

Graphical exploration of incoherence in a network of randomized trials in R

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Description: Function for simple exploration of incoherence (discrepancies between direct and indirect evidence) in a network of randomized trials.

Functions	Use
MTcoherence.fun	Coherence of a network
Supporting sub-routines	
.needed.vectors	.possible.loops combn nCm
You need the R package meta	
Datasets	
Dataset	

Evaluate the coherence of the network and plot

DESCRIPTION:

This function evaluates coherence within all first-order closed loops in a network formed by many treatments as included in a data set.

USAGE:

```
MTcoherence.fun(Dataset, plot = T)
```

REQUIRED ARGUMENTS:

Dataset

a data set having one line *per comparison*. Studies with more than two treatments must have ALL possible comparison (e.g. a study reporting A, B, and C treatment must have all three AB, AC and BC contrasts). The data must contain at least five columns with the following variables: effect size (for which normal distribution can be assumed, e.g. logOR, MD), variance of the effect size, the study id, the name of the first treatment, the name of the second treatment. Multi-arm studies must have the same study id.

OPTIONAL ARGUMENTS:

Plot

To plot incoherence estimates as forest plot .

VALUE:

A matrix with one row per loop and columns the incoherence estimate and its standard error.

DETAILS:

The function identifies all possible first order loops (triangles) formed by the network of treatments. Within each loop, at least three meta-analyses are performed. Random effects models are fitted with `metan.fun`. Then, the incoherence within each loop is estimated as the weighted difference between the indirect and direct estimate for a randomly chosen contrast.

COMMENTS:

This is not a formal test to evaluate the coherence of the network, and confidence intervals shall not be strictly interpreted as usually to draw conclusions regarding the coherence of a loop. The function and the plot provide a rather intuitive and graphical approach that can direct the identification and location of sources of information that disagree. Once a loop (or more) seem to be highly deviant from the zero line, further investigation of the causes for this apparent incoherence are required. As the direction of coherence is irrelevant to inference, positive values are returned.

EXAMPLES:

```
Coher<- MTcoherence.fun(Dataset)
```

Example

Explore incoherence

The dataset 'Dataset' includes nine studies as seen in the column ID. The first column has the effect sizes (mean differences), the second contains their variances and the last two have the names of the treatments. The names can be proper drug names or codes. However, you shall use letters instead of numbers if you have more than 9 treatments. Note that study 9 has three arms and all three contrasts should be included in the database.

```
> MTcoherence.fun(Dataset)
```

```
*----- Evaluating the coherence of the network -----*
```

```
Nr of treatments: 5
Nr of all possible first order loops (triangles): 30
Nr of available first order loops: 2
```

```
1 : Evaluation of the loop 123
Direct comparisons in the loop:
12 23 13
 3  3  2
```

```
The study with id=9 has more than two treatments in this loop (out is row nr 9
for comparison 12)
Meta-analysis for the 12 comparison
mean(se)= -0.107(0.209)
Meta-analysis for the 23 comparison
mean(se)= 0.193(0.175)
Meta-analysis for the 13 comparison
mean(se)= 0.482(0.206)
Indirect summary estimate for the 13 comparison
Mean(se)= 0.086(0.272)
```

```
Incoherence within the loop: Mean(se)= -0.396(0.341)
```

```
2 : Evaluation of the loop 235
Direct comparisons in the loop:
23 35 25
 3  1  1
```

```
Meta-analysis for the 23 comparison
mean(se)= 0.193(0.175)
Meta-analysis for the 35 comparison
mean(se)= -0.348(0.359)
Meta-analysis for the 25 comparison
mean(se)= 0.419(0.368)
Indirect summary estimate for the 25 comparison
Mean(se)= -0.155(0.399)
```

```
Incoherence within the loop: Mean(se)= -0.574(0.543)
```

Evaluation of coherence within first order closed loops

Estimates with 95% confidence intervals

1st order loops

