

Package ‘PropTestR’

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Type Package

Title Comprehensive Two-Proportion Inference

Version 1.0.0

Description Unified methods for comparing two independent or paired proportions. Provides classical, exact, score-based, non-inferiority, equivalence, effect-size, confidence-interval, and stratified procedures with standardized publication-ready output. Farrington-Manning inference is supported through established score-based methods described by Farrington and Manning (1990) <doi:10.2307/2532443> and implemented through 'ratesci', while additional established methods are provided through 'DescTools' and base R.

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Depends R (>= 4.2.0)

Imports DescTools (>= 0.99.60), ratesci (>= 1.1.0), stats

Suggests testthat (>= 3.0.0), knitr, rmarkdown

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URL <https://github.com/vinodhpm/PropTestR>

BugReports <https://github.com/vinodhpm/PropTestR/issues>

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compare_2prop	<i>Compare two independent proportions</i>
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Description

Provides a unified interface for common tests and confidence intervals for two independent binomial proportions.

Usage

```
compare_2prop(  
  x1,  
  n1,  
  x2,  
  n2,  
  method = "all",  
  alternative = c("two.sided", "less", "greater"),  
  margin = 0,  
  conf.level = 0.95  
)
```

Arguments

x1, x2	Number of successes in groups 1 and 2.
n1, n2	Number of observations in groups 1 and 2.
method	Method or methods. Use "all" for the full Version 1.0 set.
alternative	Alternative hypothesis.
margin	Null difference for score/Farrington-Manning/ non-inferiority procedures.
conf.level	Confidence level.

Value

An object of class 'prop_compare' containing standardized results.

Examples

```
result <- compare_2prop(
  x1 = 82,
  n1 = 100,
  x2 = 75,
  n2 = 100,
  method = c("wald", "score", "fisher")
)
print(result)
```

equivalence_2prop

Two One-Sided Equivalence Test for Two Independent Proportions

Description

Performs a confidence-interval-based equivalence assessment for two independent binomial proportions using the Miettinen-Nurminen confidence interval.

Usage

```
equivalence_2prop(x1, n1, x2, n2, margin, conf.level = 0.9)
```

Arguments

x1	Number of successes in group 1.
n1	Number of observations in group 1.
x2	Number of successes in group 2.
n2	Number of observations in group 2.
margin	Positive equivalence margin.
conf.level	Confidence level. The default is 0.90, corresponding to a two-one-sided test procedure at $\alpha = 0.05$.

Details

Equivalence is concluded when the confidence interval for the risk difference lies entirely within the prespecified equivalence margins.

Value

A data frame containing the observed risk difference, confidence interval, equivalence margin, equivalence decision, and method.

farrington_manning	<i>Farrington-Manning Test</i>
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Description

Performs a Farrington-Manning score test for comparing two independent binomial proportions when the null hypothesis specifies a non-zero difference.

Usage

```
farrington_manning(  
  x1,  
  n1,  
  x2,  
  n2,  
  margin,  
  alternative = "greater",  
  conf.level = 0.95  
)
```

Arguments

x1	Number of successes in group 1.
n1	Number of observations in group 1.
x2	Number of successes in group 2.
n2	Number of observations in group 2.
margin	Null difference in proportions.
alternative	Alternative hypothesis. One of "two.sided", "less", or "greater".
conf.level	Confidence level for the confidence interval.

Value

An object of class "htest" containing the estimated difference, confidence interval, score statistic, p-value, null difference, and alternative hypothesis.

References

Farrington CP, Manning G (1990). Test statistics and sample size formulae for comparative binomial trials with null hypothesis of non-zero risk difference or non-unity relative risk. *Statistics in Medicine*, 9, 1447-1454.

Examples

```
result <- farrington_manning(
  x1 = 82,
  n1 = 100,
  x2 = 85,
  n2 = 100,
  margin = -0.10,
  alternative = "greater"
)
print(result)
```

paired_2prop	<i>Compare paired proportions</i>
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Description

Performs McNemar's test for comparing two paired binary measurements. Both the asymptotic McNemar test and the exact binomial version are supported.

Usage

```
paired_2prop(b, c, n, method = c("mcnemar", "mcnemar_exact"))
```

Arguments

b	Number of discordant pairs in which the first measurement is a success and the second measurement is a failure.
c	Number of discordant pairs in which the first measurement is a failure and the second measurement is a success.
n	Total number of paired observations.
method	Method used for inference. "mcnemar" performs the continuity-corrected asymptotic McNemar test, while "mcnemar_exact" performs an exact binomial test based on the discordant pairs.

Details

The paired risk difference is calculated as $(b - c) / n$. For the exact method, the p-value is obtained from an exact binomial test conditional on the discordant pairs, with success probability 0.5.

If there are no discordant pairs ($b + c = 0$), there is no evidence of a difference between the paired proportions. In this case, the p-value is set to 1 and the test statistic is returned as NA.

Value

An object of class "htest" containing the test statistic, p-value, paired difference, discordant pairs, sample size, and contingency table.

References

McNemar Q (1947). Note on the sampling error of the difference between correlated proportions or percentages. *Psychometrika*, 12, 153-157.

Examples

```
# Continuity-corrected McNemar test
paired_2prop(
  b = 15,
  c = 5,
  n = 100,
  method = "mcnemar"
)

# Exact McNemar test
paired_2prop(
  b = 15,
  c = 5,
  n = 100,
  method = "mcnemar_exact"
)
```

plot_prop_result

Plot confidence intervals from a PropTestR result

Description

Produces a confidence-interval plot for the methods contained in a prop_compare object.

Usage

```
plot_prop_result(
  x,
  main = "Two-proportion comparison",
  xlab = "Difference in proportions"
)
```

Arguments

x	A prop_compare object returned by compare_2prop .
main	Main title of the plot.
xlab	Label for the x-axis.

Value

Invisibly returns the supplied prop_compare object.

Examples

```

result <- compare_2prop(
  x1 = 80,
  n1 = 100,
  x2 = 70,
  n2 = 100,
  method = c("wald", "score", "miettinen_nurminen")
)

plot_prop_result(result)

```

print.prop_compare	<i>Print a PropTestR two-proportion comparison</i>
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Description

Print a PropTestR two-proportion comparison

Usage

```

## S3 method for class 'prop_compare'
print(x, ...)

```

Arguments

x	An object of class 'prop_compare'.
...	Additional arguments passed to 'print.data.frame'.

Value

Invisibly returns 'x'.

proportion_ci	<i>Confidence interval for a difference of proportions</i>
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Description

Calculates a confidence interval for the difference between two independent binomial proportions using established confidence interval procedures.

Usage

```

proportion_ci(x1, n1, x2, n2, method = "mn", conf.level = 0.95)

```

Arguments

<code>x1</code>	Number of successes in group 1.
<code>n1</code>	Number of observations in group 1.
<code>x2</code>	Number of successes in group 2.
<code>n2</code>	Number of observations in group 2.
<code>method</code>	Confidence interval method. Supported methods include "ac", "wald", "waldcc", "score", "scorecc", "mn", "miettinen_nurminen", "mee", "blj", "jef-freys", "ha", "hal", and "jp".
<code>conf.level</code>	Confidence level for the interval. Must be strictly between 0 and 1.

Value

A data frame containing the estimated difference, lower confidence limit, upper confidence limit, and method.

Examples

```
proportion_ci(
  x1 = 80,
  n1 = 100,
  x2 = 70,
  n2 = 100,
  method = "mn"
)
```

proportion_effects	<i>Effect measures for two independent proportions</i>
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Description

Calculates the risk difference, risk ratio, and odds ratio for two independent binomial proportions.

Usage

```
proportion_effects(x1, n1, x2, n2, conf.level = 0.95)
```

Arguments

<code>x1</code>	Number of successes in group 1.
<code>n1</code>	Number of observations in group 1.
<code>x2</code>	Number of successes in group 2.
<code>n2</code>	Number of observations in group 2.
<code>conf.level</code>	Confidence level for the confidence intervals. Must be strictly between 0 and 1.

Details

The risk difference is calculated as the difference between the two observed proportions. The risk ratio is calculated as the ratio of the two observed proportions, and the odds ratio is calculated from the corresponding odds.

Confidence intervals for the risk difference are calculated using the Miettinen-Nurminen method. Confidence intervals for the risk ratio are calculated using the Koopman method when the underlying procedure is available.

Value

A data frame containing the effect measure, estimate, lower confidence limit, and upper confidence limit.

Examples

```
proportion_effects(
  x1 = 80,
  n1 = 100,
  x2 = 70,
  n2 = 100
)
```

stratified_2prop

Stratified comparison of two proportions

Description

Performs a Cochran-Mantel-Haenszel test for comparing two proportions across multiple independent strata.

Usage

```
stratified_2prop(x1, n1, x2, n2, strata, conf.level = 0.95)
```

Arguments

x1	Number of successes in group 1 for each stratum.
n1	Number of observations in group 1 for each stratum.
x2	Number of successes in group 2 for each stratum.
n2	Number of observations in group 2 for each stratum.
strata	Character or numeric vector identifying the strata. Its length must equal the lengths of x1, n1, x2, and n2.
conf.level	Confidence level for the confidence interval. The default is 0.95.

Details

Each stratum consists of a 2 x 2 table formed from the corresponding elements of x1, n1, x2, and n2. The Cochran-Mantel-Haenszel test is then performed using [mantelhaen.test](#).

The current implementation uses the Cochran-Mantel-Haenszel procedure for testing association across strata. The `conf.level` argument is retained for interface consistency, although the confidence interval returned by `mantelhaen.test` is determined by that function's default settings in the current implementation.

Value

A list containing the Cochran-Mantel-Haenszel test method, test statistic, p-value, confidence interval, estimated common odds ratio, and the stratified contingency tables.

Examples

```
x1 <- c(80, 70, 90)
n1 <- c(100, 100, 100)
x2 <- c(70, 65, 85)
n2 <- c(100, 100, 100)
strata <- c("A", "B", "C")

stratified_2prop(
  x1 = x1,
  n1 = n1,
  x2 = x2,
  n2 = n2,
  strata = strata
)
```

summary.prop_compare	<i>Summarize a PropTestR two-proportion comparison</i>
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Description

Summarize a PropTestR two-proportion comparison

Usage

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

Arguments

object	An object of class 'prop_compare'.
...	Additional arguments.

Value

The results table.

tidy_prop_result	<i>Tidy a PropTestR result</i>
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Description

Extracts the standardized results table from a prop_compare object.

Usage

```
tidy_prop_result(x)
```

Arguments

x A prop_compare object returned by [compare_2prop](#).

Value

A data frame containing the standardized comparison results.

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