# Package 'soc.ca'

February 9, 2016

**Title** Specific Correspondence Analysis for the Social Sciences

**Description** Specific and class specific multiple correspondence analysis on survey-like data. Soc.ca is optimized to the needs of the social scientist and presents easily interpretable results in near publication ready quality.

**URL** https://github.com/Rsoc/soc.ca

**Version** 0.7.3

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**Depends** R (>= 2.15.0), ggplot2

**Imports** gridExtra, ellipse, stats, utils, shiny, reshape2, ggrepel

**License** GPL-3

**RoxygenNote** 5.0.1

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2016-02-09 15:53:12

## R topics documented:

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add.count                          *Add a new layer of points on top of an existing plot with output from the min_cut function*

---

## Description

Add a new layer of points on top of an existing plot with output from the min_cut function

## Usage

```
add.count(x, p, label = TRUE, ...)
```

## Arguments

| | |
|---|---|
| x | a matrix created by the min_cut function |
| p | is a ggplot object, preferably from one of the mapping functions in soc.ca |
| label | if TRUE the labels of points will be shown |
| ... | further arguments are passed on to geom_path, geom_point and geom_text |

---

add.to.label *Add values to label*

---

**Description**

Adds values to the end of the label of each modality.

**Usage**

```
add.to.label(object, value = "freq", prefix = "default", suffix = ")",
  dim = 1)
```

**Arguments**

| | |
|---|---|
| object | is a soc.ca object |
| value | the type of values added to the labels. "freq" adds frequencies, "mass" adds mass values to the active modalities, "ctr" adds contribution values to the active modalities, "cor" adds correlation values. value also accepts any vector with the length of the number of active modalities. "linebreak" adds a linebreak \n after the first ":" in the label. |
| prefix | if "default" an appropriate prefix is used |
| suffix | the suffix |
| dim | the dimension from which values are retrieved |

**Value**

a soc.ca object with altered labels in names.mod and names.sup

**Examples**

```
example(soc.ca)
result.label  <- add.to.label(result)
result.label$names.mod
result.label  <- add.to.label(result, value = "ctr", dim = 2)
result.label$names.mod
result.label <- add.to.label(result, value = result$variable, prefix = " - ", suffix = "")
result.label$names.mod
result.label  <- add.to.label(result, value = "linebreak")
result.label$names.mod
map.ctr(result.label)
```

---

assign.label                    *Assign new labels*

---

### Description

Assigns new labels to a soc.ca object. The input labels are defined in a .csv file created by the export.label function.

### Usage

```
assign.label(object, file = FALSE, encoding = "UTF-8", sep = ",")
```

### Arguments

| | |
|---|---|
| object | is a soc.ca object |
| file | is the path of the .csv file with the new labels. The file is preferably created by the export.label function |
| encoding | is the encoding of the imported file |
| sep | is the seperator used to create the imported .csv file |

### Details

To use this function first export the labels from your soc.mca analysis with the export.label function. Then open and edit the created file with your favorite spreadsheet editor, like LibreOffice Calc. Change labels in the "new.label" column to the desired values and save. Use the assign.label function but remember to assign the results into a new object or overwrite the existing object.

### Value

a soc.ca object with altered labels in object$names.mod, object$names.ind and object$names.sup

### See Also

export.label, add.to.label

---

average.coord                   *Average coordinates*

---

### Description

Find the average coordinates for each category in a variable on two dimensions.

### Usage

```
average.coord(object, x, dim = c(1, 2))
```

## Arguments

| | |
|---|---|
| object | is soc.ca result object |
| x | is a variable of the same length and order as the active variables used to construct the soc.ca object |
| dim | is the two dimensions used |

## Value

a matrix with the mean points and frequencies of the given variable

## Examples

```
example(soc.ca)
average.coord(result, sup$Income)
```

---

| balance | *Contribution balance* |
|---|---|

---

## Description

Calculates the balance of the contribution of each dimension. This measure indicates whether too much of a dimensions contribution is placed on either the + or - side of the dimension.

## Usage

```
balance(object, act.dim = object$nd)
```

## Arguments

| | |
|---|---|
| object | is a soc.ca class object |
| act.dim | is the number of active dimensions to be measured |

## Value

A matrix with the share of contribution on each side of 0 and their balance (+/-)

## See Also

soc.mca, contribution

## Examples

```
example(soc.ca)
balance(result)
balance(result, act.dim = 3)
```

---

contribution                *Summaries of contribution values*

---

### Description

Different forms of contribution summaries for [soc.ca](soc.ca) objects. Results are presented according to the specified mode

### Usage

```
contribution(object, dim = 1, all = FALSE, indices = FALSE,
  mode = "sort")
```

### Arguments

| | |
|---|---|
| object | a [soc.ca](soc.ca) object |
| dim | the included dimensions |
| all | If TRUE returns all modalities instead of just those that contribute above average |
| indices | If TRUE; returns a vector with the row indices of the modalities or individuals |
| mode | indicates which form of output. Possible values: "sort", "mod", "ind", "variable". If the mode is "variable", dim can be a sequence of dimensions: 1:5 |

### Value

Each mode prints different results:

| | |
|---|---|
| "mod" | Ranks all modalities according to their contribution |
| "sort" | Ranks all modalities according to their contribution and then sorts them according to their coordinates |
| "ind" | Ranks all individuals according to their contribution |
| "variable" | Sorts all modalities according to their variable and sums the contributions per variable |

The values reported:

| | |
|---|---|
| Ctr | Contribution values in percentage. Contribution values for individuals are reported in permille |
| Coord | Principal coordinates |
| Cor | The correlation with the dimension |

### See Also

[map.ctr](map.ctr)

## Examples

```
example(soc.ca)
contribution(result)
contribution(result, 2)
contribution(result, dim = 3, all = TRUE)
contribution(result, indices = TRUE)
contribution(result, 1:2, mode = "variable")
```

---

| create.quadrant | *Create categories according to the quadrant position of each individual* |
|---|---|

---

### Description

Creates a vector from two dimensions from a soc.ca object. Labels are the cardinal directions with the first designated dimension running East - West. The center category is a circle defined by `cut.radius`.

### Usage

```
create.quadrant(object, dim = c(1, 2), cut.min = -0.125, cut.max = 0.125,
  cut.radius = 0.25)
```

### Arguments

| | |
|---|---|
| object | a soc.ca class object |
| dim | the dimensions |
| cut.min | Minimum cut value |
| cut.max | Maximum cut value |
| cut.radius | Radius of the center category |

### Value

Returns a character vector with category memberships

### See Also

soc.mca

### Examples

```
example(soc.ca)
create.quadrant(result, dim = c(2, 1))
table(create.quadrant(result, dim = c(1, 3), cut.radius = 0.5))
```

| csa.all | *Multiple Class Specific Correspondence Analysis on all values in a factor* |
|---|---|

### Description

`csa.all` performs a class specific correspondence analysis for each level in a factor variable. Returns a list with soc.csa objects and a list of measures defined by csa.measures

### Usage

```
csa.all(object, variable, dim = 1:5, ...)
```

### Arguments

| object | is a soc.ca class object created with soc.mca |
|---|---|
| variable | a factor with the same length and order as the active variables that created the soc.ca object |
| dim | is the dimension analyzed |
| ... | further arguments are directed to csa.measures |

### Value

| results | a list of soc.csa result objects |
|---|---|
| cor | a list of correlation matrixes |
| cosines | a list of matrixes with cosine values |
| angles | a list of matrixes with cosine angles between dimensions |

### See Also

soc.csa, cor, csa.measures

### Examples

```
example(soc.ca)
csa.all(result, taste$Age)
csa.all(result, taste$Age)$measures
```

csa.measures *CSA measures*

## Description

Several measures for the evaluation of the relations between the dimensions of the CSA and the dimensions the of original MCA

## Usage

```
csa.measures(csa.object, correlations = TRUE, cosines = TRUE,
  cosine.angles = TRUE, dim = 1:5, format = TRUE, ...)
```

## Arguments

| | |
|---|---|
| csa.object | is a "soc.csa" class object created by the soc.csa function |
| correlations | if TRUE correlations calculated by the cor function is returned |
| cosines | if TRUE cosine similarities are returned |
| cosine.angles | if TRUE angles are calculated in the basis of the cosine values |
| dim | is the dimensions included |
| format | if TRUE results are formatted, rounded and printed for screen reading, if FALSE the raw numbers are returned |
| ... | furhter arguments are send to the cor function |

## Value

A list of measures in either formatted or raw form.

## Examples

```
example(soc.csa)
csa.measures(res.csa)
csa.measures(res.csa, correlations = FALSE, cosine.angles = FALSE, dim = 1:10, format = FALSE)
```

directors *Directors dataset*

## Description

Prosopographical data on the top 100 CEO's from the 82 largest Danish corporations.

**Details**

The directors dataset is prosopographical data collected from a wide array of sources on biographic and corporate information. Sources include the Danish variant of Who's Who (Blaa Bog), a private business information database (Greens Erhvervsinformation), journalistic portrait articles, article search engines, bibliographic databases and financial reports. CEOs from 82 corporations were selected according to their position as CEO in December 2007. 18 executives are included on other criteria, taking into account the magnitude of the corporations and issues regarding ownership and control, resulting in a final population of 100 CEOs. The 82 corporations have formal ownership and management located in Denmark and were selected through either financial capital, measured as having a turnover of over five billion DKK (650 million Eur.), or organizational capital, defined as having at least 5000 employees; 34 corporations were included on both criteria, 45 on financial capital and three on organizational capital alone. To avoid including investors, rather than executives, a minimum of 500 employees was also required, excluding 12 firms. Companies acting only as subsidiaries were also excluded. Data is for public use and no author permission is needed, but we would love to hear from you if you find the data useful. The following example is based on the analysis from the article: "A Very Economic Elite: The Case of the Danish Top CEOs".

**Author(s)**

Christoph Ellersgaard

Anton Grau Larsen

**References**

Ellersgaard, Christoph, Anton Grau Larsen, og Martin D. Munk. 2012. "A Very Economic Elite: The Case of the Danish Top CEOs". Sociology.

Ellersgaard, Christoph Houman, og Anton Grau Larsen. 2010. "Firmaets Maend". Master Thesis, Copenhagen: University of Copenhagen.

Ellersgaard, Christoph Houman, og Anton Grau Larsen. 2011. "Kulturel kapital blandt topdirektoerer i Danmark - En domineret kapitalform?" Dansk Sociologi 22(3):9-29.

Larsen, Anton Grau, og Christoph Houman Ellersgaard. 2012. "Status og integration paa magtens felt for danske topdirektoerer". Praktiske Grunde. Nordisk tidsskrift for kultur- og samfundsvidenskab 2012(2-3).

**Examples**

```
## Not run:
data(directors)
attach(directors)


active      <- data.frame(careerprofile_maclean_cat, careerfoundation_maclean_cat,
                          years_between_edu_dir_cat, time_in_corp_before_ceo_cat,
                          age_as_ceo_cat, career_changes_cat2, mba, abroad, hd, phd,
                          education, author, placeofbirth, familyclass_bourdieu,
                          partnersfamily_in_whoswho, family_in_whoswho)

sup         <- data.frame(size_prestige, ownership_cat_2, sector, location)
```

```
id            <- navn

options(passive = c("MISSING", "Missing", "Irrelevant", "residence_value_cat2: Udlandet"))

result        <- soc.mca(active, sup, id)

result

# Contribution
contribution(result, 1)
contribution(result, 2)
contribution(result, 3)
contribution(result, 1, all = TRUE)
contribution(result, 1, indices = TRUE)
contribution(result, 1, mode = "mod")
contribution(result, mode = "variable")

# Individuals
contribution(result, 1, mode = "ind")
contribution(result, 2, mode = "ind")


# Table of variance
variance(result)

# Invert
result        <- invert(result, c(1, 2, 3))

# Export and assign label
# export.label(result)

# result       <- assign.label(result,
#  file = "https://raw.github.com/Rsoc/soc.ca/master/extra/director_labels.csv")



# Add.n
result        <- add.to.label(result)
contribution(result, 2)


# The result object or "soc.ca" object
str(result)
dim1 <- result$coord.ind[, 1]
qplot(dim1)

# Quadrant
quad         <- create.quadrant(result)
table(quad)
quad         <- create.quadrant(result, cut.min = 0, cut.max = 0)
table(quad)
```

```
# Map of individuals
map.ind(result)
map.ind(result, dim = c(2, 1), label = TRUE)
map.ind(result, dim = c(2, 1), point.size = 3, point.shape = 2)
map.ind(result, dim = c(2, 1), map.title = "The top 100 Danish CEO's",
point.color = quad)
# Map of the individuals colored by contribution
map.ind(result, point.color = result$ctr.ind[, 1],
 point.shape = 18) + scale_color_continuous(low = "white", high = "red")


# Map of contributing modalities
map.ctr(result, dim = c(2, 1))
map.ctr(result, dim = c(2, 1), ctr.dim = 2)
map.ctr(result, point.size = 3)

map.active(result, dim = c(2, 1))
map.sup(result, dim = c(2, 1))

# Plot.list

# Selecting specific active modalities
select      <- c("Career start: Corporation (n:57)", "No Phd (n:92)")
boo.select  <- match(select, result$names.mod)
map.select(result, list.mod = boo.select)

highcor     <- which(result$cor.mod[, 1] >= 0.2)
map.select(result, list.mod = highcor)

# Selecting specific supplementary modalities

highdim3    <- which(sqrt(result$coord.sup[, 3]^2) >= 0.5)
map.select(result, list.sup = highdim3)

# Selecting specific individuals based on a certain criteria

forfatter   <- author == "Forfatter"
map.select(result, list.ind = forfatter)

# Combining it all
map.select(result, list.mod = highcor, list.sup = highdim3, list.ind = forfatter)

# Add points to an existing plot
ctrplot     <- map.ctr(result, ctr.dim = 1, point.color = "red")
map.add(result, ctrplot, data.type = "ctr", ctr.dim = 2, point.color = "blue")

# Using the list option in add.points
forfatter     <- author == "Forfatter"
map.add(result, ctrplot, data.type = "select", list.ind = forfatter, colour = "purple")

# Using the list option in add.points to add labels to only a part of the cloud of individuals
forfatter      <- author == "Forfatter"
```

```
notforfatter  <- author != "Forfatter"
map.forfatter <- map.select(result, list.ind = notforfatter, label = FALSE)
map.forfatter
map.forfatter <- map.add(result, map.forfatter, data.type = "select", list.ind = forfatter)
map.forfatter

# Plotting all the modalities of one individual
result2       <- soc.ca(active, sup, id)
individual    <- which(id == "Lars Larsen")
ind.mat       <- indicator(active)
modalities    <- names(which(ind.mat[individual, ] == 1))
mod.ind       <- match(modalities, result2$names.mod)

lars          <- map.select(result2, list.mod = mod.ind)
map.add(result2, lars, data.type = "select", list.ind = individual, colour = "red")

# Adding concentration ellipses to an existing plot
el.forfatter  <- map.ellipse(result, map.forfatter, author)
el.forfatter

## End(Not run)
```

---

export                          *Export results from soc.ca*

---

### Description

Export objects from the soc.ca package to csv files.

### Usage

```
export(object, file = "export.csv", dim = 1:5)
```

### Arguments

| | |
|---|---|
| object | is a soc.ca class object |
| file | is the path and name of the .csv values are to be exported to |
| dim | is the dimensions to be exported |

### Value

A .csv file with various values in UTF-8 encoding

### See Also

soc.mca, contribution

---

export.label        *Exports the labels of a soc.ca object into a csv file.*

---

### Description

This function allows easy translation and renaming of modalities by exporting the labels into a .csv file that is easier to work with.

### Usage

```
export.label(object, file = FALSE, encoding = "UTF-8", overwrite = FALSE)
```

### Arguments

| | |
|---|---|
| object | is a soc.ca object |
| file | is the name and path of the exported file |
| encoding | is the character encoding of the exported file |
| overwrite | decides whether to overwrite already existing files |

### Details

Two columns are created within the .csv: 'New label' and 'Old label'. In the 'New label' column you write the new labels. Remember to leave 'Old label' unchanged as this column is used for matching.

If you want to add frequencies to the labels with the add.to.label function you should do this after exporting and assigning labels with the assign.label function. Otherwise the matching of the labels is likely to fail.

### Value

A .csv with two columns and preferably UTF-8 encoding.

---

ind.explorer        *Explore the cloud of individuals*

---

### Description

Explore the cloud of individuals

### Usage

```
ind.explorer(object, active, sup = NULL)
```

## Arguments

| | |
|---|---|
| object | a a soc.ca class object as created by soc.mca and soc.csa |
| active | Defines the active modalities in a data.frame with rows of individuals and columns of factors, without NA's' |
| sup | Defines the supplementary modalities in a data.frame with rows of individuals and columns of factors, without NA's |

## Value

an html application

## Examples

```
## Not run:
example(soc.mca)
ind.explorer(result, active, sup)

## End(Not run)
```

---

| indicator | *Indicator matrix* |
|---|---|

---

## Description

Creates an indicator matrix from a data.frame with questions as columns and individuals as rows.

## Usage

```
indicator(x, id = NULL, ps = ": ")
```

## Arguments

| | |
|---|---|
| x | a data.frame of factors |
| id | a vector defining the labels for the individuals. If id = NULL row number is used. |
| ps | the seperator used in the creation of the names of the columns (modalities). |

## Value

Returns a indicator matrix

## See Also

soc.mca

## Examples

```
a  <- rep(c("A","B"), 5)
b  <- rep(c("C", "D"), 5)
indicator(data.frame(a,b))
```

---

invert                          *Invert the direction of coordinates*

---

### Description

Invert one or more axes of a correspondence analysis. The principal coordinates of the analysis are multiplied by -1.

### Usage

```
invert(x, dim = 1)
```

### Arguments

x                    is a soc.ca object

dim                  is the dimensions to be inverted

### Details

This is a convieniency function as you would have to modify coord.mod, coord.ind and coord.sup in the soc.ca object.

### Value

a soc.ca object with inverted coordinates on the specified dimensions

### See Also

soc.mca, add.to.label

### Examples

```
example(soc.ca)
inverted.result  <- invert(result, 1:2)
result$coord.ind[1, 1:2]
inverted.result$coord.ind[1, 1:2]
```

| map.active | *Map the active modalities* |
|---|---|

### Description

Creates a map of the active modalities on two selected dimensions.

### Usage

```
map.active(object, dim = c(1, 2), point.shape = "variable",
  point.alpha = 0.8, point.fill = "whitesmoke", point.color = "black",
  point.size = "freq", label = TRUE, label.repel = FALSE,
  label.alpha = 0.8, label.color = "black", label.size = 4,
  label.fill = NULL, map.title = "active", labelx = "default",
  labely = "default", legend = NULL)
```

### Arguments

| | |
|---|---|
| object | a soc.ca class object as created by soc.mca and soc.csa |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| point.shape | a numerical value defining the shape of the points. If set to its default, the default scale is used. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| point.size | a numerical value defining the size of the points. If set to its default, the size is determined by the frequency of each modality. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See assign.label and add.to.label for ways to alter the labels. |
| label.repel | if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel. |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See geom_label_repel. |

| map.title | the title of the map. If set to its default the standard title is used. |
|---|---|
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the guides, theme and linkguide_legend functions from the ggplot2 package. |

## Examples

```
example(soc.ca)
map.active(result)
map.active(result, dim = c(2, 1))
map.active(result, point.size = result$ctr.mod[, 1],
 map.title = "All active modalities with size according to contribution")
```

---

| map.add | *Add points to an existing map created by one of the soc.ca mapping functions.* |
|---|---|

---

## Description

Add points to an existing map created by one of the soc.ca mapping functions.

## Usage

```
map.add(object, ca.map, plot.type = NULL, ctr.dim = 1, list.mod = NULL,
  list.sup = NULL, list.ind = NULL, point.shape = "variable",
  point.alpha = 0.8, point.fill = "whitesmoke", point.color = "black",
  point.size = "freq", label = TRUE, label.repel = TRUE,
  label.alpha = 0.8, label.color = "black", label.size = 4,
  label.fill = NULL, labelx = "default", labely = "default",
  legend = NULL)
```

## Arguments

| object | a soc.ca class object as created by soc.mca and soc.csa |
|---|---|
| ca.map | a map created using one of the soc.ca map functions |
| plot.type | defines which type of points to add to the map. Accepted values are: "mod", "sup", "ind", "ctr". These values correspond to the different forms of |
| ctr.dim | the dimensions of the contribution values |
| list.mod | a numerical vector indicating which active modalities to plot. It may also be a logical vector of the same length and order as the modalities in object$names.mod. |
| list.sup | a numerical vector indicating which supplementary modalities to plot. It may also be a logical vector of the same length and order as the modalities in object$names.sup. |

| | |
|---|---|
| list.ind | a numerical vector indicating which individuals to plot. It may also be a logical vector of the same length and order as the modalities in object$names.ind. |
| point.shape | a numerical value defining the shape of the points. If set to its default, the default scale is used. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| point.size | a numerical value defining the size of the points. If set to its default, the size is determined by the frequency of each modality. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See assign.label and add.to.label for ways to alter the labels. |
| label.repel | if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel. |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See geom_label_repel. |
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the guides, theme and linkguide_legend functions from the ggplot2 package. |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |

## Examples

```
example(soc.ca)
original.map    <- map.sup(result)
map.add(result, original.map, plot.type = "ctr", ctr.dim = 2)
map.add(result, map.ind(result), plot.type = "select",list.ind = 1:50,
 point.color = "red", label = FALSE, point.size = result$ctr.ind[1:50, 1]*2000)
```

---

map.array                    *Array of maps*

---

### Description

This function takes a list of map objects and arranges them into an array.

### Usage

```
map.array(x, ncol = 1, title = "", fixed.coord = TRUE, padding = 0.15)
```

### Arguments

| | |
|---|---|
| x | a list of objects created by one of the mapping functions in the soc.ca package or any other ggplot2 plot |
| ncol | the number of columns the plots are arranged into |
| title | the main title of the array |
| fixed.coord | if TRUE the limits of all plots are set to the same as the largest plot |
| padding | the distance between the most extreme position and the axis limit |

### Examples

```
## Not run:
example(soc.ca)
map.array(list(map.ind(result), map.mod(result)), ncol = 2)

## End(Not run)
```

---

map.csa.all                  *Array of several CSA maps*

---

### Description

Creates an array of Class Specific Mulitple Correspondence analysises

### Usage

```
map.csa.all(object, variable, dim = c(1, 2), ncol = 2, FUN = map.ind,
  fixed.coord = TRUE, main.title = "", titles = levels(variable), ...)
```

## Arguments

| | |
|---|---|
| `object` | a soc.ca result object |
| `variable` | a factor with the same order and length as those used for the active modalities in object |
| `dim` | indicates what dimensions to map and in which order to plot them |
| `ncol` | the number of columns the maps are arranged into |
| `FUN` | the mapping function used for the plots; map.active, map.ctr, map.ind, map.select or map.sup |
| `fixed.coord` | if TRUE the limits of all plots are set to the same as the largest plot |
| `main.title` | the main title for all the maps |
| `titles` | a vector of the same length as the number of levels in `variable`. These are the titles given to each subplot |
| `...` | sends any further arguments to the mapping functions |

## Examples

```
## Not run:
example(soc.csa)
map.csa.all(result, active[, 1])
map.csa.all(result, active[, 1], FUN = map.ctr, ctr.dim = 1)

## End(Not run)
```

---

| map.csa.mca | *Map the coordinates of the individuals in a CSA and its MCA* |
|---|---|

---

## Description

Map the coordinates of the individuals in a CSA and its MCA

## Usage

```
map.csa.mca(csa.object, mca.dim = 1, csa.dim = 1, smooth = TRUE,
  method = "auto")
```

## Arguments

| | |
|---|---|
| `csa.object` | a result object created by the soc.csa function |
| `mca.dim` | the dimension from the original MCA |
| `csa.dim` | the dimension from the CSA |
| `smooth` | if TRUE a line is added to the plot |
| `method` | the method used by ggplot to set the line see geom_smooth |

### See Also

soc.csa, map.csa.all, linkmap.csa.mca.array

### Examples

```
example(soc.csa)
csa.res  <- soc.csa(result, class.age)
map.csa.mca(csa.res, mca.dim = 2, csa.dim = 1)
```

---

map.csa.mca.array           *CSA-MCA array*

---

### Description

Create an array of map.csa.mca maps

### Usage

```
map.csa.mca.array(csa.object, ndim = 3, fixed.coord = TRUE, ...)
```

### Arguments

| | |
|---|---|
| csa.object | a result object created by the soc.csa function |
| ndim | the number of dimensions to include in the array, starting from 1 |
| fixed.coord | if TRUE the limits of all plots are set to the same as the largest plot |
| ... | for further arguments see map.csa.mca |

### Examples

```
example(soc.csa)
csa.res <- soc.csa(result, class.age)
map.csa.mca.array(csa.res, ndim = 3)
```

---

map.ctr                     *Map the most contributing modalities*

---

### Description

Creates a map of the modalities contributing above average to one or more dimensions on two
selected dimension.

## Usage

```
map.ctr(object, dim = c(1, 2), ctr.dim = 1, point.shape = "variable",
  point.alpha = 0.8, point.fill = "whitesmoke", point.color = "black",
  point.size = "freq", label = TRUE, label.repel = TRUE,
  label.alpha = 0.8, label.color = "black", label.size = 4,
  label.fill = NULL, map.title = "ctr", labelx = "default",
  labely = "default", legend = NULL)
```

## Arguments

| | |
|---|---|
| object | a soc.ca class object as created by [soc.mca](#) and [soc.csa](#) |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| ctr.dim | the dimensions of the contribution values |
| point.shape | a numerical value defining the shape of the points. If set to its default, the default scale is used. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See [colors](#) for some of the valid values. |
| point.size | a numerical value defining the size of the points. If set to its default, the size is determined by the frequency of each modality. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See [assign.label](#) and [add.to.label](#) for ways to alter the labels. |
| label.repel | if TRUE overlapping labels are rearranged, see [geom_text_repel](#) or [geom_label_repel](#). |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See [colors](#) for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See [geom_label_repel](#). |
| map.title | the title of the map. If set to its default the standard title is used. |
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the [guides](#), [theme](#) and linkguide_legend functions from the ggplot2 package. |

## Examples

```
example(soc.ca)
map.ctr(result)
map.ctr(result, ctr.dim = c(1, 2))
```

---

map.density                          *Density plot for the cloud of individuals*

---

### Description

Draws a 2d density plot on top of an existing soc.ca map. The density is calculated by the kde2d function from MASS and plotted by geom_density2d from ggplot2 map.density uses the coordinates of the individuals as a basis for the density calculation. Borders are arbitrary.

### Usage

```
map.density(object, map = map.ind(object), group = NULL, color = "red",
  alpha = 0.8, size = 0.5, linetype = "solid")
```

### Arguments

| | |
|---|---|
| object | a soc.ca class object |
| map | a soc.ca map object created by one of the soc.ca mapping functions |
| group | a factor determining group membership. Density is mapped for each group individually. |
| color | a single value or vector determining the color. See the scale functions of ggplot2 for ways to alter the scales. |
| alpha | a single value or vector determining the alpha. |
| size | a single value or vector determining the size of the lines. |
| linetype | a single value or vector determining the linetype |

### Examples

```
example(soc.ca)
map.density(result, map.ind(result, dim = 2:3, point.alpha = 0.2))
map.density(result, map.ind(result, legend = TRUE, point.alpha = 0.2),
 group = duplicated(active), color = duplicated(active),
 linetype = duplicated(active))
map.density(result, map.ctr(result))
```

map.ellipse                    *Concentration ellipses*

### Description

Add ellipses for each level in a factor to a plot made from a soc.ca object.

### Usage

```
map.ellipse(object, ca.plot = map.ind(object), variable,
  ellipse.label = TRUE, ellipse.color = "default", label.size = 4,
  draw.levels = 1:nlevels(variable), ellipse.line = "solid")
```

### Arguments

| | |
|---|---|
| object | is a soc.ca class object. |
| ca.plot | is a plot made from a soc.ca object. |
| variable | is a factor of the same length and in the same order as the active varibles used for the soc.ca object. |
| ellipse.label | if TRUE the labels are included in the map. |
| ellipse.color | defines the color of the ellipses. If "default" the globally defined default colors are used. Ellipse.color can be either length of 1 or equal to the number of drawn levels. |
| label.size | defines the size of the labels. |
| draw.levels | indicates the levels in the variable for which a ellipse is drawn. |
| ellipse.line | defines the type of line used for the ellipses. |

### Value

a plot with a concentration ellipse containing 80% of the individuals for each modality.

### See Also

map.ind, map.ctr

### Examples

```
example(soc.ca)
map <- map.ind(result)
map.ellipse(result, map, active[,2])
```

---

map.ellipse.array          *Ellipse array*

---

### Description

Create seperate maps with ellipses for each level in a factor arranged in an array.

### Usage

```
map.ellipse.array(object, variable, dim = c(1, 2), draw.ellipses = TRUE,
  ncol = 2, titles = levels(variable), main.title = "", ...)
```

### Arguments

| | |
|---|---|
| object | a soc.ca class object |
| variable | a factor of the same length as the data.frame used to create object |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| draw.ellipses | if TRUE ellipses are drawn |
| ncol | the number of columns the plots are arranged into |
| titles | a vector of the same length as the number of levels in variable. These are the titles given to each subplot |
| main.title | the main title for all the plots |
| ... | sends any further arguments to map.select and map.ellipse. |

### Examples

```
## Not run:
example(soc.ca)
map.ellipse.array(result, active[, 1])

## End(Not run)
```

---

map.ind          *Map the individuals of a soc.ca analysis*

---

### Description

Creates a map of the individuals on two selected dimension.

## Usage

```
map.ind(object, dim = c(1, 2), point.shape = 21, point.alpha = 0.8,
  point.fill = "whitesmoke", point.color = "black", point.size = 3,
  label = FALSE, label.repel = FALSE, label.alpha = 0.8,
  label.color = "black", label.size = 4, label.fill = NULL,
  map.title = "ind", labelx = "default", labely = "default",
  legend = NULL)
```

## Arguments

| | |
|---|---|
| object | a soc.ca class object as created by [soc.mca](#) and [soc.csa](#) |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| point.shape | a numerical value defining the shape of the points. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See [colors](#) for some of the valid values. |
| point.size | a numerical value defining the size of the points. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See [assign.label](#) and [add.to.label](#) for ways to alter the labels. |
| label.repel | if TRUE overlapping labels are rearranged, see [geom_text_repel](#) or [geom_label_repel](#). |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See [colors](#) for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See [geom_label_repel](#). |
| map.title | the title of the map. If set to its default the standard title is used. |
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the [guides](#), [theme](#) and linkguide_legend functions from the ggplot2 package. |

## Examples

```
example(soc.ca)
map.ind(result)
map.ind(result, map.title = "Each individual is given its shape according to a value in a factor",
 point.shape = active[, 1], legend = TRUE)
map  <- map.ind(result, map.title = "The contribution of the individuals with new scale",
 point.color = result$ctr.ind[, 1], point.shape = 18)
map + scale_color_continuous(low = "white", high = "red")
quad   <- create.quadrant(result)
map.ind(result, map.title = "Individuals in the space given shape and color by their quadrant",
 point.shape = quad, point.color = quad)
```

---

map.mod                         *Map all modalities*

---

## Description

Creates a map of all active and supplementary modalities on two selected dimension.

## Usage

```
map.mod(object, dim = c(1, 2), point.shape = "variable",
  point.alpha = 0.8, point.fill = "whitesmoke", point.color = "black",
  point.size = "freq", label = TRUE, label.repel = FALSE,
  label.alpha = 0.8, label.color = "black", label.size = 4,
  label.fill = NULL, map.title = "mod", labelx = "default",
  labely = "default", legend = NULL)
```

## Arguments

| | |
|---|---|
| object | a soc.ca class object as created by soc.mca and soc.csa |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| point.shape | a numerical value defining the shape of the points. If set to its default, the default scale is used. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| point.size | a numerical value defining the size of the points. If set to its default, the size is determined by the frequency of each modality. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See assign.label and add.to.label for ways to alter the labels. |

| | |
|---|---|
| label.repel | if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel. |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See geom_label_repel. |
| map.title | the title of the map. If set to its default the standard title is used. |
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the guides, theme and linkguide_legend functions from the ggplot2 package. |

## Examples

```
example(soc.ca)
map.mod(result)
map.mod(result, dim = c(3, 2), point.size = 2)
```

---

| | |
|---|---|
| map.path | *Map path along an ordered variable* |

---

## Description

Plot a path along an ordered variable. If the variable is numerical it is cut into groups by the min_cut function.

## Usage

```
map.path(object, x, map = map.ind(object, dim), dim = c(1, 2),
  label = TRUE, min.size = length(x)/10, ...)
```

## Arguments

| | |
|---|---|
| object | is a soc.ca result object |
| x | is an ordered vector, either numerical or factor |
| map | is a plot object created with one of the mapping functions in the soc.ca package |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| label | if TRUE the label of the points are shown |
| min.size | is the minimum size given to the groups of a numerical variable, see min_cut. |
| ... | further arguments are passed onto geom_path, geom_point and geom_text from the ggplot2 package |

## Examples

```
example(soc.ca)
map <- map.ind(result, point.color = as.numeric(sup$Age))
map <- map + scale_color_continuous(high = "red", low = "yellow")
map.path(result, sup$Age, map)
```

---

map.select                          *Map select modalities and individuals*

---

## Description

Creates a map of selected modalities or individuals

## Usage

```
map.select(object, dim = c(1, 2), ctr.dim = 1, list.mod = NULL,
  list.sup = NULL, list.ind = NULL, point.shape = "variable",
  point.alpha = 0.8, point.fill = "whitesmoke", point.color = "black",
  point.size = "freq", label = TRUE, label.repel = FALSE,
  label.alpha = 0.8, label.color = "black", label.size = 4,
  label.fill = NULL, map.title = "select", labelx = "default",
  labely = "default", legend = NULL, ...)
```

## Arguments

| | |
|---|---|
| object | a soc.ca class object as created by [soc.mca](#) and [soc.csa](#) |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| ctr.dim | the dimensions of the contribution values |
| list.mod | a numerical vector indicating which active modalities to plot. It may also be a logical vector of the same length and order as the modalities in object$names.mod. |
| list.sup | a numerical vector indicating which supplementary modalities to plot. It may also be a logical vector of the same length and order as the modalities in object$names.sup. |
| list.ind | a numerical vector indicating which individuals to plot. It may also be a logical vector of the same length and order as the modalities in object$names.ind. |
| point.shape | a numerical value defining the shape of the points. If set to its default, the default scale is used. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See [colors](#) for some of the valid values. |

| | |
|---|---|
| point.size | a numerical value defining the size of the points. If set to its default, the size is determined by the frequency of each modality. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See as-sign.label and add.to.label for ways to alter the labels. |
| label.repel | if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel. |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See geom_label_repel. |
| map.title | the title of the map. If set to its default the standard title is used. |
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the guides, theme and guide_legend functions from the ggplot2 package. |
| ... | further arguments are currently ignored. |

## Examples

```
example(soc.ca)
map.select(result, map.title = "Map of the first ten modalities", list.mod = 1:10)
select   <- active[, 3]
select   <- select == levels(select)[2]
map.select(result, map.title = "Map of all individuals sharing a particular value",
 list.ind = select, point.size = 3)
map.select(result, map.title = "Map of both select individuals and modalities",
 list.ind = select, list.mod = 1:10)
```

---

map.sup                          *Map the supplementary modalities*

---

## Description

Creates a map of the supplementary modalities on two selected dimension.

## Usage

```
map.sup(object, dim = c(1, 2), point.shape = "variable",
  point.alpha = 0.8, point.fill = "whitesmoke", point.color = "black",
  point.size = "freq", label = TRUE, label.repel = TRUE,
  label.alpha = 0.8, label.color = "black", label.size = 4,
  label.fill = NULL, map.title = "sup", labelx = "default",
  labely = "default", legend = NULL)
```

## Arguments

| | |
|---|---|
| object | a soc.ca class object as created by soc.mca and soc.csa |
| dim | the dimensions in the order they are to be plotted. The first number defines the horizontal axis and the second number defines the vertical axis. |
| point.shape | a numerical value defining the shape of the points. If set to its default, the default scale is used. It may be mapped to a variable with a suitable length and order. |
| point.alpha | defines the alpha of the points. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| point.fill | defines the fill color of the points. It may be mapped to a variable with a suitable length and order. |
| point.color | defines the color of the points. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| point.size | a numerical value defining the size of the points. If set to its default, the size is determined by the frequency of each modality. It may be defined by a variable with a suitable length. |
| label | if TRUE each point is assigned its label, defined in the soc.ca object. See assign.label and add.to.label for ways to alter the labels. |
| label.repel | if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel. |
| label.alpha | defines the alpha of the labels. Values range from 0 to 1. It may be mapped to a variable with a suitable length and order. |
| label.color | defines the color of the labels. It may be mapped to a variable with a suitable length and order. See colors for some of the valid values. |
| label.size | defines the size of the labels. It may be mapped to a variable with a suitable length and order. |
| label.fill | defines the color of the box behind the labels. It may be mapped to a variable with a suitable length and order. This only works if label.repel is TRUE. See geom_label_repel. |
| map.title | the title of the map. If set to its default the standard title is used. |
| labelx | the label of the horizontal axis. If set to NULL a standard label is used. |
| labely | the label of the vertical axis. If set to NULL a standard label is used. |
| legend | if set to TRUE a legend is provided. Change the legend with the guides, theme and linkguide_legend functions from the ggplot2 package. |

## Examples

```
example(soc.ca)
map.sup(result)
map.sup(result, dim = c(2, 1))
map.sup(result, point.size = result$coord.sup[, 4],
 map.title = "All supplementary modalities with size according to coordinate on the 4th dimension")
```

---

| min_cut | *Cut a continuous variable into categories with a specified minimum* |
|---|---|

---

## Description

Many continuous variables are very unequally distributed, often with many individuals in the lower categories and fewer in the top. As a result it is often difficult to create groups of equal size, with unique cut-points. By defining the wanted minimum of individuals in each category, but still allowing this minimum to be surpassed, it is easy to create ordinal variables from continuous variables. The last category will not neccessarily have the minimum number of individuals.

## Usage

```
min_cut(x, min.size = length(x)/10)
```

## Arguments

| | |
|---|---|
| x | is a continuous numerical variable |
| min.size | is the minimum number of individuals in each category |

## Value

a numerical vector with the number of each category

## Examples

```
a <- 1:1000
table(min_cut(a))
b <- c(rep(0, 50), 1:500)
table(min_cut(b, min.size = 20))
```

---

print.soc.mca                    *Print soc.ca objects*

---

### Description

Prints commonly used measures used in the analysis of multiple correspondence analysis

### Usage

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

### Arguments

x                 is a soc.ca class object

...               further arguments are ignored

### Value

Active dimensions is the number of dimensions remaining after the reduction of the dimensionality of the analysis.

Active modalities is the number of modalities that are not set as passive.

Share of passive mass is the percentage of the total mass that is represented by the passive modalities.

The values represented in the scree plot are the adjusted inertias, see variance

The active variables are represented with their number of active modalities and their share of the total variance/inertia.

### See Also

soc.mca, contribution

### Examples

```
example(soc.ca)
print(result)
```

---

soc.ca                                *Soc.ca a package for specific correspondence analysis*

---

## Description

This package is optimized to the needs of scientists within the social sciences. The soc.ca package produces specific and class specific multiple correspondence analysis on survey-like data. Soc.ca is optimized to only give the most essential statistical output sorted so as to help in analysis. Seperate functions exists for near publication-ready plots and tables.

## Details

We are in debt to the work of others, especially Brigitte Le Roux and Henry Rouanet for the mathematical definitions of the method and their examples. Furthermore this package was initially based on code from the ca package written by Michael Greenacre and Oleg Nenadic.

If you are looking for features that are absent in soc.ca, it may be available in some of these packages for correspondence analysis: **ca**, **anacor** and **FactoMineR**.

## References

Le Roux, Brigitte, and Henry Rouanet. 2010. Multiple correspondence analysis. Thousand Oaks: Sage.

Le Roux, Brigitte, and Henry Rouanet. 2004. Geometric Data Analysis from Correspondence Analysis to Structured Data Analysis. Dordrecht: Kluwer Academic Publishers.

## Examples

```
data(taste)
# Create a data frame of factors containing all the active variables
taste         <- taste[which(taste$Isup == 'Active'), ]

attach(taste)
active        <- data.frame(TV, Film, Art, Eat)
sup           <- data.frame(Gender, Age, Income)
detach(taste)

# Runs the analysis
result        <- soc.mca(active, sup)
```

---

soc.csa                          *Class Specific Multiple Correspondence Analysis*

---

### Description

soc.csa performs a class specific multiple correspondence analysis on a data.frame of factors, where cases are rows and columns are variables. Most descriptive and analytical functions that work for [soc.mca](#), also work for soc.csa

### Usage

```
soc.csa(object, class.indicator, sup = NULL)
```

### Arguments

| | |
|---|---|
| object | is a soc.ca class object created with [soc.mca](#) |
| class.indicator | |
| | the row indices of the class specific individuals |
| sup | Defines the supplementary modalities in a data.frame with rows of individuals and columns of factors, without NA's |

### Value

| | |
|---|---|
| nd | Number of active dimensions |
| n.ind | The number of active individuals |
| n.mod | The number of active modalities |
| eigen | Eigenvectors |
| total.inertia | The sum of inertia |
| adj.inertia | A matrix with all active dimensions, adjusted and unadjusted inertias. See [variance](#) |
| freq.mod | Frequencies for the active modalities. See [add.to.label](#) |
| freq.sup | Frequencies for the supplementary modalities. See [add.to.label](#) |
| ctr.mod | A matrix with the contribution values of the active modalities per dimension. See [contribution](#) |
| ctr.ind | A matrix with the contribution values of the individuals per dimension. |
| cor.mod | The correlation or quality of each modality per dimension. |
| cor.ind | The correlation or quality of each individual per dimension. |
| mass.mod | The mass of each modality |
| coord.mod | A matrix with the principal coordinates of each active modality per dimension. |
| coord.ind | A matrix with the principal coordinates of each individual per dimension. |

| | |
|---|---|
| coord.sup | A matrix with the principal coordinates of each supplementary modality per dimension. Notice that the position of the supplementary modalities in class specific analysis is the mean point of the individuals, which is not directly comparable with the cloud of the active modalities. |
| indicator.matrix | |
| | A indicator matrix. See [indicator](#) |
| names.mod | The names of the active modalities |
| names.ind | The names of the individuals |
| names.sup | The names of the supplementary modalities |
| names.passive | The names of the passive modalities |
| modal | A matrix with the number of modalities per variable and their location |
| variable | A vector with the name of the variable for each of the active modalities |
| variable.sup | A vector with the name of the variable for each of the supplementary modalities |
| original.class.indicator | |
| | The class indicator |
| original.result | |
| | The original soc.ca object used for the CSA |

## Author(s)

Anton Grau Larsen, University of Copenhagen

Stefan Bastholm Andrade, University of Copenhagen

Christoph Ellersgaard, University of Copenhagen

## References

Le Roux, B., og H. Rouanet. 2010. Multiple correspondence analysis. Thousand Oaks: Sage.

## See Also

[add.to.label](#), [contribution](#)

## Examples

```
example(soc.ca)
class.age    <- which(taste$Age == '55-64')
res.csa      <- soc.csa(result, class.age)
res.csa
```

---

| soc.mca | *Specific Multiple Correspondence Analysis* |
|---|---|

---

## Description

`soc.mca` performs a specific multiple correspondence analysis on a data.frame of factors, where cases are rows and columns are variables.

## Usage

```
soc.mca(active, sup = NULL, identifier = NULL,
  passive = getOption("passive", default = "Missing"))
```

## Arguments

| | |
|---|---|
| active | Defines the active modalities in a data.frame with rows of individuals and columns of factors, without NA's' |
| sup | Defines the supplementary modalities in a data.frame with rows of individuals and columns of factors, without NA's |
| identifier | A single vector containing a single value for each row/individual in x and sup. Typically a name or an id.number. |
| passive | A single character vector with the full or partial names of the passive modalities. All names that have a full or partial match will be set as passive. |

## Value

| | |
|---|---|
| nd | Number of active dimensions |
| n.ind | The number of active individuals |
| n.mod | The number of active modalities |
| eigen | Eigenvectors |
| total.inertia | The sum of inertia |
| adj.inertia | A matrix with all active dimensions, adjusted and unadjusted inertias. See [variance](#) |
| freq.mod | Frequencies for the active modalities. See [add.to.label](#) |
| freq.sup | Frequencies for the supplementary modalities. See [add.to.label](#) |
| ctr.mod | A matrix with the contribution values of the active modalities per dimension. See [contribution](#) |
| ctr.ind | A matrix with the contribution values of the individuals per dimension. |
| cor.mod | The correlation or quality of each modality per dimension. |
| cor.ind | The correlation or quality of each individual per dimension. |
| mass.mod | The mass of each modality |
| coord.mod | A matrix with the principal coordinates of each active modality per dimension. |

| | |
|---|---|
| coord.ind | A matrix with the principal coordinates of each individual per dimension. |
| coord.sup | A matrix with the principal coordinates of each supplementary modality per dimension. |
| names.mod | The names of the active modalities |
| names.ind | The names of the individuals |
| names.sup | The names of the supplementary modalities |
| names.passive | The names of the passive modalities |
| modal | A matrix with the number of modalities per variable and their location |
| variable | A vector with the name of the variable of the active modalities |

#### Author(s)

Anton Grau Larsen, University of Copenhagen

Stefan Bastholm Andrade, University of Copenhagen

Christoph Ellersgaard, University of Copenhagen

#### References

Le Roux, B., og H. Rouanet. 2010. Multiple correspondence analysis. Thousand Oaks: Sage.

#### See Also

soc.csa, contribution

#### Examples

```
# Loads the "taste" dataset included in this package
data(taste)
# Create a data frame of factors containing all the active variables
taste           <- taste[which(taste$Isup == 'Active'), ]

attach(taste)
active          <- data.frame(TV, Film, Art, Eat)
sup             <- data.frame(Gender, Age, Income)
detach(taste)

# Runs the analysis
result          <- soc.mca(active, sup)

# Prints the results
result

# A specific multiple correspondence analysis
# options defines what words or phrases that are looked for in the labels of the active modalities.
options(passive = c("Film: CostumeDrama", "TV: Tv-Sport"))
soc.mca(active, sup)
options(passive = NULL)
```

---

supplementary.individuals

*Add supplementary individuals to a result object*

---

### Description

Add supplementary individuals to a result object

### Usage

```
supplementary.individuals(object, sup.indicator, replace = FALSE)
```

### Arguments

| | |
|---|---|
| object | is a soc.ca class object created with soc.mca |
| sup.indicator | is a indicator matrix for the supplementary individuals with the same columns as the active variables in object. |
| replace | if TRUE the coordinates of the active individuals are discarded. If FALSE the coordinates of the supplementary and active individuals are combined. The factor object$supplementary.individuals marks the supplementary individuals. |

### Value

a soc.ca class object created with soc.mca

### Examples

```
example(soc.mca)
res.pas   <- soc.mca(active, passive = "Costume")
res.sup   <- supplementary.individuals(res.pas, sup.indicator = indicator(active))
a         <- res.sup$coord.ind[res.sup$supplementary.individuals == "Supplementary",]
b         <- res.pas$coord.ind
all.equal(as.vector(a), as.vector(b))
map.ind(res.sup)
```

---

taste                          *Taste dataset*

---

### Description

The taste example dataset used by Le Roux & Rouanet(2010):

## Value

The variables included in the dataset:

Preferred TV program
> (8 categories): news, comedy, police, nature, sport, films, drama, soap operas

Preferred Film (8 categories): action, comedy, costume drama, documentary, horror, musical, romance, SciFi

Preferred type of Art
> (7 categories): performance, landscape, renaissance, still life, portrait, modern, impressionsism

Preferred place to Eat out
> (6 categories): fish & chips, pub, Indian restuarant, Italian restaurant, French restaurant, steak house

## Author(s)

Brigitte Le Roux

## References

Le Roux, Brigitte, Henry Rouanet, Mike Savage, og Alan Warde. 2008. "Class and Cultural Division in the UK". Sociology 42(6):1049-1071.

Le Roux, B., og H. Rouanet. 2010. Multiple correspondence analysis. Thousand Oaks: Sage.

## Examples

```
## Not run:
# The taste example
data(taste)
data_taste          <- taste[which(taste$Isup == 'Active'), ]
active            <- data.frame(data_taste$TV, data_taste$Film, data_taste$Art, data_taste$Eat)
sup              <- data.frame(data_taste$Gender, data_taste$Age, data_taste$Income)

# Multiple Correspondence Analysis
result.mca     <- soc.mca(active, sup)
str(result.mca)
result.mca

variance(result.mca) # See p.46 in Le Roux(2010)

contribution(result.mca, 1)
contribution(result.mca, 2)
contribution(result.mca, 1:3, mode = "variable")

map.active(result.mca, point.fill = result.mca$variable)
map.active(result.mca,
 map.title="Map of active modalities with size of contribution to 1. dimension",
 point.size=result.mca$ctr.mod[, 1])
map.active(result.mca,
 map.title="Map of active modalities with size of contribution to 2. dimension",
```

```
  point.size=result.mca$ctr.mod[, 2])

map.ind(result.mca)
map.ind(result.mca, dim=c(1, 2), point.color=result.mca$ctr.ind[, 1],
 point.shape=18) + scale_color_continuous(low="white", high="black")

# Plot of all dublets
map.ind(result.mca, map.title="Map of all unique individuals", point.color=duplicated(active))
map.ind(result.mca, map.title="Map with individuals colored by the TV variable",
 point.color=active$TV)

# Ellipse
map              <- map.ind(result.mca)
map.ellipse(result.mca, map, as.factor(data_taste$Age == '55-64'))

##### Specific Multiple Correspondence Analysis
options(passive= c("Film: CostumeDrama", "TV: Tv-Sport"))
result.smca      <- soc.mca(active, sup)
result.smca
result.smca$names.passive

##### Class Specific Correspondence Analysis
options(passive=NULL)

class.age        <- which(data_taste$Age == '55-64')
result.csca      <- soc.csa(result.mca, class.age, sup)
str(result.csca)
# Correlations
csa.measures(result.csca)
variance(result.csca)
contribution(result.csca, 1)
contribution(result.csca, 2)
contribution(result.csca, 1:3, mode = "variable")

# Plots
map.ind(result.csca)
map.csa.mca(result.csca)
map.csa.mca.array(result.csca)

## End(Not run)
```

---

variance                     *Variance table*

---

### Description

variance returns a table of variance for the selected dimensions.

### Usage

```
variance(object, dim = NULL)
```

## Arguments

| | |
|---|---|
| object | is a soc.ca object |
| dim | is the included dimensions, if set to NULL, then only the dimensions explaining approx. more than 0.90 of the adjusted variance are included |

## Value

If assigned variance returns a matrix version of the table of variance.

## See Also

soc.mca, print.soc.mca

## Examples

```
example(soc.ca)
variance(result)
variance(result, dim = 1:4)
```

# Index