Description

`prop.comb.RR` enables to solve asymptotic inferences (p-values of test and confidence intervals) about any linear combination of independent proportions and the relative risk by means of optimal procedures and the well-known score procedure. It also provides summary measures and a recommendation about the best method that the researcher should choose in each particular case.
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Description
Main function for making inferences (confidence intervals and tests) about a linear combination of proportions using optimal methods from the literature and score method.

Usage
prop.comb(x, n, p = NULL, a = NULL, alternative = c("two.sided", "less", "greater"), conf.level = 0.95, coverage = FALSE, nrep = 1000)

Arguments
- x: a vector of counts of successes.
- n: a vector of counts of samples sizes.
- p: hypothesized true value of the interest parameter.
- a: coefficients of the linear combination of proportions.
- alternative: a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
- conf.level: confidence level of the returned confidence interval.
- coverage: coverage probability of the confidence interval.
- nrep: number of replays to calculate the estimated coverage probabilities

Details
Counts of successes must be nonnegative and hence not greater than the corresponding numbers of trials which must be positive. All finite counts should be integers.
It checks how many samples there are (k). When k=1, it will be the case of one proportion. When k=2 and a=(-1,1), we will have the difference of proportions. In another case, the parameter of interest will be a linear combination of k proportions.
When k=1, automatically a=1 and the main function will assign p=0.5 if p=NULL. If k=2 and a=NULL, automatically a=(-1,1) and the main function will assign p=0 if p=NULL, i.e. test of homogeneity of proportions.
If alternative is NULL, the main function will automatically assign alternative="two.sided".
If conf.level is NULL, the main function will automatically assign conf.level=0.95.
If coverage is NULL or FALSE, the main function does not calculate the estimated coverage probabilities. Whereas, if coverage is TRUE, the main function calculates the estimated coverage probabilities. In this case, if nrep is NULL, the main function will automatically assign nrep=1000.
**Value**

Returns a list with the following components:

- **estimate**: a vector with the sample proportions x/n.
- **a**: coefficients of the linear combination of proportions.
- **L**: estimated value of the interest parameter. L=difference for the d case.
- **inference**: confidence intervals (lower limit, upper limit) and p-values of the test (with z-values of statistics). The coverage probabilities are included when the user requests them.
- **alternative**: a character string describing the alternative hypothesis.
- **lambda**: hypothesized true value of the interest parameter.
- **k**: number of samples.
- **x**: number of successes.
- **n**: number of trials.
- **p**: same value of lambda
- **conf.level**: confidence level of the confidence interval.
- **recommendation**: recommended method by references.

**Author(s)**

Maria Alvarez Hernandez and Javier Roca Pardinas

**References**


See Also

prop.RR for inferences about the relative risk

Examples

# ONE PROPORTION
# Yu et al (2014) use a data set, which describes characteristics of some American bridges. The objective is to construct CIs for the proportion of wood bridges.

prop.comb(x=16, n=109, alternative="two.sided", conf.level=0.95)

# DIFFERENCE OF TWO PROPORTION
# Rodary et al. (1989) studied the response to chemotherapy and radiation therapy in a randomized clinical trial on nephroblastoma. The main objective is to construct CIs about the difference of the response and to contrast the homogeneity of proportions.

prop.comb(x=c(83,69), n=c(88,76), alternative="two.sided", conf.level=0.95)

# COMBINATION OF TWO PROPORTIONS
# Martin and Alvarez (2013) construct CIs about the parameter "loss associated with a diagnostic test" in the context of comparing two diagnostic tests (Bloch, 1997) and use a data set by Hanley and McNeil (1983).

prop.comb(x=c(44, 3), n=c(54, 58), a=c(-0.4, 0.6), alternative="two.sided", conf.level=0.95)

# Tebbs and Roths (2008) refer to data about a multicenter clinical trial whose aim was to evaluate the efficacy of a lowered salt regimen in the treatment of male infants with acute diarrhea. The objective is to obtain a confidence interval about the proportion of fever cases in South American area.

prop.comb(x=c(32, 34), n=c(107, 92), a=c(107/199, 92/199), alternative="two.sided", conf.level=0.95)

# LINEAR COMBINATION OF K>3 PROPORTIONS
# Price and Bonett (2004) refer to a study by Cohen et al. (1991) in which 120 rats were randomly assigned four diets (high or low fat and with or without fiber). The absence or presence of a tumor was recorded for each rat. The contrast of interest will evaluate the effects of study's variables.

# Data of diet and tumor study:
x <-c(20, 14, 27, 19); n <-c(30, 30, 30, 30)
\begin{verbatim}
prop.RR

a1 <- c(+1, -1, -1, +1); a2 <- c(+1, +1, -1, -1); a3 <- c(+1, -1, +1, -1)

prop.comb(x, n, a=a1); prop.comb(x, n, a=a2); prop.comb(x, n, a=a3)
\end{verbatim}

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**Description**

Main function for making inferences (confidence intervals and tests) about the relative risk using optimal methods from the literature and score method.

**Usage**

\[
\text{prop.RR}(x, n, \rho = \text{NULL}, \text{alternative} = \text{c("two.sided", "less", "greater")}, 
\text{conf.level} = 0.95, \text{coverage} = \text{FALSE}, \text{nrep} = 1000)
\]

**Arguments**

- **x**: a vector of counts of successes.
- **n**: a vector of counts of sample sizes.
- **rho**: hypothesized true value of the relative risk.
- **alternative**: a character string specifying the alternative hypothesis, must be one of "two.sided" (default), "greater" or "less".
- **conf.level**: confidence level of the returned confidence interval.
- **coverage**: coverage probability of the confidence interval.
- **nrep**: number of replays to calculate the estimated coverage probabilities.

**Value**

Returns a list with the following components:

- **estimate**: a vector with the sample proportions \(x/n\).
- **RR**: estimated relative risk.
- **inference**: confidence intervals (lower limit, upper limit) and p-values of the test (with z-values of statistics. The coverage probabilities are included when the user requests them.
- **alternative**: a character string describing the alternative hypothesis.
- **rho**: hypothesized true value of the relative risk.
- **x**: number of successes.
- **n**: number of trials.
- **conf.level**: confidence level of the confidence interval.
- **recommendation**: recommended method by references.
Author(s)

Maria Alvarez Hernandez and Javier Roca Pardinas

References


See Also

prop.comb for inferences about a linear combination of K proportions

Examples

# The Relative Risk was used by Maxwell (1961) for the following data related to
# the rate of occurrence of virus infection among the group of the non-inoculated
# and the group of the inoculated. The objective is to obtain an approximate
# confidence interval for RR.

prop.RR(x=c(11, 48), n=c(46, 102), conf.level=0.99)

# Price and Bonnet (2008) reviewed a study in which the aim is to prove if
# the effect of the beta-blocker could be highly beneficial or slightly detrimental.

x=c(7, 14); n=c(114, 116); prop.RR(x, n, rho=2)

summary.prop.comb  
Summary for a prop.comb object

Description

Provides results for an object of class prop.comb. It shows the contingency table with observed data, the parameter of interest and its estimated value. It provides confidence intervals (lower limit, upper limit) and p-values of the test (with z-values of statistics) for methods mentioned in references. It allows to calculate coverage probabilities for each method. It also indicates the alternative hypothesis and the recommendation about the optimal method for that particular case.

Usage

## S3 method for class 'prop.comb'
summary(object, ...)

**summary.prop.RR**

**Arguments**

- object: an object of class prop.comb.
- ...: Further arguments for summary.

**Author(s)**

Maria Alvarez Hernandez and Javier Roca Pardinas

**See Also**

prop.comb

**Examples**

```r
# One proportion
A <- prop.comb(x=16, n=109, alternative="two.sided", conf.level=0.95)
summary(A)

# Difference of proportions
B <- prop.comb(x=c(83, 69), n=c(88, 76), alternative="two.sided", conf.level=0.95)
summary(B)

# Linear combination of two proportions
C <- prop.comb(x=c(44, 3), n=c(54, 58), a=c(-0.4, 0.6), alternative="two.sided", conf.level=0.95)
summary(C)

D <- prop.comb(x=c(32, 34), n=c(107, 92), a=c(107/199, 92/199), alternative="two.sided", conf.level=0.95)
summary(D)

# Linear combination of k>2 proportions
E <- prop.comb(x=c(73, 32, 44, 34, 104), n=c(158, 107, 175, 92, 143),
a=c(158/675, 107/675, 175/675, 92/675, 143/675))
summary(E)
```

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**summary.prop.RR** | **Summary for a prop.RR object**

**Description**

Provides results for an object of class `prop.RR`. It shows the contingency table with observed data, the parameter of interest and its estimated value. It provides confidence intervals (lower limit, upper limit) and p-values of the test (with z-values of statistics) for methods mentioned in references. It allows to calculate coverage probabilities for each method. It also indicates the alternative hypothesis and the recommendation about the optimal method for that particular case.
Usage

```R
## S3 method for class 'prop.RR'
summary(object, ...)
```

Arguments

- `object`: an object of class `prop.RR`.
- `...`: Further arguments for `summary`.

Author(s)

Maria Alvarez Hernandez and Javier Roca Pardinas

See Also

- `prop.RR`

Examples

```R
A <- prop.RR(x=c(11, 48), n=c(46, 102), conf.level=0.99)
summary(A)

B <- prop.RR(x=c(7, 14), n=c(114, 116), rho=2)
summary(B)
```
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