

Web-based Meta-Analysis Using R

Keon-Woong Moon

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Chapter 1

Getting Started

Welcome to the “Web-based Meta-Analysis Using R”. In this chapter, you can perform the first **web-based meta-analysis** of your own using the sample data in a minute.

1.1 Perform Meta-Analysis In A Minute

1.1.1 The first screen : Select language

When you load the meta-analysis app, you can see this screen. Currently, this app support English and Korean. You can select your preferred language(arrow).

Web-based Meta-Analysis with R

With this app, you can perform **meta-analysis**. You can calculate the **effect size**, estimate the weighted average using fixed-effects and/or random-effects models, test heterogeneity and draw the forest-plots. Additionally, you can perform **subgroup analysis**, **meta-ANOVA**, **meta-regression**, tests of **funnel plot asymmetry**, **cumulative meta-analysis** and **sensitivity test** with just one click. You can download the report with html or PDF format. You can also download the high-quality plots with desired size and resolution.

Select Language
☒ English ☐ 한국어(Korean) **Select language Here !**

R-meta.com Meta-Analysis Citation About

1. Select/Upload Data

upload data(*.xlsx or *.csv)
Choose File | no file selected

Select Data
☒ 2 groups
☐ mentoring (2 groups)
☐ cbt (2 groups)
☐ one_group
☐ binary
☐ scared (binary)
☐ bcg (binary2)
☐ Correlation Data
☐ smoking (effect size)
☐ Gilbody (effect size)
☐ uploaded_file

2. Edit Data

	study	m1	s1	n1	m2	s2	n2
1	study_1	0.38	0.44	45	0.04	0.32	47
2	study_2	0.10	0.59	44	0.02	0.36	45
3	study_3	0.29	0.53	44	0.05	0.38	45
4	study_4	0.48	0.54	45	0.02	0.38	47
5	study_5	0.41	0.40	44	0.05	0.37	45
6	study_6	0.28	0.47	45	0.06	0.39	47
7	study_7	0.17	0.89	44	0.04	0.54	45

Export Data as CSV

3. Select Data Format

☐ Continuous Data - Two Groups
☐ Continuous Data - One Group(Before-After)
☐ Binary Data
☐ Binary Data2
☐ Correlation Data
☐ Effect size Data
☒ None of above

4. Assign Variables

5. Select Model(s)

1.1.2 Steps for meta-analysis

Performing meta-analysis with sample data is very simple. You can finish in five steps. Of these, just two clicks can do this.

1. Select/Upload Data ... use default data.
2. Edit Data ... No action required.
3. Select Data Format ... (1)
4. Assign Variables ... (arrow) No action required.

Web-based Meta-Analysis with R

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Select Language
☒ English ☐ 한국어(Korean)

R-meta.com Meta-Analysis Citation About

1. Select/Upload Data

upload data(*.xlsx or *.csv)
Choose File No file chosen

Select Data
☒ 2 groups
☐ mentoring (2 groups)
☐ cbt (2 groups)
☐ one_group
☐ binary
☐ scared (binary)
☐ bcg (binary2)
☐ Correlation Data
☐ smoking (effect size)
☐ Gilbody (effect size)
☐ uploaded_file

2. Edit Data

	study	m1	s1	n1	m2	s2	n2
1	study_1	0.38	0.44	45	0.04	0.32	47
2	study_2	0.10	0.59	44	0.02	0.36	45
3	study_3	0.29	0.53	44	0.05	0.38	45
4	study_4	0.48	0.54	45	0.02	0.38	47
5	study_5	0.41	0.40	44	0.05	0.37	45
6	study_6	0.28	0.47	45	0.06	0.39	47
7	study_7	0.17	0.89	44	0.04	0.54	45

Export Data as CSV

3. Select Data Format

1 ☒ Continuous Data - Two Groups
☐ Continuous Data - One Group(Before-After)
☐ Binary Data
☐ Binary Data2
☐ Correlation Data
☐ Effect size Data
☐ None of above

4. Assign Variables

N (experiment group)	mean (exp_group)	sd (exp_group)	N (control_group)	mean (control_group)
n1	m1	s1	n2	m2

sd (control_group) summary measure studylabel
s2 SMD study

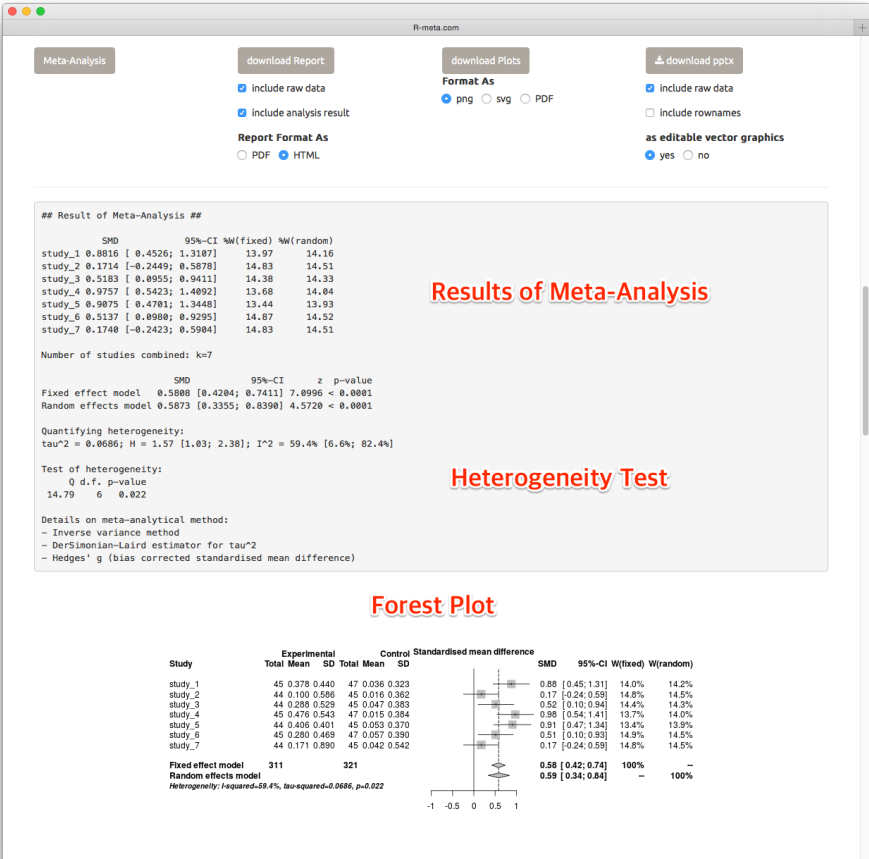
other options

... And click the Meta Analysis button(2).

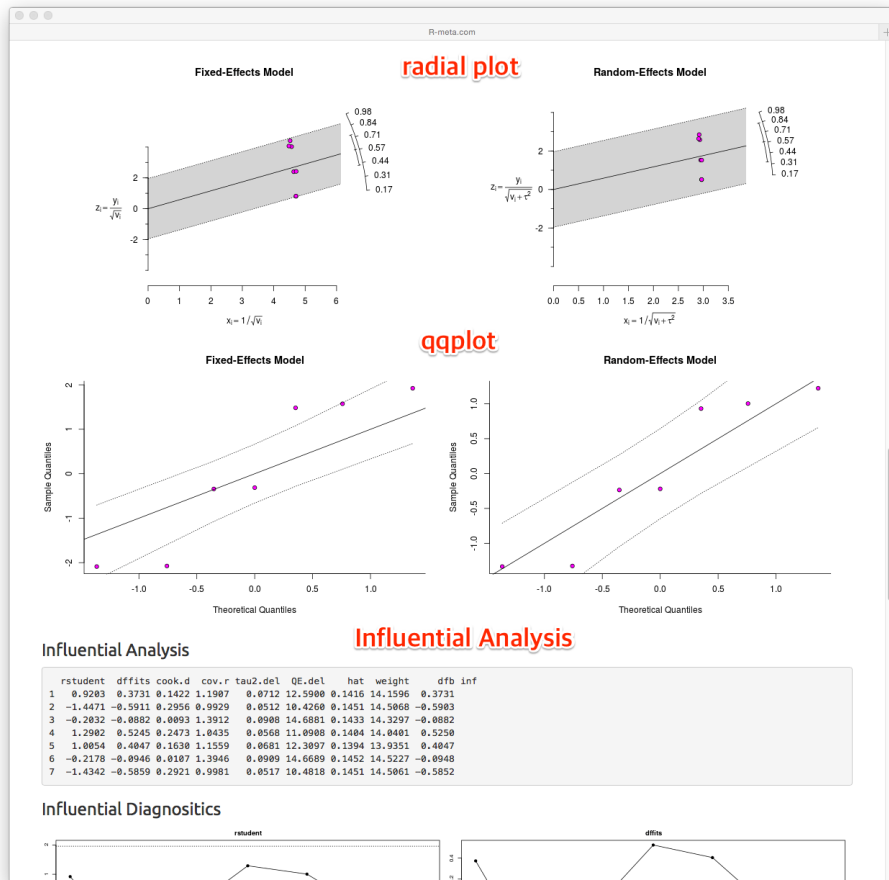
The screenshot shows the R-meta.com web interface with the following sections:

- 1. Continuous Data - Two Groups** (highlighted with a red arrow and number 1):
 - ☒ Continuous Data - Two Groups
 - ☐ Continuous Data - One Group(Before-After)
 - ☐ Binary Data
 - ☐ Binary Data2
 - ☐ Correlation Data
 - ☐ Effect size Data
 - ☐ None of above
- Input Fields**:
 - N (experiment group): n1
 - mean (exp_group): m1
 - sd (exp_group): s1
 - N (control_group): n2
 - mean (control_group): m2
 - sd (control_group): s2
 - summary measure: SMD
 - studylabel: study
 - other options: (empty text box)
- 5. Select Model(s)**:
 - ☒ Fixed-Effect
 - ☒ Random-Effects
- 6. Select Plots**:
 - ☒ Forest Plot
 - digits: 2
 - ☒ Radial plot
 - ☒ Q-Q normal plot
 - Show/hide Plot Options
- 7. Additional Analysis 1**:
 - ☐ Subgroup Analysis
 - Grouping Variable: (empty dropdown)
 - ☐ Meta ANOVA
 - Moderator Variable: (empty dropdown)
 - ☐ Meta Regression
 - Moderator(s): (empty text box)
- 8. Additional Analysis 2**:
 - ☒ Influential Diagnostics
 - ☒ Best linear unbiased prediction
 - ☐ Publication bias
 - ☐ cumulative meta-analysis
 - ☐ Sensitivity Analysis
- Meta-Analysis** (highlighted with a red arrow and number 2):
 - download Report:
 - ☒ include raw data
 - ☒ include analysis result
 - Report Format As:
 - ☐ PDF
 - ☒ HTML
 - download Plots:
 - Format As:
 - ☒ png
 - ☐ svg
 - ☐ PDF
 - download pptx:
 - ☒ include raw data
 - ☐ include rownames
 - as editable vector graphics:
 - ☒ yes
 - ☐ no

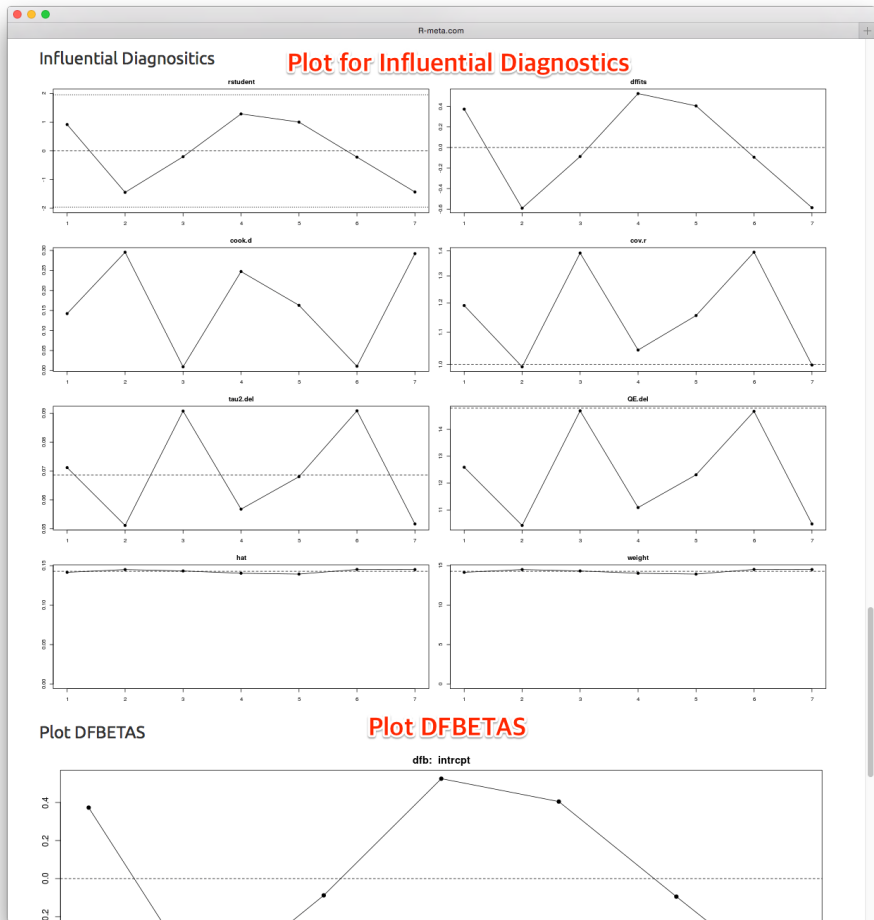
You can get the meta-analysis results as well as result of homogeneity test followed by the forest plot.

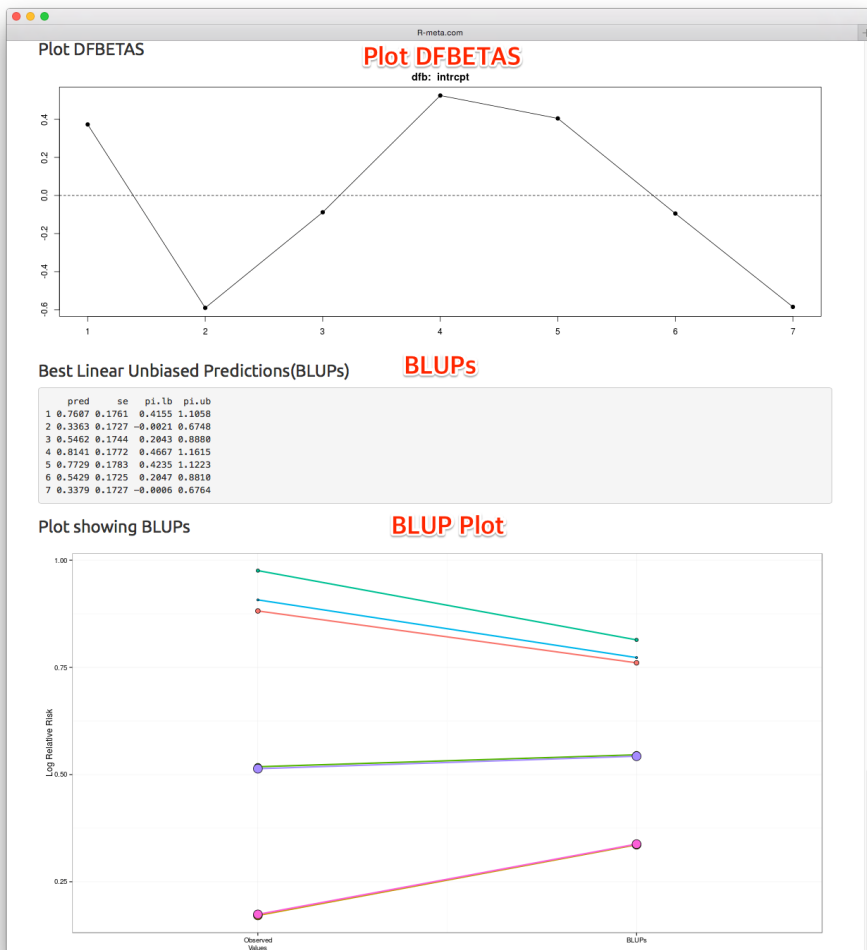


You can also get the radial plot(s) and the qqplot(s).



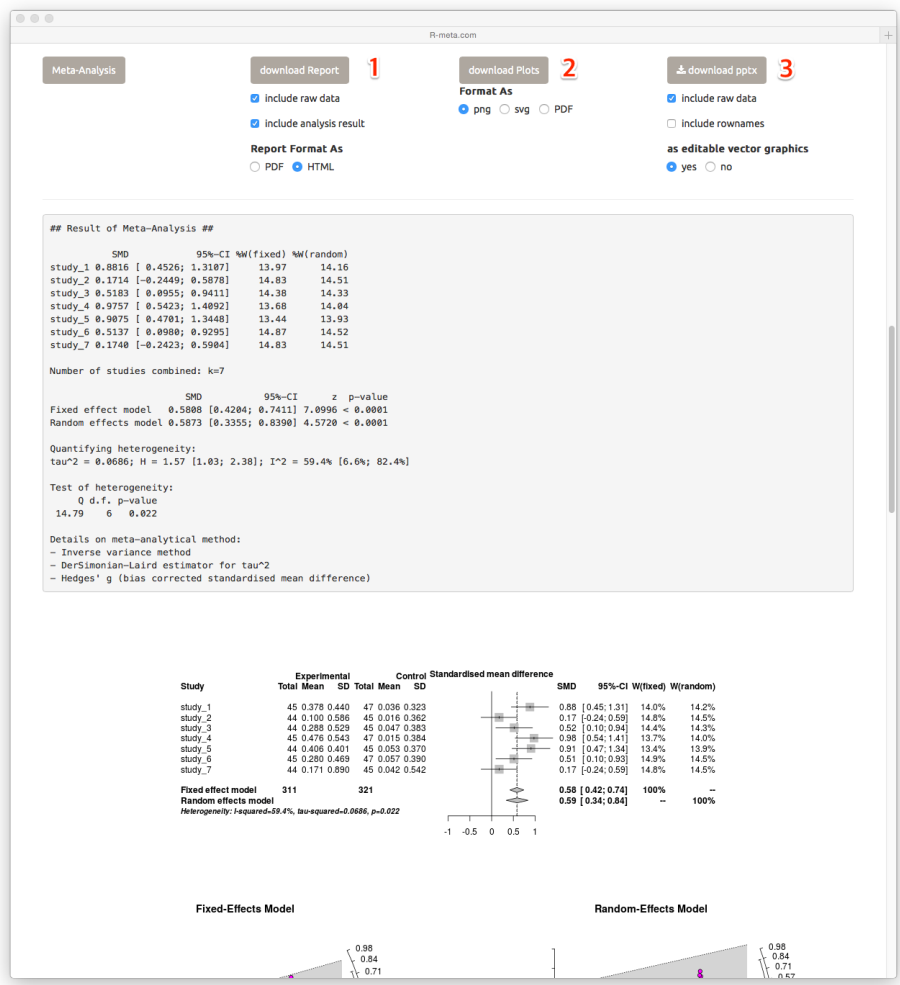
By default, you can also get the result of influential analysis and plots for influential diagnostics, DFBETAS plot followed by best linear unbiased prectictions(BLUP) and BLUP plot.





1.1.3 Download Results

You can download Report(1) as PDF(*.pdf), HTML(*.html,default) format. You can download plots(2) with png, svg or pdf format. You can download all results as a powerpoint file(*.pptx)(3). You can select editable vector graphics in powerpoint file(default).



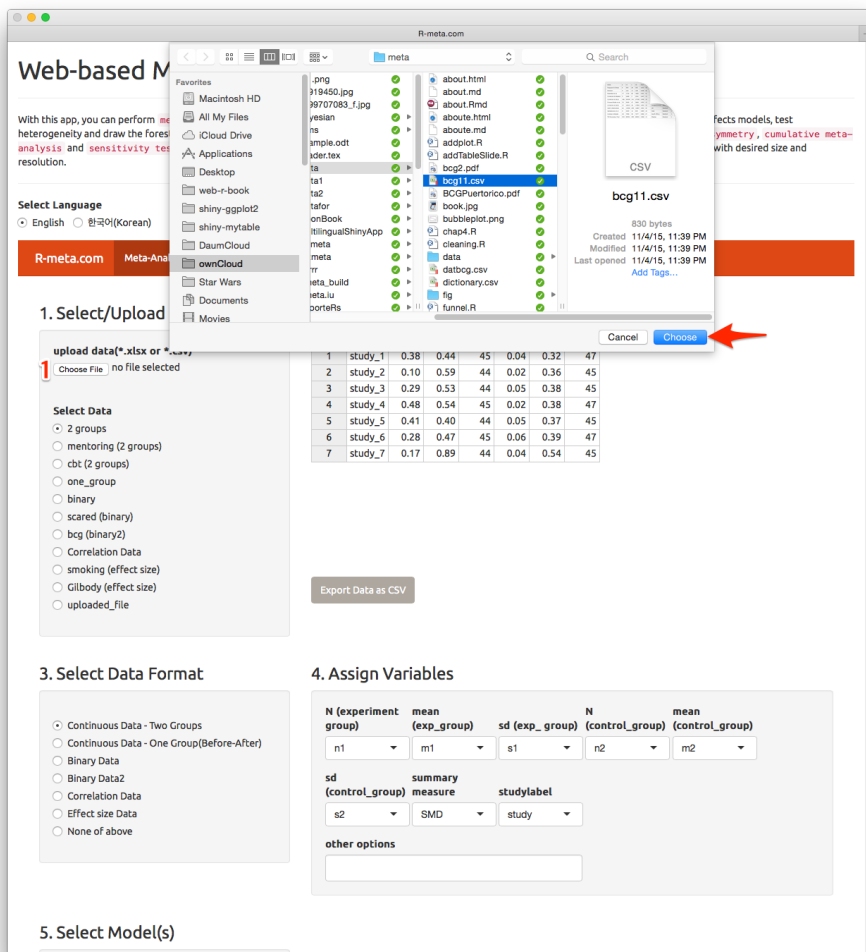
Chapter 2

Analyze Your Own Data

In this chapter, I will discuss how to upload your own data to the **web-based meta-analysis** app and edit the data. Also you will be able to learn how to use sample data as a template.

2.1 Upload data

You can upload your own data by clicking the **choose file** button(1). In the popup window, you can select your own data file. A data file with Microsoft excel format(*.xlsx) or comma-separate value format(*.csv) is allowed. Because an excel file contains calculations, functions or macros may cause error, the *.csv format is preferred*. You can save an excel file with a .csv format by “save as...” menu on excel. The limitation of file size is 30 MB. After selection of you data file, press **choose** button(arrow).



After a few seconds, the upload completed.

1. Select/Upload Data

upload data(*.xlsx or *.csv)

Choose File bcg11.csv

Upload complete

You should select the uploaded_file(1) among the Select Data radio buttons. Your file is displayed at Edit Data window.

R-meta.com

Web-based Meta-Analysis with R

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Select Language

☒ English ☐ 한국어(Korean)

R-meta.com Meta-Analysis Citation About

1. Select/Upload Data

upload data(*.xlsx or *.csv)

Choose File bcg11.csv

Upload complete

Select Data

☐ 2 groups

☐ mentoring (2 groups)

☐ cbt (2 groups)

☐ one_group

☐ binary

☐ scared (binary)

☐ bcg (binary2)

☐ Correlation Data

☐ smoking (effect size)

☐ Gilbody (effect size)

☒ 1 uploaded_file

2. Edit Data

	study	a	n1	c	n2	start	latitude	country	allocation
1	Ferguson & Simes	6	306	29	303	1933	55	Canada	Random
2	Aronson	4	123	11	139	1935	52	Northern USA	Random
3	Rosenthal et al	17	1716	65	1665	1941	42	Chicago	Alternation
4	Comstock & Webster	5	2498	3	2341	1947	33	Geogia(Sch)	Alternation
5	Comstock et al(a)	186	50634	141	27338	1949	18	Puerto Rico	Alternation
6	Frimont-Moller et al	33	5069	47	5808	1950	13	Madanapalle	Alternation
7	Comstock et al(b)	27	16913	29	17854	1950	33	Geogia(Comm)	Alternation
8	Hart & Sutherland	62	13598	248	12867	1950	53	UK	Random
9	Vanbdeviere et al	8	2545	10	629	1965	18	Haiti	Random
10	Coetzee & Berjak	29	7499	45	7277	1965	27	South Africa	Random
11	TB Prevention Trial	505	88391	499	88391	1968	13	Madras	Random

Export Data as CSV

3. Select Data Format

☒ Continuous Data - Two Groups

☐ Continuous Data - One Group(Before-After)

☐ Binary Data

☐ Binary Data2

☐ Correlation Data

☐ Effect size Data

☐ None of above

4. Assign Variables

N (experiment group) mean (exp_group) sd (exp_group) N (control_group) mean (control_group)

n1 n2

sd (control_group) summary measure studylabel

SMD study

other options

5. Select Model(s)

2.2 Edit data

You can edit your data by click a cell in the table. You can use your data table as a spreadsheet.

2. Edit Data

	study	a	n1	c	n2	start	latitude	country	allocation	alloc2
1	Ferguson & Simes	6	306	29	303	1933	55	Canada	Random	1
2	Aronson	4	123	11	139	1935	52	Northern USA	Random	1
3	Rosenthal et al	17	1716	65	1665	1941	42	Chicago	Alternation	0
4	Comstock & Webster	5	2498	3	2341	1947	33	Geogia(Sch)	Alternation	0
5	Comstock et al(a)	186	50634	141	27338	1949	18	Puerto Rico	Alternation	0
6	Frimont-Moller et al	33	5069	47	5808	1950	13	Madanapalle	Alternation	0
7	Comstock et al(b)	27	16913	29	17854	1950	33	Geogia(Comm)	Alternation	0
8	Hart & Sutherland	62	13598	248	12867	1950	53	UK	Random	1
9	Vanbdeviere et al	8	2545	10	629	1965	18	Haiti	Random	1
10	Coetzee & Berjak	29	7499	45	7277	1965	27	South Africa	Random	1
11	TB Prevention Trial	505	88391	499	88391	1968	13	Madras	Random	1

2.3 Insert/remove row

By right click the table, you can insert row or remove row.

2. Edit Data

	study	a	n1	c	n2	start	latitude	country	allocation	alloc2
1	Ferguson & Simes	6	306	29	303	1933	55	Canada	Random	1
2	Aronson	4	123	11	139	1935	52	Northern USA	Random	1
3	Rosenthal et al	17	1716	65	1665	1941	42	Chicago	Alternation	0
4	Comstock & Webster	5	2498	3	2341	1947	33	Geogia(Sch)	Alternation	0
5	Comstock et al(a)	186	50634	141	27338	1949	18	Puerto Rico	Alternation	0
6	Frimont-Moller et al	33	5069	47	5808	1950	13	Madanapalle	Alternation	0
7	Comstock et al(b)	27	16913	29	17854	1950	33	Geogia(Comm)	Alternation	0
8	Hart & Sutherland	62	13598	248	12867	1950	53	UK	Random	1
9	Vanbdeviere et al	8	2545	10	629	1965	18	Haiti	Random	1
10	Coetzee & Berjak	29	7499	45	7277	1965	27	South Africa	Random	1
11	TB Prevention Trial	505	88391	499	88391	1968	13	Madras	Random	1

- Export Data as CSV
- Insert row above

Insert row below

Remove row

Undo

Redo

Alignment

Insert column on the left

Insert column on the right

Remove column

Remove all rows except 1

4. Assign Variables

2.4 Use sample data as a template

You can use a sample data as a template. As a example, please choose the `scared(binary)`(1) among the `Select Data` radio buttons.

1. Select/Upload Data

upload data(*.xlsx or *.csv)

Choose File `bcg11.csv`

Upload complete

Select Data

- ☐ 2 groups
- ☐ mentoring (2 groups)
- ☐ cbt (2 groups)
- ☐ one_group
- ☐ binary
- 1** ☒ scared (binary)
- ☐ bcg (binary2)
- ☐ Correlation Data
- ☐ smoking (effect size)
- ☐ Gilbody (effect size)
- ☐ uploaded_file

2. Edit Data

	study	a	n1	c	n2
1	study_1	12	28	5	30
2	study_2	16	39	16	41
3	study_3	14	39	11	40
4	study_4	190	460	40	350
5	study_5	43	53	37	55
6	study_6	16	94	8	67
7	study_7	27	137	17	90

Export Data as CSV

You can choose `Remove all rows except 1`(arrow) after right click of the table.

1. Select/Upload Data

upload data(*.xlsx or *.csv)

Choose File `bcg11.csv`

Upload complete

Select Data

- ☐ 2 groups
- ☐ mentoring (2 groups)
- ☐ cbt (2 groups)
- ☐ one_group
- ☐ binary
- ☒ scared (binary)
- ☐ bcg (binary2)
- ☐ Correlation Data
- ☐ smoking (effect size)
- ☐ Gilbody (effect size)
- ☐ uploaded_file

2. Edit Data

	study	a	n1	c	n2
1	study_1	12	28	5	30
2	study_2	16	39	16	41
3	study_3	14	39	11	40
4	study_4	190	460	40	350
5	study_5	43	53	37	55
6	study_6	16	94	8	67
7	study_7	27	137	17	90

Insert row above

Insert row below

Remove row

Undo

Redo

Alignment ▶

Insert column on the left

Insert column on the right

Remove column

Remove all rows except 1

Export Data as CSV

All rows are removed except the first row.

2. Edit Data

	study	a	n1	c	n2
1	study_1	12	28	5	30

You are not allowed remove the first row, but you can edit the data. If you want to change the structure of your data, you should make a data file with the other program and upload it.

Chapter 3

A Complete Example - Meta-analysis of BCG trials

In this chapter, I will show you how to perform subgroup analysis, meta-regression, publication bias analysis using funnel plot, cumulative meta-analysis, sensitivity test and download report as a pdf file or as a powerpoint file

3.1 Select Data

Please choose the `bcg(binary2)`(1) among the **Select Data** radio buttons. The data will be displayed(arrow).

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Select Language
☒ English ☐ 한국어(Korean)

R-meta.com Meta-Analysis Citation About

1. Select/Upload Data

upload data(*.xlsx or *.csv)
 No file chosen

Select Data

- ☐ 2 groups
- ☐ mentoring (2 groups)
- ☐ cbt (2 groups)
- ☐ one_group
- ☐ binary
- ☐ scared (binary)
- ☒ **bcg (binary2)**
- ☐ Correlation Data
- ☐ smoking (effect size)
- ☐ Glibody (effect size)
- ☐ uploaded_file

2. Edit Data

	author	year	tpos	tneg	cpos	cneg	latitude	alloc	study
1	Aronson	1948	4	119	11	128	44	random	Aronson,1948
2	Ferguson & Simes	1949	6	300	29	274	55	random	Ferguson & Simes,1949
3	Rosenthal et al	1960	3	228	11	209	42	random	Rosenthal et al,1960
4	Hart & Sutherland	1977	62	13536	248	12619	52	random	Hart & Sutherland,1977
5	Frimodt-Moller et al	1973	33	5036	47	5761	13	alternate	Frimodt-Moller et al,1973
6	Stein & Aronson	1953	180	1361	372	1079	44	alternate	Stein & Aronson,1953
7	Vandiviere et al	1973	8	2537	10	619	19	random	Vandiviere et al,1973
8	TPT Madras	1980	505	87886	499	87892	13	random	TPT Madras,1980
9	Coetzee & Berjak	1968	29	7470	45	7232	27	random	Coetzee & Berjak,1968
10	Rosenthal et al	1961	17	1699	65	1600	42	systematic	Rosenthal et al,1961
11	Comstock et al	1974	186	50448	141	27197	18	systematic	Comstock et al,1974
12	Comstock & Webster	1969	5	2493	3	2338	33	systematic	Comstock & Webster,1969
13	Comstock et al	1976	27	16886	29	17825	33	systematic	Comstock et al,1976

3. Select Data Format

- ☐ Continuous Data - Two Groups
- ☐ Continuous Data - One Group(Before-After)
- ☐ Binary Data
- ☐ Binary Data2
- ☐ Correlation Data
- ☐ Effect size Data
- ☒ **None of above**

4. Assign Variables

3.2 Select Data Format

Please choose the **Binary Data2** among the **Select Data Format** radio buttons. The variables will be assigned (arrow).

Web-based Meta-Analysis with R

With this app, you can perform **meta-analysis**. You can calculate the **effect size**, estimate the weighted average using fixed-effects and/or random-effects models, test heterogeneity and draw the forest-plots. Additionally, you can perform **subgroup analysis**, **meta-ANOVA**, **meta-regression**, tests of **funnel plot asymmetry**, **cumulative meta-analysis** and **sensitivity test** with just one click. You can download the report with html or PDF format. You can also download the high-quality plots with desired size and resolution.

Select Language
☒ English ☐ 한국어(Korean)

R-meta.com Meta-Analysis Citation About

1. Select/Upload Data

upload data(*.xlsx or *.csv)

Select Data

- ☐ 2 groups
- ☐ mentoring (2 groups)
- ☐ cbt (2 groups)
- ☐ one_group
- ☐ binary
- ☐ scared (binary)
- ☒ bcg (binary2)
- ☐ Correlation Data
- ☐ smoking (effect size)
- ☐ Glibody (effect size)
- ☐ uploaded_file

2. Edit Data

	author	year	tpos	tneg	cpos	cneg	latitude	alloc	study
1	Aronson	1948	4	119	11	128	44	random	Aronson,1948
2	Ferguson & Simes	1949	6	300	29	274	55	random	Ferguson & Simes,1949
3	Rosenthal et al	1960	3	228	11	209	42	random	Rosenthal et al,1960
4	Hart & Sutherland	1977	62	13536	248	12619	52	random	Hart & Sutherland,1977
5	Frimodt-Moller et al	1973	33	5036	47	5761	13	alternate	Frimodt-Moller et al,1973
6	Stein & Aronson	1953	180	1361	372	1079	44	alternate	Stein & Aronson,1953
7	Vandiviere et al	1973	8	2537	10	619	19	random	Vandiviere et al,1973
8	TPT Madras	1980	505	87886	499	87892	13	random	TPT Madras,1980
9	Coetzee & Berjak	1968	29	7470	45	7232	27	random	Coetzee & Berjak,1968
10	Rosenthal et al	1961	17	1699	65	1600	42	systematic	Rosenthal et al,1961
11	Comstock et al	1974	186	50448	141	27197	18	systematic	Comstock et al,1974
12	Comstock & Webster	1969	5	2493	3	2338	33	systematic	Comstock & Webster,1969
13	Comstock et al	1976	27	16886	29	17825	33	systematic	Comstock et al,1976

3. Select Data Format

- ☐ Continuous Data - Two Groups
- ☐ Continuous Data - One Group(Before-After)
- ☐ Binary Data
- ☒ **Binary Data2**
- ☐ Correlation Data
- ☐ Effect size Data
- ☐ None of above

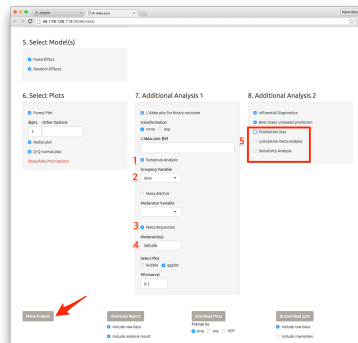
4. Assign Variables

Treated Positive	Treated Negative	Control Positive	Control Negative	summary measure	method
tpos	tneg	cpos	cneg	RR	Inverse

studylabel: study
other options:

3.3 Select Additional Analysis

To perform subgroup analysis, select the **subgroup analysis** checkbox(1) and select **alloc** as a **Grouping Variable**(2). To perform a meta-analysis, select the **Meta Regression** checkbox(5) and select **latitude** as a **Moderator(s)**(4). To perform the publication bias test, cumulative meta-analysis and sensitivity test, select the checkboxes(5) and press the **Meta-analysis** button(arrow).



Chapter 4

Customize Plot Options

In this chapter, I will show you how to customize the plots.

4.1 Show/hide Plot Options

You can customize your plot options by click the Show/hide Plot options.

6. Select Plots

☒ Forest Plot

digits

Other Options

2

☒ Radial plot

☒ Q-Q normal plot

Show/hide Plot Options

4.1.1 show all study labels

You can choose whether or not all study labels be showed(1). You can label your studies by name or by study number(2. You can adjust the plot resolution and width and height of plot.

6. Select Plots

☒ Forest Plot

digits

Other Options

2

☒ Radial plot

☒ Q-Q normal plot

Show/hide Plot Options

1 ☐ show ALL study labels

Studies be labelled

2 ☐ label with study number

Label position

☐ 1 ☐ 2 ☒ 3 ☐ 4

점 배경색: #FF00FF

#FF00FF

Resolution

units

300

in

width

height

Forest Plot

12

7

width

height

Other Plots

7

5

4.1.2 select studies be labelled

You can select some studies instead of labelling all studies.

6. Select Plots

☒ Forest Plot

digits

Other Options

2

☒ Radial plot

☒ Q-Q normal plot

Show/hide Plot Options

☐ show ALL study labels

Studies be labelled

Ferguson & Simes,1949

Frimodt-Moller et al,1973 |

Aronson,1948

Rosenthal et al,1960

Hart & Sutherland,1977

Stein & Aronson,1953

Vandiviere et al,1973

TPT Madras,1980

Coetzee & Berjak,1968

Rosenthal et al,1961

Resolution

300

in

width

height

Forest Plot

12

7

width

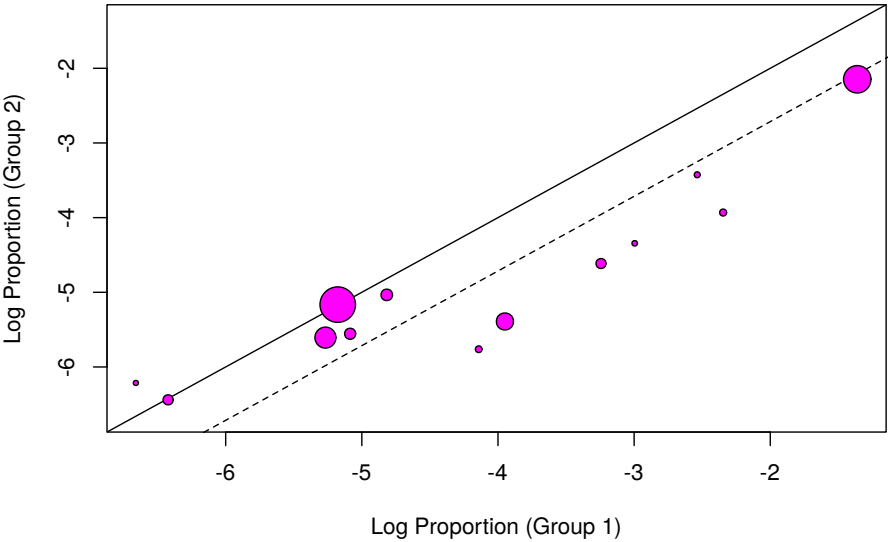
height

Other Plots

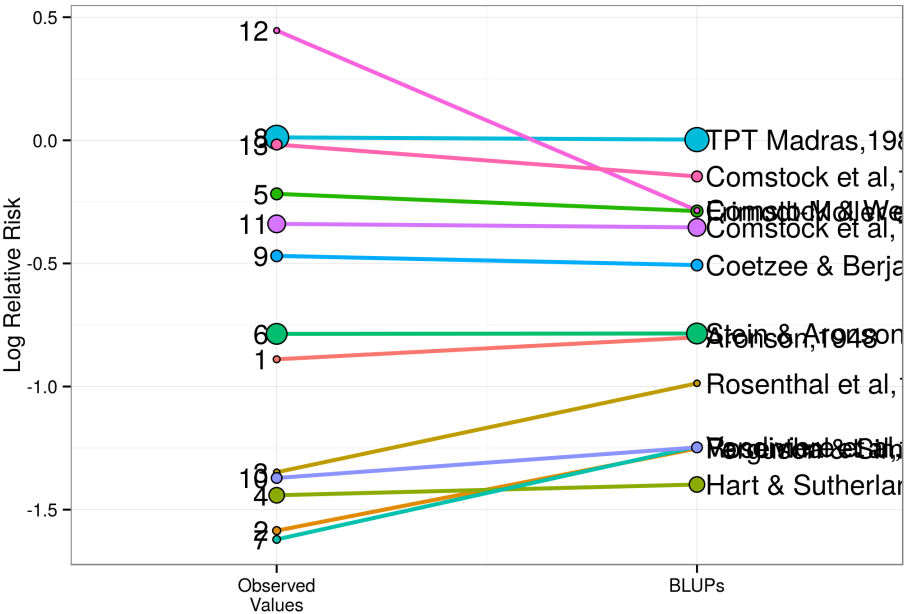
7

5

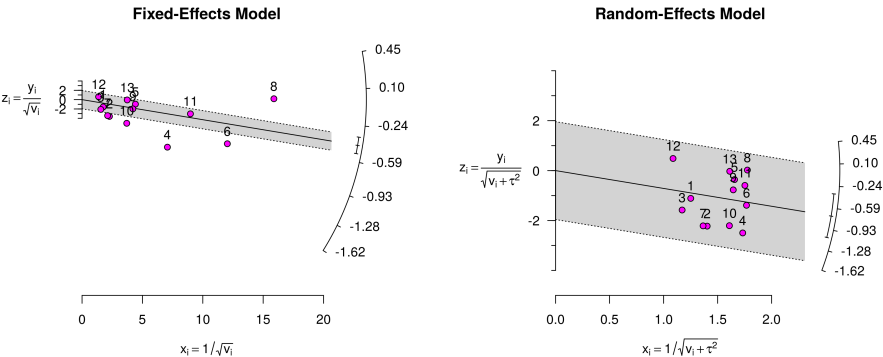
4.1.2.1 L'Abbe plot: no label



4.1.2.2 BLUP plot: all label



4.1.2.3 radial plot: all label with number



4.1.2.4 Meta-regression plot: some label

