

Package ‘soc.ca’

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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>

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add.count	<i>Add a new layer of points on top of an existing plot with output from the min_cut function</i>
-----------	---

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	<i>Add values to label</i>
--------------	----------------------------

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	<i>Assign new labels</i>
--------------	--------------------------

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 separator 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	<i>Average coordinates</i>
---------------	----------------------------

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	<i>Contribution balance</i>
---------	-----------------------------

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)
```

breakdown.variance *Breakdown of variance by group*

Description

Defining a partition of the cloud of individuals into groups, one can calculate the midpoints of the various groups. The total variance of the cloud of individuals can then be broken down to between-within variances, i.e. variance between the groups partitioning the cloud, and variance within the groups. The ratio of the between-variance to the total variance is denoted by η^2 (eta-square), and accounts for the percentage of variance 'explained' by the group-variable. (see Le Roux & Rouanet 2010, p. 20ff, 69, 114)

Usage

```
breakdown.variance(object, dim = 1:3, variable)
```

Arguments

object	is a soc.ca class object
dim	the dimensions
variable	a factor in the same length and order as the active variables

Value

a matrix

References

Le Roux, Brigitte, and Henry Rouanet. 2010. Multiple Correspondence Analysis. Thousand Oaks, Calif.: Sage Publications.

Examples

```
example(soc.ca)
breakdown.variance(result, dim = 1:3, variable = sup$Gender)
```

 contribution *Summaries of contribution values*

Description

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

Usage

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

Arguments

object	a 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
matrix.output	if TRUE; returns output as a matrix instead of as printed output.

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](#)**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")
```

`cowboy_cut`*Cut ordinal variables*

Description

If we are in a hurry and need to cut a lot of likert-scale or similar type of variables into MCA-friendly ordered factors this function comes in handy. `cowboy_cut` will try its best to create approx 3-5 categories, where the top and the bottom are smaller than the middle. Missing or other unwanted categories are recoded but still influence the categorization. So that when `cowboy_cut` tries to part the top of a variable with a threshold around 10 Make sure that levels are in the right order before cutting.

Usage

```
cowboy_cut(x, top.share = 0.1, bottom.share = 0.1, missing = "Missing")
```

Arguments

<code>x</code>	a factor
<code>top.share</code>	approximate share in top category
<code>bottom.share</code>	approximate share in bottom category
<code>missing</code>	a character vector with all the missing or unwanted categories.

Value

a recoded factor

create.quadrant	<i>Create categories according to the quadrant position of each individual</i>
-----------------	--

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	<i>Multiple Class Specific Correspondence Analysis on all values in a factor</i>
---------	--

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	<i>CSA measures</i>
--------------	---------------------

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 = FALSE,
  cosines = TRUE,
  cosine.angles = TRUE,
  dim.mca = 1:5,
  dim.csa = 1:5,
  format = TRUE,
  ...
)
```

Arguments

<code>csa.object</code>	is a "soc.csa" class object created by the soc.csa function
<code>correlations</code>	if TRUE correlations calculated by the cor function is returned
<code>cosines</code>	if TRUE cosine similarities are returned
<code>cosine.angles</code>	if TRUE angles are calculated in the basis of the cosine values
<code>dim.mca</code>	the dimensions included from the original mca
<code>dim.csa</code>	the dimensions included from the csa
<code>format</code>	if TRUE results are formatted, rounded and printed for screen reading, if FALSE the raw numbers are returned
<code>...</code>	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.mca = 1:5, 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

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

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

Larsen, Anton Grau, og Christoph Hومان 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.githubusercontent.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	<i>Exports the labels of a soc.ca object into a csv file.</i>
--------------	---

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.

extract_ind	<i>Extract individuals</i>
-------------	----------------------------

Description

Extract individuals

Usage

```
extract_ind(result, dim = 1:2)
```

Arguments

result	a soc.ca object
dim	the dimensions

Value

a data.frame with coordinates and frequencies

Examples

```
example(soc.mca)
extract_ind(result)
```

extract_mod	<i>Extract coordinates for the categories from an soc.mca</i>
-------------	---

Description

Extract coordinates for the categories from an soc.mca

Usage

```
extract_mod(result, dim = 1:2)
```

Arguments

result	a soc.mca object
dim	the dimension

Value

a data.frame with coordinates and frequencies

Examples

```
example(soc.mca)
extract_mod(result)
```

extract_sup	<i>Extract supplementary categories from an soc.mca</i>
-------------	---

Description

Extract supplementary categories from an soc.mca

Usage

```
extract_sup(result, dim = 1:2)
```

Arguments

result	a soc.mca object
dim	the dimensions

Value

a data.frame with coordinates and frequencies

Examples

```
example(soc.mca)
extract_sup(result)
```

headings	<i>Calculate contributions per heading</i>
----------	--

Description

Calculate contributions per heading

Usage

```
headings(object, dim = 1:3)
```

Arguments

object	a soc.ca object with headings
dim	a numeric vector with the dimensions

Value

a matrix

Examples

```
data(taste)
active.headings <- list()
active.headings$Consumption <- na.omit(taste)[, c("TV", "Film", "Art", "Eat")]
active.headings$Background <- na.omit(taste)[, c("Gender", "Age", "Income")]
result.headings <- soc.mca(active.headings)
headings(result.headings)
```

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 the categories of the 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 separator used in the creation of the names of the columns.

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 convenience 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

<code>object</code>	a soc.ca class object as created by soc.mca and soc.csa
<code>dim</code>	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.
<code>point.shape</code>	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.
<code>point.alpha</code>	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.
<code>point.fill</code>	defines the fill color of the points. It may be mapped to a variable with a suitable length and order.
<code>point.color</code>	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.
<code>point.size</code>	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.
<code>label</code>	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.
<code>label.repel</code>	if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel .
<code>label.alpha</code>	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.
<code>label.color</code>	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.
<code>label.size</code>	defines the size of the labels. It may be mapped to a variable with a suitable length and order.
<code>label.fill</code>	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 <code>label.repel</code> is TRUE. See geom_label_repel .
<code>map.title</code>	the title of the map. If set to its default the standard title is used.
<code>labelx</code>	the label of the horizontal axis. If set to NULL a standard label is used.
<code>labely</code>	the label of the vertical axis. If set to NULL a standard label is used.
<code>legend</code>	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	<i>Add points to an existing map created by one of the soc.ca mapping functions.</i>
---------	--

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

<code>ctr.dim</code>	the dimensions of the contribution values
<code>list.mod</code>	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 <code>object\$names.mod</code> .
<code>list.sup</code>	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 <code>object\$names.sup</code> .
<code>list.ind</code>	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 <code>object\$names.ind</code> .
<code>point.shape</code>	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.
<code>point.alpha</code>	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.
<code>point.fill</code>	defines the fill color of the points. It may be mapped to a variable with a suitable length and order.
<code>point.color</code>	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.
<code>point.size</code>	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.
<code>label</code>	if TRUE each point is assigned its label, defined in the <code>soc.ca</code> object. See assign.label and add.to.label for ways to alter the labels.
<code>label.repel</code>	if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel .
<code>label.alpha</code>	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.
<code>label.color</code>	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.
<code>label.size</code>	defines the size of the labels. It may be mapped to a variable with a suitable length and order.
<code>label.fill</code>	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 <code>label.repel</code> is TRUE. See geom_label_repel .
<code>labelx</code>	the label of the horizontal axis. If set to NULL a standard label is used.
<code>labeley</code>	the label of the vertical axis. If set to NULL a standard label is used.
<code>legend</code>	if set to TRUE a legend is provided. Change the legend with the guides , theme and linkguide_legend functions from the <code>ggplot2</code> package.
<code>dim</code>	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	<i>Array of maps</i>
-----------	----------------------

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.ca.base	<i>Create the base of a soc.ca map</i>
-------------	--

Description

Create the base of a soc.ca map

Usage

```
map.ca.base(up = NULL, down = NULL, right = NULL, left = NULL, ...)
```

Arguments

up	the name of + pole on the vertical axis - "North"
down	the name of the - pole on the vertical axis - "South"
right	the name of the + pole on horizontal axis - "East"
left	the name of the - pole on the horizontal axis - "West"
...	further arguments are passed onto ggplot()

Value

a ggplot2 object

map.csa.all	<i>Array of several CSA maps</i>
-------------	----------------------------------

Description

Creates an array of Class Specific Multiple Correspondence analyses

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	<i>Map the coordinates of the individuals in a CSA and its MCA</i>
-------------	--

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	<i>CSA-MCA array</i>
-------------------	----------------------

Description

Create an array of [map.csa.mca](#) maps

Usage

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

Arguments

<code>csa.object</code>	a result object created by the soc.csa function
<code>ndim</code>	the number of dimensions to include in the array, starting from 1
<code>fixed.coord</code>	if TRUE the limits of all plots are set to the same as the largest plot
<code>...</code>	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.
labeley	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	<i>Concentration ellipses</i>
-------------	-------------------------------

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 variables 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 separate 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

<code>object</code>	a soc.ca class object as created by soc.mca and soc.csa
<code>dim</code>	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.
<code>point.shape</code>	a numerical value defining the shape of the points. It may be mapped to a variable with a suitable length and order.
<code>point.alpha</code>	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.
<code>point.fill</code>	defines the fill color of the points. It may be mapped to a variable with a suitable length and order.
<code>point.color</code>	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.
<code>point.size</code>	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.
labeledy	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	<i>Map path along an ordered variable</i>
----------	---

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.

<code>list.ind</code>	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 <code>object\$names.ind</code> .
<code>point.shape</code>	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.
<code>point.alpha</code>	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.
<code>point.fill</code>	defines the fill color of the points. It may be mapped to a variable with a suitable length and order.
<code>point.color</code>	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.
<code>point.size</code>	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.
<code>label</code>	if TRUE each point is assigned its label, defined in the <code>soc.ca</code> object. See assign.label and add.to.label for ways to alter the labels.
<code>label.repel</code>	if TRUE overlapping labels are rearranged, see geom_text_repel or geom_label_repel .
<code>label.alpha</code>	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.
<code>label.color</code>	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.
<code>label.size</code>	defines the size of the labels. It may be mapped to a variable with a suitable length and order.
<code>label.fill</code>	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 <code>label.repel</code> is TRUE. See geom_label_repel .
<code>map.title</code>	the title of the map. If set to its default the standard title is used.
<code>labelx</code>	the label of the horizontal axis. If set to NULL a standard label is used.
<code>labely</code>	the label of the vertical axis. If set to NULL a standard label is used.
<code>legend</code>	if set to TRUE a legend is provided. Change the legend with the guides , theme and guide_legend functions from the <code>ggplot2</code> package.
<code>...</code>	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.
labeley	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")
```

mca.eigen.check

MCA Eigenvalue check

Description

Two variables that have perfectly or almost perfectly overlapping sets of categories will skew an mca analysis. This function tries to find the variables that do that so that we may remove them from the analysis or set some of the categories as passive. An MCA is run on all pairs of variables in the active dataset and we take first and strongest eigenvalue for each pair. Values range from 0.5 to 1, where 1 signifies a perfect or near perfect overlap between sets of categories while 0.5 is the opposite - a near orthogonal relationship between the two variables. While a eigenvalue of 1 is a strong candidate for intervention, probably exclusion of one of the variables, it is less clear what the lower bound is. But values around 0.8 are also strong candidates for further inspection.

Usage

```
mca.eigen.check(active, passive = "Missing")
```


Arguments

active	a data.frame of factors
passive	a character vector with the full or partial names of categories to be set as passive. Each element in passive is passed to a grep function.

Value

a tibble

Examples

```
example(soc.mca)
mca.eigen.check(active)
```

mca.triads

Compare MCA's with triads

Description

Compare MCA's with triads

Usage

```
mca.triads(l.mca, l.triads, dim = c(1, 2), fix.mca = 1)
```

Arguments

l.mca	a list of soc.mca objects
l.triads	a list of triads
dim	the dimensions of the plane
fix.mca	the indice of the mca that is used as a fixpoint for the axis across mca's

Value

a triad object

min_cut	<i>Cut a continuous variable into categories with a specified minimum</i>
---------	---

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 necessarily 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))
```

moschidis	<i>Moschidis example</i>
-----------	--------------------------

Description

The example dataset used by Odysseas E. Moschidis (2009):

Author(s)

Odysseas E. Moschidis

References

Moschidis, Odysseas E. "A Different Approach to Multiple Correspondence Analysis (MCA) than That of Specific MCA." *Mathématiques et Sciences Humaines / Mathematics and Social Sciences* 47, no. 186 (October 15, 2009): 77–88. <https://doi.org/10.4000/msh.11091>.

Examples

```
# The moschidis example
data(moschidis)
active  <- moschidis[, c("E1", "E2", "E3")]
id      <- moschidis[, c("ID")]
result  <- soc.mca(active, identifier = id, Moschidis = FALSE)

# Compare output to Moschidis (2009, p. 85)
result$inertia_full
# In the analysis of the 'real' data the modality
#'E1: 1' with a low mass (fr/Q) has a very high contribution to the fourth axis
result$ctr.mod[, 4]

# Using the transformed model suggested by Moschidis (2009) that takes into
# account the number of modalities per question in order to balance the
# contribution of the modalities
result_trans  <- soc.mca(active, identifier = id, Moschidis = TRUE)
result_trans$inertia_full
result_trans$ctr.mod[, 4]
```

 pe13

The Field of the Danish Power Elite

Description

This dataset was used to construct a field of the Danish Power Elite from 2013

Author(s)

Jacob Lunding, Anton Grau Larsen and Christoph Ellersgaard

political_space97

French Political Space example

Description

The example dataset used by Brigitte Le Roux & Henry Rouanet (2004):

Author(s)

Brigitte Le Roux

References

Perrineau, Pascal, Jean Chiche, Brigitte Le Roux, and Henry Rouanet. "L'espace politique des électeurs français à la fin des années 1990: nouveaux et anciens clivages, hétérogénéité des électeurs." *Revue Française de Science Politique*, no. 3 (June 2000): 463–88.

Le Roux, Brigitte, and Henry Rouanet. *Multiple Correspondence Analysis*. Thousand Oaks, Calif.: Sage Publications, 2010.

Examples

```
# French Political Space example
data(political_space97)
#Recoding
political_space97$Democracy <- ifelse(political_space97$Democracy %in% 1:2, "1_2",
                                     political_space97$Democracy)
political_space97$Politicians <- ifelse(political_space97$Politicians %in% 1:2, "1_2",
                                       political_space97$Politicians)

#Assigning questions to themes
ethno <- data.frame(Immigrants = political_space97$Immigrants,
                   "North-Africans" = political_space97$NorthAfricans,
                   Races = political_space97$Races,
                   "At home" = political_space97$AtHome, check.names = FALSE)

autho <- data.frame("Death Penalty" = political_space97$DeathPenalty,
                   School = political_space97$School, check.names = FALSE)

social <- data.frame("Strike Effectiveness" = political_space97$StrikeEffectiveness,
                   "Strike 95" = political_space97$Strike95,
                   "Unions" = political_space97$Unions,
                   "Public services" = political_space97$PublicServices, check.names = FALSE)

economy <- data.frame(Liberalism = political_space97$Liberalism,
                    Profit = political_space97$Profit,
                    Privatization = political_space97$Privatization,
                    Globalization = political_space97$Globalization, check.names = FALSE)

politics <- data.frame(Democracy = political_space97$Democracy,
                    Politicians = political_space97$Politicians, check.names = FALSE)

supranat <- data.frame(Euro = political_space97$Euro, "EU Power" = political_space97$EUpower,
                    "End EU" = political_space97$EndEU,
                    "EU protection" = political_space97$EUprotection, check.names = FALSE)

# Creating and naming list of headings
active <- list(ethno, autho, social, economy, politics, supranat)
names(active) <- c("Ethnocentrism", "Authoritarianism",
                 "Social", "Economy", "Politics", "Supranationality")
sup <- data.frame(political_space97$Vote)

result <- soc.mca(active, sup = sup, passive = ": 5")
headings(result)
```

```
map.active(result, point.color = result$headings,  
           point.shape = result$headings, label.color = result$headings)
```

```
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. Separate functions exist 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.

<code>coord.sup</code>	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.
<code>indicator.matrix</code>	A indicator matrix. See indicator
<code>names.mod</code>	The names of the active modalities
<code>names.ind</code>	The names of the individuals
<code>names.sup</code>	The names of the supplementary modalities
<code>names.passive</code>	The names of the passive modalities
<code>modal</code>	A matrix with the number of modalities per variable and their location
<code>variable</code>	A vector with the name of the variable for each of the active modalities
<code>variable.sup</code>	A vector with the name of the variable for each of the supplementary modalities
<code>original.class.indicator</code>	The class indicator
<code>original.result</code>	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	<i>soc.mca</i> <code>soc.mca</code> performs a specific multiple correspondence analysis on a <code>data.frame</code> of factors, where cases are rows and columns are variables.
---------	---

Description

Specific Multiple Correspondence Analysis

Usage

```
soc.mca(
  active,
  sup = NULL,
  identifier = NULL,
  passive = getOption("passive", default = "Missing"),
  weight = NULL,
  Moschidis = FALSE,
  detailed.results = FALSE
)
```

Arguments

active	Defines the active modalities in a <code>data.frame</code> with rows of individuals and columns of factors, without NA's'. Active can also be a named list of <code>data.frames</code> . The <code>data.frames</code> will correspond to the analytical headings.
sup	Defines the supplementary modalities in a <code>data.frame</code> 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.
weight	a numeric vector with the weights for the individual rows. The weight is normalized afterwards.
Moschidis	If TRUE adjusts contribution values for rare modalities. see moschidis .
detailed.results	If FALSE the result object is trimmed to reduce its memory footprint.

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 character vector with the name of the variable of the active modalities
Rosenlund.tresh	A numeric vector with the contribution values adjusted with the Rosenlund threshold, see: see p 92 in: Rosenlund, Lennart. Exploring the City with Bourdieu: Applying Pierre Bourdieu's Theories and Methods to Study the Community. Saarbrücken: VDM Verlag Dr. Müller, 2009.
t.test.sup	A matrix with a the student t-test of the coordinates of the supplementary variables
Share.of.var	A matrix the share of variance for each variable

Author(s)

Anton Grau Larsen
 Jacob Lunding
 Stefan Bastholm Andrade
 Christoph Ellersgaard

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, impressionism

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.casca   <- soc.csa(result.mca, class.age, sup)
str(result.casca)

```

```

# Correlations
csa.measures(result.csa)
variance(result.csa)
contribution(result.csa, 1)
contribution(result.csa, 2)
contribution(result.csa, 1:3, mode = "variable")

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

## End(Not run)

```

to.MCA	<i>Convert to MCA class from FactoMineR</i>
--------	---

Description

Convert to MCA class from FactoMineR

Usage

```
to.MCA(object, active, dim = 1:5)
```

Arguments

object	is a soc.ca object
active	the active variables
dim	a numeric vector

Value

an FactoMineR class object

variance	<i>Variance table</i>
----------	-----------------------

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)
```

what.is.x

Check if data is valid for soc.mca

Description

Performs tests on what has been passed on to soc.mca by the user.

Usage

```
what.is.x(x)
```

Arguments

x the active variables sent to soc.mca

Value

a character vector with an evaluation of whether x is data.frame, a list of data.frames, an indicator or a list of indicators.

Examples

```
## Not run:
# Valid scenarios ----

# X is a valid data.frame
x <- taste[, 2:7]
what.is.x(x)
```

```
# X is a valid indicator
x <- indicator(taste[, 2:7])
what.is.x(x)

# X is a valid list of data.frames with names
x <- list(nif = taste[, 2:3], hurma = taste[, 4:5])
what.is.x(x)

# X is a valid list of indicators
x <- list(nif = indicator(taste[, 2:3]), hurma = indicator(taste[, 4:5]))
what.is.x(x)

# Invalid scenarios ----

# X is a matrix - but not numeric
x <- as.matrix(taste[, 2:7])
what.is.x(x)

# X is a of data.frames list but does not have names
x <- list(taste[, 1:3], taste[, 4:5])
what.is.x(x)

# X is a list of indicators but does not have names
x <- list(indicator(taste[, 2:3]), indicator(taste[, 4:5]))
what.is.x(x)

# X is a data.frame and contains NA
x <- taste[, 2:7]
x[1,1] <- NA
what.is.x(x)

# X is a list of indicators and contains NA
x <- list(nif = indicator(taste[, 2:3]), hurma = indicator(taste[, 4:5]))
x[[1]][1,1] <- NA
what.is.x(x)

# X contains elements that are neither a matrix nor a data.frame
x <- list(nif = 1:10, taste[, 1:3], taste[, 4:7])
what.is.x(x)

# X contains both indicators and matrixes
x <- list(nif = taste[, 2:3], hurma = indicator(taste[, 5:6]))
what.is.x(x)

## End(Not run)
```


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