

Package: tidyselect (via r-universe)

June 10, 2024

Title Select from a Set of Strings

Version 1.2.1.9000

Description A backend for the selecting functions of the 'tidyverse'.
It makes it easy to implement select-like functions in your own packages in a way that is consistent with other 'tidyverse' interfaces for selection.

License MIT + file LICENSE

URL <https://tidyselect.r-lib.org>, <https://github.com/r-lib/tidyselect>

BugReports <https://github.com/r-lib/tidyselect/issues>

Depends R (>= 3.4)

Imports cli (>= 3.3.0), glue (>= 1.3.0), lifecycle (>= 1.0.3), rlang (>= 1.0.4), vctrs (>= 0.5.2), withr

Suggests covr, crayon, dplyr, knitr, magrittr, rmarkdown, stringr, testthat (>= 3.1.1), tibble (>= 2.1.3)

VignetteBuilder knitr

ByteCompile true

Config/testthat/edition 3

Config/Needs/website tidyverse/tidytemplate

Encoding UTF-8

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.0.9000

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

RemoteUrl <https://github.com/r-lib/tidyselect>

RemoteRef HEAD

RemoteSha fd22cc1dc08bd67fd4501bfad9de67628a35e854

Contents

all_of	2
eval_relocate	4
eval_rename	7
everything	9
faq-external-vector	11
faq-selection-context	13
language	14
peek_vars	18
starts_with	19
tidyselect_data_proxy	22
where	23
Index	26

all_of	<i>Select variables from character vectors</i>
--------	--

Description

These [selection helpers](#) select variables contained in a character vector. They are especially useful for programming with selecting functions.

- `all_of()` is for strict selection. If any of the variables in the character vector is missing, an error is thrown.
- `any_of()` doesn't check for missing variables. It is especially useful with negative selections, when you would like to make sure a variable is removed.

The order of selected columns is determined by the order in the vector.

Usage

```
all_of(x)
```

```
any_of(x, ..., vars = NULL)
```

Arguments

x	A vector of character names or numeric locations.
...	These dots are for future extensions and must be empty.
vars	A character vector of variable names. If not supplied, the variables are taken from the current selection context (as established by functions like <code>select()</code> or <code>pivot_longer()</code>).

Examples

Selection helpers can be used in functions like `dplyr::select()` or `tidyr::pivot_longer()`.
Let's first attach the tidyverse:

```
library(tidyverse)

# For better printing
iris <- as_tibble(iris)
```

It is a common to have a names of variables in a vector.

```
vars <- c("Sepal.Length", "Sepal.Width")
```

```
iris[, vars]
#> # A tibble: 150 x 2
#>   Sepal.Length Sepal.Width
#>       <dbl>       <dbl>
#> 1         5.1         3.5
#> 2         4.9         3
#> 3         4.7         3.2
#> 4         4.6         3.1
#> # i 146 more rows
```

To refer to these variables in selecting function, use `all_of()`:

```
iris %>% select(all_of(vars))
#> # A tibble: 150 x 2
#>   Sepal.Length Sepal.Width
#>       <dbl>       <dbl>
#> 1         5.1         3.5
#> 2         4.9         3
#> 3         4.7         3.2
#> 4         4.6         3.1
#> # i 146 more rows
```

```
iris %>% pivot_longer(all_of(vars))
#> # A tibble: 300 x 5
#>   Petal.Length Petal.Width Species name      value
#>       <dbl>       <dbl> <fct>  <chr>      <dbl>
#> 1         1.4         0.2 setosa Sepal.Length  5.1
#> 2         1.4         0.2 setosa Sepal.Width   3.5
#> 3         1.4         0.2 setosa Sepal.Length  4.9
#> 4         1.4         0.2 setosa Sepal.Width   3
#> # i 296 more rows
```

If any of the variable is missing from the data frame, that's an error:

```
starwars %>% select(all_of(vars))
#> Error:
#> i In argument: `all_of(vars)`.
#> Caused by error in `all_of()` at rlang/R/eval-tidy.R:121:3:
#> ! Can't subset elements that don't exist.
#> x Elements `Sepal.Length` and `Sepal.Width` don't exist.
```

Use `any_of()` to allow missing variables:

```
starwars %>% select(any_of(vars))
#> # A tibble: 87 x 0
```

`any_of()` is especially useful to remove variables from a data frame because calling it again does not cause an error:

```
iris %>% select(-any_of(vars))
#> # A tibble: 150 x 3
#>   Petal.Length Petal.Width Species
#>   <dbl>         <dbl> <fct>
#> 1           1.4           0.2 setosa
#> 2           1.4           0.2 setosa
#> 3           1.3           0.2 setosa
#> 4           1.5           0.2 setosa
#> # i 146 more rows
```

```
iris %>% select(-any_of(vars)) %>% select(-any_of(vars))
#> # A tibble: 150 x 3
#>   Petal.Length Petal.Width Species
#>   <dbl>         <dbl> <fct>
#> 1           1.4           0.2 setosa
#> 2           1.4           0.2 setosa
#> 3           1.3           0.2 setosa
#> 4           1.5           0.2 setosa
#> # i 146 more rows
```

See Also

The [selection language](#) page, which includes links to other selection helpers.

eval_relocate

Evaluate an expression to relocate variables

Description

`eval_relocate()` is a variant of `eval_select()` that moves a selection to a new location. Either before or after can be provided to specify where to move the selection to. This powers `dplyr::relocate()`.

Usage

```
eval_relocate(
  expr,
  data,
  ...,
  before = NULL,
  after = NULL,
  strict = TRUE,
  name_spec = NULL,
  allow_rename = TRUE,
  allow_empty = TRUE,
  allow_predicates = TRUE,
  before_arg = "before",
  after_arg = "after",
  env = caller_env(),
  error_call = caller_env()
)
```

Arguments

expr	Defused R code describing a selection according to the tidysselect syntax.
data	A named list, data frame, or atomic vector. Technically, data can be any vector with names() and "[[" implementations.
...	These dots are for future extensions and must be empty.
before, after	Defused R code describing a selection according to the tidysselect syntax. The selection represents the destination of the selection provided through expr. Supplying neither of these will move the selection to the left-hand side. Supplying both of these is an error.
strict	If TRUE, out-of-bounds errors are thrown if expr attempts to select or rename a variable that doesn't exist. If FALSE, failed selections or renamings are ignored.
name_spec	A name specification describing how to combine or propagate names. This is used only in case nested c() expressions like c(foo = c(bar = starts_with("foo"))). See the name_spec argument of <code>vctrs::vec_c()</code> for a description of valid name specs.
allow_rename	If TRUE (the default), the renaming syntax c(foo = bar) is allowed. If FALSE, it causes an error. This is useful to implement purely selective behaviour.
allow_empty	If TRUE (the default), it is ok for expr to result in an empty selection. If FALSE, will error if expr yields an empty selection.
allow_predicates	If TRUE (the default), it is ok for expr to use predicates (i.e. in where()). If FALSE, will error if expr uses a predicate. Will automatically be set to FALSE if data does not support predicates (as determined by <code>tidysselect_data_has_predicates()</code>).
before_arg, after_arg	Argument names for before and after. These are used in error messages.
env	The environment in which to evaluate expr. Discarded if expr is a <code>quosure</code> .

`error_call` The execution environment of a currently running function, e.g. `caller_env()`. The function will be mentioned in error messages as the source of the error. See the `call` argument of `abort()` for more information.

Value

A named vector of numeric locations with length equal to `length(data)`. Each position in `data` will be represented exactly once.

The names are normally the same as in the input data, except when the user supplied named selections with `c()`. In the latter case, the names reflect the new names chosen by the user.

Examples

```
library(rlang)

# Interpret defused code as a request to relocate
x <- expr(c(mpg, disp))
after <- expr(wt)
eval_relocate(x, mtcars, after = after)

# Supplying neither `before` nor `after` will move the selection to the
# left-hand side
eval_relocate(x, mtcars)

# Within a function, use `enquo()` to defuse a single argument.
# Note that `before` and `after` must also be defused with `enquo()`.
my_relocator <- function(x, expr, before = NULL, after = NULL) {
  eval_relocate(enquo(expr), x, before = enquo(before), after = enquo(after))
}

my_relocator(mtcars, vs, before = hp)

# Here is an example of using `eval_relocate()` to implement `relocate()`.
# Note that the dots are passed on as a defused call to `c(...)` .
relocate <- function(.x, ..., .before = NULL, .after = NULL) {
  pos <- eval_relocate(
    expr(c(...)),
    .x,
    before = enquo(.before),
    after = enquo(.after)
  )
  set_names(.x[pos], names(pos))
}

relocate(mtcars, vs, .before = hp)
relocate(mtcars, starts_with("d"), .after = last_col())
```

eval_rename	<i>Evaluate an expression with tidyselect semantics</i>
-------------	---

Description

eval_select() and eval_rename() evaluate defused R code (i.e. quoted expressions) according to the special rules of the **tidyselect syntax**. They power functions like dplyr::select(), dplyr::rename(), or tidyr::pivot_longer().

See the **Get started** vignette to learn how to use eval_select() and eval_rename() in your packages.

Usage

```
eval_rename(  
  expr,  
  data,  
  env = caller_env(),  
  ...,  
  strict = TRUE,  
  name_spec = NULL,  
  allow_predicates = TRUE,  
  error_call = caller_env()  
)
```

```
eval_select(  
  expr,  
  data,  
  env = caller_env(),  
  ...,  
  include = NULL,  
  exclude = NULL,  
  strict = TRUE,  
  name_spec = NULL,  
  allow_rename = TRUE,  
  allow_empty = TRUE,  
  allow_predicates = TRUE,  
  error_call = caller_env()  
)
```

Arguments

expr	Defused R code describing a selection according to the tidyselect syntax.
data	A named list, data frame, or atomic vector. Technically, data can be any vector with names() and "[[" implementations.
env	The environment in which to evaluate expr. Discarded if expr is a quosure .
...	These dots are for future extensions and must be empty.

<code>strict</code>	If TRUE, out-of-bounds errors are thrown if <code>expr</code> attempts to select or rename a variable that doesn't exist. If FALSE, failed selections or renamings are ignored.
<code>name_spec</code>	A name specification describing how to combine or propagate names. This is used only in case nested <code>c()</code> expressions like <code>c(foo = c(bar = starts_with("foo")))</code> . See the <code>name_spec</code> argument of <code>vec_tr::vec_c()</code> for a description of valid name specs.
<code>allow_predicates</code>	If TRUE (the default), it is ok for <code>expr</code> to use predicates (i.e. in <code>where()</code>). If FALSE, will error if <code>expr</code> uses a predicate. Will automatically be set to FALSE if data does not support predicates (as determined by <code>tidyselect_data_has_predicates()</code>).
<code>error_call</code>	The execution environment of a currently running function, e.g. <code>caller_env()</code> . The function will be mentioned in error messages as the source of the error. See the <code>call</code> argument of <code>abort()</code> for more information.
<code>include, exclude</code>	Character vector of column names to always include or exclude from the selection.
<code>allow_rename</code>	If TRUE (the default), the renaming syntax <code>c(foo = bar)</code> is allowed. If FALSE, it causes an error. This is useful to implement purely selective behaviour.
<code>allow_empty</code>	If TRUE (the default), it is ok for <code>expr</code> to result in an empty selection. If FALSE, will error if <code>expr</code> yields an empty selection.

Details

The `select` and `rename` variants take the same types of inputs and have the same type of return value. However `eval_rename()` has a few extra constraints. It requires named inputs, and will fail if a data frame column is renamed to another existing column name. See the [selecting versus renaming](#) section in the `syntax` vignette for a description of the differences.

Value

A named vector of numeric locations, one for each of the selected elements.

The names are normally the same as in the input data, except when the user supplied named selections with `c()`. In the latter case, the names reflect the new names chosen by the user.

A given element may be selected multiple times under different names, in which case the vector might contain duplicate locations.

See Also

<https://tidyselect.r-lib.org/articles/syntax.html> or `vignette("syntax", package = "tidyselect")` for a technical description of the rules of evaluation.

Examples

```
library(rlang)

# Interpret defused code as selection:
x <- expr(mpg:cyl)
```



```

eval_select(x, mtcars)

# Interpret defused code as a renaming selection. All inputs must
# be named within `c()`:
try(eval_rename(expr(mpg), mtcars))
eval_rename(expr(c(foo = mpg)), mtcars)

# Within a function, use `enquo()` to defuse one argument:
my_function <- function(x, expr) {
  eval_select(enquo(expr), x)
}

# If your function takes dots, evaluate a defused call to `c(...)`
# with `expr(c(...))`:
my_function <- function(.x, ...) {
  eval_select(expr(c(...)), .x)
}

# If your function takes dots and a named argument, use `{{ }}`
# inside the defused expression to tunnel it inside the tidyselect DSL:
my_function <- function(.x, .expr, ...) {
  eval_select(expr(c({{ .expr }}), ...), .x)
}

# Note that the trick above works because `expr({{ arg }})` is the
# same as `enquo(arg)`.

# The evaluators return a named vector of locations. Here are
# examples of using these location vectors to implement `select()`
# and `rename()`:
select <- function(.x, ...) {
  pos <- eval_select(expr(c(...)), .x)
  set_names(.x[pos], names(pos))
}
rename <- function(.x, ...) {
  pos <- eval_rename(expr(c(...)), .x)
  names(.x)[pos] <- names(pos)
  .x
}

select(mtcars, mpg:cyl)
rename(mtcars, foo = mpg)

```

everything

Select all variables or the last variable

Description

These functions are [selection helpers](#).

- `everything()` selects all variable. It is also useful in combination with other tidyselect operators.
- `last_col()` selects the last variable.

Usage

```
everything(vars = NULL)
```

```
last_col(offset = 0L, vars = NULL)
```

Arguments

`vars` A character vector of variable names. If not supplied, the variables are taken from the current selection context (as established by functions like `select()` or `pivot_longer()`).

`offset` Set it to `n` to select the `n`th var from the end.

Examples

Selection helpers can be used in functions like `dplyr::select()` or `tidyr::pivot_longer()`. Let's first attach the tidyverse:

```
library(tidyverse)

# For better printing
iris <- as_tibble(iris)
mtcars <- as_tibble(mtcars)
```

Use `everything()` to select all variables:

```
iris %>% select(everything())
#> # A tibble: 150 x 5
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
#>   <dbl>         <dbl>         <dbl>         <dbl> <fct>
#> 1         5.1         3.5           1.4         0.2 setosa
#> 2         4.9         3             1.4         0.2 setosa
#> 3         4.7         3.2           1.3         0.2 setosa
#> 4         4.6         3.1           1.5         0.2 setosa
#> # i 146 more rows
```

```
mtcars %>% pivot_longer(everything())
#> # A tibble: 352 x 2
#>   name value
#>   <chr> <dbl>
#> 1 mpg    21
#> 2 cyl     6
#> 3 disp  160
#> 4 hp    110
#> # i 348 more rows
```

Use `last_col()` to select the last variable:

```
iris %>% select(last_col())
#> # A tibble: 150 x 1
#>   Species
#>   <fct>
#> 1 setosa
#> 2 setosa
#> 3 setosa
#> 4 setosa
#> # i 146 more rows
```

```
mtcars %>% pivot_longer(last_col())
#> # A tibble: 32 x 12
#>   mpg   cyl  disp    hp  drat    wt   qsec    vs  am  gear  name  value
#>   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <chr> <dbl>
#> 1  21     6   160   110  3.9   2.62  16.5    0    1     4 carb     4
#> 2  21     6   160   110  3.9   2.88  17.0    0    1     4 carb     4
#> 3  22.8    4   108    93  3.85  2.32  18.6    1    1     4 carb     1
#> 4  21.4    6   258   110  3.08  3.22  19.4    1    0     3 carb     1
#> # i 28 more rows
```

Supply an offset `n` to select a variable located `n` positions from the end:

```
mtcars %>% select(1:last_col(5))
#> # A tibble: 32 x 6
#>   mpg   cyl  disp    hp  drat    wt
#>   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
#> 1  21     6   160   110  3.9   2.62
#> 2  21     6   160   110  3.9   2.88
#> 3  22.8    4   108    93  3.85  2.32
#> 4  21.4    6   258   110  3.08  3.22
#> # i 28 more rows
```

See Also

The [selection language](#) page, which includes links to other selection helpers.

faq-external-vector *FAQ - Note: Using an external vector in selections is ambiguous*

Description

Ambiguity between columns and external variables:

With selecting functions like `dplyr::select()` or `tidyr::pivot_longer()`, you can refer to variables by name:

```
mtcars %>% select(cyl, am, vs)
#> # A tibble: 32 x 3
#>   cyl    am  vs
#>   <dbl> <dbl> <dbl>
#> 1     6     1   0
#> 2     6     1   0
#> 3     4     1   1
#> 4     6     0   1
#> # i 28 more rows
```

```
mtcars %>% select(mpg:disp)
#> # A tibble: 32 x 3
#>   mpg    cyl  disp
#>   <dbl> <dbl> <dbl>
#> 1  21     6  160
#> 2  21     6  160
#> 3 22.8     4  108
#> 4 21.4     6  258
#> # i 28 more rows
```

For historical reasons, it is also possible to refer an external vector of variable names. You get the correct result, but with a warning informing you that selecting with an external variable is ambiguous because it is not clear whether you want a data frame column or an external object.

```
vars <- c("cyl", "am", "vs")
result <- mtcars %>% select(vars)
#> Warning: Using an external vector in selections was deprecated in tidyselct
#> 1.1.0.
#> i Please use `all_of()` or `any_of()` instead.
#> # Was:
#> data %>% select(vars)
#>
#> # Now:
#> data %>% select(all_of(vars))
#>
#> See
#> <https://tidyselct.r-lib.org/reference/faq-external-vector.html>.
#> This warning is displayed once every 8 hours.
#> Call `lifecycle::last_lifecycle_warnings()` to see where this
#> warning was generated.
```

We have decided to deprecate this particular approach to using external vectors because they introduce ambiguity. Imagine that the data frame contains a column with the same name as your external variable.

```
some_df <- mtcars[1:4, ]
some_df$vars <- 1:nrow(some_df)
```

These are very different objects but it isn't a problem if the context forces you to be specific about where to find vars:

```
vars
#> [1] "cyl" "am" "vs"
```

```
some_df$vars
#> [1] 1 2 3 4
```

In a selection context however, the column wins:

```
some_df %>% select(vars)
#> # A tibble: 4 x 1
#>   vars
#>   <int>
#> 1     1
#> 2     2
#> 3     3
#> 4     4
```

Fixing the ambiguity:

To make your selection code more robust and silence the message, use `all_of()` to force the external vector:

```
some_df %>% select(all_of(vars))
#> # A tibble: 4 x 3
#>   cyl   am   vs
#>   <dbl> <dbl> <dbl>
#> 1     6     1     0
#> 2     6     1     0
#> 3     4     1     1
#> 4     6     0     1
```

For more information or if you have comments about this, please see the [Github issue](#) tracking the deprecation process.

faq-selection-context *FAQ - Error: Must be used within a selecting function*

Description

Functions like `starts_with()`, `contains()` or `matches()` are **selection helpers** that only work in a selection context, e.g. `dplyr::select()` or the `cols` argument of `tidyr::pivot_longer()`.

Using a selection helper anywhere else results in an error:

```
starts_with("foo")
#> Error:
#> ! `starts_with()` must be used within a *selecting* function.
#> i See
#>   <https://tidyselect.r-lib.org/reference/faq-selection-context.html>
#>   for details.
```

```
mtcars[contains("foo")]
#> Error:
#> ! `contains()` must be used within a *selecting* function.
#> i See
#> <https://tidyselect.r-lib.org/reference/faq-selection-context.html>
#> for details.

subset(mtcars, select = matches("foo"))
#> Error:
#> ! `matches()` must be used within a *selecting* function.
#> i See
#> <https://tidyselect.r-lib.org/reference/faq-selection-context.html>
#> for details.
```

If you see this error, you may have used a selection helper in the wrong place, possibly as the result of a typo (e.g. misplaced comma or wrong argument name). Alternatively, you may be deliberately trying to reduce duplication in your code by extracting out a selection into a variable:

```
my_vars <- c(name, species, ends_with("color"))
#> Error in eval(expr, envir, enclos): object 'name' not found
```

To make this work you'll need to do two things:

- Wrap the whole thing in a function
- Use `any_of()` or `all_of()` instead of bare variable names

```
my_vars <- function() {
  c(any_of(c("name", "species")), ends_with("color"))
}
dplyr::select(starwars, my_vars())
#> # A tibble: 87 x 5
#>   name          species hair_color skin_color eye_color
#>   <chr>         <chr>   <chr>    <chr>    <chr>
#> 1 Luke Skywalker Human    blond    fair     blue
#> 2 C-3PO         Droid   <NA>     gold     yellow
#> 3 R2-D2         Droid   <NA>     white, blue red
#> 4 Darth Vader   Human   none     white    yellow
#> # i 83 more rows
```

Description

Overview of selection features::

tidyselect implements a DSL for selecting variables. It provides helpers for selecting variables:

- `var1:var10`: variables lying between `var1` on the left and `var10` on the right.
- `starts_with("a")`: names that start with "a".
- `ends_with("z")`: names that end with "z".
- `contains("b")`: names that contain "b".
- `matches("x.y")`: names that match regular expression `x.y`.
- `num_range(x, 1:4)`: names following the pattern, `x1`, `x2`, ..., `x4`.
- `all_of(vars)/any_of(vars)`: matches names stored in the character vector `vars`. `all_of(vars)` will error if the variables aren't present; `any_of(var)` will match just the variables that exist.
- `everything()`: all variables.
- `last_col()`: furthest column on the right.
- `where(is.numeric)`: all variables where `is.numeric()` returns TRUE.

As well as operators for combining those selections:

- `!selection`: only variables that don't match `selection`.
- `selection1 & selection2`: only variables included in both `selection1` and `selection2`.
- `selection1 | selection2`: all variables that match either `selection1` or `selection2`.

When writing code inside packages you can substitute "var" for `var` to avoid R CMD check notes.

Simple examples

Here we show the usage for the basic selection operators. See the specific help pages to learn about helpers like `starts_with()`.

The selection language can be used in functions like `dplyr::select()` or `tidyr::pivot_longer()`. Let's first attach the tidyverse:

```
library(tidyverse)

# For better printing
iris <- as_tibble(iris)
```

Select variables by name:

```
starwars %>% select(height)
#> # A tibble: 87 x 1
#>   height
#>   <int>
#> 1    172
#> 2    167
#> 3     96
#> 4    202
#> # i 83 more rows
```

```
iris %>% pivot_longer(Sepal.Length)
#> # A tibble: 150 x 6
#>   Sepal.Width Petal.Length Petal.Width Species name      value
#>   <dbl>         <dbl>         <dbl> <fct>   <chr>         <dbl>
#> 1     3.5         1.4           0.2 setosa Sepal.Length  5.1
#> 2     3         1.4           0.2 setosa Sepal.Length  4.9
#> 3     3.2         1.3           0.2 setosa Sepal.Length  4.7
#> 4     3.1         1.5           0.2 setosa Sepal.Length  4.6
#> # i 146 more rows
```

Select multiple variables by separating them with commas. Note how the order of columns is determined by the order of inputs:

```
starwars %>% select(homeworld, height, mass)
#> # A tibble: 87 x 3
#>   homeworld height  mass
#>   <chr>      <int> <dbl>
#> 1 Tatooine    172    77
#> 2 Tatooine    167    75
#> 3 Naboo       96     32
#> 4 Tatooine    202   136
#> # i 83 more rows
```

Functions like `tidyr::pivot_longer()` don't take variables with dots. In this case use `c()` to select multiple variables:

```
iris %>% pivot_longer(c(Sepal.Length, Petal.Length))
#> # A tibble: 300 x 5
#>   Sepal.Width Petal.Width Species name      value
#>   <dbl>         <dbl> <fct>   <chr>         <dbl>
#> 1     3.5         0.2 setosa Sepal.Length  5.1
#> 2     3.5         0.2 setosa Petal.Length  1.4
#> 3     3           0.2 setosa Sepal.Length  4.9
#> 4     3           0.2 setosa Petal.Length  1.4
#> # i 296 more rows
```

Operators::

The `:` operator selects a range of consecutive variables:

```
starwars %>% select(name:mass)
#> # A tibble: 87 x 3
#>   name          height  mass
#>   <chr>          <int> <dbl>
#> 1 Luke Skywalker    172    77
#> 2 C-3PO             167    75
#> 3 R2-D2             96     32
#> 4 Darth Vader      202   136
#> # i 83 more rows
```


The ! operator negates a selection:

```
starwars %>% select(!(name:mass))
#> # A tibble: 87 x 11
#>   hair_color skin_color eye_color birth_year sex gender homeworld species
#>   <chr>      <chr>      <chr>      <dbl> <chr> <chr>   <chr>   <chr>
#> 1 blond     fair         blue         19  male  masculine Tatooine Human
#> 2 <NA>      gold         yellow        112 none  masculine Tatooine Droid
#> 3 <NA>      white, blue red         33  none  masculine Naboo   Droid
#> 4 none      white        yellow        41.9 male  masculine Tatooine Human
#> # i 83 more rows
#> # i 3 more variables: films <list>, vehicles <list>, starships <list>
```

```
iris %>% select(!c(Sepal.Length, Petal.Length))
#> # A tibble: 150 x 3
#>   Sepal.Width Petal.Width Species
#>   <dbl>      <dbl> <fct>
#> 1         3.5         0.2 setosa
#> 2          3         0.2 setosa
#> 3         3.2         0.2 setosa
#> 4         3.1         0.2 setosa
#> # i 146 more rows
```

```
iris %>% select(!ends_with("Width"))
#> # A tibble: 150 x 3
#>   Sepal.Length Petal.Length Species
#>   <dbl>      <dbl> <fct>
#> 1          5.1         1.4 setosa
#> 2          4.9         1.4 setosa
#> 3          4.7         1.3 setosa
#> 4          4.6         1.5 setosa
#> # i 146 more rows
```

& and | take the intersection or the union of two selections:

```
iris %>% select(starts_with("Petal") & ends_with("Width"))
#> # A tibble: 150 x 1
#>   Petal.Width
#>   <dbl>
#> 1         0.2
#> 2         0.2
#> 3         0.2
#> 4         0.2
#> # i 146 more rows
```

```
iris %>% select(starts_with("Petal") | ends_with("Width"))
#> # A tibble: 150 x 3
#>   Petal.Length Petal.Width Sepal.Width
#>   <dbl>      <dbl>      <dbl>
#> 1          1.4         0.2         3.5
```

```
#> 2          1.4          0.2          3
#> 3          1.3          0.2          3.2
#> 4          1.5          0.2          3.1
#> # i 146 more rows
```

To take the difference between two selections, combine the & and ! operators:

```
iris %>% select(starts_with("Petal") & !ends_with("Width"))
#> # A tibble: 150 x 1
#>   Petal.Length
#>   <dbl>
#> 1         1.4
#> 2         1.4
#> 3         1.3
#> 4         1.5
#> # i 146 more rows
```

Details

The order of selected columns is determined by the inputs.

- `all_of(c("foo", "bar"))` selects "foo" first.
- `c(starts_with("c"), starts_with("d"))` selects all columns starting with "c" first, then all columns starting with "d".

peek_vars

Peek at variables in the selection context

Description

- `peek_vars()` returns the vector of names of the variables currently available for selection.
- `peek_data()` returns the whole input vector (only available with `eval_select()`).

Read the [Get started](#) for examples of how to create selection helpers with `peek_vars()`.

The variable names in a selection context are registered automatically by `eval_select()` and `eval_rename()` for the duration of the evaluation. `peek_vars()` is the glue that connects [selection helpers](#) to the current selection context.

Usage

```
peek_vars(..., fn = NULL)
```

```
peek_data(..., fn = NULL)
```

Arguments

... These dots are for future extensions and must be empty.

fn The name of the function to use in error messages when the helper is used in the wrong context. If not supplied, a generic error message is used instead.

starts_with *Select variables that match a pattern*

Description

These [selection helpers](#) match variables according to a given pattern.

- `starts_with()`: Starts with an exact prefix.
- `ends_with()`: Ends with an exact suffix.
- `contains()`: Contains a literal string.
- `matches()`: Matches a regular expression.
- `num_range()`: Matches a numerical range like x01, x02, x03.

Usage

```
starts_with(match, ignore.case = TRUE, vars = NULL)
```

```
ends_with(match, ignore.case = TRUE, vars = NULL)
```

```
contains(match, ignore.case = TRUE, vars = NULL)
```

```
matches(match, ignore.case = TRUE, perl = FALSE, vars = NULL)
```

```
num_range(prefix, range, suffix = "", width = NULL, vars = NULL)
```

Arguments

match	A character vector. If length > 1, the union of the matches is taken. For <code>starts_with()</code> , <code>ends_with()</code> , and <code>contains()</code> this is an exact match. For <code>matches()</code> this is a regular expression, and can be a stringr pattern.
ignore.case	If TRUE, the default, ignores case when matching names.
vars	A character vector of variable names. If not supplied, the variables are taken from the current selection context (as established by functions like <code>select()</code> or <code>pivot_longer()</code>).
perl	Should Perl-compatible regexps be used?
prefix, suffix	A prefix/suffix added before/after the numeric range.
range	A sequence of integers, like 1:5.
width	Optionally, the "width" of the numeric range. For example, a range of 2 gives "01", a range of three "001", etc.

Examples

Selection helpers can be used in functions like `dplyr::select()` or `tidyr::pivot_longer()`. Let's first attach the tidyverse:

```
library(tidyverse)
```

```
# For better printing
iris <- as_tibble(iris)
```

`starts_with()` selects all variables matching a prefix and `ends_with()` matches a suffix:

```
iris %>% select(starts_with("Sepal"))
#> # A tibble: 150 x 2
#>   Sepal.Length Sepal.Width
#>   <dbl>         <dbl>
#> 1         5.1         3.5
#> 2         4.9         3
#> 3         4.7         3.2
#> 4         4.6         3.1
#> # i 146 more rows
```

```
iris %>% select(ends_with("Width"))
#> # A tibble: 150 x 2
#>   Sepal.Width Petal.Width
#>   <dbl>         <dbl>
#> 1         3.5         0.2
#> 2         3         0.2
#> 3         3.2         0.2
#> 4         3.1         0.2
#> # i 146 more rows
```

You can supply multiple prefixes or suffixes. Note how the order of variables depends on the order of the suffixes and prefixes:

```
iris %>% select(starts_with(c("Petal", "Sepal")))
#> # A tibble: 150 x 4
#>   Petal.Length Petal.Width Sepal.Length Sepal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1         1.4         0.2         5.1         3.5
#> 2         1.4         0.2         4.9         3
#> 3         1.3         0.2         4.7         3.2
#> 4         1.5         0.2         4.6         3.1
#> # i 146 more rows
```

```
iris %>% select(ends_with(c("Width", "Length")))
#> # A tibble: 150 x 4
#>   Sepal.Width Petal.Width Sepal.Length Petal.Length
#>   <dbl>         <dbl>         <dbl>         <dbl>
```

```
#> 1      3.5      0.2      5.1      1.4
#> 2      3      0.2      4.9      1.4
#> 3      3.2      0.2      4.7      1.3
#> 4      3.1      0.2      4.6      1.5
#> # i 146 more rows
```

contains() selects columns whose names contain a word:

```
iris %>% select(contains("al"))
#> # A tibble: 150 x 4
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1           5.1           3.5           1.4           0.2
#> 2           4.9           3             1.4           0.2
#> 3           4.7           3.2           1.3           0.2
#> 4           4.6           3.1           1.5           0.2
#> # i 146 more rows
```

starts_with(), ends_with(), and contains() do not use regular expressions. To select with a regexp use matches():

```
# [pt] is matched literally:
iris %>% select(contains("[pt]al"))
#> # A tibble: 150 x 0
```

```
# [pt] is interpreted as a regular expression
iris %>% select(matches("[pt]al"))
#> # A tibble: 150 x 4
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1           5.1           3.5           1.4           0.2
#> 2           4.9           3             1.4           0.2
#> 3           4.7           3.2           1.3           0.2
#> 4           4.6           3.1           1.5           0.2
#> # i 146 more rows
```

starts_with() selects all variables starting with a prefix. To select a range, use num_range(). Compare:

```
billboard %>% select(starts_with("wk"))
#> # A tibble: 317 x 76
#>   wk1  wk2  wk3  wk4  wk5  wk6  wk7  wk8  wk9  wk10  wk11  wk12  wk13
#>   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
#> 1    87   82   72   77   87   94   99   NA   NA   NA   NA   NA   NA
#> 2    91   87   92   NA   NA   NA   NA   NA   NA   NA   NA   NA   NA
#> 3    81   70   68   67   66   57   54   53   51   51   51   51   47
#> 4    76   76   72   69   67   65   55   59   62   61   61   59   61
#> # i 313 more rows
```

```
#> # i 63 more variables: wk14 <dbl>, wk15 <dbl>, wk16 <dbl>, wk17 <dbl>,  
#> #   wk18 <dbl>, wk19 <dbl>, wk20 <dbl>, wk21 <dbl>, ...  
  
billboard %>% select(num_range("wk", 10:15))  
#> # A tibble: 317 x 6  
#>   wk10  wk11  wk12  wk13  wk14  wk15  
#>   <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
#> 1     NA     NA     NA     NA     NA     NA  
#> 2     NA     NA     NA     NA     NA     NA  
#> 3     51     51     51     47     44     38  
#> 4     61     61     59     61     66     72  
#> # i 313 more rows
```

See Also

The [selection language](#) page, which includes links to other selection helpers.

tidyselect_data_proxy *tidyselect methods for custom types*

Description

- `tidyselect_data_proxy()` returns a data frame.
- `tidyselect_data_has_predicates()` returns TRUE or FALSE

If your doesn't support predicate functions, return a 0-row data frame from `tidyselect_data_proxy()` and FALSE from `tidyselect_data_has_predicates()`.

Usage

```
tidyselect_data_proxy(x)
```

```
tidyselect_data_has_predicates(x)
```

Arguments

`x` A data-frame like object passed to `eval_select()`, `eval_rename()`, and friends.

where	<i>Select variables with a function</i>
-------	---

Description

This [selection helper](#) selects the variables for which a function returns TRUE.

Usage

```
where(fn)
```

Arguments

`fn` A function that returns TRUE or FALSE (technically, a *predicate* function). Can also be a purrr-like formula.

Examples

Selection helpers can be used in functions like `dplyr::select()` or `tidyr::pivot_longer()`. Let's first attach the tidyverse:

```
library(tidyverse)
```

```
# For better printing
iris <- as_tibble(iris)
```

`where()` takes a function and returns all variables for which the function returns TRUE:

```
is.factor(iris[[4]])
#> [1] FALSE
```

```
is.factor(iris[[5]])
#> [1] TRUE
```

```
iris %>% select(where(is.factor))
#> # A tibble: 150 x 1
#>   Species
#>   <fct>
#> 1 setosa
#> 2 setosa
#> 3 setosa
#> 4 setosa
#> # i 146 more rows
```

```
is.numeric(iris[[4]])
#> [1] TRUE
```

```

is.numeric(iris[[5]])
#> [1] FALSE

iris %>% select(where(is.numeric))
#> # A tibble: 150 x 4
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1         5.1         3.5           1.4           0.2
#> 2         4.9         3             1.4           0.2
#> 3         4.7         3.2           1.3           0.2
#> 4         4.6         3.1           1.5           0.2
#> # i 146 more rows

```

The formula shorthand:

You can use purrr-like formulas as a shortcut for creating a function on the spot. These expressions are equivalent:

```

iris %>% select(where(is.numeric))
#> # A tibble: 150 x 4
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1         5.1         3.5           1.4           0.2
#> 2         4.9         3             1.4           0.2
#> 3         4.7         3.2           1.3           0.2
#> 4         4.6         3.1           1.5           0.2
#> # i 146 more rows

```

```

iris %>% select(where(function(x) is.numeric(x)))
#> # A tibble: 150 x 4
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1         5.1         3.5           1.4           0.2
#> 2         4.9         3             1.4           0.2
#> 3         4.7         3.2           1.3           0.2
#> 4         4.6         3.1           1.5           0.2
#> # i 146 more rows

```

```

iris %>% select(where(~ is.numeric(.x)))
#> # A tibble: 150 x 4
#>   Sepal.Length Sepal.Width Petal.Length Petal.Width
#>   <dbl>         <dbl>         <dbl>         <dbl>
#> 1         5.1         3.5           1.4           0.2
#> 2         4.9         3             1.4           0.2
#> 3         4.7         3.2           1.3           0.2
#> 4         4.6         3.1           1.5           0.2
#> # i 146 more rows

```

The shorthand is useful for adding logic inline. Here we select all numeric variables whose mean is greater than 3.5:


```
iris %>% select(where(~ is.numeric(.x) && mean(.x) > 3.5))
#> # A tibble: 150 x 2
#>   Sepal.Length Petal.Length
#>   <dbl>         <dbl>
#> 1         5.1         1.4
#> 2         4.9         1.4
#> 3         4.7         1.3
#> 4         4.6         1.5
#> # i 146 more rows
```

Index

`abort()`, 6, 8
`all_of`, 2
`all_of()`, 2
`all_of(vars)`, 15
`any_of(all_of)`, 2
`any_of()`, 2
`any_of(vars)`, 15

`contains(starts_with)`, 19
`contains()`, 19
`contains(b)`, 15

`ends_with(starts_with)`, 19
`ends_with()`, 19
`ends_with(z)`, 15
`eval_relocate`, 4
`eval_rename`, 7
`eval_rename()`, 18, 22
`eval_select(eval_rename)`, 7
`eval_select()`, 4, 18, 22
`everything`, 9
`everything()`, 10, 15

`faq-external-vector`, 11
`faq-selection-context`, 13

`language`, 14
`last_col(everything)`, 9
`last_col()`, 10, 15

`matches(starts_with)`, 19
`matches()`, 19
`matches(x.y)`, 15

`num_range(starts_with)`, 19
`num_range()`, 19

`peek_data(peek_vars)`, 18
`peek_vars`, 18

`quosure`, 5, 7

`select_helpers(language)`, 14
`selection helper`, 23
`selection helpers`, 2, 9, 18, 19
`selection language`, 4, 11, 22
`starts_with`, 19
`starts_with()`, 15, 19
`starts_with(a)`, 15

`tidyselect_data_has_predicates`
 (`tidyselect_data_proxy`), 22
`tidyselect_data_has_predicates()`, 5, 8
`tidyselect_data_proxy`, 22

`vctrs::vec_c()`, 5, 8

`where`, 23
`where(is.numeric)`, 15