

# Package ‘guideR’

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**Type** Package

**Title** Miscellaneous Statistical Functions Used in 'guide-R'

**Version** 0.8.0

**Description** Companion package for the manual

'guide-R : Guide pour l'analyse de données d'enquêtes avec R' available at  
<<https://larmarange.github.io/guide-R/>>. 'guideR' implements miscellaneous  
functions introduced in 'guide-R' to facilitate statistical analysis and  
manipulation of survey data.

**License** GPL (>= 3)

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<https://github.com/larmarange/guideR>

**BugReports** <https://github.com/larmarange/guideR/issues>

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|                 |                                                       |
|-----------------|-------------------------------------------------------|
| combine_answers | <i>Combine answers of a multiple answers question</i> |
|-----------------|-------------------------------------------------------|

---

## Description

Considering a multiple answers question coded as several binary variables (one per item), create a new variable (list column or character) combining all positive answers. If defined, use variable labels (see examples).

## Usage

```
combine_answers(data, answers, into, value = NULL, sep = NULL)
```

**Arguments**

|         |                                                                                                                            |
|---------|----------------------------------------------------------------------------------------------------------------------------|
| data    | A data frame, data frame extension (e.g. a tibble), or a survey design object.                                             |
| answers | <tidy-select> List of variables identifying the different answers of the question.                                         |
| into    | Names of new variables to create as character vector.                                                                      |
| value   | Value indicating a positive answer. By default, will use the maximum observed value and will display a message.            |
| sep     | An optional character string to separate the results and return a character. If NULL, return a list column (see examples). |

**Note**

If NA is observed for at least one item, return NA.

**Examples**

```
d <-
  dplyr::tibble(
    q1a = sample(c("y", "n"), size = 200, replace = TRUE),
    q1b = sample(c("y", "n", "n", NA), size = 200, replace = TRUE),
    q1c = sample(c("y", "y", "n"), size = 200, replace = TRUE),
    q1d = sample("n", size = 200, replace = TRUE)
  )

d |> combine_answers(q1a:q1d, into = "combined")
d |> combine_answers(q1a:q1d, into = "combined", sep = ", ", value = "y")
d |> combine_answers(q1a:q1d, into = "combined", sep = " | ", value = "n")
```

cut\_quartiles

*Cut a continuous variable in quartiles***Description**

Convenient function to quickly cut a numeric vector into quartiles, i.e. by applying `cut(x, breaks = fivenum(x))`. Variable label is preserved by `cut_quartiles()`.

**Usage**

```
cut_quartiles(x, include.lowest = TRUE, ...)
```

**Arguments**

|                |                                                                                                                                       |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------|
| x              | a numeric vector which is to be converted to a factor by cutting.                                                                     |
| include.lowest | logical, indicating if an 'x[i]' equal to the lowest (or highest, for <code>right = FALSE</code> ) 'breaks' value should be included. |
| ...            | further arguments passed to <code>base::cut()</code> .                                                                                |

## Examples

```
mtcars$mpg |> cut_quartiles() |> summary()
```

---

```
grouped_tbl_pivot_wider
```

*Helpers for grouped tables generated with gtsummary*

---

## Description

A series of helpers for grouped tables generated by `tbl_regression()` in case of multinomial models, multi-components models or other grouped results. `grouped_tbl_pivot_wider()` allows to display results in a wide format, with one set of columns per group. `multinom_add_global_p_pivot_wider()` is a specific case for multinomial models, when displaying global p-values in a wide format: it calls `gtsummary::add_global_p()`, followed by `grouped_tbl_pivot_wider()`, and then keep only the last column with p-values (see examples). Finally, as grouped regression tables doesn't have exactly the same structure as ungrouped tables, functions as `gtsummary::bold_labels()` do not always work properly. If the grouped table is kept in a long format, `style_grouped_tbl()` could be use to improve the output by styling variable labels, levels and/or group names. **TO BE NOTED:** to style group names, `style_grouped_tbl()` convert the table into a gt object with `gtsummary::as_gt()`. This function should therefore be used last. If the table is intended to be exported to another format, do not use `style_grouped_tbl()`.

## Usage

```
grouped_tbl_pivot_wider(x)

multinom_add_global_p_pivot_wider(
  x,
  ...,
  p_value_header = "**Likelihood-ratio test**"
)

style_grouped_tbl(
  x,
  bold_groups = TRUE,
  uppercase_groups = TRUE,
  bold_labels = FALSE,
  italicize_labels = TRUE,
  indent_labels = 4L,
  bold_levels = FALSE,
  italicize_levels = FALSE,
  indent_levels = 8L
)
```

**Arguments**

`x` A grouped regression table generated with `gtsummary::tbl_regression()`.  
`...` Additional arguments passed to `gtsummary::add_global_p()`.  
`p_value_header` Header for the p-value column.  
`bold_groups` Bold group group names?  
`uppercase_groups` Convert group names to upper case?  
`bold_labels` Bold variable labels?  
`italicize_labels` Italicize variable labels?  
`indent_labels` Number of spaces to indent variable labels.  
`bold_levels` Bold levels?  
`italicize_levels` Italicize levels?  
`indent_levels` Number of spaces to indent levels.

**Value**

A gtsummary or a gt table.

**Examples**

```

mod <- nnet::multinom(
  grade ~ stage + marker + age,
  data = gtsummary::trial,
  trace = FALSE
)
tbl <- mod |> gtsummary::tbl_regression(exponentiate = TRUE)
tbl
tbl |> grouped_tbl_pivot_wider()

tbl |> multinom_add_global_p_pivot_wider() |> gtsummary::bold_labels()
tbl |> style_grouped_tbl()
  
```

**Description**

See `gtsummary::tests` for more details on how defining custom tests. `fisher.simulate.p()` implements Fisher test with computation of p-values by Monte Carlo simulation in larger than 2x2 tables (see `stats::fisher.test()`). `svytest_oneway()` is designed to compare means between sub-groups for survey objects. It is based on `survey::svytest()` for comparing 2 means, and on `svyoneway()` for comparing 3 means or more.

**Usage**

```
fisher.simulate.p(data, variable, by, ...)
```

```
svyttest_oneway(data, variable, by, ...)
```

**Arguments**

|          |                               |
|----------|-------------------------------|
| data     | A data set.                   |
| variable | Name of the variable to test. |
| by       | Name of the by variable.      |
| ...      | Unused.                       |

**Examples**

```
library(gtsummary)
trial |>
  tbl_summary(include = grade, by = trt) |>
  add_p(test = all_categorical() ~ "fisher.simulate.p")
```

```
iris |>
  srvyr::as_survey() |>
  tbl_svysummary(
    include = Petal.Length,
    by = Species
  ) |>
  add_p(test = all_continuous() ~ svyttest_oneway)
```

---

gtsummary\_themes

*Themes for gtsummary*


---

**Description**

Additional themes for tables generated with gtsummary.

**Usage**

```
theme_gtsummary_prop_n(
  prop_stat = "{p}% ({n})",
  prop_digits = 1,
  mean_sd = FALSE,
  cont_digits = 1,
  set_theme = TRUE
)
```

```

theme_gtsummary_fisher_simulate_p(set_theme = TRUE)

theme_gtsummary_unweighted_n(
  n_unweighted_prefix = "",
  n_unweighted_suffix = " obs.",
  prop_digits = 1,
  mean_sd = FALSE,
  cont_digits = 1,
  overall_string = NULL,
  set_theme = TRUE
)

theme_gtsummary_bold_labels(set_theme = TRUE)

```

## Arguments

|                                                       |                                                                                                                                                         |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>prop_stat</code>                                | (character)<br>Statistics to display for categorical variables (see <a href="#">gtsummary::tbl_summary()</a> ).                                         |
| <code>prop_digits</code>                              | (non-negative integer)<br>Define the number of decimals to display for proportions.                                                                     |
| <code>mean_sd</code>                                  | (scalar logical)<br>Also, set default summary statistics to mean and standard deviation in <a href="#">gtsummary::tbl_summary()</a> . Default is FALSE. |
| <code>cont_digits</code>                              | (non-negative integer)<br>Define the number of decimals to display for continuous variables.                                                            |
| <code>set_theme</code>                                | (scalar logical)<br>Logical indicating whether to set the theme. Default is TRUE. When FALSE the named list of theme elements is returned invisibly     |
| <code>n_unweighted_prefix, n_unweighted_suffix</code> | (character)<br>Prefix and suffix displayed before and after the unweighted number of observations.                                                      |
| <code>overall_string</code>                           | (character)<br>Optional string to name the <i>overall</i> column.                                                                                       |

## Details

`theme_gtsummary_prop_n()` displays, by default, proportions before the number of observations (between brackets). This function cannot be used simultaneously with [gtsummary::theme\\_gtsummary\\_mean\\_sd\(\)](#), but you can use the `mean_sd = TRUE` option of `theme_gtsummary_prop_n()`. `theme_gtsummary_prop_n()` also modifies default method for [gtsummary::add\\_ci.tbl\\_summary\(\)](#) ("wilson" for categorical variables, "t.test", i.e. mean confidence interval, for continuous variables if `mean_sd = TRUE`, "wilcox.test", i.e. confidence interval of the pseudomedian, for continuous variables if `mean_sd = FALSE`). Finally, `theme_gtsummary_prop_n()` also modifies default tests for [gtsummary::add\\_p.tbl\\_summary\(\)](#) for continuous variables if `mean_sd = TRUE` ("t.test" for comparing 2 groups, or "oneway.test" for 3 groups or more). If `mean_sd = FALSE`, the default tests for continuous variables remain

"wilcox.test" (2 groups) or "kruskal.test" (3 groups or more). For categorical variables, "chisq.test.no.correct" and "fisher.test" are used by default. See `theme_gtsummary_fisher_simulate_p()` to change the default test for categorical variables.

`theme_gtsummary_fisher_simulate_p()` modify the default test used for categorical variables by Fisher test, with computation of p-values by Monte Carlo simulation in larger than 2x2 tables.

`theme_gtsummary_unweighted_n()` modifies default values of tables returned by `gtsummary::tbl_svysummary()` and displays the unweighted number of observations instead of the weighted n. `theme_gtsummary_unweighted_n()` also modifies default method for `gtsummary::add_ci.tbl_svysummary()` ("svyprop.logit" for categorical variables, "svymean", i.e. mean confidence interval, for continuous variables if `mean_sd = TRUE`, "svymedian.mean", i.e. confidence interval of the median, for continuous variables if `mean_sd = FALSE`). Finally, `theme_gtsummary_unweighted_n()` also modifies default tests for `gtsummary::add_p.tbl_svysummary()` for continuous variables if `mean_sd = TRUE` (`svyttest_oneway` which calls `survey::svyttest()` for comparing 2 means and `svyoneway()` for comparing 3 means or more). If `mean_sd = FALSE`, the default tests for continuous variables remain "svy.wilcox.test" which used a designed-based Wilcoxon test (2 groups) or Kruskal-Wallis test (3 groups or more). For categorical variables, "svy.chisq.test" is used by default.

`theme_gtsummary_bold_labels()` applies automatically `gtsummary::bold_labels()` to all tables generated with `gtsummary`.

## Examples

```
library(gtsummary)

trial |>
  tbl_summary(include = c(grade, age), by = trt) |>
  add_p()

theme_gtsummary_prop_n(mean_sd = TRUE)
theme_gtsummary_fisher_simulate_p()
theme_gtsummary_bold_labels()
trial |>
  tbl_summary(include = c(grade, age), by = trt) |>
  add_p()

data("api", package = "survey")
apistrat$both[1:5] <- NA
apistrat |>
  srvyr::as_survey(strata = stype, weights = pw) |>
  tbl_svysummary(include = c(stype, both), by = awards) |>
  add_overall()

theme_gtsummary_unweighted_n()
apistrat |>
  srvyr::as_survey(strata = stype, weights = pw) |>
  tbl_svysummary(include = c(stype, both), by = awards) |>
  add_overall()
```

```
gtsummary::reset_gtsummary_theme()
```

---

|                     |                                |
|---------------------|--------------------------------|
| gtsummary_utilities | <i>Utilities for gtsummary</i> |
|---------------------|--------------------------------|

---

## Description

Utilities for tables generated with [gtsummary](#).

## Usage

```
bold_variable_group_headers(x)
```

```
italicize_variable_group_headers(x)
```

```
indent_levels(x, indent = 8L)
```

```
indent_labels(x, indent = 4L)
```

## Arguments

|        |                                                      |
|--------|------------------------------------------------------|
| x      | A gtsummary object.                                  |
| indent | An integer indicating how many space to indent text. |

## See Also

[gtsummary::modify\\_bold\(\)](#), [gtsummary::modify\\_italic\(\)](#), [gtsummary::modify\\_indent\(\)](#)

## Examples

```
library(gtsummary)
tbl <-
  trial |>
  tbl_summary(
    include = c(stage, grade, age, trt, response, death)
  ) |>
  add_variable_group_header(
    header = "Clinical situation at diagnosis",
    variables = c(stage, grade, age)
  ) |>
  add_variable_group_header(
    header = "Treatment and outcome",
    variables = c(trt, response, death)
  )
tbl
```

```
tbl |>
  bold_variable_group_headers() |>
  italicize_labels() |>
  indent_levels(indent = 8L)
```

---

|                      |                                              |
|----------------------|----------------------------------------------|
| install_dependencies | <i>Install / Update project dependencies</i> |
|----------------------|----------------------------------------------|

---

## Description

This function uses `renv::dependencies()` to identify R package dependencies in a project and then calls `pak::pkg_install()` to install / update these packages. If some packages are not found, the function will install those available and returns a message indicated packages not installed/updated.

## Usage

```
install_dependencies(dependencies = NULL, ask = TRUE)
```

## Arguments

|              |                                                                                                                                                                                              |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dependencies | An optional list of dependencies. If NULL, will be determined with <code>renv::dependencies()</code> . If equal to "old", will use the list returned by <code>utils::old.packages()</code> . |
| ask          | Whether to ask for confirmation when installing a different version of a package that is already installed. Installations that only add new packages never require confirmation.             |

## Value

(Invisibly) A data frame with information about the installed package(s).

## Examples

```
## Not run:
install_dependencies()

## End(Not run)
```

---

is\_different*Comparison tests considering NA as values to be compared*

---

**Description**

is\_different() and is\_equal() performs comparison tests, considering NA values as legitimate values (see examples).

**Usage**

```
is_different(x, y)
```

```
is_equal(x, y)
```

```
cumdifferent(x)
```

```
num_cycle(x)
```

**Arguments**

x, y                      Vectors to be compared.

**Details**

cum\_different() allows to identify groups of continuous rows that have the same value. num\_cycle() could be used to identify sub-groups that respect a certain condition (see examples).

is\_equal(x, y) is equivalent to  $(x == y \ \& \ !\text{is.na}(x) \ \& \ !\text{is.na}(y)) \mid (\text{is.na}(x) \ \& \ \text{is.na}(y))$ , and is\_different(x, y) is equivalent to  $(x != y \ \& \ !\text{is.na}(x) \ \& \ !\text{is.na}(y)) \mid \text{xor}(\text{is.na}(x), \text{is.na}(y))$ .

**Value**

A vector of the same length as x.

**Examples**

```
v <- c("a", "b", NA)
is_different(v, "a")
is_different(v, NA)
is_equal(v, "a")
is_equal(v, NA)
d <- dplyr::tibble(group = c("a", "a", "b", "b", "a", "b", "c", "a"))
d |>
  dplyr::mutate(
    subgroup = cumdifferent(group),
    sub_a = num_cycle(group == "a")
  )
```

---

|               |                          |
|---------------|--------------------------|
| leading_zeros | <i>Add leading zeros</i> |
|---------------|--------------------------|

---

**Description**

Add leading zeros

**Usage**

```
leading_zeros(x, left_digits = NULL, digits = 0, prefix = "", suffix = "", ...)
```

**Arguments**

- x                    a numeric vector
- left\_digits        number of digits before decimal point, automatically computed if not provided
- digits             number of digits after decimal point
- prefix, suffix    Symbols to display before and after value
- ...                additional parameters passed to `base::formatC()`, as `big.mark` or `decimal.mark`

**Value**

A character vector of the same length as x.

**See Also**

```
base::formatC(), base::sprintf()
```

**Examples**

```
v <- c(2, 103.24, 1042.147, 12.4566, NA)
leading_zeros(v)
leading_zeros(v, digits = 1)
leading_zeros(v, left_digits = 6, big.mark = " ")
leading_zeros(c(0, 6, 12, 18), prefix = "M")
```

---

|                 |                                                                 |
|-----------------|-----------------------------------------------------------------|
| long_to_periods | <i>Transform a data frame from long format to period format</i> |
|-----------------|-----------------------------------------------------------------|

---

**Description**

Transform a data frame from long format to period format

**Usage**

```
long_to_periods(data, id, start, stop = NULL, by = NULL)
```

**Arguments**

|       |                                                                                                                                                                                             |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data  | A data frame, or a data frame extension (e.g. a tibble).                                                                                                                                    |
| id    | <tidy-select> Column containing individual ids                                                                                                                                              |
| start | <tidy-select> Time variable indicating the beginning of each row                                                                                                                            |
| stop  | <tidy-select> Optional time variable indicating the end of each row. If not provided, it will be derived from the dataset, considering that each row ends at the beginning of the next one. |
| by    | <tidy-select> Co-variables to consider (optional)                                                                                                                                           |

**Value**

A tibble.

**See Also**

[periods\\_to\\_long\(\)](#)

**Examples**

```
d <- dplyr::tibble(
  patient = c(1, 2, 3, 3, 4, 4, 4),
  begin = c(0, 0, 0, 1, 0, 36, 39),
  end = c(50, 6, 1, 16, 36, 39, 45),
  covar = c("no", "no", "no", "yes", "no", "yes", "yes")
)
d

d |> long_to_periods(id = patient, start = begin, stop = end)
d |> long_to_periods(id = patient, start = begin, stop = end, by = covar)

# If stop not provided, it is deduced.
# However, it considers that observation ends at the last start time.
d |> long_to_periods(id = patient, start = begin)
```

---

|         |                                                                                  |
|---------|----------------------------------------------------------------------------------|
| mean_sd | <i>Compute means, standard deviations and confidence intervals by sub-groups</i> |
|---------|----------------------------------------------------------------------------------|

---

**Description**

mean\_sd() lets you quickly compute mean and standard deviation by sub-groups. Use .conf.int = TRUE to also return confidence intervals of the mean.

**Usage**

```
mean_sd(data, ...)

## S3 method for class 'data.frame'
mean_sd(
  data,
  ...,
  .by = NULL,
  .drop = FALSE,
  .drop_na_by = FALSE,
  .conf.int = FALSE,
  .conf.level = 0.95,
  .options = NULL
)

## S3 method for class 'survey.design'
mean_sd(
  data,
  ...,
  .by = NULL,
  .drop = FALSE,
  .drop_na_by = FALSE,
  .conf.int = FALSE,
  .conf.level = 0.95,
  .options = NULL
)

## Default S3 method:
mean_sd(
  data,
  ...,
  .drop = FALSE,
  .conf.int = FALSE,
  .conf.level = 0.95,
  .options = NULL
)
```

**Arguments**

|                    |                                                                                                                                                                               |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>data</code>  | A vector, a data frame, data frame extension (e.g. a tibble), or a survey design object.                                                                                      |
| <code>...</code>   | <a href="#">&lt;data-masking&gt;</a> Variable(s) for which to compute mean and standard deviation.                                                                            |
| <code>.by</code>   | <a href="#">&lt;tidy-select&gt;</a> Optional additional variables to group by (in addition to those eventually previously declared using <a href="#">dplyr::group_by()</a> ). |
| <code>.drop</code> | If TRUE, will remove empty groups from the output.                                                                                                                            |

|                          |                                                                                                                                            |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <code>.drop_na_by</code> | If TRUE, will remove any NA values observed in the <code>.by</code> variables (or variables defined with <code>dplyr::group_by()</code> ). |
| <code>.conf.int</code>   | If TRUE, will estimate confidence intervals.                                                                                               |
| <code>.conf.level</code> | Confidence level for the returned confidence intervals.                                                                                    |
| <code>.options</code>    | Additional arguments passed to <code>stats::t.test()</code> or <code>srvyr::survey_mean()</code> .                                         |

### Value

A tibble. Column "n" reports the number of valid observations and "missing" the number of missing (NA) observations, unweighted for survey objects.

A tibble with one row per group.

### Examples

```
# using a vector
iris$Petal.Length |> mean_sd()

# one variable
iris |> mean_sd(Petal.Length)
iris |> mean_sd(Petal.Length, .conf.int = TRUE)
iris |> mean_sd(Petal.Length, .by = Species)
mtcars |> mean_sd(mpg, .by = c(cyl, gear))

# two variables
iris |> mean_sd(Petal.Length, Petal.Width)
iris |> mean_sd(dplyr::pick(dplyr::starts_with("Petal")), .by = Species)

# missing values
d <- iris
d$Petal.Length[1:10] <- NA
d |> mean_sd(Petal.Length)
d |> mean_sd(Petal.Length, .by = Species)

## SURVEY DATA -----

ds <- srvyr::as_survey(iris)
ds |> mean_sd(Petal.Length, .by = Species, .conf.int = TRUE)
```

---

median\_iqr

*Compute median, quartiles and interquartile range by sub-groups*

---

### Description

`median_iqr()` lets you quickly compute median, quartiles and interquartile range by sub-groups. Use `.outliers = TRUE` to also return whiskers and outliers (see `ggplot2::stat_boxplot()`).

**Usage**

```
median_iqr(data, ...)

## S3 method for class 'data.frame'
median_iqr(
  data,
  ...,
  .by = NULL,
  .drop = FALSE,
  .drop_na_by = FALSE,
  .outliers = FALSE
)

## S3 method for class 'survey.design'
median_iqr(
  data,
  ...,
  .by = NULL,
  .drop = FALSE,
  .drop_na_by = FALSE,
  .outliers = FALSE
)

## Default S3 method:
median_iqr(data, ..., .drop = FALSE, .outliers = FALSE)
```

**Arguments**

|                          |                                                                                                                                                                               |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>data</code>        | A vector, a data frame, data frame extension (e.g. a tibble), or a survey design object.                                                                                      |
| <code>...</code>         | <a href="#">&lt;data-masking&gt;</a> Variable(s) for which to compute median, quartiles and interquartile range.                                                              |
| <code>.by</code>         | <a href="#">&lt;tidy-select&gt;</a> Optional additional variables to group by (in addition to those eventually previously declared using <a href="#">dplyr::group_by()</a> ). |
| <code>.drop</code>       | If TRUE, will remove empty groups from the output.                                                                                                                            |
| <code>.drop_na_by</code> | If TRUE, will remove any NA values observed in the <code>.by</code> variables (or variables defined with <a href="#">dplyr::group_by()</a> ).                                 |
| <code>.outliers</code>   | If TRUE, will estimate whiskers and outliers.                                                                                                                                 |

**Value**

A tibble. Column "n" reports the number of valid observations and "missing" the number of missing (NA) observations, unweighted for survey objects.

A tibble with one row per group.

**Examples**

```
# using a vector
iris$Petal.Length |> median_iqr()

# one variable
iris |> median_iqr(Petal.Length)
iris |> median_iqr(Petal.Length, .outliers = TRUE)
iris |> median_iqr(Petal.Length, .by = Species)
mtcars |> median_iqr(mpg, .by = c(cyl, gear))

# two variables
iris |> median_iqr(Petal.Length, Petal.Width)
iris |> median_iqr(dplyr::pick(dplyr::starts_with("Petal")), .by = Species)

# missing values
d <- iris
d$Petal.Length[1:10] <- NA
d |> median_iqr(Petal.Length)
d |> median_iqr(Petal.Length, .by = Species)

## SURVEY DATA -----

ds <- srvyr::as_survey(iris)
ds |> median_iqr(Petal.Length, .by = Species, .outliers = TRUE)
```

---

observed\_vs\_theoretical

*Plot observed vs predicted distribution of a fitted model*


---

**Description**

Plot observed vs predicted distribution of a fitted model

**Usage**

```
observed_vs_theoretical(model)
```

**Arguments**

model                    A statistical model.

**Details**

Has been tested with `stats::lm()` and `stats::glm()` models. It may work with other types of models, but without any warranty.

**Value**

A ggplot2 plot.

**Examples**

```
# a linear model
mod <- lm(Sepal.Length ~ Sepal.Width + Species, data = iris)
mod |> observed_vs_theoretical()

# a logistic regression
mod <- glm(
  as.factor(Survived) ~ Class + Sex,
  data = titanic,
  family = binomial()
)
mod |> observed_vs_theoretical()
```

---

|                 |                                                                 |
|-----------------|-----------------------------------------------------------------|
| periods_to_long | <i>Transform a data frame from period format to long format</i> |
|-----------------|-----------------------------------------------------------------|

---

**Description**

Transform a data frame from period format to long format

**Usage**

```
periods_to_long(
  data,
  start,
  stop,
  time_step = 1,
  time_name = "time",
  keep = FALSE
)
```

**Arguments**

|           |                                                                                                                                                                                                                   |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data      | A data frame, or a data frame extension (e.g. a tibble).                                                                                                                                                          |
| start     | <a href="#">&lt;tidy-select&gt;</a> Time variable indicating the beginning of each row                                                                                                                            |
| stop      | <a href="#">&lt;tidy-select&gt;</a> Optional time variable indicating the end of each row. If not provided, it will be derived from the dataset, considering that each row ends at the beginning of the next one. |
| time_step | (numeric) Desired value for the time variable.                                                                                                                                                                    |
| time_name | (character) Name of the time variable.                                                                                                                                                                            |
| keep      | (logical) Should start and stop variable be kept in the results?                                                                                                                                                  |

**Value**

A tibble.

**See Also**

[long\\_to\\_periods\(\)](#)

**Examples**

```
d <- dplyr::tibble(
  patient = c(1, 2, 3, 3),
  begin = c(0, 2, 0, 3),
  end = c(6, 4, 2, 8),
  covar = c("no", "yes", "no", "yes")
)
d

d |> periods_to_long(start = begin, stop = end)
d |> periods_to_long(start = begin, stop = end, time_step = 5)
```

---

|                  |                                                  |
|------------------|--------------------------------------------------|
| plot_categorical | <i>Plot a categorical variable by sub-groups</i> |
|------------------|--------------------------------------------------|

---

**Description**

Plot one or several categorical variables by sub-groups. See [proportion\(\)](#) for more details on the way proportions and confidence intervals are computed. Return a bar plot (see examples).

**Usage**

```
plot_categorical(
  data,
  outcome,
  na.rm = TRUE,
  by = NULL,
  drop_na_by = FALSE,
  convert_continuous = TRUE,
  ...,
  show_overall = TRUE,
  overall_label = "Overall",
  show_pvalues = TRUE,
  pvalues_test = c("fisher", "chisq"),
  pvalues_labeller = scales::label_pvalue(add_p = TRUE),
  pvalues_size = 3.5,
  pvalues_y = ifelse(flip, 1.05, 1),
  show_labels = TRUE,
  labels_labeller = scales::label_percent(1),
  labels_size = 3.5,
```

```

labels_color = "auto",
facet_labeller = ggplot2::label_wrap_gen(width = 50, multi_line = TRUE),
flip = FALSE,
minimal = FALSE,
return_data = FALSE
)

```

## Arguments

|                    |                                                                                                                                                                                                                                                                            |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data               | A data frame, data frame extension (e.g. a tibble), or a survey design object.                                                                                                                                                                                             |
| outcome            | <code>&lt;tidy-select&gt;</code> List of categorical variables to be plotted.                                                                                                                                                                                              |
| na.rm              | Should NA values be removed from the outcome?                                                                                                                                                                                                                              |
| by                 | <code>&lt;tidy-select&gt;</code> List of variables to group by (comparison is done separately for each variable).                                                                                                                                                          |
| drop_na_by         | Remove NA values in by variables?                                                                                                                                                                                                                                          |
| convert_continuous | Should continuous by variables (with 5 unique values or more) be converted to quartiles (using <code>cut_quartiles()</code> )?                                                                                                                                             |
| ...                | Additional arguments passed to <code>ggplot2::geom_bar()</code> .                                                                                                                                                                                                          |
| show_overall       | Display "Overall" column?                                                                                                                                                                                                                                                  |
| overall_label      | Label for the overall column.                                                                                                                                                                                                                                              |
| show_pvalues       | Display p-values in the top-left corner?                                                                                                                                                                                                                                   |
| pvalues_test       | Test to compute p-values for data frames: "fisher" for <code>stats::fisher.test()</code> (with <code>simulate.p.value = TRUE</code> ) or "chisq" for <code>stats::chisq.test()</code> . Has no effect on survey objects for those <code>survey::svychisq()</code> is used. |
| pvalues_labeller   | Labeller function for p-values.                                                                                                                                                                                                                                            |
| pvalues_size       | Text size for p-values.                                                                                                                                                                                                                                                    |
| pvalues_y          | Y position of p-values.                                                                                                                                                                                                                                                    |
| show_labels        | Display proportion labels?                                                                                                                                                                                                                                                 |
| labels_labeller    | Labeller function for labels.                                                                                                                                                                                                                                              |
| labels_size        | Size of labels.                                                                                                                                                                                                                                                            |
| labels_color       | Color of labels.                                                                                                                                                                                                                                                           |
| facet_labeller     | Labeller function for strip labels.                                                                                                                                                                                                                                        |
| flip               | Flip x and y axis?                                                                                                                                                                                                                                                         |
| minimal            | Should a minimal theme be applied? (no y-axis, no grid)                                                                                                                                                                                                                    |
| return_data        | Return computed data instead of the plot?                                                                                                                                                                                                                                  |

### Examples

```
titanic |>
  plot_categorical(
    Class,
    by = c(Age, Sex)
  )
```

```
titanic |>
  plot_categorical(
    Class,
    by = c(Age, Sex),
    show_overall = FALSE,
    flip = TRUE
  )
```

```
titanic |>
  plot_categorical(
    Class,
    by = c(Age, Sex),
    flip = TRUE,
    minimal = TRUE
  )
```

```
gtsummary::trial |>
  plot_categorical(grade, by = c(age, stage, trt))
gtsummary::trial |>
  plot_categorical(grade, by = c(age, stage, trt), drop_na_by = TRUE)
gtsummary::trial |>
  plot_categorical(c(grade, stage), by = c(trt, response))
```

---

plot\_continuous

*Plot a continuous variable by sub-groups*

---

### Description

Plot one or several continuous variables by sub-groups. See [median\\_iqr\(\)](#) for more details on the way statistics are computed. Return a box plot (see examples).

### Usage

```
plot_continuous(
  data,
  outcome,
  by = NULL,
```

```

drop_na_by = FALSE,
convert_continuous = TRUE,
...,
show_overall = TRUE,
overall_label = "Overall",
show_pvalues = TRUE,
pvalues_labeller = scales::label_pvalue(add_p = TRUE),
pvalues_size = 3.5,
facet_labeller = ggplot2::label_wrap_gen(width = 50, multi_line = TRUE),
flip = FALSE,
minimal = FALSE,
free_scale = FALSE,
return_data = FALSE
)

```

### Arguments

|                    |                                                                                                                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data               | A data frame, data frame extension (e.g. a tibble), or a survey design object.                                                                                                                |
| outcome            | <a href="#">&lt;tidy-select&gt;</a> List of continuous variables to be plotted.                                                                                                               |
| by                 | <a href="#">&lt;tidy-select&gt;</a> List of variables to group by (comparison is done separately for each variable).                                                                          |
| drop_na_by         | Remove NA values in by variables?                                                                                                                                                             |
| convert_continuous | Should continuous by variables (with 5 unique values or more) be converted to quartiles (using <a href="#">cut_quartiles()</a> )?                                                             |
| ...                | Additional arguments passed to <a href="#">ggplot2::geom_boxplot()</a> .                                                                                                                      |
| show_overall       | Display "Overall" column?                                                                                                                                                                     |
| overall_label      | Label for the overall column.                                                                                                                                                                 |
| show_pvalues       | Display p-values in the top-left corner? p-values are computed with <a href="#">stats::kruskal.test()</a> for data frames, and with <a href="#">survey::svyranktest()</a> for survey objects. |
| pvalues_labeller   | Labeller function for p-values.                                                                                                                                                               |
| pvalues_size       | Text size for p-values.                                                                                                                                                                       |
| facet_labeller     | Labeller function for strip labels.                                                                                                                                                           |
| flip               | Flip x and y axis?                                                                                                                                                                            |
| minimal            | Should a minimal theme be applied? (no y-axis, no grid)                                                                                                                                       |
| free_scale         | Allow y axis to vary between conditions?                                                                                                                                                      |
| return_data        | Return computed data instead of the plot?                                                                                                                                                     |

### Examples

```

iris |>
  plot_continuous(Petal.Length, by = Species)

iris |>

```

```
plot_continuous(  
  dplyr::starts_with("Petal"),  
  by = Species,  
  free_scale = TRUE,  
  fill = "lightblue",  
  outlier.color = "red"  
)  
  
mtcars |>  
  plot_continuous(  
    mpg,  
    by = c(cyl, gear),  
    flip = TRUE,  
    mapping = ggplot2::aes(fill = by)  
  )  
  
# works with continuous by variables  
mtcars |>  
  plot_continuous(  
    mpg,  
    by = c(displ, drat),  
    flip = TRUE,  
    minimal = TRUE  
  )  
  
# works with survey object  
iris |>  
  srvyr::as_survey() |>  
  plot_continuous(  
    Petal.Length,  
    by = c(Species, Petal.Width),  
    flip = TRUE  
  )
```

---

plot\_inertia\_from\_tree

*Plot inertia, absolute loss and relative loss from a classification tree*

---

## Description

Plot inertia, absolute loss and relative loss from a classification tree

## Usage

```
plot_inertia_from_tree(tree, k_max = 15)
```

```
get_inertia_from_tree(tree, k_max = 15)
```

**Arguments**

|       |                                                                                                                                                                                                                    |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| tree  | A dendrogram, i.e. an <code>stats::hclust</code> object, an <code>FactoMineR::HCPC</code> object or an object that can be converted to an <code>stats::hclust</code> object with <code>stats::as.hclust()</code> . |
| k_max | Maximum number of clusters to return / plot.                                                                                                                                                                       |

**Value**

A ggplot2 plot or a tibble.

**Examples**

```
hc <- hclust(dist(USArrests))
get_inertia_from_tree(hc)
plot_inertia_from_tree(hc)
```

---

|            |                                 |
|------------|---------------------------------|
| plot_means | <i>Plot means by sub-groups</i> |
|------------|---------------------------------|

---

**Description**

Plot one or several means by sub-groups. See `mean_sd()` for more details on the way means and confidence intervals are computed. By default, return a point plot, but other geometries could be used (see examples).

**Usage**

```
plot_means(
  data,
  outcome,
  by = NULL,
  drop_na_by = FALSE,
  convert_continuous = TRUE,
  geom = "point",
  ...,
  show_overall = TRUE,
  overall_label = "Overall",
  show_ci = TRUE,
  conf_level = 0.95,
  ci_color = "black",
  show_pvalues = TRUE,
  pvalues_labeller = scales::label_pvalue(add_p = TRUE),
  pvalues_size = 3.5,
  show_labels = TRUE,
  label_y = NULL,
  labels_labeller = scales::label_number(0.1),
  labels_size = 3.5,
  labels_color = "black",
```

```

    show_overall_line = FALSE,
    overall_line_type = "dashed",
    overall_line_color = "black",
    overall_line_width = 0.5,
    facet_labeller = ggplot2::label_wrap_gen(width = 50, multi_line = TRUE),
    flip = FALSE,
    minimal = FALSE,
    free_scale = FALSE,
    return_data = FALSE
  )

```

## Arguments

|                    |                                                                                                                                                                                                                                               |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data               | A data frame, data frame extension (e.g. a tibble), or a survey design object.                                                                                                                                                                |
| outcome            | <code>&lt;tidy-select&gt;</code> List of continuous variables to be plotted.                                                                                                                                                                  |
| by                 | <code>&lt;tidy-select&gt;</code> List of variables to group by (comparison is done separately for each variable).                                                                                                                             |
| drop_na_by         | Remove NA values in by variables?                                                                                                                                                                                                             |
| convert_continuous | Should continuous by variables (with 5 unique values or more) be converted to quartiles (using <code>cut_quartiles()</code> )?                                                                                                                |
| geom               | Geometry to use for plotting means ("point" by default).                                                                                                                                                                                      |
| ...                | Additional arguments passed to the geom defined by geom.                                                                                                                                                                                      |
| show_overall       | Display "Overall" column?                                                                                                                                                                                                                     |
| overall_label      | Label for the overall column.                                                                                                                                                                                                                 |
| show_ci            | Display confidence intervals?                                                                                                                                                                                                                 |
| conf_level         | Confidence level for the confidence intervals.                                                                                                                                                                                                |
| ci_color           | Color of the error bars representing confidence intervals.                                                                                                                                                                                    |
| show_pvalues       | Display p-values in the top-left corner? p-values are computed with <code>stats::oneway.test()</code> for data frames, and with <code>survey::svyttest()</code> (2 groups) or <code>svyoneway()</code> (3 groups or more) for survey objects. |
| pvalues_labeller   | Labeller function for p-values.                                                                                                                                                                                                               |
| pvalues_size       | Text size for p-values.                                                                                                                                                                                                                       |
| show_labels        | Display mean labels?                                                                                                                                                                                                                          |
| label_y            | Y position of labels. If NULL, will be auto-determined.                                                                                                                                                                                       |
| labels_labeller    | Labeller function for labels.                                                                                                                                                                                                                 |
| labels_size        | Size of labels.                                                                                                                                                                                                                               |
| labels_color       | Color of labels.                                                                                                                                                                                                                              |
| show_overall_line  | Add an overall line?                                                                                                                                                                                                                          |

|                    |                                                         |
|--------------------|---------------------------------------------------------|
| overall_line_type  | Line type of the overall line.                          |
| overall_line_color | Color of the overall line.                              |
| overall_line_width | Line width of the overall line.                         |
| facet_labeller     | Labeller function for strip labels.                     |
| flip               | Flip x and y axis?                                      |
| minimal            | Should a minimal theme be applied? (no y-axis, no grid) |
| free_scale         | Allow y axis to vary between conditions?                |
| return_data        | Return computed data instead of the plot?               |

### Examples

```
iris |>
  plot_means(Petal.Length, by = Species)
```

```
iris |>
  plot_means(
    dplyr::starts_with("Petal"),
    by = Species,
    geom = "bar",
    fill = "lightblue",
    show_overall_line = TRUE
  )
```

```
mtcars |>
  plot_means(
    mpg,
    by = c(cyl, gear),
    size = 3,
    colour = "plum",
    flip = TRUE
  )
```

# works with continuous by variables

```
mtcars |>
  plot_means(
    mpg,
    by = c(displ, drat),
    fill = "plum",
    geom = "bar",
    flip = TRUE,
    minimal = TRUE
  )
```

# works with survey object

```
iris |>
```

```
srvyr::as_survey() |>
plot_means(
  Petal.Length,
  by = c(Species, Petal.Width),
  label_y = -1,
  size = 3,
  mapping = ggplot2::aes(colour = by),
  flip = TRUE
)
```

---

plot\_multiple\_answers *Plot a multiple answers question*

---

### Description

Considering a multiple answers question coded as several binary variables (one per answer), plot the proportion of positive answers. If `combine_answers = FALSE`, plot the proportion of positive answers of each item, separately. If `combine_answers = TRUE`, combine the different answers (see [combine\\_answers\(\)](#)) and plot the proportion of each combination ([ggupset](#) package required when `flip = FALSE`). See [proportion\(\)](#) for more details on the way proportions and confidence intervals are computed. By default, return a bar plot, but other geometries could be used (see examples). If defined, use variable labels (see examples).

### Usage

```
plot_multiple_answers(
  data,
  answers = dplyr::everything(),
  value = NULL,
  by = NULL,
  combine_answers = FALSE,
  combine_sep = " | ",
  missing_label = " missing",
  none_label = "none",
  drop_na = FALSE,
  drop_na_by = FALSE,
  sort = c("none", "ascending", "descending", "degrees"),
  geom = "bar",
  ...,
  show_ci = TRUE,
  conf_level = 0.95,
  ci_color = "black",
  show_labels = TRUE,
  labels_labeller = scales::label_percent(1),
  labels_size = 3.5,
  labels_color = "black",
  flip = FALSE,
```

```

    return_data = FALSE
  )

plot_multiple_answers_dodge(
  data,
  answers = dplyr::everything(),
  value = NULL,
  by,
  combine_answers = FALSE,
  combine_sep = " | ",
  missing_label = " missing",
  none_label = "none",
  drop_na = FALSE,
  drop_na_by = FALSE,
  sort = c("none", "ascending", "descending", "degrees"),
  geom = c("bar", "point"),
  width = 0.75,
  ...,
  show_ci = TRUE,
  conf_level = 0.95,
  ci_color = "black",
  show_labels = TRUE,
  labels_labeller = scales::label_percent(1),
  labels_size = 3.5,
  labels_color = "black",
  flip = FALSE
)

```

### Arguments

|                 |                                                                                                                                           |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| data            | A data frame, data frame extension (e.g. a tibble), or a survey design object.                                                            |
| answers         | <tidy-select> List of variables identifying the different answers of the question.                                                        |
| value           | Value indicating a positive answer. By default, will use the maximum observed value and will display a message.                           |
| by              | <tidy-select> Optional list of variables to compare (using facets).                                                                       |
| combine_answers | Should answers be combined? (see examples)                                                                                                |
| combine_sep     | Character string to separate combined answers.                                                                                            |
| missing_label   | When combining answers and drop_na = FALSE, label for missing values.                                                                     |
| none_label      | When combining answers and flip = TRUE, label when no item is selected.                                                                   |
| drop_na         | Should any observation with a least one NA value be dropped?                                                                              |
| drop_na_by      | If TRUE, will remove any NA values observed in the by variables                                                                           |
| sort            | Should answers be sorted according to their proportion? They could also be sorted by degrees (number of elements) when combining answers. |
| geom            | Geometry to use for plotting proportions ("bar" by default).                                                                              |

|                 |                                                            |
|-----------------|------------------------------------------------------------|
| ...             | Additional arguments passed to the geom defined by geom.   |
| show_ci         | Display confidence intervals?                              |
| conf_level      | Confidence level for the confidence intervals.             |
| ci_color        | Color of the error bars representing confidence intervals. |
| show_labels     | Display proportion labels?                                 |
| labels_labeller | Labeller function for proportion labels.                   |
| labels_size     | Size of proportion labels.                                 |
| labels_color    | Color of proportion labels.                                |
| flip            | Flip x and y axis?                                         |
| return_data     | Return computed data instead of the plot?                  |
| width           | Dodging width.                                             |

### Note

If `drop_na = TRUE`, any observation with at least one NA value for one item will be dropped. If `drop_na = FALSE` and `combine_answers = FALSE`, NA values for a specific answer are excluded the denominator when computing proportions. Therefore, all proportions may be computed on different population sizes. If `drop_na = FALSE` and `combine_answers = TRUE`, any observation with at least one NA value will be labeled with `missing_label`.

### Examples

```
d <-
  dplyr::tibble(
    q1a = sample(c("y", "n"), size = 200, replace = TRUE),
    q1b = sample(c("y", "n", "n", NA), size = 200, replace = TRUE),
    q1c = sample(c("y", "y", "n"), size = 200, replace = TRUE),
    q1d = sample("n", size = 200, replace = TRUE)
  )

d |> plot_multiple_answers(q1a:q1c)

d |>
  labelled::set_variable_labels(
    q1a = "apple",
    q1b = "banana",
    q1c = "chocolate",
    q1d = "Dijon mustard"
  ) |>
  plot_multiple_answers(
    value = "y",
    drop_na = TRUE,
    sort = "desc",
    fill = "lightblue",
    flip = TRUE
  )
```

```

d |>
  plot_multiple_answers(
    combine_answers = TRUE,
    value = "y",
    fill = "#DDCC77",
    drop_na = TRUE
  )

d |>
  plot_multiple_answers(
    combine_answers = TRUE,
    value = "y",
    flip = TRUE,
    mapping = ggplot2::aes(fill = prop),
    show.legend = FALSE
  ) +
  ggplot2::scale_fill_distiller(palette = "Spectral")

d$group <- sample(c("group A", "group B"), size = 200, replace = TRUE)
d |>
  plot_multiple_answers(
    answers = q1a:q1d,
    by = group,
    combine_answers = TRUE,
    sort = "degrees",
    value = "y",
    fill = "grey80"
  )

d |>
  plot_multiple_answers_dodge(q1a:q1d, by = group)
d |>
  plot_multiple_answers_dodge(q1a:q1d, by = group, flip = TRUE)
d |>
  plot_multiple_answers_dodge(q1a:q1d, by = group, combine_answers = TRUE)

```

---

plot\_proportions

*Plot proportions by sub-groups*


---

## Description

Plot one or several proportions (defined by logical conditions) by sub-groups. See [proportion\(\)](#) for more details on the way proportions and confidence intervals are computed. By default, return a bar plot, but other geometries could be used (see examples). `stratified_by()` is an helper function facilitating a stratified analyses (i.e. proportions by groups stratified according to a third

variable, see examples). `dummy_proportions()` is an helper to easily convert a categorical variable into dummy variables and therefore showing the proportion of each level of the original variable (see examples).

## Usage

```
plot_proportions(
  data,
  condition,
  by = NULL,
  drop_na_by = FALSE,
  convert_continuous = TRUE,
  geom = "bar",
  ...,
  show_overall = TRUE,
  overall_label = "Overall",
  show_ci = TRUE,
  conf_level = 0.95,
  ci_color = "black",
  show_pvalues = TRUE,
  pvalues_test = c("fisher", "chisq"),
  pvalues_labeller = scales::label_pvalue(add_p = TRUE),
  pvalues_size = 3.5,
  show_labels = TRUE,
  label_y = NULL,
  labels_labeller = scales::label_percent(1),
  labels_size = 3.5,
  labels_color = "black",
  show_overall_line = FALSE,
  overall_line_type = "dashed",
  overall_line_color = "black",
  overall_line_width = 0.5,
  facet_labeller = ggplot2::label_wrap_gen(width = 50, multi_line = TRUE),
  flip = FALSE,
  minimal = FALSE,
  free_scale = FALSE,
  return_data = FALSE
)

stratified_by(condition, strata)

dummy_proportions(variable)
```

## Arguments

|                        |                                                                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>data</code>      | A data frame, data frame extension (e.g. a tibble), or a survey design object.                                                                      |
| <code>condition</code> | <code>&lt;data-masking&gt;</code> A condition defining a proportion, or a <code>dplyr::tibble()</code> defining several proportions (see examples). |

|                    |                                                                                                                                                                                                                                                                            |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| by                 | <tidy-select> List of variables to group by (comparison is done separately for each variable).                                                                                                                                                                             |
| drop_na_by         | Remove NA values in by variables?                                                                                                                                                                                                                                          |
| convert_continuous | Should continuous by variables (with 5 unique values or more) be converted to quartiles (using cut_quartiles())?                                                                                                                                                           |
| geom               | Geometry to use for plotting proportions ("bar" by default).                                                                                                                                                                                                               |
| ...                | Additional arguments passed to the geom defined by geom.                                                                                                                                                                                                                   |
| show_overall       | Display "Overall" column?                                                                                                                                                                                                                                                  |
| overall_label      | Label for the overall column.                                                                                                                                                                                                                                              |
| show_ci            | Display confidence intervals?                                                                                                                                                                                                                                              |
| conf_level         | Confidence level for the confidence intervals.                                                                                                                                                                                                                             |
| ci_color           | Color of the error bars representing confidence intervals.                                                                                                                                                                                                                 |
| show_pvalues       | Display p-values in the top-left corner?                                                                                                                                                                                                                                   |
| pvalues_test       | Test to compute p-values for data frames: "fisher" for <code>stats::fisher.test()</code> (with <code>simulate.p.value = TRUE</code> ) or "chisq" for <code>stats::chisq.test()</code> . Has no effect on survey objects for those <code>survey::svychisq()</code> is used. |
| pvalues_labeller   | Labeller function for p-values.                                                                                                                                                                                                                                            |
| pvalues_size       | Text size for p-values.                                                                                                                                                                                                                                                    |
| show_labels        | Display proportion labels?                                                                                                                                                                                                                                                 |
| label_y            | Y position of labels. If NULL, will be auto-determined.                                                                                                                                                                                                                    |
| labels_labeller    | Labeller function for labels.                                                                                                                                                                                                                                              |
| labels_size        | Size of labels.                                                                                                                                                                                                                                                            |
| labels_color       | Color of labels.                                                                                                                                                                                                                                                           |
| show_overall_line  | Add an overall line?                                                                                                                                                                                                                                                       |
| overall_line_type  | Line type of the overall line.                                                                                                                                                                                                                                             |
| overall_line_color | Color of the overall line.                                                                                                                                                                                                                                                 |
| overall_line_width | Line width of the overall line.                                                                                                                                                                                                                                            |
| facet_labeller     | Labeller function for strip labels.                                                                                                                                                                                                                                        |
| flip               | Flip x and y axis?                                                                                                                                                                                                                                                         |
| minimal            | Should a minimal theme be applied? (no y-axis, no grid)                                                                                                                                                                                                                    |
| free_scale         | Allow y axis to vary between conditions?                                                                                                                                                                                                                                   |
| return_data        | Return computed data instead of the plot?                                                                                                                                                                                                                                  |
| strata             | Stratification variable                                                                                                                                                                                                                                                    |
| variable           | Variable to be converted into dummy variables.                                                                                                                                                                                                                             |

**Examples**

```
titanic |>
  plot_proportions(
    Survived == "Yes",
    overall_label = "All",
    labels_color = "white"
  )
```

```
titanic |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    fill = "lightblue"
  )
```

```
titanic |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    fill = "lightblue",
    flip = TRUE
  )
```

```
titanic |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    fill = "lightblue",
    minimal = TRUE
  )
```

```
titanic |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    geom = "point",
    color = "red",
    size = 3,
    show_labels = FALSE
  )
```

```
titanic |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    geom = "area",
    fill = "lightgreen",
    show_overall = FALSE
  )
```

```

titanic |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    geom = "line",
    color = "purple",
    ci_color = "darkblue",
    show_overall = FALSE
  )

titanic |>
  plot_proportions(
    Survived == "Yes",
    by = -Survived,
    mapping = ggplot2::aes(fill = by),
    color = "black",
    show.legend = FALSE,
    show_overall_line = TRUE,
    show_pvalues = FALSE
  )

# defining several proportions

titanic |>
  plot_proportions(
    dplyr::tibble(
      Survived = Survived == "Yes",
      Male = Sex == "Male"
    ),
    by = c(Class),
    mapping = ggplot2::aes(fill = condition)
  )

titanic |>
  plot_proportions(
    dplyr::tibble(
      Survived = Survived == "Yes",
      Male = Sex == "Male"
    ),
    by = c(Class),
    mapping = ggplot2::aes(fill = condition),
    free_scale = TRUE
  )

iris |>
  plot_proportions(
    dplyr::tibble(
      "Long sepal" = Sepal.Length > 6,
      "Short petal" = Petal.Width < 1
    ),
    by = Species,
    fill = "palegreen"
  )

```

```

iris |>
  plot_proportions(
    dplyr::tibble(
      "Long sepal" = Sepal.Length > 6,
      "Short petal" = Petal.Width < 1
    ),
    by = Species,
    fill = "palegreen",
    flip = TRUE
  )

# works with continuous by variables
iris |>
  labelled::set_variable_labels(
    Sepal.Length = "Length of the sepal"
  ) |>
  plot_proportions(
    Species == "versicolor",
    by = dplyr::contains("leng"),
    fill = "plum",
    colour = "plum4"
  )

# works with survey object
titanic |>
  srvyr::as_survey() |>
  plot_proportions(
    Survived == "Yes",
    by = c(Class, Sex),
    fill = "darksalmon",
    color = "black",
    show_overall_line = TRUE,
    labels_labeller = scales::label_percent(.1)
  )

# stratified analysis
titanic |>
  plot_proportions(
    (Survived == "Yes") |> stratified_by(Sex),
    by = Class,
    mapping = ggplot2::aes(fill = condition)
  ) +
  ggplot2::theme(legend.position = "bottom") +
  ggplot2::labs(fill = NULL)

# Convert Class into dummy variables
titanic |>
  plot_proportions(
    dummy_proportions(Class),
    by = Sex,
    mapping = ggplot2::aes(fill = level)
  )

```

)

---

plot\_trajectories      *Plot trajectories*

---

## Description

Create a trajectory index plot (similar to sequence index plot) from a data frame in long or period format.

## Usage

```
plot_trajectories(
  data,
  id,
  time,
  fill,
  by = NULL,
  sort_by = NULL,
  nudge_x = NULL,
  hide_y_labels = NULL,
  facet_labeller = ggplot2::label_wrap_gen(width = 50, multi_line = TRUE),
  ...
)

plot_periods(
  data,
  id,
  start,
  stop,
  fill,
  by = NULL,
  sort_by = NULL,
  nudge_x = NULL,
  hide_y_labels = NULL,
  facet_labeller = ggplot2::label_wrap_gen(width = 50, multi_line = TRUE),
  ...
)
```

## Arguments

|                   |                                                                     |
|-------------------|---------------------------------------------------------------------|
| <code>data</code> | A data frame, or a data frame extension (e.g. a tibble).            |
| <code>id</code>   | <code>&lt;tidy-select&gt;</code> Column containing individual ids.  |
| <code>time</code> | <code>&lt;tidy-select&gt;</code> Time variable.                     |
| <code>fill</code> | <code>&lt;tidy-select&gt;</code> Variable mapped to fill aesthetic. |
| <code>by</code>   | <code>&lt;tidy-select&gt;</code> Optional variables to group by.    |

|                |                                                                                 |
|----------------|---------------------------------------------------------------------------------|
| sort_by        | <tidy-select> Optional variables to sort trajectories.                          |
| nudge_x        | Optional amount of horizontal distance to move.                                 |
| hide_y_labels  | Hide y labels? If NULL, hide them when more than 20 trajectories are displayed. |
| facet_labeller | Labeller function for strip labels.                                             |
| ...            | Additional arguments passed to <code>ggplot2::geom_tile()</code>                |
| start, stop    | <tidy-select> Start and stop variables of the periods.                          |

### Note

`plot_trajectories()` assumes that data are stored in a long format (i.e. one row per unit of time). You can use `tidyr::pivot_longer()` or `periods_to_long()` to transform your data in such format. By default, tiles are centered on the value of time. You can adjust horizontal position with `nudge_x`. By default, each row is assumed to represent one unit of time and represented with a width of 1. You can adjust tiles' width with `width`.

`plot_periods()` is adapted for period format with a start and a stop variable. You can use `long_to_periods()` to transform your data in such format. Beginning and ending of each tile is determined by `start` and `stop` arguments.

### Examples

```
d <- dplyr::tibble(
  id = c(1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 3, 3),
  time = c(0:3, 0:2, 0:4),
  status = c("a", "a", "b", "b", "b", "b", "a", "b", "b", "b", "b", "a"),
  group = c("f", "f", "f", "f", "f", "f", "f", "m", "m", "m", "m", "m")
)

d |> plot_trajectories(id = id, time = time, fill = status, colour = "black")
d |> plot_trajectories(id = id, time = time, fill = status, nudge_x = .5)
d |> plot_trajectories(id = id, time = time, fill = status, by = group)

d2 <- d |>
  dplyr::mutate(end = time + 1) |>
  long_to_periods(id = id, start = time, stop = end, by = status)
d2
d2 |> plot_periods(
  id = id,
  start = time,
  stop = end,
  fill = status,
  colour = "black",
  height = 0.8
)
```

---

|            |                            |
|------------|----------------------------|
| proportion | <i>Compute proportions</i> |
|------------|----------------------------|

---

**Description**

`proportion()` lets you quickly count observations (like `dplyr::count()`) and compute relative proportions. Proportions are computed separately by group (see examples).

**Usage**

```
proportion(data, ...)  
  
## S3 method for class 'data.frame'  
proportion(  
  data,  
  ...,  
  .by = NULL,  
  .na.rm = FALSE,  
  .weight = NULL,  
  .scale = 100,  
  .sort = FALSE,  
  .drop = FALSE,  
  .drop_na_by = FALSE,  
  .conf.int = FALSE,  
  .conf.level = 0.95,  
  .options = list(correct = TRUE)  
)  
  
## S3 method for class 'survey.design'  
proportion(  
  data,  
  ...,  
  .by = NULL,  
  .na.rm = FALSE,  
  .scale = 100,  
  .sort = FALSE,  
  .drop_na_by = FALSE,  
  .conf.int = FALSE,  
  .conf.level = 0.95,  
  .options = NULL  
)  
  
## Default S3 method:  
proportion(  
  data,  
  ...,  
  .na.rm = FALSE,
```

```

    .scale = 100,
    .sort = FALSE,
    .drop = FALSE,
    .conf.int = FALSE,
    .conf.level = 0.95,
    .options = list(correct = TRUE)
  )

```

## Arguments

|                          |                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>data</code>        | A vector, a data frame, data frame extension (e.g. a tibble), or a survey design object.                                                             |
| <code>...</code>         | <data-masking> Variable(s) for those computing proportions.                                                                                          |
| <code>.by</code>         | <tidy-select> Optional additional variables to group by (in addition to those eventually previously declared using <code>dplyr::group_by()</code> ). |
| <code>.na.rm</code>      | Should NA values be removed (from variables declared in <code>...</code> )?                                                                          |
| <code>.weight</code>     | <data-masking> Frequency weights. Can be NULL or a variable.                                                                                         |
| <code>.scale</code>      | A scaling factor applied to proportion. Use 1 for keeping proportions unchanged.                                                                     |
| <code>.sort</code>       | If TRUE, will show the highest proportions at the top.                                                                                               |
| <code>.drop</code>       | If TRUE, will remove empty groups from the output.                                                                                                   |
| <code>.drop_na_by</code> | If TRUE, will remove any NA values observed in the <code>.by</code> variables (or variables defined with <code>dplyr::group_by()</code> ).           |
| <code>.conf.int</code>   | If TRUE, will estimate confidence intervals.                                                                                                         |
| <code>.conf.level</code> | Confidence level for the returned confidence intervals.                                                                                              |
| <code>.options</code>    | Additional arguments passed to <code>stats::prop.test()</code> or <code>srvyr::survey_prop()</code> .                                                |

## Value

A tibble.

A tibble with one row per group.

## Examples

```

# using a vector
titanic$Class |> proportion()

# univariable table
titanic |> proportion(Class)
titanic |> proportion(Class, .sort = TRUE)
titanic |> proportion(Class, .conf.int = TRUE)
titanic |> proportion(Class, .conf.int = TRUE, .scale = 1)

# bivariable table
titanic |> proportion(Class, Survived) # proportions of the total
titanic |> proportion(Survived, .by = Class) # row proportions
titanic |> # equivalent syntax
  dplyr::group_by(Class) |>

```

```

    proportion(Survived)

# combining 3 variables or more
titanic |> proportion(Class, Sex, Survived)
titanic |> proportion(Sex, Survived, .by = Class)
titanic |> proportion(Survived, .by = c(Class, Sex))

# missing values
dna <- titanic
dna$Survived[c(1:20, 500:530)] <- NA
dna |> proportion(Survived)
dna |> proportion(Survived, .na.rm = TRUE)

## SURVEY DATA -----

ds <- srvyr::as_survey(titanic)

# univariable table
ds |> proportion(Class)
ds |> proportion(Class, .sort = TRUE)
ds |> proportion(Class, .conf.int = TRUE)
ds |> proportion(Class, .conf.int = TRUE, .scale = 1)

# bivariable table
ds |> proportion(Class, Survived) # proportions of the total
ds |> proportion(Survived, .by = Class) # row proportions
ds |> dplyr::group_by(Class) |> proportion(Survived)

# combining 3 variables or more
ds |> proportion(Class, Sex, Survived)
ds |> proportion(Sex, Survived, .by = Class)
ds |> proportion(Survived, .by = c(Class, Sex))

# missing values
dsna <- srvyr::as_survey(dna)
dsna |> proportion(Survived)
dsna |> proportion(Survived, .na.rm = TRUE)

```

---

|                    |                                                           |
|--------------------|-----------------------------------------------------------|
| round_preserve_sum | <i>Round values while preserve their rounded sum in R</i> |
|--------------------|-----------------------------------------------------------|

---

## Description

Sometimes, the sum of rounded numbers (e.g., using `base::round()`) is not the same as their rounded sum.

## Usage

```
round_preserve_sum(x, digits = 0)
```

**Arguments**

|        |                                  |
|--------|----------------------------------|
| x      | Numerical vector to sum.         |
| digits | Number of decimals for rounding. |

**Details**

This solution applies the following algorithm

- Round down to the specified number of decimal places
- Order numbers by their remainder values
- Increment the specified decimal place of values with  $k$  largest remainders, where  $k$  is the number of values that must be incremented to preserve their rounded sum

**Value**

A numerical vector of same length as x.

**Source**

<https://biostatmatt.com/archives/2902>

**Examples**

```
sum(c(0.333, 0.333, 0.334))
round(c(0.333, 0.333, 0.334), 2)
sum(round(c(0.333, 0.333, 0.334), 2))
round_preserve_sum(c(0.333, 0.333, 0.334), 2)
sum(round_preserve_sum(c(0.333, 0.333, 0.334), 2))
```

---

safe\_pal

*A safe discrete colour palette*


---

**Description**

Provides a safe colour palette for categorical variable. It is based on Paul Tol's colour schemes designed to be distinct for all people, including colour-blind readers, distinct from black and white, distinct on screen and paper, and matching well together. It is primarily based on the *bright* colour scheme implemented in `khroma::scale_fill_bright()`. This colour scheme include 7 colours, including a grey reserved for NA values. Therefore, `scale_fill_safe()` use the *bright* scheme only if 6 or less colours are needed (keeping the grey for any NA value). If 7 to 9 colours are needed, the *muted* scheme (cf. `khroma::scale_fill_muted()`) is used instead. Finally, if 10 or more colours are requested, the *rainbow* scheme is used (cf. `khroma::scale_fill_discrete_rainbow()`). This is a sequential colour scheme. Here, colour are randomly reordered to provide more contrasts between modalities.

**Usage**

```
safe_pal(reverse = FALSE)

scale_fill_safe(
  name = ggplot2::waiver(),
  ...,
  reverse = FALSE,
  aesthetics = "fill",
  na.value = "#BBBBBB"
)

scale_colour_safe(
  name = ggplot2::waiver(),
  ...,
  reverse = FALSE,
  aesthetics = "colour",
  na.value = "#BBBBBB"
)

scale_color_safe(
  name = ggplot2::waiver(),
  ...,
  reverse = FALSE,
  aesthetics = "colour",
  na.value = "#BBBBBB"
)
```

**Arguments**

|                         |                                                                                                                                                                                                                                                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>reverse</code>    | A logical scalar: should the resulting vector of colours be reversed?                                                                                                                                                                                                                 |
| <code>name</code>       | The name of the scale. Used as the axis or legend title. If <code>ggplot2::waiver()</code> , the default, the name of the scale is taken from the first mapping used for that aesthetic. If <code>NULL</code> , the legend title will be omitted.                                     |
| <code>...</code>        | Other arguments passed on to <code>discrete_scale()</code> to control name, limits, breaks, labels and so forth.                                                                                                                                                                      |
| <code>aesthetics</code> | Character string or vector of character strings listing the name(s) of the aesthetic(s) that this scale works with. This can be useful, for example, to apply colour settings to the colour and fill aesthetics at the same time, via <code>aesthetics = c("colour", "fill")</code> . |
| <code>na.value</code>   | Colour to be used for NA values (if any).                                                                                                                                                                                                                                             |

**Value**

A palette function.

**Examples**

```
scales::show_col(safe_pal()(6))
scales::show_col(safe_pal(reverse = TRUE)(6))
scales::show_col(safe_pal()(9))
scales::show_col(safe_pal()(16))

ggplot2::ggplot(titanic) +
  ggplot2::aes(x = Age, fill = Class) +
  ggplot2::geom_bar() +
  scale_fill_safe()

ggplot2::ggplot(iris) +
  ggplot2::aes(x = Petal.Length, y = Petal.Width, colour = Species) +
  ggplot2::geom_point(size = 3) +
  scale_colour_safe()
```

---

|              |                                                         |
|--------------|---------------------------------------------------------|
| step_with_na | <i>Apply step(), taking into account missing values</i> |
|--------------|---------------------------------------------------------|

---

## Description

When your data contains missing values, concerned observations are removed from a model. However, then at a later stage, you try to apply a descending stepwise approach to reduce your model by minimization of AIC, you may encounter an error because the number of rows has changed.

## Usage

```
step_with_na(model, ...)

## Default S3 method:
step_with_na(model, ..., full_data = eval(model$call$data))

## S3 method for class 'svyglm'
step_with_na(model, ..., design)
```

## Arguments

|           |                                                                       |
|-----------|-----------------------------------------------------------------------|
| model     | A model object.                                                       |
| ...       | Additional parameters passed to <a href="#">stats::step()</a> .       |
| full_data | Full data frame used for the model, including missing data.           |
| design    | Survey design previously passed to <a href="#">survey::svyglm()</a> . |

## Details

step\_with\_na() applies the following strategy:

- recomputes the models using only complete cases;
- applies [stats::step\(\)](#);

- recomputes the reduced model using the full original dataset.

`step_with_na()` has been tested with `stats::lm()`, `stats::glm()`, `nnet::multinom()`, `survey::svyglm()` and `survival::coxph()`. It may be working with other types of models, but with no warranty.

In some cases, it may be necessary to provide the full dataset initially used to estimate the model.

`step_with_na()` may not work inside other functions. In that case, you may try to pass `full_data` to the function.

## Value

The stepwise-selected model.

## Examples

```
set.seed(42)
d <- titanic |>
  dplyr::mutate(
    Group = sample(
      c("a", "b", NA),
      dplyr::n(),
      replace = TRUE
    )
  )
mod <- glm(as.factor(Survived) ~ ., data = d, family = binomial())
# step(mod) should produce an error
mod2 <- step_with_na(mod, full_data = d)
mod2

## WITH SURVEY -----

library(survey)
ds <- d |>
  dplyr::mutate(Survived = as.factor(Survived)) |>
  srvyr::as_survey()
mods <- survey::svyglm(
  Survived ~ Class + Group + Sex,
  design = ds,
  family = quasibinomial()
)
mod2s <- step_with_na(mods, design = ds)
mod2s
```

**Description**

This function allows to compare several means using `survey::svyglm()`. More precisely, this is a wrapper for `survey::regTermTest(m, "group")` where `m <- survey::svyglm(x ~ group, design)`.

**Usage**

```
svyoneway(formula, design, ...)
```

**Arguments**

|         |                                                                                                                                           |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------|
| formula | a formula of the form <code>lhs ~ rhs</code> where <code>lhs</code> gives the sample values and <code>rhs</code> the corresponding groups |
| design  | a survey design object                                                                                                                    |
| ...     | additional parameters passed to <code>survey::regTermTest()</code>                                                                        |

**Value**

an object of class "htest"

**See Also**

`stats::oneway.test()` for classic data frames

**Examples**

```
svyoneway(
  Petal.Length ~ Species,
  design = srvyr::as_survey(iris)
)
```

---

titanic

*Titanic data set in long format*


---

**Description**

This titanic dataset is equivalent to `datasets::Titanic |> dplyr::as_tibble() |> tidyr::uncount(n)`.

**Usage**

```
titanic
```

**Format**

An object of class `tbl_df` (inherits from `tbl`, `data.frame`) with 2201 rows and 4 columns.

See Also

[datasets::Titanic](#)

---

|           |                                 |
|-----------|---------------------------------|
| unrowwise | <i>Remove row-wise grouping</i> |
|-----------|---------------------------------|

---

Description

Remove row-wise grouping created with [dplyr::rowwise\(\)](#) while preserving any other grouping declared with [dplyr::group\\_by\(\)](#).

Usage

```
unrowwise(data)
```

Arguments

|      |           |
|------|-----------|
| data | A tibble. |
|------|-----------|

Value

A tibble.

Examples

```
titanic |> dplyr::rowwise()
titanic |> dplyr::rowwise() |> unrowwise()

titanic |> dplyr::group_by(Sex, Class) |> dplyr::rowwise()
titanic |> dplyr::group_by(Sex, Class) |> dplyr::rowwise() |> unrowwise()
```

---

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| view_dictionary | <i>Display the variable dictionary of a data frame in the RStudio viewer</i> |
|-----------------|------------------------------------------------------------------------------|

---

Description

Generates an interactive variable dictionary based on [labelled::look\\_for\(\)](#). Accepts data frames, tibbles, and also survey objects.

**Usage**

```
view_dictionary(data = NULL, details = c("basic", "none", "full"))

view_detailed_dictionary(data = NULL)

to_DT(
  x,
  caption = NULL,
  column_labels = list(pos = "#", variable = "Variable", col_type = "Type", label =
    "Variable label", values = "Values", missing = "Missing values", unique_values =
    "Unique values", na_values = "User-defined missings (values)", na_range =
    "User-defined missings (range)")
)
```

**Arguments**

|               |                                                                                                                                                                                  |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| data          | a data frame, a tibble or a survey object (if NULL, will use the text you currently select in <b>RStudio</b> , useful if the function is called through the corresponding addin) |
| details       | add details about each variable (see <a href="#">labelled::look_for()</a> )                                                                                                      |
| x             | a tibble returned by <a href="#">look_for()</a>                                                                                                                                  |
| caption       | an optional caption for the table                                                                                                                                                |
| column_labels | Optional column labels                                                                                                                                                           |

**Details**

`view_dictionary()` calls [labelled::look\\_for\(\)](#) and applies `to_DT()` to the result to produce an HTML version of the variable dictionary. If you are using **RStudio**, it will be displayed by default in the *Viewer* pane, allowing to have the dictionary close to your code.

`view_detailed_dictionary()` is similar to `view_dictionary()` with the option `details = "full"`.

These two functions are also available through dedicated addins in **RStudio**. To use them, select the name of a data frame, then choose *View variable dictionary* in the *Addins* menu.

**Note**

`to_DT()` is an utility to convert the result of [labelled::look\\_for\(\)](#) into a `DT::datatable()`.

**Examples**

```
iris |> view_dictionary()

iris |> labelled::look_for(details = TRUE) |> to_DT()
```

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