Package 'likert'

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Type Package

Title Analysis and Visualization Likert Items

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URL http://jason.bryer.org/likert, http://github.com/jbryer/likert

BugReports https://github.com/jbryer/likert/issues

Description An approach to analyzing Likert response items, with an emphasis on visualizations. The stacked bar plot is the preferred method for presenting Likert results. Tabular results are also implemented along with density plots to assist researchers in determining whether Likert responses can be used quantitatively instead of qualitatively. See the likert(), summary.likert(), and plot.likert() functions to get started.

License GPL

LazyLoad yes

VignetteBuilder utils

Depends R (>= 3.0),ggplot2,xtable

Imports psych,reshape2,gridExtra,grid,plyr

Suggests devtools,shiny

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R topics documented:

`likert-package` *Likert Analysis and Visualization*

Description

Likert Analysis and Visualization

Author(s)

<jason@bryer.org>

abs_formatter *Absolute value formatter for continuous_scale*

Description

This will print the absolute value for labeling on axis. Usefull for stacked bar plots where negative values are not negative percentages but represent negative groups.

Usage

```
abs_formatter(x)
```

Arguments

x	value to be reformatted.

Value

the absolute value of x.

align.plots *Adapted from ggExtra package which is no longer available. This is related to an experimental mlpsa plot that will combine the circular plot along with the two individual distributions.*

Description

Adapted from ggExtra package which is no longer available. This is related to an experimental mlpsa plot that will combine the circular plot along with the two individual distributions.

Usage

```
## S3 method for class 'plots'
align(gl, ...)
```

Arguments

gl	grid.layout
...	graphic elements to combine.

References

http://groups.google.com/group/ggplot2/browse_thread/thread/1b859d6b4b441c90 http://ggextra.googlecode.com/svn/trunk

gap — *Fictitious dataset with importance and satisfaction results across five different offices.*

Description

This data set is used in the `GapAnalysis` demo and is used to demonstrate how the `likert` package handles a gap analysis.

Format

a data frame with 68 ovservations of 11 variables.

label_wrap_mod — *Wrap label text.*

Description

Wrap label text.

Usage

```
label_wrap_mod(value, width = 25)
```

Arguments

`value`	vector (converted using `as.character`) to be wrapped.
`width`	the maximum width of each line in characters.
	Adapted from https://github.com/hadley/ggplot2/wiki/labeller

likert — *Analyze Likert type items.*

Description

This function will provide various statistics about a set of likert items. The resulting object will have the following items:

Usage

```
likert(items, summary, grouping = NULL, factors = NULL, importance,
  nlevels = length(levels(items[, 1])))
```

Arguments

items	data frame containing the likert based items. The variables in the data frame should be factors.
summary	a pre-summarized data frame. The first column must be the items and the remaining columns are the levels (e.g. strongly disagree, disagree, etc).
grouping	(optional) should the results be summarized by the given grouping variable.
factors	a vector with `length(factors) == ncol(items)` defining which factor each column belongs to. The values correspond to the factor label.
importance	a data frame of the same dimensions as items containing an importance rating for each item. The order of columns should match and the names from items will be used.
nlevels	number of possible levels. Only necessary if there are missing levels.

Details

- `results` - this data frame will contain a column 'Item', 'Group' (if a grouping variable was specified, and a column for each level of the items (e.g. agree, disagree, etc.). The value within each cell corresponds to the percentage of responses for that level and group.
- `items` - a copy of the original items data frame.
- `grouping` - a copy of the original grouping vector.
- `nlevels` - the number of levels used in the calculations.

Value

a likert class with the following elements: results, items, grouping, nlevels, and summary.

See Also

plot.likert

summary.likert

Examples

```
data(pisaitems)
items29 <- pisaitems[,substr(names(pisaitems), 1,5) == 'ST25Q']
names(items29) <- c("Magazines", "Comic books", "Fiction",
                    "Non-fiction books", "Newspapers")
l29 <- likert(items29)
summary(l29)
plot(l29)
```

likert.bar.plot *Bar Plot for Likert Items.*

Description

Bar plot for the results of likert.

Usage

```
likert.bar.plot(l, group.order, center = (l$nlevels - 1)/2 + 1, ...)
```

Arguments

l	results of likert.
group.order	the order in which groups (for grouped items) or items (for non-grouped items) should be plotted.
center	specifies which level should be treated as the center. For example, center = 3 would use the third level as the center whereas center = 3.5 would indicate no specific level is the center but <= 3 are low levels and >= 4 are high levels (i.e. used for forced choice items or those without a neutral option). This also influences where the color breaks from low to high.
...	passed to likert.options
likert	object of type likert.

See Also

plot.likert

likert.heat.plot

likert.bar.plot

likert.density.plot

likert.density.plot *Creates a density plot for likert items.*

Description

This funciton will create a visualization that treats the likert items as a continuous variable.

Usage

```
likert.density.plot(likert, facet = TRUE, bw = 0.5, legend, ...)
```

Arguments

likert	object of type likert.
facet	for non-grouped items, should each density distribution be plotted in a separate facet.
bw	the smoothing bandwidth. This is often set to the standard deviation but this is often inadequate for Likert type items. The value of 0.5 is used since the difference between any two adjacent levels is one.
legend	title for the legend.
...	parameters passed to density.

See Also

plot.likert

---

likert.heat.plot *Internal method.*

Description

Internal method.

Usage

```
likert.heat.plot(likert, low.color = "white", high.color = "blue",
  text.color = "black", text.size = 4, wrap = 50, ...)
```

Arguments

likert	object of type likert.
low.color	color for low values.
high.color	color for high values.
text.color	color of text attributes.
text.size	size of text attributes.
wrap	width to wrap label text for non-grouped likert objects.
...	currently unused.

See Also

plot.likert

likert.bar.plot

`likert.histogram.plot` *Histogram of number of responses.*

Description

Plots a histogram of the number of responses for each item and group (if specified). Negative values (in maroon by default) indicate the number of missing values for that item and group.

Usage

```
likert.histogram.plot(l, xlab = "n", plot.missing = TRUE,
  bar.color = "grey70", missing.bar.color = "maroon",
  label.completed = "Completed", label.missing = "Missing",
  legend.position = "bottom", wrap = ifelse(is.null(l$grouping), 50, 100),
  order, group.order, panel.arrange = "v", panel.strip.color = "#F0F0F0",
  text.size = 2.5, ...)
```

Arguments

`l`	results of `likert`.
`xlab`	label used for the x-axis.
`plot.missing`	if TRUE, missing values will be plotted to the left of the x-axis.
`bar.color`	the bar color.
`missing.bar.color`	the color of the bar for missing values.
`label.completed`	the label to use in the legend representing the count of complete values.
`label.missing`	the label to use in the legend representing the count of missing values.
`legend.position`	location of the legend.
`wrap`	number of characters before warping the text in the panel strips.
`order`	the order of the items.
`group.order`	the order in which groups (for grouped items) or items (for non-grouped items) should be plotted.
`panel.arrange`	v for vertical or h for horizontal.
`panel.strip.color`	the color for panels.
`text.size`	text size.
`...`	other ggplot2 parameters.

likert.matrix.plot *Matrix plot (experimental)*

Description

Matrix plot (experimental)

Usage

```
likert.matrix.plot(likert, nSample = nrow(likert$items), ...)
```

Arguments

likert	results of likert.
nSample	random sample of all rows. This function may take a while to run with large datasets (including the pisaitems data). Plotting a random subsample allows for quicker development.
...	parameters passed to pairs.ordered.categorical.

likert.options *Builds an object with options for plotting likert results.*

Description

Builds an object with options for plotting likert results.

Usage

```
likert.options(low.color = "#D8B365", high.color = "#5AB4AC",
  neutral.color = "grey90", neutral.color.ramp = "white", colors = NULL,
  plot.percent.low = TRUE, plot.percent.high = TRUE,
  plot.percent.neutral = TRUE, plot.percents = FALSE, text.size = 3,
  text.color = "black", centered = TRUE, include.center = TRUE,
  ordered = TRUE, wrap = 50, wrap.grouping = 50, legend = "Response",
  legend.position = "bottom", panel.arrange = "v",
  panel.strip.color = "#F0F0F0", ...)
```

Arguments

low.color	color for low values.
high.color	color for high values.
neutral.color	color for middle values (if odd number of levels).
neutral.color.ramp	second color used when calling colorRamp with low.color and high.color to define the color palettes.

colors	vector specifying the colors to use. This must be equal to the number of likert levels.
plot.percent.low	whether to plot low percentages.
plot.percent.high	whether to plot high percentages.
plot.percent.neutral	whether to plot netural percentages.
plot.percents	whether to label each category/bar.
text.size	size of text attributes.
text.color	color of text attributes.
centered	if true, the bar plot will be centered around zero such that the lower half of levels will be negative.
include.center	if TRUE, include the center level in the plot otherwise the center will be excluded.
ordered	reorder items from high to low.
wrap	width to wrap label text for item labels
wrap.grouping	width to wrap label text for group labels.
legend	title for the legend.
legend.position	the position for the legend ("left", "right", "bottom", "top", or two-element numeric vector).
panel.arrange	how panels for grouped likert items should be arrange. Possible values are v (vertical, the default), h (horizontal), and NULL (auto fill horizontal and vertical)
panel.strip.color	the background color for panel labels.
...	included for future expansion.

---

mass *Results from an administration of the Math Anxiety Scale Survey.*

Description

A data frame of results of the Math Anxiety Scale Survey administered to 20 students in a statistics course. This data frame contains the original data and can be used to verify the pre-summarized procedures.

Format

data frame with 14 rows and 6 columns.

References

Bai, H., Wang, L., Pan, W., & Frey, M. (2009). Measuring mathematics anxiety: Psychometric analysis of a bidimensional affective scale. Journal of Instructional Psychology, 36 (3), 185- 193.

MathAnxiety — *Pre-summarized results from an administration of the Math Anxiety Scale Survey.*

Description

A data frame of presummarized results of the Math Anxiety Scale Survey administered to 20 students in a statistics course.

Format

data frame with 14 rows and 6 columns.

References

Bai, H., Wang, L., Pan, W., & Frey, M. (2009). Measuring mathematics anxiety: Psychometric analysis of a bidimensional affective scale. Journal of Instructional Psychology, 36 (3), 185- 193.

MathAnxietyGender — *Pre-summarized results from an administration of the Math Anxiety Scale Survey grouped by gender.*

Description

A data frame of presummarized results of the Math Anxiety Scale Survey administered to 20 students in a statistics course grouped by gender.

Format

data frame with 28 rows and 7 columns.

References

Bai, H., Wang, L., Pan, W., & Frey, M. (2009). Measuring mathematics anxiety: Psychometric analysis of a bidimensional affective scale. Journal of Instructional Psychology, 36 (3), 185- 193.

pisaitems *Programme of International Student Assessment*

Description

North American (i.e. Canada, Mexico, and United States) results from the 2009 Programme of International Student Assessment (PISA) as provided by the Organization for Economic Co-operation and Development (OECD). See http://www.pisa.oecd.org/ for more information including the code book.

Format

a data frame 66,690 ovservations of 81 variables from North America.

Source

Organization for Economic Co-operation and Development

plot.likert *Plots a set of likert items.*

Description

This is an implementation of the S3 plot generic function. Based upon the type parameter this function will call either likert.bar.plot, likert.heat.plot, or likert.density.plot. See the help pages for those functions for all the available parameters to customize the aesthetics of the figure. Although those functions can be plotted directly, we recommend call the generic plot function.

Usage

```
## S3 method for class 'likert'
plot(x, type = c("bar", "heat", "density"),
  include.histogram = FALSE, panel.widths = c(3, 1), panel.arrange = "v",
  panel.strip.color = "#F0F0F0", legend.position = "bottom", group.order,
  panel.background = element_rect(size = 1, color = "grey70", fill = NA), ...)
```

Arguments

x	the likert items to plot
type	the type of plot to create. Current values are bar and heat.
include.histogram	if TRUE, a histogram of count of responses is also plotted.
panel.widths	if include.histogram=TRUE, this vector of length two specifies the ratio of the left and right panels.

`panel.arrange` how panels for grouped likert items should be arrange. Possible values are `v` (vertical, the default), `h` (horizontal), and `NULL` (auto fill horizontal and vertical)

`panel.strip.color`
the background color for panel labels.

`legend.position`
the position for the legend ("left", "right", "bottom", "top", or two-element numeric vector).

`group.order` the order in which groups (for grouped items) or items (for non-grouped items) should be plotted.

`panel.background`
define background of the plot. See `theme`.

`...` other parameters passed passed to `likert.bar.plot` or `likert.heat.plot`.

See Also

likert.bar.plot

likert.heat.plot

likert.density.plot

likert.histogram.plot

`plot.likert.gap` *Plots a set of likert items.*

Description

This is an implementation of the S3 plot generic function. Based upon the `type` parameter this function will call either `likert.bar.plot`, `likert.heat.plot`, or `likert.density.plot`. See the help pages for those functions for all the available parameters to customize the aesthetics of the figure. Although those functions can be plotted directly, we recommend call the generic `plot` function.

Usage

```
## S3 method for class 'likert.gap'
plot(x, type = c("bar", "density"),
  include.histogram = FALSE, panel.widths = c(3, 1), panel.arrange = "v",
  panel.strip.color = "#F0F0F0", legend.position = "bottom",
  panel.background = element_rect(size = 1, color = "grey70", fill = NA),
  satisfaction.label = "Satisfaction", importance.label = "Importance",
  legend, ...)
```

Arguments

x	the likert items to plot
type	the type of plot to create. Current values are bar and heat.
include.histogram	if TRUE, a histogram of count of responses is also plotted.
panel.widths	if include.histogram=TRUE, this vector of length two specifies the ratio of the left and right panels.
panel.arrange	how panels for grouped likert items should be arrange. Possible values are v (vertical, the default), h (horizontal), and NULL (auto fill horizontal and vertical)
panel.strip.color	the background color for panel labels.
legend.position	the position for the legend ("left", "right", "bottom", "top", or two-element numeric vector).
panel.background	define background of the plot. See theme.
satisfaction.label	label used for satisfaction items.
importance.label	label used for importance items.
legend	title for the legend.
...	other parameters passed passed to likert.bar.plot or likert.heat.plot.

See Also

likert.bar.plot

likert.heat.plot

likert.density.plot

likert.histogram.plot

---

print.likert *Prints results table.*

Description

Prints results table.

Usage

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

Arguments

x	the likert class to print.
...	parameters passed to print.data.frame.

`print.likert.bar.plot` *Print method for* `likert.bar.plot`*. The primary purpose is to suppress the "Stacking not well defined when ymin != 0" warning printed by* `ggplot2` *for bar plots that have negative bars (i.e. the centered plots).*

Description

Print method for `likert.bar.plot`. The primary purpose is to suppress the "Stacking not well defined when ymin != 0" warning printed by `ggplot2` for bar plots that have negative bars (i.e. the centered plots).

Usage

```
## S3 method for class 'likert.bar.plot'
print(x, ...)
```

Arguments

`x`	a plot from `likert.bar.plot`.
`...`	other parameters passed to ggplot2.

`print.likert.gap` *Prints results table.*

Description

Prints results table.

Usage

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

Arguments

`x`	the likert class to print.
`...`	parameters passed to `print.data.frame`.

print.likert.heat.plot *Print method for* likert.heat.plot.

Description

Print method for likert.heat.plot.

Usage

```
## S3 method for class 'likert.heat.plot'
print(p, ...)
```

Arguments

p	a plot from likert.heat.plot.
...	other parameters passed to ggplot2.

print.xlikert *Prints the results of* xtable.likert.

Description

Print method for xtable.likert.

Usage

```
## S3 method for class 'xlikert'
print(x, tabular.environment = "longtable",
  floating = FALSE, ...)
```

Arguments

x	results of xtable.likert.
tabular.environment	see print.xtable.
floating	see print.xtable.
...	other parameters passed to print.xtable

recode *Recode a vector.*

Description

This utility function will recode values from an original `character` or `factor` vector with new values.

Usage

```
recode(x, from, to, to.class = NULL)
```

Arguments

`x`	the vector whose values will be recoded.
`from`	the old values in x to be recoded.
`to`	the new values.
`to.class`	an 'as.' function representing the desired vector type (i.e. as.character, as.numeric, as.logical, as.numeric).

Value

a vector with same length of x with recoded values.

Examples

```
test <- letters[sample(5, 10, replace=TRUE)]
recode(test, from=letters[1:5], to=paste('Letter', letters[1:5]))
```

reverse.levels *Reverse the levels of a factor.*

Description

Reverse the levels of a factor.

Usage

```
reverse.levels(x)
```

Arguments

`x`	a factor or a data.frame of factors whose levels will be reverse coded.

Examples

```
mylevels <- c('Strongly Disagree', 'Disagree', 'Neither', 'Agree', 'Strongly Agree')
test <- factor(sample(mylevels[1:5], 10, replace=TRUE))
cbind(test, as.integer(test), as.integer(reverse.levels(test)))
```

---

sasr *Results from the Survey of Academic Self-Regulation (SASR).*

Description

The Survey of Academic Self-Regulation (SASR) is comprised of six factors: self-regulation, intrinsic motivation, extrinsic motivation, self-efficacy, metacognition, and personal relevance and control.

Format

a data frame with 860 ovservations of 63 variables.

References

Dugan, R., & Andrade, H. (2011). Exploring the construct validity of academic self-regulation using a new self-report questionnaire. The International Journal of Educational and Psychological Assessment, 7(1).

---

shinyLikert *Shiny App for the likert package.*

Description

This will start a shiny app included with the package to show many of the features available in the likert package.

Usage

```
shinyLikert()
```

References

http://rstudio.com/shiny

summary.likert *Prints summary table of a Likert analysis.*

Description

The summary function returns a data frame that provides additional information. It contains 'Item' and 'Group' columns similiar to the results data frame as well as a column 'low' corresponding to the sum of levels below neutral, a column 'high' corresponding to the sum of levels above neutral, and columns 'mean' and 'sd' corresponding to the mean and standard deviation, respectively, of the results. The numeric values are determined by as.numeric which will use the values of the factors.

Usage

```
## S3 method for class 'likert'
summary(object, center = (object$nlevels - 1)/2 + 1,
  ordered = TRUE, ...)
```

Arguments

object	the likert class to summarize.
center	specifies which level should be treated as the center. For example, center = 3 would use the third level as the center whereas center = 3.5 would indicate no specific level is the center but <= 3 are low levels and >= 4 are high levels (i.e. used for forced choice items or those without a neutral option).
ordered	whether the results should be ordered. Currently unsupported for grouped analysis.
...	currently unused.

summary.likert.gap *Prints summary table of a Likert analysis.*

Description

The summary function returns a data frame that provides additional information. It contains 'Item' and 'Group' columns similiar to the results data frame as well as a column 'low' corresponding to the sum of levels below neutral, a column 'high' corresponding to the sum of levels above neutral, and columns 'mean' and 'sd' corresponding to the mean and standard deviation, respectively, of the results. The numeric values are determined by as.numeric which will use the values of the factors.

Usage

```
## S3 method for class 'likert.gap'
summary(object, ...)
```

Arguments

object	the likert class to summarize.
...	parameters passed to summary.likert

Value

a list with two data frames with summarized data for satisfaction and importance results separately.

---

xtable.likert *Prints a LaTeX table of the likert items.*

Description

Crate a LaTeX or HTML table of the likert results.

Usage

```
## S3 method for class 'likert'
xtable(x, caption = NULL, label = NULL, align = NULL,
  digits = NULL, display = NULL, auto = FALSE, include.n = TRUE,
  include.mean = TRUE, include.sd = TRUE, include.low = TRUE,
  include.neutral = (x$nlevels%%2 != 0), include.high = TRUE,
  include.levels = TRUE, include.missing = TRUE, center = (x$nlevels -
  1)/2 + 1, ordered = TRUE, ...)
```

Arguments

x	likert class object.
caption	the table caption.
label	the table label.
align	column alignments.
digits	number of digits to use for numeric columns.
display	column formats.
auto	Logical, indicating whether to apply automatic format when no value is passed to align, digits, or display (see xtable for more information.
include.n	option to include n
include.mean	option to include mean
include.sd	option to include sd
include.low	option to include low
include.neutral	option to include neutral
include.high	option to include high
include.levels	option to include levels

`include.missing`
: option to include missing levels.

`center`
: specifies which level should be treated as the center. For example, `center = 3` would use the third level as the center whereas `center = 3.5` would indicate no specific level is the center but <= 3 are low levels and >= 4 are high levels (i.e. used for forced choice items or those without a neutral option). This also influences which levels are summarized in the low and high groups.

`ordered`
: whether the results should be ordered. See `summary.likert`

`...`
: other parameters passed to xtable.

See Also

xtable, print.xtable

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