# Manual for web application meta-plot

https://rvanaert.shinyapps.io/meta-plot
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Meta-plots as proposed in van Assen et al. (2019) can be created with this web application.[1] The meta-plot is a descriptive tool for meta-analysis that (i) provides information on the effect size estimate and its precision, (ii) robustness of the effect size estimate with respect to primary study's precision, (iii) evidence of publication bias and its effect on the effect size estimate, (iv) information on the evidential value of primary studies in the meta-analysis.

The web application can currently be used for creating meta-plots for three different effect size measures: two-independent means, and one raw correlation coefficients, and odds ratio.

**Step-by-step guide for using the web application:**

1) Select the effect size measure in the meta-analysis (two-independent means, one raw correlation, or odds ratio).

2) Select the alpha level which is used in the primary studies. The default alpha level is .05. Note that it is assumed that two-tailed tests were conducted in the primary studies. If one-tailed hypothesis tests were used in the primary studies, the alpha level has to be multiplied by two.

3) Two options are available for entering data in the web application. Data can be entered via a CSV file or manually in a table in the web browser.

   Manually in table:

   Data can be entered in the web browser if "Manually in table" is selected. Note that extra rows can be added to the table by clicking the "plus" sign above the table. The following information has to be entered:

   For two-independent means:
   - *m1i* → mean in group 1 for each primary study
   - *m2i* → mean in group 2 for each primary study
   - *n1i* → sample size in group 1 for each primary study
   - *n2i* → sample size in group 2 for each primary study
   - *sd1i* → standard deviation in group 1 for each primary study
   - *sd2i* → standard deviation in group 2 for each primary study

[1] This web application is based on the R package `puniform` which can be downloaded from CRAN by running the following line of code `install.packages("puniform"); library(puniform)`. The function `meta_plot()` in the package can be used to obtain the plots in R.

For one correlation:

- *ri* → raw correlation coefficient for each primary study
- *ni* → sample size for each primary study

For odds ratio:

For creating a meta-plot based on odds ratios as effect size measure, the 2x2 frequency table should follow a specific format. The reason for this is that the probability for the outcome of interest in the control conditions has to be estimated. Hence, the 2x2 frequency table should look like this:

| | Outcome 1 | Outcome 2 |
|---|---|---|
| Control group | *ai* | *bi* |
| Experimental group | *ci* | *di* |

Via CSV file:

If "via CSV file" is selected, a comma separated file has to be uploaded with a comma as separator and a period indicating the decimal point. The first row should *exactly* match the names of the variables as described above for supplying the data manually in the table. To give an example, the CSV file for two-independent means has to be structured as follows

For descriptive statistics:

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | m1i | m2i | n1i | n2i | sd1i | sd2i |
| 2 | 0.2 | 0 | 200 | 200 | 1 | 1 |
| 3 | 0.2 | 0 | 200 | 200 | 1 | 1 |

4) By clicking the "Create plots" button two meta-plots are created. One based on all primary studies included in the meta-analysis and one summary meta-plot.

5) Optional is to save the meta-plots in a .pdf file by clicking the button "Download plots".

**References**

van Assen, M. A. L. M., …, & van Aert (2019). The meta-plot. Manuscript in preparation.