# Package ‘itemanalysis’

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**Version** 1.0  
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**Title** Classical Test Theory Item Analysis  
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**Depends** ggplot2, polycor, car  

**Description** Runs classical item analysis for multiple-choice test items and polytomous items (e.g., rating scales). The statistics reported in this package can be found in any measurement textbook such as Crocker and Algina (2006, ISBN:9780495395911).

**License** GPL (&gt;= 2)

**URL** [http://sites.education.miami.edu/zopluoglu/](http://sites.education.miami.edu/zopluoglu/)

**NeedsCompilation** no  
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**dichotomous**  
*Raw data from a multiple-choice test*

**Description**

The data is taken from the following website [http://www.jmetrik.com/example-data.php](http://www.jmetrik.com/example-data.php). This file includes nominal responses of 6,000 examinees to 56 binary items.

**Usage**

data(dichotomous)

**Format**

A data frame with 60000 examinees and 56 items

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**itemanalysis**  
*itemanalysis: Classical Test Theory Item Analysis*

**Description**

This package

**Details**

- Package: ITEMAN
- Type: Package
- Version: 1.0
- Date: 2015-09-29
- License: GPL-2
- LazyLoad: yes

The package can be used to run classical item analysis for multiple-choice test items and polytomously scored items (e.g., rating scale items).

**Author(s)**

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**See Also**

- [itemanalysis1](#) for running classical item analysis for multiple-choice test items
- [itemanalysis2](#) for running classical item analysis for polytomously scored items
Classical Test Theory Item Analysis for Multiple-Choice Test Items

**Description**

Classical Test Theory Item Analysis for Multiple-Choice Test Items

**Usage**

```r
itemanalysis1(data, key, options, ngroup = ncol(data) + 1, correction = TRUE)
```

**Arguments**

- `data`: a data frame with `N` rows and `m` columns, with `N` denoting the number of subjects and `m` denoting the number of items.
- `key`: a vector of answer key with a length of `m`.
- `options`: a vector of response options for the test such as `c("A","B","C","D")`.
- `ngroup`: number of score groups to be use for plotting the item trace lines.
- `correction`: TRUE or FALSE. If it is TRUE, then an adjustment is made for point-biserial correlation.

**Details**

To be added later.

**Value**

- `plots`: a list object storing the item trace line plots for each item.

**Author(s)**

Cengiz Zopluoglu

**See Also**

- `itemanalysis2` for classical item analysis of polytomously scored items

**Examples**

```r
data(dichotomous)
head(dichotomous)
str(dichotomous)

# Key response vector
key <- c("A","D","C","B","C","B","C","D","A","D","C","A","D","C","A","
```
# Use itemanalysis1 function to run the item analysis

# In order to reduce running time for the example below,
# I specify "data=dichotomous[,]Q:Q0" so it only analyze the
# first 10 itmes.
# You should specify "data=dichotomous" to analyze based on U6 items.

item.analysis <- itemanalysis1(data=dichotomous[,1:10],
  key=key,
  options=c("A","B","C","D"),
  ngroup=10,
  correction=FALSE)

# item.analysis$plots[[1]] # Item Trace Line for the first item
# item.analysis$plots[[2]] # Item Trace Line for the second item
# item.analysis$plots[[3]] # Item Trace Line for the third item
# item.analysis$plots[[4]] # Item Trace Line for the fourth item
# item.analysis$plots[[5]] # Item Trace Line for the fifth item
# item.analysis$plots[[6]] # Item Trace Line for the sixth item
# item.analysis$plots[[7]] # Item Trace Line for the seventh item
# item.analysis$plots[[8]] # Item Trace Line for the eighth item
# item.analysis$plots[[9]] # Item Trace Line for the ninth item
# item.analysis$plots[[10]] # Item Trace Line for the tenth item

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itemanalysis2  

**Classical Test Theory Item Analysis for Polytomous Items**

**Description**

Classical Test Theory Item Analysis for Polytomous Items

**Usage**

itemanalysis2(data, options, ngroup = ncol(data) + 1, correction = TRUE)

**Arguments**

data  
a data frame with \(N\) rows and \(m\) columns, with \(N\) denoting the number of subjects and \(m\) denoting the number of items.

options  
a vector of numerical code of the response categories available for the items such as c(0,1,2,3). The minimum score is assumed to be 0.

ngroup  
number of score groups to be use for plotting the item trace lines

correction  
TRUE or FALSE. If it is TRUE, then an adjustment is made for point-biserial correlation.
Details
to be added later

Value
plots a list object storing the item trace line plots for each item

Author(s)
Cengiz Zopluoglu

See Also
itemanalysis1 for classical item analysis of multiple-choice test items

Examples

data(timss2011_usa)

timss2011_usa$Q14B <- recode(var = timss2011_usa$Q14B,
                           recodes = "c(0)=3;c(1)=2;c(2)=1;c(3)=0")

timss2011_usa$Q14C <- recode(var = timss2011_usa$Q14C,
                           recodes = "c(0)=3;c(1)=2;c(2)=1;c(3)=0")

item.analysis <- itemanalysis2(data=timss2011_usa,
                                options=c(0,1,2,3),
                                ngroup=18,
                                correction=FALSE)

# item.analysis$plots[[1]] # Item Trace Line for the first item
# item.analysis$plots[[2]] # Item Trace Line for the second item
# item.analysis$plots[[3]] # Item Trace Line for the third item
# item.analysis$plots[[4]] # Item Trace Line for the fourth item
# item.analysis$plots[[5]] # Item Trace Line for the fifth item
# item.analysis$plots[[6]] # Item Trace Line for the sixth item

Description
The data is a subset of TIMSS 2011 USA data and includes responses for six statements to measure attitudes towards math. These rating scale items have response codes from 0 to 3 with 0 indicating "I strongly disagree", 1 indicating "I disagree", 2 indicating "I agree", and 3 indicating "I strongly agree" for a given statement. Note that items 14B and 14C has to be reverse coded before analysis to make them consistent with other four items.
Usage
data(timss2011_usa)

Format
A data frame with 10079 observations and 6 items.
Q14A I enjoy learning mathematics
Q14B I wish have not to study Math
Q14C Mathematics is boring
Q14D I learn interesting things in mathematics class
Q14E I like mathematics
Q14F I think it’s important to do well in mathematics
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