Package ‘ridittools’

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Type Package

Title Useful Functions for Ridit Analysis

Version 0.1

Date 2018-03-11

Author Eric Bohlman

Maintainer Eric Bohlman <ericbohlman@gmail.com>

Description Functions to compute ridit scores of vectors, compute mean ridits and their standard errors for vectors compared to a reference vector, as described in Fleiss (1981, ISBN:0-471-06428-9), and compute means/SEs for multiple groups in matrices. Data can be either counts or proportions. Emphasis is on ridit analysis of ordered categorical data such as Likert items and pain-rating scales.

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R topics documented:

riditools-package .................................................. 2
acc ................................................................. 3
flu.age .......................................................... 4
handgun .......................................................... 4
meanridit ......................................................... 5
meanridits ......................................................... 6
riditsrefgroup .................................................... 7
semiauto .......................................................... 8
seridit ............................................................ 8
seridits ............................................................ 9
seritdiff ........................................................... 10
toridit ............................................................ 11
Description

Functions to compute ridit scores of vectors, compute mean ridits and their standard errors for vectors compared to a reference vector, as described in Fleiss (1981, ISBN:0-471-06428-9), and compute means/SEs for multiple groups in matrices. Data can be either counts or proportions. Emphasis is on ridit analysis of ordered categorical data such as Likert items and pain-rating scales.

Details

The DESCRIPTION file:

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License: GPL-2 | GPL-3 | MIT + file LICENSE
LazyData: TRUE

Index of help topics:

acc Vehicle accident injuries
flu.age Flu subtype by age group
handgun Favorability of handgun ban by party
meanridit Compute mean ridit of group given reference group
meanridits Compute mean ridits of multiple groups
riditsrefgroup Utility to determine reference group. Primarily for internal use/
ridittools-package Useful Functions for Ridit Analysis
semiauto Favorability of semiautomatic weapons ban by party
seridit Compute standard error of mean ridit for group given reference group
seriditdiff Compute standard error of difference between two mean ridits
seridits Compute standard errors of mean ridits of multiple groups
toridit Compute ridit scores for group
acc

**Author(s)**

Eric Bohlman

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**References**


**Examples**

```r
ref <- acc[, 1]
toridit(ref)
g <- acc[, 2]
meanridit(g, ref)
seridit(g, ref)
meanridits(flu.age, 2, "H3")
meanridits(flu.age, 2) # Uses group totals as reference
seridits(handgun, 2, 1)
```

---

**acc**  
*Vehicle accident injuries*

**Description**

Counts of motor vehicle accident injuries; rows are ordered by increasing severity First column is total injuries for all drivers; second is injuries to slightly intoxicated drivers

**Usage**

acc

**Format**

7x2 matrix of counts

**Source**

Fleiss, pp. 152-153

**Examples**

acc
flu.age

**Flu subtype by age group**

**Description**
Cross-tabulation of influenza virus subtypes by age group

**Usage**
flu.age

**Format**
4x5 matrix of counts; rows are age groups in increasing order, columns are viral subtypes

**Source**
http://cdc.gov/flu/weekly for week ending 24 Feb 2018

**Examples**
flu.age

---

handgun

**Favorability of handgun ban by party**

**Description**
Likert ratings of American favorability toward a handgun ban, cross-tabulated by political party identification.

**Usage**
handgun

**Format**
5x4 matrix of counts; rows are ratings, first column is total responses, remaining columns are Democrats, independents, and Republicans.

**Details**
These data were originally specified as proportions and were derived by multiplication by sample sizes. As such, the first column slightly differs, due to rounding error, from the row sums of the remaining columns.
meanridit

Source
YouGov poll of 1500 adult Americans, Feb. 25-27 2018

Examples
handgun

meanridit Compute mean ridit of group given reference group

Description
Compute mean ridit for a group given a reference group

Usage
meanridit(v, ref)

Arguments
v Vector of counts or proportions
ref Vector of counts or proportions to use as reference group

Value
The group’s mean ridit

Author(s)
Eric Bohlman

References

Examples
# PolitiFact ratings in order of increasing truthfulness (8 Mar 2018)
obama <- c(9, 71, 70, 161, 165, 123)
trump <- c(77, 169, 114, 78, 60, 24)
# Probability that a random Trump statement is at least as truthful as a random Obama statement
meanridit(trump, obama)

## The function is currently defined as
function (v, ref)
{
  sum(to.ridit(ref) * v)/sum(v)
}
meanridits

Compute mean ridits of multiple groups

Description

Computes mean ridits of multiple groups in a crosstab matrix. Groups can be either rows or columns, with the other dimension representing the response categories.

Usage

```
meanridits(x, margin, ref = NULL)
```

Arguments

- `x`: matrix of cross-tabulated counts or proportions
- `margin`: 1 for groups in rows, 2 for groups in columns
- `ref`: if omitted, use totals across groups as reference group; if vector of counts (or proportions), use as reference group; otherwise, number (or name if it exists) of group to use as reference

Value

vector of mean ridits

Note

using group totals as reference will not give meaningful results if data are proportions

Author(s)

Eric Bohlman

Examples

```
meanridits(flu.age, 2)
meanridits(flu.age, 2, "H3")
meanridits(handgun, 2, 1)
meanridits(handgun, 2, rowSums(handgun[ , 2:4]))
```

```r
## The function is currently defined as
function (x, margin, ref = NULL)
{
    apply(x, margin, meanridit, riditsrefgroup(x, margin, ref))
}
```
riditsrefgroup

**Utility to determine reference group. Primarily for internal use/**

**Description**
For internal use.

**Usage**

```{r}
riditsrefgroup(x, margin, ref = NULL)
```

**Arguments**

- `x` matrix of counts or proportions
- `margin` margin that represents groups. 1 for rows, 2 for columns
- `ref` group to use as reference. if omitted, use totals across groups. if a vector, use it. otherwise use the group with its number (or name if available)

**Value**

vector of counts/proportions to use as reference group

**Author(s)**

Eric Bohlman

**Examples**

```{r}
## The function is currently defined as
function (x, margin, ref = NULL)
{
  if (length(ref) > 1) {
    refgroup <- ref
  }
  else if (length(ref) == 1) {
    if (margin == 1) {
      refgroup <- x[, ref]
    }
    else {
      refgroup <- x[ref]
    }
  } else {
    refgroup <- apply(x, 3 - margin, sum)
  }
}
```
semiauto  Favorability of semiautomatic weapons ban by party

Description
Likert ratings of American favorability toward a ban on semi-automatic weapons, cross-tabulated by political party identification.

Usage
semiauto

Format
5x4 matrix of counts; rows are ratings, first column is total responses, remaining columns are Democrats, independents, and Republicans.

Details
These data were originally specified as proportions and were derived by multiplication by sample sizes. As such, the first column slightly differs, due to rounding error, from the row sums of the remaining columns.

Source
YouGov poll of 1500 adult Americans, Feb. 25-27 2018

Examples
semiauto

seridit  Compute standard error of mean ridit for group given reference group

Description
Given a vector of counts for a group and a vector of counts for a reference group, computes the standard error of the mean ridit for the group.

Usage
seridit(v, ref)

Arguments

<table>
<thead>
<tr>
<th>v</th>
<th>same as meanridit(), but must be counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>ref</td>
<td>same as meanridit(), but must be counts</td>
</tr>
</tbody>
</table>
Value

standard error of mean ridit

Author(s)

Eric Bohlman

References


Examples

`# PolitiFact ratings in order of increasing truthfulness (8 Mar 2018)`
`obama <- c(9, 71, 70, 161, 165, 123)
trump <- c(77, 169, 114, 78, 60, 24)

# Result is approximately standard normal
(meanridit(trump, obama) - 0.5) / seridit(trump, obama)

## The function is currently defined as
function (v, ref)
{
  N <- sum(ref)
n <- sum(v)
term1 <- (n + 1) / N
term2 <- 1 / (N * (N + n - 1))
term3 <- sum((ref + v) ^ 3) / (N * (N + n) * (N + n - 1))
  1 / (2 * sqrt(3 * n)) * sqrt(1 + term1 + term2 - term3)
}

seridits

Compute standard errors of mean ridits of multiple groups

Description

Takes the same data as `meanridits()`, but returns standard errors rather than means.

Usage

`seridits(x, margin, ref = NULL)`

Arguments

- `x` same as for `meanridits()`, but must be counts rather than proportions
- `margin` same as for `meanridits()`
- `ref` same as for `meanridits()`
seriditdiff

Details

note that if the results include the reference group, its standard error will not be meaningful; by
definition its mean ridit will be exactly 0.5

Value

a vector of standard errors for each group’s mean ridits

Author(s)

Eric Bohlman

See Also

meanridits

Examples

(meanridits(semiauto, 2, 1) - 0.5) / seridits(semiauto, 2, 1)

## The function is currently defined as

function (x, margin, ref = NULL)
{
  apply(x, margin, se.ridit, riditsrefgroup(x, margin, ref))
}

---

seriditdiff Compute standard error of difference between two mean ridits

Description

Computes the approximate standard error of the difference between the mean ridits of two groups.
This does not depend on the reference group the mean ridits are relative to, only on the sizes of the
two groups.

Usage

seriditdiff(g1, g2)

Arguments

g1 vector of counts (not ridits) for first group

g2 vector of counts (not ridits) for second group

Details

the order of the two groups doesn’t matter.
Value

approximate standard error of difference between mean ridits

Author(s)

Eric Bohlman

References


Examples

seriditdiff(semiauto[, "Ind"], semiauto[, "Rep"])

## The function is currently defined as
function(g1, g2) {
    sqrt(sum(g1) + sum(g2)) / (2 * sqrt(3 * sum(g1) * sum(g2)))
}

---

toridit \hspace{1cm} Compute ridit scores for group

Description

Computes the vector of ridit scores corresponding to a vector of counts or proportions.

Usage

toridit(v)

Arguments

v \hspace{1cm} vector of counts or proportions

Value

vector of ridit scores

Author(s)

Eric Bohlman

References

Examples

# PolitiFact ratings for Barack Obama in order of increasing truthfulness (8 Mar 2018)
toridit(c(9, 71, 70, 161, 165, 123)) # counts
toridit(c(.02, .12, .12, .27, .28, .21)) # proportions

## The function is currently defined as
function (v)
{
  (cumsum(v) - 0.5 * v)/sum(v)
}
Index

*Topic \textasciitilde kwd1
  meanridit, 5
  meanridits, 6
  riditsrefgroup, 7
  seridit, 8
  seridits, 9
  toridit, 11

*Topic \textasciitilde kwd2
  meanridit, 5
  meanridits, 6
  riditsrefgroup, 7
  seridit, 8
  seridits, 9
  toridit, 11

*Topic \texttt{datasets}
  acc, 3
  flu.age, 4
  handgun, 4
  semiauto, 8

*Topic \texttt{package}
  ridittools\-package, 2
  meanridit, 5
  meanridits, 6, 10
  riditsrefgroup, 7
  ridittools\(\texttt{ridittools\-package}\), 2
  semiauto, 8
  seridit, 8
  seriditdiff\(\texttt{seriditdiff}\), 10
  seridits, 9
  seritdiff, 10
  toridit, 11