

# Package ‘RSmallTelescopes’

September 23, 2020

**Title** Empirical Small Telescopes Analysis

**Version** 1.0.2

**Description** We provide functions to perform an empirical small telescopes analysis. This package contains 2 functions, SimulatePower() and EstimatePower(). Users only need to call SimulatePower() to conduct the analysis. For more information on small telescopes analysis see Uri Simonsohn (2015) <doi:10.1177/0956797614567341>.

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EstimatePower

*Estimate Power*


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### Description

Estimate statistical power of an effect size parameter by simulation using original sample size.

### Usage

```
EstimatePower(data, n.original, sims.power, analysis)
```

### Arguments

data	Dataset (matrix).
n.original	The sample size of the original analysis (scalar).
sims.power	The number of samples to be simulated (scalar).
analysis	Function to produce a p value and an effect size estimate.

### Value

Power estimate generated through simulation (scalar).

### Examples

```
# create or import dataset
example.data <- matrix(rnorm(50), 25, 2)

# estimate statistical power
EstimatePower(
  data = example.data,
  n.original = 10,
  analysis = function(data) {
    corr <- cor.test(data[,1], data[,2])
    return(list(effect.size = corr$estimate, p.value = corr$p.value))
  },
  sims.power = 100)
```

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SimulatePower

*Simulate Power*


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### Description

Estimate statistical power for point estimate of effect size plus the lower and upper bounds of a confidence interval.

**Usage**

```

SimulatePower(
  data,
  n.original,
  analysis,
  sims.CI = 10000,
  CI.level = 0.9,
  sims.power = 10000,
  sims.samples = 11,
  seed = 1
)

```

**Arguments**

<code>data</code>	Dataset (matrix).
<code>n.original</code>	The sample size of the original analysis (scalar).
<code>analysis</code>	Function to produce a p value and an effect size estimate.
<code>sims.CI</code>	The number of simulated samples used to construct CI (scalar); default = 10,000.
<code>CI.level</code>	The confidence level of the interval (scalar); default = .90.
<code>sims.power</code>	The number of samples to be simulated (scalar); default = 10,000.
<code>sims.samples</code>	Number of samples analyzed at upper/lower bounds of CI (scalar); default = 11.
<code>seed</code>	Allows randomly generated numbers to be reproducible (scalar); default = 1.

**Value**

Displays statistical power for point estimate of an effect size plus the lower and upper bounds of a confidence interval. List contains the following components:

<code>n.replication</code>	The sample size of the replication analysis.
<code>n.original</code>	The sample size of the original analysis.
<code>sims.CI</code>	The number of simulated samples used to construct CI.
<code>CI.level</code>	The confidence level of the interval.
<code>sims.power</code>	The number of samples simulated.
<code>sims.samples</code>	Number of samples analyzed at upper/lower bounds of CI.
<code>es.estimate</code>	Point estimate of effect size.
<code>es.power</code>	Estimated power for the point estimate of effect size.
<code>CI.lower.estimate</code>	Effect size estimate at the lower bound of the CI.
<code>CI.lower.power</code>	Estimated power for the lower bound of the CI.
<code>CI.upper.estimate</code>	Effect size estimate at the upper bound of the CI.
<code>CI.upper.power</code>	Estimated power for the upper bound of the CI.

**Examples**

```
# create or import dataset
example.data <- matrix(rnorm(50), 25, 2)

# conduct empirical small telescopes analysis
SimulatePower(
  data = example.data,
  n.original = 10,
  analysis = function(data) {
    corr <- cor.test(data[,1], data[,2])
    return(list(effect.size = corr$estimate, p.value = corr$p.value))
  },
  sims.CI = 100,
  sims.power = 100)
```

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