Package ‘metapower’

February 8, 2021

Type Package

Title Power Analysis for Meta-Analysis

Version 0.2.2


Depends R (>= 3.6)

License GPL-2

Encoding UTF-8

LazyData true

Imports cowplot (>= 1.0.0), dplyr (>= 0.8.5), ggplot2 (>= 3.3.0), knitr (>= 1.28), magrittr (>= 1.5), tidyr (>= 1.0.2), testthat (>= 2.3.2), rlang (>= 0.4.5)

Suggests rmarkdown (>= 2.1)

VignetteBuilder knitr

RoxygenNote 7.1.1

NeedsCompilation no

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homogen_power

Compute Power for Test of Homogeneity in Meta-analysis

Description

Compute statistical power for the Test of Homogeneity for meta-analysis under both fixed- and random-effects models.

Usage

homogen_power(
  effect_size,
  study_size,
  k,
  i2,
  es_type,
  p = 0.05,
  con_table = NULL
)

Arguments

effect_size  Numerical value of effect size.
study_size  Numerical value for number number of participants (per study).
k  Numerical value for total number of studies.
i2  Numerical value for Heterogeneity estimate (i^2).
es_type  'Character reflecting effect size metric: 'r', 'd', or 'or'.
p  Numerical value for significance level (Type I error probability).
con_table  (Optional) Numerical values for 2x2 contingency table as a vector in the following format: c(a,b,c,d).

2x2 Table Group 1 Group 2
  Present  a  b
  Not Present  c  d
mod_power

Value

Estimated Power to detect differences in homogeneity of effect sizes for fixed- and random-effects models

References


See Also

https://jason-griffin.shinyapps.io/shiny_metapower/

Examples

homogen_power(effect_size = .5, study_size = 10, k = 10, i2 = .50, es_type = "d")

mod_power

Compute Power for Categorical Moderator Analysis in Meta-analysis

Description

Computes statistical power for categorical moderator analysis under fixed and random effects models.

Usage

mod_power(
    n_groups,
    effect_sizes,
    study_size,
    k,
    i2,
    es_type,
    p = 0.05,
    con_table = NULL
)
Arguments

n_groups  Numerical value for the levels of a categorical variable.

effect_sizes  Numerical values for effect sizes of for each group.

study_size  Numerical value for number of participants (per study).

k  Numerical value for total number of studies.

i2  Numerical value for Heterogeneity estimate ($i^2$).

es_type  Character reflecting effect size metric: 'r', 'd', or 'or'.

p  Numerical value for significance level (Type I error probability).

con_table  (Optional) List of numerical values for 2x2 contingency tables as a vector in the following format: c(a,b,c,d). These should be specified for each group (i.e., n_groups).

<table>
<thead>
<tr>
<th>2x2 Table</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Not Present</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

Value

Estimated Power estimates for moderator analysis under fixed- and random-effects models

See Also

https://jason-griffin.shinyapps.io/shiny_metapower/

Examples

```r
mod_power(n_groups = 2,
    effect_sizes = c(.1,.5),
    study_size = 20,
    k = 10,
    i2 = .50,
    es_type = "d")

mod_power(n_groups = 2,
    con_table = list(g1 = c(6,5,4,5), g2 = c(8,5,2,5)),
    study_size = 40,
    k = 20,
    i2 = .50,
    es_type = "or")
```

mpower  Compute Power for Meta-analysis
**mpower**

**Description**

Computes statistical power for summary effect sizes in meta-analysis.

**Usage**

```r
mpower(
  effect_size,
  study_size,
  k,
  i2,
  es_type,
  test_type = "two-tailed",
  p = 0.05,
  con_table = NULL
)
```

**Arguments**

- `effect_size`: Numerical value of effect size.
- `study_size`: Numerical value for number number of participants (per study).
- `k`: Numerical value for total number of studies.
- `i2`: Numerical value for Heterogeneity estimate ($i^2$).
- `es_type`: Character reflecting effect size metric: 'r', 'd', or 'or'.
- `test_type`: Character value reflecting test type: ("two-tailed" or "one-tailed").
- `p`: Numerical value for significance level (Type I error probability).
- `con_table`: (Optional) Numerical values for 2x2 contingency table as a vector in the following format: c(a,b,c,d).

<table>
<thead>
<tr>
<th>2x2 Table</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Not Present</td>
<td>c</td>
<td>d</td>
</tr>
</tbody>
</table>

**Value**

Estimated Power

**References**


See Also

https://jason-griffin.shinyapps.io/shiny_metapower/

Examples

mpower(effect_size = .2, study_size = 10, k = 10, i2 = .5, es_type = "d")

plot_homogen_power

Plot Power Curve for Test of Homogeneity

Description

Plots power curves for the test of homogeneity for different levels of within-study variation for fixed effects models. For random-effects models, power curves are plotted for various levels of heterogeneity.

Usage

plot_homogen_power(obj)

Arguments

obj should be an "homogen_power" object

Value

Power curve plot for the user specified input parameters

plot_mod_power

Plot Power Curve for Categorical Moderators

Description

Plots power curves for categorical moderator in meta-analysis

Usage

plot_mod_power(obj)

Arguments

obj This should be an 'mod_power' object

Value

Power curves for moderator analysis under fixed and random effects models
plot_mpower

Plot Power Curve for Meta-analysis

Description

Plots power curves for fixed effects models with various effect size magnitudes. Also plots power curves for various levels of heterogeneity (e.g., i² = 75

Usage

plot_mpower(obj)

Arguments

obj

This should be an "mpower" object

Value

Power curve plot for the user specified input parameters

plot_subgroup_power

Plot Power Curve for Subgroup analysis

Description

Plots power curves to detect subgroup differences in meta-analysis.

Usage

plot_subgroup_power(obj)

Arguments

obj

This should be an 'subgroup_power' object

Value

Power curves to detect subgroup differences for fixed and random effects models
subgroup_power

Compute Power for Subgroup Analysis in Meta-analysis

Description

Computes statistical power for different subgroups under fixed and random effects models.

Usage

subgroup_power(
  n_groups,
  effect_sizes,
  study_size,
  k,
  i2 = 0.5,
  es_type,
  p = 0.05,
  con_table = NULL
)

Arguments

n_groups  Numerical value for the number of subgroups.

effect_sizes  Numerical values for effect sizes of for each group.

study_size  Numerical value for number of participants (per study).

k  Numerical value for total number of studies.

i2  Numerical value for Heterogeneity estimate (i^2).

es_type  Character reflecting effect size metric: 'r', 'd', or 'or'.

p  Numerical value for significance level (Type I error probability).

con_table  (Optional) List of numerical values for 2x2 contingency tables as a vector in the following format: c(a,b,c,d). These should be specified for each subgroup (i.e., n_groups).

Value

Estimated Power estimates for subgroup differences under fixed- and random-effects models

See Also

https://jason-griffin.shinyapps.io/shiny_metapower/
Examples

```r
subgroup_power(n_groups = 2,
    effect_sizes = c(.1,.5),
    study_size = 20,
    k = 10,
    I^2 = .5,
    es_type = "d")
subgroup_power(n_groups = 2,
    con_table = list(g1 = c(6,5,4,5), g2 = c(8,5,2,5)),
    study_size = 40,
    k = 20,
    I^2 = .5,
    es_type = "or")
```
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