Gov 50: 4. Data Wrangling

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Roadmap

1. Data Wrangling
2. Operating on rows
3. Operating on columns
4. Operating on groups

1/ Data Wrangling

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    - You need to rename the variables.
    - You need to reorder the rows of the data.
- Today we'll talk about tools to do these tasks

data.frames vs tibbles

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```r
mtcars$mpg
```

```
##  [1] 21.0 21.0 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 17.8
## [12] 16.4 17.3 15.2 10.4 10.4 14.7 32.4 30.4 33.9 21.5 15.5
## [23] 15.2 13.3 19.2 27.3 26.0 30.4 15.8 19.7 15.0 21.4
```

Problems with data frames

```
mtcars
```

```
##                       mpg cyl  disp  hp drat   wt qsec vs am
## Mazda RX4            21.0   6 160.0 110 3.90 2.62 16.5  0  1
## Mazda RX4 Wag        21.0   6 160.0 110 3.90 2.88 17.0  0  1
## Datsun 710           22.8   4 108.0  93 3.85 2.32 18.6  1  1
## Hornet 4 Drive       21.4   6 258.0 110 3.08 3.21 19.4  1  0
## Hornet Sportabout    18.7   8 360.0 175 3.15 3.44 17.0  0  0
## Valiant              18.1   6 225.0 105 2.76 3.46 20.2  1  0
## Duster 360           14.3   8 360.0 245 3.21 3.57 15.8  0  0
## Merc 240D            24.4   4 146.7  62 3.69 3.19 20.0  1  0
## Merc 230             22.8   4 140.8  95 3.92 3.15 22.9  1  0
## Merc 280             19.2   6 167.6 123 3.92 3.44 18.3  1  0
## Merc 280C            17.8   6 167.6 123 3.92 3.44 18.9  1  0
## Merc 450SE           16.4   8 275.8 180 3.07 4.07 17.4  0  0
## Merc 450SL           17.3   8 275.8 180 3.07 3.73 17.6  0  0
## Merc 450SLC          15.2   8 275.8 180 3.07 3.78 18.0  0  0
## Cadillac Fleetwood   10.4   8 472.0 205 2.93 5.25 18.0  0  0
## Lincoln Continental  10.4   8 460.0 215 3.00 5.42 17.8  0  0
## Chrysler Imperial    14.7   8 440.0 230 3.23 5.34 17.4  0  0
## Fiat 128             32.4   4  78.7  66 4.08 2.20 19.5  1  1
## Honda Civic          30.4   4  75.7  52 4.93 1.61 18.5  1  1
## Toyota Corolla       33.9   4  71.1  65 4.22 1.83 19.9  1  1
```

tibbles: a tidyverse alternative

```
midwest
```

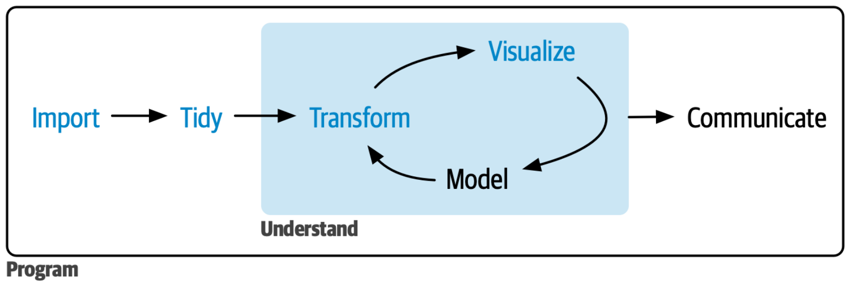
```
## # A tibble: 437 x 28
##       PID county    state  area poptotal popdensity
##     <int> <chr>     <chr> <dbl>    <int>      <dbl>
##  1    561 ADAMS     IL    0.052    66090      1271.
##  2    562 ALEXANDER IL    0.014    10626       759
##  3    563 BOND      IL    0.022    14991       681.
##  4    564 BOONE     IL    0.017    30806      1812.
##  5    565 BROWN     IL    0.018     5836       324.
##  6    566 BUREAU    IL    0.05     35688       714.
##  7    567 CALHOUN   IL    0.017     5322       313.
##  8    568 CARROLL   IL    0.027    16805       622.
##  9    569 CASS      IL    0.024    13437       560.
## 10    570 CHAMPAIGN IL    0.058   173025      2983.
## # ... with 427 more rows, and 22 more variables:
## #   popwhite <int>, popblack <int>,
## #   popamerindian <int>, popasian <int>,
## #   popother <int>, percwhite <dbl>, percblack <dbl>,
## #   percamerindan <dbl>, percasian <dbl>,
```

rows x columns

column types

abridged output

Transform-Visualize-Model cycle



Credit: Hadley Wickham

dplyr: a package for data transformation

- All `dplyr` functions:

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- All `dplyr` functions:
    - Take a dataset as their first argument

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- All `dplyr` functions:
  - Take a dataset as their first argument
  - Manipulate the dataset in some way

dplyr: a package for data transformation

- All `dplyr` functions:
  - Take a dataset as their first argument
  - Manipulate the dataset in some way
  - Returns the manipulated dataset

pipe

Nested calls can be hard to read (have to read inside out):

```
f(g(h(r(x))))
```

pipe

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```
f(g(h(r(x))))
```

The pipe |> allows us to move output between functions (|> = “and then”):

```
x |>
  r() |>
  h() |>
  g() |>
  h()
```

The piped output goes to the first argument by default.

Local news data

- How does station ownership affect local news coverage?

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Variable	Description
`callsign`	Callsign of the station
`affiliation`	Network affiliation of the station
`date`	Airdate of news
`weekday`	Day of the week of airdate
`ideology`	Measure of news slant (bigger is more conservative)
`national_politics`	Avg proportion of segments on national politics
`local_politics`	Avg proportion of segments on national politics
`sinclair2017`	Station acquired by Sinclair group in Sept 2017
`post`	Date is before/after acquisition (0/1)

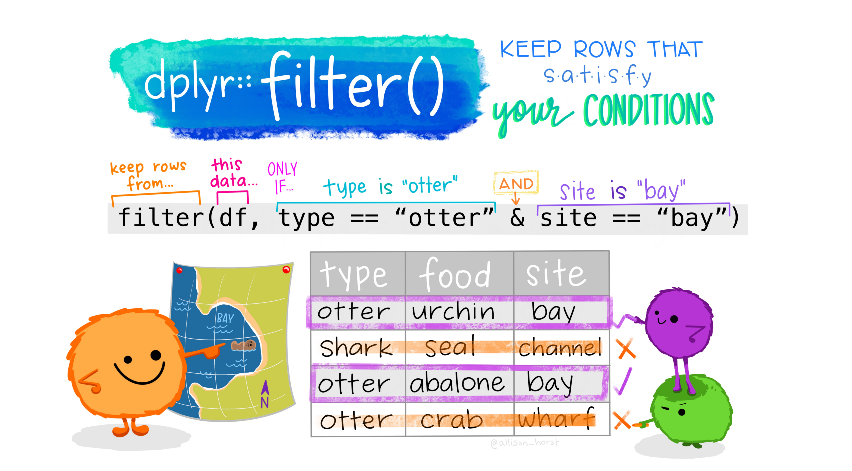
```r
library(gov50data)
news
```

```
## # A tibble: 3,137 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KRBC     NBC         2017-06-05 Mon      NA     
##  2 KTAB     CBS         2017-06-05 Mon      NA     
##  3 KXVA     FOX         2017-06-05 Mon      NA     
##  4 KPAX     CBS         2017-06-06 Tue      NA     
##  5 KTAB     CBS         2017-06-06 Tue      NA     
##  6 KECI     NBC         2017-06-07 Wed       0.0655
##  7 KPAX     CBS         2017-06-07 Wed       0.0853
##  8 KRBC     NBC         2017-06-07 Wed       0.0183
##  9 KTAB     CBS         2017-06-07 Wed       0.0850
## 10 KTMF     ABC         2017-06-07 Wed       0.0842
## # i 3,127 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

2/ Operating on rows

filter()

`filter()` selects rows that satisfy the argument you pass it:



```
filter(df, type == “otter” & site == “bay”)
```

type	food	site
otter	urchin	bay
shark	seal	channel
otter	abalone	bay
otter	crab	wharf

Credit: Allison Horst

```r
news |>
  filter(weekday == "Tue")
```

```
## # A tibble: 626 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KPAX     CBS         2017-06-06 Tue     NA
##  2 KTAB     CBS         2017-06-06 Tue     NA
##  3 KAEF     ABC         2017-06-13 Tue      0.0242
##  4 KBVU     FOX         2017-06-13 Tue      0.00894
##  5 KBZK     CBS         2017-06-13 Tue      0.129
##  6 KCVU     FOX         2017-06-13 Tue      0.114
##  7 KECI     NBC         2017-06-13 Tue      0.115
##  8 KHSL     CBS         2017-06-13 Tue      0.0821
##  9 KNVN     NBC         2017-06-13 Tue      0.120
## 10 KPAX     CBS         2017-06-13 Tue      0.0984
## # i 616 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

Multiple conditions means “and”

```r
news |>
  filter(weekday == "Tue",
         affiliation == "FOX")
```

```
## # A tibble: 130 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KBVU     FOX         2017-06-13 Tue      0.00894
##  2 KCVU     FOX         2017-06-13 Tue      0.114
##  3 WEMT     FOX         2017-06-13 Tue      0.235
##  4 WYDO     FOX         2017-06-13 Tue      0.0949
##  5 KBVU     FOX         2017-06-20 Tue     NA
##  6 KCVU     FOX         2017-06-20 Tue     NA
##  7 KXVA     FOX         2017-06-20 Tue     NA
##  8 WEMT     FOX         2017-06-20 Tue      0.268
##  9 WYDO     FOX         2017-06-20 Tue      0.0590
## 10 KBVU     FOX         2017-06-27 Tue     NA
## # i 120 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

logicals

- Comparing two values/vectors:

logicals

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    - `>`/`>=`: greater than/greater than or equal to

logicals

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  - >/>=: greater than/greater than or equal to
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logicals

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logicals

- Comparing two values/vectors:
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- Combining multiple logical statements:

logicals

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  - &: and

logicals

- Comparing two values/vectors:
  - >/>=: greater than/greater than or equal to
  - </<=: less than/less than or equal to
  - ==/!=: equal to/not equal to
- Combining multiple logical statements:
  - &: and
  - |: or

Common gotcha!

```r
news |>
  filter(weekday = "Tue")
```

```
## Error in `filter()`:
## ! We detected a named input.
## i This usually means that you've used `=` instead of `==`.
## i Did you mean `weekday == "Tue"`?
```

```r
news |>
  filter(affiliation == "FOX" | affiliation == "ABC")
```

```
## # A tibble: 1,525 x 10
##    callsign affiliation date       weekday  ideology
##    <chr>    <chr>       <date>     <ord>       <dbl>
##  1 KXVA     FOX         2017-06-05 Mon     NA
##  2 KTMF     ABC         2017-06-07 Wed      0.0842
##  3 KTXS     ABC         2017-06-07 Wed     -0.000488
##  4 KXVA     FOX         2017-06-07 Wed     NA
##  5 KAEF     ABC         2017-06-08 Thu      0.0426
##  6 KBVU     FOX         2017-06-08 Thu     -0.0860
##  7 KTMF     ABC         2017-06-08 Thu      0.0433
##  8 KTXS     ABC         2017-06-08 Thu      0.0627
##  9 KXVA     FOX         2017-06-08 Thu     NA
## 10 WCTI     ABC         2017-06-08 Thu      0.139
## # i 1,515 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

```r
news |>
  filter(ideology < 0 & weekday == "Tue")
```

```
## # A tibble: 66 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KAEF     ABC         2017-06-27 Tue     -0.0117
##  2 KECI     NBC         2017-06-27 Tue     -0.00362
##  3 KHSL     CBS         2017-06-27 Tue     -0.0735
##  4 KNVN     NBC         2017-06-27 Tue     -0.0175
##  5 KPAX     CBS         2017-06-27 Tue     -0.134
##  6 KTXS     ABC         2017-06-27 Tue     -0.0307
##  7 WCTI     ABC         2017-06-27 Tue     -0.0308
##  8 WITN     NBC         2017-06-27 Tue     -0.0233
##  9 WJHL     CBS         2017-06-27 Tue     -0.00388
## 10 WNCT     CBS         2017-06-27 Tue     -0.130
## # i 56 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

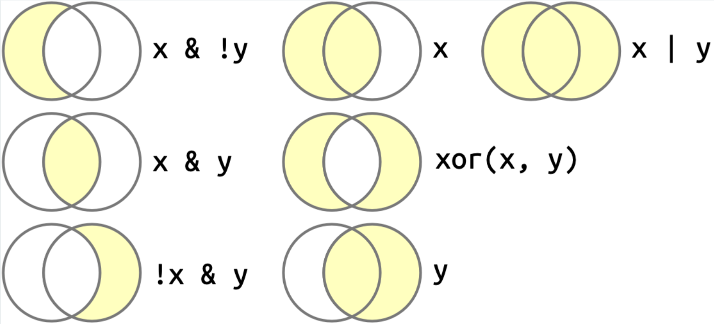
Combining %in%

When combining | and ==, useful to use %in%:

```
news |>
  filter(weekday %in% c("Mon", "Fri"))
```

```
## # A tibble: 1,253 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KRBC     NBC         2017-06-05 Mon       NA
##  2 KTAB     CBS         2017-06-05 Mon       NA
##  3 KXVA     FOX         2017-06-05 Mon       NA
##  4 KAEF     ABC         2017-06-09 Fri        0.0870
##  5 KBVU     FOX         2017-06-09 Fri       NA
##  6 KECI     NBC         2017-06-09 Fri        0.115
##  7 KPAX     CBS         2017-06-09 Fri        0.0882
##  8 KRBC     NBC         2017-06-09 Fri        0.0929
##  9 KTAB     CBS         2017-06-09 Fri        0.0588
## 10 KTMF     ABC         2017-06-09 Fri       NA
## # i 1,243 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

Complicated logicals



`arrange()`

`arrange()` will reorder the rows based on the values of the columns.

arrange()

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With multiple arguments, sort by first argument, then second, then third...

Arrange by callsign then date

```r
news |>
  arrange(callsign, date)
```

```
## # A tibble: 3,137 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##   1 KAEF     ABC         2017-06-08 Thu         0.0426
##   2 KAEF     ABC         2017-06-09 Fri         0.0870
##   3 KAEF     ABC         2017-06-12 Mon         0.0135
##   4 KAEF     ABC         2017-06-13 Tue         0.0242
##   5 KAEF     ABC         2017-06-14 Wed         0.123
##   6 KAEF     ABC         2017-06-15 Thu         0.0778
##   7 KAEF     ABC         2017-06-16 Fri        NA
##   8 KAEF     ABC         2017-06-19 Mon         0.778
##   9 KAEF     ABC         2017-06-20 Tue         0.115
## 10 KAEF     ABC         2017-06-21 Wed        -0.315
## # i 3,127 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

Which station-dates were the most liberal?

```r
news |>
  arrange(ideology)
```

```
## # A tibble: 3,137 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KRBC     NBC         2017-10-19 Thu       -0.674
##  2 WJHL     CBS         2017-12-08 Fri       -0.673
##  3 KRBC     NBC         2017-10-18 Wed       -0.586
##  4 KCVU     FOX         2017-06-22 Thu       -0.414
##  5 KRBC     NBC         2017-12-11 Mon       -0.365
##  6 KAEF     ABC         2017-06-21 Wed       -0.315
##  7 KTMF     ABC         2017-12-01 Fri       -0.303
##  8 KWYB     ABC         2017-12-01 Fri       -0.303
##  9 KTVM     NBC         2017-09-01 Fri       -0.302
## 10 KNVN     NBC         2017-12-08 Fri       -0.299
## # i 3,127 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

Which station-dates were the most conservative?

Use `desc()` to reverse the order:

```
news |>
  arrange(desc(ideology))
```

```
## # A tibble: 3,137 x 10
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KAEF     ABC         2017-06-19 Mon        0.778
##  2 WYDO     FOX         2017-07-19 Wed        0.580
##  3 KRCR     ABC         2017-10-03 Tue        0.566
##  4 KAEF     ABC         2017-10-18 Wed        0.496
##  5 KBVU     FOX         2017-11-16 Thu        0.491
##  6 KTMF     ABC         2017-11-06 Mon        0.455
##  7 KAEF     ABC         2017-06-29 Thu        0.447
##  8 KPAX     CBS         2017-11-23 Thu        0.437
##  9 KTAB     CBS         2017-11-16 Thu        0.427
## 10 KCVU     FOX         2017-07-06 Thu        0.406
## # i 3,127 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

3/ Operating on columns

select():

`select()` selects columns via their names.

Selecting based on names

```r
news |>
  select(callsign, date, ideology)
```

```
## # A tibble: 3,137 x 3
##    callsign date       ideology
##    <chr>    <date>        <dbl>
##  1 KRBC     2017-06-05   NA
##  2 KTAB     2017-06-05   NA
##  3 KXVA     2017-06-05   NA
##  4 KPAX     2017-06-06   NA
##  5 KTAB     2017-06-06   NA
##  6 KECI     2017-06-07    0.0655
##  7 KPAX     2017-06-07    0.0853
##  8 KRBC     2017-06-07    0.0183
##  9 KTAB     2017-06-07    0.0850
## 10 KTMF     2017-06-07    0.0842
## # i 3,127 more rows
```

Selecting based on a range of variables

```r
news |>
  select(callsign:ideology)
```

```
## # A tibble: 3,137 x 5
##    callsign affiliation date       weekday ideology
##    <chr>    <chr>       <date>     <ord>      <dbl>
##  1 KRBC     NBC         2017-06-05 Mon       NA
##  2 KTAB     CBS         2017-06-05 Mon       NA
##  3 KXVA     FOX         2017-06-05 Mon       NA
##  4 KPAX     CBS         2017-06-06 Tue       NA
##  5 KTAB     CBS         2017-06-06 Tue       NA
##  6 KECI     NBC         2017-06-07 Wed        0.0655
##  7 KPAX     CBS         2017-06-07 Wed        0.0853
##  8 KRBC     NBC         2017-06-07 Wed        0.0183
##  9 KTAB     CBS         2017-06-07 Wed        0.0850
## 10 KTMF     ABC         2017-06-07 Wed        0.0842
## # i 3,127 more rows
```

Selecting all not in a range

```r
news |>
  select(!callsign:ideology)
```

```
## # A tibble: 3,137 x 5
##    national_politics local_politics sinclair2017  post month
##                <dbl>          <dbl>        <dbl> <dbl> <ord>
##  1           0.0286          0.0190            0     0 Jun
##  2           0.0286          0.0190            0     0 Jun
##  3           0.0393          0.0262            0     0 Jun
##  4           0.00357         0.194             0     0 Jun
##  5           0.0945          0.109             0     0 Jun
##  6           0.225           0.148             1     0 Jun
##  7           0.283           0.123             0     0 Jun
##  8           0.130           0.189             0     0 Jun
##  9           0.0901          0.138             0     0 Jun
## 10           0.152           0.129             0     0 Jun
## # i 3,127 more rows
```

Selecting all numeric columns

```r
news |>
  select(where(is.numeric))
```

```
## # A tibble: 3,137 x 5
##    ideology national_politics local_politics sinclair2017
##       <dbl>             <dbl>          <dbl>        <dbl>
##  1  NA                0.0286          0.0190            0
##  2  NA                0.0286          0.0190            0
##  3  NA                0.0393          0.0262            0
##  4  NA                0.00357         0.194             0
##  5  NA                0.0945          0.109             0
##  6   0.0655           0.225           0.148             1
##  7   0.0853           0.283           0.123             0
##  8   0.0183           0.130           0.189             0
##  9   0.0850           0.0901          0.138             0
## 10   0.0842           0.152           0.129             0
## # i 3,127 more rows
## # i 1 more variable: post <dbl>
```

Combining multiple selections

```r
news |>
  select(callsign:weekday, ends_with("politics"))
```

```
## # A tibble: 3,137 x 6
##    callsign affiliation date       weekday national_politics
##    <chr>    <chr>       <date>     <ord>               <dbl>
##  1 KRBC     NBC         2017-06-05 Mon               0.0286
##  2 KTAB     CBS         2017-06-05 Mon               0.0286
##  3 KXVA     FOX         2017-06-05 Mon               0.0393
##  4 KPAX     CBS         2017-06-06 Tue               0.00357
##  5 KTAB     CBS         2017-06-06 Tue               0.0945
##  6 KECI     NBC         2017-06-07 Wed               0.225
##  7 KPAX     CBS         2017-06-07 Wed               0.283
##  8 KRBC     NBC         2017-06-07 Wed               0.130
##  9 KTAB     CBS         2017-06-07 Wed               0.0901
## 10 KTMF     ABC         2017-06-07 Wed               0.152
## # i 3,127 more rows
## # i 1 more variable: local_politics <dbl>
```

rename()

`rename(new_name = old_name)` renames the `old_name` variable to `new_name`

```r
news |>
  rename(call_sign = callsign)
```

```
## # A tibble: 3,137 x 10
##    call_sign affiliation date       weekday ideology
##    <chr>     <chr>       <date>     <ord>      <dbl>
##  1 KRBC      NBC         2017-06-05 Mon      NA
##  2 KTAB      CBS         2017-06-05 Mon      NA
##  3 KXVA      FOX         2017-06-05 Mon      NA
##  4 KPAX      CBS         2017-06-06 Tue      NA
##  5 KTAB      CBS         2017-06-06 Tue      NA
##  6 KECI      NBC         2017-06-07 Wed       0.0655
##  7 KPAX      CBS         2017-06-07 Wed       0.0853
##  8 KRBC      NBC         2017-06-07 Wed       0.0183
##  9 KTAB      CBS         2017-06-07 Wed       0.0850
## 10 KTMF      ABC         2017-06-07 Wed       0.0842
## # i 3,127 more rows
## # i 5 more variables: national_politics <dbl>,
## #   local_politics <dbl>, sinclair2017 <dbl>, post <dbl>,
## #   month <ord>
```

mutate()

`mutate(new_var = fun(old_vars))` adds new columns that are functions of existing columns.

```r
news |>
  mutate(
    national_local_diff = national_politics - local_politics,
    national_politics_perc = national_politics * 100
  ) |>
  select(callsign, date, national_politics, local_politics,
         national_local_diff, national_politics_perc)
```

```
## # A tibble: 3,137 x 6
##    callsign date       national_politics local_politics national_local_diff national_politics_perc
##    <chr>    <date>                 <dbl>          <dbl>               <dbl>                  <dbl>
##  1 KRBC     2017-06-05           0.0286          0.0190             0.00952                  2.86
##  2 KTAB     2017-06-05           0.0286          0.0190             0.00952                  2.86
##  3 KXVA     2017-06-05           0.0393          0.0262             0.0131                   3.93
##  4 KPAX     2017-06-06           0.00357         0.194             -0.191                    0.357
##  5 KTAB     2017-06-06           0.0945          0.109             -0.0145                   9.45
##  6 KECI     2017-06-07           0.225           0.148              0.0761                  22.5
##  7 KPAX     2017-06-07           0.283           0.123              0.160                   28.3
##  8 KRBC     2017-06-07           0.130           0.189             -0.0589                  13.0
##  9 KTAB     2017-06-07           0.0901          0.138             -0.0476                   9.01
## 10 KTMF     2017-06-07           0.152           0.129              0.0229                  15.2
## # i 3,127 more rows
```

`if_else()`

`if_else(test_condition, yes, no)` allows us to create a vector that depends on a logical

`if_else()`

`if_else(test_condition, yes, no)` allows us to create a vector that depends on a logical

New vector gets `yes` expression when `test_condition` is TRUE, no otherwise

```
news |>
  mutate(Ownership = if_else(sinclair2017 == 1,
                             "Acquired by Sinclair",
                             "Not Acquired")) |>
  select(callsign, affiliation, date, Ownership)
```

```
## # A tibble: 3,137 x 4
##    callsign affiliation date       Ownership
##    <chr>    <chr>       <date>     <chr>
##  1 KRBC     NBC         2017-06-05 Not Acquired
##  2 KTAB     CBS         2017-06-05 Not Acquired
##  3 KXVA     FOX         2017-06-05 Not Acquired
##  4 KPAX     CBS         2017-06-06 Not Acquired
##  5 KTAB     CBS         2017-06-06 Not Acquired
##  6 KECI     NBC         2017-06-07 Acquired by Sinclair
##  7 KPAX     CBS         2017-06-07 Not Acquired
##  8 KRBC     NBC         2017-06-07 Not Acquired
##  9 KTAB     CBS         2017-06-07 Not Acquired
## 10 KTMF     ABC         2017-06-07 Not Acquired
## # i 3,127 more rows
```

4/ Operating on groups

group_by()

group_by(var) divides the data into groups based on the var variable.

`group_by()`

`group_by(var)` divides the data into groups based on the `var` variable.

Doesn't change data yet, but subsequent operations will by `var`.

```r
news |>
  group_by(month)
```

```
## # A tibble: 3,137 x 10
## # Groups:   month [7]
##    callsign affiliation date       weekday ideology national_politics
##    <chr>    <chr>       <date>     <ord>      <dbl>             <dbl>
##  1 KRBC     NBC         2017-06-05 Mon      NA                 0.0286
##  2 KTAB     CBS         2017-06-05 Mon      NA                 0.0286
##  3 KXVA     FOX         2017-06-05 Mon      NA                 0.0393
##  4 KPAX     CBS         2017-06-06 Tue      NA                 0.00357
##  5 KTAB     CBS         2017-06-06 Tue      NA                 0.0945
##  6 KECI     NBC         2017-06-07 Wed       0.0655            0.225
##  7 KPAX     CBS         2017-06-07 Wed       0.0853            0.283
##  8 KRBC     NBC         2017-06-07 Wed       0.0183            0.130
##  9 KTAB     CBS         2017-06-07 Wed       0.0850            0.0901
## 10 KTMF     ABC         2017-06-07 Wed       0.0842            0.152
## # i 3,127 more rows
## # i 4 more variables: local_politics <dbl>, sinclair2017 <dbl>,
## #   post <dbl>, month <ord>
```

summarize()

`summarize(sum_var = fun(curr_var))` calculates summaries of variables by groups.

Ideological slant by weekday

```
news |>
  group_by(month) |>
  summarize(
    slant_mean = mean(ideology, na.rm = TRUE)
  )
```

```
## # A tibble: 7 x 2
##   month slant_mean
##   <ord>      <dbl>
## 1 Jun       0.0786
## 2 Jul       0.103
## 3 Aug       0.105
## 4 Sep       0.0751
## 5 Oct       0.0862
## 6 Nov       0.0972
## 7 Dec       0.0774
```

Summaries by ownership and pre/post

```r
news |>
  group_by(sinclair2017, post) |>
  summarize(
    slant_mean = mean(ideology, na.rm = TRUE),
    national_mean = mean(national_politics, na.rm = TRUE)
  )
```

```
## # A tibble: 4 x 4
## # Groups:   sinclair2017 [2]
##   sinclair2017  post slant_mean national_mean
##          <dbl> <dbl>      <dbl>         <dbl>
## 1            0     0     0.100          0.118
## 2            0     1     0.0768         0.107
## 3            1     0     0.0936         0.124
## 4            1     1     0.0938         0.144
```

Summarize across types of variables

`across()` will apply a summary function across many variables

```r
news |>
  group_by(sinclair2017, post) |>
  summarize(
    across(where(is.numeric), mean, na.rm = TRUE),
  )
```

```
## # A tibble: 4 x 5
## # Groups:   sinclair2017 [2]
##   sinclair2017  post ideology national_politics local_politics
##          <dbl> <dbl>    <dbl>             <dbl>          <dbl>
## 1            0     0   0.100              0.118          0.158
## 2            0     1   0.0768             0.107          0.150
## 3            1     0   0.0936             0.124          0.170
## 4            1     1   0.0938             0.144          0.147
```