

Package ‘ProMetaR’

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Type Package

Title Meta-Analysis of Proportions and Prevalence

Version 1.0.0

Description Tools for meta-analysis of proportions and prevalence from studies reporting event counts and sample sizes. Provides transformed and untransformed inverse-variance models, random-effects estimation, heterogeneity statistics, prediction intervals, subgroup analysis, meta-regression, leave-one-out sensitivity analysis, influence diagnostics, forest plots, funnel plots, and an optional binomial generalized linear mixed model interface. The package is designed for epidemiological, veterinary, medical, and One Health applications, including antimicrobial resistance prevalence studies.

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Imports stats, graphics

Suggests testthat (>= 3.0.0), metafor, knitr, rmarkdown

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

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

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bias_prop	<i>Small-study effect diagnostic</i>
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Description

Performs an Egger-type regression diagnostic for possible small-study effects.

Usage

```
bias_prop(x)
```

Arguments

x A prometar object returned by meta_prop().

Value

An object of class prometar_bias containing the regression intercept, its standard error, test statistic, p-value, and fitted regression model.

forest_prop	<i>Forest plot for a proportion meta-analysis</i>
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Description

Forest plot for a proportion meta-analysis

Usage

```
forest_prop(x, xlab = "Proportion", xlim = c(0, 1), ...)
```

Arguments

x	A prometar object.
xlab	X-axis label.
xlim	Axis limits.
...	Graphical arguments.

Value

Invisibly returns x.

funnel_prop	<i>Funnel plot for a proportion meta-analysis</i>
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Description

Funnel plot for a proportion meta-analysis

Usage

```
funnel_prop(x, ...)
```

Arguments

x	A prometar object.
...	Graphical arguments.

Value

Invisibly returns x.

influence_prop	<i>Influence diagnostics</i>
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Description

Calculates simple influence measures based on leave-one-out meta-analysis results.

Usage

```
influence_prop(x)
```

Arguments

x A prometar object returned by meta_prop().

Value

A data frame containing the leave-one-out estimate, its change from the full analysis, and the corresponding I-squared statistic.

loo_prop	<i>Leave-one-out sensitivity analysis</i>
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Description

Repeats the meta-analysis after removing each study in turn.

Usage

```
loo_prop(x)
```

Arguments

x A prometar object returned by meta_prop().

Value

A data frame containing the omitted study, pooled estimate, confidence limits, and I-squared statistic for each leave-one-out analysis.

metareg_prop	<i>Meta-regression for proportions</i>
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Description

Fits a weighted linear meta-regression model using transformed study-level proportions as the response.

Usage

```
metareg_prop(x, moderators, ...)
```

Arguments

x	A prometar object returned by meta_prop().
moderators	A data frame containing moderator variables, with one row per study.
...	Additional arguments reserved for future extensions.

Value

An object of class prometar_metareg, containing regression coefficients, standard errors, test statistics, p-values, fitted values, residuals, moderator data, and the transformation used in the original meta-analysis.

meta_prop	<i>Meta-analysis of proportions</i>
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Description

Performs a meta-analysis of proportions using a transformation-based random-effects model.

Usage

```
meta_prop(
  events,
  n,
  studlab = NULL,
  data = NULL,
  method = c("REML", "DL", "PM"),
  transform = c("logit", "arcsine", "raw", "pft"),
  correction = 0.5,
  level = 0.95,
  prediction = TRUE
)
```

Arguments

events	Number of events in each study.
n	Sample size in each study.
studlab	Optional study labels.
data	Optional data frame containing the variables.
method	Random-effects estimator: "REML", "DL", or "PM".
transform	Transformation: "logit", "arcsine", "raw", or "pft".
correction	Continuity correction for extreme logit proportions.
level	Confidence level.
prediction	Logical; calculate a prediction interval.

Value

An object of class `prometar`.

meta_prop_glmm	<i>Optional binomial GLMM via metafor</i>
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Description

Fits a binomial generalized linear mixed model for proportions using `metafor`.

Usage

```
meta_prop_glmm(events, n, studlab = NULL, ...)
```

Arguments

events	Number of events in each study.
n	Sample size for each study.
studlab	Optional study labels.
...	Additional arguments passed to <code>metafor::rma.glmm()</code> .

Value

A fitted GLMM object returned by `metafor::rma.glmm()`.

predict_prop	<i>Prediction interval</i>
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Description

Prediction interval

Usage

```
predict_prop(x)
```

Arguments

x A prometar object.

Value

A two-element vector.

prop_heterogeneity	<i>Heterogeneity statistics</i>
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Description

Heterogeneity statistics

Usage

```
prop_heterogeneity(x)
```

Arguments

x A prometar object.

Value

A named list of heterogeneity statistics.

prop_transform	<i>Transform proportions</i>
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Description

Transform proportions

Usage

```
prop_transform(  
  events,  
  n,  
  method = c("logit", "arcsine", "raw", "pft"),  
  correction = 0.5  
)
```

Arguments

- events Number of events.
- n Sample size.
- method Transformation method.
- correction Continuity correction.

Value

A data frame of transformed study-level values.

subgroup_prop	<i>Subgroup meta-analysis</i>
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Description

Performs separate meta-analyses of proportions within levels of a categorical subgroup variable.

Usage

```
subgroup_prop(x, subgroup, ...)
```

Arguments

- x A prometar object returned by meta_prop().
- subgroup A categorical vector identifying the subgroup for each study. Its length must equal the number of studies in x.
- ... Additional arguments passed to meta_prop().

Value

An object of class `prometar_subgroup`, containing a fitted `prometar` object for each subgroup.

`summary_prop`*Summarize a ProMetaR meta-analysis*

Description

Produces a compact summary of a meta-analysis of proportions.

Usage

```
summary_prop(x, digits = 4)
```

Arguments

<code>x</code>	A <code>prometar</code> object.
<code>digits</code>	Number of decimal places.

Value

A data frame containing the main meta-analysis results.

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