# Telling stories with R: Data Visualization

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# Telling stories with R: Data Visualization

**Instructor**: Jan Zilinsky

Creating effective visualizations of social and political data can help you discover and communicate new insights. This is a course designed to help students become better communicators with R. The focus is on graphing various types of evidence including:

```
- summaries of statistical models
- quantitative representations of text (e.g. content of social media post and the accompanyi
- macro-economic data

Students are encouraged to think creatively about visualizing different types of information
```

After taking this course, students will be expected to be able to present real data clearly and to identify strengths and weakness of existing data displays and dashboards.

### Topics:

- What works and what to avoid even if it works?
- Principles of visual perception and effect communication
- Getting familiar with ggplot

### A ggplot deep dive

```
- Toplines, cross-tabs
- Geometries, statistics and coordinates
- Facets, themes
- Refining plots
- 3-way cross-tabs
- Heatmaps
- Visualizing output from statistical models
- Coefficients and uncertainty
```

## Other lessons

```
- Predicted probabilities, marginal effects, and interactions
- Model performance (in-sample and out-of-sample comparisons)
- Machine learning output (regression trees, most important variables, etc.)
```

**Assignments:**

- Create your own dataset (30%).
  - Create your own dataset. It needs to have at least one of these 3 attributes
    1. Multiple levels (at least 2).
    2. Original topic, subject or angle.
    3. Impressive scope (e.g. time dimension)
  - Easy example of #1: rating things you like.
    - Suppose you decide go the "quantified self" route and create a dataset with evaluations the favorite TV shows of the members of your group.
    - What's the outcome variable? (Multiple attributes can be assessed.)
    - What levels can be measured?
      - If you are rating a TV show, the natural components would be seasons, and episodes. Within episodes there might be themes or actors. Unpacking these attributes opens possibilities for creating stories, making interactive visualizations, etc.
- Final project (70%)
  - Form a group of 3 (max. 4) classmates
  - Start thinking about topic after lecture 3
  - Prepare a compelling data visualization
  - Some elements in R are expected, you could also use D3 or another language if you wish.

# 1 Principles

In summary, this book has no content whatsoever.

```
1 + 1
```

```
[1] 2
```

# 2 Toplines and crosstabs

In summary, this book has no content whatsoever.

```
-- Attaching packages --------------------------------------- tidyverse 1.3.2 --
v ggplot2 3.4.2     v purrr   1.0.1
v tibble  3.2.1     v dplyr   1.1.1
v tidyr   1.3.0     v stringr 1.5.0
v readr   2.1.3     v forcats 0.5.2
-- Conflicts ------------------------------------------ tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()    masks stats::lag()
```

```
d1
```

```
# A tibble: 2,000 x 61
   caseid   female   edu black hispanic   age income   pid  ideo interest attend
   <chr>     <dbl> <dbl> <dbl>    <dbl> <dbl>  <dbl> <dbl> <dbl>    <dbl>  <dbl>
 1 R_24COU~      1     5     0        0    23      2     7     3        5      3
 2 R_2B2nP~      0     6     0        0    39      7     4     6        3      2
 3 R_p5eQb~      0     3     0        0    43      4     4     1        3      2
 4 R_2dYYB~      0     2     1        0    22      2     1     7        4      3
 5 R_3sgIL~      0     3     1        0    40      5     1     1        4      3
 6 R_31Ab1~      0     6     0        0    28      4     4     4        3      1
 7 R_2f36X~      0     6     0        0    41      7     4     2        4      2
 8 R_2XcYI~      0     2     1        0    21      4     1     3        4      4
 9 R_339E8~      1     6     0        0    58      6     3     3        4      4
10 R_3mlfI~      0     5     0        0    43      6     1     1        5      4
# i 1,990 more rows
# i 50 more variables: facebook <dbl+lbl>, twitter <dbl+lbl>, reddit <dbl+lbl>,
#   chans <dbl>, con1 <dbl>, con2 <dbl>, con3 <dbl>, con4 <dbl>, conwis <dbl>,
#   msm <dbl>, onepercent <dbl>, deepstate <dbl>, goodevil <dbl+lbl>,
#   vio1 <dbl>, vio2 <dbl>, violence <dbl>, argue1 <dbl>, argue2 <dbl>,
#   argue3 <dbl>, argument <dbl>, pop1 <dbl>, pop2 <dbl>, official <dbl>,
#   manip1 <dbl>, manip2 <dbl>, manip3 <dbl>, manip4 <dbl>, ...
```

```
table(d2$climatechange)
```

```
  1   2   3   4   5
733 454 395 233 206
```

```
table(d2$climatechangeBIN)
```

```
   0    1
1582  439
```

```
d2 %>% count(climatechangeBIN)
```

```
# A tibble: 3 x 2
  climatechangeBIN     n
             <dbl> <int>
1                0  1582
2                1   439
3               NA     2
```

Are the missing observations the same for the original and the recoded variable? (If not, we would want to check whether earlier code did something unintended.)

```
d2 %>% count(climatechangeBIN,climatechange)
```

```
# A tibble: 6 x 3
  climatechangeBIN climatechange     n
             <dbl>         <dbl> <int>
1                0             1   733
2                0             2   454
3                0             3   395
4                1             4   233
5                1             5   206
6               NA            NA     2
```

# 3 Standard charts

In summary, this book has no content whatsoever.

```
1 + 1
```

```
[1] 2
```

# 4 Advanced ggplot

## 4.1 Heatmaps

```
1 + 1
```

```
[1] 2
```

# 5 Visualizing statistical models

A more accurate title, of course, woudl be "visualizing *outputs* from statistical models".

# References

## Useful resources include:


Gestalt Principles

Gestalt Principles (Part 2)

https://socviz.co/

https://ggplot2-book.org/index.html

https://cssbook.net/content/chapter06.html

https://storymaps.arcgis.com/stories/1e7f582d478a4b99bd0c70fffeac4c8b

https://cup.columbia.edu/book/better-data-visualizations/9780231193115

https://journals.sagepub.com/doi/pdf/10.1177/15291006211057899