Package 'DFA.CANCOR'

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Type Package

Title Linear Discriminant Function and Canonical Correlation Analysis

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Description Functions that produce SPSS- and SAS-like output for linear discriminant function analysis and canonical correlation analysis.

Imports MASS, car, irr, CCA, CCP, MVN, yacca, graphics, utils

LazyLoad yes

LazyData yes

License GPL (>= 2)

NeedsCompilation no

R topics documented:

`DFA.CANCOR-package` *DFA.CANCOR*

Description

This package provides SPSS- and SAS-like output for linear discriminant function analysis (via the DFA function) and for canonical correlation analysis (via the CANCOR function).

CANCOR *Canonical correlation analysis*

Description

This function provides SPSS- and SAS-like output for canonical correlation analysis. It uses functions from the CCA, CCP, MVN, and yacca packages.

Usage

```
CANCOR(data, set1, set2, plot, plotCV)
```

Arguments

data	A dataframe where the rows are cases & the columns are the variables.
set1	The names of the continuous variables for the first set, e.g., set1 = c('varA', 'varB', 'varC').
set2	The names of the continuous variables for the second set, e.g., set2 = c('varD', 'varE', 'varF').
plot	Should a helio plot of the structure coefficients be produced? The options are: 'yes' or 'no'.
plotCV	The canonical variate number for the helio plot, e.g., plotCV = 1.

Value

The displayed output includes descriptive statistics and Pearson correlations, tests of univariate and multivariate normality, multivariate significance tests, canonical function correlations and bivariate significance tests, raw canonical coefficients, structure coefficients, standardized coefficients, and a helio plot of the structure coefficients.

The returned output is a list with elements

cancors	canonical correlations and their significance tests
rawCoefSet1	raw canonical coefficients for Set 1
rawCoefSet2	raw canonical coefficients for Set 2
structCoef11	structure coefficients for Set 1 variables with the Set 1 variates
structCoef21	structure coefficients for Set 2 variables with the Set 1 variates
structCoef12	structure coefficients for Set 1 variables with the Set 2 variates
structCoef22	structure coefficients for Set 2 variables with the Set 2 variates
standCoefSet1	standardized coefficients for Set 1 variables
standCoefSet2	standardized coefficients for Set 2 variables
standCoefSet2	standardized coefficients for Set 2 variables

Author(s)

Brian P. O'Connor

References

Sherry, A., & Henson, R. K. (2005). Conducting and interpreting canonical correlation analysis in personality research: A user-friendly primer. Journal of Personality Assessment, 84, 37-48.

Tabachnik, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6th ed.). New York, NY: Pearson.

Examples

```
# data that simulate those from De Leo & Wulfert (2013)
CANCOR(data = na.omit(data_CCA_De_Leo),
       set1 = c('Tobacco_Use','Alcohol_Use','Illicit_Drug_Use','Gambling_Behavior',
                'Unprotected_Sex','CIAS_Total'),
       set2 = c('Impulsivity','Social_Interaction_Anxiety','Depression',
                'Social_Support','Intolerance_of_Deviance','Family_Morals',
                'Family_Conflict','Grade_Point_Average'),
       plot = 'yes', plotCV = 1)

## Not run:
# data from Tabachnik & Fidell (2013, p. 589)
CANCOR(data = data_CCA_Tabachnik,
       set1 = c('TS','TC'),
       set2 = c('BS','BC'),
       plot = 'yes', plotCV = 1)

# UCLA dataset
UCLA_CCA_data <- read.csv("https://stats.idre.ucla.edu/stat/data/mmreg.csv")
colnames(UCLA_CCA_data) <- c("LocusControl", "SelfConcept", "Motivation",
                             "read", "write", "math", "science", "female")
summary(UCLA_CCA_data)
CANCOR(data = UCLA_CCA_data,
       set1 = c("LocusControl","SelfConcept","Motivation"),
       set2 = c("read","write","math","science","female"),
       plot = 'yes', plotCV = 1)

## End(Not run)
```

`data_CCA_De_Leo` *data_CCA_De_Leo*

Description

A data frame with scores on 14 variables that have the same correlational structure, and which produce the same canonical correlation analysis results, as those reported in De Leo and Wulfert (2013).

Usage

```
data(data_CCA_De_Leo)
```

Source

De Leo, J. A., & Wulfert, E. (2013). Problematic internet use and other risky behaviors in college students: An application of problem-behavior theory. Psychology of Addictive Behaviors, 27(1), 133-141.

Examples

```
## Not run:
head(data_CCA_De_Leo)

# data that simulate those from De Leo & Wulfert (2013)
CANCOR(data = na.omit(data_CCA_De_Leo),
       set1 = c('Tobacco_Use','Alcohol_Use','Illicit_Drug_Use','Gambling_Behavior',
                'Unprotected_Sex','CIAS_Total'),
       set2 = c('Impulsivity','Social_Interaction_Anxiety','Depression',
                'Social_Support','Intolerance_of_Deviance','Family_Morals',
                'Family_Conflict','Grade_Point_Average'),
       plot = 'yes', plotCV = 1)

## End(Not run)
```

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data_CCA_Tabachnik *data_CCA_Tabachnik*

Description

A data frame with scores on 4 variables for 8 cases. Used by Tabachnik & Fidell (2013, p. 589) in their chapter on canonical correlation.

Usage

```
data(data_CCA_Tabachnik)
```

Source

Tabachnik, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6th ed.). New York, NY: Pearson.

Examples

```
## Not run:
head(data_CCA_Tabachnik)

# data from Tabachnik & Fidell (2013, p. 589)
CANCOR(data = data_CCA_Tabachnik,
       set1 = c('TS','TC'),
       set2 = c('BS','BC'),
       plot = 'yes', plotCV = 1)

## End(Not run)
```

data_DFA_Field *data_DFA_Field*

Description

A data frame with scores on 2 variables for 10 cases in each of 3 groups. Used by Field et al. (2012) in their chapter on MANOVA and discriminant function analysis.

Usage

```
data(data_DFA_Field)
```

Source

Field, A., Miles, J., & Field, Z. (2012). Discovering statistics using R. Los Angeles, CA: Sage.

Examples

```
## Not run:
head(data_DFA_Field)

DFA(data = data_DFA_Field,
    groups = 'Group',
    variables = c('Actions','Thoughts'),
    priorprob = 'SIZES', predictive = 'yes')

## End(Not run)
```

data_DFA_Sherry *data_DFA_Sherry*

Description

A data frame with scores on 5 variables for 10 cases in each of 3 groups. Used by Sherry (2006) in her article on discriminant function analysis.

Usage

```
data(data_DFA_Sherry)
```

Source

Sherry, A. (2006). Discriminant analysis in counseling research. Counseling Psychologist, 34, 661-683.

Examples

```
## Not run:
head(data_DFA_Sherry)

DFA(data = data_DFA_Sherry,
    groups = 'Group',
    variables = c('Neuroticism','Extroversion','Openness',
                  'Agreeableness','Conscientiousness'),
    normtests = 'yes', priorprob = 'SIZES', predictive = 'yes')

## End(Not run)
```

DFA *Discriminant function analysis*

Description

This function provides SPSS- and SAS-like output for linear discriminant function analysis. It uses functions from the car, CPP, MASS, MVN, and irr packages.

Usage

```
DFA(data, groups, variables, normtests, priorprob, predictive)
```

Arguments

data	A dataframe where the rows are cases & the columns are the variables.
groups	The name of the groups variable in the dataframe, e.g., groups = 'Group'.
variables	The names of the continuous variables in the dataframe that will be used in the DFA, e.g., variables = c('varA', 'varB', 'varC').
normtests	Should tests of univariate and multivariate normality be conducted? The options are: 'yes' or 'no'.
priorprob	How should the prior probabilities of the group sizes be computed? The options are: 'EQUAL' for equal group sizes; or 'SIZES' for the group sizes to be based on the sizes of the groups in the dataframe.
predictive	Should a predictive DFA be conducted? The options are: 'yes' or 'no'.

Value

The displayed output includes descriptive statistics for the groups, tests of univariate and multivariate normality, the results of tests of the homogeneity of the group variance-covariance matrices, eigenvalues & canonical correlations, Wilks lambda & peel-down statistics, raw and standardized discriminant function coefficients, structure coefficients, functions at group centroids, one-way ANOVA tests of group differences in scores on each discriminant function, one-way ANOVA tests of group differences in scores on each original DV, significance tests for group differences on the original DVs according to Bird et al. (2014), a plot of the group means on the standardized discriminant functions, and extensive output from predictive discriminant function analyses (if requested).

The returned output is a list with elements

rawCoef	canonical discriminant function coefficients
structCoef	structure coefficients
standCoef	standardized coefficients
standCoefSPSS	standardized coefficients from SPSS
centroids	unstandardized canonical discriminant functions evaluated at the group means
centroidSDs	group standard deviations on the unstandardized functions
centroidsZ	standardized canonical discriminant functions evaluated at the group means
centroidSDsZ	group standard deviations on the standardized functions
DFAscores	scores on the discriminant functions

Author(s)

Brian P. O'Connor

References

Bird, K. D., & Hadzi-Pavlovic, D. (2013). Controlling the maximum familywise Type I error rate in analyses of multivariate experiments. Psychological Methods, 19(2), p. 265-280.

Sherry, A. (2006). Discriminant analysis in counseling research. Counseling Psychologist, 34, 661-683..

Tabachnik, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6th ed.). New York, NY: Pearson.

Examples

```
DFA(data = data_DFA_Field,
    groups = 'Group',
    variables = c('Actions','Thoughts'),
    normtests = 'yes', priorprob = 'SIZES', predictive = 'yes')

## Not run:
DFA(data = data_DFA_Sherry,
    groups = 'Group',
    variables = c('Neuroticism','Extroversion','Openness',
                  'Agreeableness','Conscientiousness'),
    normtests = 'yes', priorprob = 'SIZES', predictive = 'yes')

## End(Not run)
```

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