

Package: ggtukey (via r-universe)

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Title Compact Letter Displays for Multiple Comparisons in 'ggplot2'

Version 0.4.0

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Description Provides a simple interface to visualize paired comparisons in 'ggplot2' by adding compact letter displays (i.e. Tukey letters).

License GPL (>= 3)

Encoding UTF-8

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Requires R >= 4.1.0

Imports dplyr, egg, ggplot2, magrittr, multcompView, pgirmess, purrr, rlang, stats, tibble, tidyr

Suggests Hmisc, knitr, rmarkdown, palmerpenguins, testthat (>= 3.0.0), vdiff

VignetteBuilder knitr

URL <https://ethanbass.github.io/ggtukey>,
<https://github.com/ethanbass/ggtukey>

BugReports <https://github.com/ethanbass/ggtukey/issues>

Config/testthat/edition 3

Repository <https://ethanbass.r-universe.dev>

RemoteUrl <https://github.com/ethanbass/ggtukey>

RemoteRef HEAD

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boxplot_letters	<i>Create ggplot boxplot with compact letter display</i>
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Description

Performs pairwise comparisons using [TukeyHSD](#) and produces boxplots with compact letter display showing significance pairwise differences. Letters are produced by [multcompLetters](#). Plots are produced by [ggplot2](#). Raw data can also be overlaid in various ways according to the value of `raw`.

Usage

```
boxplot_letters(
  data,
  x,
  y,
  fill,
  group,
  test = c("tukey", "kruskalmc"),
  type = c("two-way", "one-way"),
  where = c("box", "whisker", "mean", "median", "se", "sd", "cl_normal", "cl_boot"),
  raw = c("none", "points", "dots", "jitter"),
  pt_col = "slategray",
  ...,
  hjust = 0,
  vjust = -0.2,
  lab_size = 4,
  na.rm = TRUE,
  threshold = 0.05
)
```

Arguments

<code>data</code>	A data.frame in "long" format.
<code>x</code>	variable to plot on x axis.
<code>y</code>	variable to plot on y axis.
<code>fill</code>	column or color to fill boxplots
<code>group</code>	A grouping variable (to allow faceting).
<code>test</code>	Which test to run for pairwise comparisons. Either <code>tukey</code> (the default) or <code>kruskalmc</code> .
<code>type</code>	If a grouping variable is provided, determines whether to run separate tests for each facet (one-way) or a single (two-way) test (with an interaction term between <code>x</code> and <code>group</code>). Defaults to two-way. This argument only applies if the Tukey test is selected, since there is no two-way Kruskal-Wallis test.

where	Where to put the letters. Either above the box (box) or upper whisker (whisker) of a boxplot; at the mean or median; or at the top of the error bars calculated from the standard error (se), standard deviation sd, or 95% confidence intervals returned by <code>smean.ci.normal</code> , or <code>smean.ci.boot</code> .
raw	Whether to plot raw data and (if so), how. The current options are none, <code>geom_point</code> , <code>geom_dotplot</code> , or <code>geom_jitter</code> .
pt_col	Color of points, if raw data is plotted.
...	Additional arguments to <code>geom_point</code> , <code>geom_dotplot</code> , or <code>geom_jitter</code> , according to the value of raw.
hjust	Horizontal adjustment of label. Argument to <code>geom_text</code> .
vjust	Vertical adjustment of label. Argument to <code>geom_text</code> .
lab_size	Label size. Argument to <code>geom_text</code> .
na.rm	Logical. Whether to remove observations with NAs for the provided factors (i.e. x and group) before plotting.
threshold	Statistical threshold for significance. Defaults to 0.05.

Details

Allows group variable for faceting

Value

Returns the specified plot as a ggplot object.

Note

Adapted from a helpful [blog post](#) by [Justin Mathias](#).

Author(s)

Ethan Bass

Examples

```
set.seed(1)
data <- data.frame("Category" = c(rep("Low", 10), rep("Medium", 10), rep("High", 10)),
                  "Value" = c(rnorm(10, 5), rnorm(10, 5.5), rnorm(10, 10)),
                  "Size" = c("Big", "Small"))
boxplot_letters(data, Category, Value)
boxplot_letters(data, x=Category, y=Value, group=Size)
```

geom_tukey	<i>Create Compact Letter Display Layer Groups with at least one letter in common are not significantly different.</i>
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Description

Create Compact Letter Display Layer Groups with at least one letter in common are not significantly different.

Usage

```
geom_tukey(
  test = c("tukey", "kruskalmc"),
  type = c("two-way", "one-way"),
  threshold = 0.05,
  where = c("box", "whisker", "mean", "median", "se", "sd", "cl_normal", "cl_boot"),
  hjust = 0,
  vjust = -0.2,
  geom = "text",
  size = 4,
  color = "black",
  fill = "white",
  alpha = 1,
  na.rm = TRUE
)
```

Arguments

test	Which test to run for pairwise comparisons. Either tukey (the default) or kruskalmc.
type	If a grouping variable is provided, determines whether to run separate tests for each facet (one-way) or one (two-way) test with an interaction term between x and group. Defaults to two-way.
threshold	Statistical threshold for significance. Defaults to 0.05.
where	Where to put the letters. Either above the box (box) or upper whisker (whisker) of a boxplot; at the mean or median; or at the top of the error bars calculated from the standard error (se), standard deviation sd, or 95% confidence intervals returned by smean.cl.normal , or smean.cl.boot .
hjust	Horizontal adjustment of the label. (Argument to geom_text).
vjust	Vertical adjustment of the label. (Argument to geom_text).
geom	Which geom to use to plot letters. Options are text and label.
size	Label size. Argument to geom_text .
color	Label color.
fill	Label fill (only applies if geom == "label").
alpha	Label transparency. Defaults to 1.
na.rm	Logical. Whether to remove observations with NAs for the provided factors (i.e. x and group) before plotting. Defaults to TRUE.

Note

Thank you to [Hiroaki Yutani](#) and [Simon P. Couch](#) for a couple of very helpful blog posts ([1](#), [2](#)) describing the `ggplot_add` syntax.

Author(s)

Ethan Bass

References

- Piepho, Hans-Peter. An Algorithm for a Letter-Based Representation of All-Pairwise Comparisons. *Journal of Computational and Graphical Statistics* 13, no. 2 (June 1, 2004): 456–66. doi:10.1198/1061860043515.
- Piepho, Hans-Peter. “Letters in Mean Comparisons: What They Do and Don’t Mean.” *Agronomy Journal* 110, no. 2 (2018): 431–34. doi:10.2134/agronj2017.10.0580
- Graves S, Piepho H, Dorai-Raj LSwhfS (2019). `multcompView`: Visualizations of Paired Comparisons. R package version 0.1-8. <https://CRAN.R-project.org/package=multcompView>

Examples

```
library(ggplot2)
set.seed(1)
data <- data.frame("Category" = c(rep("Low", 10), rep("Medium", 10), rep("High", 10)),
                  "Value" = c(rnorm(10, 5), rnorm(10, 5.5), rnorm(10, 10)),
                  "Size" = c("Big", "Small"))
data |> ggplot(aes(x=Category, y=Value)) + geom_boxplot() + facet_wrap(~Size) + geom_tukey()
data |> ggplot(aes(x=Size, y=Value)) + geom_boxplot() + facet_wrap(~Category) + geom_tukey()
```

is.color

Check whether color specifications exists.

Description

Function to check whether all specified colors are actual colors.

Usage

```
is.color(x, return.colors = FALSE)
```

Arguments

`x` Vector of any of the three kinds of R color specifications, i.e., either a color name (as listed by `palettecolors()`), a hexadecimal string of the form `'#rrggbb'` or `'#rrggbbaa'` (see `rgb`), or a positive integer `i` meaning `palette()[i]`.

`return.colors` Logical: logical values (FALSE, default) or returning colors (TRUE)

Value

Logical value (or colors)

Note

Adapted from plotfunctions package <https://cran.r-project.org/web/packages/plotfunctions/index.html>

Author(s)

Jacolien van Rij

Examples

```
# correct color definitions:
is.color(c('#FF0000FF', '#00FF00FF', '#0000FFFF'))
is.color(c('red', 'steelblue', 'green3'))
is.color(c(1,7,28))
# mixtures are possible too:
is.color(c('#FF0000FF', 'red', 1, '#FF0000', rgb(.1,0,0)))

# return colors:
# note that 28 is converted to 4...
is.color(c(1,7,28), return.colors=TRUE)
is.color(c('#FF0000CC', 'red', 1, '#FF0000'), return.colors=TRUE)

# 4 incorrect colors, 1 correct:
test <- c('#FH0000', 3, '#FF00991', 'lavendel', '#AABBCCFFF')
is.color(test)
is.color(test, return.colors=TRUE)
```

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