

# Package: ggpower (via r-universe)

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**Title** Publication-Ready Power Analysis and Visualization

**Version** 0.1.1

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**Description** Provides statistical power analysis and sample size calculations for t-tests, ANOVA, regression, chi-square, proportion, correlation, nonparametric, biomarker, and clinical trial designs. Includes a scriptable API via 'power\_compute()', publication-ready 'ggplot2' visualizations, and an optional 'Shiny' application.

**URL** <https://github.com/YaoxiangLi/ggpower>,  
<https://yaoxiangli.github.io/ggpower/>

**BugReports** <https://github.com/YaoxiangLi/ggpower/issues>

**License** GPL (>= 3)

**Imports** bs4Dash, config, ggplot2, golem, shiny

**Encoding** UTF-8

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**Repository** <https://yaoxiangli.r-universe.dev>

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|                     |                                     |
|---------------------|-------------------------------------|
| effect_size_helpers | <i>Effect-size helper functions</i> |
|---------------------|-------------------------------------|

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Description

Helpers used by the GUI effect-size drawer and by scripting workflows.

Usage

```
effect_size_d(mean_h1, mean_h0 = 0, sd)
effect_size_f(eta2)
effect_size_f2(r2)
effect_size_f2_increas(r2_full, r2_reduced)
effect_size_h(p1, p2)
effect_size_q(r1, r2)
effect_size_w(p0, p1)
eta2_from_f(f)
odds_ratio_from_probs(p0, p1)
r2_from_f2(f2)
```

Arguments

|                  |                                  |
|------------------|----------------------------------|
| mean_h1, mean_h0 | Means used to compute Cohen’s d. |
| sd               | Common standard deviation.       |
| eta2             | Eta-squared value.               |

|                         |                                                                         |
|-------------------------|-------------------------------------------------------------------------|
| r2, r2_full, r2_reduced | R-squared values; r2 is also the second correlation in effect_size_q(). |
| p0, p1, p2              | Probabilities or probability vectors.                                   |
| r1                      | First correlation in effect_size_q().                                   |
| f, f2                   | Cohen effect-size values.                                               |

**Value**

A numeric effect-size or converted variance-explained value.

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|                    |                                                                |
|--------------------|----------------------------------------------------------------|
| format_result_html | <i>Format a ggpower result as structured HTML for Shiny UI</i> |
|--------------------|----------------------------------------------------------------|

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**Description**

Renders metric cards, input/output blocks, and notes for the Shiny app.

**Usage**

```
format_result_html(x)
```

**Arguments**

|   |                          |
|---|--------------------------|
| x | A ggpower_result object. |
|---|--------------------------|

**Value**

A shiny.tag list suitable for renderUI.

---

|                    |                                             |
|--------------------|---------------------------------------------|
| ggpower_calculator | <i>Evaluate a ggpower calculator script</i> |
|--------------------|---------------------------------------------|

---

**Description**

Evaluates distribution-function calculator expressions, including helpers such as zcdf(), tinv(), ncfcdf(), and binocdf().

**Usage**

```
ggpower_calculator(script)
```

**Arguments**

|        |                                                                                                                  |
|--------|------------------------------------------------------------------------------------------------------------------|
| script | Character calculator script with arithmetic, assignments, comments, and supported distribution helper functions. |
|--------|------------------------------------------------------------------------------------------------------------------|

**Value**

The value of the final expression.

**Examples**

```
ggpower_calculator("x <- 2^3\nx + zinv(.975)")
```

---

|                |                                       |
|----------------|---------------------------------------|
| ggpower_result | <i>Create a ggpower result object</i> |
|----------------|---------------------------------------|

---

**Description**

Creates the common result object used by the scriptable API and Shiny GUI.

**Usage**

```
ggpower_result(test, analysis, inputs, outputs, notes = character(),
  distribution = list())
```

**Arguments**

|              |                                                    |
|--------------|----------------------------------------------------|
| test         | Character label for the selected test.             |
| analysis     | Character label for the selected analysis mode.    |
| inputs       | Named list of input parameters.                    |
| outputs      | Named list of computed output parameters.          |
| notes        | Character vector with method notes or assumptions. |
| distribution | Named list describing the H0/H1 distributions.     |

**Value**

An object of class ggpower\_result.

---

|                      |                                                 |
|----------------------|-------------------------------------------------|
| ggpower_t_one_sample | <i>Plot Power Curve for a One-Sample t-Test</i> |
|----------------------|-------------------------------------------------|

---

**Description**

This function creates a ggplot2 power curve for a one-sample t test.

**Usage**

```
ggpower_t_one_sample(d, alpha = 0.05, n_range = seq(20, 100, by = 5),
  tails = "two")
```

**Arguments**

|         |                                                                                   |
|---------|-----------------------------------------------------------------------------------|
| d       | Numeric. The effect size (d).                                                     |
| alpha   | Numeric. The significance level (default 0.05).                                   |
| n_range | Numeric vector. A vector of total sample sizes (default is seq(20, 100, by = 5)). |
| tails   | Character. "two" or "one".                                                        |

**Value**

A ggplot object showing the power curve.

**Examples**

```
# Plot power curve for d = 0.5 over sample sizes from 20 to 100
ggpower_t_one_sample(d = 0.5, alpha = 0.05, n_range = seq(20, 100, by = 5))
```

---

|               |                                               |
|---------------|-----------------------------------------------|
| ggpower_tests | <i>List supported statistical power tests</i> |
|---------------|-----------------------------------------------|

---

**Description**

Lists the tests available to power\_compute().

**Usage**

```
ggpower_tests(domain = NULL, module = NULL)
```

**Arguments**

|        |                                                                                     |
|--------|-------------------------------------------------------------------------------------|
| domain | Optional character vector to filter by domain (general, biomarker, pharma).         |
| module | Optional character vector to filter by app module (workspace, biomarker, clinical). |

**Value**

A data frame describing tests available to power\_compute().

**Examples**

```
ggpower_tests()
ggpower_tests(module = "biomarker")
```

---

|               |                                                 |
|---------------|-------------------------------------------------|
| ggpower_ttest | <i>Plot Power Curve for a Two-Sample t-Test</i> |
|---------------|-------------------------------------------------|

---

### Description

This function creates a ggplot2 power curve for a two-sample t test.

### Usage

```
ggpower_ttest(d, alpha = 0.05, n_range = seq(10, 100, by = 5),
  tails = "two")
```

### Arguments

|         |                                                                                       |
|---------|---------------------------------------------------------------------------------------|
| d       | Numeric. The effect size (Cohen's d).                                                 |
| alpha   | Numeric. The significance level (default 0.05).                                       |
| n_range | Numeric vector. A vector of sample sizes per group (default is seq(10, 100, by = 5)). |
| tails   | Character. "two" or "one".                                                            |

### Value

A ggplot object showing the power curve.

### Examples

```
# Create a power curve for d = 0.5 over a range of sample sizes per group
ggpower_ttest(d = 0.5, alpha = 0.05, n_range = seq(10, 100, by = 5))
```

---

|                   |                                     |
|-------------------|-------------------------------------|
| plot_distribution | <i>Plot H0 and H1 distributions</i> |
|-------------------|-------------------------------------|

---

### Description

Builds a publication-ready distribution overlay for a computed power-analysis result.

### Usage

```
plot_distribution(result)
```

### Arguments

|        |                          |
|--------|--------------------------|
| result | A ggpower_result object. |
|--------|--------------------------|

**Value**

A ggplot object.

**Examples**

```
result <- power_compute("t_one_sample", "post_hoc", d = 0.5, n = 40)
plot_distribution(result)
```

---

|                  |                           |
|------------------|---------------------------|
| plot_power_curve | <i>Plot a power curve</i> |
|------------------|---------------------------|

---

**Description**

Builds a publication-ready power curve for a selected ggpower test.

**Usage**

```
plot_power_curve(test, n_values, analysis = "post_hoc", ...)
```

**Arguments**

|          |                                                |
|----------|------------------------------------------------|
| test     | Character test id.                             |
| n_values | Numeric vector of total sample sizes.          |
| analysis | Power analysis mode used for fixed parameters. |
| ...      | Test-specific fixed parameters.                |

**Value**

A ggplot object.

**Examples**

```
plot_power_curve("t_one_sample", n_values = c(20, 30, 40), d = 0.5)
```

---

|               |                                           |
|---------------|-------------------------------------------|
| power_compute | <i>Compute statistical power analyses</i> |
|---------------|-------------------------------------------|

---

### Description

Runs a power analysis using the shared ggpower compute engine. The function supports classical test families and analysis modes.

### Usage

```
power_compute(test, analysis = "post_hoc", ...)
```

### Arguments

|          |                                                                             |
|----------|-----------------------------------------------------------------------------|
| test     | Character test id. Use ggpower_tests() to list available ids.               |
| analysis | One of "a_priori", "compromise", "criterion", "post_hoc", or "sensitivity". |
| ...      | Test-specific input parameters.                                             |

### Value

A ggpower\_result object.

### Examples

```
power_compute("t_one_sample", "a_priori", d = 0.625, alpha = 0.05,
  power = 0.95, tails = "one")
```

---

|                    |                                              |
|--------------------|----------------------------------------------|
| power_t_one_sample | <i>Compute Power for a One-Sample t-Test</i> |
|--------------------|----------------------------------------------|

---

### Description

Calculates the power for a one-sample t-test given the effect size (d), total sample size (n), and significance level (alpha).

### Usage

```
power_t_one_sample(d, n, alpha = 0.05, tails = "two")
```

### Arguments

|       |                                                                           |
|-------|---------------------------------------------------------------------------|
| d     | Numeric. The effect size (difference from the constant divided by sigma). |
| n     | Integer. Total sample size.                                               |
| alpha | Numeric. The significance level (default is 0.05).                        |
| tails | Character. "two" for a two-tailed test or "one" for a one-tailed test.    |



**Value**

Numeric. The computed power (1 - beta).

**Examples**

```
# Calculate power for an effect size of 0.5 with n = 40 subjects
power_t_one_sample(d = 0.5, n = 40, alpha = 0.05)
```

---

|                |                                                  |
|----------------|--------------------------------------------------|
| power_t_paired | <i>Compute power for a paired-samples t-test</i> |
|----------------|--------------------------------------------------|

---

**Description**

Computes achieved power for a paired-samples t-test using the noncentral t kernel.

**Usage**

```
power_t_paired(d, n, alpha = 0.05, tails = "two")
```

**Arguments**

|       |                                        |
|-------|----------------------------------------|
| d     | Numeric paired-samples effect size dz. |
| n     | Integer number of pairs.               |
| alpha | Numeric significance level.            |
| tails | Character, "two" or "one".             |

**Value**

Numeric power.

**Examples**

```
power_t_paired(d = 0.5, n = 40)
```

---

|                    |                                                                   |
|--------------------|-------------------------------------------------------------------|
| power_t_two_sample | <i>Compute Power for a Two-Sample t-Test (Equal Sample Sizes)</i> |
|--------------------|-------------------------------------------------------------------|

---

**Description**

This function calculates the power for a two-sample t-test when the two groups have equal sample sizes.

**Usage**

```
power_t_two_sample(d, n_per_group, alpha = 0.05, tails = "two", n2 = NULL)
```

**Arguments**

|             |                                                                            |
|-------------|----------------------------------------------------------------------------|
| d           | Numeric. The effect size (Cohen's d).                                      |
| n_per_group | Integer. The sample size per group.                                        |
| alpha       | Numeric. The significance level (default is 0.05).                         |
| tails       | Character. "two" for a two-tailed test or "one" for a one-tailed test.     |
| n2          | Optional second-group sample size. If omitted, equal group sizes are used. |

**Value**

Numeric. The computed power (1 - beta).

**Examples**

```
# Compute power for an effect size d = 0.5 with 30 subjects per group
power_t_two_sample(d = 0.5, n_per_group = 30)
```

---

|         |                                  |
|---------|----------------------------------|
| run_app | <i>Run the Shiny Application</i> |
|---------|----------------------------------|

---

**Description**

Run the Shiny Application

**Usage**

```
run_app(
  onStart = NULL,
  options = list(),
  enableBookmarking = NULL,
  uiPattern = "/",
  ...
)
```

**Arguments**

|                   |                                                                                                                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| onStart           | A function that will be called before the app is actually run. This is only needed for shinyAppObj, since in the shinyAppDir case, a global.R file can be used for this purpose.                                                                                                                                    |
| options           | Named options that should be passed to the runApp call (these can be any of the following: "port", "launch.browser", "host", "quiet", "display.mode" and "test.mode"). You can also specify width and height parameters which provide a hint to the embedding environment about the ideal height/width for the app. |
| enableBookmarking | Can be one of "url", "server", or "disable". The default value, NULL, will respect the setting from any previous calls to <a href="#">enableBookmarking()</a> . See <a href="#">enableBookmarking()</a> for more information on bookmarking your app.                                                               |
| uiPattern         | A regular expression that will be applied to each GET request to determine whether the ui should be used to handle the request. Note that the entire request path must match the regular expression in order for the match to be considered successful.                                                             |
| ...               | arguments to pass to golem_opts. See <code>'?golem::get_golem_options'</code> for more details.                                                                                                                                                                                                                     |

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|                 |                            |
|-----------------|----------------------------|
| save_power_plot | <i>Save a ggpower plot</i> |
|-----------------|----------------------------|

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**Description**

Exports publication-ready ggpower plots through `ggplot2::ggsave()`.

**Usage**

```
save_power_plot(plot, filename, width = 7, height = 5, dpi = 320)
```

```
save_distribution_plot(plot, filename, width = 7, height = 5, dpi = 320)
```

**Arguments**

|               |                                |
|---------------|--------------------------------|
| plot          | A ggplot object.               |
| filename      | Output filename.               |
| width, height | Plot dimensions.               |
| dpi           | Resolution for raster outputs. |

**Value**

The filename invisibly.

---

|               |                                        |
|---------------|----------------------------------------|
| theme_ggpower | <i>Publication-ready ggpower theme</i> |
|---------------|----------------------------------------|

---

**Description**

Provides consistent typography, spacing, and grid styling for ggpower figures.

**Usage**

```
theme_ggpower(base_size = 12, base_family = "")
```

**Arguments**

|             |                   |
|-------------|-------------------|
| base_size   | Base font size.   |
| base_family | Base font family. |

**Value**

A ggplot2 theme.

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