

# Package: rdittools (via r-universe)

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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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**LazyData** TRUE

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ridittools-package	<i>Useful Functions for Ridit Analysis</i>
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## 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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Title:     Useful Functions for Ridit Analysis
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Description: Functions to compute ridit scores of vectors, compute mean ridits and their standard errors for vectors compared to a reference vector, and compute means/SEs for multiple groups in matrices.
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

**Author(s)**

Eric Bohlman

Maintainer: Eric Bohlman &lt;ericbohlman@gmail.com&gt;

**References**

Fleiss, Joseph L., (1981), Statistical Methods for Rates and Proportions. New York: John Wiley & Sons.

**Examples**

```
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	<i>Flu subtype by age group</i>
---------	---------------------------------

---

**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	<i>Favorability of handgun ban by party</i>
---------	---

---

**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.

**Source**

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

**Examples**

handgun

---

meanridit	<i>Compute mean ridit of group given reference group</i>
-----------	--

---

**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**

Fleiss, J.,L., (1981), Statistical Methods for Rates and Proportions. New York: John Wiley & Sons., p.153

**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]))

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

```

---

riditsrefgroup	<i>Utility to determine reference group. Primarily for internal use/</i>
----------------	--

---

**Description**

For internal use.

**Usage**

```
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**

```

## 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	<i>Compute standard error of mean ridit for group given reference group</i>
---------	---

---

**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**

v	same as meanridit(), but must be counts
ref	same as meanridit(), but must be counts

**Value**

standard error of mean ridit

**Author(s)**

Eric Bohlman

**References**

Fleiss, J.,L., (1981), Statistical Methods for Rates and Proportions. New York: John Wiley & Sons, p. 154

**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**

<code>x</code>	same as for <code>meanridits()</code> , but must be counts rather than proportions
<code>margin</code>	same as for <code>meanridits()</code>
<code>ref</code>	same as for <code>meanridits()</code>

**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))
}
```

---

`seritdiff`*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**

Fleiss, J.,L., (1981), Statistical Methods for Rates and Proportions. New York: John Wiley & Sons., p. 155

**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`*Compute ridity scores for group*

---

**Description**

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

**Usage**

```
toridit(v)
```

**Arguments**

`v` vector of counts or proportions

**Value**

vector of ridity scores

**Author(s)**

Eric Bohlman

**References**

Fleiss, J.,L., (1981), Statistical Methods for Rates and Proportions. New York: John Wiley & Sons, p. 152

**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)
}
```

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