Timulak (2014). Measuring psychotherapy outcomes in routine practice: Examining Slovak versions of three commonly used outcome instruments, European Journal of Psychotherapy & Counselling, 16:2, 140-162, DOI: https://doi.org/10.1080/13642537.2014.895772

See Also

`RCI()` function for calculation of the Reliable Change Index

Examples

```
clin.cut.off=clin_sig_chang(SD_0 = 3.5,
                            SD_1 = 2.1,
                            M_0 = 4.2,
                            M_1 = 12.1)
clin.cut.off
```

`dat` *IRI validation dataset*

Description

This dataset consists the two variables which were used in the study examining psychometric properties of the Interpersonal Reactivity Index.

Usage

```
dat
```

Format

A data frame with 835 rows and 2 variables:

`Gender` integer COLUMN_DESCRIPTION

`IRI_EC` double COLUMN_DESCRIPTION

Details

DETAILS

lasy.log.reg *Lasy logistic regression function*

Description

This function performs logistic regression and print results in tibble output. This function aims to provide the results of the regression analysis in the format, which is frequently desired in academic journals.

Usage

```
lasy.log.reg(
  independent.var,
  dependent.var,
  print.cov = FALSE,
  covariates = NULL,
  data
)
```

Arguments

`independent.var`	independent variable/s
`dependent.var`	dependent variable/s
`print.cov`	Print effect of covariates, default is FALSE
`covariates`	covariates to be included in a model
`data`	data frame or tibble object

Format

An object of class `"tibble"`

Details

Currently, this function does not provide model fit indicators such as AIC or BIC.

Value

data frame

Author(s)

Lukas Novak, `<lukasjirinovak@gmail.com>`

References

Welch, B. L. (1947). "The generalization of "Student's" problem when several different population variances are involved". Biometrika. 34 (1–2): 28–35.

Wilcoxon, F., Individual Comparisons by Ranking Methods, Biometrics Bulletin, Vol. 1, 1945, pp. 80–83. DOI:10.2307/3001968

Dunn, O. J. (1961) Multiple comparisons among means. Journal of the American Statistical Association. 56, 52–64.

Games, P. A., Keselman, H. J., & Clinch, J. J. Tests for homogeneity of variance in factorial designs. Psychological Bulletin, 86, 978–984

Examples

```
# data loading
data(paq.validation.study)
regress.output <- lasy.log.reg(independent.var = c("TEQ","PAQ","G_EOT","G_DDF"),
                               covariates = c("Age"),
                               dependent.var = c("econom_stat_dich",
                                                 "family_status",
                                                 "edu_dich"),
                               data = paq.validation.study)

print(regress.output)
```

---

mitab — *Measurement invariance table*

Description

Measurement invariance table

Usage

```
mitab(
  group1_nam,
  group2_nam,
  ordered,
  model,
  data,
  std.lv,
  meanstructure,
  group,
  yes_no_results,
  estimator,
  robust = FALSE,
  cfi.difference = FALSE,
  rmsea.difference = FALSE
)
```

Arguments

`group1_nam`	name of the first group
`group2_nam`	name of the second group
`ordered`	logical, if set to TRUE items will be treated as ordered variables
`model`	lavaan model to test
`data`	data frame or tibble
`std.lv`	logical, if TRUE than standardized loadings are stored in temporal output
`meanstructure`	logical, if TRUE than model with meanstructure is estimated
`group`	name of grouping variable
`yes_no_results`	logical, if TRUE than lasy output indicating difference between models is added, currently working only based on CFI and RMSEA
`estimator`	name of estimator to be used during fitting procedure
`robust`	logical, if TRUE, than robust results are printed, working only with estimators providing robust results (e.g. MLR or DWLS)
`cfi.difference`	logical, if TRUE, delta of the CFI is printed in output
`rmsea.difference`	logical, if TRUE, delta of the RMSEA is printed in output

Format

An object of class `"tibble"`

Details

This function creates table with the key output from measurement invariance testing.

Value

data frame

Author(s)

Lukas Novak, `<lukasjirinovak@gmail.com>`

References

Myles Hollander and Douglas A. Wolfe (1973). Nonparametric Statistical Methods. New York: John Wiley & Sons. Pages 27–33 (one-sample), 68–75 (two-sample). Or second edition (1999).

Examples

```
# The famous Holzinger and Swineford (1939) example
HS.model <- ' visual  =~ x1 + x2 + x3
textual =~ x4 + x5 + x6
speed   =~ x7 + x8 + x9 '

library(lavaan)
dat <- HolzingerSwineford1939
res.tab.mi <- mitab(
group1_nam = "Grant-White",
```

```
group2_nam = "Pasteur",
ordered = FALSE,
model = HS.model,
data = dat,
std.lv = TRUE,
meanstructure = TRUE,
group = "school",
yes_no_results = TRUE,
estimator = "MLR",
robust = TRUE,
cfi.difference = TRUE)

print(res.tab.mi)
```

---

mult.g.comp *Robust multi-group comparison*

Description

This function allows to compare multiple groups in multiple outcome variables with violated parametric assumptions.

Usage

```
mult.g.comp(df, outcome.var, groups)
```

Arguments

`df`	data frame or tibble object
`outcome.var`	continuous variable/s
`groups`	grouping variable/s

Format

An object of class `"tibble"`

Details

Currently, this function does not report effect size from post-hoc tests.

Two group comparison:
If there is less than three groups, the Welch test or the Wilcoxon test depending on data distribution.

Three and more groups comparison:
If more than two groups are present in data, the Dunn test or Games-Howell test is performed.

Value

data frame

Author(s)

Lukas Novak, <lukasjirinovak@gmail.com>

References

Welch, B. L. (1947). "The generalization of "Student's" problem when several different population variances are involved". Biometrika. 34 (1–2): 28–35.

Wilcoxon, F., Individual Comparisons by Ranking Methods, Biometrics Bulletin, Vol. 1, 1945, pp. 80–83. DOI:10.2307/3001968

Dunn, O. J. (1961) Multiple comparisons among means. Journal of the American Statistical Association. 56, 52–64.

Games, P. A., Keselman, H. J., & Clinch, J. J. Tests for homogeneity of variance in factorial designs. Psychological Bulletin, 86, 978–984

Examples

```
# data loading
data(dat)
tab.1=mult.g.comp(df = paq.validation.study, outcome.var = c("PAQ","G_DIF","G_DDF","G_EOT"),
groups = c("economical_status",
           "Gender",
           "education",
           "family_status"))
# printing the output
print(tab.1)
```

---

paq.validation.study *paq.validation.study*

Description

This dataset contains data which were used for validation of the Perth Alexithymia Questionnaire in the Czech Republic.

Usage

```
paq.validation.study
```

Format

A data frame with 848 rows and 53 variables:

`P_DIF` double COLUMN_DESCRIPTION

`P_DDF` double COLUMN_DESCRIPTION

`P_DAF` double COLUMN_DESCRIPTION

`N_DIF` double COLUMN_DESCRIPTION

`N_DDF` double COLUMN_DESCRIPTION

`N_DAF` double COLUMN_DESCRIPTION

`G_EOT` double COLUMN_DESCRIPTION

`G_DIF` double COLUMN_DESCRIPTION

`G_DDF` double COLUMN_DESCRIPTION

`G_DAF` double COLUMN_DESCRIPTION

`family_status` integer COLUMN_DESCRIPTION

`Gender` integer COLUMN_DESCRIPTION

`TEQ_1` double COLUMN_DESCRIPTION

`TEQ_3` double COLUMN_DESCRIPTION

`TEQ_5` double COLUMN_DESCRIPTION

`TEQ_16` double COLUMN_DESCRIPTION

`TEQ_CON_2` double COLUMN_DESCRIPTION

`TEQ_CON_4` double COLUMN_DESCRIPTION

`TEQ_CON_14` double COLUMN_DESCRIPTION

`TEQ` double COLUMN_DESCRIPTION

`Age` double COLUMN_DESCRIPTION

`age_group` double COLUMN_DESCRIPTION

`age.quality` double COLUMN_DESCRIPTION

`ethnicity` integer COLUMN_DESCRIPTION

`education` integer COLUMN_DESCRIPTION

`economical_status` integer COLUMN_DESCRIPTION

`PAQ_1` double COLUMN_DESCRIPTION

`PAQ_2` double COLUMN_DESCRIPTION

`PAQ_3` double COLUMN_DESCRIPTION

`PAQ_4` double COLUMN_DESCRIPTION

`PAQ_5` double COLUMN_DESCRIPTION

`PAQ_6` double COLUMN_DESCRIPTION

`PAQ_7` double COLUMN_DESCRIPTION

`PAQ_8` double COLUMN_DESCRIPTION

`PAQ_9` double COLUMN_DESCRIPTION

`PAQ_10` double COLUMN_DESCRIPTION

`PAQ_11` double COLUMN_DESCRIPTION

`PAQ_12` double COLUMN_DESCRIPTION

`PAQ_13` double COLUMN_DESCRIPTION

`PAQ_14` double COLUMN_DESCRIPTION

`PAQ_15` double COLUMN_DESCRIPTION

`PAQ_16` double COLUMN_DESCRIPTION

`PAQ_17` double COLUMN_DESCRIPTION

`PAQ_18` double COLUMN_DESCRIPTION

`PAQ_19` double COLUMN_DESCRIPTION

`PAQ_20` double COLUMN_DESCRIPTION

`PAQ_21` double COLUMN_DESCRIPTION

`PAQ_22` double COLUMN_DESCRIPTION

`PAQ_23` double COLUMN_DESCRIPTION

`PAQ_24` double COLUMN_DESCRIPTION

`PAQ` double COLUMN_DESCRIPTION

`edu_dich` integer COLUMN_DESCRIPTION

`econom_stat_dich` integer COLUMN_DESCRIPTION

dichotomization of variables

paq.validation.study <- paq.validation.study %>% dplyr::mutate(edu_dich = as.factor(ifelse(education == "University master or higher", "University","lower_edu")), econom_stat_dich = as.factor(ifelse(economical_status == "Student", "Student","non_student")))

`RCI` *Reliable Change Index (RCI)*

Description

This function calculates Reliable Change Index (RCI) as modifed by Wiger and Solberg (2001, p.148).

Usage

```
RCI(SD_0, test.ret.rel)
```

Arguments

`SD_0`	standard deviation of the non-clinical population
`test.ret.rel`	test-retest reliability of the instrument

Format

numeric vector of values

Details

This function computes value corresponding to "the minimum amount of change that could not be attributed to the error of measurement" (Biescad & Timulak, 2014, p. 150). If score change from before to post treatment is lower that value resulting from this function, than change in client score can not be attributed to the effectiveness of the therapy but rather other factors such as a measurement error (Biescad & Timulak, 2014). This function is a result of modification of the original Jacobson and Truax (1991) formula by Wiger and Solberg (2001, p.148).

Value

numeric vector

Author(s)

Lukas Novak, `<lukasjirinovak@gmail.com>`

References

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. Journal of Consulting and Clinical Psychology, 59(1), 12-19, DOI: https://doi.org/10.1037/0022-006X.59.1.12

Matus Biescad & Ladislav Timulak (2014). Measuring psychotherapy outcomes in routine practice: Examining Slovak versions of three commonly used outcome instruments, European Journal of Psychotherapy & Counselling, 16:2, 140-162, DOI: https://doi.org/10.1080/13642537.2014.895772

Wiger, D. E., & Solberg, K. B. (2001). Tracking Mental Health Outcomes: A Therapist's Guide to Measuring Client Progress, Analyzing Data, and Improving Your Practice (1., Vol. 2001). Wiley.

See Also

`clin_sig_chang()` function for calculation of the clinical cut-off scores

Examples

```
re.ch.in = RCI(SD_0 = 4.87, test.ret.rel = 0.66)
re.ch.in
```

`two.g.comp` *Automatic two-groups comparison*

Description

Automatic two-groups comparison

Usage

```
two.g.comp(df, y, group.var)
```

Arguments

`df`	data frame or tibble with one socio-demographic variable and one continuous variable
`y`	continuous variable
`group.var`	binary grouping variable

Format

An object of class `"tibble"`

Details

This function computes either Wilcox test or t-test depending on whether homogeneity of variances assumption is met or not.

Value

data frame

Author(s)

Lukas Novak, <lukasjirinovak@gmail.com>

References

Myles Hollander and Douglas A. Wolfe (1973). Nonparametric Statistical Methods. New York: John Wiley & Sons. Pages 27–33 (one-sample), 68–75 (two-sample). Or second edition (1999).

Examples

```
# data loading
data(dat)
# running the function
two.g.comp.out.EC = two.g.comp(df = dat, y = "IRI_EC", group.var = "Gender")
# printing the output
print(two.g.comp.out.EC)
```

---

word2pdf *word to pdf*

Description

Conversion of word document to pdf using either R Markdown package or Libre office. The latter represents higher quality approach - in general.

Usage

```
word2pdf(imp_file, out_file)
```

Arguments

`imp_file`	name of the word document to convert - without docx suffix
`out_file`	name of output pdf file without - without pdf suffix

Format

An object of class `"pdf"`

Details

this function is currently running only on windows

Value

pdf file

Author(s)

Lukas Novak, <lukasjirinovak@gmail.com>

Examples

```
# example from word do pdf
#word2pdf(imp_file = "example.docx",out_file = "example1.pdf")
```

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