# Package 'ggfacto'

October 22, 2021

**Title** Graphs for Correspondence Analysis

**Version** 0.2.2

**Description** Readable, complete and pretty graphs for correspondence analysis made with 'FactoMineR'. They can be rendered as interactive 'HTML' plots, showing useful informations at mouse hover. The interest is not mainly visual but statistical: it helps the reader to keep in mind the data contained in the cross-table or Burt table while reading the correspondence analysis, thus preventing over-interpretation. Graphs are made with 'ggplot2', which means that you can use the + syntax to manually add as many graphical pieces you want, or change theme elements.

**URL** https://github.com/BriceNocenti/ggfacto

**BugReports** https://github.com/BriceNocenti/ggfacto/issues

**License** GPL (>= 3)

**Encoding** UTF-8

**RoxygenNote** 7.1.1

**Imports** magrittr (>= 1.5.0), FactoMineR (>= 2.0.0), ggiraph (>= 0.7.0), ggplot2 (>= 3.0.0), widgetframe (>= 0.3.0), dplyr (>= 1.0.0), forcats (>= 0.5.0), purrr (>= 0.3.0), rlang (>= 0.4.0), stringi (>= 1.4.6), stringr (>= 1.4.0), tibble (>= 3.0.0), tidyr (>= 1.0.0), tidyselect (>= 1.1.0), vctrs (>= 0.3.0), ggrepel (>= 0.9.0), gridExtra (>= 2.0), tabxplor (>= 1.0.0), stats (>= 4.0.0), grDevices (>= 4.0.0), htmlwidgets (>= 1.4.0), kableExtra (>= 1.3.0)

**Suggests** finalfit (>= 1.0.0)

**NeedsCompilation** no

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**Repository** CRAN

**Date/Publication** 2021-10-22 07:40:02 UTC

# R topics documented:



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ggca *Readable and Interactive graph for simple correspondence analysis*

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## Description

A readable, complete and beautiful graph for simple correspondence analysis made with `FactoMineR::CA`. Interactive tooltips, appearing when hovering on points with mouse, allow to keep in mind all the content of the table while reading the graph. Since it is made in the spirit of `ggplot2`, it is possible to change theme or add another plot elements with +. Then, interactive tooltips won't appear until you pass the result through `ggi`.

## Usage

```
ggca(
  res.ca = res.ca,
  axes = c(1, 2),
  show_sup = FALSE,
  xlim,
  ylim,
  out_lims_move = FALSE,
  type = c("points", "text", "labels"),
  text_repel = FALSE,
  uppercase = "col",
  tooltips = "row",
  rowtips_subtitle = "Row pct",
  coltips_subtitle = "Column pct",
  rowcolor_numbers = 0,
  colcolor_numbers = 0,
  cleannames = TRUE,
  filter = "",
  title,
  text_size = 3.5,
  dist_labels = c("auto", 0.12),
  right_margin = 0,
```

```
  size_scale_max = 8,
  use_theme = TRUE
)
```

## Arguments

| | |
|---|---|
| res.ca | An object created with FactoMineR::CA. |
| axes | The axes to print, as a numeric vector of length 2. |
| show_sup | When TRUE show supplementary rows and cols. |
| xlim, ylim | Horizontal and vertical axes limits, as double vectors of length 2. |
| out_lims_move | When TRUE, the points out of xlim or ylim are not removed, but moved at the edges of the graph. |
| type | Determines the way the two variables of the table are printed.<br>• "points" : colored points with text legends<br>• "text" : colored text<br>• "labels" : colored labels |
| text_repel | When TRUE the graph is not interactive anymore, but the resulting image is better to print because points and labels don't overlaps. It uses ggrepel::geom_text_repel. |
| uppercase | Print "row" var or "col" var labels with uppercase. |
| tooltips | Choose the content of interactive tooltips at mouse hover : "col" for the table of columns percentages, "row" for line percentages, c("row","col") for both. |
| rowtips_subtitle, coltips_subtitle | The subtitles used before the table in interactive tooltips. |
| rowcolor_numbers, colcolor_numbers | If row var or col var levels are prefixed with numbers(ex. : "1-" ), the number of digits to use to create classes that will be used to add colors to points. |
| cleannames | Set to TRUE to clean levels names, by removing prefix numbers like "1-", and text in parentheses. |
| filter | Regex patterns to discard levels of row or col variables. |
| title | The title of the graph. |
| text_size | Size of text. |
| dist_labels | When type = "points", the distance of text and labels from points. |
| right_margin | A margin at the right, in cm. Useful to read tooltips over points placed at the right of the graph without formatting problems. |
| size_scale_max | Size of points. |
| use_theme | By default, a specific **ggplot2** theme is used. Set to FALSE to customize your own theme. |

## Value

A ggplot object to be printed in the 'RStudio' Plots pane. Possibility to add other gg objects with +. Sending the result through ggi will draw the interactive graph in the Viewer pane using ggiraph.

## Examples

```
# Make the correspondence analysis :

tabs <- table(forcats::gss_cat$race, forcats::gss_cat$marital)[-4,]
# tabs <- tabxplor::tab_plain(forcats::gss_cat, race, marital, df = TRUE)
res.ca <- FactoMineR::CA(tabs, graph = FALSE)

# Interactive plot :
graph.ca <- ggca(res.ca,
                 title = "Race by marical : correspondence analysis",
                 tooltips = c("row", "col"))
ggi(graph.ca) #to make the plot interactive

# Image plot :
ggca(res.ca,
     title = "Race by marical : correspondence analysis",
     text_repel = TRUE)
```

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# ggi *Pass a MCA plot into a html interactive plot*

---

## Description

Pass a MCA plot into a html interactive plot

## Usage

```
ggi(
  plot = ggplot2::last_plot(),
  width = NULL,
  height = NULL,
  keep_ratio = TRUE,
  savewidget = FALSE,
  dir = NULL,
  name = "Plot",
  replace = FALSE,
  open = rlang::is_interactive(),
  iframe = NULL,
  pixel_width,
  ...
)
```

## Arguments

| | |
|---|---|
| plot | The plot, created with ggmca or ggca. |
| width | The width in centimeters. Default to printing device's size. |

| | |
|---|---|
| height | The height in centimeters. Default to printing device's size. |
| keep_ratio | By default, the height is forced based of the relative size of the MCA's axes. Set to FALSE to avoid this behavior. |
| savewidget | Should the html widget be saved on disk ? |
| dir | If saved as file, the directory in which to save the html widget. Default to temporary directory. Set global option "ggfacto.export_dir" with link[base:options]{options} to change default directory. |
| name | The name of the file to save. |
| replace | Replace file ? By default, number added to find a new name. |
| open | Should the resulting file be opened at once ? |
| iframe | Create an html frame around the plot to ensure fixed dimensions. Useful when opening the plot in a web browser (but will produce a blank graph with **rmarkdown**). This is default behavior with savewidget = TRUE. |
| pixel_width | The width in pixels for widgetframe. |
| ... | Additional arguments to pass to girafe and dsvg. fonts can be used to provide text fonts. |

## Value

An html plot.

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ggmca *Readable and Interactive graph for multiple correspondence analysis*

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## Description

A readable, complete and beautiful graph for multiple correspondence analysis made with FactoMineR::MCA. Interactive tooltips, appearing when hovering near points with mouse, allow to keep in mind many important data (tables of active variables, and additional chosen variables) while reading the graph. Profiles of answers (from the graph of "individuals") are drawn in the back, and can be linked to FactoMineR::HCPC classes. Since it is made in the spirit of ggplot2, it is possible to change theme or add another plot elements with +. Then, interactive tooltips won't appear until you pass the result through ggi. Step-by-step functions : use ggmca_data to get the data frames with every parameter in a MCA printing, then modify, and pass to ggmca_plot to draw the graph.

## Usage

```
ggmca(
  res.mca = res.mca,
  sup_vars,
  tooltip_vars_1lv,
  tooltip_vars,
  axes = c(1, 2),
  axes_names = NULL,
```

```
  type = c("text", "points", "labels", "active_vars_only", "numbers"),
  cleannames = TRUE,
  keep_levels,
  discard_levels,
  profiles = TRUE,
  profiles_tooltip_discard = "^Not |^No |^Pas |^Non ",
  cah,
  max_profiles,
  nb_char_for_color = rep(0, length(sup_vars)),
  text_repel = FALSE,
  title,
  actives_in_bold = FALSE,
  ellipses = NULL,
  xlim,
  ylim,
  out_lims_move = FALSE,
  color_profiles,
  base_profiles_color = "#dddddd",
  shift_colors = 0,
  colornames_recode,
  scale_color_light = material_colors_light(),
  scale_color_dark = material_colors_dark(),
  text_size = 3,
  size_scale_max = 8,
  dist_labels = c("auto", 0.04),
  right_margin = 0,
  use_theme = TRUE
)

ggmca_data(
  res.mca = res.mca,
  sup_vars,
  tooltip_vars_1lv,
  tooltip_vars,
  cleannames = TRUE,
  keep_levels,
  discard_levels,
  profiles = TRUE,
  profiles_tooltip_discard = "^Pas |^Non |^Not |^No ",
  cah,
  max_profiles,
  nb_char_for_color = rep(0, length(sup_vars))
)

ggmca_plot(
  data,
  axes = c(1, 2),
  axes_names = NULL,
```

```
  type = c("text", "points", "labels", "active_vars_only", "numbers", "facets"),
  text_repel = FALSE,
  title,
  actives_in_bold = FALSE,
  ellipses = NULL,
  xlim,
  ylim,
  out_lims_move = FALSE,
  color_profiles,
  base_profiles_color = "#dddddd",
  shift_colors = 0,
  colornames_recode,
  scale_color_light = material_colors_light(),
  scale_color_dark = material_colors_dark(),
  text_size = 3,
  size_scale_max = 8,
  dist_labels = c("auto", 0.04),
  right_margin = 0,
  use_theme = TRUE
)
```

## Arguments

| | |
|---|---|
| `res.mca` | An object created with `FactoMineR::MCA`. |
| `sup_vars` | A character vectors of supplementary qualitative variables to print. They must have been passed in `MCA` before. |
| `tooltip_vars_1lv` | A character vectors of variables, whose first level (if character/factor) or weighted_mean (if numeric) will be added at the top of interactive tooltips. |
| `tooltip_vars` | A character vector of variables (character/factors), whose complete levels will be added at the bottom of interactive tooltips. |
| `axes` | The axes to print, as a numeric vector of length 2. |
| `axes_names` | Names of all the axes (not just the two selected ones), as a character vector. |
| `type` | Determines the way `sup_vars` are printed.<br>• `"text"` : colored text<br>• `"points"` : colored points with text legends<br>• `"labels"` : colored labels<br>• `"active_vars_only"` : no `sup_vars`<br>• `"numbers"` : colored labels of prefix numbers, with small names<br>• `"facets"` : one graph of profiles of answer for each levels of the first `sup_vars`. A different color is used for each. |
| `cleannames` | Set to `TRUE` to clean levels names, by removing prefix numbers like `"1-"`, and text in parentheses. |
| `keep_levels` | A character vector of variables levels to keep : others will be discarded. |
| `discard_levels` | A character vector of variables levels to discard. |

`profiles` When `TRUE`, profiles of answers are drawn in the back of the graph with light-grey points. When hovering with mouse, the answers of individuals to active variables will appears. If `cah` is provided, to hover near one point will color all the points of the same `HCPC` class.

`profiles_tooltip_discard`
A regex pattern to remove useless levels among interactive tooltips for profiles of answers (ex. : levels expressing "no" answers).

`cah` A variable made with `HCPC`, to link the answers-profiles points who share the same ICPC class (will be colored together at mouse hover).

`max_profiles` The maximum number of profiles points to print.

`nb_char_for_color`
If `sup_vars` are prefixed with numbers, the number of characters to use to create classes that will be used to add colors to points.

`text_repel` When `TRUE` the graph is not interactive anymore, but the resulting image is better to print because points and labels don't overlaps. It uses `ggrepel::geom_text_repel`.

`title` The title of the graph.

`actives_in_bold`
Should active variables be in bold font, or sup variables ?

`ellipses` Set to a number between 0 and 1 to draw a concentration ellipse for each level of the first `sup_vars`. `0.95` draw ellipses containing 95 individuals of each category. `0.5` draw median-ellipses, containing half the individuals of each category.

`xlim, ylim` Horizontal and vertical axes limits, as double vectors of length 2.

`out_lims_move` When `TRUE`, the points out of `xlim` or `ylim` are not removed, but moved at the edges of the graph.

`color_profiles` If `cah` is provided, should the answers profiles be colored depending on their cah class ?

`base_profiles_color`
The base color for answers profiles. Default to gray. Set to 'NULL' to discard profiles. With 'color_profiles', set to 'NULL' to discard the non-colored profiles.

`shift_colors` Change colors of the `sup_vars` points.

`colornames_recode`
A named character vector with `fct_recode` style to rename the levels of the color variable if needed (levels used for colors are printed in console message whenever the function is used).

`scale_color_light`
A scale color for sup vars points

`scale_color_dark`
A scale color for sup vars texts

`text_size` Size of text.

`size_scale_max` Size of points.

`dist_labels` When `type = points`, the distance of labels from points.

`right_margin` A margin at the right, in cm. Useful to read tooltips over points placed at the right of the graph without formatting problems.

| | |
|---|---|
| use_theme | By default, a specific **ggplot2** theme is used. Set to FALSE to customize your own theme. |
| data | A list of data frames made with ggmca_data. |

## Value

A ggplot object to be printed in the 'RStudio' Plots pane. Possibility to add other gg objects with +. Sending the result through ggi will draw the interactive graph in the Viewer pane using ggiraph.

A list containing the data frames to pass to ggmca_plot.

A ggplot object.

## Functions

- ggmca_data: get the data frames with all parameters to print a MCA graph
- ggmca_plot: print MCA graph from data frames with parameters

## Examples

```
data(tea, package = "FactoMineR")
res.mca <- FactoMineR::MCA(tea, quanti.sup = 19, quali.sup = c(20:36), graph = FALSE)

res.mca %>%
  ggmca(sup_vars = c("SPC", "age_Q"), ylim = c(NA, 1.2)) %>%
  ggi()        #to make the graph interactive
#Concentration ellipses for each levels of a supplementary variable :
ggmca(res.mca, sup_vars = "SPC", ylim = c(NA, 1.2), ellipses = 0.5, text_repel = TRUE)

#Graph of profiles of answer for each levels of a supplementary variable :
ggmca(res.mca, sup_vars = "SPC", ylim = c(NA, 1.2), type = "facets", ellipses = 0.5)
```

---

# ggsave2 *Save a plot as image*

---

## Description

Save a plot as image

## Usage

```
ggsave2(
  plot = ggplot2::last_plot(),
  dir = NULL,
  name = "Plot",
  xt = "png",
  dpi = 600,
```

```
  width = 21,
  height,
  scale = 1,
  replace = FALSE,
  open = rlang::is_interactive()
)
```

## Arguments

| | |
|---|---|
| plot | The plot, created with **ggplot2**. |
| dir | If saved as file, the directory in which to save the html widget. Default to temporary directory. Set global option "ggfacto.export_dir" with link[base:options]{options} to change default directory. |
| name | The name of the file to save. |
| xt | The extension name, when saving as image (interactive graph will always be .html). |
| dpi | The resolution. |
| width | The width in centimeters. |
| height | The height in centimeters. By default, width/1.41. |
| scale | Fixed ratio between horizontal and vertical axes. |
| replace | Replace file ? By default, number added to find a new name. |
| open | Should the resulting file be opened at once ? |

## Value

Creates a file, and opens it in 'RStudio' viewer, as a side effect.

---

# material_colors_dark *Title Scale color dark for MCA.*

---

## Description

Title Scale color dark for MCA.

## Usage

```
material_colors_dark()
```

## Value

A character vector of color codes, with color names.

## Examples

```
material_colors_dark()
```

material_colors_light *Title Scale color light for MCA.*

## Description

Title Scale color light for MCA.

## Usage

```
material_colors_light()
```

## Value

A character vector of color codes, with color names.

## Examples

```
material_colors_light()
```

mca_interpret *Helper table to interpret multiple correspondence analysis*

## Description

A table to help to interpret the meaning of axes in multiple correspondence analysis (MCA), based on Brigitte Le Roux, *Analyse geometrique des donnees multidimensionnelles*, Dunod, Paris, 2014 / Brigitte Le Roux and Henri Rouanet, *Geometric data analysis : from correspondence analysis to structured data analysis*, Kluwer, Boston, 2004. Only levels whose relative contribution to the variance of axis is superior to the mean contribution are kept. The spread between positive levels and negative levels of the same variable is calculated in percentages of the variance of the question/variable.

## Usage

```
mca_interpret(res.mca = res.mca, axes = c(1, 2), type = c("html", "console"))
```

## Arguments

| | |
|---|---|
| res.mca | An object created with FactoMineR::MCA, |
| axes | The axes to interpret, as an integer vector. Default to axes 1 and 2. |
| type | By default, a html table is printed. Set to "console" to print in console or axes the numbers as a data.frame. |

## Value

An html table (or a tibble).

## Examples

```
data(tea, package = "FactoMineR")
res.mca <- FactoMineR::MCA(tea, quanti.sup = 19, quali.sup = c(20:36), graph = FALSE)
mca_interpret(res.mca)
```

---

`pers_or_plot` *Modified odd ratios plot from 'finalfit'*

---

## Description

Modified odd ratios plot from 'finalfit'

## Usage

```
pers_or_plot(
  .data,
  dependent,
  explanatory,
  random_effect = NULL,
  factorlist = NULL,
  glmfit = NULL,
  confint_type = NULL,
  remove_ref = FALSE,
  break_scale = NULL,
  column_space = c(-0.5, 0, 0.2),
  dependent_label = NULL,
  prefix = "",
  suffix = ": OR (95% CI, p-value)",
  table_text_size = 5,
  title_text_size = 18,
  plot_opts = NULL,
  table_opts = NULL,
  return_df = FALSE,
  ...
)
```

## Arguments

| | |
|---|---|
| `.data` | Data frame. |
| `dependent` | Character vector of length 1: name of dependent variable (must have 2 levels). |
| `explanatory` | Character vector of any length: name(s) of explanatory variables. |
| `random_effect` | Character vector of length 1, name of random effect variable. |
| `factorlist` | Option to provide output directly from `summary_factorlist()`. |
| `glmfit` | Option to provide output directly from `glmmulti()` and `glmmixed()`. |

| | |
|---|---|
| confint_type | One of c("profile","default") for GLM models or c("default","Wald","profile","boot") for glmer models. Note "default" == "Wald". |
| remove_ref | Logical. Remove reference level for factors. |
| break_scale | Manually specify x-axis breaks in format c(0.1,1,10). |
| column_space | Adjust table column spacing. |
| dependent_label | Main label for plot. |
| prefix | Plots are titled by default with the dependent variable. This adds text before that label. |
| suffix | Plots are titled with the dependent variable. This adds text after that label. |
| table_text_size | Alter font size of table text. |
| title_text_size | Alter font size of title text. |
| plot_opts | A list of arguments to be appended to the ggplot call by "+". |
| table_opts | A list of arguments to be appended to the ggplot table call by "+". |
| return_df | To return the dataframe. |
| ... | Other parameters. |

## Value

The odd ratios plot as a ggplot2 object.

---

# theme_facto *A ggplot2 Theme for Geometrical Data Analysis*

---

## Description

A ggplot2 Theme for Geometrical Data Analysis

## Usage

```
theme_facto(
  res,
  axes = c(1, 2),
  legend.position = c("none", "left", "right", "bottom", "top"),
  no_color_scale = FALSE,
  size_scale_max = 8,
  xlim,
  ylim
)
```

## Arguments

| | |
|---|---|
| res | An object created with FactoMineR::MCA, CA, etc. |
| axes | The axes to print, as a numeric vector of length 2. |
| legend.position | One of c("none","left","right","bottom","top"). |
| no_color_scale | When TRUE, you can provide color_scale next without warning. |
| size_scale_max | Maximum size of the points. |
| xlim | Horizontal axe limits. |
| ylim | Vertical axe limits. |

## Value

A list of ggplot2 objects.

# Index