# The statistical importance of a study for a network meta-analysis estimate

## CURRENT STATUS: UNDER REVISION

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# Abstract

Background: In pairwise meta-analysis, the contribution of each study to the pooled estimate is given by its weight, which is defined based on the inverse variance of the estimate from that study. For network meta-analysis (NMA), the contribution of direct (and indirect) evidence is easily obtained from the diagonal elements of the hat matrix. It is, however, not fully clear how to generalize this to the percentage contribution of each study to a NMA estimate.

Methods: After briefly discussing available approaches, we want to question whether it is possible to obtain unique percentage contributions and discuss another approach. We define the importance of each study for a NMA estimate by the reduction of the estimate's variance when adding the given study to the others. An equivalent interpretation is the relative loss in precision when the study is left out.

Results: Importances are values between 0 and 1. An importance of 1 means that the study is an essential link of the pathway in the network connecting one of the treatments with the other. These numbers in general do not add to one and thus cannot be interpreted as `percentage contributions'.

Conclusions: Importances generalize the concept of weights in pairwise meta-analysis in a natural way. Moreover, they are uniquely defined, easily calculated, and have an intuitive interpretation. We give some real examples for illustration.

## Full-text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed.

However, the manuscript can be downloaded and accessed as a PDF.
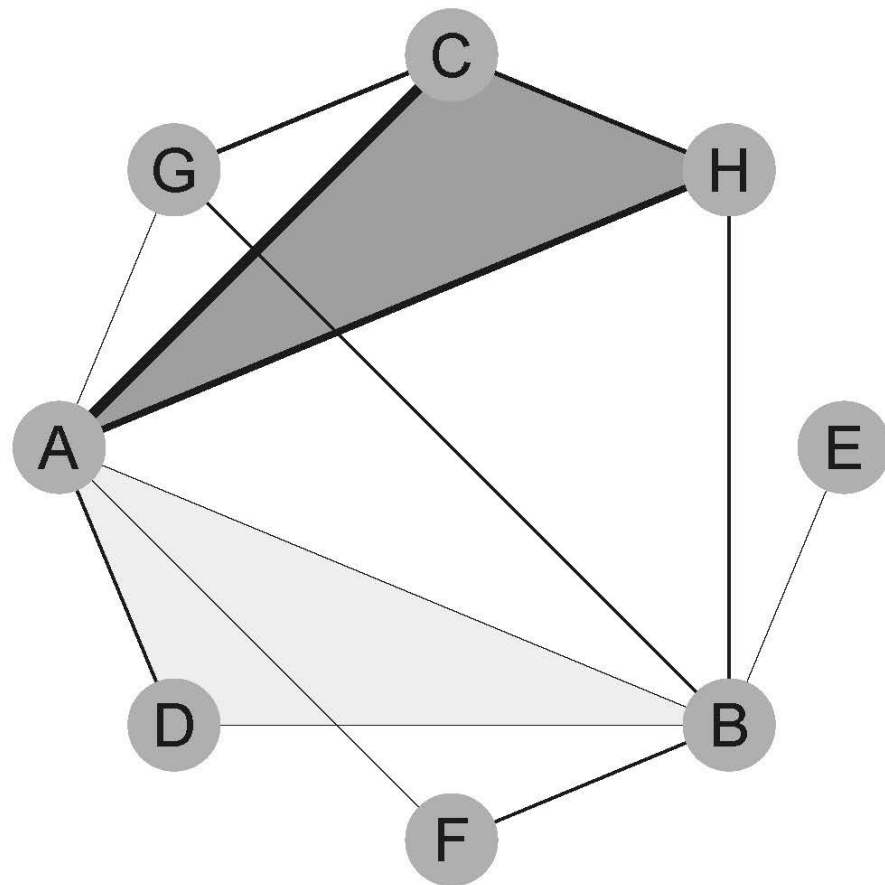
## Figures

# Full network



Figure 1
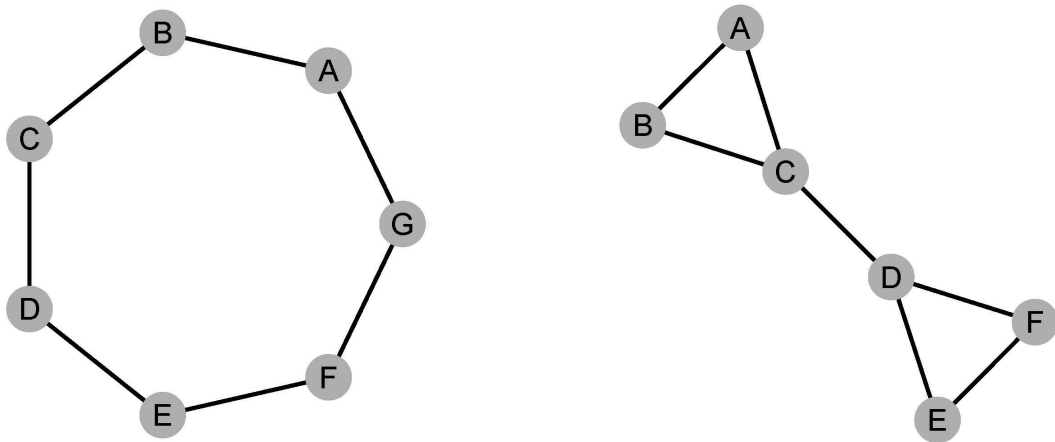
Network graph of thrombolytic data.

Figure 2

Left panel: A circle of n treatments with equal variances. Right panel: A network with a
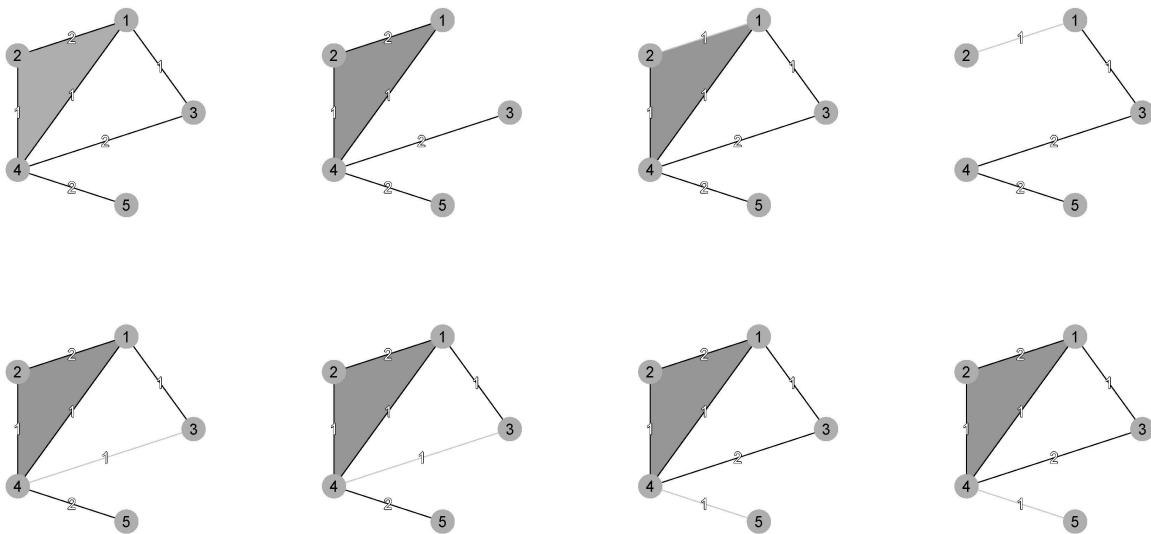
bridge.



Figure 3

Parkinson data (top left panel) with each study removed in turn (other panels).
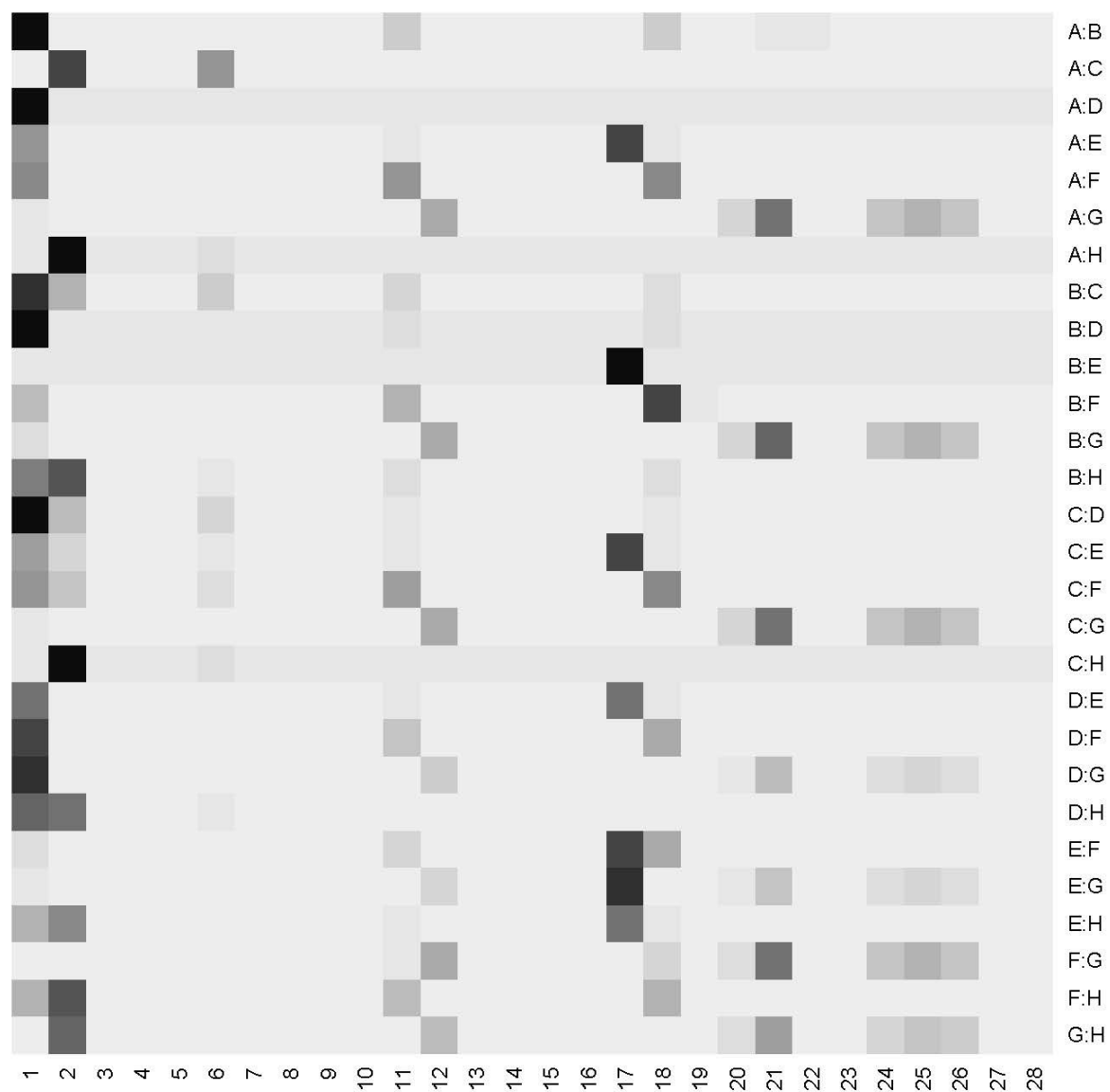
Figure 4

A grayscale heatmap of importances for thrombolytic data. Darker colors represent greater

importance of a study (column) for a comparison (row).

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

Additional File 1.R
Additional File 2.pdf
Additional File 3.csv