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1. Introduction

This file provides information on MetaEasy, a Microsoft Excel add-in for performing meta-analyses. More details on the module can be found in the technical paper in which it was described (paper available in http://www.jstatsoft.org/v30/i07 but download the software from www.statanalysis.co.uk to get the latest version). Please note that the software's main aim is to help novice meta-analysts in combining outcomes from various studies, which were disseminated in different formats. To that end dichotomous outcomes are always transformed to Standardized Mean Differences so that they can be combined with continuous outcomes.

If you want to meta-analyse only dichotomous outcomes, avoid using MetaEasy since it will introduce another degree of bias via the transformation. Finally, if you already have computed effect sizes and their standard errors, MetaEasy is not going to be of any help since its primary function is the computation of these using various methods. If MetaEasy is not right for you try RevMan which is also free (and a very good piece of software). The functions included in MetaEasy have been implemented in Stata in two commands named metaeff and metaan (type \'ssc describe metaan\' or \'ssc describe metaeff\' in STATA, for a description)

2. Installation

- Download an save setup.zip to a location in your hard disk drive
- Extract files to your desktop
- Install setup.exe by double-clicking on it and following the instructions
- After setup has been completed every time you open an Excel instance a meta-analysis menu will be available (Figure 1)
3. Format Sheets

Before inputting data the data and report sheets need to be formatted accordingly. Select the format sheet option and input the number of meta-analysis you want to include in a single excel workbook (Figure 2). For each meta-analysis 5 sheets are created (Figure 3) which will be explained below.

![Figure 2](image_url)

![Figure 3](image_url)

### 3.1. Data Sheet

The data sheet is the only sheet that is unlocked and on which data needs to be inputted. Each row corresponds to a study outcome for which information needs to be inputted in the appropriate information field so that the outcome effect and its standard error can be computed. Although there number of fields is large (Table I), completion of only a few may be sufficient. Nevertheless, you are advised to input all available information since the most robust effect calculation method will be automatically selected. More details on the used methods can be found in 4.2.

<table>
<thead>
<tr>
<th>Name</th>
<th>Label</th>
<th>Type</th>
<th>Required</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>The name of the study</td>
<td>String</td>
<td>Yes</td>
<td>Only needs to be inputted once for each study (in the first outcome/variable row). If the cell background colour is set to red, the row is not included in the analysis.</td>
</tr>
<tr>
<td>Design</td>
<td>The type of the design (RTC, Observational study etc)</td>
<td>String</td>
<td>No</td>
<td>Only needs to be inputted once for each study (in the first outcome/variable row)</td>
</tr>
<tr>
<td>Name</td>
<td>Label</td>
<td>Type</td>
<td>Required</td>
<td>Information</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------------------</td>
<td>---------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Variables</td>
<td>Outcome variable names</td>
<td>String</td>
<td>Yes</td>
<td>Will be truncated to 28 characters in graphs. If the cell background colour is set to yellow the row is not included in the analysis. The font styles used (bold, italics, normal) are carried over to the result sheets. It is advised to set power outcome names in bold and secondary outcomes ones in italics. Outcomes with names in italics are plotted separately in the outcomes scatter plot. No action has be set for bold font style names</td>
</tr>
<tr>
<td>Nlb</td>
<td>Intervention group size, before treatment</td>
<td>Integer</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td>Nla</td>
<td>Intervention group size, after treatment</td>
<td>Integer</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>NCb</td>
<td>Control group size, before treatment</td>
<td>Integer</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td>NCa</td>
<td>Control group size, after treatment</td>
<td>Integer</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>N(tot)b</td>
<td>Nlb + NCb</td>
<td>Integer</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes (certain old studies provide the sum instead of the individual items)</td>
</tr>
<tr>
<td>N(tot)a</td>
<td>Nla + NCa</td>
<td>Integer</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes (certain old studies provide the sum instead of the individual items)</td>
</tr>
<tr>
<td>lb</td>
<td>Number of events in intervention group, after treatment</td>
<td>Integer</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td>la</td>
<td>Number of events in intervention group, after treatment</td>
<td>Integer</td>
<td>Yes* (1a, 1b)</td>
<td></td>
</tr>
<tr>
<td>Cb</td>
<td>Number of events in control group, before treatment</td>
<td>Integer</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td>Ca</td>
<td>Number of events in control group, after treatment</td>
<td>Integer</td>
<td>Yes* (1a, 1b)</td>
<td></td>
</tr>
<tr>
<td>mean(lb)</td>
<td>Mean effect, intervention group, before treatment</td>
<td>Real</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td>mean(la)</td>
<td>Mean effect, intervention group, after treatment</td>
<td>Real</td>
<td>Yes* (3, 4, 5, 6)</td>
<td></td>
</tr>
<tr>
<td>mean(Cb)</td>
<td>Mean effect, control group, before treatment</td>
<td>Real</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td>Name</td>
<td>Label</td>
<td>Type</td>
<td>Required</td>
<td>Information</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td><code>mean(Ca)</code></td>
<td>Mean effect, control group, after treatment</td>
<td>Real</td>
<td>Yes* (3, 4, 5, 6)</td>
<td>If <code>MD</code> has not been inputted it is calculated by the formula. If it has, the inputted value is used instead (to take into account adjusted <code>MD</code> values)</td>
</tr>
<tr>
<td><code>SD(Ia)</code></td>
<td>Standard deviation of the effect, intervention group, after treatment</td>
<td>Real</td>
<td>Yes* (4)</td>
<td></td>
</tr>
<tr>
<td><code>SD(Ca)</code></td>
<td>Standard deviation of the effect, control group, after treatment</td>
<td>Real</td>
<td>Yes* (4)</td>
<td></td>
</tr>
<tr>
<td><code>MD</code></td>
<td>Means difference ( MD = mean(Ia) - mean(Ca) )</td>
<td>Real</td>
<td>Yes* (3, 4, 5, 6)</td>
<td></td>
</tr>
<tr>
<td><code>lCI95(MD)</code></td>
<td>Lower limit of 95% Confidence Interval for the means difference.</td>
<td>Real</td>
<td>Yes* (3)</td>
<td></td>
</tr>
<tr>
<td><code>uCI95(MD)</code></td>
<td>Upper limit of 95% Confidence Interval for the means difference.</td>
<td>Real</td>
<td>Yes* (3)</td>
<td></td>
</tr>
<tr>
<td><code>median(Ia)</code></td>
<td>Median of effect, intervention group, after treatment</td>
<td>Real</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td><code>median(Ca)</code></td>
<td>Median of effect, control group, after treatment</td>
<td>Real</td>
<td>-</td>
<td>Not used in any of the methods, column provided for information purposes and/or future use</td>
</tr>
<tr>
<td><code>lCI95(Ia)</code></td>
<td>Lower limit of 95% Confidence Interval for the mean of the intervention group, after treatment.</td>
<td>Real</td>
<td>Yes* (5)</td>
<td></td>
</tr>
<tr>
<td><code>uCI95(Ia)</code></td>
<td>Upper limit of 95% Confidence Interval for the mean of the intervention group, after treatment.</td>
<td>Real</td>
<td>Yes* (5)</td>
<td></td>
</tr>
<tr>
<td><code>lCI95(Ca)</code></td>
<td>Lower limit of 95% Confidence Interval for the mean of the control group, after treatment.</td>
<td>Real</td>
<td>Yes* (5)</td>
<td></td>
</tr>
<tr>
<td><code>uCI95(Ca)</code></td>
<td>Upper limit of 95% Confidence Interval for the mean of the control group, after treatment.</td>
<td>Real</td>
<td>Yes* (5)</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Label</td>
<td>Type</td>
<td>Required</td>
<td>Information</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>OR</td>
<td>Odds ratio:</td>
<td>Real</td>
<td>Yes* (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[ OR = \frac{Ia}{Ca} - \frac{Ia}{Nla} ]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[ ] [ ]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORI/95%</td>
<td>Lower limit of 95% Confidence Interval for after treatment Odds Ratio</td>
<td>Real</td>
<td>Yes* (2)</td>
<td></td>
</tr>
<tr>
<td>ORu95%</td>
<td>Upper limit of 95% Confidence Interval for after treatment Odds Ratio</td>
<td>Real</td>
<td>Yes* (2)</td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>P-value of a two way test that compares between groups</td>
<td>Real</td>
<td>Yes* (6, 7)</td>
<td></td>
</tr>
<tr>
<td>t-value</td>
<td>T-value of a two way t-test that compares between groups</td>
<td>Real</td>
<td>Yes* (6, 7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A p-value is calculated using this value, which always overrides an inputted p-value in the previous field</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>Degrees of freedom of a two way t-test that compares between groups</td>
<td>Integer</td>
<td>Yes* (6, 7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Degrees of freedom are automatically computed (if not provided) as Nla + NCa – 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEdiff</td>
<td>Standard Error of Difference between the means of the two groups.</td>
<td>Real</td>
<td>Yes* (3)</td>
<td></td>
</tr>
<tr>
<td>direction</td>
<td>Direction of the effect</td>
<td>Char</td>
<td>Yes</td>
<td>Leave empty if effect favours intervention. Input a single minus sign to reverse effect, if it favours control</td>
</tr>
<tr>
<td>quality</td>
<td>Quality of the study</td>
<td>Integer</td>
<td>No</td>
<td>Evaluation of each study (only needs to be inputted once for each study). For future use and information purposes only.</td>
</tr>
<tr>
<td>subgroup</td>
<td>Subgroup information for an outcome</td>
<td>String</td>
<td>No</td>
<td>Information on subgroup outcomes. They are used to label outcomes in the results.</td>
</tr>
</tbody>
</table>

*Requisite for one effect size calculation method or more, but not all. The method(s) involved are shown in brackets
4. Execute meta

After the data sheet has been updated you can run a meta-analysis using one of two options.

The first option will include all outcomes in the analysis, even secondary ones. The second will only include secondary outcomes for studies that totally lack primary ones. The option you select at this point can only affect the results in the last sheet (models). After the code is executed the four result sheets (results, summary, graph & models) are updated. It is likely that you will receive an error at this stage if the data sheet has not been completed with appropriate values (probability values above 1, negative group sizes or counts etc)

4.1. Results Sheet

As previously mentioned, eight different methods are used to compute the effect and SE of an outcome and their results are listed on this sheet. Once more, each row corresponds to a single outcome and the various results are provided just for comparison since the most robust method is automatically selected and used in the meta-analysis. Empty fields indicate that a particular method could not be used due to missing data (Figure 5). Additional information regarding the outcome is provided at the far right end of the worksheet (Figure 6). These additional fields are interpreted in Table II. The sheet is protected and cannot be changed but data can be copied from it.
Figure 5

<table>
<thead>
<tr>
<th>Field name</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculated &amp; wanted?</td>
<td>YES if the effect could be calculated with any of the methods and the outcome hasn’t been excluded from the analysis by highlighting the study or variables field in the data sheet (see Table I). Empty otherwise</td>
</tr>
<tr>
<td>Reversed effect?</td>
<td>YES if the effect has been reversed using field direction in the data sheet. Empty otherwise.</td>
</tr>
<tr>
<td>Method selected</td>
<td>Displays the method that will be used in the meta-analysis. Empty if the effect could not be computed with any of the methods.</td>
</tr>
<tr>
<td>Missing data from method…</td>
<td>For each method lists the data that are missing to compute results. Empty if the method has been successfully used. Select a cell of interest and see its full contents in the formula bar (Figure 7)</td>
</tr>
</tbody>
</table>

Table II
Figure 6

Figure 7
4.2. Methods description

The methods used are labelled 1a, 1b, 2, 3, 4, 5, 6 & 7. The first three refer to dichotomous data, 3 to 6 to continuous and method 7 applies to both types. Table III provides information on the input needed by each method. All methods have been inferred from The Cochrane Collaboration Handbook for Systematic Reviews of Interventions v.4.2.6, §8.5 - http://www.cochrane.org/resources/handbook/.

<table>
<thead>
<tr>
<th>Method</th>
<th>Data type</th>
<th>Input needed</th>
<th>Effect Estimate Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Dichotomous</td>
<td>Nla and NCa and la and Ca</td>
<td>Risk Difference</td>
</tr>
<tr>
<td>1b</td>
<td>Dichotomous</td>
<td>Nla and NCa and la and Ca</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>2</td>
<td>Dichotomous</td>
<td>Nla and NCa and OR and CI95%(OR)</td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>3</td>
<td>Continuous</td>
<td>Nla and NCa and MD and (CI95%(MD) or SEdiff(m))</td>
<td>Mean Difference</td>
</tr>
<tr>
<td>4</td>
<td>Continuous</td>
<td>Nla and NCa and MD and SD(la) and SD(Ca)</td>
<td>Mean Difference</td>
</tr>
<tr>
<td>5</td>
<td>Continuous</td>
<td>Nla and NCa and MD and CI95%(meanla) and CI95%(meanca)</td>
<td>Mean Difference</td>
</tr>
<tr>
<td>6</td>
<td>Continuous</td>
<td>Nla and NCa and MD and (P or (T and DF))</td>
<td>Mean Difference</td>
</tr>
<tr>
<td>7</td>
<td>Continuous</td>
<td>Nla and NCa and (P or (T and DF))</td>
<td>Any</td>
</tr>
</tbody>
</table>

Table III

Where:

- Nla is the size of the intervention group.
- NCa is the size of the control group.
- la is the number of events in the intervention group (always stands that la<Nla).
- Ca is the number of events in the control group (always stands that Ca<NCa).
- OR is the Odds Ratio \( OR = \frac{Ia}{Ca} \cdot \frac{(Nla - la)}{(NCa - Ca)} \).
- CI95%(OR) is the 95% Confidence Interval for the Odds Ratio
- MD is the means difference of the two groups, either provided or calculated with:
  \( MD = mean(la) - mean(Ca) \).
- CI95%(MD) is the 95% Confidence Interval for the means difference.
- $SE_{diff(m)}$ is the Standard Error of Difference between the means of the two groups.
- $SD(la)$ is the Standard Deviation for the intervention group.
- $SD(Ca)$ is the Standard Deviation for the control group.
- $CI_{95\%}(mean_{la})$ is the 95% Confidence Interval for the mean of the intervention group.
- $CI_{95\%}(mean_{ca})$ is the 95% Confidence Interval for the mean of the control group.
- $P$ is the p-value of the test.
- $T$ is the t-value of the t-test.
- $DF$ the degrees of freedom of the t-test.

As one would expect, there are studies for which we have enough data to employ more than one method. In cases as such all the possible ‘paths’ are used so that we can compare the results and identify possible errors. However, only one method is finally selected to provide us with data for the forest plot. The priority lists follow:

<table>
<thead>
<tr>
<th>Data type</th>
<th>Priority list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dichotomous</td>
<td>2, 1a, 1b, 7</td>
</tr>
<tr>
<td>Continuous</td>
<td>4, 5, 3, 6, 7</td>
</tr>
</tbody>
</table>

For some outcomes enough data is provided for the application of more than one of the methods. In such cases, the effect size and SE are calculated using all possible ‘options’ which enables the user to compare the results and the accuracy of the information supplied by the study in question (Figure 5). Nevertheless, only one method is finally selected to provide us with effect sizes and SEs for the plots and the meta-analysis. The methods have been prioritised according to expected precision: that is, the expectation that the effect size and associated variance computed from the input data will be accurate. As a general rule, the fewer the number of mathematical transformations involved in getting from the “raw data” to the statistical parameters used as input for the method, the higher the expected precision. As for 1a and 2a, they require exactly the same data but while the first one uses the Risk Difference to produce the results, the second one employs the Odds Ratio ($OR$). Since they both require exactly the same input, the former is arbitrarily prioritised over the latter, which – in effect – is never used in further analyses but is provided for comparison.
4.2.1. Method 1a (based on RD) – Dichotomous Data

We need:
- \( Nla, NCa, Ia, Ca \)

Step 1

\[
SE_{diff}(RD) = \sqrt{\frac{P_{la}(1-P_{la})}{Nla} + \frac{P_{ca}(1-P_{ca})}{NCa}} \quad \text{where} \quad P_{la} = \frac{Ia}{Nla} \quad \text{and} \quad P_{ca} = \frac{Ca}{NCa}
\]

Step 2

\[
SE_{effect} = \sqrt{\frac{1}{Nla} + \frac{1}{NCa}}
\]

Step 3

\[
SD = \frac{SE_{diff}}{SE_{effect}}
\]

Step 4

\[
effect = \frac{RD}{SD}
\]

Step 5

\[
CI95\%(effect) = effect \pm 1.96 \cdot SE_{effect}
\]

Step 6

\[
value\_error\_bars = SE_{effect} \cdot 1.96
\]

4.2.2. Method 1b (based on OR) – Dichotomous Data

We need:
- \( Nla, NCa, Ia, Ca \)

Step 1

Let \( Q = \ln(OR) \) where \( OR = \frac{Ia/(Nla - Ia)}{Ca/(NCa - Ca)} \)

Step 2

\[
SE_{diff}(Q) = \sqrt{\frac{1}{Ia} + \frac{1}{Nla - Ia} + \frac{1}{Ca} + \frac{1}{NCa - Ca}}
\]

Step 3

\footnote{There are some cases where \( Nla = Ia \) or \( NCa = Ca \) and therefore the Odds Ratio cannot be computed.}
\[
upperCI_{95\%}(Q) = Q + 1.96 \cdot SE_{diff}(Q)
\]
\[
lowerCI_{95\%}(Q) = Q - 1.96 \cdot SE_{diff}(Q)
\]

**Step 4**
\[
effect = \sqrt{\frac{3}{\pi}} Q
\]

**Step 5**
\[
upperCI_{95\%}(effect) = upperCI_{95\%}(Q) \cdot \sqrt{\frac{3}{\pi}}
\]
\[
lowerCI_{95\%}(effect) = lowerCI_{95\%}(Q) \cdot \sqrt{\frac{3}{\pi}}
\]

**Step 6**
\[
value_{-error_{-bars}} = \sqrt{\frac{3}{\pi}} SE_{diff}(Q) \cdot 1.96
\]

### 4.2.3. Method 2 (based on OR and its CI) – Dichotomous Data

We need:
- \(N_{la}, N_{ca}, OR, CI_{95\%}(OR)\)

**Step 1**
Calculate 'absolute' confidence intervals for Standardised Mean Difference (SMD)
\[
upperCI_{95\%}(SMD) = \sqrt{\frac{3}{\pi}} \ln(upperCI_{95\%}(OR))
\]
\[
lowerCI_{95\%}(SMD) = \sqrt{\frac{3}{\pi}} \ln(lowerCI_{95\%}(OR))
\]

**Step 2**
\[
SE_{\text{effect}} = \frac{upperCI_{95\%}(SMD) - lowerCI_{95\%}(SMD)}{3.92}
\]
when \(N_{la} \geq 60 \& N_{ca} \geq 60\)

(when sample size is small: \(SE_{\text{effect}} = \frac{upperCI_{95\%}(SMD) - lowerCI_{95\%}(SMD)}{2 \cdot \text{tinv}(1 - 0.95,N_{la} + N_{ca} - 2)}\)

where the denominator is an excel function returning the t-value for specific CI and dfs)

**Step 3**
\[
effect = \sqrt{\frac{3}{\pi}} \ln OR
\]

effect is actually SMD

**Step 4**
CI95\%(effect) = effect ± 1.96 \cdot SE_{effect}

Step5
value_ error_ bars = SE_{effect} \cdot 1.96

4.2.4. Method 3 – Continuous data

We need:
- $N_{la}, N_{ca}$, Mean Difference ($MD$) and Confidence Interval for the mean difference $CI95\%(MD)^2$

Step1
$$SE_{diff}(MD) = \frac{upperCI95\%(MD) - lowerCI95\%(MD)}{3.92}$$
when $N_{la} \geq 60$ & $N_{ca} \geq 60$

(when sample size is small: $SE_{diff}(MD) = \frac{upperCI95\%(MD) - lowerCI95\%(MD)}{2 \cdot tinv(1 - 0.95, N_{la} + N_{ca} - 2)}$
where the denominator is an excel function returning the t-value for specific CI and DFs)

Step2
$$SE_{effect} = \sqrt{\frac{1}{N_{la}} + \frac{1}{N_{ca}}}$$

Step3
$$SD = \frac{SE_{diff}}{SE_{effect}}$$

Step4
$$effect = \frac{MD}{SD}$$

Step5
$$CI95\%(effect) = effect ± 1.96 \cdot SE_{effect}$$

Step6
value_ error_ bars = SE_{effect} \cdot 1.96

4.2.5. Method 4 – Continuous data

We need:

\[2\] Instead of the $CI95\%(MD)$ the $SE_{diff}(MD)$ may be provided instead
•  $N_{la}$, $N_{Ca}$, $MD$, $SD(\text{Ia})$, $SD(\text{Ca})$³

**Step 1**

$$SD = \sqrt{\frac{SD(\text{Ia})^2 \cdot (N_{la} - 1) + SD(\text{Ca})^2 \cdot (N_{Ca} - 1)}{N_{la} + N_{Ca} - 2}}$$

**Step 2**

$$SE_{effect} = \sqrt{\frac{1}{N_{la}} + \frac{1}{N_{Ca}}}$$

**Step 3**

$$effect = \frac{MD}{SD}$$

**Step 4**

$$CI_{95\%}(effect) = effect \pm 1.96 \cdot SE_{effect}$$

**Step 5**

$$value\_error\_bars = SE_{effect} \cdot 1.96$$

### 4.2.6. Method 5 – Continuous data

We need:
•  $N_{la}$, $N_{Ca}$, $MD$, $CI(\text{Ia})$, $CI(\text{Ca})$

**Step 1**

$$SD(\text{Ia}) = \sqrt{N_{la} \cdot \frac{upperCI_{95\%}(\text{Ia}) - lowerCI_{95\%}(\text{Ia})}{3.92}}$$

(if $N_{la} < 60$ then $SD(\text{Ia}) = \sqrt{N_{la} \cdot \frac{upperCI_{95\%}(\text{Ia}) - lowerCI_{95\%}(\text{Ia})}{2 \cdot \text{tinv}(1-0.95,N_{la}-1)}}$)

**Step 2**

$$SD(\text{Ca}) = \sqrt{N_{Ca} \cdot \frac{upperCI_{95\%}(\text{Ca}) - lowerCI_{95\%}(\text{Ca})}{3.92}}$$

(if $N_{Ca} < 60$ then $SD(\text{Ca}) = \sqrt{N_{Ca} \cdot \frac{upperCI_{95\%}(\text{Ca}) - lowerCI_{95\%}(\text{Ca})}{2 \cdot \text{tinv}(1-0.95,N_{Ca}-1)}}$)

**Step 3**

³ Instead of $SD(\text{Ia})$ and $SD(\text{Ca})$ we may have $SEM(\text{Ia})$ & $SEM(\text{Ca})$. Then we use: $SEM = \frac{SD}{\sqrt{N}}$ to convert $SEM$ to $SD$.  

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\[ SD = \sqrt{\frac{SD(Ia)^2 \cdot Nla + SD(Ca)^2 \cdot NCa}{Nla + NCa}} \]

**Step 4**

\[ SE_{effect} = \sqrt{\frac{1}{Nla} + \frac{1}{NCa}} \]

**Step 5**

\[ effect = \frac{MD}{SD} \]

**Step 6**

\[ CI_{95\%}(effect) = effect \pm 1.96 \cdot SE_{effect} \]

**Step 7**

\[ value \_ error \_ bars = SE_{effect} \cdot 1.96 \]

**4.2.7. Method 6 – Continuous data**

We need:

- \( Nla, NCa, MD \) and \( P \) value

**Step 1**

\[ SE_{diff}(MD) = \frac{|MD|}{tinv(P, Nla + NCa - 2)} \]

**Step 2**

\[ SE_{effect} = \sqrt{\frac{1}{Nla} + \frac{1}{NCa}} \]

**Step 3**

\[ SD = \frac{SE_{diff}}{SE_{effect}} \]

**Step 4**

\[ effect = \frac{MD}{SD} \]

**Step 5**

\[ CI_{95\%}(effect) = effect \pm 1.96 \cdot SE_{effect} \]

**Step 6**

\[ value \_ error \_ bars = SE_{effect} \cdot 1.96 \]
4.2.8. Method 7 – Continuous data

We need:
- \( Nla, NCa \) and \( P \) value

**Step1**

\[ z = \text{abs}(\text{norm}\sin(P / 2)) \]

**Step2**

\[ SE_{\text{effect}} = \sqrt{\frac{1}{Nla} + \frac{1}{NCa}} \]

**Step3**

\[ \text{effect} = z \cdot SE_{\text{effect}} \]

**Step4**

\[ CI_{95\%}(\text{effect}) = \text{effect} \pm 1.96 \cdot SE_{\text{effect}} \]

**Step5**

\[ \text{value_error_bars} = SE_{\text{effect}} \cdot 1.96 \]
4.3. Summary Sheet

The outcomes for which an effect was computed are presented in this sheet (Figure 8). Details for the fields in the sheet are presented in Table V.

Figure 8

Primary outcomes are listed first followed by the secondary ones, grouped by study. The same style applies to the forest plot. The sheet is protected and cell values cannot be changed but data can be copied from it. The forest plot can also be selected and copied.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>effect</td>
<td>The outcome’s effect, as computed by the “best” possible method</td>
</tr>
<tr>
<td>effectl95</td>
<td>Lower lever of the 95% CI for the effect, as computed by the “best” possible method</td>
</tr>
</tbody>
</table>
### 4.4. Models Sheet

The last sheet calculates a single effect size and its variance for each study using the available outcomes (Figure 9).

![Figure 9](image_url)
Each study’s effect size is the median of the effect sizes of the respective outcomes, while the variance of the effect is the median of their variances. The computed values are used in various meta-analysis models in order to determine an overall effect for the intervention. For all methods (Fixed, DerSimonial-Laird, Q, Maximum-Likelihood, Profile-Likelihood, Permutations and T-test) an overall effect is computed along with a variance and confidence interval. References for all the used methods are provided in Table VI. Note that the Permutations method, in order to save on computational time, uses a randomisation method when the number of studies is above 10. Therefore results may be slightly different for its CIs from one execution to the next.

<table>
<thead>
<tr>
<th>Name</th>
<th>Reference / Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-test (T)</td>
<td>One sample t-test that compares the (median) study effects to zero. Variances of the effects are ignored.</td>
</tr>
</tbody>
</table>

Table VI

A forest plot is also created that includes the individual study effects and the overall effects (Figure 10). The study weights in the graph relate to the fixed effects model, even though diamonds for all methods have been included. It should be noted however that the appropriate weights have been used in the calculations for the other models, despite the apparent discrepancy in the graph (weights are much more uniform for the RE models). This plot was created purely for information purposes and ‘prettier’/publishable forest plots can be obtained in other application (i.e. RevMan, STATA).

Finally measures of heterogeneity are displayed to help the user decide on the appropriate model for his/her analysis (Figure 11). The measures are: Cochrane’s Q (for
p-value below $\alpha$ homogeneity is rejected), estimates of the between-study variance $\tau^2$ with three methods. In addition $I^2$ and $H^2_0$ (i.e. $H^2 - 1$ and in the $(0, +\infty)$ range) are reported (their calculation is based on the DL method)

Figure 10
5. Exporting graphs

Using the Export graph command a user can export a selected picture (the forest plots) or range of cells (the evidence summary chart) as a Graphics Interchange Format (GIF) image. For pictures and graphs, the magnification factor can be edited to provide a better quality GIF image. The code for this command was collected from various websites and authors: Harold Staff (http://www.mvps.org/dmcritchie/excel/xl2gif.htm), David McRitchie, Stephen Bullen and Jon Peltier (http://www.ac6ia.com/makegif.html). Currently only the GIF format is offered as an export option but we will consider adding more coding options if suggested by user feedback.

6. Uninstall

Go to Control Panel and open add/remove programs. Scroll down, select the Meta-analysis add-in, click on remove and follow the instructions (Figure 12)