Package 'MetaAnalyser'

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Type Package

Title An Interactive Visualisation of Meta-Analysis as a Physical Weighing Machine

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Description An interactive application to visualise meta-analysis data as a physical weighing machine. The interface is based on the Shiny web application framework, though can be run locally and with the user's own data.

License GPL (>= 2)

Depends R (>= 2.10), shiny

Imports ggvis, DT (>= 0.1.40), rstudioapi

Suggests rmeta

URL https://github.com/chjackson/MetaAnalyser

BugReports https://github.com/chjackson/MetaAnalyser/issues

LazyData yes

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

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R topics documented:

`aspirin` *Aspirin meta-analysis data*

Description

63 randomized controlled trials reported by Edwards et al. (1998) that each investigated the benefit of oral aspirin for pain relief.

Usage

```
data("aspirin")
```

Format

A data frame with 63 observations on the following 3 variables.

`name` Study name

`est` Study estimate: log-odds ratio for the proportion of patients in each arm who had at least a 50% reduction in pain

`se` Corresponding standard errors

Details

This dataset is included in this package to demonstrate asymmetry in meta-analysis, where smaller studies tend to show larger effect size estimates, whereas larger studies tend to report more modest results.

Source

Edwards, J. E. Oldman, A., Smith, L., Collins, S. L., Carol, D., Wiffen, P. J., McQuay, H.J., and Moore, R.A. (1998) Single dose oral aspirin for acute pain. Cochrane Database of Systematic Reviews, 4.

Examples

```
## Not run: MetaAnalyser(aspirin)
```

`catheter` *Meta-analysis of antibacterial catheter coating*

Description

Data on the effectiveness of silver sulfadiazine coating on venous catheters for preventing bacterial colonisation of the catheter and bloodstream infection. A modified version of the data provided by the **rmeta** package, excluding four small or uninformative studies.

Usage

```
data("catheter")
```

Format

A data frame with 11 observations on the following 3 variables.

`name` Study name

`est` Log odds ratio of bacteria colonisation (treatment compared to control)

`se` Corresponding standard error

Details

The Appavi, Pemberton, Logghe and Bach (a) studies are excluded. The data here are produced from the source numerators and denominators using the `meta.MH` method in **rmeta**.

Source

Veenstra D et al (1998) "Efficacy of Antiseptic Impregnated Central Venous Catheters in Preventing Nosocomial Infections: A Meta-analysis" JAMA 281:261-267

References

The **rmeta** package (Lumley, 2012).

Examples

```
## Not run:
MetaAnalyser(catheter)

## End(Not run)
```

magnesium *Magnesium and myocardial infarction meta-analysis data*

Description

8 randomised trials assessing the use of magnesium to treat myocardial infarction, previously analysed by Higgins and Spiegelhalter (2002).

Usage

```
data("magnesium")
```

Format

A data frame with 8 observations on the following 3 variables.

`name` Study name

`est` Log odds ratio of death (magnesium versus control)

`se` Standard error for the log odds ratio

Source

Higgins, J. P., & Spiegelhalter, D. J. (2002). Being sceptical about meta-analyses: a Bayesian perspective on magnesium trials in myocardial infarction. International Journal of Epidemiology, 31(1), 96-104.

Examples

```
## Not run: MetaAnalyser(magnesium)
```

MetaAnalyser *The Meta-Analyser*

Description

An interactive application to visualise meta-analysis data as a physical weighing machine

Usage

```
MetaAnalyser(dat, rstudio = FALSE)

MetaAnalyzer(dat, rstudio = FALSE)
```

Arguments

dat	Meta-analysis data. This should be a data frame with three columns, called "name", "est" and "se" giving the study name, study-specific parameter estimates and corresponding standard errors respectively. Numeric or character study names are permitted. If the data frame has more than three columns, the first three are used. If the first three columns are called "name", "est" and "se" in some order, they are re-ordered appropriately, otherwise they are re-named.
rstudio	The default of FALSE opens the app in the system default web browser. If running RStudio and `rstudio=TRUE`, the app is opened in the RStudio built-in viewer.

Details

Opens a web browser with the interactive application.

If `dat` is omitted, the default `magnesium` dataset is used.

`MetaAnalyzer` is an alias for `MetaAnalyser`.

Value

None

References

J. Bowden and C. Jackson "Weighing evidence with the Meta-Analyser" The American Statistician (2016) Available online, http://dx.doi.org/10.1080/00031305.2016.1165735

Examples

```
## Not run: MetaAnalyser(magnesium)
```

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metasumm *Meta-analysis summary statistics*

Description

Compute meta-analysis weights and corresponding pooled estimates given a set of estimates and standard errors. Weights are simply defined by the inverse variance, where the variance is the sum of the study-specific and random effects variance.

Usage

```
metasumm(dat, resd, egger = FALSE)
```

Arguments

dat	Meta-analysis data. This should be a data frame with three columns, called "name", "est" and "se" giving the study name, study-specific parameter estimates and corresponding standard errors respectively. Numeric or character study names are permitted. If the data frame has more than three columns, the first three are used. If the first three columns are called "name", "est" and "se" in some order, they are re-ordered appropriately, otherwise they are re-named.
resd	Random effects standard deviation. Set `resd=0` for a fixed effects meta-analysis. If `resd` is omitted, a random effects meta-analysis is performed using the typical DerSimonian and Laird method to obtain the standard deviation (`resd_dsl`).
egger	Set to `TRUE` to perform Egger correction.

Value

A list with the following components:

est	Original study-specific estimates (if `egger=FALSE`) or Egger-corrected version of these (if `egger=TRUE`).
pool	Pooled estimate
poolse	Pooled standard error
poolci	Pooled 95% confidence interval
pwtfe	Weights for fixed effects model, normalised to sum to 1
pwtre	Weights for desired random effects standard deviation, normalised to sum to 1

`resd_dsl` *Heterogeneity standard deviation in meta-analysis*

Description

Random effects standard deviation using the classic DerSimonian & Laird formula.

Usage

```
resd_dsl(dat)
```

Arguments

dat	Meta-analysis data. This should be a data frame with three columns, called "name", "est" and "se" giving the study name, study-specific parameter estimates and corresponding standard errors respectively. Numeric or character study names are permitted. If the data frame has more than three columns, the first three are used. If the first three columns are called "name", "est" and "se" in some order, they are re-ordered appropriately, otherwise they are re-named.

Value

Estimated random effects standard deviation

Examples

```
resd_dsl(magnesium)
```

`symmetric` *Artificially symmetric meta-analysis data*

Description

Artificial meta-analysis dataset with a symmetric pattern about the pooled estimate.

Usage

```
data("symmetric")
```

Format

A data frame with 13 observations on the following 3 variables.

`name` Study name, here simply a numeric vector from 1 to 13

`est` Study-specific estimate

`se` Standard error

Details

Used in this package to illustrate an idealised situation where there is no correlation between effect size and precision across studies.

Examples

```
## Not run: MetaAnalyser(symmetric)
```

Index