

The counties dataset

DATA MANIPULATION WITH DPLYR



Chris Cardillo

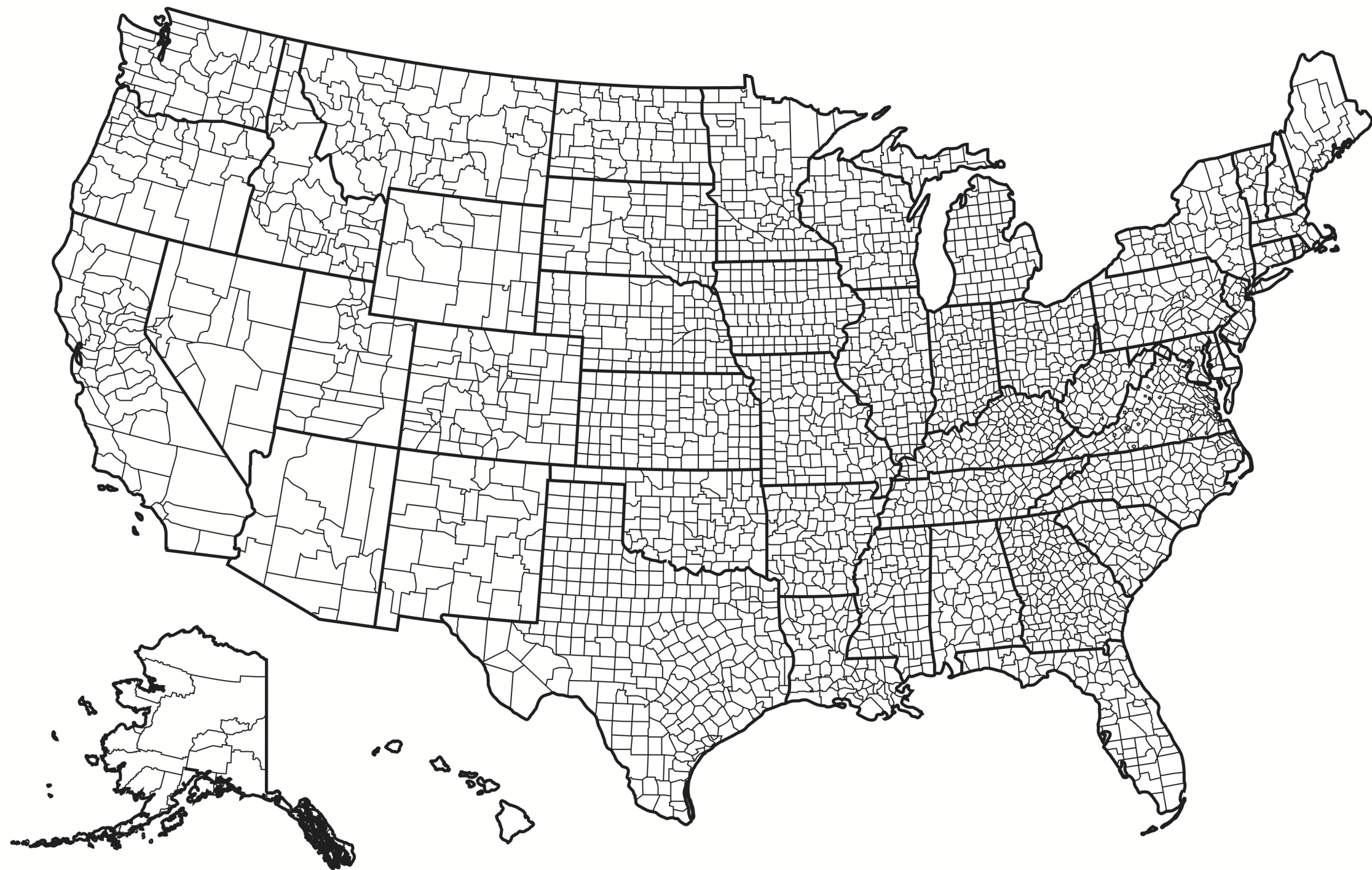
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Chapter 1 verbs

- `select()`
- `filter()`
- `arrange()`
- `mutate()`

2015 United States Census





Counties dataset

counties

```
# A tibble: 3,138 x 40
  census_id state county region metro population  men women hispanic white black native asian pacific
  <chr>      <chr> <chr>  <chr> <chr>      <dbl> <dbl> <dbl>    <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
1 1001      Alab... Autau... South Metro      55221 26745 28476      2.6  75.8  18.5    0.4    1      0
2 1003      Alab... Baldw... South Metro     195121 95314 99807      4.5  83.1   9.5    0.6    0.7    0
3 1005      Alab... Barbo... South Nonm...     26932 14497 12435      4.6  46.2  46.7    0.2    0.4    0
4 1007      Alab... Bibb    South Metro     22604 12073 10531      2.2  74.5  21.4    0.4    0.1    0
5 1009      Alab... Blount  South Metro     57710 28512 29198      8.6  87.9   1.5    0.3    0.1    0
6 1011      Alab... Bullo... South Nonm...     10678  5660  5018      4.4  22.2  70.7    1.2    0.2    0
7 1013      Alab... Butler  South Nonm...     20354  9502 10852      1.2  53.3  43.8    0.1    0.4    0
8 1015      Alab... Calho... South Metro    116648 56274 60374      3.5   73    20.3    0.2    0.9    0
9 1017      Alab... Chamb... South Nonm...     34079 16258 17821      0.4  57.3  40.3    0.2    0.8    0
10 1019      Alab... Chero... South Nonm...     26008 12975 13033      1.5  91.7   4.8    0.6    0.3    0
# ... with 3,128 more rows, and 26 more variables: citizens <dbl>, income <dbl>, income_err <dbl>,
# income_per_cap <dbl>, income_per_cap_err <dbl>, poverty <dbl>, child_poverty <dbl>,
# professional <dbl>, service <dbl>, office <dbl>, construction <dbl>, production <dbl>, drive <dbl>,
# carpool <dbl>, transit <dbl>, walk <dbl>, other_transp <dbl>, work_at_home <dbl>, mean_commute <dbl>,
# employed <dbl>, private_work <dbl>, public_work <dbl>, self_employed <dbl>, family_work <dbl>,
# unemployment <dbl>, land_area <dbl>
```

```
glimpse(counties)
```

```
Observations: 3,138
Variables: 40
$ census_id      <chr> "1001", "1003", "1005", "1007", "1009", "1011", "1013", ...
$ state          <chr> "Alabama", "Alabama", "Alabama", "Alabama", "Alabama", "..."
$ county         <chr> "Autauga", "Baldwin", "Barbour", "Bibb", "Blount", "Bull..."
$ region         <chr> "South", "South", "South", "South", "South", "South", "S..."
$ metro          <chr> "Metro", "Metro", "Nonmetro", "Metro", "Metro", "Nonmetr..."
$ population     <dbl> 55221, 195121, 26932, 22604, 57710, 10678, 20354, 116648...
$ men            <dbl> 26745, 95314, 14497, 12073, 28512, 5660, 9502, 56274, 16...
$ women          <dbl> 28476, 99807, 12435, 10531, 29198, 5018, 10852, 60374, 1...
$ hispanic       <dbl> 2.6, 4.5, 4.6, 2.2, 8.6, 4.4, 1.2, 3.5, 0.4, 1.5, 7.6, 0...
$ white          <dbl> 75.8, 83.1, 46.2, 74.5, 87.9, 22.2, 53.3, 73.0, 57.3, 91...
$ black          <dbl> 18.5, 9.5, 46.7, 21.4, 1.5, 70.7, 43.8, 20.3, 40.3, 4.8,...
$ native         <dbl> 0.4, 0.6, 0.2, 0.4, 0.3, 1.2, 0.1, 0.2, 0.2, 0.6, 0.4, 0...
$ asian          <dbl> 1.0, 0.7, 0.4, 0.1, 0.1, 0.2, 0.4, 0.9, 0.8, 0.3, 0.3, 0...
$ pacific        <dbl> 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0...
$ citizens       <dbl> 40725, 147695, 20714, 17495, 42345, 8057, 15581, 88612, ...
$ income         <dbl> 51281, 50254, 32964, 38678, 45813, 31938, 32229, 41703, ...
...
```


Select

```
counties %>%  
  select(state, county, population, unemployment)
```

```
# A tibble: 3,138 x 4  
  state    county    population unemployment  
  <chr>   <chr>         <dbl>         <dbl>  
1 Alabama Autauga         55221           7.6  
2 Alabama Baldwin       195121          7.5  
3 Alabama Barbour        26932          17.6  
4 Alabama Bibb           22604           8.3  
5 Alabama Blount         57710           7.7  
6 Alabama Bullock        10678            18  
7 Alabama Butler         20354           10.9  
8 Alabama Calhoun       116648           12.3  
9 Alabama Chambers       34079           8.9  
10 Alabama Cherokee      26008           7.9  
# ... with 3,128 more rows
```

Creating a new table

```
counties_selected <- counties %>%  
  select(state, county, population, unemployment)
```



```
counties_selected
```

```
# A tibble: 3,138 x 4
  state    county  population unemployment
  <chr>   <chr>      <dbl>         <dbl>
1 Alabama Autauga      55221          7.6
2 Alabama Baldwin    195121         7.5
3 Alabama Barbour     26932        17.6
4 Alabama Bibb        22604         8.3
5 Alabama Blount     57710         7.7
6 Alabama Bullock    10678         18
7 Alabama Butler     20354        10.9
8 Alabama Calhoun    116648        12.3
9 Alabama Chambers   34079         8.9
10 Alabama Cherokee  26008         7.9
# ... with 3,128 more rows
```

Let's practice!

DATA MANIPULATION WITH DPLYR

The filter and arrange verbs

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```
counties_selected <- counties %>%  
  select(state, county, population, unemployment)
```

```
counties_selected
```

```
# A tibble: 3,138 x 4  
  state    county    population unemployment  
  <chr>   <chr>         <dbl>         <dbl>  
1 Alabama Autauga         55221          7.6  
2 Alabama Baldwin       195121         7.5  
3 Alabama Barbour        26932        17.6  
4 Alabama Bibb           22604          8.3  
5 Alabama Blount         57710          7.7  
6 Alabama Bullock        10678          18  
7 Alabama Butler         20354        10.9  
8 Alabama Calhoun       116648        12.3  
9 Alabama Chambers       34079          8.9  
10 Alabama Cherokee      26008          7.9  
# ... with 3,128 more rows
```

Arrange

```
counties_selected %>%  
  arrange(population)
```

```
# A tibble: 3,138 x 4  
  state      county      population unemployment  
  <chr>     <chr>         <dbl>         <dbl>  
1 Hawaii   Kalawao         85             0  
2 Texas    King            267            5.1  
3 Nebraska McPherson       433            0.9  
4 Montana  Petroleum       443            6.6  
5 Nebraska Arthur          448             4  
6 Nebraska Loup           548            0.7  
7 Nebraska Blaine          551            0.7  
8 New Mexico Harding     565             6  
9 Texas    Kenedy          565             0  
10 Colorado San Juan        606           13.8  
# ... with 3,128 more rows
```

Arrange: descending

```
counties_selected %>%  
  arrange(desc(population))
```

```
# A tibble: 3,138 x 4  
  state      county      population unemployment  
  <chr>     <chr>         <dbl>         <dbl>  
1 California Los Angeles  10038388         10  
2 Illinois   Cook           5236393        10.7  
3 Texas      Harris         4356362          7.5  
4 Arizona    Maricopa       4018143          7.7  
5 California San Diego      3223096          8.7  
6 California Orange        3116069          7.6  
7 Florida    Miami-Dade     2639042          10  
8 New York   Kings          2595259          10  
9 Texas      Dallas         2485003          7.6  
10 New York   Queens         2301139          8.6  
# ... with 3,128 more rows
```

Filter

```
counties_selected %>%  
  arrange(desc(population)) %>%  
  filter(state == "New York")
```

```
# A tibble: 62 x 4  
  state     county      population unemployment  
  <chr>    <chr>          <dbl>         <dbl>  
1 New York Kings      2595259         10  
2 New York Queens     2301139          8.6  
3 New York New York   1629507          7.5  
4 New York Suffolk    1501373          6.4  
5 New York Bronx      1428357         14  
6 New York Nassau     1354612          6.4  
7 New York Westchester 967315          7.6  
8 New York Erie       921584           7  
9 New York Monroe     749356          7.7  
10 New York Richmond   472481          6.9  
# ... with 52 more rows
```


Filter

```
counties_selected %>%  
  arrange(desc(population)) %>%  
  filter(unemployment < 6)
```

```
# A tibble: 949 x 4  
  state     county      population unemployment  
  <chr>    <chr>          <dbl>         <dbl>  
1 Virginia Fairfax      1128722         4.9  
2 Utah     Salt Lake    1078958         5.8  
3 Hawaii   Honolulu     984178         5.6  
4 Texas    Collin       862215         4.9  
5 Texas    Denton       731851         5.7  
6 Texas    Fort Bend    658331         5.1  
7 Kansas   Johnson      566814         4.5  
8 Maryland Anne Arundel  555280         5.9  
9 Colorado Jefferson    552344         5.9  
10 Utah     Utah         551957         5.5  
# ... with 939 more rows
```

Combining conditions

```
counties_selected %>%  
  arrange(desc(population)) %>%  
  filter(state == "New York",  
         unemployment < 6)
```

```
# A tibble: 5 x 4  
  state      county      population unemployment  
  <chr>     <chr>          <dbl>         <dbl>  
1 New York Tompkins      103855         5.9  
2 New York Chemung       88267         5.4  
3 New York Madison       72427         5.1  
4 New York Livingston     64801         5.4  
5 New York Seneca        35144         5.5
```

Let's practice!

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Mutate

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```
counties_selected <- counties %>%  
  select(state, county, population, unemployment)
```

```
counties_selected
```

```
# A tibble: 3,138 x 4  
  state    county    population unemployment  
  <chr>   <chr>         <dbl>         <dbl>  
1 Alabama Autauga         55221          7.6  
2 Alabama Baldwin       195121         7.5  
3 Alabama Barbour        26932        17.6  
4 Alabama Bibb           22604          8.3  
5 Alabama Blount         57710          7.7  
6 Alabama Bullock        10678          18  
7 Alabama Butler         20354        10.9  
8 Alabama Calhoun       116648        12.3  
9 Alabama Chambers       34079          8.9  
10 Alabama Cherokee      26008          7.9  
# ... with 3,128 more rows
```

Total number of unemployed people

```
population * unemployment / 100
```

Mutate

```
counties_selected %>%  
  mutate(unemployed_population = population * unemployment / 100)
```

```
# A tibble: 3,138 x 5  
  state   county  population unemployment unemployed_population  
  <chr>   <chr>      <dbl>         <dbl>          <dbl>  
1 Alabama Autauga      55221          7.6           4197.  
2 Alabama Baldwin    195121         7.5          14634.  
3 Alabama Barbour     26932        17.6           4740.  
4 Alabama Bibb        22604         8.3           1876.  
5 Alabama Blount      57710         7.7           4444.  
6 Alabama Bullock     10678         18            1922.  
7 Alabama Butler      20354        10.9           2219.  
8 Alabama Calhoun    116648        12.3          14348.  
9 Alabama Chambers   34079         8.9           3033.  
10 Alabama Cherokee   26008         7.9           2055.  
# ... with 3,128 more rows
```



```
counties_selected %>%
  mutate(unemployed_population = population * unemployment / 100) %>%
  arrange(desc(unemployed_population))
```

```
# A tibble: 3,138 x 5
  state      county      population unemployment unemployed_population
  <chr>      <chr>      <dbl>         <dbl>         <dbl>
1 California Los Angeles 10038388         10         1003839.
2 Illinois   Cook        5236393         10.7         560294.
3 Texas      Harris      4356362          7.5         326727.
4 Arizona    Maricopa    4018143          7.7         309397.
5 California Riverside  2298032         12.9         296446.
6 California San Diego   3223096          8.7         280409.
7 Michigan   Wayne      1778969         14.9         265066.
8 California San Bernardino 2094769         12.6         263941.
9 Florida    Miami-Dade  2639042          10         263904.
10 New York   Kings      2595259          10         259526.
# ... with 3,128 more rows
```

Let's practice!

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