Package ‘ufs’

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Type Package
Title A Collection of Utilities
Version 0.5.2
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License GPL (>= 3)

Description This is a new version of the 'userfriendlyscience' package, which has grown a bit unwieldy. Therefore, distinct functionalities are being 'consciously uncoupled' into different packages. This package contains the general-purpose tools and utilities (see the 'behaviorchange' package, the 'rosetta' package, and the soon-to-be-released 'scd' package for other functionality), and is the most direct 'successor' of the original 'userfriendlyscience' package. For example, this package contains a number of basic functions to create higher level plots, such as diamond plots, to easily plot sampling distributions, to generate confidence intervals, to plan study sample sizes for confidence intervals, and to do some basic operations such as (dis)attenuate effect size estimates.

URL https://r-packages.gitlab.io/ufs
BugReports https://gitlab.com/r-packages/ufs/-/issues
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Suggests bootES (>= 1.2), car (>= 3.0), careless (>= 1.1), GGally (>= 1.4.0), jmvcore (>= 1.2), lavaan (>= 0.6), MASS (>= 7.3), MBESS (>= 4.5.1), psych (>= 1.8), rio (>= 0.5), remotes (>= 0.2), rmarkdown (>= 1.1), viridis (>= 0.5.1)
Imports digest (>= 0.6.19), diptest (>= 0.75.7), dplyr (>= 0.7.6), ggplot2 (>= 2.2.1), ggrepel (>= 0.8), ggridges (>= 0.5.0), grDevices (>= 3.0.0), gridExtra (>= 2.3), gtable (>= 0.2.0), htmltools (>= 0.4.0), kableExtra (>= 1.1.0), knitr (>= 1.22), pander (>= 0.6.3), plyr (>= 1.8.4), pwr, rmdpartials (>= 0.5.8), scales (>= 1.0.0), SuppDists (>= 1.1.9)
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### Description

Sample size for accuracy: $d$

### Usage

```r
aipedjmv(d = 0.5, w = 0.1, conf.level = 95)
```

### Arguments

- **d**: 
- **w**: 
- **conf.level**: 

---

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**Sample size for accuracy: $d$**
areColors

Value
A results object containing:

- results$text
- results$aipePlot

Description
This function by Josh O’Brien checks whether elements of a vector are valid colors. It has been
copied from a Stack Exchange answer (see https://stackoverflow.com/questions/13289009/
check-if-character-string-is-a-valid-color-representation).

Usage
areColors(x)
**Arguments**

- `x`: The vector.

**Value**

A logical vector.

**Author(s)**

Josh O’Brien

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

**Examples**

```r
ufs::areColors(c(NA, "black", "blackk", "1", ":00", ":000000"));
```

---

### arr

**Absolute Relative Risk and confidence interval**

**Description**

This is a function to conveniently and quickly compute the absolute relative risk (ARR) and its confidence interval.

**Usage**

```r
arr(
  expPos,
  expN,
  conPos,
  conN,
  conf.level = 0.95,
  digits = 2,
  printAsPercentage = TRUE
)
```

```r
## S3 method for class 'ufsARR'
print(x, digits = x$digits, printAsPercentage = x$printAsPercentage, ...)
```

**Arguments**

- `expPos`: Number of positive events in the experimental condition.
- `expN`: Total number of cases in the experimental condition.
- `conPos`: Number of positive events in the control condition.
associationMatrix

conN  Total number of cases in the control condition.
conf.level  The confidence level for the confidence interval.
digits  The number of digits to round to when printing the results.
printAsPercentage  Whether to multiply with 100 when printing the results.
x  The result of the call to arr.
...  Any additional arguments are neglected.

**Value**

An object with in estimate, the ARR, and in conf.int, the confidence interval.

**Examples**

ufs::arr(10, 60, 20, 60);

---

**Description**

associationMatrix produces a matrix with confidence intervals for effect sizes, point estimates for those effect sizes, and the p-values for the test of the hypothesis that the effect size is zero, corrected for multiple testing.

**Usage**

```r
associationMatrix(
  dat = NULL,
  x = NULL,
  y = NULL,
  conf.level = 0.95,
  correction = "fdr",
  bootstrapV = FALSE,
  info = c("full", "ci", "es"),
  includeSampleSize = "depends",
  bootstrapV.samples = 5000,
  digits = 2,
  pValueDigits = digits + 1,
  colNames = FALSE,
  type = c("R", "html", "latex"),
  file = "",
  statistic = associationMatrixStatDefaults,
  effectSize = associationMatrixESDefaults,
  var.equal = TRUE
)
```
## S3 method for class 'associationMatrix'
print(x, type = x$input$type, info = x$input$info, file = x$input$file, ...)

## S3 method for class 'associationMatrix'
pander(x, info = x$input$info, file = x$input$file, ...)

### Arguments

dat
A dataframe with the variables of interest. All variables in this dataframe will be used if both x and y are NULL. If dat is NULL, the user will be presented with a dialog to select a datafile.

x
If not NULL, this should be a character vector with the names of the variables to include in the rows of the association table. If x is NULL, all variables in the dataframe will be used.

y
If not NULL, this should be a character vector with the names of the variables to include in the columns of the association table. If y is NULL, the variables in x will be used for the columns as well (which produces a symmetric matrix, similar to most correlation matrices).

cconf.level
Level of confidence of the confidence intervals.
correction
Correction for multiple testing: an element out of the vector c("holm", "hochberg", "hommel", "bonferroni", "BH", "BY", "fdr", "none"). NOTE: the p-values are corrected for multiple testing; The confidence intervals are not!

bootstrapV
Whether to use bootstrapping to compute the confidence interval for Cramer’s V or whether to use the Fisher’s Z conversion.

info
Information to print: either both the confidence interval and the point estimate for the effect size (and the p-value, corrected for multiple testing), or only the confidence intervals, or only the point estimate (and the corrected p-value). Must be on element of the vector c("full", "ci", "es").

includeSampleSize
Whether to include the sample size when the effect size point estimate and p-value are shown. If this is "depends", it will depend on whether all associations have the same sample size (and the sample size will only be printed when they don’t). If "always", the sample size will always be added. If anything else, it will never be printed.

bootstrapV.samples
If using bootstrapping for Cramer’s V, the number of samples to generate.

digits
Number of digits to round to when printing the results.
pValueDigits
How many digits to use for formatting the p values.
colNames
If true, the column heading will use the variables names instead of numbers.
type
Type of output to generate: must be an element of the vector c("R", "html", "latex").

file
If a file is specified, the output will be written to that file instead of shown on the screen.
This is the complicated bit; this is where associationMatrix allows customization of the used statistics to perform null hypothesis significance testing. For everyday use, leaving this at the default value, associationMatrixStatDefaults, works fine. In case you want to customize, read the ‘Notes’ section below.

Like the ‘statistics’ argument, ‘effectSize also allows customization, in this case of the used effect sizes. Again, the default value, associationMatrixESDefaults, works for everyday use. Again, see the ‘Notes’ section below if you want to customize.

Whether to test for equal variances (‘test’), assume equality (‘yes’), or assume unequality (‘no’).

Addition arguments are passed on to the print() and pander::pandert() functions.

An object with the input and several output variables, one of which is a dataframe with the association matrix in it. When this object is printed, the association matrix is printed to the screen. If the ‘file’ parameter is specified, a file with this matrix will also be written to disk.

The ‘statistic’ and ‘effectSize’ parameter make it possible to use different functions to conduct null hypothesis significance testing and compute effect sizes. In both cases, the parameter needs to be a list containing four lists, named ‘dichotomous’, ‘nominal’, ‘ordinal’, and ‘interval’. Each of these lists has to contain four elements, character vectors of length one (i.e. just one string value), again named ‘dichotomous’, ‘nominal’, ‘ordinal’, and ‘interval’.

The combination of each of these names (e.g. ‘dichotomous’ and ‘nominal’, or ‘ordinal’ and ‘interval’, etc) determine which test should be done when computing the p-value to test the association between two variables of those types, or which effect sizes to compute. When called, associationMatrix determines the measurement levels of the relevant variables. It then uses these two levels (their string representation, e.g. ‘dichotomous’ etc) to find a string in the ‘statistic’ and ‘effectSize’ objects. Two functions with these names are then called from two lists, ‘computeStatistic’ and computeEffectSize. These lists list contain functions that have the same names as the strings in the ‘statistic’ list.

For example, when the default settings are used, the string (function name) found for two dichotomous variables when searching in associationMatrixStatDefaults is ‘chisq’, and the string found in associationMatrixESDefaults is ‘v’. associationMatrix then calls computeStatistic[['chisq']] and computeEffectSize[['v']], providing the two variables as arguments, as well as passing the ‘conf.level’ argument. These two functions then each return an object that associationMatrix extracts the information from. Inspect the source code of these functions (by typing their names without parentheses in the R prompt) to learn how this object should look, if you want to write your own functions.

Author(s)
Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
Examples

```r
### Generate a simple association matrix using all three variables in the
### Orange tree dataframe
associationMatrix(Orange);

### Or four variables from infert:
associationMatrix(infert, c("education", "parity",
    "induced", "case"), colNames=TRUE);

### Use variable names in the columns and generate html
associationMatrix(Orange, colNames=TRUE, type='html');
```

---

**associationsDiamondPlot**

A diamondplot with confidence intervals for associations

Description

This function produces a diamondplot that plots the confidence intervals for associations between a number of covariates and a criterion. It currently only supports the Pearson’s r effect size metric; other effect sizes are converted to Pearson’s r.

Usage

```r
associationsDiamondPlot(
  dat,
  covariates,
  criteria,
  labels = NULL,
  criteriaLabels = NULL,
  decreasing = NULL,
  sortBy = NULL,
  conf.level = 0.95,
  criteriaColors = viridisPalette(length(criteria)),
  criterionColor = "black",
  returnLayerOnly = FALSE,
  esMetric = "r",
  multiAlpha = 0.33,
  singleAlpha = 1,
  showLegend = TRUE,
  xlab = "Effect size estimates",
  ylab = "",
  theme = ggplot2::theme_bw(),
  lineSize = 1,
)```

associationsDiamondPlot

```r
associationsDiamondPlotDf(
   dat,
   covariates,
   criterion,
   labels = NULL,
   decreasing = NULL,
   conf.level = 0.95,
   esMetric = "r"
)
```

Arguments

- **dat**
  The dataframe containing the relevant variables.

- **covariates**
  The covariates: the list of variables to associate to the criterion or criteria, usually the predictors.

- **criterion**, **criteria**
  The criteria, usually the dependent variables; one criterion (one dependent variable) can also be specified of course. The helper function `associationsDiamondPlotDf` always accepts only one criterion.

- **labels**
  The labels for the covariates, for example the questions that were used (as a character vector).

- **criteriaLabels**
  The labels for the criteria (in the legend).

- **decreasing**
  Whether to sort the covariates by the point estimate of the effect size of their association with the criterion. Use `NULL` to not sort at all, `TRUE` to sort in descending order, and `FALSE` to sort in ascending order.

- **sortBy**
  When specifying multiple criteria, this can be used to indicate by which criterion the items should be sorted (if they should be sorted).

- **conf.level**
  The confidence of the confidence intervals.

- **criteriaColors**, **criterionColor**
  The colors to use for the different associations can be specified in `criteriaColors`. This should be a vector of valid colors with at least as many elements as criteria are specified in `criteria`. If only one criterion is specified, the color in `criterionColor` is used.

- **returnLayerOnly**
  Whether to return the entire object that is generated, or just the resulting `ggplot2` layer.

- **esMetric**
  The effect size metric to plot - currently, only 'r' is supported, and other values will return an error.
multAlpha, singleAlpha

The transparency (alpha channel) value of the diamonds for each association can be specified in multAlpha, and if only one criterion is specified, the alpha level of the diamonds can be specified in singleAlpha.

showLegend

Whether to show the legend.

xlab, ylab

The label to use for the x and y axes (for duoComparisonDiamondPlot, must be vectors of two elements). Use NULL to not use a label.

theme

The ggplot() theme to use.

lineSize

The thickness of the lines (the diamonds’ strokes).

outputFile

A file to which to save the plot.

outputWidth, outputHeight

Width and height of saved plot (specified in centimeters by default, see ggsaveParams).

ggsaveParams

Parameters to pass to ggsave when saving the plot.

...

Any additional arguments are passed to diamondPlot() and eventually to ggDiamondLayer().

Details

associationsToDiamondPlotDf is a helper function that produces the required dataframe.

This function can be used to quickly plot multiple confidence intervals.

Value

A plot.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

diamondPlot(), ggDiamondLayer()

Examples

### Simple diamond plot with correlations and their confidence intervals

associationsDiamondPlot(mtcars, 
  covariates=c('cyl', 'hp', 'drat', 'wt', 
               'am', 'gear', 'vs', 'carb', 'qsec'), 
  criteria='mpg');

### Same diamond plot, but now with two criteria, and colouring the diamonds based on the correlation point estimates: a gradient is created where red is used for -1,
### Description
Measurement error (i.e. the complement of reliability) results in a downward bias of observed effect sizes. This attenuation can be emulated by this function.

### Usage

```r
attenuate.d(d, reliability)
```

### Arguments

- **d**: The value of Cohen’s d (that would be obtained with perfect measurements)
- **reliability**: The reliability of the measurements of the continuous variable

### Value

The attenuated value of Cohen’s d

### Author(s)

Gjalt-Jorn Peters & Stefan Gruijters

### References


### Examples

```r
attenuate.d(.5, .8);
```
attenuate.r

Attenuate a Pearson’s r estimate for unreliability in the measurements

Description

Attenuate a Pearson’s r estimate for unreliability in the measurements

Usage

attenuate.r(r, reliability1, reliability2)

Arguments

r
The (disattenuated) value of Pearson’s r
reliability1, reliability2
The reliabilities of the two variables

Value

The attenuated value of Pearson’s r

Examples

attenuate.r(.5, .8, .9);

A_VarghaDelaney

Vargha & Delaney’s A

Description

Vargha & Delaney’s A

Usage

A_VarghaDelaney(
  control,
  experimental,
  bootstrap = NULL,
  conf.level = 0.95,
  warn = FALSE
)

**BAC_plot**

**Arguments**

- `control` A vector with the data for the control condition.
- `experimental` A vector with the data from the experimental condition.
- `bootstrap` The number of bootstrap samples to use to compute confidence intervals, or NULL to not compute confidence intervals.
- `conf.level` The confidence level of the confidence intervals.
- `warn` Whether to allow the `stats::wilcox.test()` function to emit warnings, for example if ties are encountered.

**Value**

A numeric vector of length 1 with the A value, named 'A'.

**Examples**

```r
ufs::A_VarghaDelaney(1:8, 3:12);
```

---

**Description**

Bland-Altman Change plot

**Usage**

```r
BAC_plot(
  data,
  cols = names(data),
  reliability = NULL,
  pointSize = 2,
  deterioratedColor = "#482576E6",
  unchangedColor = "#25848E80",
  improvedColor = "#7AD151E6",
  zeroLineColor = "black",
  zeroLineType = "dashed",
  ciLineColor = "red",
 (ciLineType = "solid",
  conf.level = 0.95,
  theme = ggplot2::theme_minimal(),
  ignoreBias = FALSE,
  iccFromPsych = FALSE,
  iccFromPsychArgs = NULL
)
```
Arguments

data The data frame; if it only has two columns, the first of which is the pre-change column, cols can be left empty.
cols The names of the columns with the data; the first is the column with the pre-change data, the second the column after the change.
reliability The reliability estimate, for example as obtained with the ICC() function in the psych() package; can be omitted, in which case the intraclass correlation is computed.
pointSize The size of the points in the plot.
deterioratedColor, unchangedColor, improvedColor The colors to use for cases who deteriorate, stay the same, and improve, respectively.
zeroLineColor, ciLineColor The colors for the line at 0 (no change) and at the confidence interval bounds (i.e. the point at which a difference becomes indicative of change given the reliability), respectively.
zeroLineType, ciLineType The line types for the line at 0 (no change) and at the confidence interval bounds (i.e. the point at which a difference becomes indicative of change given the reliability), respectively.
conf.level The confidence level of the confidence interval.
theme The ggplot2 theme to use.
ignoreBias Whether to ignore bias (i.e. allow the measurements at the second time to shift upwards or downwards). If FALSE, the variance associated with such a shift is considered error variance (i.e. 'unreliability').
iccFromPsych Whether to compute ICC using the psych::ICC() function or not.
iccFromPsychArgs If using the psych::ICC() function, the arguments to pass.

Value

A ggplot2 plot.

Examples

### Create smaller dataset for example
dat <- ufs::testRetestSimData[
  1:25,
  c('t0_item1', 't1_item1')
];

ufs::BAC_plot(dat, reliability = .5);
ufs::BAC_plot(dat, reliability = .8);
ufs::BAC_plot(dat, reliability = .9);
**Description**

This is a dataset lifted from the psychTools package (which was originally in the psych package). For details, please check that help page (using "psychTools::bfi").

**Usage**

```r
data(bfi)
```

**Format**

A `data.frame` with 2800 rows and 28 columns.

**Examples**

```r
data(bfi);
```

---

**biAxisDiamondPlot**  
*Diamondplot with two Y axes*

**Description**

This is basically a `meansDiamondPlot()`, but extended to allow specifying subquestions and anchors at the left and right side. This is convenient for psychological questionnaires when the anchors or dimensions were different from item to item. This function is used to function the left panel of the CIBER plot in the behaviorchange package.

**Usage**

```r
biAxisDiamondPlot(
  dat,  
  items = NULL,  
  leftAnchors = NULL,  
  rightAnchors = NULL,  
  subQuestions = NULL,  
  decreasing = NULL,  
  conf.level = 0.95,  
  showData = TRUE,  
  dataAlpha = 0.1,  
  dataColor = "#444444",  
  diamondColors = NULL,  
  jitterWidth = 0.45,  
  jitterHeight = 0.45,
```

---
xbreaks = NULL,
xLabels = NA,
xAxisLab = paste0("Scores and ", round(100 * conf.level, 2), "% CIs"),
drawPlot = TRUE,
returnPlotOnly = TRUE,
baseSize = 1,
dotSize = baseSize,
baseFontSize = 10 * baseSize,
theme = ggplot2::theme_bw(base_size = baseFontSize),
outputFile = NULL,
outputWidth = 10,
outputHeight = 10,
ggsaveParams = ufs::opts$get("ggsaveParams"),
...
)

Arguments

dat The dataframe containing the variables.
items The variables to include.
leftAnchors The anchors to display on the left side of the left hand panel. If the items were measured with one variable each, this can be used to show the anchors that were used for the respective scales. Must have the same length as items.
rightAnchors The anchors to display on the left side of the left hand panel. If the items were measured with one variable each, this can be used to show the anchors that were used for the respective scales. Must have the same length as items.
subQuestions The subquestions used to measure each item. This can also be used to provide pretty names for the variables if the items were not measured by one question each. Must have the same length as items.
decreasing Whether to sort the items. Specify NULL to not sort at all, TRUE to sort in descending order, and FALSE to sort in ascending order.
conf.level The confidence levels for the confidence intervals.
showData Whether to show the individual datapoints.
dataAlpha The alpha level (transparency) of the individual datapoints. Value between 0 and 1, where 0 signifies complete transparency (i.e. invisibility) and 1 signifies complete 'opaqueness'.
dataColor The color to use for the individual datapoints.
diamondColors The colours to use for the diamonds. If NULL, the generateColors argument can be used which will then be passed to diamondPlot().
jitterWidth How much to jitter the individual datapoints horizontally.
jitterHeight How much to jitter the individual datapoints vertically.
xbreaks Which breaks to use on the X axis (can be useful to override ggplot()’s defaults).
xLabels Which labels to use for those breaks (can be useful to override ggplot()’s defaults; especially useful in combination with xBreaks of course).
biAxisDiamondPlot

**xAxisLab**  Axis label for the X axis.

**drawPlot**  Whether to draw the plot, or only return it.

**returnPlotOnly**  Whether to return the entire object that is generated (including all intermediate objects) or only the plot.

**baseSize**  This can be used to efficiently change the size of most plot elements.

**dotSize**  This is the size of the points used to show the individual data points in the left hand plot.

**baseFontSize**  This can be used to set the font size separately from the baseSize.

**theme**  This is the theme that is used for the plots.

**outputFile**  A file to which to save the plot.

**outputWidth, outputHeight**  Width and height of saved plot (specified in centimeters by default, see ggsaveParams).

**ggsaveParams**  Parameters to pass to ggsave when saving the plot.

...  These arguments are passed on to diamondPlot.

**Details**

This is a diamondplot that can be used for items/questions where the anchors of the response scales could be different for every item. For the rest, it is very similar to meansDiamondPlot().

**Value**

Either just a plot (a gtable::gtable() object) or an object with all produced objects and that plot.

**Author(s)**

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters  gjalt-jorn@userfriendlyscience.com

**See Also**

CIBER() in the behaviorchange package, associationsDiamondPlot()

**Examples**

```r
biAxisDiamondPlot(dat=mtcars,
    items=c('cyl', 'wt'),
    subQuestions=c('cylinders', 'weight'),
    leftAnchors=c('few', 'light'),
    rightAnchors=c('many', 'heavy'),
    xbreaks=0:8);
```
---

**biDimColors**  
*Create colours for a response scale for an item*

**Description**  
Create colours for a response scale for an item

**Usage**  
```
biDimColors(start, mid, end, length, show = TRUE)
```

```
uniDimColors(start, end, length, show = TRUE)
```

**Arguments**

- **start**  
  Color to start with

- **mid**  
  Color in the middle, for bidimensional scales

- **end**  
  Color to end with

- **length**  
  The number of response options

- **show**  
  Whether to show the colours

**Value**

The colours as hex codes.

**Examples**

```
uniDimColors("#000000", "#00BB00", length=5, show=FALSE);
```

---

**carelessObject**  
*Compute diagnostics for careless responding*

**Description**

This function is a wrapper for the functions from the careless package. Normally, you’d probably call carelessReport which calls this function to generate a report of suspect participants.

**Usage**

```
carelessObject(  
data,  
items = names(data),  
flagUnivar = 0.99,  
flagMultivar = 0.95,  
irvSplit = 4,  
responseTime = NULL  
)
```
Arguments

data The dataframe.
items The items to look at.
flagUnivar How extreme a score has to be for it to be flagged as suspicious univariately.
flagMultivar This has not been implemented yet.
irvSplit Whether to split for the IRV, and if so, in how many parts.
responseTime If not NULL, the name of a column containing the participants’ response times.

Value

An object of class carelessObject.

Examples

carelessObject(mtcars);

carelessReport

A report to help diagnosing careless responders

Description

This function wraps functions from the careless package to help inspect and diagnose careless participants. It is optimized for using in R Markdown files.

Usage

carelessReport(
  data,
  items = names(data),
  nFlags = 1,
  flagUnivar = 0.99,
  flagMultivar = 0.95,
  irvSplit = 4,
  headingLevel = 3,
  datasetName = NULL,
  responseTime = NULL,
  headingSuffix = " {.tabset}",
  digits = 2,
  missingSymbol = "Missing"
)
### Arguments

- **data**: The dataframe.
- **items**: The items to look at.
- **nFlags**: How many indicators need to be flagged for a participant to be considered suspect.
- **flagUnivar**: How extreme a score has to be for it to be flagged as suspicious univariately.
- **flagMultivar**: This has not been implemented yet.
- **irvSplit**: Whether to split for the IRV, and if so, in how many parts.
- **headingLevel**: The level of the heading in Markdown (the number of #s to include before the heading).
- **datasetName**: The name of the dataset to display (to override, if desired).
- **responseTime**: If not NULL, the name of a column containing the participants’ response times.
- **headingSuffix**: The suffix to include; by default, set such that the individual participants IRP plots are placed in separate tabs.
- **digits**: The number of digits to round to.
- **missingSymbol**: How to represent missing values.

### Value

NULL, invisibly; and prints the report.

### Examples

```r
### Get the BFI data taken from the `psych` package
dat <- ufs::bfi;

### Get the variable names for the regular items
bfiVars <- setdiff(names(dat), c("gender", "education", "age"));

### Inspect suspect participants, very conservatively to
### limit the output (these are 2800 participants).
carelessReport(data = dat, items = bfiVars, nFlags = 5);
```

---

**cat0**  
*Concatenate to screen without spaces*

### Description

The cat0 function is to cat what paste0 is to paste; it simply makes concatenating many strings without a separator easier.
checkDataIntegrity

Usage

    cat0(..., sep = "")

Arguments

... The character vector(s) to print; passed to `cat`.

sep The separator to pass to `cat`, of course, "" by default.

Value

Nothing (invisible NULL, like `cat`).

Examples

    cat0("The first variable is ", names(mtcars)[1], ";");

checkDataIntegrity Conveniently checking data integrity

Description

This function is designed to make it easy to perform some data integrity checks, specifically checking for values that are impossible or unrealistic. These values can then be replaced by another value, or the offending cases can be deleted from the dataframe.

Usage

    checkDataIntegrity(
        x,
        dat,
        newValue = NA,
        removeCases = FALSE,
        validValueSuffix = "_validValue",
        newValueSuffix = "_newValue",
        totalVarName = "numberOfInvalidValues",
        append = TRUE,
        replace = TRUE,
        silent = FALSE,
        rmarkdownOutput = FALSE,
        callingSelf = FALSE
    )
Arguments

x This can be either a vector or a list. If it is a vector, it should have two elements, the first one being a regular expression matching one or more variables in the dataframe specified in `dat`, and second one being the condition the matching variables have to satisfy. If it is a list, it should be a list of such vectors. The conditions should start with a Comparison operator followed by a value (e.g. "<30" or ">=0").

dat The dataframe containing the variables of which we should check the integrity.

newValue The new value to be assigned to cases not satisfying the specified conditions.

removeCases Whether to delete cases that do not satisfy the criterion from the dataframe (if FALSE, they’re not deleted, but the offending value is replaced by newValue).

validValueSuffix Suffix to append to variable names when creating variable names for new variables that contain TRUE and FALSE to specify for each original variable whether its value satisfied the specified criterion.

newValueSuffix If replace is FALSE, original values are not replaced, but instead new variables are created where the offending values have been replaced. This suffix is appended to each original variable name to create the new variable name.

totalVarName This is the name of a variable that contains, for each case, the total number of invalid values among all variables checked.

append Whether to append the columns to the dataframe, or only return the new columns.

replace Whether to replace the offending values with the value specified in `newValue` or whether to create new columns (see newValueSuffix).

silent Whether to display the log, or only set it as attribute of the returned dataframe.

rmarkdownOutput Whether to format the log so that it’s ready to be included in RMarkdown reports.

callingSelf For internal use; whether the function calls itself.

Value

The dataframe with the corrections, and the log stored in attribute checkDataIntegrity_log.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

### Default behavior: return dataframe with offending values replaced by NA

checkDataIntegrity(c('mpg', '<30'),
### Check two conditions, and instead of returning the dataframe with the results appended, only return the columns indicating which cases 'pass', what the new values would be, and how many invalid values were found for each case (to easily remove cases that provided many invalid values)

checkDataIntegrity(list(c('mpg', '<30'), c('gear', '<5')), mtcars, append=FALSE);

---

### Description

This function efficiently checks for the presence of a package without loading it (unlike `library()` or `require()`). This is useful to force yourself to use the package::function syntax for addressing functions; you can make sure required packages are installed, but their namespace won’t attach to the search path.

### Usage

```r
checkPkgs(
  ..., install = FALSE, load = FALSE, repos = "https://cran.rstudio.com"
)
```

### Arguments

- `...` A series of packages. If the packages are named, the names are the package names, and the values are the minimum required package versions (see the second example).
- `install` Whether to install missing packages from `repos`.
- `load` Whether to load packages (which is exactly `not` the point of this package, but hey, YMMV).
- `repos` The repository to use if installing packages; default is the RStudio repository.

### Value

Invisibly, a vector of the available packages.
Examples

ufs::checkPkgs('base');

### Require a specific version
ufs::checkPkgs(ufs = "0.3.1");

### This will show the error message
tryCatch(
  ufs::checkPkgs(
    base = "99",
    stats = "42.5",
    ufs = 20
  ),
  error = print
);

---

CIM

**Conceptual Independence Matrix**

Description

Conceptual Independence Matrix

Usage

CIM(
  data,
  scales,
  conf.level = 0.95,
  colors = c("#440154FF", "#7AD151FF"),
  outputFile = NULL,
  outputWidth = 100,
  outputHeight = 100,
  outputUnits = "cm",
  faMethod = "minres",
  n.iter = 100,
  n.repeatOnWarning = 50,
  warningTolerance = 2,
  silentRepeatOnWarning = FALSE,
  showWarnings = FALSE,
  skipRegex = NULL,
  headingLevel = 2,
  printAbbreviations = TRUE,
  drawPlot = TRUE,
  returnPlotOnly = TRUE
)


CIM_partial(
  x,
  headingLevel = x$input$headingLevel,
  quiet = TRUE,
  echoPartial = FALSE,
  partialFile = NULL,
  ...
)

## S3 method for class 'CIM'
knit_print(
  x,
  headingLevel = x$input$headingLevel,
  quiet = TRUE,
  echoPartial = FALSE,
  partialFile = NULL,
  ...
)

Arguments

data The dataframe containing the variables.
scales The scales: a named list of character vectors, where the character vectors specify
the variable names, and the names of each character vector specifies the relevant
scale.
conf.level The confidence level for the confidence intervals.
colors The colors used for the factors. The default uses the discrete viridis() palette,
which is optimized for perceptual uniformity, maintaining its properties when
printed in grayscale, and designed for colourblind readers. A vector can also be
supplied; the colors must be valid arguments to colorRamp() (and therefore, to
col2rgb()).
outputFile The file to write the output to.
outputWidth, outputHeight, outputUnits
  The width, height, and units for the output file.
faMethod The method to pass on to psych::fa().
n.iter The number of iterations to pass on to psych::fa().
n.repeatOnWarning
  How often to repeat on warnings (in the hopes of getting a run without warn-
ings).
warningTolerance
  How many warnings are accepted.
silentRepeatOnWarning
  Whether to be chatty or silent when repeating after warnings.
showWarnings
  Whether to show the warnings.
skipRegex A character vector of length 2 containing two regular expressions; if the two scales both match one or both of those regular expressions, that cell is skipped.

headingLevel The level for the heading; especially useful when knitting an Rmd partial.

printAbbreviations Whether to print a table with the abbreviations that are used.

drawPlot Whether to draw the plot or only return it.

returnPlotOnly Whether to return the plot only, or the entire object.

x The object to print.

quiet Whether to be quiet or chatty.

echoPartial Whether to echo the code in the Rmd partial.

partialFile Can be used to override the Rmd partial file.

... Additional arguments are passed on the respective default methods.

Value

A ggplot2::ggplot() plot.

Examples

### Load dataset `bfi`, originally from psychTools package
data(bfi, package= 'ufs');

### Specify scales
bfiScales <-
  list(Agreeableness = paste0("Agreeableness_item_", 1:5),
       Conscientiousness = paste0("Conscientiousness_item_", 1:5),
       Extraversion = paste0("Extraversion_item_", 1:5),
       Neuroticism = paste0("Neuroticism_item_", 1:5),
       Openness = paste0("Openness_item_", 1:5));

names(bfi) <- c(unlist(bfiScales),
                 c('gender', 'education', 'age'));

### Only select first two and the first three items to
### keep it quick; just pass the full `bfiScales`
### object to run for all five the full scales

CIM(bfi,
    scales=lapply(bfiScales, head, 3)[1:2],
    n.iter=10);
The distribution of Cohen's \( d \)

**Description**

These functions use some conversion to and from the \( t \) distribution to provide the Cohen's \( d \) distribution. There are four versions that act similar to the standard distribution functions (the \( d, p , q , \) and \( r \) functions, and their longer aliases .Cohensd), three convenience functions (pdExtreme, pdMild, and pdInterval), a function to compute the confidence interval for a Cohen's \( d \) estimate cohensdCI, and a function to compute the sample size required to obtain a confidence interval around a Cohen's \( d \) estimate with a specified accuracy (pwr.cohensdCI and its alias pwr.confIntd).

**Usage**

cohensdCI(d, n, conf.level = 0.95, plot = FALSE, silent = TRUE)

dCohensd(
  x,
  df = NULL,
  populationD = 0,
  n = NULL,
  n1 = NULL,
  n2 = NULL,
  silent = FALSE
)

pCohensd(q, df, populationD = 0, lower.tail = TRUE)

qCohensd(p, df, populationD = 0, lower.tail = TRUE)

rCohensd(n, df, populationD = 0)

pdInterval(ds, n, populationD = 0)

pdExtreme(d, n, populationD = 0)

pdMild(d, n, populationD = 0)

pwr.cohensdCI(d, w = 0.1, conf.level = 0.95, extensive = FALSE, silent = TRUE)

**Arguments**

- \( n , n1 , n2 \) Desired number of Cohen's \( d \) values for rCohensd and rd (n), and the number of participants/datapoints in total (n) or in each group (n1 and n2) for dd, dCohensd, pdExtreme, pdMild, pdInterval, and cohensdCI.
- \( \text{conf.level} \) The level of confidence of the confidence interval.
plot

Whether to show a plot of the sampling distribution of Cohen’s $d$ and the confidence interval. This can only be used if specifying one value for $d$, $n$, and conf.level.

silent

Whether to provide FALSE or suppress (TRUE) warnings. This is useful because function 'qt', which is used under the hood (see qt() for more information), warns that 'full precision may not have been achieved' when the density of the distribution is very close to zero. This is normally no cause for concern, because with sample sizes this big, small deviations have little impact.

x, q, d

Vector of quantiles, or, in other words, the value(s) of Cohen’s $d$.

df

Degrees of freedom.

populationD

The value of Cohen’s $d$ in the population; this determines the center of the Cohen’s $d$ distribution. I suppose this is the noncentrality parameter.

lower.tail

logical; if TRUE (default), probabilities are the likelihood of finding a Cohen’s $d$ smaller than the specified value; otherwise, the likelihood of finding a Cohen’s $d$ larger than the specified value.

p

Vector of probabilites ($p$-values).

ds

A vector with two Cohen’s $d$ values.

w

The desired maximum 'half-width' or margin of error of the confidence interval.

extensive

Whether to only return the required sample size, or more extensive results.

Details

The functions use convert.d.to.t() and convert.t.to.d() to provide the Cohen’s $d$ distribution.

The confidence interval functions, coensdCI and pwr.cohensdCI, now use the same method as MBESS (a slightly adapted version of the MBESS function conf.limits.nct is used).

More details about coensdCI and pwr.cohensdCI are provided in Peters & Crutzen (2017).

Value

dCohensd (or dd) gives the density, pCohensd (or pd) gives the distribution function, qCohensd (or qd) gives the quantile function, and rCohensd (or rd) generates random deviates.

pdExtreme returns the probability (or probabilities) of finding a Cohen’s $d$ equal to or more extreme than the specified value(s).

pdMild returns the probability (or probabilities) of finding a Cohen’s $d$ equal to or less extreme than the specified value(s).

pdInterval returns the probability of finding a Cohen’s $d$ that lies in between the two specified values of Cohen’s $d$.

cohensdCI provides the confidence interval(s) for a given Cohen’s $d$ value.

pwr.cohensdCI provides the sample size required to obtain a confidence interval for Cohen’s $d$ with a desired width.
Author(s)

Gjalt-Jorn Peters (Open University of the Netherlands), with the exported MBESS function conf.limits.net written by Ken Kelley (University of Notre Dame), and with an error noticed by Guy Prochilo (University of Melbourne).

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

References

Peters, G. J. Y. & Crutzen, R. (2017) Knowing exactly how effective an intervention, treatment, or manipulation is and ensuring that a study replicates: accuracy in parameter estimation as a partial solution to the replication crisis. https://dx.doi.org/


See Also

convert.d.to.t(), convert.t.to.d(), dt(), pt(), qt(), rt()

Examples

### Confidence interval for Cohen's d of .5
### from a sample of 200 participants, also
### showing this visually: this clearly shows
### how wildly our Cohen's d value can vary
### from sample to sample.
cohensdCI(.5, n=200, plot=TRUE);

### How many participants would we need if we
### would want a more accurate estimate, say
### with a maximum confidence interval width
### of .2?
pwr.cohensdCI(.5, w=.1);

### Show that 'sampling distribution':
cohensdCI(.5,
    n=pwr.cohensdCI(.5, w=.1),
    plot=TRUE);

### Generate 10 random Cohen's d values
rCohensd(10, 20, populationD = .5);

### Probability of findings a Cohen's d smaller than
### .5 if it's 0 in the population (i.e. under the
### null hypothesis)
pCohensd(.5, 64);

### Probability of findings a Cohen's d larger than
### computeStatistic_t

#### associationMatrix Helper Functions

**Description**

These objects contain a number of settings and functions for associationMatrix.

**Usage**

- `computeStatistic_t(var1, var2, conf.level = 0.95, var.equal = TRUE, ...)`
- `computeStatistic_r(var1, var2, conf.level = 0.95, ...)`
- `computeStatistic_f(var1, var2, conf.level = 0.95, ...)`
- `computeStatistic_chisq(var1, var2, conf.level = 0.95, ...)`
- `computeEffectSize_d(var1, var2, conf.level = 0.95, var.equal = TRUE, ...)`
- `computeEffectSize_r(var1, var2, conf.level = 0.95, ...)`
- `computeEffectSize_etasq(var1, var2, conf.level = 0.95, ...)`
- `computeEffectSize_omegasq(var1, var2, conf.level = 0.95, ...)`
- `computeEffectSize_v(var1, var2, conf.level = 0.95, bootstrap = FALSE, samples = 5000, ...)`
Arguments

- **var1**: One of the two variables for which to compute a statistic or effect size.
- **var2**: The other variable for which to compute the statistic or effect size.
- **conf.level**: The confidence for the confidence interval for the effect size.
- **var.equal**: Whether to test for equal variances (test), assume equality (yes), or assume inequality (no).
- **...**: Any additional arguments are sometimes used to specify exactly how statistics and effect sizes should be computed.
- **bootstrap**: Whether to bootstrap to estimate the confidence interval for Cramer’s V. If FALSE, the Fisher’s Z conversion is used.
- **samples**: If bootstrapping, the number of samples to generate (of course, more samples means more accuracy and longer processing time).

Value

associationMatrixStatDefaults and associationMatrixESDefaults contain the default functions from computeStatistic and computeEffectSize that are called (see the help file for associationMatrix for more details).

The other functions return an object with the relevant statistic or effect size, with a confidence interval for the effect size.

For computeStatistic, this object always contains:

- **statistic**: The relevant statistic.
- **statistic.type**: The type of statistic.
- **parameter**: The degrees of freedom for this statistic.
- **p.raw**: The p-value of this statistic for NHST.

And in addition, it often contains (among other things, sometimes):

- **object**: The object from which the statistics are extracted.

For computeEffectSize, this object always contains:

- **es**: The point estimate for the effect size.
- **esc.type**: The type of effect size.
- **ci**: The confidence interval for the effect size.

And in addition, it often contains (among other things, sometimes):

- **object**: The object from which the effect size is extracted.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
Examples

```
computeStatistic_f(Orange$Tree, Orange$circumference)
computeEffectSize_etasq(Orange$Tree, Orange$circumference)
```

---

confintdjm

**Effect Size Confidence Interval: Cohens’s d**

**Description**

Effect Size Confidence Interval: Cohens’s d

**Usage**

```
confintdjm(d = 0.5, n = 128, conf.level = 95)
```

**Arguments**

- `d`
- `n`
- `conf.level`

**Value**

A results object containing:

```
results$text
results$ciPlot
```

---

confIntOmegaSq

**Confidence intervals for Omega Squared**

**Description**

This function uses the MBESS functions `conf.limits.ncf()` (which has been copied into this package to avoid the dependency on MBESS) and `convert.ncf.to.omegasq()` to compute the point estimate and confidence interval for Omega Squared (which have been lifted out of MBESS to avoid importing the whole package).
Usage

```r
confIntOmegaSq(var1, var2, conf.level = 0.95)
```

```r
## S3 method for class 'confIntOmegaSq'
print(x, ..., digits = 2)
```

Arguments

- `var1, var2`: The two variables: one should be a factor (or will be made a factor), the other should have at least interval level of measurement. If none of the variables is a factor, the function will look for the variable with the least unique values and change it into a factor.
- `conf.level`: Level of confidence for the confidence interval.
- `x, digits, ...`: Respectively the object to print, the number of digits to round to, and any additional arguments to pass on to the `print` function.

Value

A `confIntOmegaSq` object is returned, with as elements:

- `input`: The input arguments
- `intermediate`: Objects generated while computing the output
- `output`: The output of the function, consisting of:
  - `output$es`: The point estimate
  - `output$ci`: The confidence interval

Note

Formula 16 in Steiger (2004) is used for the conversion in `convert.ncf.to.omegasq()`.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters `gjalt-jorn@userfriendlyscience.com`

References


Examples

```r
confIntOmegaSq(mtcars$mpg, mtcars$cyl);
```
confIntProp

Confidence intervals for proportions, vectorized over all arguments

Description

This function simply computes confidence intervals for proportions.

Usage

confIntProp(x, n, conf.level = 0.95, plot = FALSE)

Arguments

x  
The number of 'successes', i.e. the number of events, observations, or cases that one is interested in.

n  
The total number of cases or observations.

conf.level  
The confidence level.

plot  
Whether to plot the confidence interval in the binomial distribution.

Details

This function is the adapted source code of binom.test(). It uses pbeta(), with some lines of code taken from the binom.test() source. Specifically, the count for the low category is specified as first 'shape argument' to pbeta(), and the total count (either the sum of the count for the low category and the count for the high category, or the total number of cases if compareHiToLo is FALSE) minus the count for the low category as the second 'shape argument'.

Value

The confidence interval bounds in a twodimensional matrix, with the first column containing the lower bound and the second column containing the upper bound.

Author(s)

Unknown (see binom.test(); adapted by Gjalt-Jorn Peters)

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

binom.test() and ggProportionPlot, the function for which this was written.
confIntR

Examples

### Simple case
cconfIntProp(84, 200);

### Using vectors
cconfIntProp(c(2,3), c(10, 20), conf.level=c(.90, .95, .99));

confIntR

A function to compute a correlation’s confidence interval

Description

This function computes the confidence interval for a given correlation and its sample size. This is useful to obtain confidence intervals for correlations reported in papers when informing power analyses.

Usage

confIntR(r, N, conf.level = 0.95, plot = FALSE)

Arguments

- **r**: The observed correlation coefficient.
- **N**: The sample size of the sample where the correlation was computed.
- **conf.level**: The desired confidence level of the confidence interval.
- **plot**: Whether to show a plot.

Value

The confidence interval(s) in a matrix with two columns. The left column contains the lower bound, the right column the upper bound. The rownames() are the observed correlations, and the colnames() are ‘lo’ and ‘hi’. The confidence level and sample size are stored as attributes. The results are returned like this to make it easy to access single correlation coefficients from the resulting object (see the examples).

Author(s)

Douglas Bonett (UC Santa Cruz, United States), with minor edits by Murray Moinester (Tel Aviv University, Israel) and Gjalt-Jorn Peters (Open University of the Netherlands, the Netherlands).

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
References


Peters, G. J. Y. & Crutzen, R. (forthcoming) An easy and foolproof method for establishing how effective an intervention or behavior change method is: required sample size for accurate parameter estimation in health psychology.

See Also

`confIntR()`

Examples

```r
### To request confidence intervals for one correlation
confIntR(.3, 100);

### The lower bound of a single correlation
confIntR(.3, 100)[1];

### To request confidence intervals for multiple correlations:
confIntR(c(.1, .3, .5), 250);

### The upper bound of the correlation of .5:
confIntR(c(.1, .3, .5), 250)[['.5', 'hi后者']];
```

description

Effect Size Confidence Interval: Pearson’s r

Usage

`confintrjmv(r = 0.3, N = 400, conf.level = 95)`
Arguments

- \( r \)
- \( N \)
- \( \text{conf.level} \)

Value

A results object containing:

- `results$text`
- `results$ciPlot`

Description

This function is vectorized.

Usage

\[
\text{confIntSD}(x, n = \text{NULL}, \text{conf.level} = 0.95)
\]

Arguments

- \( x \) Either a standard deviation, in which case \( n \) must also be provided, or a vector, in which case \( n \) must be \text{NULL}.
- \( n \) The sample size is \( x \) is a standard deviation.
- \( \text{conf.level} \) The confidence level

Value

A vector or matrix.

Examples

\[
\text{ufs::confIntSD(mtcars$mpg);}
\text{ufs::confIntSD(c(6, 7), c(32, 32));}
\]
convert conversion functions

Description

These are a number of functions to convert statistics and effect size measures from/to each other.

Arguments

- `chisq, cohensf, cohensfsq, d, etasq, f, logodds, means, omegasq, or, p, r, t, z`
  The value of the relevant statistic or effect size.
- `ncf`
  The value of a noncentrality parameter of the F distribution.
- `n, n1, n2, N, ns`
  The number of observations that the r or t value is based on, or the number of observations in each of the two groups for an anova, or the total number of participants when specifying a noncentrality parameter.
- `df, df1, df2`
  The degrees of freedom for that statistic (for F, the first one is the numerator (i.e. the effect), and the second one the denominator (i.e. the error term)).
- `proportion`
  The proportion of participants in each of the two groups in a t-test or anova. This is used to compute the sample size in each group if the group sizes are unknown. Thus, if you only provide df1 and df2 when converting an F value to a Cohen’s d value, equal group sizes are assumed.
- `b`
  The value of a regression coefficient.
- `se, sds`
  The standard error of standard errors of the relevant statistic (e.g. of a regression coefficient) or variables.
- `minDim`
  The smallest of the number of columns and the number of rows of the crosstable for which the chisquare is translated to a Cramer’s V value.
- `lower.tail`
  For the F and chisquare distributions, whether to get the probability of the lower or upper tail.
- `akfEq8`
  When converting Cohen’s d to r, for small sample sizes, bias is introduced when the commonly suggested formula is used (Aaron, Kromrey & Ferron, 1998). Therefore, by default, this function uses different equations depending on the sample size (for n < 50 and for n > 50). When akfEq8 is set to TRUE or FALSE, the corresponding action is taken; when akfEq8 is not logical (i.e. TRUE or FALSE), the function depends on the sample size.
- `var.equal`
  Whether to compute the value of t or Cohen’s d assuming equal variances (‘yes’), unequal variances (‘no’), or whether to test for the difference (‘test’).

Details

Note that by default, the behavior of `convert.d.to.r` depends on the sample size (see Bruce, Kromrey & Ferron, 1998).

Value

The converted value as a numeric value.
Author(s)
Gjalt-Jorn Peters and Peter Verboon
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

References

Examples

convert.t.to.r(t=-6.46, n=200);
convert.r.to.t(r=-.41, n=200);

### Compute some p-values
convert.t.to.p(4.2, 197);
convert.chisq.to.p(5.2, 3);
convert.f.to.p(8.93, 3, 644);

### Convert d to r using both equations
convert.d.to.r(d=.2, n1=5, n2=5, akfEq8 = FALSE);
convert.d.to.r(d=.2, n1=5, n2=5, akfEq8 = TRUE);

convert.cer.to.d

Helper functions for Numbers Needed for Change

Description
These functions are used by nnc() in the behaviorchange package to compute the Numbers Needed for Change, but are also available for manual use.

Usage

convert.cer.to.d(
  cer,
  eer,
  eventDesirable = TRUE,
  eventIfHigher = TRUE,
  dist = "norm",
  distArgs = NULL,
  distNS = "stats"
)

convert.d.to.eer(
  d,
convert.cer.to.d

cer,
eventDesirable = TRUE,
eventIfHigher = TRUE,
dist = "norm",
distArgs = list(),
distNS = "stats"
)

convert.d.to.nnc(d, cer, r = 1, eventDesirable = TRUE, eventIfHigher = TRUE)

convert.eer.to.d(
  eer,
  cer,
  eventDesirable = TRUE,
  eventIfHigher = TRUE,
  dist = "norm",
  distArgs = NULL,
  distNS = "stats"
)

Arguments

cer  The Control Event Rate.
eer  The Experimental Event Rate.
eventDesirable  Whether an event is desirable or undesirable.
eventIfHigher  Whether scores above or below the threshold are considered 'an event'.
dist, distArgs, distNS  Used to specify the distribution to use to convert between Cohen's d and the CER and EER. distArgs can be used to specify additional arguments to the corresponding q and p functions, and distNS to specify the namespace (i.e. package) from where to get the distribution functions.
d  The value of Cohen's d.
r  The correlation between the determinant and behavior (for mediated Numbers Needed for Change).

Value

The converted value.

Author(s)

Gjalt-Jorn Peters & Stefan Gruijters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

References

convert.d.to.U3

Convert Cohen's d to U3

Description
This function simply returns the result of \texttt{pnorm()} for Cohen's d.

Usage
\texttt{convert.d.to.U3(d)}

Arguments
\texttt{d} Cohen's d.

Value
An unnames numeric vector with the U3 values.

Examples
\texttt{convert.d.to.U3(.5)};

---

convertToNumeric

Conveniently convert vectors to numeric

Description
Tries to 'smartly' convert factor and character vectors to numeric.

Usage
\texttt{convertToNumeric(vector, byFactorLabel = FALSE)}
Arguments

- `vector` The vector to convert.
- `byFactorLabel` When converting factors, whether to do this by their label value (TRUE) or their level value (FALSE).

Value

The converted vector.

Examples

```r
ufs::convertToNumeric(as.character(1:8));
```

---

cramersV  
*Cramer's V and its confidence interval*

Description

These functions compute the point estimate and confidence interval for Cramer's V.

Usage

```r
cramersV(x, y = NULL, digits = 2)
confIntV(x, y = NULL, conf.level = 0.95, samples = 500, digits = 2, method = c("bootstrap", "fisher"), storeBootstrappingData = FALSE)
```

Arguments

- `x` Either a crosstable to analyse, or one of two vectors to use to generate that crosstable. The vector should be a factor, i.e. a categorical variable identified as such by the 'factor' class.
- `y` If `x` is a crosstable, `y` can (and should) be empty. If `x` is a vector, `y` must also be a vector.
**dataShape**

- **digits**: Minimum number of digits after the decimal point to show in the result.
- **...**: Any additional arguments are passed on to the print function.
- **conf.level**: Level of confidence for the confidence interval.
- **samples**: Number of samples to generate when bootstrapping.
- **method**: Whether to use Fisher’s Z or bootstrapping to compute the confidence interval.
- **storeBootstrappingData**: Whether to store (or discard) the data generating during the bootstrapping procedure.

**Description**

A point estimate or a confidence interval for Cramer’s V, an effect size to describe the association between two categorical variables.

**Examples**

```r
### Get confidence interval for Cramer's V
### Note that by using 'table', and so removing the raw data, inhibits
### bootstrapping, which could otherwise take a while.
confIntV(table(infert$education, infert$induced));
```

**dataShape**

`normalityAssessment and samplingDistribution`

**Description**

`normalityAssessment` can be used to assess whether a variable and the sampling distribution of its mean have an approximately normal distribution.

**Usage**

```r
dataShape(
  sampleVector,
  na.rm = TRUE,
  type = 2,
  digits = 2,
  conf.level = 0.95,
  plots = TRUE,
  xLabs = NA,
  yLabs = NA,
  qqCI = TRUE,
  labelOutliers = TRUE,
  sampleSizeOverride = NULL
)
```
### S3 method for class 'dataShape'
print(x, digits = x$input$digits, extraNotification = TRUE, ...)

### S3 method for class 'dataShape'
pander(x, digits = x$input$digits, extraNotification = TRUE, ...)

normalityAssessment(
  sampleVector,
  samples = 10000,
  digits = 2,
  samplingDistColor = "#2222CC",
  normalColor = "#00CC00",
  samplingDistLineSize = 2,
  normalLineSize = 1,
  xLabel.sampleDist = NULL,
  yLabel.sampleDist = NULL,
  xLabel.samplingDist = NULL,
  yLabel.samplingDist = NULL,
  sampleSizeOverride = TRUE
)

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

### S3 method for class 'normalityAssessment'
pander(x, headerPrefix = "####", suppressPlot = FALSE, ...)

samplingDistribution(
  popValues = c(0, 1),
  popFrequencies = c(50, 50),
  sampleSize = NULL,
  sampleFromPop = FALSE,
  ...
)

#### Arguments

- `sampleVector` Numeric vector containing the sample data.
- `na.rm` Whether to remove missing data first.
- `type` Type of skewness and kurtosis to compute; either 1 (g1 and g2), 2 (G1 and G2), or 3 (b1 and b2). See Joanes & Gill (1998) for more information.
- `digits` Number of digits to use when printing results.
- `conf.level` Confidence of confidence intervals.
- `plots` Whether to display plots.
- `xLabs, yLabs` The axis labels for the three plots (should be vectors of three elements; the first specifies the X or Y axis label for the rightmost plot (the histogram), the second for the middle plot (the QQ plot), and the third for the rightmost plot (the box plot).
qqCI  Whether to show the confidence interval for the QQ plot.
labelOutliers  Whether to label outliers with their row number in the box plot.
sampleSizeOverride  Whether to use the sample size of the sample as sample size for the sampling distribution, instead of the sampling distribution size. This makes sense, because otherwise, the sample size and thus sensitivity of the null hypothesis significance tests is a function of the number of samples used to generate the sampling distribution.
x  The object to print/pander.
extraNotification  Whether to be particularly informative.
...  Additional arguments are passed on, usually to the default methods.
samples  Number of samples to use when constructing sampling distribution.
samplingDistColor  Color to use when drawing the sampling distribution.
normalColor  Color to use when drawing the standard normal curve.
samplingDistLineSize  Size of the line used to draw the sampling distribution.
normalLineSize  Size of the line used to draw the standard normal distribution.
xLabel.sampleDist  Label of x axis of the distribution of the sample.
yLabel.sampleDist  Label of y axis of the distribution of the sample.
xLabel.samplingDist  Label of x axis of the sampling distribution.
yLabel.samplingDist  Label of y axis of the sampling distribution.
headerPrefix  A prefix to insert before the heading (e.g. to use Markdown headings).
suppressPlot  Whether to suppress (TRUE) or print (FALSE) the plot.
popValues  The possible values (levels) of the relevant variable. For example, for a dichotomous variable, this can be "c(1:2)" (or "c(1, 2)"). Note that samplingDistribution is for manually specifying the frequency distribution (or proportions); if you have a vector with 'raw' data, just call normalityAssessment directly.
popFrequencies  The frequencies corresponding to each value in popValues; must be in the same order! See the examples.
sampleSize  Size of the sample; the sum of the frequencies if not specified.
sampleFromPop  If true, the sample vector is created by sampling from the population information specified; if false, rep() is used to generate the sample vector. Note that if proportions are supplied in popFrequencies, sampling from the population is necessary!
Details

dsamplingDistribution is a convenient wrapper for normalityAssessment that makes it easy to quickly generate a sample and sampling distribution from frequencies (or proportions).
dataShape computes the skewness and kurtosis.
normalityAssessment provides a number of normality tests and draws histograms of the sample data and the sampling distribution of the mean (most statistical tests assume the latter is normal, rather than the first; normality of the sample data guarantees normality of the sampling distribution of the mean, but if the sample size is sufficiently large, the sampling distribution of the mean is approximately normal even when the sample data are not normally distributed). Note that for the sampling distribution, the degrees of freedom are usually so huge that the normality tests, negligible deviations from normality will already result in very small p-values.
samplingDistribution makes it easy to quickly assess the distribution of a variables based on frequencies or proportions, and dataShape computes skewness and kurtosis.

Value

An object with several results, the most notably of which are:

plot.sampleDist  Histogram of sample distribution
sw.sampleDist    Shapiro-Wilk normality test of sample distribution
ad.sampleDist    Anderson-Darling normality test of sample distribution
ks.sampleDist    Kolmogorov-Smirnoff normality test of sample distribution
kurtosis.sampleDist  Kurtosis for sample distribution
skewness.sampleDist  Skewness for sample distribution
plot.samplingDist  Histogram of sampling distribution
sw.samplingDist    Shapiro-Wilk normality test of sampling distribution
ad.samplingDist    Anderson-Darling normality test of sampling distribution
ks.samplingDist    Kolmogorov-Smirnoff normality test of sampling distribution
dataShape.samplingDist  Skewness and kurtosis for sampling distribution

Examples

### Note: the 'not run' is simply because running takes a lot of time,
### but these examples are all safe to run!
## Not run:

normalityAssessment(rnorm(35));
### Create a distribution of three possible values and show the sampling distribution for the mean

```r
cor <- c(1, 2, 3);
popFrequencies <- c(20, 50, 30);
sampleSize <- 100;
samplingDistribution(popValues = cor, popFrequencies = popFrequencies, sampleSize = sampleSize);
```

### Create a very skewed distribution of ten possible values

```r
cor <- c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10);
popFrequencies <- c(2, 4, 8, 6, 10, 15, 12, 200, 350, 400);
samplingDistribution(popValues = cor, popFrequencies = popFrequencies, sampleSize = sampleSize, digits=5);
```

## End(Not run)

---

**descr**

**descr (or descriptives)**

**Description**

This function provides a number of descriptives about your data, similar to what SPSS’s DESCRIPTIVES (often called with DESCRIPT) does.

**Usage**

```r
descr(
  x,
  digits = 4,
  errorOnFactor = FALSE,
  include = c("central tendency", "spread", "range", "distribution shape",
             "sample size"),
  maxModes = 1,
  t = FALSE,
  conf.level = 0.95,
  quantileType = 2
)
```

## Default S3 method:

```r
descr(
  x,
  digits = 4,
  errorOnFactor = FALSE,
  include = c("central tendency", "spread", "range", "distribution shape",
             "sample size"),
  maxModes = 1,
  t = FALSE,
  conf.level = 0.95,
  quantileType = 2
)
```
"sample size"),
maxModes = 1,
t = FALSE,
conf.level = 0.95,
quantileType = 2
)

## S3 method for class 'descr'
print(
  x,
  digits = attr(x, "digits"),
  t = attr(x, "transpose"),
  row.names = FALSE,
  ...
)

## S3 method for class 'descr'
pander(x, headerPrefix = ",", headerStyle = "**", ...)

## S3 method for class 'descr'
as.data.frame(x, row.names = NULL, optional = FALSE, ...)

## S3 method for class 'data.frame'
descr(x, ...)

### Arguments

**x**  
The vector for which to return descriptives.

**digits**  
The number of digits to round the results to when showing them.

**errorOnFactor**  
Whether to show an error when the vector is a factor, or just show the frequencies instead.

**include**  
Which elements to include when showing the results.

**maxModes**  
Maximum number of modes to display: displays "multi" if more than this number of modes if found.

**t**  
Whether to transpose the dataframes when printing them to the screen (this is easier for users relying on screen readers).

**conf.level**  
Confidence of confidence interval around the mean in the central tendency measures.

**quantileType**  
The type of quantiles to be used to compute the interquartile range (IQR). See `quantile` for more information.

**row.names**  
Whether to show row names (TRUE) or not (FALSE).

...  
Additional arguments are passed to the default `print` and `pander` methods.

**headerPrefix**  
The prefix for the heading; can be used to insert hashes (#) to create Markdown headings.

**headerStyle**  
A string to insert before and after the heading (to make stuff bold or italic in Markdown).
optional Provided for compatibility with the default \texttt{as.data.frame()} method - see that help page for details.

Details

Note that R (of course) has many similar functions, such as \texttt{summary, psych::describe()} in the excellent \texttt{psych::psych} package.

The Hartigans' Dip Test may be unfamiliar to users; it is a measure of uni- vs. multidimensionality, computed by \texttt{dip::dip.test()} from the \texttt{dip.test} package. Depending on the sample size, values over .025 can be seen as mildly indicative of multimodality, while values over .05 probably warrant closer inspection (the p-value can be obtained using \texttt{dip::dip.test()}; also see Table 1 of Hartigan & Hartigan (1985) for an indication as to critical values).

Value

A list of dataframes with the requested values.

Author(s)

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters \texttt{gjalt-jorn@userfriendlyscience.com}

References


See Also

\texttt{summary, psych::describe()}

Examples

\begin{verbatim}
descr(mtcars$mpg);
\end{verbatim}
diamondCoordinates

Usage

diamondCoordinates(
  values,
  otherAxisValue = 1,
  direction = "horizontal",
  autoSize = NULL,
  fixedSize = 0.15
)

ggDiamondLayer(
  data,
  ciCols = 1:3,
  colorCol = NULL,
  generateColors = NULL,
  fullColorRange = NULL,
  color = "black",
  lineColor = NA,
  otherAxisCol = 1:nrow(data),
  autoSize = NULL,
  fixedSize = 0.15,
  direction = "horizontal",
  ...
)

rawDataDiamondLayer(
  dat,
  items = NULL,
  itemOrder = 1:length(items),
  dataAlpha = 0.1,
  dataColor = "#444444",
  jitterWidth = 0.5,
  jitterHeight = 0.4,
  size = 3,
  ...
)

varsToDiamondPlotDf(
  dat,
  items = NULL,
  labels = NULL,
  decreasing = NULL,
  conf.level = 0.95
)

Arguments

values A vector of 2 or more values that are used to construct the diamond coordinates. If three values are provided, the middle one becomes the diamond’s center. If
two, four, or more values are provided, the median becomes the diamond’s cen-
ter.

otherAxisValue The value on the other axis to use to compute the coordinates; this will be the Y
axis value of the points of the diamond (if direction is ’horizontal’) or the X
axis value (if direction is ’vertical’).

direction Whether the diamonds should be constructed horizontally or vertically.

autoSize Whether to make the height of each diamond conditional upon its length (the
width of the confidence interval).

fixedSize If not using relative heights, fixedSize determines the height to use.

data, dat A dataframe (or matrix) containing lower bounds, centers (e.g. means), and
upper bounds of intervals (e.g. confidence intervals) for ggDiamondLayer or
items and raw data for varsToDiamondPlotDf and rawDataDiamondLayer.

ciCols The columns in the dataframe with the lower bounds, centers (e.g. means), and
upper bounds (in that order).

colorCol The column in the dataframe containing the colors for each diamond, or a vector
with colors (with as many elements as the dataframe has rows).

generateColors A vector with colors to use to generate a gradient. These colors must be valid
arguments to colorRamp() (and therefore, to col2rgb()).

fullColorRange When specifying a gradient using generateColors, it is usually desirable to
specify the minimum and maximum possible value corresponding to the outer
anchors of that gradient. For example, when plotting numbers from 0 to 100
using a gradient from ’red’ through ’orange’ to ’green’, none of the means
may actually be 0 or 100; the lowest mean may be, for example, 50. If no
fullColorRange is specified, the diamond representing that lowest mean of 50
will be red, not orange. When specifying the fullColorRange, the lowest and
highest ’colors’ in generateColors are anchored to the minimum and maxi-
mum values of fullColorRange.

color When no colors are automatically generated, all diamonds will have this color.

lineColor If NA, lines will have the same colors as the diamonds’ fill. If not NA, must be a
valid color, which is then used as line color. Note that e.g. linetype and color
can be used as well, which will be passed on to geom_polygon().

otherAxisCol A vector of values, or the index of the column in the dataframe, that specifies
the values for the Y axis of the diamonds. This should normally just be a vector
of consecutive integers.

... Any additional arguments are passed to geom_polygon(). This can be used to
set, for example, the alpha value of the diamonds. Additional arguments for
rawDataDiamondLayer are passed on to geom_jitter().

items The items from the dataframe to include in the diamondplot or dataframe.

itemOrder Order of the items to use (if not sorting).

dataAlpha This determines the alpha (transparency) of the data points.

dataColor The color of the data points.

jitterWidth How much to jitter the individual datapoints horizontally.

jitterHeight How much to jitter the individual datapoints vertically.
diamondCoordinates

size The size of the data points.
labels The item labels to add to the dataframe.
decreasing Whether to sort the items (rows) in the dataframe decreasing (TRUE), increasing (FALSE), or not at all (NULL).
conf.level The confidence of the confidence intervals.

Value
ggDiamondLayer returns a ggplot() geom_polygon() object, which can then be used in ggplot() plots (as diamondPlot() does).
diamondCoordinates returns a set of four coordinates that together specify a diamond.
varsToDiamondPlotDf returns a dataframe of diamondCoordinates.
rawDataDiamondLayer returns a geom_jitter() object.

Author(s)
Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also
meansDiamondPlot(), meanSDtoDiamondPlot(), factorLoadingDiamondCIplot(), diamondPlot()

Examples

## Not run:
### (Don't run this example as a test, because we
### need the ggplot function which isn't part of
### this package.)

### The coordinates for a simple diamond
diamondCoordinates(values = c(1,2,3));

### Plot this diamond
ggplot() + ggDiamondLayer(data.frame(1,2,3));

## End(Not run)
diamondPlot

Basic diamond plot construction function

Description
This function constructs a diamond plot using ggDiamondLayer(). It's normally not necessary to call this function directly: instead, use meansDiamondPlot() meanSDtoDiamondPlot(), and factorLoadingDiamondCIplot().

Usage
diamondPlot(
  data,
  ciCols = 1:3,
  colorCol = NULL,
  otherAxisCol = NULL,
  yValues = NULL,
  yLabels = NULL,
  ylab = NULL,
  autoSize = NULL,
  fixedSize = 0.15,
  xlab = "Effect Size Estimate",
  theme = ggplot2::theme_bw(),
  color = "black",
  returnLayerOnly = FALSE,
  outputFile = NULL,
  outputWidth = 10,
  outputHeight = 10,
  ggsaveParams = ufs::opts$get("ggsaveParams"),
  ...
)

Arguments
data A dataframe (or matrix) containing lower bounds, centers (e.g. means), and upper bounds of intervals (e.g. confidence intervals).
ciCols The columns in the dataframe with the lower bounds, centers (e.g. means), and upper bounds (in that order).
colorCol The column in the dataframe containing the colors for each diamond, or a vector with colors (with as many elements as the dataframe has rows).
otherAxisCol The column in the dataframe containing the values that determine where on the Y axis the diamond should be placed. If this is not available in the dataframe, specify it manually using yValues.
yValues The values that determine where on the Y axis the diamond should be placed (can also be a column in the dataframe; in that case, use otherAxisCol).
diamondPlot

yLabels: The labels to use for each diamond (placed on the Y axis).
autoSize: Whether to make the height of each diamond conditional upon its length (the width of the confidence interval).
fixedSize: If not using relative heights, fixedSize determines the height to use.
xlab, ylab: The labels of the X and Y axes.
theme: The theme to use.
color: Color to use if colors are specified for each diamond.
returnLayerOnly: Set this to TRUE to only return the ggplot() layer of the diamondplot, which can be useful to include it in other plots.
outputFile: A file to which to save the plot.
outputWidth, outputHeight: Width and height of saved plot (specified in centimeters by default, see ggsaveParams).
ggsaveParams: Parameters to pass to ggsave when saving the plot.
...: Additional arguments will be passed to ggDiamondLayer()

Value

A ggplot2::ggplot() plot with a ggDiamondLayer() is returned.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

meansDiamondPlot(), meanSDtoDiamondPlot(), ggDiamondLayer(), factorLoadingDiamondCIplot()

Examples

tmpDf <- data.frame(lo = c(1, 2, 3),
                     mean = c(1.5, 3, 5),
                     hi = c(2, 4, 10),
                     color = c('green', 'red', 'blue'));

### A simple diamond plot
diamondPlot(tmpDf);

### A diamond plot using the specified colours
diamondPlot(tmpDf, colorCol = 4);

### A diamond plot using automatically generated colours
### using a gradient
diamondPlot(tmpDf, generateColors=c('green', 'red'));

### A diamond plot using automatically generated colours
disattenuate.d

### using a gradient, specifying the minimum and maximum possible values that can be attained
diamondPlot(tmpDf, generateColors=c('green', 'red'),
        fullColorRange=c(1, 10));

---

### disattenuate.d

*Disattenuate a Cohen's d estimate for unreliability in the continuous variable*

**Description**

Measurement error (i.e. the complement of reliability) results in a downward bias of observed effect sizes. This attenuation can be reversed by disattenuation.

**Usage**

`disattenuate.d(d, reliability)`

**Arguments**

- `d` The (attenuated) value of Cohen's d (i.e. the value as observed in the sample, and therefore attenuated (decreased) by measurement error in the continuous variable).
- `reliability` The reliability of the measurements of the continuous variable

**Value**

The disattenuated value of Cohen's d

**Author(s)**

Gjalt-Jorn Peters & Stefan Gruijters

**References**


**Examples**

`disattenuate.d(.5, .8);`
**disattenuate.r**  
*Disattenuate a Pearson’s r estimate for unreliability*

**Description**

Disattenuate a Pearson’s r estimate for unreliability

**Usage**

```
disattenuate.r(r, reliability1, reliability2)
```

**Arguments**

- `r`: The (attenuated) value of Pearson’s r
- `reliability1`, `reliability2`: The reliabilities of the two variables

**Value**

The disattenuated value of Pearson’s r

**Examples**

```
disattenuate.r(.5, .8, .9);
```

---

**duoComparisonDiamondPlot**  

*meansComparisonDiamondPlot and duoComparisonDiamondPlot*

**Description**

These are two diamond plot functions to conveniently make diamond plots to compare subgroups or different samples. They are both based on a univariate diamond plot where colors are used to distinguish the data points and diamonds of each subgroup or sample. The means comparison diamond plot produces only this plot, while the duo comparison diamond plot combines it with a diamond plot visualising the effect sizes of the associations. The latter currently only works for two subgroups or samples, while the simple meansComparisonDiamondPlot also works when comparing more than two sets of datapoints. These functions are explained more in detail in Peters (2017).
Usage

duoComparisonDiamondPlot(
    dat,
    items = NULL,
    compareBy = NULL,
    labels = NULL,
    compareByLabels = NULL,
    decreasing = NULL,
    conf.level = c(0.95, 0.95),
    showData = TRUE,
    dataAlpha = 0.1,
    dataSize = 3,
    comparisonColors = viridisPalette(length(unique(dat[, compareBy]))),
    associationsColor = "grey",
    alpha = 0.33,
    jitterWidth = 0.5,
    jitterHeight = 0.4,
    xlab = c("Scores and means", "Effect size estimates"),
    ylab = c(NULL, NULL),
    plotTitle = NULL,
    theme = ggplot2::theme_bw(),
    showLegend = TRUE,
    legend.position = "top",
    lineSize = 1,
    drawPlot = TRUE,
    xbreaks = "auto",
    outputFile = NULL,
    outputWidth = 10,
    outputHeight = 10,
    ggsaveParams = ufs::opts$get("ggsaveParams"),
    ...
)

meansComparisonDiamondPlot(
    dat,
    items = NULL,
    compareBy = NULL,
    labels = NULL,
    compareByLabels = NULL,
    decreasing = NULL,
    sortBy = NULL,
    conf.level = 0.95,
    showData = TRUE,
    dataAlpha = 0.1,
    dataSize = 3,
    comparisonColors = viridisPalette(length(unique(dat[, compareBy]))),
    alpha = 0.33,
    jitterWidth = 0.5,
jitterHeight = 0.4,
xlab = "Scores and means",
ylab = NULL,
plotTitle = NULL,
theme = ggplot2::theme_bw(),
showLegend = TRUE,
legend.position = "top",
lineSize = 1,
xbreaks = "auto",
outputFile = NULL,
outputWidth = 10,
outputHeight = 10,
ggsaveParams = ufs::opts$get("ggsaveParams"),
...)

Arguments

dat The dataframe containing the relevant variables.
items The variables to plot (on the y axis).
compareBy The variable by which to compare (i.e. the variable indicating to which subgroup or sample a row in the dataframe belongs).
labels The labels to use on the y axis; these values will replace the variable names in the dataframe (specified in items).
compareByLabels The labels to use to replace the value labels of the compareBy variable.
decreasing Whether to sort the variables by their mean values (NULL to not sort, TRUE to sort in descending order (i.e. items with lower means are plotted more to the bottom), and FALSE to sort in ascending order (i.e. items with lower means are plotted more to the top).
conf.level The confidence level of the confidence intervals specified by the diamonds for the means (for meansComparisonDiamondPlot) and for both the means and effect sizes (for duoComparisonDiamondPlot).
showData Whether to plot the data points.
dataAlpha The transparency (alpha channel) value for the data points: a value between 0 and 1, where 0 denotes complete transparency and 1 denotes complete opacity.
dataSize The size of the data points.
comparisonColors The colors to use for the different subgroups or samples. This should be a vector of valid colors with at least as many elements as sets of data points that should be plotted.
associationsColor For duoComparisonDiamondPlot, the color to use to plot the effect sizes in the right-hand plot.
alpha The alpha channel (transparency) value for the diamonds: a value between 0 and 1, where 0 denotes complete transparency and 1 denotes complete opacity.
jitterWidth, jitterHeight

How much noise to add to the data points (to prevent overplotting) in the horizontal (x axis) and vertical (y axis) directions.

xlab, ylab

The label to use for the x and y axes (for duoComparisonDiamondPlot, must be vectors of two elements). Use NULL to not use a label.

plotTitle

Optionally, for meansComparisonDiamondPlot, a title for the plot (can also be specified for duoComparisonDiamondPlot, in which case it's passed on to meansComparisonDiamondPlot for the left panel - but note that this messes up the alignment of the two panels).

theme

The theme to use for the plots.

showLegend

Whether to show the legend (which color represents which subgroup/sample).

legend.position

Where to place the legend in meansComparisonDiamondPlot (can also be specified for duoComparisonDiamondPlot, in which case it's passed on to meansComparisonDiamondPlot for the left panel - but note that this messes up the alignment of the two panels).

lineSize

The thickness of the lines (the diamonds' strokes).

drawPlot

Whether to draw the plot, or only (invisibly) return it.

xbreaks

Where the breaks (major grid lines, ticks, and labels) on the x axis should be.

outputFile

A file to which to save the plot.

outputWidth, outputHeight

Width and height of saved plot (specified in centimeters by default, see ggsaveParams).

ggsaveParams

Parameters to pass to ggsave when saving the plot.

...

Any additional arguments are passed to diamondPlot() by meansComparisonDiamondPlot and to both meansComparisonDiamondPlot and associationsDiamondPlot() by duoComparisonDiamondPlot.

sortBy

If the variables should be sorted (see decreasing), this variable specified which subgroup should be sorted by. Therefore, the value specified here must be a value label ('level label') of the compareBy variable.

Details

These functions are explained in Peters (2017).

Value

A Diamond plots: a ggplot2::ggplot() plot meansComparisonDiamondPlot, and a gtable() by duoComparisonDiamondPlot.

Author(s)

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
References


See Also

diamondPlot(), meansDiamondPlot(), the CIBER() function in the behaviorchange package

Examples

```r
meansComparisonDiamondPlot(mtcars, 
  items=c('disp', 'hp'),
  compareBy='vs',
  xbreaks=c(100,200, 300, 400));
meansComparisonDiamondPlot(chickwts, 
  items='weight',
  compareBy='feed',
  xbreaks=c(100,200,300,400),
  showData=FALSE);
 duoComparisonDiamondPlot(mtcars, 
  items=c('disp', 'hp'),
  compareBy='vs',
  xbreaks=c(100,200, 300, 400));
```

---

**escapeRegex**  
Escapes any characters that would have special meaning in a regular expression.

**Description**

Escapes any characters that would have special meaning in a regular expression.

**Usage**

```r
escapeRegex(string)
```

**Arguments**

- `string`  
  string being operated on.

**Details**

`escapeRegex` will escape any characters that would have special meaning in a regular expression. For any string `grep(regexpEscape(string), string)` will always be true.
Value

The value of the string with any characters that would have special meaning in a regular expression escaped.

Note

Note that this function was copied literally from the Hmisc package (to prevent importing the entire package for one line of code).

Author(s)

Charles Dupont
Department of Biostatistics
Vanderbilt University
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also


Examples

```r
string <- "this\(system\) {is} [full]."
escapeRegex(string)
```

---

### exceptionalScore

**Find exceptional scores**

This function can be used to detect exceptionally high or low scores in a vector.

#### Usage

```r
exceptionalScore(
  x,
  prob = 0.025,
  both = TRUE,
  silent = FALSE,
  quantileCorrection = 1e-04,
  quantileType = 8
)
```
exceptionalScores

**Arguments**

- **x**: Vector in which to detect exceptional scores.
- **prob**: Probability that a score is exceptionally positive or negative; i.e. scores with a quartile lower than prob or higher than 1-prob are considered exceptional (if both is TRUE, at least). So, note that a prob of .025 means that if both=TRUE, the most exceptional 5% of the values is marked as such.
- **both**: Whether to consider values exceptional if they’re below prob as well as above 1-prob, or whether to only consider values exceptional if they’re below prob is prob is < .5, or above prob if prob > .5.
- **silent**: Can be used to suppress messages.
- **quantileCorrection**: By how much to correct the computed quantiles; this is used because when a distribution is very right-skewed, the lowest quantile is the lowest value, which is then also the mode; without subtracting a correction, almost all values would be marked as 'exceptional'.
- **quantileType**: The algorithm used to compute the quantiles; see `stats::quantile()`.

**Details**

Note that of course, by definition, prob or 2 * prob percent of the values is exceptional, so it is usually not a wise idea to remove scores based on their 'exceptionalness'. Instead, use `exceptionalScores()`, which calls this function, to see how often participants answered exceptionally, and remove them based on that.

**Value**

A logical vector, indicating for each value in the supplied vector whether it is exceptional.

**Examples**

```R
exceptionalScore(
  c(1,1,2,2,2,3,3,3,4,4,4,5,5,5,5,5,6,6,7,8,20),
  prob=.05
);
```

---

**exceptionalScores**  
*Find exceptional scores*

**Description**

A function to detect participants that consistently respond exceptionally.
exceptionalScores

Usage

exceptionalScores(
  dat,
  items = NULL,
  exception = 0.025,
  totalOnly = TRUE,
  append = TRUE,
  both = TRUE,
  silent = FALSE,
  suffix = "_isExceptional",
  totalVarName = "exceptionalScores"
)

Arguments

dat The dataframe containing the variables to inspect, or the vector to inspect (but for vectors, exceptionalScore() might be more useful).

items The names of the variables to inspect.

exception When an item will be considered exceptional, passed on as prob to exceptionalScore().

totalOnly Whether to return only the number of exceptional scores for each row in the dataframe, or for each inspected item, which values are exceptional.

append Whether to return the supplied dataframe with the new variable(s) appended (if TRUE), or whether to only return the new variable(s) (if FALSE).

both Whether to look for both low and high exceptional scores (TRUE) or not (FALSE; see exceptionalScore()).

silent Can be used to suppress messages.

suffix If not returning the total number of exceptional values, for each inspected variable, a new variable is returned indicating which values are exceptional. The text string is appended to each original variable name to create the new variable names.

totalVarName If returning only the total number of exceptional values, and appending these to the provided dataset, this text string is used as variable name.

Value

Either a vector containing the number of exceptional values, a dataset containing, for each inspected variable, which values are exceptional, or the provided dataset where either the total or the exceptional values for each variable are appended.

Examples

exceptionalScores(mtcars);
exportToHTML  

Exporting tables to HTML

Description

This function exports data frames or matrices to HTML, sending output to one or more of the console, viewer, and one or more files.

Usage

```r
exportToHTML(
  input,
  output = ufs::opts$get("tableOutput"),
  tableOutputCSS = ufs::opts$get("tableOutputCSS")
)
```

Arguments

- **input**: Either a `data.frame`, table, or matrix, or a list with three elements: `pre`, `input`, and `post`. The `pre` and `post` are simply prepended and postpended to the HTML generated based on the `input$input` element.
- **output**: The output: a character vector with one or more of "console" (the raw concatenated input, without conversion to HTML), "viewer", which uses the RStudio viewer if available, and one or more filenames in existing directories.
- **tableOutputCSS**: The CSS to use for the HTML table.

Value

Invisibly, the (potentially concatenated) `input` as character vector.

Examples

```r
exportToHTML(mtcars[1:5, 1:5]);
```

extractVarName  

Extract variable names

Description

Functions often get passed variables from within dataframes or other lists. However, printing these names with all their dollar signs isn’t very userfriendly. This function simply uses a regular expression to extract the actual name.

Usage

```r
extractVarName(x)
```
faConfInt

Arguments

x A character vector of one or more variable names.

Value

The actual variables name, with all containing objectes stripped off.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

extractVarName('mtcars$mpg');

faConfInt (Extract confidence bounds from psych's factor analysis object)

Description

This function contains some code from a function in psych::psych-package that's not exported print.psych.fa.ci but useful nonetheless. It basically takes the outcomes of a factor analysis and extracted the confidence intervals.

Usage

faConfInt(fa)

Arguments

fa The object produced by the psych::fa() function from the psych::psych-package package. It is important that the n.iter argument of psych::fa() was set to a realistic number, because otherwise, no confidence intervals will be available.

Details

This function extract confidence interval bounds and combines them with factor loadings using the code from the print.psych.fa.ci in psych::psych-package.

Value

A list of dataframes, one for each extracted factor, with in each dataframe three variables:

lo lower bound of the confidence interval
est point estimate of the factor loading
hi upper bound of the confidence interval
factorLoadingDiamondCIplot

Two-dimensional visualisation of factor analyses

Description

This function uses the diamondPlot() to visualise the results of a factor analyses. Because the factor loadings computed in factor analysis are point estimates, they may vary from sample to sample. The factor loadings for any given sample are usually not relevant; samples are but means to study populations, and so, researchers are usually interested in population values for the factor loadings. However, tables with lots of loadings can quickly become confusing and intimidating. This function aims to facilitate working with and interpreting factor analysis based on confidence intervals by visualising the factor loadings and their confidence intervals.

Usage

factorLoadingDiamondCIplot(
  fa,
  xlab = "Factor Loading",
  colors = viridisPalette(max(2, fa$factors)),
  labels = NULL,
  theme = ggplot2::theme_bw(),
  sortAlphabetically = FALSE,
  ...
)

Arguments

fa The object produced by the psych::fa() function from the psych::psych package. It is important that the n.iter argument of psych::fa() was set to a realistic number, because otherwise, no confidence intervals will be available.
factorLoadingDiamondCIplot

xlab
   The label for the x axis.

colors
   The colors used for the factors. The default uses the discrete viridis palette, which is optimized for perceptual uniformity, maintaining its properties when printed in grayscale, and designed for colourblind readers.

labels
   The labels to use for the items (on the Y axis).

theme
   The ggplot2 theme to use.

sortAlphabetically
   Whether to sort the items alphabetically.

... Additional arguments will be passed to ggDiamondLayer(). This can be used to set, for example, the transparency (alpha value) of the diamonds to a lower value using e.g. alpha=.5.

Value
   A ggplot2::ggplot() plot with several ggDiamondLayer()s is returned.

Author(s)
   Gjalt-Jorn Peters
   Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also
   psych::fa()ss, meansDiamondPlot(), meanSDtoDiamondPlot(), diamondPlot(), ggDiamondLayer()

Examples

```r
## Not run:
### (Not run during testing because it takes too long and
### may generate warnings because of the bootstrapping of
### the confidence intervals)

factorLoadingDiamondCIplot(psych::fa(psych::Bechtoldt,
   nfactors=2,
   n.iter=50,
   n.obs=200));

### And using a lower alpha value for the diamonds to
### make them more transparent

factorLoadingDiamondCIplot(psych::fa(psych::Bechtoldt,
   nfactors=2,
   n.iter=50,
   n.obs=200),
   alpha=.5,
   size=1);

## End(Not run)
```
factorLoadingHeatmap  Two-dimensional visualisation of factor analyses

Description

This function uses the `diamondPlot()` to visualise the results of a factor analyses. Because the factor loadings computed in factor analysis are point estimates, they may vary from sample to sample. The factor loadings for any given sample are usually not relevant; samples are but means to study populations, and so, researchers are usually interested in population values for the factor loadings. However, tables with lots of loadings can quickly become confusing and intimidating. This function aims to facilitate working with and interpreting factor analysis based on confidence intervals by visualising the factor loadings and their confidence intervals.

Usage

```r
factorLoadingHeatmap(
  fa,
  xlab = "Factor Loading",
  colors = viridisPalette(max(2, fa$factors)),
  labels = NULL,
  showLoadings = FALSE,
  heatmap = FALSE,
  theme = ggplot2::theme_minimal(),
  sortAlphabetically = FALSE,
  digits = 2,
  labs = list(title = NULL, x = NULL, y = NULL),
  themeArgs = list(panel.grid = ggplot2::element_blank(), legend.position = "none",
                   axis.text.x = ggplot2::element_blank()),
  ...
)
```

Arguments

- `fa` The object produced by the `psych::fa()` function from the `psych::psych` package. It is important that the `n.iter` argument of `psych::fa()` was set to a realistic number, because otherwise, no confidence intervals will be available.
- `xlab` The label for the x axis.
- `colors` The colors used for the factors. The default uses the discrete `viridis` palette, which is optimised for perceptual uniformity, maintaining its properties when printed in grayscale, and designed for colourblind readers.
- `labels` The labels to use for the items (on the Y axis).
- `showLoadings` Whether to show the factor loadings or not.
- `heatmap` Whether to produce a heatmap or use diamond plots.
- `theme` The ggplot2 theme to use.
factorLoadingHeatmap

sortAlphabetically
  Whether to sort the items alphabetically.

digits
  Number of digits to round to.

labs
  The labels to pass to ggplot2.

themeArgs
  Additional theme arguments to pass to ggplot2.

... Additional arguments will be passed to ggDiamondLayer(). This can be used to set, for example, the transparency (alpha value) of the diamonds to a lower value using e.g. alpha=.5.

Value

A ggplot2::ggplot() plot with several ggDiamondLayer()s is returned.

Author(s)

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

psych::fa(), meansDiamondPlot(), meanSDtoDiamondPlot(), diamondPlot(), ggDiamondLayer()

Examples

## Not run:
### (Not run during testing because it takes too long and
### may generate warnings because of the bootstrapping of
### the confidence intervals)

factorLoadingHeatmap(psych::fa(psych::Bechtoldt,
  nfactors=2,
  n.iter=50,
  n.obs=200));

### And using a lower alpha value for the diamonds to
### make them more transparent

factorLoadingHeatmap(psych::fa(psych::Bechtoldt,
  nfactors=2,
  n.iter=50,
  n.obs=200),
  alpha=.5,
  size=1);

## End(Not run)
fa_failsafe

*Description*

Do factor-analysis, logging warnings and errors

*Usage*

```r
fa_failsafe(
  ..., 
  n.repeatOnWarning = 50,
  warningTolerance = 2,
  silentRepeatOnWarning = FALSE,
  showWarnings = TRUE
)
```

*Arguments*

- `...`: The arguments for `fa` in psych.
- `n.repeatOnWarning`: How often to repeat on warnings (in the hopes of getting a run without warnings).
- `warningTolerance`: How many warnings are accepted.
- `silentRepeatOnWarning`: Whether to be chatty or silent when repeating after warnings.
- `showWarnings`: Whether to show the warnings.

*Value*

A list with the `fa` object and a `warnings` and an `errors` object.

---

findShortestInterval

*Find the shortest interval*

*Description*

This function takes a numeric vector, sorts it, and then finds the shortest interval and returns its length.

*Usage*

```r
findShortestInterval(x)
```
formatCI

Arguments

x The numeric vector.

Value

The length of the shortest interval.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

findShortestInterval(c(1, 2, 4, 7, 20, 10, 15));

formatCI Pretty formatting of confidence intervals

Description

Pretty formatting of confidence intervals

Usage

formatCI(
  ci,
  sep = ";
  prefix = "\[",
  suffix = "]\",
  digits = 2,
  noZero = FALSE
)

Arguments

ci A confidence interval (a vector of 2 elements; longer vectors work, but I guess that wouldn’t make sense).
sep The separator of the values, usually ";" or ";".
prefix, suffix The prefix and suffix, usually a type of opening and closing parenthesis/bracket.
digits The number of digits to which to round the values.
noZero Whether to strip the leading zero (before the decimal point), as is typically done when following APA style and displaying correlations, \( p \) values, and other numbers that cannot reach 1 or more.
formatPvalue

Value
A character vector of one element.

See Also
noZero(), formatR(), formatPvalue()

Examples
### With leading zero ...
formatCI(c(0.55, 0.021));

### ... and without
formatCI(c(0.55, 0.021), noZero=TRUE);

---

formatPvalue

Pretty formatting of p values

Description
Pretty formatting of p values

Usage
formatPvalue(values, digits = 3, spaces = TRUE, includeP = TRUE)

Arguments
values The p-values to format.
digits The number of digits to round to. Numbers smaller than this number will be shown as <.001 or <.0001 etc.
spaces Whether to include spaces between symbols, operators, and digits.
includeP Whether to include the 'p' and '='-symbol in the results (the '<' symbol is always included).

Value
A formatted P value, roughly according to APA style guidelines. This means that the noZero function is used to remove the zero preceding the decimal point, and p values that would round to zero given the requested number of digits are shown as e.g. p<.001.

See Also
formatCI(), formatR(), noZero()
Examples

```r
formatPvalue(cor.test(mtcars$mpg, mtcars$disp)$p.value);
formatPvalue(cor.test(mtcars$drat, mtcars$qsec)$p.value);
```

formatR
Pretty formatting of correlation coefficients

Description

Pretty formatting of correlation coefficients

Usage

```r
formatR(r, digits = 2)
```

Arguments

- `r`: The Pearson correlation to format.
- `digits`: The number of digits to round to.

Value

The formatted correlation.

See Also

noZero(), formatCI(), formatPvalue()

Examples

```r
formatR(cor(mtcars$mpg, mtcars$disp));
```

getData
Basic SPSS translation functions

Description

Basic functions to make working with R easier for SPSS users: getData and getDat provide an easy way to load SPSS datafiles, and exportToSPSS to write to a datafile and syntax file that SPSS can import; filterBy and useAll allow easy temporary filtering of rows from the data frame; mediaan and modus compute the median and mode of ordinal or numeric data.
Usage

getData(
    filename = NULL,
    file = NULL,
    errorMessage = "[defaultErrorMessage]",
    applyRioLabels = TRUE,
    use.value.labels = FALSE,
    to.data.frame = TRUE,
    stringsAsFactors = FALSE,
    silent = FALSE,
    ...
  )

getDat(..., dfName = "dat", backup = TRUE)

Arguments

filename, file It is possible to specify a path and filename to load here. If not specified, the default R file selection dialogue is shown. file is still available for backward compatibility but will eventually be phased out.

errorMessage The error message that is shown if the file does not exist or does not have the right extension; [defaultErrorMessage] is replaced with a default error message (and can be included in longer messages).

applyRioLabels Whether to apply the labels supplied by Rio. This will make variables that has value labels into factors.

use.value.labels Only useful when reading from SPSS files: whether to read variables with value labels as factors (TRUE) or numeric vectors (FALSE).

to.data.frame Only useful when reading from SPSS files: whether to return a dataframe or not.

stringsAsFactors Whether to read strings as strings (FALSE) or factors (TRUE).

silent Whether to suppress potentially useful information.

... Additional options, passed on to the function used to import the data (which depends on the extension of the file).

dfName The name of the dataframe to create in the parent environment.

backup Whether to backup an object with name dfName, if one already exists in the parent environment.

Value

gedata returns the imported dataframe, with the filename from which it was read stored in the 'filename' attribute.

ggetDat is a simple wrapper for getData() which creates a dataframe in the parent environment, by default with the name 'dat'. Therefore, calling getDat() in the console will allow the user to select a file, and the data from the file will then be read and be available as 'dat'. If an object with dfName (i.e. 'dat' by default) already exists, it will be backed up with a warning. getDat() also invisibly returns the data.frame.
Note

getData() currently can’t read from LibreOffice or OpenOffice files. There doesn’t seem to be a platform-independent package that allows this. Non-CRAN package ROpenOffice from Omega-Hat should be able to do the trick, but fails to install (manual download and installation using https://www.omegahat.org produces “ERROR: dependency 'Rcompression' is not available for package 'ROpenOffice'” - and manual download and installation of RCompression produces “Please define LIB_ZLIB; ERROR: configuration failed for package 'Rcompression'”). If you have any suggestions, please let me know!

Examples

```r
## Not run:
### Open a dialogue to read an SPSS file
getData();

## End(Not run)
```

---

**ggBarChart**

*Bar chart using ggplot*

Description

This function provides a simple interface to create a `ggplot2::ggplot()` bar chart.

Usage

```r
ggBarChart(vector, plotTheme = ggplot2::theme_bw(), ...)
```

Arguments

- `vector`: The vector to display in the bar chart.
- `plotTheme`: The theme to apply.
- `...`: And additional arguments are passed to `ggplot2::geom_bar()`.

Value

A `ggplot2::ggplot()` plot is returned.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
See Also

  \texttt{ggplot2::geom_bar()}

Examples

\begin{verbatim}
ggBarChart(mtcars$cyl);
\end{verbatim}

\begin{verbatim}
ggBoxplot

Box plot using \texttt{ggplot}

Description

This function provides a simple interface to create a \texttt{ggplot} box plot, organising different boxplots by levels of a factor is desired, and showing row numbers of outliers.

Usage

\begin{verbatim}
ggBoxplot(
  dat,
  y = NULL,
  x = NULL,
  labelOutliers = TRUE,
  outlierColor = "red",
  theme = ggplot2::theme_bw(),
  ...)
\end{verbatim}

Arguments

\begin{verbatim}
dat                Either a vector of values (to display in the box plot) or a dataframe containing variables to display in the box plot.
y                If \texttt{dat} is a dataframe, this is the name of the variable to make the box plot of.
x                If \texttt{dat} is a dataframe, this is the name of the variable (normally a factor) to place on the X axis. Separate box plots will be generate for each level of this variable.
labelOutliers      Whether or not to label outliers.
outlierColor       If labeling outliers, this is the color to use.
theme              The theme to use for the box plot.
...                Any additional arguments will be passed to \texttt{geom_boxplot}.
\end{verbatim}

Details

This function is based on JasonAizkalns’ answer to a question on Stack Exchange (Cross Validated; see https://stackoverflow.com/questions/33524669/labeling-outliers-of-boxplots-in-r).
Value

A `ggplot` plot is returned.

Author(s)

Jason Aizkalns; implemented in this package (and tweaked a bit) by Gjalt-Jorn Peters.
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

`geom_boxplot`

Examples

```r
### A box plot for miles per gallon in the mtcars dataset:
ggBoxplot(mtcars$mpg);

### And separate for each level of 'cyl' (number of cylinder):
ggBoxplot(mtcars, y='mpg', x='cyl');
```

---

## ggEasyBar

### Convenience functions for `ggplots` based on multiple variables

**Description**

These are convenience functions to quickly generate plots for multiple variables, with the variables in the y axis.

**Usage**

```r
ggEasyBar(
data, 
items = NULL, 
labels = NULL, 
sortByMean = TRUE, 
ylab = NULL, 
xlab = NULL, 
scale_fill_function = NULL, 
fontColor = "white", 
fontSize = 2, 
labelMinPercentage = 1, 
showInLegend = "both", 
legendRows = 2, 
legendValueLabels = NULL, 
biAxisLabels = NULL
)```


Arguments

data  The dataframe containing the variables.
items  The variable names (if not provided, all variables will be used).
labels  Labels can optionally be provided; if they are, these will be used instead of the variable names.
sortByMean  Whether to sort the variables by mean value.
xlab, ylab  The labels for the x and y axes.
scale_fill_function  The function to pass to `ggplot()` to provide the colors of the bars. If NULL, set to `ggplot2::scale_fill_viridis_d(labels = legendValueLabels, guide = ggplot2::guide_legend(title = NULL, nrow=legendRows, byrow=TRUE))`.

fontColor, fontSize  The color and size of the font used to display the labels

labelMinPercentage  The minimum percentage that a category must reach before the label is printed (in whole percentages, i.e., on a scale from 0 to 100).

showInLegend  What to show in the legend in addition to the values; nothing ("none"), the frequencies ("freq"), the percentages ("perc"), or both ("both"). This is only used if only one variable is shown in the plot; afterwise, after all, the absolute frequencies and percentages differ for each variable.

legendRows  Number or rows in the legend.
legendValueLabels  Labels to use in the legend; must be a vector of the same length as the number of categories in the variables.

biAxisLabels  This can be used to specify labels to use if you want to use labels on both the left and right side. This is mostly useful when plotting single questions or semantic differentials. This must be a list with two character vectors, `leftAnchors` and `rightAnchors`, which must each have the same length as the number of items specified in `items`. See the examples for, well, examples.

Value

A `ggplot()` plot is returned.
ggPie

A ggplot pie chart

Description

This function creates a pie chart. Note that these are generally quite strongly advised against, as people are not good at interpreting relative frequencies on the basis of pie charts.

Usage

ggPie(vector, scale_fill = ggplot2::scale_fill_viridis_d())

Arguments

- **vector**: The vector (best to pass a factor).
- **scale_fill**: The ggplot scale fill function to use for the colors.

Value

A ggplot pie chart.

Note

This function is very strongly based on the Mathematical Coffee post at http://mathematicalcoffee.blogspot.com/2014/06/ggpie-pie-graphs-in-ggplot2.html.
Examples

```r
ggPie(mtcars$cyl);
```

---

**ggProportionPlot**  
*Sample distribution based plotting of proportions*

---

**Description**

This function visualises percentages, but avoids a clear cut for the sample point estimate, instead using the confidence (as in confidence interval) to create a gradient. This effectively hinders drawing conclusions on the basis of point estimates, thereby urging a level of caution that is consistent with what the data allows.

**Usage**

```r
ggProportionPlot(
  dat,
  items = NULL,
  loCategory = NULL,
  hiCategory = NULL,
  subQuestions = NULL,
  leftAnchors = NULL,
  rightAnchors = NULL,
  compareHiToLo = TRUE,
  showDiamonds = FALSE,
  diamonds.conf.level = 0.95,
  diamonds.alpha = 1,
  na.rm = TRUE,
  barHeight = 0.4,
  conf.steps = seq(from = 0.001, to = 0.999, by = 0.001),
  scale_color = c("#21908CFF", "#FDE725FF"),
  scale_fill = c("#21908CFF", "#FDE725FF"),
  rank.conf = FALSE,
  linetype = 1,
  theme = ggplot2::theme_bw(),
  returnPlotOnly = TRUE
)
```

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

```r
## S3 method for class 'ggProportionPlot'
grid.draw(x, ...)
```
Arguments

dat  The dataframe containing the items (variables), or a vector.
items The names of the items (variables). If none are specified, all variables in the
       dataframe are used.
loCategory The value of the low category (usually 0). If not provided, the minimum value
          is used.
hiCategory The value of the high category (usually 1). If not provided, the maximum value
           is used.
subQuestions The labels to use for the variables (for example, different questions). The vari-
               able names are used if these aren’t provided.
leftAnchors The labels for the low categories. The values are used if these aren’t provided.
rightAnchors The labels for the high categories. The values are used if these aren’t provided.
compareHiToLo Whether to compare the percentage of low category values to the total of the
                  low category values and the high category values, or whether to ignore the high
                  category values and compute the percentage of low category values relative to
                  all cases. This can be useful when a variable has more than two values, and you
                  only want to know/plot the percentage relative to the total number of cases.
showDiamonds Whether to add diamonds to illustrate the confidence intervals.
diamonds.conf.level The confidence level of the diamonds’ confidence intervals.
diamonds.alpha The alpha channel (i.e. transparency, or rather ‘obliqueness’) of the diamonds.
na.rm Whether to remove missing values.
barHeight The height of the bars, or rather, half the height. Use .5 to completely fill the
          space.
conf.steps The number of steps to use to generate the confidence levels for the proportion.
scale_color, scale_fill A vector with two values (valid colors), that are used for the colors (stroke) and
                  fill for the gradient; both vectors should normally be the same, but if you feel
                  adventurous, you can play around with the number of conf.steps and this. If
                  you specify only one color, no gradient is used but a single color (i.e. specifying
                  the same single color for both scale_color and scale_fill simply draws bars
                  of that color).
rank.conf Whether to let the fill and color gradients use the confidence or the ranked con-
              dence.
linetype The linetype() to use (0 = blank, 1 = solid, 2 = dashed, 3 = dotted, 4 = dotdash,
          5 = longdash, 6 = twodash).
theme The theme to use.
returnPlotOnly Whether to only return the ggplot2() plot or the full object including interme-
                  diate values and objects.
x The object to print/plot.
... Any additional arguments are passed on to print and grid.draw.
Details

This function used \texttt{confIntProp()} to compute confidence intervals for proportions at different levels of confidence. The confidence interval bounds at those levels of confidence are then used to draw rectangles with colors in a gradient that corresponds to the confidence level.

Note that percentually, the gradient may not look continuous because at the borders between lighter and darker rectangles, the shade of the lighter rectangle is perceived as even lighter than it is, and the shade of the darker rectangle is perceived as even darker. This makes it seem as if each rectangle is coloured with a gradient in the opposite direction.

Value

A \texttt{ggplot2()} object (if \texttt{returnPlotOnly} is TRUE), or an object containing that \texttt{ggplot2()} object and intermediate products.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters \texttt{gjalt-jorn@userfriendlyscience.com}

See Also

\texttt{confIntProp()} and \texttt{binom.test()}

Examples

```r
### V/S (no idea what this is: ?mtcars only mentions 'V/S' :-))
### and transmission (automatic vs manual)
ggProportionPlot(mtcars, items=c('vs', 'am'));

### Number of cylinders, by default comparing lowest value
### (4) to highest (8):
ggProportionPlot(mtcars, items=c('cyl'));

### Not run:
### Not running these to save time during package building/checking

### We can also compare 4 to 6:
ggProportionPlot(mtcars, items=c('cyl'),
    hiCategory=6);

### Now compared to total records, instead of to
### highest value (hiCategory is ignored then)
ggProportionPlot(mtcars, items=c('cyl'),
    compareHiToLo=FALSE);

### And for 6 cylinders:
ggProportionPlot(mtcars, items=c('cyl'),
    loCategory=6, compareHiToLo=FALSE);
```
### And for 8 cylinders:
ggProportionPlot(mtcars, items=c('cyl'),
    loCategory=8, compareHiLo=FALSE);

### And for 8 cylinders with different labels
ggProportionPlot(mtcars, items=c('cyl'),
    loCategory=8,
    subQuestions='Cylinders',
    leftAnchors="Eight",
    rightAnchors="Four\nor\nsix",
    compareHiLo=FALSE);

### ... And showing the diamonds for the confidence intervals
ggProportionPlot(mtcars, items=c('cyl'),
    loCategory=8,
    subQuestions='Cylinders',
    leftAnchors="Eight",
    rightAnchors="Four\nor\nsix",
    compareHiLo=FALSE,
    showDiamonds=TRUE);

## End(Not run)

### Using less steps for the confidence levels and changing
### the fill colours
ggProportionPlot(mtcars,
    items=c('vs', 'am'),
    showDiamonds = TRUE,
    scale_fill = c("#B63679FF", "#FCDBFFF"),
    conf.steps=seq(from=0.0001, to=.9999, by=.2));

---

**ggqq**

*Easy ggplot Q-Q plot*

---

**Description**

This function creates a qq-plot with a confidence interval.

**Usage**

ggqq(
  x,
  distribution = "norm",
  ...,
  ci = TRUE,
  line.estimate = NULL,
  conf.level = 0.95,
  sampleSizeOverride = NULL,
observedOnX = TRUE,
scaleExpected = TRUE,
theoryLab = "Theoretical quantiles",
observeLab = "Observed quantiles",
theme = ggplot2::theme_bw()
)

Arguments

x                  A vector containing the values to plot.
distribution      The distribution to (a ‘d’ and ‘q’ are prepended, and the resulting functions are used, e.g. dnorm and qnorm for the normal curve).
...                Any additional arguments are passed to the quantile function (e.g. qnorm). Because of these dots, any following arguments must be named explicitly.
ci                 Whether to show the confidence interval.
line.estimate     Whether to show the line showing the match with the specified distribution (e.g. the normal distribution).
conf.level        The confidence of the confidence level around the estimate for the specified distribution.
sampleSizeOverride If it can be desirable to get the confidence intervals for a different sample size (when the sample size is very large, for example, such as when this plot is generated by the function normalityAssessment). That different sample size can be specified here.
observedOnX       Whether to plot the observed values (if TRUE) or the theoretically expected values (if FALSE) on the X axis. The other is plotted on the Y axis.
scaleExpected     Whether the scale the expected values to match the scale of the variable. This option is provided to be able to mimic SPSS’ Q-Q plots.
theoryLab         The label for the theoretically expected values (on the Y axis by default).
observeLab        The label for the observed values (on the Y axis by default).
theme              The theme to use.

Details

This is strongly based on the answer by user Floo0 to a Stack Overflow question at Stack Exchange (see https://stackoverflow.com/questions/4357031/qqnorm-and-qqline-in-ggplot2/27191036#27191036), also posted at GitHub (see https://gist.github.com/rentrop/d39a8406ad8af2a1066c). That code is in turn based on the qqPlot() function from the car package.

Value

A ggplot plot is returned.

Author(s)

John Fox and Floo0; implemented in this package (and tweaked a bit) by Gjalt-Jorn Peters.
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com


Examples

```r
ggqq(mtcars$mpg);
```

---

**ggSave**

*Save a ggplot with specific defaults*

**Description**

This function is vectorized over all argument except 'plot': so if you want to save multiple versions, simply provide vectors. Vectors of length 1 will be recycled using `rep()`; otherwise vectors have to all be the same length as file.

**Usage**

```r
ggSave(
  file = NULL,
  plot = ggplot2::last_plot(),
  width = ufs::opts$get("ggSaveFigWidth"),
  height = ufs::opts$get("ggSaveFigHeight"),
  units = ufs::opts$get("ggSaveUnits"),
  dpi = ufs::opts$get("ggSaveDPI"),
  device = NULL,
  type = NULL,
  bg = "transparent",
  ...
)
```

**Arguments**

- `file` The file where to save to.
- `plot` The plot to save; if omitted, the last drawn plot is saved.
- `height, width` The dimensions of the plot, specified in units.
- `units` The units, 'cm', 'mm', or 'in'.
- `dpi` The resolution (dots per inch). This argument is vectorized.
- `device` The graphic device; is inferred from the file if not specified.
- `type` An additional arguments for the graphic device.
- `bg` The background (e.g. 'white').
- `...` Any additional arguments are passed on to `ggplot2::ggsave()`.

**Value**

The plot, invisibly.
Examples

plot <- ufs::ggBoxplot(mtcars, 'mpg');
ggSave(file=tempfile(fileext=".png"), plot=plot);

heading

Print a heading

Description

This is just a convenience function to print a markdown or HTML heading at a given 'depth'.

Usage

heading(
  ...,  
  headingLevel = ufs::opts$get("defaultHeadingLevel"),
  output = "markdown",
  cat = TRUE
)

Arguments

... The heading text: pasted together with no separator.
headingLevel The level of the heading; the default can be set with e.g. ufs::optssetq(defaultHeadingLevel=1).
output Whether to output to HTML ("html") or markdown (anything else).
cat Whether to cat (print) the heading or just invisibly return it.

Value

The heading, invisibly.

Examples

heading("Hello ", "World", headingLevel=5);
### This produces: "\n\n##### Hello World\n\n"
ifelseObj

Conditional returning of an object

Description

The ifelseObj function just evaluates a condition, returning one object if it’s true, and another if it’s false.

Usage

ifelseObj(condition, ifTrue, ifFalse)

Arguments

condition Condition to evaluate.
ifTrue Object to return if the condition is true.
ifFalse Object to return if the condition is false.

Value

One of the two objects

Examples

dat <- ifelseObj(sample(c(TRUE, FALSE), 1), mtcars, Orange);

insertFigureCaption

Insert numbered caption

Description

These functions can be used to manually insert a numbered caption. These functions have been designed to work well with setFigCapNumbering() and setTabCapNumbering(). This is useful when inserting figures or tables in an RMarkdown document when you use automatic caption numbering for knitr chunks, but are inserting a table or figure that isn’t produced in a knitr chunk while still retaining the automatic numbering. insertNumberedCaption() is the general-purpose function; you will typically only use insertFigureCaption() and insertTableCaption().
Usage

```r
insertFigureCaption(
  captionText = "", captionName = "fig.cap",
  prefix = getOption(paste0(optionName, "_prefix"), "Figure %s: "),
  suffix = getOption(paste0(optionName, "_suffix"), ""),
  optionName = paste0("setCaptionNumbering_", captionName),
  resetCounterTo = NULL
)
```

```r
insertNumberedCaption(
  captionText = "", captionName = "fig.cap",
  prefix = getOption(paste0(optionName, "_prefix"), "Figure %s: "),
  suffix = getOption(paste0(optionName, "_suffix"), ""),
  optionName = paste0("setCaptionNumbering_", captionName),
  resetCounterTo = NULL
)
```

```r
insertTableCaption(
  captionText = "", captionName = "tab.cap",
  prefix = getOption(paste0(optionName, "_prefix"), "Table %s: "),
  suffix = getOption(paste0(optionName, "_suffix"), ""),
  optionName = paste0("setCaptionNumbering_", captionName),
  resetCounterTo = NULL
)
```

Arguments

- **captionText**: The text of the caption.
- **captionName**: The name of the caption; by default, for tables, "tab.cap".
- **prefix, suffix**: The prefix and suffix texts; base::sprintf() is used to insert the number in the position taken up by \%s.
- **optionName**: The name of the option to use to save the number counter.
- **resetCounterTo**: If a numeric value, the counter is reset to that value.

Value

The caption in a character vector.

Examples

```r
insertNumberedCaption("First caption");
insertNumberedCaption("Second caption");
sectionNumber <- 12;
insertNumberedCaption("Third caption",
    prefix = paste0("Table ",
```
invertItem

Description

Inverts items (as in, in a questionnaire), by calling `invertItem` on all relevant items.

Usage

invertItem(item, fullRange = NULL, ignorePreviousInversion = FALSE)

invertItems(dat, items = NULL, ...)

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>item</td>
<td>The vector to invert.</td>
</tr>
<tr>
<td>fullRange</td>
<td>The full range; will otherwise be derived from the vector.</td>
</tr>
<tr>
<td>ignorePreviousInversion</td>
<td>Whether to avoid inverting items that were already inverted.</td>
</tr>
<tr>
<td>dat</td>
<td>The dataframe containing the variables to invert.</td>
</tr>
<tr>
<td>items</td>
<td>The names or indices of the variables to invert. If not supplied (i.e. NULL), all variables in the dataframe will be inverted.</td>
</tr>
<tr>
<td>...</td>
<td>Arguments (parameters) passed on to data.frame when recreating that after having used lapply.</td>
</tr>
</tbody>
</table>

Value

The dataframe with the specified items inverted.

Author(s)

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

invertItem

Examples

invertItems(mtcars, c('cyl'));
iqrOutlier

Identify outliers according to the IQR criterion

Description

The IQR criterion holds that any value lower than one-and-a-half times the interquartile range below
the first quartile, or higher than one-and-a-half times the interquartile range above the third quartile,
is an outlier. This function returns a logical vector that identifies those outliers.

Usage

iqrOutlier(x)

Arguments

x

The vector to scan for outliers.

Value

A logical vector where TRUE identifies outliers.

Author(s)

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

IQR

Examples

### One outlier in the miles per gallon
iqrOutlier(mtcars$mpg);
irpplot  

Visualising individual response patterns

Description

Visualising individual response patterns

Usage

irpplot(
  data,
  row,
  columns,
  dataName = NULL,
  title = paste("Row", row, " in dataset", dataName)
)

Arguments

data         A dataframe with the dataset containing the responses.
row          A vector with indices of the rows for which you want the individual response patterns. These can be either the relevant row numbers, or if character row names are set, the names of the relevant rows.
columns      A vector with the names of the variables you want the individual response patterns for.
dataName, title  Optionally, you can override the dataset name that is used in the title; or, the title (the dataset name is only used in the title).

Value

A ggplot2::ggplot().

Examples

### Get a dataset
dat <- ufs::bfi;

### Show the individual responses for
### the tenth participant
irpplot(dat, 10, 1:20);

### Set some missing values
dat[10, c(1, 5, 15)] <- NA;

### Show the individual responses again
irpplot(dat, 10, 1:20);
is.nr

NULL and NA 'proof' checking of whether something is a number

Description
Convenience function that returns TRUE if the argument is not null, not NA, and is.numeric.

Usage
is.nr(x)

Arguments

x  The value or vector to check.

Value
TRUE or FALSE.

Examples

is.nr(8); ### Returns TRUE
is.nr(NULL); ### Returns FALSE
is.nr(NA);  ### Returns FALSE

is.odd

Checking whether numbers are odd or even

Description
Checking whether numbers are odd or even

Usage

is.odd(vector)

is.even(vector)

Arguments

vector  The vector to process

Value
A logical vector.
isTrue

Examples

is.odd(4);

isTrue  More flexible version of isTRUE

Description

Returns TRUE for TRUE elements, FALSE for FALSE elements, and whatever is specified in na for NA items.

Usage

isTrue(x, na = FALSE)

Arguments

x The vector to check for TRUE, FALSE, and NA values.

na What to return for NA values.

Value

A logical vector.

Examples

isTrue(c(TRUE, FALSE, NA));
isTrue(c(TRUE, FALSE, NA), na=TRUE);

kblXtra  Wrapper for kableExtra for consistent ufs table styling

Description

Wrapper for kableExtra for consistent ufs table styling
Usage

```r
kblXtra(
  x,
  digits = 2,
  format = "html",
  escape = FALSE,
  print = TRUE,
  viewer = FALSE,
  kable_classic = FALSE,
  lightable_options = "striped",
  html_font = "Arial Narrow", "Source Sans Pro", sans-serif",
  full_width = TRUE,
  table.attr = "style='border:0px solid black !important;'",
  ...
)
```

Arguments

- `x` The dataframe to print
- `digits, format, escape, table.attr, lightable_options, html_font, full_width` Defaults that are passed to `knitr::kable()`
- `print` Whether to print the table
- `viewer` Whether to show the table in the viewer
- `kable_classic` Whether to call `kable_classic`; otherwise, `kable_styling` is called.
- `...` Additional arguments are passed to `knitr::kable()`

Value

The table, invisibly.

Examples

```r
kblXtra(mtcars);
```
knitFig

Easily knit a custom figure fragment

Usage

knitAndSave(
  plotToDraw,
  figCaption,
  file = NULL,
  path = NULL,
  figWidth = ufs::opts$get("ggSaveFigWidth"),
  figHeight = ufs::opts$get("ggSaveFigHeight"),
  units = ufs::opts$get("ggSaveUnits"),
  dpi = ufs::opts$get("ggSaveDPI"),
  catPlot = ufs::opts$get("knitAndSave.catPlot"),
  ...
)

Arguments

plotToDraw  The plot to knit using knitFig() and save using ggSave().
figCaption  The caption of the plot (used as filename if no filename is specified).
file, path   The filename to use when saving the plot, or the path where to save the file if no
             filename is provided (if path is also omitted, getWd() is used).
figWidth, figHeight  The plot dimensions, by default specified in inches (but ’units’ can be set which
                      is then passed on to ggSave()).
units, dpi    The units and DPI of the image which are then passed on to ggSave().
catPlot      Whether to use cat() to print the knitr fragment.
...           Additional arguments are passed on to ggSave(). Note that file (and ...) are
             vectorized (see the ggSave() manual page).

Value

The knitFig() result, visibly.

Examples

## Not run: plot <- ggBoxplot(mtcars, 'mpg');
knitAndSave(plot, figCaption="a boxplot", file=tempfile(fileext=".png"));
## End(Not run)

knitFig

Easily knit a custom figure fragment

Description

This function was written to make it easy to knit figures with different, or dynamically generated,
widths and heights (and captions) in the same chunk when working with R Markdown.
Usage

```r
knitFig(
  plotToDraw,
  template = getOption("ufs.knitFig.template", NULL),
  figWidth = ufs::opts$get("ggSaveFigWidth"),
  figHeight = ufs::opts$get("ggSaveFigHeight"),
  figCaption = "A plot.",
  chunkName = NULL,
  returnRaw = FALSE,
  catPlot = ufs::opts$get("knitFig.catPlot"),
  ...
)
```

Arguments

- `plotToDraw`: The plot to draw, e.g. a `ggplot` plot.
- `template`: A character value with the `knit_expand` template to use.
- `figWidth`: The width to set for the figure (in inches).
- `figHeight`: The height to set for the figure (in inches).
- `figCaption`: The caption to set for the figure.
- `chunkName`: Optionally, the name for the chunk. To avoid problems because multiple chunks have the name "unnamed-chunk-1", if no chunk name is provided, `digest::digest()` is used to generate an MD5-hash from `Sys.time`.
- `returnRaw`: Whether to `cat()` the result (TRUE) or whether to return it as `knitr::asis_output()` object (FALSE).
- `catPlot`: Whether to use the `base::cat()` function to print the code for the plot, and return the result invisibly. If not, the result is returned visible, and so probably printed anyway.
- `...`: Any additional arguments are passed on to `knit_expand`.

Value

This function returns nothing, but uses `knitexpand` and `knit` to `cat` the result.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

- `knit_expand` and `knit`

Examples

```r
## Not run: knitFig(ggBoxplot(mtcars, 'mpg'))
```
### makeScales

**Title**

**Description**

Title

**Usage**

```r
makeScales(data, scales, append = TRUE)
```

**Arguments**

- `data` The dataframe containing the variables (the items).
- `scales` A list of character vectors with the items in each scale, where each vectors’ name is the name of the scale.
- `append` Whether to return the dataframe including the new variables (TRUE), or a dataframe with only those new variables (FALSE).

**Value**

Either a dataframe with the newly created variables, or the supplied dataframe with the newly created variables appended.

**Examples**

```r
### First generate a list with the scales
scales <- list(scale1 = c('mpg', 'cyl'), scale2 = c('disp', 'hp'));

### Create the scales and add them to the dataframe
makeScales(mtcars, scales);
```

### massConvertToNumeric

**Converting many dataframe columns to numeric**

**Description**

This function makes it easy to convert many dataframe columns to numeric.

**Usage**

```r
massConvertToNumeric(
  dat,
  byFactorLabel = FALSE,
  ignoreCharacter = TRUE,
  stringsAsFactors = FALSE
)
```
meanConfInt

Arguments

- **dat**: The dataframe with the columns.
- **byFactorLabel**: When converting factors, whether to do this by their label value (TRUE) or their level value (FALSE).
- **ignoreCharacter**: Whether to convert (FALSE) or ignore (TRUE) character vectors.
- **stringsAsFactors**: In the returned dataframe, whether to return string (character) vectors as factors or not.

Value

A data.frame.

Examples

```r
### Create a dataset
a <- data.frame(var1 = factor(1:4),
                var2 = as.character(5:6),
                stringsAsFactors=FALSE);

### Ignores var2
b <- ufs::massConvertToNumeric(a);

### Converts var2
c <- ufs::massConvertToNumeric(a,
                ignoreCharacter = FALSE);
```

---

meanConfInt

**A confidence interval for the mean**

Description

A confidence interval for the mean

Usage

```r
meanConfInt(
  vector = NULL,
  mean = NULL,
  sd = NULL,
  n = NULL,
  se = NULL,
  conf.level = 0.95
)
```

```r
## S3 method for class 'meanConfInt'
print(x, digits = 2, ...)
```
**Arguments**

- **vector**
  A vector with raw data points - either specify this or a mean and then either an sd and n or an se.

- **mean**
  A mean.

- **sd, n**
  A standard deviation and sample size; can be specified to compute the standard error.

- **se**
  The standard error (can be specified instead of sd and n).

- **conf.level**
  The confidence level of the interval.

- **x, digits, ...**
  Respectively the object to print, the number of digits to round to, and any additional arguments to pass on to the print function.

**Value**

An object with elements input, intermediate, and output, where output holds the result in list `ci`.

**Examples**

```r
meanConfInt(mean=5, sd=2, n=20);
```

---

**Description**

This function generates a so-called diamond plot: a plot based on the forest plots that are commonplace in meta-analyses. The underlying idea is that point estimates are uninformative, and it would be better to focus on confidence intervals. The problem of the points with errorbars that are commonly employed is that the focus the audience’s attention on the upper and lower bounds, even though those are the least relevant values. Using diamonds remedies this.

**Usage**

```r
meansDiamondPlot(
  data,
  items = NULL,
  labels = NULL,
  decreasing = NULL,
  conf.level = 0.95,
  showData = TRUE,
  dataAlpha = 0.1,
  dataSize = 3,
  dataColor = "#444444",
  diamondColors = NULL,
  jitterWidth = 0.5,
```
jitterHeight = 0.4,
returnLayerOnly = FALSE,
xlab = "Scores and means",
ylab = NULL,
theme = ggplot2::theme_bw(),
xbreaks = "auto",
outputFile = NULL,
outputWidth = 10,
outputHeight = 10,
ggsaveParams = ufs::opts$get("ggsaveParams"),
dat = NULL,
...)

Arguments

data, dat
The dataframe containing the variables (items) to show in the diamond plot (the name dat for this argument is deprecated but still works for backward compatibility).

items
Optionally, the names (or numeric indices) of the variables (items) to show in the diamond plot. If NULL, all columns (variables, items) will be used.

labels
A character vector of labels to use instead of column names from the dataframe.

decreasing
Whether to sort the variables (rows) in the diamond plot decreasing (TRUE), increasing (FALSE), or not at all (NULL).

conf.level
The confidence of the confidence intervals.

showData
Whether to show the raw data or not.

dataAlpha
This determines the alpha (transparency) of the data points. Note that argument alpha can be used to set the alpha of the diamonds; this is eventually passed on to ggDiamondLayer().

dataSize
The size of the data points.

dataColor
The color of the data points.

diamondColors
A vector of the same length as there are rows in the dataframe, to manually specify colors for the diamonds.

d jitterWidth
How much to jitter the individual datapoints horizontally.

jitterHeight
How much to jitter the individual datapoints vertically.

returnLayerOnly
Set this to TRUE to only return the ggplot() layer of the diamondplot, which can be useful to include it in other plots.

xlab, ylab
The labels of the X and Y axes.

theme
The theme to use.

xbreaks
Where the breaks (major grid lines, ticks, and labels) on the x axis should be.

outputFile
A file to which to save the plot.

outputWidth, outputHeight
Width and height of saved plot (specified in centimeters by default, see ggsaveParams).
meansDiamondPlot

**ggsaveParams**Parameters to pass to ggsave when saving the plot.

...Additional arguments are passed to `diamondPlot()` and eventually to `ggDiamondLayer()`. This can be used to, for example, specify two or more colors to use to generate a gradient (using `generateColors` and maybe `fullColorRange`).

**Value**

A `ggplot()` plot with a `ggDiamondLayer()` is returned.

**Author(s)**

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

**See Also**

See `diamondPlot()`, `meanSDtoDiamondPlot()`, `ggDiamondLayer()`, `factorLoadingDiamondCIplot()

**Examples**

tmpDf <- data.frame(item1 = rnorm(50, 1.6, 1),
                     item2 = rnorm(50, 2.6, 2),
                     item3 = rnorm(50, 4.1, 3));

### A simple diamond plot
meansDiamondPlot(tmpDf);

### A diamond plot with manually
### specified labels and colors
meansDiamondPlot(tmpDf,
                 labels=c('First',
                          'Second',
                          'Third'),
                 diamondColors=c('blue', 'magenta', 'yellow'));

### Using a gradient for the colors
meansDiamondPlot(tmpDf,
                 labels=c('First',
                          'Second',
                          'Third'),
                 generateColors = c("magenta", "cyan"),
                 fullColorRange = c(1,5));
meanSDtoDiamondPlot

Description

Diamond plot: means

Usage

meanSDtoDiamondPlotJMV(data, items, conf.level = 95, showData = TRUE)

Arguments

data
t.items
cconf.level
tshowData

Value

A results object containing:

results$text
results$diamondPlot

meanSDtoDiamondPlot

A diamond plot based on means, standard deviations, and sample sizes

Description

This function generates a so-called diamond plot: a plot based on the forest plots that are commonplace in meta-analyses. The underlying idea is that point estimates are uninformative, and it would be better to focus on confidence intervals. The problem of the points with errorbars that are commonly employed is that the focus the audience’s attention on the upper and lower bounds, even though those are the least relevant values. Using diamonds remedies this.

Usage

meanSDtoDiamondPlot(
  dat = NULL,
  means = 1,
  sds = 2,
  ns = 3,
meanSDtoDiamondPlot

labels = NULL,
colorCol = NULL,
conf.level = 0.95,
xlab = "Means",
outputFile = NULL,
outputWidth = 10,
outputHeight = 10,
ggsaveParams = ufs::opts$ggsaveParams,
...
)

Arguments

dat The dataset containing the means, standard deviations, sample sizes, and possible labels and manually specified colors.

means Either the column in the dataframe containing the means, as numeric or as character index, or a vector of means.

sds Either the column in the dataframe containing the standard deviations, as numeric or as character index, or a vector of standard deviations.

ns Either the column in the dataframe containing the sample sizes, as numeric or as character index, or a vector of sample sizes.

labels Optionally, either the column in the dataframe containing labels, as numeric or as character index, or a vector of labels.

colorCol Optionally, either the column in the dataframe containing manually specified colours, as numeric or as character index, or a vector of manually specified colours.

conf.level The confidence of the confidence intervals.

xlab The label for the x axis.

outputFile A file to which to save the plot.

outputWidth, outputHeight Width and height of saved plot (specified in centimeters by default, see ggsaveParams).

ggsaveParams Parameters to pass to ggsave when saving the plot.

... Additional arguments are passed to diamondPlot() and eventually to ggDiamondLayer(). This can be used to, for example, specify two or more colors to use to generate a gradient (using generateColors and maybe fullColorRange).

Value

A ggplot() plot with a ggDiamondLayer() is returned.

Author(s)

Gjalt-Jorn Peters

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
multiResponse

Generate a table for multiple response questions

Description

The multiResponse function mimics the behavior of the table produced by SPSS for multiple response questions.
Usage

multiResponse(
  data,
  items = NULL,
  regex = NULL,
  perlRegex = TRUE,
  endorsedOption = 1
)

Arguments

data: Dataframe containing the variables to display.
items, regex: Arguments items and regex can be used to specify which variables to process. items should contain the variable (column) names (or indices), and regex should contain a regular expression used to match to the column names of the dataframe. If none is provided, all variables in the dataframe are processed.
perlRegex: Whether to use the perl engine to match the regex.
endorsedOption: Which value represents the endorsed option (note that producing this kind of table requires dichotomous items, where each variable is either endorsed or not endorsed, so this is also a way to treat other variables as dichotomous).

Value

A dataframe with columns Option, Frequency, Percentage, and Percentage of (X) cases, where X is the number of cases.

Author(s)

Ananda Mahto; implemented in this package (and tweaked a bit) by Gjalt-Jorn Peters.

Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

References

This function is based on the excellent and extensive Stack Exchange answer by Ananda Mahto at https://stackoverflow.com/questions/9265003/analysis-of-multiple-response.

Examples

multiResponse(mtcars, c('vs', 'am'));
multiResponsejmv

**Description**

Multi Response

**Usage**

\[
\text{multiResponsejmv}(\text{data, items, endorsedOption} = 1)
\]

**Arguments**

- **data**
- **items**
- **endorsedOption**

**Value**

A results object containing:

\[
\text{results$table}
\]

A table

Tables can be converted to data frames with `asDF` or `as.data.frame`. For example:

\[
\text{results$table$asDF}
\]

\[
\text{as.data.frame(results$table)}
\]

---

multiVarFreq

**Generate a table collapsing frequencies of multiple variables**

**Description**

This function can be used to efficiently combine the frequencies of variables with the same possible values. The frequencies are collapsed into a table with the variable names as row names and the possible values as column (variable) names.

**Usage**

\[
\text{multiVarFreq}(\text{data, items = NULL, labels = NULL, sortByMean} = \text{TRUE})
\]
normalHist

Arguments

- **data**: The dataframe containing the variables.
- **items**: The variable names.
- **labels**: Labels can be provided which will be set as row names when provided.
- **sortByMean**: Whether to sort the rows by mean value for each variable (only sensible if the possible values are numeric).

Value

The resulting dataframe, but with class 'multiVarFreq’ prepended to allow pretty printing.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

table()

Examples

```
multiVarFreq(mtcars, c('gear', 'carb'));
```

Description

normalHist generates a histogram with a density curve and a normal density curve.

Usage

```
normalHist(
  vector,
  histColor = "#0000CC",
  distributionColor = "#0000CC",
  normalColor = "#00CC00",
  distributionLineSize = 1,
  normalLineSize = 1,
  histAlpha = 0.25,
  xLabel = NULL,
  yLabel = NULL,
  normalCurve = TRUE,
```
distCurve = TRUE,
breaks = 30,
theme = ggplot2::theme_minimal(),
rug = NULL,
jitteredRug = TRUE,
rugSides = "b",
rugAlpha = 0.2,
returnPlotOnly = FALSE
)

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

Arguments

- **vector**: A numeric vector.
- **histColor**: The colour to use for the histogram.
- **distributionColor**: The colour to use for the density curve.
- **normalColor**: The colour to use for the normal curve.
- **distributionLineWidth**: The line size to use for the distribution density curve.
- **normalLineWidth**: The line size to use for the normal curve.
- **histAlpha**: Alpha value (‘opaqueness’, as in, versus transparency) of the histogram.
- **xLabel**: Label to use on x axis.
- **yLabel**: Label to use on y axis.
- **normalCurve**: Whether to display the normal curve.
- **distCurve**: Whether to display the curve showing the distribution of the observed data.
- **breaks**: The number of breaks to use (this is equal to the number of bins minus one, or in other words, to the number of bars minus one).
- **theme**: The theme to use.
- **rug**: Whether to add a rug (i.e. lines at the bottom that correspond to individual datapoints).
- **jitteredRug**: Whether to jitter the rug (useful for variables with several datapoints sharing the same value).
- **rugSides**: This is useful when the histogram will be rotated; for example, this can be set to ‘r’ if the histogram is rotated 270 degrees.
- **rugAlpha**: Alpha value to use for the rug. When there is a lot of overlap, this can help get an idea of the number of datapoints at ‘popular’ values.
- **returnPlotOnly**: Whether to return the usual normalHist object that also contains all settings and intermediate objects, or whether to only return the ggplot2::ggplot() plot.
- **x**: The object to print.
- **...**: Any additional arguments are passed to the default print method.
Value

An object, with the following elements:

- input: The input when the function was called.
- intermediate: The intermediate numbers and distributions.
- dat: The dataframe used to generate the plot.
- plot: The histogram.

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

```r
normalHist(mtcars$mpg)
```

---

**noZero**

*Remove one or more zeroes before the decimal point*

Description

Remove one or more zeroes before the decimal point

Usage

```r
noZero(str)
```

Arguments

- `str`: The character string to process.

Value

The processed string.

See Also

`formatCI()`, `formatR()`, `formatPvalue()`

Examples

```r
noZero("0.3");
```
opts

Options for the ufs package

Description

The ufs::opts object contains three functions to set, get, and reset options used by the ufs package. Use ufs::opts$set to set options, ufs::opts$get to get options, or ufs::opts$reset to reset specific or all options to their default values.

Usage

opts

Format

An object of class list of length 5.

Details

It is normally not necessary to get or set ufs options. The following arguments can be passed:

... For ufs::opts$set, the dots can be used to specify the options to set, in the format option = value, for example, tableOutput = c("console", "viewer"). For ufs::opts$reset, a list of options to be reset can be passed.

option For ufs::opts$set, the name of the option to set.

default For ufs::opts$get, the default value to return if the option has not been manually specified.

The following options can be set:

tableOutput Where to show some tables.

Examples

### Get the default columns in the variable view
ufs::opts$get("tableOutput");

### Set it to a custom version
ufs::opts$set(tableOutput = c("values", "level"));

### Check that it worked
ufs::opts$get("tableOutput");

### Reset this option to its default value
ufs::opts$reset("tableOutput");

### Check that the reset worked, too
ufs::opts$get("tableOutput");
The distribution of Omega Squared

Description
These functions use some conversion to and from the \( F \) distribution to provide the Omega Squared distribution.

Usage
\[
\begin{align*}
pomegaSq(q, df1, df2, populationOmegaSq = 0, lower.tail = TRUE) \\
qomegaSq(p, df1, df2, populationOmegaSq = 0, lower.tail = TRUE) \\
romegaSq(n, df1, df2, populationOmegaSq = 0) \\
domegaSq(x, df1, df2, populationOmegaSq = 0)
\end{align*}
\]

Arguments
- \( df1, df2 \): Degrees of freedom for the numerator and the denominator, respectively.
- \( populationOmegaSq \): The value of Omega Squared in the population; this determines the center of the Omega Squared distribution. This has not been implemented yet in this version of \( ufs \). If anybody has the inverse of \texttt{convert.ncf.to.omegasq()} for me, I’ll happily integrate this.
- \( lower.tail \): logical; if TRUE (default), probabilities are the likelihood of finding an Omega Squared smaller than the specified value; otherwise, the likelihood of finding an Omega Squared larger than the specified value.
- \( p \): Vector of probabilites (\( p \)-values).
- \( n \): Desired number of Omega Squared values.
- \( x, q \): Vector of quantiles, or, in other words, the value(s) of Omega Squared.

Details
The functions use \texttt{convert.omegasq.to.f()} and \texttt{convert.f.to.omegasq()} to provide the Omega Squared distribution.

Value
\( domegaSq \) gives the density, \( pomegaSq \) gives the distribution function, \( qomegaSq \) gives the quantile function, and \( romegaSq \) generates random deviates.

Author(s)
Gjalt-Jorn Peters  
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com
See Also

convert.omegasq.to.f(), convert.f.to.omegasq(), df(), pf(), qf(), rf()

Examples

### Generate 10 random Omega Squared values
romegaSq(10, 66, 3);

### Probability of findings an Omega Squared
### value smaller than .06 if it's 0 in the population
pomegaSq(.06, 66, 3);

pwr.bootES

Estimate required sample size for accuracy in parameter estimation
using bootES

Description

This function uses bootES::bootES() to compute

Usage

pwr.bootES(data = data, ci.type = "bca", ..., w = 0.1, silent = TRUE)

Arguments

data The dataset, as you would normally supply to bootES::bootES(); you will probably have to simulate this.

.ci.type The estimation method; by default, the default of bootES::bootES() is used ('bca'), but this is changed to 'basic' if it encounters problems.

... Other options for bootES::bootES() (see that help page).

w The desired 'halfwidth' of the confidence interval.

silent Whether to provide a lot of information about progress ('FALSE') or not ('TRUE').

Value

A single numeric value (the sample size).

References

Examples

```r
### To estimate a mean
x <- rnorm(500, mean=8, sd=3);
pwr.bootES(data.frame(x=x),
R=500,
w=.5);

### To estimate a correlation (the 'effect.type' parameter is
### redundant here; with two columns in the data frame, computing
### the confidence interval for the Pearson correlation is the default
### behavior of bootES)
y <- x+rnorm(500, mean=0, sd=5);
cor(x, y);
requiredN <-
pwr.bootES(data.frame(x=x,
y=y),
  effect.type='r',
  R=500,
  w=.2);
print(requiredN);

### Compare to parametric confidence interval
### based on the computed required sample size
confIntR(r = cor(x, y),
  N = requiredN);

### Width of obtained confidence interval
print(round(diff(as.numeric(confIntR(r = cor(x, y),
  N = requiredN))), 2));
```

### pwr.confIntProp

**Estimate required sample size for accuracy in parameter estimation of a proportion**

**Description**

This function uses `confIntProp()` to compute the required sample size for estimating a proportion with a given accuracy.

**Usage**

```r
pwr.confIntProp(prop, conf.level = 0.95, w = 0.1, silent = TRUE)
```

**Arguments**

- `prop` The proportion you expect to find, or a vector of proportions to enable easy sensitivity analyses.
- `conf.level` The confidence level of the desired confidence interval.
- `w` The desired 'halfwidth' of the confidence interval.
- `silent` Whether to provide a lot of information about progress ('FALSE') or not ('TRUE').
pwr.confIntR

Determine required sample size for a given confidence interval width for Pearson’s r

Description
This function computes how many participants you need if you want to achieve a confidence interval of a given width. This is useful when you do a study and you are interested in how strongly two variables are associated.

Usage
pwr.confIntR(r, w = 0.1, conf.level = 0.95)

Arguments
r
  The correlation you expect to find (confidence intervals for a given level of confidence get narrower as the correlation coefficient increases).

w
  The required half-width (or margin of error) of the confidence interval.

conf.level
  The level of confidence.

Value
The required sample size, or a vector or matrix of sample sizes if multiple correlation coefficients or required (half-)widths were supplied. The row and column names specify the r and w values to which the sample size in each cell corresponds. The confidence level is set as attribute to the resulting vector or matrix.

Author(s)
Douglas Bonett (UC Santa Cruz, United States), with minor edits by Murray Moinester (Tel Aviv University, Israel) and Gjalt-Jorn Peters (Open University of the Netherlands, the Netherlands).
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples
### Required sample size to estimate a prevalence of .03 in the population with a confidence interval of a maximum half-width of .01
pwr.confIntProp(.03, w=.01);

### Vectorized over prop, so you can easily see how the required sample size varies as a function of the proportion
pwr.confIntProp(c(.03, .05, .10), w=.01);

Value
A single numeric value (the sample size).
References


Peters, G. J. Y. & Crutzen, R. (forthcoming) An easy and foolproof method for establishing how effective an intervention or behavior change method is: required sample size for accurate parameter estimation in health psychology.

See Also

pwr.confIntR

Examples

```r
pwr.confIntR(c(.4, .6, .8), w=c(.1, .2));
```

---

*pwr.omegasq Power calculations for Omega Squared.*

Description

This function uses `pwr.anova.test` from the `pwr` package in combination with `convert.cohensf.to.omegasq` and `convert.omegasq.to.cohensf` to provide power analyses for Omega Squared.

Usage

```r
pwr.omegasq(
  k = NULL,
  n = NULL,
  omegasq = NULL,
  sig.level = 0.05,
  power = NULL,
  digits = 4
)
```

## S3 method for class 'pwr.omegasq'
print(x, digits = x$digits, ...)
Arguments

- **k**: The number of groups.
- **n**: The sample size.
- **omegasq**: The Omega Squared value.
- **sig.level**: The significance level (alpha).
- **power**: The power.
- **digits**: The number of digits desired in the output (4, the default, is quite high; but omega squared value tend to be quite low).
- **x**: The object to print.
- **...**: Additional arguments are ignored.

Details

This function was written to work similarly to the power functions in the `pwr` package.

Value

An `power.htest.ufs` object that contains a number of input and output values, most notably:

- **power**: The (specified or computed) power
- **n**: The (specified or computed) sample size in each group
- **sig.level**: The (specified or computed) significance level (alpha)
- **omegasq**: The (specified or computed) Omega Squared value
- **cohensf**: The computed value for the Cohen’s $f$ effect size measure

Author(s)

Gjalt-Jorn Peters & Peter Verboon
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

See Also

- `pwr.anova.test`
- `convert.cohensf.to.omegasq`
- `convert.omegasq.to.cohensf`

Examples

```r
pwr.omegasq(omegasq=.06, k=3, power=.8)
```
quietRemotesInstall  

**quietRemotesInstall**  
Quietly update a package from a remote repository

**Description**  
Simple wrapper for remotes functions that fail gracefully (well, don’t fail at all, just don’t do what they’re supposed to do) when there’s no internet connection.

**Usage**  
```r
quietRemotesInstall(
  x,
  func,
  unloadNamespace = TRUE,
  dependencies = FALSE,
  upgrade = FALSE,
  quiet = TRUE,
  errorInvisible = TRUE,
  ...
)
```

```r
quietGitLabUpdate(
  x,
  unloadNamespace = TRUE,
  dependencies = FALSE,
  upgrade = FALSE,
  quiet = TRUE,
  errorInvisible = TRUE,
  ...
)
```

**Arguments**

- `x`  The repository name (e.g. "r-packages/ufs")
- `func`  The `remotes` function to use
- `unloadNamespace`  Whether to first unload the relevant namespace
- `dependencies, upgrade`  Whether to install dependencies or upgrade
- `quiet`  Whether to suppress messages and warnings
- `errorInvisible`  Whether to suppress errors
- `...`  Additional arguments are passed on to the `remotes` function

**Value**

The result of the call to the `remotes` function
qVec

Convenience function to quickly copy-paste a vector

Description
Convenience function to quickly copy-paste a vector

Usage
qVec(x, fn = NULL)
qVecSum(x)

Arguments
x A string with numbers, separated by arbitrary whitespace.
fn An optional function to apply to the vector before returning it.

Value
The numeric vector or result of calling the function

Examples
qVec('23 9 11 14 12 20');

rbind_dfs
Simple alternative for rbind.fill or bind_rows

Description
Simple alternative for rbind.fill or bind_rows

Usage
rbind_dfs(x, y, clearRowNames = TRUE)

Arguments
x One dataframe
y Another dataframe
clearRowNames Whether to clear row names (to avoid duplication)

Value
The merged dataframe
bind_df_list

Examples

```r
bind_dfs(Orange, mtcars);
```

`bind_df_list`  
Bind lots of dataframes together rowwise

**Description**

Bind lots of dataframes together rowwise

**Usage**

```r
bind_df_list(x)
```

**Arguments**

- `x`  
  A list of dataframes

**Value**

A dataframe

**Examples**

```r
bind_df_list(list(Orange, mtcars, ChickWeight));
```

regrInfluential  
Detecting influential cases in regression analyses

**Description**

This function combines a number of criteria for determining whether a datapoint is an influential case in a regression analysis. It then sum the criteria to compute an index of influentiality. A list of cases with an index of influentiality of 1 or more is then displayed, after which the regression analysis is repeated without those influential cases. A scattermatrix is also displayed, showing the density curves of each variable, and in the scattermatrix, points that are colored depending on how influential each case is.

**Usage**

```r
regrInfluential(formula, data, createPlot = TRUE)
```

```r
## S3 method for class 'regrInfluential'
print(x, headingLevel = 3, ...)
```
Arguments

- **formula**: The formula of the regression analysis.
- **data**: The data to use for the analysis.
- **createPlot**: Whether to create the scattermatrix (requires the GGally package to be installed).
- **x**: Object to print.
- **headingLevel**: The number of hash symbols to prepend to the heading.
- **...**: Additional arguments are passed on to the `regr` print function.

Value

A `regrInfluential` object, which, if printed, shows the influential cases, the regression analyses repeated without those cases, and the scatter matrix.

Author(s)

Gjalt-Jorn Peters & Marwin Snippe
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

```r
regrInfluential(mpg ~ hp, mtcars);
```

---

**repeatStr**

**Repeat a string a number of times**

Description

Repeat a string a number of times

Usage

```r
repeatStr(n = 1, str = " ")
```

Arguments

- **n, str**: Normally, respectively the frequency with which to repeat the string and the string to repeat; but the order of the inputs can be switched as well.

Value

A character vector of length 1.
**Examples**

```r
### 10 spaces:
repStr(10);

### Three euro symbols:
repStr("\u20ac", 3);
```

---

**Description**

This method can be used to format results in a way that can directly be included in a report or manuscript.

**Usage**

```r
report(x, headingLevel = 3, quiet = TRUE, ...)
```

## Default S3 method:

```r
report(x, headingLevel = 3, quiet = TRUE, ...)
```

**Arguments**

- `x`: The object to show.
- `headingLevel`: The level of the Markdown heading to provide; basically the number of hashes ("#") to prepend to the headings.
- `quiet`: Passed on to `knitr::knit()` whether it should be chatty (FALSE) or quiet (TRUE).
- `...`: Passed to the specific method; for the default method, this is passed to the print method.

---

**safeRequire**

*Load a package, install if not available*

**Description**

Load a package, install if not available

**Usage**

```r
safeRequire(packageName, mirrorIndex = NULL)
```

**Arguments**

- `packageName`: The package
- `mirrorIndex`: The index of the mirror (1 is used if not specified)
scaleDiagnosis

Description

scaleDiagnosis provides a number of diagnostics for a scale (an aggregative measure consisting of several items).

Usage

scaleDiagnosis(
  data = NULL,
  items = NULL,
  plotSize = 180,
  sizeMultiplier = 1,
  axisLabels = "none",
  scaleReliability.ci = FALSE,
  conf.level = 0.95,
  normalHist = TRUE,
  poly = TRUE,
  digits = 3,
  headingLevel = 3,
  scaleName = NULL,
  ...)

## S3 method for class 'scaleDiagnosis'
print(x, digits = x$digits, ...)

scaleDiagnosis_partial(
  x,
  headingLevel = x$input$headingLevel,
  quiet = TRUE,
  echoPartial = FALSE,
  partialFile = NULL,
  ...
)

## S3 method for class 'scaleDiagnosis'
knit_print(
  x,
  headingLevel = x$headingLevel,
  quiet = TRUE,
  echoPartial = FALSE,
  partialFile = NULL,
  ...
)
Arguments

data  A dataframe containing the items in the scale. All variables in this dataframe will be used if items is NULL.
items  If not NULL, this should be a character vector with the names of the variables in the dataframe that represent items in the scale.
plotSize  Size of the final plot in millimeters.
sizeMultiplier  Allows more flexible control over the size of the plot elements
axisLabels  Passed to ggpairs function to set axisLabels.
scaleReliability.ci  TRUE or FALSE: whether to compute confidence intervals for Cronbach’s Alpha and Omega (uses bootstrapping function in MBESS, takes a while).
conf.level  Confidence of confidence intervals for reliability estimates (if requested with scaleReliability.ci).
normalHist  Whether to use the default ggpairs histogram on the diagonal of the scattermatrix, or whether to use the normalHist() version.
poly  Whether to also request the estimates based on the polychoric correlation matrix when calling scaleStructure().
digits  The number of digits to pass to the print method for the descriptives dataframe.
headingLevel  The level of the heading (number of hash characters to insert before the heading, to be rendered as headings of that level in Markdown).
scaleName  Optionally, a name for the scale to print as heading for the results.
...  Additional arguments for scaleDiagnosis() are passed on to scatterMatrix(), and additional arguments for the print method are passed to the default print method.

Details

Function to generate an object with several useful statistics and a plot to assess how the elements (usually items) in a scale relate to each other, such as Cronbach’s Alpha, omega, the Greatest Lower Bound, a factor analysis, and a correlation matrix.

Value

An object with the input and several output variables. Most notably:
scaleReliability  The results of scaleReliability.
pca  A Principal Components Analysis
fa  A Factor Analysis
describe  Descriptive statistics about the items
scatterMatrix  A scattermatrix with histograms on the diagonal and correlation coefficients in the upper right half.
Author(s)
Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

### Note: the 'not run' is simply because running takes a lot of time,
### but these examples are all safe to run!
## Not run:
### This will prompt the user to select an SPSS file
scaleDiagnosis();

### Generate a datafile to use
exampleData <- data.frame(item1=rnorm(100));
exampleData$item2 <- exampleData$item1+rnorm(100);
exampleData$item3 <- exampleData$item1+rnorm(100);
exampleData$item4 <- exampleData$item2+rnorm(100);
exampleData$item5 <- exampleData$item2+rnorm(100);

### Use a selection of two variables
scaleDiagnosis(data=exampleData, items=c('item2', 'item4'));

### Use all items
scaleDiagnosis(data=exampleData);

## End(Not run)

scaleStructure

Description
The scaleStructure function (which was originally called scaleReliability) computes a number of measures to assess scale reliability and internal consistency. Note that to compute omega, the MBESS and/or the psych packages need to be installed, which are suggested packages and therefore should be installed separately (i.e. won’t be installed automatically).

Usage

scaleStructure(
  data = NULL,
  items = "all",
  digits = 2,
  ci = TRUE,
  interval.type = "normal-theory",
  conf.level = 0.95,
)
Arguments

data: A dataframe containing the items in the scale. All variables in this dataframe will be used if items = 'all'. If dat is NULL, a the getData function will be called to show the user a dialog to open a file.

items: If not 'all', this should be a character vector with the names of the variables in the dataframe that represent items in the scale.

digits: Number of digits to use in the presentation of the results.

ci: Whether to compute confidence intervals as well. This requires the suggested MBESS package, which has to be installed separately. If true, the method specified in interval.type is used. When specifying a bootstrapping method, this can take quite a while!

interval.type: Method to use when computing confidence intervals. The list of methods is explained in the help file for ci.reliability in MBESS. Note that when specifying a bootstrapping method, the method will be set to normal-theory for
computing the confidence intervals for the ordinal estimates, because these are based on the polychoric correlation matrix, and raw data is required for bootstrapping.

- **conf.level**: The confidence of the confidence intervals.
- **silent**: If computing confidence intervals, the user is warned that it may take a while, unless silent=TRUE.
- **samples**: The number of samples to compute for the bootstrapping of the confidence intervals.
- **bootstrapSeed**: The seed to use for the bootstrapping - setting this seed makes it possible to replicate the exact same intervals, which is useful for publications.
- **omega.psych**: Whether to also compute the interval estimate for omega using the omega function in the psych package. The default point estimate and confidence interval for omega are based on the procedure suggested by Dunn, Baguley & Brunsden (2013) using the MBESS function ci.reliability (because it has more options for computing confidence intervals, not always requiring bootstrapping), whereas the psych package point estimate was suggested in Revelle & Zinbarg (2008). The psych estimate usually (perhaps always) results in higher estimates for omega.
- **omega.psych_nfactors**: The number of factor to use in the factor analysis when computing Omega. The default in psych::omega() is 3; to obtain the same results as in jamovi’s “Reliability”, set this to 1.
- **omega.psych_flip**: Whether to let psych automatically flip items with negative correlations. The default in psych::omega() is TRUE; to obtain the same results as in jamovi’s “Reliability”, set this to FALSE.
- **poly**: Whether to compute ordinal measures (if the items have sufficiently few categories).
- **suppressSuggestedPkgsMsg**: Whether to suppress the message about the suggested MBESS and psych packages.
- **headingLevel**: The level of the Markdown heading to provide; basically the number of hashes (‘#’) to prepend to the headings.
- **x**: The object to print
- **...**: Any additional arguments for the default print function.
- **quiet**: Passed on to knitr::knit() whether it should be chatty (FALSE) or quiet (TRUE).
- **echoPartial**: Whether to show the executed code in the R Markdown partial (TRUE) or not (FALSE).
- **partialFile**: This can be used to specify a custom partial file. The file will have object x available, which is the result of a call to scaleStructure().

**Details**

If you use this function in an academic paper, please cite Peters (2014), where the function is introduced, and/or Crutzen & Peters (2015), where the function is discussed from a broader perspective.
This function is basically a wrapper for functions from the psych and MBESS packages that compute measures of reliability and internal consistency. For backwards compatibility, in addition to scaleStructure, scaleReliability can also be used to call this function.

**Value**

An object with the input and several output variables. Most notably:

<table>
<thead>
<tr>
<th>input</th>
<th>Input specified when calling the function</th>
</tr>
</thead>
<tbody>
<tr>
<td>intermediate</td>
<td>Intermediate values and objects computed to get to the final results</td>
</tr>
<tr>
<td>output</td>
<td>Values of reliability / internal consistency measures, with as most notable elements:</td>
</tr>
<tr>
<td>output$dat</td>
<td>A dataframe with the most important outcomes</td>
</tr>
<tr>
<td>output$omega</td>
<td>Point estimate for omega</td>
</tr>
<tr>
<td>output$glb</td>
<td>Point estimate for the Greatest Lower Bound</td>
</tr>
<tr>
<td>output$alpha</td>
<td>Point estimate for Cronbach's alpha</td>
</tr>
<tr>
<td>output$coefficientH</td>
<td>Coefficient H</td>
</tr>
<tr>
<td>output$omega.ci</td>
<td>Confidence interval for omega</td>
</tr>
<tr>
<td>output$alpha.ci</td>
<td>Confidence interval for Cronbach's alpha</td>
</tr>
</tbody>
</table>

**Author(s)**

Gjalt-Jorn Peters and Daniel McNeish (University of North Carolina, Chapel Hill, US).
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

**References**


**See Also**

`psych::omega()`, `psych::alpha()`, and `MBESS::ci.reliability()`.

**Examples**

```r
## Not run:
### (These examples take a lot of time, so they are not run
### during testing.)

### This will prompt the user to select an SPSS file
scaleStructure();

### Load data from simulated dataset testRetestSimData (which
### satisfies essential tau-equivalence).
data(testRetestSimData);

### Select some items in the first measurement
exampleData <- testRetestSimData[2:6];

### Use all items (don't order confidence intervals to save time
### during automated testing of the example)
scaleStructure(dat=exampleData, ci=FALSE);

### Use a selection of three variables (without confidence
### intervals to save time
scaleStructure(dat=exampleData, items=c('t0_item2', 't0_item3', 't0_item4'),
              ci=FALSE);

### Make the items resemble an ordered categorical (ordinal) scale
ordinalExampleData <- data.frame(apply(exampleData, 2, cut,
                                        breaks=5, ordered_result=TRUE,
                                        labels=as.character(1:5)));

### Now we also get estimates assuming the ordinal measurement level
scaleStructure(ordinalExampleData, ci=FALSE);

## End(Not run)
```
Description

scatterMatrix produces a matrix with jittered scatterplots, histograms, and correlation coefficients.

Usage

scatterMatrix(
  dat,
  items = NULL,
  itemLabels = NULL,
  plotSize = 180,
  sizeMultiplier = 1,
  pointSize = 1,
  axisLabels = "none",
  normalHist = TRUE,
  progress = NULL,
  theme = ggplot2::theme_minimal(),
  hideGrid = TRUE,
  conf.level = 0.95,
  ...
)

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

Arguments

dat A dataframe containing the items in the scale. All variables in this dataframe will be used if items is NULL.

items If not NULL, this should be a character vector with the names of the variables in the dataframe that represent items in the scale.

itemLabels Optionally, labels to use for the items (optionally, named, with the names corresponding to the items; otherwise, the order of the labels has to match the order of the items)

plotSize Size of the final plot in millimeters.

sizeMultiplier Allows more flexible control over the size of the plot elements

pointSize Size of the points in the scatterplots

axisLabels Passed to ggpairs function to set axisLabels.

normalHist Whether to use the default ggpairs histogram on the diagonal of the scattermatrix, or whether to use the normalHist() version.

progress Whether to show a progress bar; set to FALSE to disable. See GGally::ggpairs() help for more information.
```
theme The ggplot2 theme to use.
hideGrid Whether to hide the gridlines in the plot.
conf.level The confidence level of confidence intervals.
... Additional arguments for `scatterMatrix()` are passed on to `normalHist()`.
and additional arguments for the `print` method are passed on to the default
print method.
x The object to print.
```

Value

An object with the input and several output variables. Most notably:

```
output$scatterMatrix
A scattermatrix with histograms on the diagonal and correlation coefficients in
the upper right half.
```

Author(s)

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

```r
### Note: the 'not run' is simply because running takes a lot of time,
### but these examples are all safe to run!
## Not run:

### Generate a datafile to use
exampleData <- data.frame(item1=rnorm(100));
exampleData$item2 <- exampleData$item1+rnorm(100);
exampleData$item3 <- exampleData$item1+rnorm(100);
exampleData$item4 <- exampleData$item2+rnorm(100);
exampleData$item5 <- exampleData$item2+rnorm(100);

### Use all items
scatterMatrix(dat=exampleData);

## End(Not run)
```

Description

Set a knitr hook to automatically number captions for, e.g., figures and tables. `setCaptionNumberingKnitrHook()` is the general purpose function; you normally use `setFigCapNumbering()` or `setTabCapNumbering()`.
Usage

```
setCaptionNumberingKnitrHook(
  captionName = "fig.cap",
  prefix = "Figure \%s: ",
  suffix = "",
  optionName = paste0("setCaptionNumbering_", captionName),
  resetCounterTo = 1
)
```

```
setFigCapNumbering(
  captionName = "fig.cap",
  prefix = "Figure \%s: ",
  suffix = "",
  optionName = paste0("setCaptionNumbering_", captionName),
  resetCounterTo = 1
)
```

```
setTabCapNumbering(
  captionName = "tab.cap",
  prefix = "Table \%s: ",
  suffix = "",
  optionName = paste0("setCaptionNumbering_", captionName),
  resetCounterTo = 1
)
```

Arguments

captionName  The name of the caption; for example, fig.cap or tab.cap.

prefix, suffix  The prefix and suffix; any occurrences of \%s will be replaced by the number.

optionName  The name to use for the option that keeps track of the numbering.

resetCounterTo  Whether to reset the counter (as stored in the options), and if so, to what value (set to FALSE to prevent resetting).

Value

NULL, invisibly.

Examples

```R
### To start automatically numbering figure captions
setFigCapNumbering();
```

```R
### To start automatically numbering table captions
setTabCapNumbering();
```
sharedSubString  

**Description**

A function to find the longest shared substring in a character vector.

**Usage**

sharedSubString(x, y = NULL)

**Arguments**

- `x`: The character vector to process.
- `y`: Optionally, two single values can be specified. This is probably not useful to end users, but it’s used by the function when it calls itself.

**Value**

A vector of length one with either the longest substring that occurs in all values of the character vector, or NA if no overlap an be found.

**Author(s)**

Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

**Examples**

```r
sharedSubString(c("t0_responseTime", "t1_responseTime", "t2_responseTime"));
### Returns "_responseTime"
```

---

**Description**

`simDataSet` can be used to conveniently and quickly simulate a dataset that satisfies certain constraints, such as a specific correlation structure, means, ranges of the items, and measurement levels of the variables. Note that the results are approximate; mvrnorm is used to generate the correlation matrix, but the factor are only created after that, so cutting the variable into factors may change the correlations a bit.
usage

```
simDataSet(
  n,
  varNames,
  correlations = c(0.1, 0.4),
  specifiedCorrelations = NULL,
  means = 0,
  sds = 1,
  ranges = c(1, 7),
  factors = NULL,
  cuts = NULL,
  labels = NULL,
  seed = 20160503,
  empirical = TRUE,
  silent = FALSE
)
```

Arguments

- `n` Number of requires cases (records, entries, participants, rows) in the final dataset.
- `varNames` Names of the variables in a vector; note that the length of this vector will determine the number of variables simulated.
- `correlations` The correlations between the variables are randomly sampled from this range using the uniform distribution; this way, it’s easy to have a relatively ‘messy’ correlation matrix without the need to specify every correlation manually.
- `specifiedCorrelations` The correlations that have to have a specific value can be specified here, as a list of vectors, where each vector’s first two elements specify variables names, and the last one the correlation between those two variables. Note that tweaking the correlations may take some time; the `MASS::mvrnorm()` function will complain that "'Sigma' is not positive definite", or in other words, you supplied a combination of correlations that can’t exist simultaneously, if you get it wrong.
- `means, sds` The means and standard deviations of the variables. Note that is you set ranges for one or more variables (see below), those ranges are used to rescale those variables, overriding any specified means and standard deviations. If only one mean or standard deviation is supplied, it’s recycled along the variables.
- `ranges` The desired ranges of the variables, supplied as a named list where the name of each element corresponds to a variable. The `scales::rescale()` function will be used to rescale those variables for which a desired scale is specified here. Note that for those variables, the means and standard deviations will be determined by these new ranges.
- `factors` A vector of variable names that should be converted into factors (using `base::cut()`). Make sure to specify lists for `cuts` and `labels` as well (of the same length).
- `cuts` A list of vectors that specify, for each factor, where to ‘cut’ the numeric vector into factor levels.
labels  A list of vectors that specify, for each factor, and for each level, the labels that should be assigned to the factor levels. Each vector in this list has to have one more element than each vector in the cuts list.

seed  The seed to use when generating the dataset (to make sure the exact same dataset can be generated repeatedly).

empirical  Whether to generate the data using the exact empirical = TRUE or approximate (empirical = FALSE) correlation matrix; this is passed on to MASS::mvrnorm().

silent  Whether to show intermediate and final descriptive information (correlation and covariance matrices as well as summaries).

Details

This function was intended to allow relatively quick generation of datasets that satisfy specific constraints, e.g. including a number of factors, variables with a specified minimum and maximum value or specified means and standard deviations, and of course specific correlations. Because all correlations except those specified are randomly generated from a uniform distribution, it's quite convenient to generate messy kind of real looking datasets quickly. Note that it's mostly a convenience function, and datasets will still require tweaking; for example, factors are simply numeric vectors that are cut() after MASS::mvrnorm() generated the data, so the associations will change slightly.

Value

The generated dataframe is returned invisibly.

Examples

```r
dat <- simDataSet(
  500,
  varNames=c('age',
              'sex',
              'educationLevel',
              'negativeLifeEventsInPast10Years',
              'problemCoping',
              'emotionCoping',
              'resilience',
              'depression'),
  means = c(40,
            0,
            0,
            5,
            3.5,
            3.5,
            3.5,
            3.5),
  sds = c(10,
         1,
         1,
         1.5,
         1.5,
         1.5,
         1.5,
         1.5))
```
spearmanBrown

1.5,
1.5,
1.5),
specifiedCorrelations =
list(c('problemCoping', 'emotionCoping', -.5),
c('problemCoping', 'resilience', .5),
c('problemCoping', 'depression', -.4),
c('depression', 'emotionCoping', .6),
c('depression', 'resilience', -.3)),
ranges = list(age = c(18, 54),
negativeLifeEventsInPast10Years = c(0, 8),
problemCoping = c(1, 7),
emotionCoping = c(1, 7)),
factors=c("sex", "educationLevel"),
cuts=list(c(0),
  c(-.5, .5)),
labels=list(c('female', 'male'),
           c('lower', 'middle', 'higher')),
silent=FALSE);

spearmanBrown  Spearman-Brown formula

Description
Spearman-Brown formula

Usage
spearmanBrown(nrOfItems, itemReliability)
spearmanBrown_reversed(nrOfItems, scaleReliability)
spearmanBrown_requiredLength(scaleReliability, itemReliability)

Arguments
nrOfItems Number of items (or 'subtests') in the scale (or 'test').
itemReliability The reliability of one item (or 'subtest').
scaleReliability The reliability of the scale (or, desired reliability of the scale).

Value
For spearmanBrown, the predicted scale reliability; for spearmanBrown_requiredLength, the
number of items required to achieve the desired scale reliability; and for spearmanBrown_reversed,
the reliability of one item.
Examples

spearmanBrown(10, .4);
spearmanBrown_reversed(10, .87);
spearmanBrown_requiredLength(.87, .4);

strToFilename

Convert a string to a safe filename

Description

Convert a string to a safe filename

Usage

strToFilename(str, ext = NULL)

Arguments

str The string to convert.

ext Optionally, an extension to append.

Value

The string, processed to remove potentially problematic characters.

Examples

strToFilename("this contains: illegal characters, spaces, et cetera.");

spearmanBrown

Selects suspect participants from a carelessObject

Description

This function is a wrapper for the carelessObject() function, which wraps a number of functions from the careless package. Normally, you’d probably call carelessReport which calls this function to generate a report of suspect participants.

Usage

suspectParticipants(
  carelessObject,
  nFlags = 1,
  digits = 2,
  missingSymbol = "Missing"
)
Arguments

- `carelessObject` The result of the call to `carelessObject()`.
- `nFlags` The number of flags required to be considered suspect.
- `digits` The number of digits to round to.
- `missingSymbol` How to represent missing values.

Value

A logical vector.

Examples

```r
suspectParticipants(carelessObject(mtcars),
                   nFlags = 2);
```

---

testRetestSimData is a simulated dataframe used to demonstrate the testRetestAlpha coefficient function.

Description

This dataset contains the true scores of 250 participants on some variable, and 10 items of a scale administered twice (at t0 and at t1).

Format

A data frame with 250 observations on the following 21 variables.

- `trueScore` The true scores
- `t0_item1` Score on item 1 at test
- `t0_item2` Score on item 2 at test
- `t0_item3` Score on item 3 at test
- `t0_item4` Score on item 4 at test
- `t0_item5` Score on item 5 at test
- `t0_item6` Score on item 6 at test
- `t0_item7` Score on item 7 at test
- `t0_item8` Score on item 8 at test
- `t0_item9` Score on item 9 at test
- `t0_item10` Score on item 10 at test
- `t1_item1` Score on item 1 at retest
- `t1_item2` Score on item 2 at retest
- `t1_item3` Score on item 3 at retest
Details
This dataset was generated with the code in the reliabilityTest.r test script.

Author(s)
Gjalt-Jorn Peters
Maintainer: Gjalt-Jorn Peters gjalt-jorn@userfriendlyscience.com

Examples

data(testRetestSimData);
head(testRetestSimData);
hist(testRetestSimData$t0_item1);
cor(testRetestSimData);

vecTxt

Easily parse a vector into a character value

Description
vecTxtQ, vecTxtB, and vecTxtM and are convenience functions with default quotes that can be useful when working in R Markdown documents.

Usage

vecTxt(
  vector,
  delimiter = ", "
)
Arguments

- **vector**: The vector to process.
- **delimiter, firstDelimiter, lastDelimiter**: The delimiters to use for respectively the middle, first `firstElements`, and last `lastElements` elements.
- **useQuote**: This character string is pre- and appended to all elements; so use this to quote all elements (`useQuote=""`), doublequote all elements (`useQuote="\""`), or anything else (e.g. `useQuote='|'`). The only difference between `vecTxt` and `vecTxtQ` is that the latter by default quotes the elements.
- **firstElements, lastElements**: The number of elements for which to use the first respective last delimiters.
- **lastHasPrecedence**: If the vector is very short, it’s possible that the sum of `firstElements` and `lastElements` is larger than the vector length. In that case, downwardly adjust the number of elements to separate with the first delimiter (`TRUE`) or the number of elements to separate with the last delimiter (`FALSE`)?
- **...**: Any addition arguments to `vecTxtQ` are passed on to `vecTxt`.

Value

A character vector of length 1.

Examples

```r
vecTxtQ(names(mtcars));
```

ViridisPalette

*Convenience function to get 2-7 color viridis palettes*

Description

This function only exists to avoid importing the viridis package.

Usage

```r
viridisPalette(x)
```
**Arguments**

\[ x \]
The number of colors you want (seven at most).

**Value**

A vector of colours.

---

**wrapVector**

*Wrap all elements in a vector*

---

**Description**

Wrap all elements in a vector

**Usage**

\[
\text{wrapVector}(x, \text{width} = 0.9 \times \text{getOption("width")}, \text{sep} = \"\n\", \ldots)
\]

**Arguments**

\[ x \]
The character vector
\[ \text{width} \]
The number of
\[ \text{sep} \]
The glue with which to combine the new lines
\[ \ldots \]
Other arguments are passed to \text{strwrap()}.  

**Value**

A character vector

**Examples**

\[
\text{res} \leftarrow \text{wrapVector(}
\text{c(}
\quad \text{"This is a sentence ready for wrapping",}
\quad \text{"So is this one, although it's a bit longer"}
\text{),}
\quad \text{width} = 10
\text{)};
\]

\text{print(res)};
\text{cat(res, sep="\n");}
Construct the URL for a Zotero export call

Description

This function is just a convenience function to create a simple URL to download references from a public Zotero group. See https://www.zotero.org/support/dev/web_api/v3/start for details.

Usage

```r
zotero_construct_export_call(
  group,
  sort = "dateAdded",
  direction = "asc",
  format = "bibtex",
  start = 0,
  limit = 100
)
```

Arguments

- **group**: The group ID
- **sort**: On which field to sort
- **direction**: The direction to sort in
- **format**: The format to export
- **start**: The index of the first record to return
- **limit**: The number of records to return

Value

The URL in a character vector.

Examples

```r
zotero_construct_export_call(2425237);
```
zotero_download_and_export_items

*Download and save all items in a public Zotero group*

**Description**

Download and save all items in a public Zotero group

**Usage**

```r
zotero_download_and_export_items(
  group,
  file,
  format = "bibtex",
  showKeys = TRUE
)
```

**Arguments**

- **group**: The group ID
- **file**: The filename to write to
- **format**: The format to export
- **showKeys**: Whether to show the keys

**Value**

The bibliography as a character vector

**Examples**

```r
## Not run:
tmpFile <- tempfile(fileext=".bib");
zotero_download_and_export_items(
  2425237,
  tmpFile
);
writtenBibliography <- readLines(tmpFile);
writtenBibliography[1:7];
## End(Not run)
```
**zotero_get_all_items**  
*Get all items in a public Zotero group*

**Description**
Get all items in a public Zotero group

**Usage**

```r
zotero_get_all_items(group, format = "bibtex")
```

**Arguments**

- `group`:
The group ID
- `format`:
The format to export

**Value**
A character vector

**Examples**

```r
zotero_get_all_items(2425237);
```

---

**zotero_nr_of_items**  
*Get number of items in a public Zotero group*

**Description**
Get number of items in a public Zotero group

**Usage**

```r
zotero_nr_of_items(group)
```

**Arguments**

- `group`:
The group ID

**Value**
The number of items as a numeric vector.

**Examples**

```r
zotero_nr_of_items(2425237);
```
%IN%  

Case insensitive version of %in%

Description
This is simply 'in', but applies `base::toupper()` to both arguments, first.

Usage
```r
find %IN% table
```

Arguments
- `find`  
  The element(s) to look up in the vector or matrix.
- `table`  
  The vector or matrix in which to look up the element(s).

Value
A logical vector.

Examples
```r
letters[1:4] %IN% LETTERS
```
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