

08 Shiny Lab Session

36-721 Statistical Graphics and Visualization

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Last time

- ▶ Introduce Projects
- ▶ Visualization Research overview, examples, sources to follow
- ▶ Inkscape demo continued;
see also [Chris Hilbig's Inkscape cheat sheet](#)

Today

- ▶ More details posted on Census project
- ▶ Visually demonstrating statistical concepts & algorithms: examples
- ▶ Shiny lab session: exercises to work in groups

Stat concepts: with animation

Sampling variation: New York Times, [How not to be misled by the jobs report](#)

Decision trees: R2D3, [A visual introduction to machine learning](#)

Algorithms for sampling, sorting, shuffling, and maze generation:
Mike Bostock, [Visualizing algorithms](#)

Stat concepts: with controls

P-hacking: 538, [Science isn't broken](#)

P-values: Aaron Fisher, [Visual p-value](#)

Various concepts: Emil Kirkegaard, [Understanding statistics](#)

Stat concepts: with direct interaction

Regression diagnostics: Alex Reinhart, [The Regressomatic 4000](#)

Simpson's paradox: Lewis Lehe & Victor Powell, [Simpson's paradox](#)

Shiny lab session resources

- ▶ Tutorial (lessons 1-5)
- ▶ Application layout guide
- ▶ Interactive plots
- ▶ Selecting rows of data

Shiny exercises: exploring data

Plot the `UScereal` dataset as in HW3, showing fibre vs calories.

- ▶ Widgets: add a `selectInput` control to select a 3rd variable and plot it using size.
- ▶ Layout: add a plot of fat vs sugars, and show these 2 plots side by side.
- ▶ Brushing: let user select data points, and print those cereals' names below plots.
- ▶ Linking: let user brush to select points on either plot, and highlight those points (change their color) on both plots.

Shiny exercises: showing statistical concepts

1. Recreate this **Restriction of range** app, but also plot a regression line fitted just to the restricted sample.
2. Show the probability of **“mixed panel assignment”**:

A court has a total of 20 judges, 8 of whom are women. Panels of 5 judges are randomly drawn to decide any given case. What is the probability of drawing a panel on which at least 1 of the judges is female?

- ▶ Plot a bar chart, showing the probability distribution of “number of females on the panel.”
- ▶ Give the probability of 1 or more females.
- ▶ Add controls, so user can change total number of available judges; number of available female judges; and size of panel.

Shiny exercises: example solutions

https://github.com/civilstat/36721-F15/tree/master/08_ShinyLab

plus an old unpolished solution to the Mixed Panel exercise:

<https://github.com/civilstat/MixedPanel>

You can run these from within R using code like

```
library(shiny)
runGitHub("36721-F15", "civilstat",
          subdir = "08_ShinyLab/UScereal_Widgets")
runGitHub("MixedPanel", "civilstat")
```

See also [David Haggmann's solutions](#) using ggvis

For next time

- ▶ Tuesday: some specific visualizations useful during statistical analysis
- ▶ Thursday: high-dimensional data; install **GGobi** to follow along
- ▶ Project 1 (Graphic Design) due Sat. 5pm, through Blackboard