

# Package ‘RSmallTelescopes’

October 12, 2022

**Title** Empirical Small Telescopes Analysis

**Version** 1.0.4

**Description** We provide functions to perform an empirical small telescopes analysis. This package contains 2 functions, `SmallTelescopes()` and `EstimatePower()`. Users only need to call `SmallTelescopes()` to conduct the analysis. For more information on small telescopes analysis see Uri Simonsohn (2015) <[doi:10.1177/0956797614567341](https://doi.org/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, B.power, analysis, n.rows, alpha)
```

### Arguments

data	Dataset (matrix).
n.original	The sample size of the original analysis (scalar).
B.power	The number of samples to be simulated (scalar).
analysis	Function to produce a p value and an effect size estimate.
n.rows	The number of rows per subject in the dataset (scalar)
alpha	Set alpha level for analysis (scalar)

### 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))
  },
  B.power = 100,
  n.rows = 1,
  alpha = 0.05)
```

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SmallTelescopes	<i>Small Telescopes</i>
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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**

```
SmallTelescopes(
  data,
  analysis,
  n.original,
  B.CI = 10000,
  CI.level = 0.9,
  B.power = 10000,
  alpha = 0.05,
  n.rows = 1,
  seed = 1
)
```

**Arguments**

data	Dataset (matrix).
analysis	Function to produce a p value and an effect size estimate.
n.original	The sample size of the original analysis (scalar).
B.CI	The number of simulated samples used to construct CI (scalar); default = 10,000.
CI.level	The confidence level of the interval (scalar); default = .90.
B.power	The number of samples to be simulated (scalar); default = 10,000.
alpha	Set alpha level for analysis (scalar); default = 0.05.
n.rows	The number of rows per subject in the dataset (scalar); default = 1.
seed	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:

n.replication	The sample size of the replication analysis.
n.original	The sample size of the original analysis.
B.CI	The number of simulated samples used to construct CI.
CI.level	The confidence level of the interval.
B.power	The number of samples simulated.

p.value            The p value calculated from the replication data  
es.estimate       Point estimate of effect size.  
es.power           Estimated power for the point estimate of effect size.  
CI.lower.estimate            Effect size estimate at the lower bound of the CI.  
CI.lower.power   Estimated power for the lower bound of the CI.  
CI.upper.estimate            Effect size estimate at the upper bound of the CI.  
CI.upper.power   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
SmallTelescopes(
  data = example.data,
  analysis = function(data) {
    corr <- cor.test(data[,1], data[,2])
    return(list(effect.size = corr$estimate, p.value = corr$p.value))
  },
  n.original = 10,
  B.CI = 100,
  B.power = 100)
```

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