

Package: `simpr` (via `r-universe`)

September 15, 2024

Type Package

Title Flexible 'Tidyverse'-Friendly Simulations

Version 0.2.6

Description A general, 'tidyverse'-friendly framework for simulation studies, design analysis, and power analysis. Specify data generation, define varying parameters, generate data, fit models, and tidy model results in a single pipeline, without needing loops or custom functions.

License GPL-2

Encoding UTF-8

LazyData true

URL <https://statisfactions.github.io/simpr/>,
<https://github.com/statisfactions/simpr/>

BugReports <https://github.com/statisfactions/simpr/issues/>

Depends R (>= 4.0.0)

Imports broom, dplyr, furrr, generics, purrr, lifecycle, magrittr,
rlang, tibble, tidyr (>= 1.2.0), tidyselect

RoxygenNote 7.2.3

Suggests MASS, testthat, ggplot2, knitr, rmarkdown

VignetteBuilder knitr

Repository <https://statisfactions.r-universe.dev>

RemoteUrl <https://github.com/statisfactions/simpr>

RemoteRef HEAD

RemoteSha bc63a84f463c222a543c9fa04be5cfce1af46d3d

Contents

<code>apply_fits</code>	2
<code>define</code>	3

fit.simpr_tibble	5
generate.simpr_spec	7
glance_fits	9
per_sim	10
print.simpr_spec	11
specify.formula	12
tidyverse_verbs	14
tidy_fits	37
whole_tibble	38

Index	39
--------------	-----------

apply_fits	<i>Run a given function or formula expression on a simpr_mod object and tidy the output.</i>
------------	--

Description

This function applies a given function to all fit objects and returns the result in a tidy tibble. Any function or purrr-style lambda function can be used.

Usage

```
apply_fits(obj, .f, ..., .progress = FALSE, .options = furrr_options())
```

Arguments

obj	a simpr_tibble with repetition number, metaparameters, simulated data, and fitted models, from fit
.f	A function or purrr-style lambda function (see as_mapper) used for computing on the fit object
...	Additional arguments to .f.
.progress	A logical, for whether or not to print a progress bar for multiprocess, multisession, and multicore plans .
.options	The future specific options to use with the workers when using futures. This must be the result from a call to furrr_options() .

Value

A tibble with columns .sim_id, rep, Source (which contains the name of the fit column), any metaparameters from [define](#), and additional columns containing the results of .f applied to each fit object.

See Also

[tidy_fits](#), [glance_fits](#)

Examples

```

set.seed(100)
logit_fit = specify(a = ~ sample(0:1, size = n, replace = TRUE),
  b = ~ a + rlnorm(n)) %>%
  define(n = c(40, 50)) %>%
  generate(1) %>%
  fit(logit = ~ glm(a ~ b, family = "binomial"))

logit_fit %>%
  apply_fits(broom::augment)

## Arguments to the function can be passed in ...
logit_fit %>%
  apply_fits(broom::augment, se_fit = TRUE)

## Using a purrr-style lambda function
logit_fit %>%
  apply_fits(~ summary(.)$cov.scaled)

```

define	<i>Define metaparameters to vary in simulation</i>
--------	--

Description

Takes the output of [specify](#) (a `simpr_spec` object) and defines the metaparameters (i.e. simulation factors).

Usage

```
define(.x = NULL, ..., .list = NULL, .suffix = "_index")
```

Arguments

<code>.x</code>	a <code>simpr_spec</code> object (the output of specify)
<code>...</code>	metaparameters: named arguments containing vectors or lists of objects to be used in the simulation.
<code>.list</code>	additional parameters passed to <code>define()</code> as a list. Useful if you already have desired metaparameters already in list format or created by other functions.
<code>.suffix</code>	name of suffix to append onto index column for list metaparameters, <code>"_index"</code> by default. See <i>Details</i> .

Details

This is the second step in the simulation process, after specifying the simulated data using [specify](#). The output of [define](#) is then passed to [generate](#) to actually generate the simulation.

Metaparameters are named arguments, passed to `...`, that are used in the simulation. A metaparameter is some kind of vector or list, representing something that is to be systematically varied as a part of the simulation design. Any metaparameter should also appear in the formulas of `specify`, and thus the simulation changes depending on the value of the metaparameter.

When creating the simulation, simulations for all possible combinations of metaparameters are generated, resulting in a fully crossed simulation design. If only a subset of the fully crossed design is needed, use the filtering options available in `generate`.

When one of `...` is a list, a new column is generated in the output to `generate` to serve as the index of the list. This new column will be the name of the list argument, with the suffix argument appended onto the end. So if `Y = list(a = 1:2, b = letters[2:3])`, and `suffix = "_index"`, the default, a column named `Y_index` would be added to the output of `generate` with values "a" and "b".

Value

a `simpr_spec` object to pass onto `generate` for the simulation.

Examples

```
# Simple example of setting a metaparameter
simple_meta = specify(a = ~ 1 + rnorm(n)) %>%
  define(n = c(5, 10)) %>%
  generate(1)

simple_meta # $sim has a 5-row tibble and a 10-row tibble

multi_meta = specify(a = ~ mu + rnorm(n)) %>%
  define(n = c(5, 10),
        mu = seq(-1, 1, length.out = 3)) %>%
  generate(1)

multi_meta # generates simulations for all combos of n and mu

# define can handle lists which can contain multiple matrices, etc.
meta_list_out = specify(a = ~ MASS::mvrnorm(n, rep(0, 2), Sigma = S)) %>%
  define(n = c(10, 20, 30),
        S = list(independent = diag(2), correlated = diag(2) + 2)) %>%
  generate(1)

meta_list_out # generates S_index column

# define can also take arguments as a list using the .list argument
meta_list_out_2 = specify(a = ~ MASS::mvrnorm(n, rep(0, 2), Sigma = S)) %>%
  define(.list = list(n = c(10, 20, 30),
                    S = list(independent = diag(2), correlated = diag(2) + 2))) %>%
  generate(1)
```

fit.simpr_tibble *Fit models to the simulated data*

Description

Takes simulated data from [generate](#) and applies functions to it, usually model-fitting functions.

Usage

```
## S3 method for class 'simpr_tibble'
fit(
  object,
  ...,
  .quiet = TRUE,
  .warn_on_error = TRUE,
  .stop_on_error = FALSE,
  .debug = FALSE,
  .progress = FALSE,
  .options = furrr_options()
)

## S3 method for class 'simpr_spec'
fit(
  object,
  ...,
  .quiet = TRUE,
  .warn_on_error = TRUE,
  .stop_on_error = FALSE,
  .debug = FALSE,
  .progress = FALSE,
  .options = furrr_options()
)
```

Arguments

object	a <code>simpr_tibble</code> object—the simulated data from generate —or an <code>simpr_spec</code> object not yet generated.
...	purrr-style lambda functions used for computing on the simulated data. See <i>Details</i> and <i>Examples</i> .
.quiet	Should simulation errors be broadcast to the user as they occur?
.warn_on_error	Should there be a warning when simulation errors occur? See <code>vignette("Managing simulation errors")</code> .
.stop_on_error	Should the simulation stop immediately when simulation errors occur?
.debug	Run simulation in debug mode, allowing objects, etc. to be explored for each attempt to fit objects.

.progress	A logical, for whether or not to print a progress bar for multiprocessing, multithreading, and multicore plans .
.options	The future specific options to use with the workers when using futures. This must be the result from a call to <code>furrr_options()</code> .

Details

This is the fourth step in the simulation process: after generating the simulation data, apply functions such as fitting a statistical model to the data. The output is often then passed to `tidy_fits` or `glance_fits` to extract relevant model estimates from the object.

Similar to `specify`, the model-fitting `...` arguments can be arbitrary R expressions (purrr-style lambda functions, see `as_mapper`) to specify fitting models to the data. The functions are computed within each simulation cell, so dataset names are generally unnecessary: e.g., to compute regressions on each cell, `fit(linear_model = ~lm(c ~ a + b))`. If your modeling function requires a reference to the full dataset, use `.`, e.g. `fit(linear_model = ~lm(c ~ a + b, data = .))`.

Value

a `simpr_tibble` object with additional list-columns for the output of the provided functions (e.g. model outputs). Just like the output of `generate`, there is one row per repetition per combination of metaparameters, and the columns are the repetition number `rep`, the metaparameter names, the simulated data `sim`, with additional columns for the function outputs specified in `...`. If `per_sim` was called previously, `fit` returns the object to default `simpr_tibble` mode.

Examples

```
## Generate data to fit models
simple_linear_data = specify(a = ~ 2 + rnorm(n),
                           b = ~ 5 + 3*a + rnorm(n, 0, sd = 0.5)) %>%
  define(n = 100:101) %>%
  generate(2)

## Fit with a single linear term
linear_fit = simple_linear_data %>%
  fit(linear = ~lm(b ~ a, data = .))

linear_fit # first fit element also prints

## Each element of $linear is a model object
linear_fit$linear

## We can fit multiple models to the same data
multi_fit = simple_linear_data %>%
  fit(linear = ~lm(b ~ a, data = .),
      quadratic = ~lm(b ~ a + I(a^2), data = .))

## Two columns, one for each model
multi_fit

## Again, each element is a model object
multi_fit$quadratic
```

```

## Can view terms more nicely with tidy_fits
multi_fit %>%
  tidy_fits

## Can view model summaries with glance_fits
multi_fit %>%
  glance_fits

## Fit functions do not actually need to be any particular kind of model, they
## can be any arbitrary function. However, not all functions will lead to useful
## output with tidy_fits and glance_fits.
add_five_data = simple_linear_data %>%
  fit(add_five = ~ . + 5) ## adds 5 to every value in dataset

add_five_data

```

generate.simpr_spec *Generate simulated data from specification*

Description

Use specification from [specify](#) or [define](#) to produce simulated data.

Usage

```

## S3 method for class 'simpr_spec'
generate(
  x,
  .reps,
  ...,
  .sim_name = "sim",
  .quiet = TRUE,
  .warn_on_error = TRUE,
  .stop_on_error = FALSE,
  .debug = FALSE,
  .progress = FALSE,
  .options = furrr_options(seed = TRUE)
)

```

Arguments

x	a simpr_spec object generated by define or specify , containing the specifications of the simulation
.reps	number of replications to run (a whole number greater than 0)
...	filtering criteria for which rows to simulate, passed to filter . This is useful for reproducing just a few selected rows of a simulation without needing to redo the entire simulation, see <code>vignette("Reproducing simulations")</code> ,

.sim_name	name of the list-column to be created, containing simulation results. Default is "sim"
.quiet	Should simulation errors be broadcast to the user as they occur?
.warn_on_error	Should there be a warning when simulation errors occur? See vignette("Managing simulation errors").
.stop_on_error	Should the simulation stop immediately when simulation errors occur?
.debug	Run simulation in debug mode, allowing objects, etc. to be explored for each generated variable specification.
.progress	A logical, for whether or not to print a progress bar for multiprocessing, multisession, and multicore plans.
.options	The future specific options to use with the workers when using futures. This must be the result from a call to <code>furrr_options(seed = TRUE)</code> .

Details

This is the third step in the simulation process: after specifying the population model and defining the metaparameters, if any, `generate` is the workhorse function that actually generates the simulated datasets, one for each replication and combination of metaparameters. You likely want to use the output of `generate` to fit model(s) with `fit`.

Errors you get using this function usually have to do with how you specified the simulation in `specify` and `define`.

Value

a `simpr_sims` object, which is a tibble with a row for each repetition (a total of `rep` repetitions) for each combination of metaparameters and some extra metadata used by `fit`. The columns are `rep` for the repetition number, the names of the metaparameters, and a list-column (named by the argument `sim_name`) containing the dataset for each repetition and metaparameter combination. `simpr_sims` objects can be manipulated elementwise by `dplyr` and `tidyr` verbs: the command is applied to each element of the simulation list-column.

See Also

`specify` and `define` for examples of how these functions affect the output of `generate`. See vignette("Optimization") and the furrr website for more information on working with futures: <https://furrr.futureverse.org/>

Examples

```
meta_list_out = specify(a = ~ MASS::mvrnorm(n, rep(0, 2), Sigma = S)) %>%
  define(n = c(10, 20, 30),
        S = list(independent = diag(2), correlated = diag(2) + 2)) %>%
  generate(1)

## View overall structure of the result and a single simulation output
meta_list_out

## Changing .reps will change the number of replications and thus the number of
```



```

## rows in the output
meta_list_2 = specify(a = ~ MASS::mvrnorm(n, rep(0, 2), Sigma = S)) %>%
  define(n = c(10, 20, 30),
        S = list(independent = diag(2), correlated = diag(2) + 2)) %>%
  generate(2)

meta_list_2

## Fitting, tidying functions can be included in this step by running those functions and then
## generate. This can save computation time when doing large
## simulations, especially with parallel processing
meta_list_generate_after = specify(a = ~ MASS::mvrnorm(n, rep(0, 2), Sigma = S)) %>%
  define(n = c(10, 20, 30),
        S = list(independent = diag(2), correlated = diag(2) + 2)) %>%
  fit(lm = ~ lm(a_2 ~ a_1, data = .)) %>%
  tidy_fits %>%
  generate(1)

meta_list_generate_after

```

glance_fits

Create tibble of model "glances" (summaries)

Description

Turn fitted models of simulated data (from `fit`) into a tidy tibble of model summaries, each with one line (via `broom::glance`).

Usage

```
glance_fits(obj, ..., .progress = FALSE, .options = furrr_options())
```

Arguments

<code>obj</code>	tibble with repetition number, metaparameters, simulated data, and fitted models, from <code>fit</code>
<code>...</code>	Additional arguments to <code>broom::glance</code> .
<code>.progress</code>	A logical, for whether or not to print a progress bar for multiprocessing, multisession, and multicore plans.
<code>.options</code>	The future specific options to use with the workers when using futures. This must be the result from a call to <code>furrr_options()</code> .

Details

This the fifth step of the simulation process: after fitting the model with `fit`, now tidy the model output for further analysis such as evaluating power. All model objects should be supported by `broom::glance`.

The output of this function is quite useful comparing overall model fits; see *Examples*. For looking at specific features of the model such as tests for individual parameter estimates, use `tidy_fits`.

Value

a tibble with the output of the broom: `glance` method for the given object.

See Also

`tidy_fits` to view model components (e.g. parameter estimates), `apply_fits` to apply an arbitrary function to the fits

Examples

```
simple_linear_data = specify(a = ~ 2 + rnorm(n),
  b = ~ 5 + 3 * x1 + rnorm(n, 0, sd = 0.5)) %>%
  define(n = 100:101) %>%
  generate(2)

## Can show tidy output for multiple competing models,
compare_degree = simple_linear_data %>%
  fit(linear = ~lm(a ~ b, data = .),
    quadratic = ~lm(a ~ b + I(b^2), data = .)) %>%
  glance_fits

compare_degree

## Models can be anything supported by broom::tidy.
cor_vs_lm = simple_linear_data %>%
  fit(linear = ~lm(a ~ b, data = .),
    cor = ~ cor.test(.$a, .$b)) %>%
  glance_fits

cor_vs_lm # has NA for non-matching terms
```

per_sim

Work directly with simulation results with dplyr and tidyr

Description

Allows applying data transformations to every simulation result with syntax as if dealing with a single simulation result using dplyr and tidyr verbs

Usage

```
per_sim(obj)
```

Arguments

obj A `simpr_tibble` or `simpr_spec` object.

Details

After producing simulation results (a `simpr_tibble` object), it is sometimes needed to do some data transformation to prepare for analysis. This can always be specified in specify through custom functions, but `per_sim` allows you to also easily specify this in your pipeline. After running `per_sim`, you can use the `dplyr` and `tidyr` verbs you would use on a single simulation result and it will be applied to all results.

If, after running `per_sim`, you wish to return to the default behavior to access `simpr_tibble` results as a tibble with a `list_column` for simulation results again, run [whole_tibble](#).

Value

A `simpr_sims` object for use with `dplyr` and `tidyr` verbs.

Examples

```
## Often most convenient to specify simulations for 'wide' data
data_wide = specify(a = ~ runif(5, min = 0, max = 1),
                   b = ~ runif(5, min = 0, max = 2)) %>%
  generate(2)

data_wide

## Any dplyr or tidyr verbs can be applied after per_sim()
data_long = data_wide %>%
  per_sim() %>%
  pivot_longer(everything(), names_to = "name",
              values_to = "value")

data_long

## Now, ready for analysis
data_long %>%
  fit(lm = ~lm(value ~ name)) %>%
  tidy_fits
```

print.simpr_spec *Methods for simpr_spec class*

Description

Accessor & display methods for `simpr_spec` class

Usage

```
## S3 method for class 'simpr_spec'
print(x, ...)
```

```
new_simpr_spec()
```

```
is.simpr_spec(x)
```

Arguments

```
x          a simpr_spec object
...        ignored
```

Details

Class `simpr_spec` is created by `specify` and/or `define` to specify the simulation variables, which is produced by `generate`. The print method provides an overview of the specification, including the conditions.

Value

`print.simpr_spec` has no return value and is called for its side-effects. `new_simpr_spec` returns an empty `simpr_spec` object. `is.simpr_spec` returns a length-1 logical vector, TRUE or FALSE, which indicates whether an object is a `simpr_spec`.

Examples

```
empty = new_simpr_spec()
print(empty)

## Easiest to create a simpr_spec with specify
simple_spec = specify(a = ~ rbinom(n, size, prob))
print(simple_spec)

## Adding on define adds all possible combinations
## of conditions and more info in output.
defined_spec = specify(a = ~ rbinom(n, size, prob)) %>%
  define(n = c(10, 20),
         size = c(20, 40),
         prob = c(0.2, 0.4))
print(defined_spec)
```

specify.formula

Specify data-generating mechanisms

Description

Specify the data-generating mechanisms for the simulation using purrr-style lambda functions.

Usage

```
## S3 method for class 'formula'
specify(x = NULL, ..., .use_names = TRUE, .sep = "_")
```

Arguments

x	leave this argument blank (NULL); this argument is a placeholder and can be skipped.
...	named purrr-style formula functions used for generating simulation variables. x is not recommended as a name, since it is a formal argument and will be automatically assumed to be the first variable (a message will be displayed if x is used).
.use_names	Whether to use names generated by the lambda function (TRUE, the default), or to overwrite them with supplied names.
.sep	Specify the separator for auto-generating names. See <i>Column naming</i> .

Details

This is always the first command in the simulation process, to specify the actual simulated variables, which is then passed to `define` to define metaparameters and then to `generate` to generate the data.

The ... arguments use an efficient syntax to specify custom functions needed for generating a simulation, based on the purrr package. When producing one variable, one can provide an expression such as `specify(a = ~ 3 + runif(10))`; the expression is preceded by `~`, the tilde operator, and can refer to previous arguments in `specify` or to metaparameters in `define`. This is called a lambda function.

Order matters: arguments are evaluated sequentially, so later argument can refer to an earlier one, e.g. `specify(a = ~ rnorm(2), b = ~ a + rnorm(2))`.

`generate` combines results together into a single tibble for each simulation, so all lambda functions should produce the same number of rows. However, a lambda function can produce multiple columns.

Value

A `simpr_specify` object which contains the functions needed to generate the simulation; to be passed to `define` for defining metaparameters or, if there are no metaparameters, directly to `generate` for generating the simulation.

Also useful is the fact that one can refer to variables in subsequent arguments. So, one could define another variable `b` that depends on `a` very simply, e.g. `specify(a = ~ 3 + runif(10), b = ~ 2 * x)`.

Finally, one can also refer to metaparameters that are to be systematically varied in the simulation study. See `define` and the examples for more details.

Column naming

Because functions can produce different numbers of columns, there are several options for naming columns. If a provided lambda function produces a single column, the name given to the argument becomes the name of the column. If the lambda function already produces column names, then the output will use these names if `.use_names = TRUE`, the default. Otherwise, `simpr` uses the argument name as a base and auto-numbers the columns. For instance, if the argument `a` generates a two-column matrix and `.sep = "_"` (the default) the columns will be named `a_1` and `a_2`.

Custom names can also be directly provided by a double-sided formula. The left-hand side must use `c` or `cbind`, e.g. `specify(c(a, b) ~ MASS::mvrnorm(5, c(0, 0), Sigma = diag(2)))`.

Note

This function is an S3 method for `specify` from the `generics` package. Because `x` is a formal argument of `specify`, if you have a variable in your simulation named `x` it will be automatically moved to be the first variable (with a message). It is therefore safest to use any other variable name besides `x`.

Examples

```
## specify a variable and generate it in the simulation
single_var = specify(a = ~ 1 + rnorm(5)) %>%
  generate(1) # generate a single repetition of the simulation
single_var

two_var = specify(a = ~ 1 + rnorm(5),
                  b = ~ x + 2) %>%
  generate(1)
two_var

## Generates a_01 through a_10
autonumber_var = specify(a = ~ MASS::mvrnorm(5, rep(0, 10), Sigma = diag(10))) %>%
  generate(1)
autonumber_var

# alternatively, you could use a two-sided formula for names
multi_name = specify(cbind(a, b, c) ~ MASS::mvrnorm(5, rep(0, 3), Sigma = diag(3))) %>%
  generate(1)
multi_name

# Simple example of setting a metaparameter
simple_meta = specify(a = ~ 1 + rnorm(n)) %>%
  define(n = c(5, 10)) %>% # without this line you would get an error!
  generate(1)

simple_meta # has two rows now, one for each value of n
simple_meta$sim[[1]] # n = 5
simple_meta$sim[[2]] # n = 10
```

tidyverse_verbs

Simpr methods for tidyverse verbs

Description

These are `simpr`-compatible methods for generic `dplyr` and `tidyr` verbs. The user is not expected to call these methods directly.

Usage

```
## S3 method for class 'simpr_sims'
add_count(
  x,
  ...,
  wt = NULL,
  sort = FALSE,
  name = NULL,
  .drop = lifecycle::deprecated()
)

## S3 method for class 'simpr_spec'
add_count(
  x,
  ...,
  wt = NULL,
  sort = FALSE,
  name = NULL,
  .drop = lifecycle::deprecated()
)

## S3 method for class 'simpr_sims'
anti_join(x, y, by = NULL, copy = FALSE, ...)

## S3 method for class 'simpr_spec'
anti_join(x, y, by = NULL, copy = FALSE, ...)

## S3 method for class 'simpr_sims'
arrange_(.data, ..., .dots = list())

## S3 method for class 'simpr_spec'
arrange_(.data, ..., .dots = list())

## S3 method for class 'simpr_sims'
arrange(.data, ..., .by_group = FALSE)

## S3 method for class 'simpr_spec'
arrange(.data, ..., .by_group = FALSE)

## S3 method for class 'simpr_sims'
as.tbl(x, ...)

## S3 method for class 'simpr_spec'
as.tbl(x, ...)

## S3 method for class 'simpr_sims'
auto_copy(x, y, copy = FALSE, ...)
```

```
## S3 method for class 'simpr_spec'  
auto_copy(x, y, copy = FALSE, ...)  
  
## S3 method for class 'simpr_sims'  
collect(x, ...)  
  
## S3 method for class 'simpr_spec'  
collect(x, ...)  
  
## S3 method for class 'simpr_sims'  
compute(x, ...)  
  
## S3 method for class 'simpr_spec'  
compute(x, ...)  
  
## S3 method for class 'simpr_sims'  
count(x, ..., wt = NULL, sort = FALSE, name = NULL)  
  
## S3 method for class 'simpr_spec'  
count(x, ..., wt = NULL, sort = FALSE, name = NULL)  
  
## S3 method for class 'simpr_sims'  
distinct(.data, ..., .dots, .keep_all = FALSE)  
  
## S3 method for class 'simpr_spec'  
distinct(.data, ..., .dots, .keep_all = FALSE)  
  
## S3 method for class 'simpr_sims'  
distinct(.data, ..., .keep_all = FALSE)  
  
## S3 method for class 'simpr_spec'  
distinct(.data, ..., .keep_all = FALSE)  
  
## S3 method for class 'simpr_sims'  
do_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
do_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
do(.data, ...)  
  
## S3 method for class 'simpr_spec'  
do(.data, ...)  
  
## S3 method for class 'simpr_sims'  
dplyr_col_modify(data, cols)
```



```
## S3 method for class 'simpr_spec'  
dplyr_col_modify(data, cols)  
  
## S3 method for class 'simpr_sims'  
dplyr_reconstruct(data, template)  
  
## S3 method for class 'simpr_spec'  
dplyr_reconstruct(data, template)  
  
## S3 method for class 'simpr_sims'  
dplyr_row_slice(data, i, ...)  
  
## S3 method for class 'simpr_spec'  
dplyr_row_slice(data, i, ...)  
  
## S3 method for class 'simpr_sims'  
filter_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
filter_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
filter(.data, ..., .preserve = FALSE)  
  
## S3 method for class 'simpr_spec'  
filter(.data, ..., .preserve = FALSE)  
  
## S3 method for class 'simpr_sims'  
full_join(  
  x,  
  y,  
  by = NULL,  
  copy = FALSE,  
  suffix = c(".x", ".y"),  
  ...,  
  keep = FALSE  
)  
  
## S3 method for class 'simpr_spec'  
full_join(  
  x,  
  y,  
  by = NULL,  
  copy = FALSE,  
  suffix = c(".x", ".y"),  
  ...,  
  keep = FALSE  
)
```

```
## S3 method for class 'simpr_sims'  
group_by(.data, ..., .dots = list(), add = FALSE)  
  
## S3 method for class 'simpr_spec'  
group_by(.data, ..., .dots = list(), add = FALSE)  
  
## S3 method for class 'simpr_sims'  
group_by(.data, ..., .add = FALSE, .drop = dplyr::group_by_drop_default(.data))  
  
## S3 method for class 'simpr_spec'  
group_by(.data, ..., .add = FALSE, .drop = dplyr::group_by_drop_default(.data))  
  
## S3 method for class 'simpr_sims'  
group_data(.data)  
  
## S3 method for class 'simpr_spec'  
group_data(.data)  
  
## S3 method for class 'simpr_sims'  
group_indices(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
group_indices(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
group_indices(.data, ...)  
  
## S3 method for class 'simpr_spec'  
group_indices(.data, ...)  
  
## S3 method for class 'simpr_sims'  
group_keys(.tbl, ...)  
  
## S3 method for class 'simpr_spec'  
group_keys(.tbl, ...)  
  
## S3 method for class 'simpr_sims'  
group_map(.data, .f, ..., .keep = FALSE)  
  
## S3 method for class 'simpr_spec'  
group_map(.data, .f, ..., .keep = FALSE)  
  
## S3 method for class 'simpr_sims'  
group_modify(.data, .f, ..., .keep = FALSE)  
  
## S3 method for class 'simpr_spec'  
group_modify(.data, .f, ..., .keep = FALSE)
```

```
## S3 method for class 'simpr_sims'  
group_nest(.tbl, ..., .key = "data", keep = FALSE)  
  
## S3 method for class 'simpr_spec'  
group_nest(.tbl, ..., .key = "data", keep = FALSE)  
  
## S3 method for class 'simpr_sims'  
group_size(x)  
  
## S3 method for class 'simpr_spec'  
group_size(x)  
  
## S3 method for class 'simpr_sims'  
group_split(.tbl, ..., .keep = TRUE)  
  
## S3 method for class 'simpr_spec'  
group_split(.tbl, ..., .keep = TRUE)  
  
## S3 method for class 'simpr_sims'  
group_trim(.tbl, .drop = dplyr::group_by_drop_default(.tbl))  
  
## S3 method for class 'simpr_spec'  
group_trim(.tbl, .drop = dplyr::group_by_drop_default(.tbl))  
  
## S3 method for class 'simpr_sims'  
group_vars(x)  
  
## S3 method for class 'simpr_spec'  
group_vars(x)  
  
## S3 method for class 'simpr_sims'  
groups(x)  
  
## S3 method for class 'simpr_spec'  
groups(x)  
  
## S3 method for class 'simpr_sims'  
inner_join(  
  x,  
  y,  
  by = NULL,  
  copy = FALSE,  
  suffix = c(".x", ".y"),  
  ...,  
  keep = FALSE  
)
```

```
## S3 method for class 'simpr_spec'  
inner_join(  
  x,  
  y,  
  by = NULL,  
  copy = FALSE,  
  suffix = c(".x", ".y"),  
  ...,  
  keep = FALSE  
)  
  
## S3 method for class 'simpr_sims'  
intersect(x, y, ...)  
  
## S3 method for class 'simpr_spec'  
intersect(x, y, ...)  
  
## S3 method for class 'simpr_sims'  
left_join(  
  x,  
  y,  
  by = NULL,  
  copy = FALSE,  
  suffix = c(".x", ".y"),  
  ...,  
  keep = FALSE  
)  
  
## S3 method for class 'simpr_spec'  
left_join(  
  x,  
  y,  
  by = NULL,  
  copy = FALSE,  
  suffix = c(".x", ".y"),  
  ...,  
  keep = FALSE  
)  
  
## S3 method for class 'simpr_sims'  
mutate_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
mutate_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
mutate(.data, ...)
```

```
## S3 method for class 'simpr_spec'  
mutate(.data, ...)  
  
## S3 method for class 'simpr_sims'  
n_groups(x)  
  
## S3 method for class 'simpr_spec'  
n_groups(x)  
  
## S3 method for class 'simpr_sims'  
nest_by(.data, ..., .key = "data", .keep = FALSE)  
  
## S3 method for class 'simpr_spec'  
nest_by(.data, ..., .key = "data", .keep = FALSE)  
  
## S3 method for class 'simpr_sims'  
nest_join(x, y, by = NULL, copy = FALSE, keep = FALSE, name = NULL, ...)  
  
## S3 method for class 'simpr_spec'  
nest_join(x, y, by = NULL, copy = FALSE, keep = FALSE, name = NULL, ...)  
  
## S3 method for class 'simpr_sims'  
pull(.data, var = -1, name = NULL, ...)  
  
## S3 method for class 'simpr_spec'  
pull(.data, var = -1, name = NULL, ...)  
  
## S3 method for class 'simpr_sims'  
relocate(.data, ..., .before = NULL, .after = NULL)  
  
## S3 method for class 'simpr_spec'  
relocate(.data, ..., .before = NULL, .after = NULL)  
  
## S3 method for class 'simpr_sims'  
rename_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
rename_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
rename_with(.data, .fn, .cols = dplyr::everything(), ...)  
  
## S3 method for class 'simpr_spec'  
rename_with(.data, .fn, .cols = dplyr::everything(), ...)  
  
## S3 method for class 'simpr_sims'  
rename(.data, ...)
```

```
## S3 method for class 'simpr_spec'
rename(.data, ...)

## S3 method for class 'simpr_sims'
right_join(
  x,
  y,
  by = NULL,
  copy = FALSE,
  suffix = c(".x", ".y"),
  ...,
  keep = FALSE
)

## S3 method for class 'simpr_spec'
right_join(
  x,
  y,
  by = NULL,
  copy = FALSE,
  suffix = c(".x", ".y"),
  ...,
  keep = FALSE
)

## S3 method for class 'simpr_sims'
rows_delete(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_spec'
rows_delete(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_sims'
rows_insert(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_spec'
rows_insert(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_sims'
rows_patch(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_spec'
rows_patch(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_sims'
rows_update(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_spec'
rows_update(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)
```

```
## S3 method for class 'simpr_sims'
rows_upsert(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_spec'
rows_upsert(x, y, by = NULL, ..., copy = FALSE, in_place = FALSE)

## S3 method for class 'simpr_sims'
rowwise(data, ...)

## S3 method for class 'simpr_spec'
rowwise(data, ...)

## S3 method for class 'simpr_sims'
same_src(x, y)

## S3 method for class 'simpr_spec'
same_src(x, y)

## S3 method for class 'simpr_sims'
sample_frac(tbl, size = 1, replace = FALSE, weight = NULL, .env = NULL, ...)

## S3 method for class 'simpr_spec'
sample_frac(tbl, size = 1, replace = FALSE, weight = NULL, .env = NULL, ...)

## S3 method for class 'simpr_sims'
sample_n(tbl, size, replace = FALSE, weight = NULL, .env = NULL, ...)

## S3 method for class 'simpr_spec'
sample_n(tbl, size, replace = FALSE, weight = NULL, .env = NULL, ...)

## S3 method for class 'simpr_sims'
select_(.data, ..., .dots = list())

## S3 method for class 'simpr_spec'
select_(.data, ..., .dots = list())

## S3 method for class 'simpr_sims'
select(.data, ...)

## S3 method for class 'simpr_spec'
select(.data, ...)

## S3 method for class 'simpr_sims'
semi_join(x, y, by = NULL, copy = FALSE, ...)

## S3 method for class 'simpr_spec'
semi_join(x, y, by = NULL, copy = FALSE, ...)
```

```
## S3 method for class 'simpr_sims'
setdiff(x, y, ...)

## S3 method for class 'simpr_spec'
setdiff(x, y, ...)

## S3 method for class 'simpr_sims'
setequal(x, y, ...)

## S3 method for class 'simpr_spec'
setequal(x, y, ...)

## S3 method for class 'simpr_sims'
slice_(.data, ..., .dots = list())

## S3 method for class 'simpr_spec'
slice_(.data, ..., .dots = list())

## S3 method for class 'simpr_sims'
slice_head(.data, ..., n, prop)

## S3 method for class 'simpr_spec'
slice_head(.data, ..., n, prop)

## S3 method for class 'simpr_sims'
slice_max(.data, order_by, ..., n, prop, with_ties = TRUE)

## S3 method for class 'simpr_spec'
slice_max(.data, order_by, ..., n, prop, with_ties = TRUE)

## S3 method for class 'simpr_sims'
slice_min(.data, order_by, ..., n, prop, with_ties = TRUE)

## S3 method for class 'simpr_spec'
slice_min(.data, order_by, ..., n, prop, with_ties = TRUE)

## S3 method for class 'simpr_sims'
slice_sample(.data, ..., n, prop, weight_by = NULL, replace = FALSE)

## S3 method for class 'simpr_spec'
slice_sample(.data, ..., n, prop, weight_by = NULL, replace = FALSE)

## S3 method for class 'simpr_sims'
slice_tail(.data, ..., n, prop)

## S3 method for class 'simpr_spec'
slice_tail(.data, ..., n, prop)
```



```
## S3 method for class 'simpr_sims'  
slice(.data, ..., .preserve = FALSE)  
  
## S3 method for class 'simpr_spec'  
slice(.data, ..., .preserve = FALSE)  
  
## S3 method for class 'simpr_sims'  
summarise_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
summarise_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
summarise(.data, ..., .groups = NULL)  
  
## S3 method for class 'simpr_spec'  
summarise(.data, ..., .groups = NULL)  
  
## S3 method for class 'simpr_sims'  
tally(x, wt = NULL, sort = FALSE, name = NULL)  
  
## S3 method for class 'simpr_spec'  
tally(x, wt = NULL, sort = FALSE, name = NULL)  
  
## S3 method for class 'simpr_sims'  
tbl_vars(x)  
  
## S3 method for class 'simpr_spec'  
tbl_vars(x)  
  
## S3 method for class 'simpr_sims'  
transmute_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_spec'  
transmute_(.data, ..., .dots = list())  
  
## S3 method for class 'simpr_sims'  
transmute(.data, ...)  
  
## S3 method for class 'simpr_spec'  
transmute(.data, ...)  
  
## S3 method for class 'simpr_sims'  
ungroup(x, ...)  
  
## S3 method for class 'simpr_spec'  
ungroup(x, ...)
```

```
## S3 method for class 'simpr_sims'  
union_all(x, y, ...)  
  
## S3 method for class 'simpr_spec'  
union_all(x, y, ...)  
  
## S3 method for class 'simpr_sims'  
union(x, y, ...)  
  
## S3 method for class 'simpr_spec'  
union(x, y, ...)  
  
## S3 method for class 'simpr_sims'  
complete_(data, cols, fill = list(), ...)  
  
## S3 method for class 'simpr_spec'  
complete_(data, cols, fill = list(), ...)  
  
## S3 method for class 'simpr_sims'  
complete(data, ..., fill = list())  
  
## S3 method for class 'simpr_spec'  
complete(data, ..., fill = list())  
  
## S3 method for class 'simpr_sims'  
drop_na_(data, vars)  
  
## S3 method for class 'simpr_spec'  
drop_na_(data, vars)  
  
## S3 method for class 'simpr_sims'  
drop_na(data, ...)  
  
## S3 method for class 'simpr_spec'  
drop_na(data, ...)  
  
## S3 method for class 'simpr_sims'  
expand_(data, dots, ...)  
  
## S3 method for class 'simpr_spec'  
expand_(data, dots, ...)  
  
## S3 method for class 'simpr_sims'  
expand(data, ..., .name_repair = "check_unique")  
  
## S3 method for class 'simpr_spec'  
expand(data, ..., .name_repair = "check_unique")
```

```
## S3 method for class 'simpr_sims'
extract_(
  data,
  col,
  into,
  regex = "[[:alnum:]]+",
  remove = TRUE,
  convert = FALSE,
  ...
)

## S3 method for class 'simpr_spec'
extract_(
  data,
  col,
  into,
  regex = "[[:alnum:]]+",
  remove = TRUE,
  convert = FALSE,
  ...
)

## S3 method for class 'simpr_sims'
extract(
  data,
  col,
  into,
  regex = "[[:alnum:]]+",
  remove = TRUE,
  convert = FALSE,
  ...
)

## S3 method for class 'simpr_spec'
extract(
  data,
  col,
  into,
  regex = "[[:alnum:]]+",
  remove = TRUE,
  convert = FALSE,
  ...
)

## S3 method for class 'simpr_sims'
fill_(data, fill_cols, .direction = c("down", "up"))
```

```
## S3 method for class 'simpr_spec'  
fill_(data, fill_cols, .direction = c("down", "up"))  
  
## S3 method for class 'simpr_sims'  
fill(data, ..., .direction = c("down", "up", "downup", "updown"))  
  
## S3 method for class 'simpr_spec'  
fill(data, ..., .direction = c("down", "up", "downup", "updown"))  
  
## S3 method for class 'simpr_sims'  
gather_  
  data,  
  key_col,  
  value_col,  
  gather_cols,  
  na.rm = FALSE,  
  convert = FALSE,  
  factor_key = FALSE  
)  
  
## S3 method for class 'simpr_spec'  
gather_  
  data,  
  key_col,  
  value_col,  
  gather_cols,  
  na.rm = FALSE,  
  convert = FALSE,  
  factor_key = FALSE  
)  
  
## S3 method for class 'simpr_sims'  
gather(  
  data,  
  key = "key",  
  value = "value",  
  ...,  
  na.rm = FALSE,  
  convert = FALSE,  
  factor_key = FALSE  
)  
  
## S3 method for class 'simpr_spec'  
gather(  
  data,  
  key = "key",  
  value = "value",  
  ...,
```

```
    na.rm = FALSE,
    convert = FALSE,
    factor_key = FALSE
  )

## S3 method for class 'simpr_sims'
nest_legacy(data, ..., .key = "data")

## S3 method for class 'simpr_spec'
nest_legacy(data, ..., .key = "data")

## S3 method for class 'simpr_sims'
nest(.data, ..., .names_sep = NULL, .key = lifecycle::deprecated())

## S3 method for class 'simpr_spec'
nest(.data, ..., .names_sep = NULL, .key = lifecycle::deprecated())

## S3 method for class 'simpr_sims'
pivot_longer(
  data,
  cols,
  names_to = "name",
  names_prefix = NULL,
  names_sep = NULL,
  names_pattern = NULL,
  names_ptypes = list(),
  names_transform = list(),
  names_repair = "check_unique",
  values_to = "value",
  values_drop_na = FALSE,
  values_ptypes = list(),
  values_transform = list(),
  ...
)

## S3 method for class 'simpr_spec'
pivot_longer(
  data,
  cols,
  names_to = "name",
  names_prefix = NULL,
  names_sep = NULL,
  names_pattern = NULL,
  names_ptypes = list(),
  names_transform = list(),
  names_repair = "check_unique",
  values_to = "value",
  values_drop_na = FALSE,
```

```
  values_ptypes = list(),
  values_transform = list(),
  ...
)

## S3 method for class 'simpr_sims'
pivot_wider(
  data,
  id_cols = NULL,
  id_expand = FALSE,
  names_from = NULL,
  names_prefix = "",
  names_sep = "_",
  names_glue = NULL,
  names_sort = FALSE,
  names_vary = "fastest",
  names_expand = FALSE,
  names_repair = "check_unique",
  values_from = NULL,
  values_fill = NULL,
  values_fn = NULL,
  unused_fn = NULL,
  ...
)

## S3 method for class 'simpr_spec'
pivot_wider(
  data,
  id_cols = NULL,
  id_expand = FALSE,
  names_from = NULL,
  names_prefix = "",
  names_sep = "_",
  names_glue = NULL,
  names_sort = FALSE,
  names_vary = "fastest",
  names_expand = FALSE,
  names_repair = "check_unique",
  values_from = NULL,
  values_fill = NULL,
  values_fn = NULL,
  unused_fn = NULL,
  ...
)

## S3 method for class 'simpr_sims'
replace_na(data, replace, ...)
```

```
## S3 method for class 'simpr_spec'  
replace_na(data, replace, ...)  
  
## S3 method for class 'simpr_sims'  
separate_(  
  data,  
  col,  
  into,  
  sep = "[^[:alnum:]]+",  
  remove = TRUE,  
  convert = FALSE,  
  extra = "warn",  
  fill = "warn",  
  ...  
)  
  
## S3 method for class 'simpr_spec'  
separate_(  
  data,  
  col,  
  into,  
  sep = "[^[:alnum:]]+",  
  remove = TRUE,  
  convert = FALSE,  
  extra = "warn",  
  fill = "warn",  
  ...  
)  
  
## S3 method for class 'simpr_sims'  
separate_rows_(data, cols, sep = "[^[:alnum:]].]", convert = FALSE)  
  
## S3 method for class 'simpr_spec'  
separate_rows_(data, cols, sep = "[^[:alnum:]].]", convert = FALSE)  
  
## S3 method for class 'simpr_sims'  
separate_rows(data, ..., sep = "[^[:alnum:]].]", convert = FALSE)  
  
## S3 method for class 'simpr_spec'  
separate_rows(data, ..., sep = "[^[:alnum:]].]", convert = FALSE)  
  
## S3 method for class 'simpr_sims'  
separate(  
  data,  
  col,  
  into,  
  sep = "[^[:alnum:]]+",  
  remove = TRUE,
```

```
    convert = FALSE,
    extra = "warn",
    fill = "warn",
    ...
  )

## S3 method for class 'simpr_spec'
separate(
  data,
  col,
  into,
  sep = "[^[:alnum:]]+",
  remove = TRUE,
  convert = FALSE,
  extra = "warn",
  fill = "warn",
  ...
)

## S3 method for class 'simpr_sims'
spread_(
  data,
  key_col,
  value_col,
  fill = NA,
  convert = FALSE,
  drop = TRUE,
  sep = NULL
)

## S3 method for class 'simpr_spec'
spread_(
  data,
  key_col,
  value_col,
  fill = NA,
  convert = FALSE,
  drop = TRUE,
  sep = NULL
)

## S3 method for class 'simpr_sims'
spread(data, key, value, fill = NA, convert = FALSE, drop = TRUE, sep = NULL)

## S3 method for class 'simpr_spec'
spread(data, key, value, fill = NA, convert = FALSE, drop = TRUE, sep = NULL)

## S3 method for class 'simpr_sims'
```



```
unite_(data, col, from, sep = "_", remove = TRUE)

## S3 method for class 'simpr_spec'
unite_(data, col, from, sep = "_", remove = TRUE)

## S3 method for class 'simpr_sims'
unite(data, col, ..., sep = "_", remove = TRUE, na.rm = FALSE)

## S3 method for class 'simpr_spec'
unite(data, col, ..., sep = "_", remove = TRUE, na.rm = FALSE)

## S3 method for class 'simpr_sims'
unnest_legacy(data, ..., .drop = NA, .id = NULL, .sep = NULL, .preserve = NULL)

## S3 method for class 'simpr_spec'
unnest_legacy(data, ..., .drop = NA, .id = NULL, .sep = NULL, .preserve = NULL)

## S3 method for class 'simpr_sims'
unnest(
  data,
  cols,
  ...,
  keep_empty = FALSE,
  ptype = NULL,
  names_sep = NULL,
  names_repair = "check_unique",
  .drop = lifecycle::deprecated(),
  .id = lifecycle::deprecated(),
  .sep = lifecycle::deprecated(),
  .preserve = lifecycle::deprecated()
)

## S3 method for class 'simpr_spec'
unnest(
  data,
  cols,
  ...,
  keep_empty = FALSE,
  ptype = NULL,
  names_sep = NULL,
  names_repair = "check_unique",
  .drop = lifecycle::deprecated(),
  .id = lifecycle::deprecated(),
  .sep = lifecycle::deprecated(),
  .preserve = lifecycle::deprecated()
)
```

Arguments

x	See original function documentation
...	See original function documentation
wt	See original function documentation
sort	See original function documentation
name	See original function documentation
.drop	See original function documentation
y	See original function documentation
by	See original function documentation
copy	See original function documentation
.data	See original function documentation
.dots	See original function documentation
.by_group	See original function documentation
.keep_all	See original function documentation
data	See original function documentation
cols	See original function documentation
template	See original function documentation
i	See original function documentation
.preserve	See original function documentation
suffix	See original function documentation
keep	See original function documentation
add	See original function documentation
.add	See original function documentation
.tbl	See original function documentation
.f	See original function documentation
.keep	See original function documentation
.key	See original function documentation
var	See original function documentation
.before	See original function documentation
.after	See original function documentation
.fn	See original function documentation
.cols	See original function documentation
in_place	See original function documentation
tbl	See original function documentation
size	See original function documentation
replace	See original function documentation
weight	See original function documentation

<code>.env</code>	See original function documentation
<code>n</code>	See original function documentation
<code>prop</code>	See original function documentation
<code>order_by</code>	See original function documentation
<code>with_ties</code>	See original function documentation
<code>weight_by</code>	See original function documentation
<code>.groups</code>	See original function documentation
<code>fill</code>	See original function documentation
<code>vars</code>	See original function documentation
<code>dots</code>	See original function documentation
<code>.name_repair</code>	See original function documentation
<code>col</code>	See original function documentation
<code>into</code>	See original function documentation
<code>regex</code>	See original function documentation
<code>remove</code>	See original function documentation
<code>convert</code>	See original function documentation
<code>fill_cols</code>	See original function documentation
<code>.direction</code>	See original function documentation
<code>key_col</code>	See original function documentation
<code>value_col</code>	See original function documentation
<code>gather_cols</code>	See original function documentation
<code>na.rm</code>	See original function documentation
<code>factor_key</code>	See original function documentation
<code>key</code>	See original function documentation
<code>value</code>	See original function documentation
<code>.names_sep</code>	See original function documentation
<code>names_to</code>	See original function documentation
<code>names_prefix</code>	See original function documentation
<code>names_sep</code>	See original function documentation
<code>names_pattern</code>	See original function documentation
<code>names_ptypes</code>	See original function documentation
<code>names_transform</code>	See original function documentation
<code>names_repair</code>	See original function documentation
<code>values_to</code>	See original function documentation
<code>values_drop_na</code>	See original function documentation
<code>values_ptypes</code>	See original function documentation

values_transform	See original function documentation
id_cols	See original function documentation
id_expand	See original function documentation
names_from	See original function documentation
names_glue	See original function documentation
names_sort	See original function documentation
names_vary	See original function documentation
names_expand	See original function documentation
values_from	See original function documentation
values_fill	See original function documentation
values_fn	See original function documentation
unused_fn	See original function documentation
sep	See original function documentation
extra	See original function documentation
drop	See original function documentation
from	See original function documentation
.id	See original function documentation
.sep	See original function documentation
keep_empty	See original function documentation
ptype	See original function documentation

Details

See original function documentation for details of the functions. Two methods have been created for each `tidyr` and `dplyr` generic function: one for `simpr_spec` objects (generated by `specify` and `define`) which are simply stored for later evaluation by `generate`, and one for `simpr_sims` objects to perform the operation elementwise on each simulation.

To use these special per-simulation versions of these tidyverse verbs as a part of a `simpr` simulation, first run `per_sim` on the object. If you do NOT want to compute only on each simulation but want to return to the default behavior of operating on the entire simulation tibble, use `whole_tibble`.

Value

`simpr_sims` methods return a `simpr_sims` object with the given data transformation applied to each simulation. `simpr_spec` methods return a `simpr_spec` object that stores the given data transformation, to be executed when `generate` is called.

tidy_fits	<i>Tidy fits into a tidy tibble</i>
-----------	-------------------------------------

Description

Turn models fit to simulated data (from [fit](#)) into a tidy tibble of model estimates (via broom: [:tidy](#)).

Usage

```
tidy_fits(obj, ..., .progress = FALSE, .options = furrr_options())
```

Arguments

obj	a <code>simpr_tibble</code> with fitted models, from fit
...	Additional arguments to the broom: :tidy method.
.progress	A logical, for whether or not to print a progress bar for multiprocessing, multise- sion, and multicore plans .
.options	The future specific options to use with the workers when using futures. This must be the result from a call to furrr_options() .

Details

This the fifth step of the simulation process: after fitting the model with [fit](#), now tidy the model output for further analysis such as evaluating power. All model objects should be supported by broom: [:tidy](#). See [apply_fits](#) for applying any arbitrary function to the data, including other tidiers.

The output of this function is quite useful for diagnosing bias, precision, and power. For looking at overall features of the model (e.g., R-squared), use [glance_fits](#).

Value

a tibble with the output of the broom: [:tidy](#) method applied to each model fit and then bound into a single tibble.

See Also

[glance_fits](#) to view overall model statistics (e.g. R-squared), [apply_fits](#) to apply an arbitrary function to the fits

Examples

```
simple_linear_data = specify(a = ~ 2 + rnorm(n),
  b = ~ 5 + 3 * x1 + rnorm(n, 0, sd = 0.5)) %>%
  define(n = 100:101) %>%
  generate(2)

## Can show tidy output for multiple competing models,
```

```

compare_degree = simple_linear_data %>%
  fit(linear = ~lm(a ~ b, data = .),
      quadratic = ~lm(a ~ b + I(b^2), data = .)) %>%
  tidy_fits

compare_degree

## Models can be anything supported by broom::tidy.
cor_vs_lm = simple_linear_data %>%
  fit(linear = ~lm(a ~ b, data = .),
      cor = ~ cor.test(.$a, .$b)) %>%
  tidy_fits

cor_vs_lm # has NA for non-matching terms

```

whole_tibble	<i>Convert a simpr_sims object back to a simpr_tibble</i>
--------------	---

Description

Undoes [per_sim](#) to allow access to simulation results as a tibble, with simulations available as a list-column.

Usage

```
whole_tibble(x)
```

Arguments

x A `simpr_sims` or `simpr_spec` object.

Details

This function is the inverse of [per_sim](#). This enables tidyverse verbs to return to the default behavior of acting on the full table, as opposed to the behavior, activated by [per_sim](#), of acting elementwise on the simulation results.

Value

A tibble with the metaparameters and simulation results

Index

`add_count.simpr_sims (tidyverse_verbs)`,
14
`add_count.simpr_spec (tidyverse_verbs)`,
14
`anti_join.simpr_sims (tidyverse_verbs)`,
14
`anti_join.simpr_spec (tidyverse_verbs)`,
14
`apply_fits`, 2, 10, 37
`arrange.simpr_sims (tidyverse_verbs)`, 14
`arrange.simpr_spec (tidyverse_verbs)`, 14
`arrange_.simpr_sims (tidyverse_verbs)`,
14
`arrange_.simpr_spec (tidyverse_verbs)`,
14
`as.tbl.simpr_sims (tidyverse_verbs)`, 14
`as.tbl.simpr_spec (tidyverse_verbs)`, 14
`as_mapper`, 2, 6
`auto_copy.simpr_sims (tidyverse_verbs)`,
14
`auto_copy.simpr_spec (tidyverse_verbs)`,
14

`c`, 13
`cbind`, 13
`collect.simpr_sims (tidyverse_verbs)`, 14
`collect.simpr_spec (tidyverse_verbs)`, 14
`complete.simpr_sims (tidyverse_verbs)`,
14
`complete.simpr_spec (tidyverse_verbs)`,
14
`complete_.simpr_sims (tidyverse_verbs)`,
14
`complete_.simpr_spec (tidyverse_verbs)`,
14
`compute.simpr_sims (tidyverse_verbs)`, 14
`compute.simpr_spec (tidyverse_verbs)`, 14
`count.simpr_sims (tidyverse_verbs)`, 14
`count.simpr_spec (tidyverse_verbs)`, 14

`define`, 2, 3, 3, 7, 8, 12, 13, 36
`distinct.simpr_sims (tidyverse_verbs)`,
14
`distinct.simpr_spec (tidyverse_verbs)`,
14
`distinct_.simpr_sims (tidyverse_verbs)`,
14
`distinct_.simpr_spec (tidyverse_verbs)`,
14
`do.simpr_sims (tidyverse_verbs)`, 14
`do.simpr_spec (tidyverse_verbs)`, 14
`do_.simpr_sims (tidyverse_verbs)`, 14
`do_.simpr_spec (tidyverse_verbs)`, 14
`dplyr_col_modify.simpr_sims (tidyverse_verbs)`, 14
`dplyr_col_modify.simpr_spec (tidyverse_verbs)`, 14
`dplyr_reconstruct.simpr_sims (tidyverse_verbs)`, 14
`dplyr_reconstruct.simpr_spec (tidyverse_verbs)`, 14
`dplyr_row_slice.simpr_sims (tidyverse_verbs)`, 14
`dplyr_row_slice.simpr_spec (tidyverse_verbs)`, 14
`drop_na.simpr_sims (tidyverse_verbs)`, 14
`drop_na.simpr_spec (tidyverse_verbs)`, 14
`drop_na_.simpr_sims (tidyverse_verbs)`,
14
`drop_na_.simpr_spec (tidyverse_verbs)`,
14

`expand.simpr_sims (tidyverse_verbs)`, 14
`expand.simpr_spec (tidyverse_verbs)`, 14
`expand_.simpr_sims (tidyverse_verbs)`, 14
`expand_.simpr_spec (tidyverse_verbs)`, 14
`extract.simpr_sims (tidyverse_verbs)`, 14
`extract.simpr_spec (tidyverse_verbs)`, 14
`extract_.simpr_sims (tidyverse_verbs)`,
14

- extract_.simpr_spec (tidyverse_verbs),
14
- fill.simpr_sims (tidyverse_verbs), 14
- fill.simpr_spec (tidyverse_verbs), 14
- fill_.simpr_sims (tidyverse_verbs), 14
- fill_.simpr_spec (tidyverse_verbs), 14
- filter, 7
- filter.simpr_sims (tidyverse_verbs), 14
- filter.simpr_spec (tidyverse_verbs), 14
- filter_.simpr_sims (tidyverse_verbs), 14
- filter_.simpr_spec (tidyverse_verbs), 14
- fit, 2, 8, 9, 37
- fit.simpr_spec (fit.simpr_tibble), 5
- fit.simpr_tibble, 5
- full_join.simpr_sims (tidyverse_verbs),
14
- full_join.simpr_spec (tidyverse_verbs),
14
- furrr_options(), 2, 6, 9, 37
- gather.simpr_sims (tidyverse_verbs), 14
- gather.simpr_spec (tidyverse_verbs), 14
- gather_.simpr_sims (tidyverse_verbs), 14
- gather_.simpr_spec (tidyverse_verbs), 14
- generate, 3–6, 12, 13, 36
- generate.simpr_spec, 7
- glance, 9, 10
- glance_fits, 2, 6, 9, 37
- group_by.simpr_sims (tidyverse_verbs),
14
- group_by.simpr_spec (tidyverse_verbs),
14
- group_by_.simpr_sims (tidyverse_verbs),
14
- group_by_.simpr_spec (tidyverse_verbs),
14
- group_data.simpr_sims
(tidyverse_verbs), 14
- group_data.simpr_spec
(tidyverse_verbs), 14
- group_indices.simpr_sims
(tidyverse_verbs), 14
- group_indices.simpr_spec
(tidyverse_verbs), 14
- group_indices_.simpr_sims
(tidyverse_verbs), 14
- group_indices_.simpr_spec
(tidyverse_verbs), 14
- group_keys.simpr_sims
(tidyverse_verbs), 14
- group_keys.simpr_spec
(tidyverse_verbs), 14
- group_map.simpr_sims (tidyverse_verbs),
14
- group_map.simpr_spec (tidyverse_verbs),
14
- group_modify.simpr_sims
(tidyverse_verbs), 14
- group_modify.simpr_spec
(tidyverse_verbs), 14
- group_nest.simpr_sims
(tidyverse_verbs), 14
- group_nest.simpr_spec
(tidyverse_verbs), 14
- group_size.simpr_sims
(tidyverse_verbs), 14
- group_size.simpr_spec
(tidyverse_verbs), 14
- group_split.simpr_sims
(tidyverse_verbs), 14
- group_split.simpr_spec
(tidyverse_verbs), 14
- group_trim.simpr_sims
(tidyverse_verbs), 14
- group_trim.simpr_spec
(tidyverse_verbs), 14
- group_vars.simpr_sims
(tidyverse_verbs), 14
- group_vars.simpr_spec
(tidyverse_verbs), 14
- groups.simpr_sims (tidyverse_verbs), 14
- groups.simpr_spec (tidyverse_verbs), 14
- inner_join.simpr_sims
(tidyverse_verbs), 14
- inner_join.simpr_spec
(tidyverse_verbs), 14
- intersect.simpr_sims (tidyverse_verbs),
14
- intersect.simpr_spec (tidyverse_verbs),
14
- is.simpr_spec (print.simpr_spec), 11
- left_join.simpr_sims (tidyverse_verbs),
14
- left_join.simpr_spec (tidyverse_verbs),
14

mutate.simpr_sims (tidyverse_verbs), 14
 mutate.simpr_spec (tidyverse_verbs), 14
 mutate_.simpr_sims (tidyverse_verbs), 14
 mutate_.simpr_spec (tidyverse_verbs), 14

 n_groups.simpr_sims (tidyverse_verbs),
 14
 n_groups.simpr_spec (tidyverse_verbs),
 14
 nest.simpr_sims (tidyverse_verbs), 14
 nest.simpr_spec (tidyverse_verbs), 14
 nest_by.simpr_sims (tidyverse_verbs), 14
 nest_by.simpr_spec (tidyverse_verbs), 14
 nest_join.simpr_sims (tidyverse_verbs),
 14
 nest_join.simpr_spec (tidyverse_verbs),
 14
 nest_legacy.simpr_sims
 (tidyverse_verbs), 14
 nest_legacy.simpr_spec
 (tidyverse_verbs), 14
 new_simpr_spec (print.simpr_spec), 11

 per_sim, 6, 10, 36, 38
 pivot_longer.simpr_sims
 (tidyverse_verbs), 14
 pivot_longer.simpr_spec
 (tidyverse_verbs), 14
 pivot_wider.simpr_sims
 (tidyverse_verbs), 14
 pivot_wider.simpr_spec
 (tidyverse_verbs), 14
 print.simpr_spec, 11
 pull.simpr_sims (tidyverse_verbs), 14
 pull.simpr_spec (tidyverse_verbs), 14

 relocate.simpr_sims (tidyverse_verbs),
 14
 relocate.simpr_spec (tidyverse_verbs),
 14
 rename.simpr_sims (tidyverse_verbs), 14
 rename.simpr_spec (tidyverse_verbs), 14
 rename_.simpr_sims (tidyverse_verbs), 14
 rename_.simpr_spec (tidyverse_verbs), 14
 rename_with.simpr_sims
 (tidyverse_verbs), 14
 rename_with.simpr_spec
 (tidyverse_verbs), 14

 replace_na.simpr_sims
 (tidyverse_verbs), 14
 replace_na.simpr_spec
 (tidyverse_verbs), 14
 right_join.simpr_sims
 (tidyverse_verbs), 14
 right_join.simpr_spec
 (tidyverse_verbs), 14
 rows_delete.simpr_sims
 (tidyverse_verbs), 14
 rows_delete.simpr_spec
 (tidyverse_verbs), 14
 rows_insert.simpr_sims
 (tidyverse_verbs), 14
 rows_insert.simpr_spec
 (tidyverse_verbs), 14
 rows_patch.simpr_sims
 (tidyverse_verbs), 14
 rows_patch.simpr_spec
 (tidyverse_verbs), 14
 rows_update.simpr_sims
 (tidyverse_verbs), 14
 rows_update.simpr_spec
 (tidyverse_verbs), 14
 rows_upsert.simpr_sims
 (tidyverse_verbs), 14
 rows_upsert.simpr_spec
 (tidyverse_verbs), 14
 rowwise.simpr_sims (tidyverse_verbs), 14
 rowwise.simpr_spec (tidyverse_verbs), 14

 same_src.simpr_sims (tidyverse_verbs),
 14
 same_src.simpr_spec (tidyverse_verbs),
 14
 sample_frac.simpr_sims
 (tidyverse_verbs), 14
 sample_frac.simpr_spec
 (tidyverse_verbs), 14
 sample_n.simpr_sims (tidyverse_verbs),
 14
 sample_n.simpr_spec (tidyverse_verbs),
 14
 select.simpr_sims (tidyverse_verbs), 14
 select.simpr_spec (tidyverse_verbs), 14
 select_.simpr_sims (tidyverse_verbs), 14
 select_.simpr_spec (tidyverse_verbs), 14
 semi_join.simpr_sims (tidyverse_verbs),
 14

- semi_join.simpr_spec (tidyverse_verbs),
14
- separate.simpr_sims (tidyverse_verbs),
14
- separate.simpr_spec (tidyverse_verbs),
14
- separate_.simpr_sims (tidyverse_verbs),
14
- separate_.simpr_spec (tidyverse_verbs),
14
- separate_rows.simpr_sims
(tidyverse_verbs), 14
- separate_rows.simpr_spec
(tidyverse_verbs), 14
- separate_rows_.simpr_sims
(tidyverse_verbs), 14
- separate_rows_.simpr_spec
(tidyverse_verbs), 14
- setdiff.simpr_sims (tidyverse_verbs), 14
- setdiff.simpr_spec (tidyverse_verbs), 14
- setequal.simpr_sims (tidyverse_verbs),
14
- setequal.simpr_spec (tidyverse_verbs),
14
- simpr_sims, 8, 36
- simpr_sims (per_sim), 10
- simpr_tibble (whole_tibble), 38
- slice.simpr_sims (tidyverse_verbs), 14
- slice.simpr_spec (tidyverse_verbs), 14
- slice_.simpr_sims (tidyverse_verbs), 14
- slice_.simpr_spec (tidyverse_verbs), 14
- slice_head.simpr_sims
(tidyverse_verbs), 14
- slice_head.simpr_spec
(tidyverse_verbs), 14
- slice_max.simpr_sims (tidyverse_verbs),
14
- slice_max.simpr_spec (tidyverse_verbs),
14
- slice_min.simpr_sims (tidyverse_verbs),
14
- slice_min.simpr_spec (tidyverse_verbs),
14
- slice_sample.simpr_sims
(tidyverse_verbs), 14
- slice_sample.simpr_spec
(tidyverse_verbs), 14
- slice_tail.simpr_sims
(tidyverse_verbs), 14
- slice_tail.simpr_spec
(tidyverse_verbs), 14
- specify, 3, 4, 6–8, 12, 14, 36
- specify.formula, 12
- spread.simpr_sims (tidyverse_verbs), 14
- spread.simpr_spec (tidyverse_verbs), 14
- spread_.simpr_sims (tidyverse_verbs), 14
- spread_.simpr_spec (tidyverse_verbs), 14
- summarise.simpr_sims (tidyverse_verbs),
14
- summarise.simpr_spec (tidyverse_verbs),
14
- summarise_.simpr_sims
(tidyverse_verbs), 14
- summarise_.simpr_spec
(tidyverse_verbs), 14
- tally.simpr_sims (tidyverse_verbs), 14
- tally.simpr_spec (tidyverse_verbs), 14
- tbl_vars.simpr_sims (tidyverse_verbs),
14
- tbl_vars.simpr_spec (tidyverse_verbs),
14
- tidy, 37
- tidy_fits, 2, 6, 9, 10, 37
- tidyverse_verbs, 14
- transmute.simpr_sims (tidyverse_verbs),
14
- transmute.simpr_spec (tidyverse_verbs),
14
- transmute_.simpr_sims
(tidyverse_verbs), 14
- transmute_.simpr_spec
(tidyverse_verbs), 14
- ungroup.simpr_sims (tidyverse_verbs), 14
- ungroup.simpr_spec (tidyverse_verbs), 14
- union.simpr_sims (tidyverse_verbs), 14
- union.simpr_spec (tidyverse_verbs), 14
- union_all.simpr_sims (tidyverse_verbs),
14
- union_all.simpr_spec (tidyverse_verbs),
14
- unite.simpr_sims (tidyverse_verbs), 14
- unite.simpr_spec (tidyverse_verbs), 14
- unite_.simpr_sims (tidyverse_verbs), 14
- unite_.simpr_spec (tidyverse_verbs), 14
- unnest.simpr_sims (tidyverse_verbs), 14

`unnest.simpr_spec(tidyverse_verbs)`, [14](#)
`unnest_legacy.simpr_sims`
 (`tidyverse_verbs`), [14](#)
`unnest_legacy.simpr_spec`
 (`tidyverse_verbs`), [14](#)

`whole_tibble`, [11](#), [36](#), [38](#)