

# Package ‘dualScale’

July 2, 2014

**Type** Package

**Title** Dual Scaling Analysis of Multiple Choice Data

**Version** 0.9.1

**Date** 2014-01-27

**Author** Jose G. Clavel, Shizuiko Nishisato and Antonio Pita

**Maintainer** Jose G. Clavel <dualScale@gmail.com>

**Description** Functions to analyze multiple choice data using Dual Scaling

**License** GPL-2

**Depends** matrixcalc, ff, vcd, lattice, Matrix

**NeedsCompilation** no

**Repository** CRAN

**Date/Publication** 2014-01-27 21:00:54

## R topics documented:

dualScale-package . . . . .	2
baba . . . . .	3
badCoded . . . . .	3
blood . . . . .	4
dsCHECK . . . . .	5
dsFC . . . . .	6
dsMC . . . . .	7
plot.ds . . . . .	8
print.ds . . . . .	9
singapore . . . . .	10
summary.ds . . . . .	11

<b>Index</b>	<b>13</b>
--------------	-----------

---

dualScale-package      *Dual Scaling for Multiple Choice Data*

---

## Description

This package includes dsMC and dsFC for several versions of dual scaling of multiple-choice data.

## Details

Package: ds  
Type: Package  
Version: 0.9  
Date: 2014-01-24  
License: GPL2

With dsMC and dsFC a ds class object is created. It can be analyzed later with print.ds, plot.ds or summary.ds

## Author(s)

Jose G. Clavel, Shizuhiko Nishisato and Antonio Pita

Maintainer: Jose G. Clavel <dualScale@gmail.com>

## References

Nishisato and Clavel (2014). Nishisato (2007)

## See Also

[dsMC](#), [dsFC](#), [dsCHECK](#), [plot.ds](#), [print.ds](#), [summary.ds](#)

## Examples

```
data(singapore)
ciuca<-dsFC(singapore,2,6)
plot(ciuca)
bea<-dsMC(singapore)
print(bea)
```

---

baba

*Nishisato and Baba, 1999, artificial set of data*

---

**Description**

18 subjects and 5 items with different numbers of options.

**Usage**

data(baba)

**Format**

A data frame with 18 subjects on 5 items with the following numbers of options:

V1 2 options

V2 3 options

V3 4 options

V4 5 options

V5 6 options

**Source**

Nishisato S, Baba Y (1999). On contingency, projection and forced classification of dual scaling. *Behaviormetrika*, 26, 207–219.

**References**

Nishisato S (2007). *Multidimensional Nonlinear Descriptive Analysis*. Chapman & Hall/CRC.

**Examples**

data(baba)

---

badCoded

*Nishisato and Clavel, artificial set of data*

---

**Description**

10 observation and 3 variables erroneously coded.

**Usage**

data(badCoded)

**Format**

A data frame with 10 observations on the following 3 variables.

V2 Option 1 is omitted

V3 Options go from 1 to 8

V4 Option 1 omitted, other are not consecutive and there is NA

**Source**

Nishisato S, Baba Y (1999). On contingency, projection and forced classification of dual scaling. *Behaviormetrika*, 26, 207–219.

**References**

Nishisato S (2007). *Multidimensional Nonlinear Descriptive Analysis*. Chapman & Hall/CRC.

**Examples**

```
data(badCoded)
dsCHECK(badCoded, 'rad')
```

---

blood

*Blood Preassure*

---

**Description**

Nishisato's widely used artificial data on 15 subjects answering 6 questions on their health.

**Usage**

```
data(blood)
```

**Format**

A frame 15x6 multiple-choice table of chosen option numbers.

V1 How would you rate your blood preassure? (1=low, 2=medium, 3=high)

V2 Do you get migraines? (1=rarely, 2=sometimes, 3=often)

V3 What is your age group? (1=20-34, 2=35-49, 3=50-65)

V4 How would you rate your daily level of anxiety? (1=low, 2=medium, 3=high)

V5 How would you rate your weight? (1=light, 2= medium, 3=heavy)

V6 What about your height? (1= short, 2=medium, 3=tall)

**Details**

The data were used for the first time in Nishisato (1999), and have been used in a number of his papers.

**Source**

Nishisato S (1999). Data types and information: beyond the current practice of data analysis. In *Classification and Information Processing at the Turn of the Millennium*, pp. 40–51. Springer-Verlag.

**References**

Nishisato S (1999), cited above.

Nishisato S (2007). *Multidimensional Nonlinear Descriptive Analysis*. Chapman & Hall/CRC.

**Examples**

```
data(blood)
```

---

 dsCHECK

*Transforming data appropriate for dual scaling*


---

**Description**

Initial data-polishing and handling of missing responses

**Usage**

```
dsCHECK(X, mode='rad')
```

**Arguments**

X	The input data, a multiple choice table.
mode	There are two options: "rad" (default) for radical imputation and "act" for active imputation.

**Details**

With option "rad," those subjects with NA (no answer) responses are discarded from analysis. With option "act," the NA responses were placed into newly created options so that missing responses are also subjected to analysis.

**Value**

InitialData	The Initial Data.
TData	The transformed data, ready for dsMC or dsFC

**References**

Nishisato and Clavel (2014 in print). Dual scaling og multiple-choice data in R. *Journal of Statistical Software*.

**See Also**

[dsMC](#), [dsFC](#)

**Examples**

```
data(badCoded)
dsCHECK(badCoded, mode='act')
```

---

 dsFC

---

*Forced Classification Analysis*


---

**Description**

This program is for forced classification of dual scaling.

**Usage**

```
dsFC(X, Crit, dim)
```

**Arguments**

X	The Initial Data.
Crit	The criterion item for forced classification.
dim	The maximum number of components to be extracted.

**Details**

There are three types of outputs: Forced classification of the criterion item (type A); dual scaling of non-criterion items by ignoring the criterion item (type B); dual scaling of non-criterion items after eliminating the influence of the criterion item (type C). These three types correspond to, respectively, dual scaling of data projected onto the subspace of the criterion item, dual scaling of non-criterion items, and dual scaling of data in the complementary space of the criterion item.

**Value**

Match	Match-mismatch tables
Predict	Correct prediction percentages
Proj.Op_A	Projected options weights
Proj.Su_A	Projected subject scores
Inf_A	Distribution of information over components
ItemStat_A	Item statistics
Out_A	Results obtained by forced classification
Rij_A	Inter-item correlation
Norm.Op_A	Normed options weights
Norm.Su_A	Normed subject scores

**References**

Nishisato (1984). Forced classification: A simple application of a quantification technique. *Psychometrika*, 49, 25-36.

**See Also**

[dsMC](#), [dsCHECK](#), [summary.ds](#), [plot.ds](#)

**Examples**

```
data(singapore)
dsFC(singapore,2,6)
```

---

dsMC

*Dual Scaling for Multiple Choice Data*


---

**Description**

The traditional analysis

**Usage**

```
dsMC(X, dim = NA)
```

**Arguments**

X	The data
dim	is the number of components one wishes to extract. If no value is provided, the entire components will be extracted.

**Value**

Tot.Op	Total Number of Options
Proj.Op_0	Projected options weights
Proj.Su_0	Projected subject scores
Inf_0	Distribution of information over components
ItemStat_0	Item statistics
Out_0	Results
Rij_0	Inter-item correlation
Norm.Op_0	Normed options weights
Norm.Su_0	Normed subject scores

**References**

Nishisato, S. (1980). *Analysis of categorical data: Dual scaling and its applications*. Toronto: University of Toronto Press.

**See Also**

[dsFC](#), [summary.ds](#), [plot.ds](#)

**Examples**

```
data(singapore)
dsMC(singapore)
pato<-dsMC(singapore)
pato$Out_0
```

---

plot.ds

*Plotting 2D graphs for ds objects*

---

**Description**

Produces a two-dimensional graph of dual scaling results.

**Usage**

```
## S3 method for class 'ds'
plot(x, dim1=1, dim2=2, type="Asy1", ...)
```

**Arguments**

x	Dual scaling object from dsMC or dsFC
dim1	Component for the horizontal axis
dim2	Component for the vertical axis
type	Graph types: "Sym" for symmetric graph; "Asy" for assymmetric graph (default); "Sub" for only subjects; "Ite" for only item options.
...	Arguments to be passed to methods

**Details**

The function plot.ds makes a two-dimensional representation of the object ds created by dsFC or dsMC.

**See Also**

[dsMC](#), [dsFC](#), [summary.ds](#)

**Examples**

```
data(singapore)
bea<-dsFC(singapore,1,6)
plot(bea)
plot(bea,1,2,'Asy1')
```



---

`print.ds`*Print Method for Class 'ds'*

---

**Description**

Printing dual scaling objects

**Usage**

```
## S3 method for class 'ds'  
print(x, type, ...)
```

**Arguments**

<code>x</code>	dual scaling object from dsFC or dsMC
<code>type</code>	Specific dsFC outputs: 'B'=results from ignoring the criterion item; 'C'=results from the subspace of the criterion item and from its complementary subspace.
<code>...</code>	Arguments to be passed to methods

**Details**

The function `print.ds` provides basic statistics of the `ds` object. The function `summary.ca` offers all available information from analysis.

**Note**

Regarding all available information, please refer to Clavel and Nishisato (2014).

**See Also**

[dsMC](#), [dsFC](#), [summary.ds](#), [plot.ds](#)

**Examples**

```
data(singapore)  
oscar<-dsFC(singapore,2,6)  
print(oscar)  
print(oscar, 'B')  
print(oscar, 'C')  
bea<-dsMC(singapore)  
print(bea)
```

---

singapore

*Singaporean children as viewed by adults*

---

**Description**

A short survey on children in Singapore.

**Usage**

```
data(singapore)
```

**Format**

A data set of 23 subjects on 4 multiple-choice questions.

V1 How old are you? (1 = 20-29, 2 = 30-39, 3 = 40 or over)

V2 Children today are not as disciplined as when I was a child. (1 = agree, 2 = disagree, 3 = I cannot tell)

V3 Children today are not as fortunate as when I was a child. (1 = agree, 2 = disagree, 3 = I cannot tell)

V4 Religions should be taught at school. (1 = agree, 2 = disagree, 3 = Indifferent)

**Details**

The data were collected from 23 participants at a workshop in Singapore in 1985

**Source**

Nishisato S and Nishisato, I.(1994). *Dual Scaling in a Nutshell*. Toronto: MicroStats.

**References**

Nishisato S (2007). *Multidimensional Nonlinear Descriptive Analysis*. Chapman & Hall/CRC.

**Examples**

```
data(singapore)
```

summary.ds

*Summarizing Dual Scaling Analysis***Description**

This generic function is used to produce results of several applications of dsFC and dsMC.

**Usage**

```
## S3 method for class 'ds'
summary(object,...)
```

**Arguments**

object	Dual scaling object from dsMC or dsFC.
...	Arguments to be passed to methods

**Details**

Available results available from different applications.

**Value**

For Ordinary Dual Scaling (dsMC)

IniDat	Initial Data
It0Na	Item options labels
N.Comp	Total number of Components
N.Item	Total number of items
N.Op	Number of options of each item
N.Ss	Total number of subjects
SubNa	Subject labels
Tot.Op	Total number of options
Inf_0	Distribution of information over components
ItemStat_0	Item statistics
Out_0	Results obtained
Rij_0	Inter item correlation
Norm.Op_0	Normed option weights
Norm.Su_0	Normed subjects scores
Proj.Op_0	Projected option weights
Proj.Su_0	Projected subjects scores

For Force Classification Dual Scaling (dsFC). (NOTE: '\_B' and '\_C' values also available).

IniDat	Initial data
CramerV	Cramer's coefficient V
CritItem	The criterion item for forced classification
ItONa	Item options labels
Match	Match-mismatch tables
N.Comp	Total number of components
N.Item	Total number of items
NSs	Total number of subjects
NOpt	Number of options of each item
Predict	Percentage of correct classification
SubNa	Subject labels
Tot.Op	Total number of options
Inf_A	Distribution of information over components
ItemStat_A	Item statistics
Out_A	Results obtained by forced classification in the criterion subspace
Rij_A	Inter item correlation
Norm.Op_A	Normed option weights
Norm.Su_A	Normed subject scores
Proj.Op_A	Projected option weights
Proj.Su_A	Projected subject scores
Out_B	Results obtained by ignoring the criterion item
Out_C	Results obtained in subspace complimentary to the criterion item

**Author(s)**

Jose G. Clavel, Shizuhiko Nishisato and Antonio Pita

**References**

Nishisato S (2007). *Multidimensional Nonlinear Descriptive Analysis*. Chapman & Hall/CRC.

**See Also**

[dsFC](#), [dsMC](#), [print.ds](#), [plot.ds](#)

**Examples**

```
data(singapore)
ole<-dsMC(singapore)
summary(ole)
ole$IniDa
```

# Index

## \*Topic **Dual Scaling**

- dsFC, [6](#)
- dsMC, [7](#)
- dualScale-package, [2](#)
- plot.ds, [8](#)
- print.ds, [9](#)
- summary.ds, [11](#)

## \*Topic **Forced Classification**

- dsFC, [6](#)
- dualScale-package, [2](#)
- plot.ds, [8](#)
- print.ds, [9](#)
- summary.ds, [11](#)

## \*Topic **datasets**

- baba, [3](#)
- badCoded, [3](#)
- blood, [4](#)
- singapore, [10](#)

## \*Topic **package**

- dualScale-package, [2](#)

baba, [3](#)

badCoded, [3](#)

blood, [4](#)

dsCHECK, [2](#), [5](#), [7](#)

dsFC, [2](#), [6](#), [6](#), [8](#), [9](#), [12](#)

dsMC, [2](#), [6](#), [7](#), [7](#), [8](#), [9](#), [12](#)

dualScale (dualScale-package), [2](#)

dualScale-package, [2](#)

plot.ds, [2](#), [7](#), [8](#), [8](#), [9](#), [12](#)

print.ds, [2](#), [9](#), [12](#)

singapore, [10](#)

summary.ds, [2](#), [7-9](#), [11](#)