Package ‘condir’

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Title Computation of P Values and Bayes Factors for Conditioning Data

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Description Set of functions for the easy analyses of conditioning data.

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URL https://github.com/AngelosPsy/condir

BugReports https://github.com/AngelosPsy/condir/issues

Suggests rmarkdown, spelling, testthat

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`csCompare` *Statistically compare CRs towards two CSs*

Description

Compare CRs towards two CSs within a frequentist and a Bayesian framework.

Usage

```
csCompare(
  cs1,
  cs2,
  group = NULL,
  data = NULL,
  alternative = "two.sided",
  conf.level = 0.95,
  mu = 0,
  rscale = 0.707,
  descriptives = TRUE,
  out.thres = 3,
  boxplot = TRUE
)
```

Arguments

`cs1`	a numeric vector of values. If the `data` argument is defined, it can refer to either the column index or the column name of the data object. See `Details` for more information.
`cs2`	a numeric vector of values. If the `data` argument is defined, it can refer to either the column index or the column name of the data object. See `Details` for more information.
`group`	column index or name that contain the group data. See `Details` for more information.
`data`	numeric matrix or data frame that contains the relevant data.
`alternative`	a character string for the specification of the alternative hypothesis. Possible values: `"two.sided"` (default), `"greater"` or `"less"`.
`conf.level`	Interval's confidence level.
`mu`	a numeric value for the mean value or mean difference.
`rscale`	the scale factor for the prior used in the Bayesian t.test.
`descriptives`	Returns basic descriptive statistics for `cs1` and `cs2`.

`out.thres`	The threshold for detecting outliers (default is 3). If set to 0, no outliers analysis will be performed. See `Details` below for more information.
`boxplot`	Should a boxplot of the variables be produced (default is TRUE)?

Details

`csCompare` performs both a student t-test (using the `stats::t.test` function) and a Bayesian t-test (using the `BayesFactor::ttest.tstat`). If `cs1` and/or `cs2` are or refer to multiple columns of a matrix or a data.frame, then the row means are computed before the t-tests are performed. In case `group` is `NULL`, paired-samples t-tests will be run. In case the `group` is different than `NULL`, then the csCompare first computes difference scores between the cs1 and the cs2 (i.e., cs1 - cs2). In case the group argument is defined but, after removal of NA's (`stats::na.omit`), only one group is present, a paired samples t-test is run. In case of independent samples t-test, the function runs a Welch's t-test.

Regarding outliers, those are detected based on the deviations from the standardized residuals of each test. For example, in case of a paired-samples t-test, the `csCompare` function will run an additional regression for detecting deviations (defined in the `out.thres` argument) from the standardized residuals. The detected outliers are removed from both the frequentists and Bayesian analyses.

Value

The function returns (at least) 3 list objects. These are: `descriptives`, `freq.results`, and `bayes.results`. In case outliers are detected, then the outlier analyses are returned as well with the name `res.out` as prefix to all list objects. For example, the descriptive statistics of the outlier analyses, can be indexed by using `obj$res.out$descriptives`, with obj being the object of the csCompare results.

The values of the `descriptives` are described in `psych::describe`.

The values of the `freq.results` are: `method`: which test was run.

`alternative`: the alternative hypothesis.

`WG1, WG2`: the Shapiro test values, separately for group 1 and group 2. In case of a paired-samples t-test, the WG2 is 0.

`WpG1, WpG2`: the p-values of Shapiro test, separately for group 1 and group 2. In case of a paired-samples t-test, the WpG2 is 0.

`null.value`: The value defined by `mu` (see above).

`LCI, HCI`: The low (`LCI`) and high (`HCI`) bounds of the confidence intervals.

`t.statistic`: Logical.

`df`: The degrees of freedom of the t-test performed.

`p.value`: The p-value of the performed t-test.

`cohenD`: The Cohen's d for the performed t-test.

`cohenDM`: The magnitude of the resulting Cohen's d.

`hedgesG`: The Hedge's g for the performed t-test.

`hedgesGM`: The magnitude of the resulting Hedge's g.

The values of the `bayes.results` are:

`LNI`, `HNI`: The low (`LNI`) and high (`HNI`) intervals of the hypothesis to test.

`rscale`: The used scale (see `rscale` argument above).

`bf10`: The BF10.

`bf01`: The BF01.

`propError`: The proportional error of the computed Bayes factor.

References

Krypotos, A. M., Klugkist, I., & Engelhard, I. M. (2017). Bayesian hypothesis testing for human threat conditioning research: An introduction and the condir R package. European Journal of Psychotraumatology, 8.

Rouder, J. N., Speckman, P. L., Sun, D., Morey, R. D., & Iverson, G. (2009). Bayesian t-tests for accepting and rejecting the null hypothesis. Psychonomic Bulletin & Review, 16, 225-237

See Also

`t.test`, `ttest.tstat`

Examples

```
set.seed(1000)
csCompare(cs1 = rnorm(n = 100, mean = 10), cs2 = rnorm(n = 100, mean = 9))
```

`csPlot` *Plot CRs for each CS*

Description

Plot the mean of median of each CRs, for each CS

Usage

```
csPlot(
  cs1,
  cs2,
  group = NULL,
  data = NULL,
  ylab = "CRs",
  col = c("black", "grey"),
  legend = c("cs1", "cs2")
)
```

Arguments

cs1	a numeric vector of values. If the data argument is defined, it can refer to either the column index or the column name of the data object. See Details for more information.
cs2	a numeric vector of values. If the data argument is defined, it can refer to either the column index or the column name of the data object. See Details for more information.
group	column index or name that contain the group data. See Details for more information.
data	numeric matrix or data frame that contains the relevant data.
ylab	Label for the x-axis
col	The color of the error bars to be used (either given as a numeric vector or a character string). The length of the chosen colors should be equal to the length of the legend names otherwise a warning is returned.
legend	The legend names to be used. The length of the legend labels should be the same as the length of the color string, otherwise a warning is returned.

Details

csCompare performs both a student t-test (using the stats::t.test function) and a Bayesian t-test (using the BayesFactor::ttest.tstat). In case group is not defined, paired-samples t-tests are run. In case the group is defined, then the csCompare first computes difference scores between the cs1 and the cs2 (i.e., cs1 - cs2). In case the group argument is defined but, after removal of NA's (stats::na.omit), only one group is defined, a paired samples t-test is run.

See Also

t.test, ttest.tstat

Examples

```
set.seed(1000)
csPlot(cs1 = rnorm(n = 100, mean = 10), cs2 = rnorm(n = 100, mean = 9))
```

---

csReport *Report results of conditioning data*

Description

Report results of data analyses run with the csCompare.

Usage

```
csReport(
  csCompareObj = NULL,
  csSensitivityObj = NULL,
  save = FALSE,
  fileName = "report",
  alphaLevel = 0.05,
  interpretation = FALSE
)
```

Arguments

`csCompareObj`	a list or data frame returned from the `csCompare` function. The object should be of class csCompare.
`csSensitivityObj`	Sensitivity analysis results returned from the `csSensitivity` function. The object should be of class csSensitivity.
`save`	If `code` argument is set to `FALSE` (default), the results are printed on the screen. Otherwise, a '.txt' file with the report is generated.
`fileName`	The file name of the produced report. The argument is ignored if `save` is set to `FALSE`.
`alphaLevel`	The alpha level to be used for determining significant or non-significant results.
`interpretation`	Should an interpretation of the results be included? (FALSE). In case of the Bayesian results, the results are interpreted according to Lee and Wagenmakers (2013).

Examples

```
set.seed(1000)
tmp <- csCompare(cs1 = rnorm(n = 100, mean = 10),
cs2 = rnorm(n = 100, mean = 9))
csReport(tmp)
```

---

csRobustnessPlot *Plot robustness results*

Description

Plots the results of robustness test

Usage

```
csRobustnessPlot(
  cs1,
  cs2,
  group = NULL,
```

```
  data = NULL,
  alternative = "two.sided",
  conf.level = 0.95,
  mu = 0,
  rscaleSens = c("medium", "wide", "ultrawide"),
  BF01 = TRUE,
  ylimz = NULL,
  sensitivity = FALSE
)
```

Arguments

cs1	a numeric vector of values. If the data argument is defined, it can refer to either the column index or the column name of the data object. See Details for more information.
cs2	a numeric vector of values. If the data argument is defined, it can refer to either the column index or the column name of the data object. See Details for more information.
group	column index or name that contain the group data. See Details for more information.
data	numeric matrix or data frame that contains the relevant data.
alternative	a character string for the specification of the alternative hypothesis. Possible values: "two.sided" (default), "greater" or "less".
conf.level	Interval's confidence level.
mu	a numeric value for the mean value or mean difference.
rscaleSens	the scale factor for the prior used in the Bayesian t.test
BF01	Should the BF01 be plotted (default is set to TRUE). If FALSE, the BF10 is plotted.
ylimz	the limits of the y-axis (default to NULL).
sensitivity	Should the sensitivity results be returned (default is set to FALSE).

Details

This plot template is influenced by the JASP way (https://jasp-stats.org/) for plotting sensitivity analysis results. On the x-axis or the width of the Cauchy's Scale is plotted. On the y-axis either BF01 is plotted (if BF01 is set to TRUE) or BF10 (if BF01 is set to FALSE).

References

JASP Team (2019). JASP (Version 0.11.1)[Computer software].

Krypotos, A. M., Klugkist, I., & Engelhard, I. M. (2017). Bayesian hypothesis testing for human threat conditioning research: An introduction and the condir R package. European Journal of Psychotraumatology, 8.

See Also

csCompare, csSensitivity

Examples

```
set.seed(1000)
csRobustnessPlot(cs1 = rnorm(n = 100, mean = 10),
cs2 = rnorm(n = 100, mean = 9))
```

`csSensitivity` *Sensitivity analysis for the Bayes Factors of* `csCompare` *results*

Description

Perform a sensitivity analysis for the Bayes factors computed with the `csCompare` results

Usage

```
csSensitivity(
  cs1,
  cs2,
  group = NULL,
  data = NULL,
  alternative = "two.sided",
  conf.level = 0.95,
  mu = 0,
  rscaleSens = c(0.707, 1, 1.41),
  out.thres = 3
)
```

Arguments

`cs1`	a numeric vector of values. If the `data` argument is defined, it can refer to either the column index or the column name of the data object. See `Details` for more information.
`cs2`	a numeric vector of values. If the `data` argument is defined, it can refer to either the column index or the column name of the data object. See `Details` for more information.
`group`	column index or name that contain the group data. See `Details` for more information.
`data`	numeric matrix or data frame that contains the relevant data.
`alternative`	a character string for the specification of the alternative hypothesis. Possible values: `"two.sided"` (default), `"greater"` or `"less"`.
`conf.level`	Interval's confidence level.
`mu`	a numeric value for the mean value or mean difference.
`rscaleSens`	the scale factor for the prior used in the Bayesian t.test
`out.thres`	The threshold for detecting outliers (default is 3). If set to 0, no outliers analysis will be performed. See `Details` below for more information.

Details

csCompare performs both a student t-test (using the stats::t.test function) and a Bayesian t-test (using the BayesFactor::ttest.tstat). In case group is not defined, paired-samples t-tests are run. In case the group is defined, then the csCompare first computes difference scores between the cs1 and the cs2 (i.e., cs1 - cs2). In case the group argument is defined but, after removal of NA's (stats::na.omit), only one group is defined, a paired samples t-test is run.

Value

The function returns a data frame with the results of the student t-test and the Bayesian t-test.

References

Krypotos, A. M., Klugkist, I., & Engelhard, I. M. (2017). Bayesian hypothesis testing for human threat conditioning research: An introduction and the condir R package. European Journal of Psychotraumatology, 8.

See Also

csCompare, t.test, ttest.tstat

Examples

```
set.seed(1000)
csSensitivity(cs1 = rnorm(n = 100, mean = 10),
cs2 = rnorm(n = 100, mean = 9))
```

---

csShine *Shiny app for the* condir *package*

Description

Launches a Shiny app for performing the core analyses included in condir

Usage

```
csShine()
```

Details

The function can be called without any arguments (i.e., csShine()). For the interface, we used a css template available at http://getbootstrap.com.

References

Krypotos, A. M., Klugkist, I., & Engelhard, I. M. (2017). Bayesian hypothesis testing for human threat conditioning research: An introduction and the condir R package. European Journal of Psychotraumatology, 8.

csTable — *Produce tables of* csCompare *results*

Description

It provides wrapper functions for generating tables of different types of computer languages.

Usage

```
csTable(csCompareObj, typeOfTable = "latex")
```

Arguments

csCompareObj	a list or data frame returned from the csCompare function
typeOfTable	The type of table to be generated. See details

Details

csCompare generates tables of different languages. The options are latex, and markdown.

Examples

```
tmp <- csCompare(cs1 = c(1, 2, 3, 1, 4), cs2 = c(10, 12, 12, 31, 13))
csTable(tmp)
```

roundBF — *Local function for determining how BF is reported*

Description

Function used for determining the symbol, and the form, of the BF reported.

Usage

```
roundBF(bf, rscale, BF01 = TRUE)
```

Arguments

bf	Logical. The BF.
rscale	The rscale that was used.
BF01	Whether the BF01 (default) should be reported or not

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