

Package ‘hetmeta’

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Type Package

Title Heterogeneity Measures in Meta-Analysis

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Description

Assess the presence of statistical heterogeneity and quantify its impact in the context of meta-analysis. It includes test for heterogeneity as well as other statistical measures (R_b , I^2 , R_I).

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Depends metafor

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hetmeta-package *Heterogeneity Measures In Meta-Analysis*

Description

The hetmeta package contains functions useful to assess the presence and to quantifying the impact of statistical heterogeneity. Several measures of heterogeneity are implemented in the `hetmeta` function.

All the functions in the packages requires a meta-analytic model of class `rma.uni` that can be easily obtained using the `metafor` package. See `metafor-package` for a comprehensive and detailed description.

Functions and data included in the package

The main function is `hetmeta`, which calculates the measures of heterogeneity in an object of class "hetmeta" (see `hetmetaObject`). The methods `print.hetmeta` and `confint.hetmeta` defines function for printing results and deriving confidence intervals.

Author(s)

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References

- Crippa A, Khudyakov P, Wang M, Orsini N, Spiegelman D. A new measure of between-studies heterogeneity in meta-analysis. 2016. *Stat. Med.* In Press.
- DerSimonian R, Laird N. Meta-analysis in clinical trials. *Control. Clin. Trials* 1986; 7(3):177-188.
- Rebecca HJ, Thompson J. Detecting and describing heterogeneity in meta-analysis. *Stat. Med.* 17.8 (1998): 841-856.
- Higgins JPT, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat. Med.* 2002; 21(11):1539-1558.

confint.hetmeta *Confidence Intervals for 'hetmeta' Objects*

Description

The function calculates confidence intervals for the heterogeneity measures in a 'hetmeta' object.

Usage

```
## S3 method for class 'hetmeta'  
confint(object, parm, level, digits, ...)
```

Arguments

object	an object of class hetmeta produced by hetmeta .
parm	this argument is here for compatability with the generic function confint, but is (currently) ignored.
level	numerical value between 0 and 100 specifying the confidence interval level (if unspecified, the default is to take the value from the object).
digits	an integer specifying the number of digits to which printed results must be rounded.
...	further arguments passed to or from other methods.

Details

The confidence intervals are constructed based on the (asymptotic) normal distribution of the estimators. Standard error are derived using the delta method. See the references for more details.

Author(s)

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References

Takkouche B, Khudyakov P, Costa-Bouzas J, Spiegelman D. Confidence Intervals for Heterogeneity Measures in Meta-analysis. *Am. J. Epidemiol.* 2013:kw060.

Crippa A, Khudyakov P, Wang M, Orsini N, Spiegelman D. A new measure of between-studies heterogeneity in meta-analysis. 2016. *Stat. Med.* In Press.

See Also

[hetmeta](#)

Examples

```
## load BCG vaccine data
data(dat.bcg)

## random-effects model of log relative risks
dat <- escalc(measure="RR", ai=tpos, bi=tneg, ci=cpos, di=cneg, data=dat.bcg)
res <- rma(yi, vi, data=dat)

## heterogeneity measures
het <- hetmeta(res)
confint(het)
```

hetmeta

Deriving Measures Of Heterogeneity

Description

The "hetmeta" implements the most common measures of heterogeneity in meta-analysis.

Usage

```
hetmeta(model)
```

Arguments

model an object of class "rma.uni".

Details

The "hetmeta" function calculates estimates for several heterogeneity measures in meta-analysis based on a meta-analytic model of class `rma.uni` (see [metafor-package](#) for more details).

Specifically, the measures derived in the function are the R_b , I^2 , and R_I . To complement those measures, the DerSimonian-Laird Q test is presented, together with the coefficient of variation of the pooled estimate CV_b , coefficient of variation of the within-study variances, and the typical within-variance terms as defined in the I^2 and R_I . See references for more details.

Value

The hetmeta function returns an object of class "hetmeta" as described in [hetmetaObject](#).

Author(s)

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References

Crippa A, Khudyakov P, Wang M, Orsini N, Spiegelman D. A new measure of between-studies heterogeneity in meta-analysis. 2016. *Stat. Med.* In Press.

Takkouche B, Khudyakov P, Costa-Bouzas J, Spiegelman D. Confidence Intervals for Heterogeneity Measures in Meta-analysis. *Am. J. Epidemiol.* 2013;kw060.

Higgins JPT, Thompson SG. Quantifying heterogeneity in a meta-analysis. *Stat. Med.* 2002; 21(11):1539-1558.

Takkouche B, Cadarso-Suarez C, Spiegelman D. Evaluation of old and new tests of heterogeneity in epidemiologic meta-analysis. *Am. J. Epidemiol.* 1999; 150(2):206-215.

See Also

[hetmeta-package](#), [metafor](#)

Examples

```
## load data
dat <- get(data(dat.gibson2002))

## random-effects model analysis of the standardized mean differences
dat <- escalc(measure = "SMD", m1i = m1i, sd1i = sd1i, n1i = n1i, m2i = m2i,
             sd2i = sd2i, n2i = n2i, data = dat)
res <- rma(yi, vi, data = dat, method = "REML")

## heterogeneity measures
hetmeta(res)

## load BCG vaccine data
data(dat.bcg)

## random-effects model of log relative risks
dat <- escalc(measure="RR", ai=tpos, bi=tneg, ci=cpos, di=cneg, data=dat.bcg)
res <- rma(yi, vi, data=dat)

## heterogeneity measures
hetmeta(res)
```

 hetmetaObject

hetmeta Object

Description

An object returned by hetmeta function, inheriting from class "rma.uni"

Details

An object of class "hetmeta". The object is derived from an object of class [rma.uni](#). In addition to thatm it has the following components: Objects of class "hetmeta" are lists with defined components.

Rb	value of R_b , which quantifies the proportion of the between-study heterogeneity relative to the variance of the pooled
Ri	value of R_I , whihc quantifies the proportion of the variance of the effect estimate due to between-studies variation.
CVb	value of CV_b , the between-studies coefficient of variation.
se_Rb	the sandard error of R_b^2 derived using the delta method.
se_I2	the sandard error of I^2 derived using the delta method.
se_Ri	the sandard error of R_I derived using the delta method.
se_CVb	the sandard error of CV_b derived using the delta method.
s2_I2	the "typical" within-study variance as defined in the I^2
s2_Ri	the "typical" within-study variance as defined in the R_I
cv_vi	value of the coefficient of variation of the within-study variances.

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See Also

[hetmeta](#), [hetmeta-package](#)

print.hetmeta	<i>Printing hetmeta Results</i>
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Description

Print function for objects of class "hetmeta".

Usage

```
## S3 method for class 'hetmeta'  
print(x, digits, ...)
```

Arguments

x	an object of class hetmeta produced by hetmeta .
digits	an integer specifying the number of digits to which printed results must be rounded.
...	further arguments passed to or from other methods.

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See Also

[hetmeta](#)

Examples

```
#To be included
```

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