A Fully Customizable Textbook for Introductory Statistics/Data Science Courses

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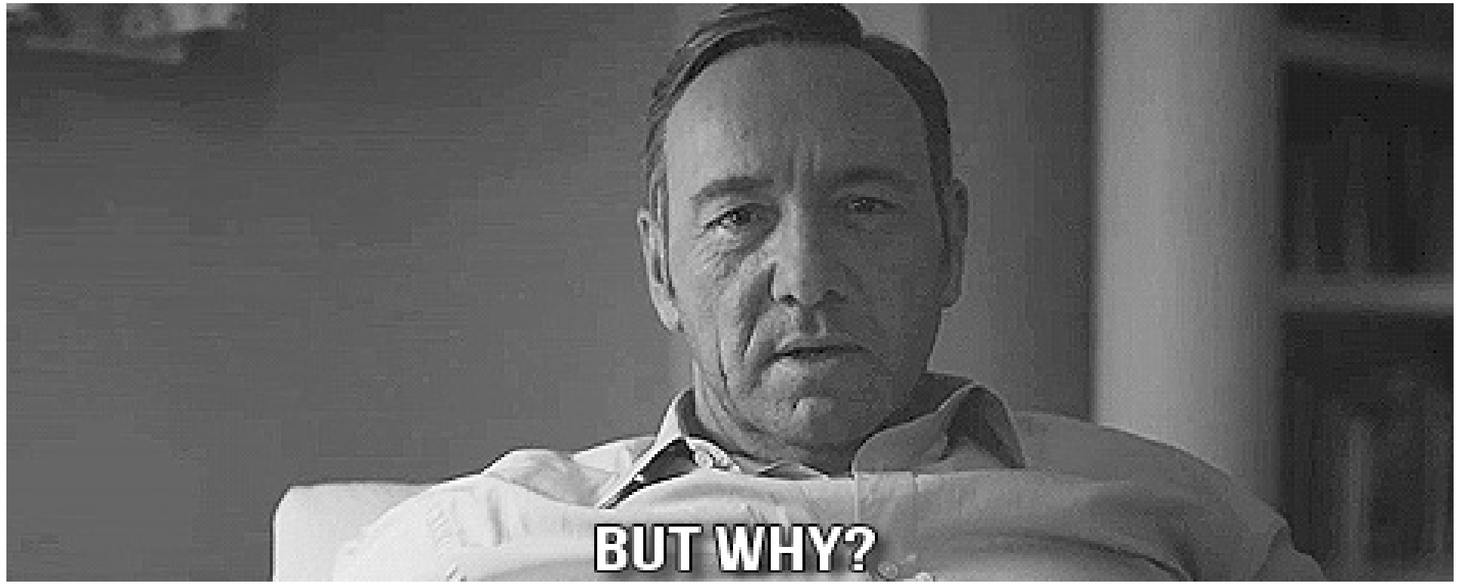
Slides available at http://bit.ly/moderndive-causeweb

Why is this needed?



Guiding Principles of ModernDive

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1. Blur the lines between lecture and lab

While in lab section...

Then and Now

- Segregated lecture/lab is a legacy of when:
  - Desktops reigned
  - Proprietary statistical software was usually the best/only option

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- Segregated lecture/lab is a legacy of when:
  - Desktops reigned
  - Proprietary statistical software was usually the best/only option
- Today
  - Almost all students have access to laptops
  - Open source software options are more palatable

A new classroom environment

Working like data scientists/statisticians work

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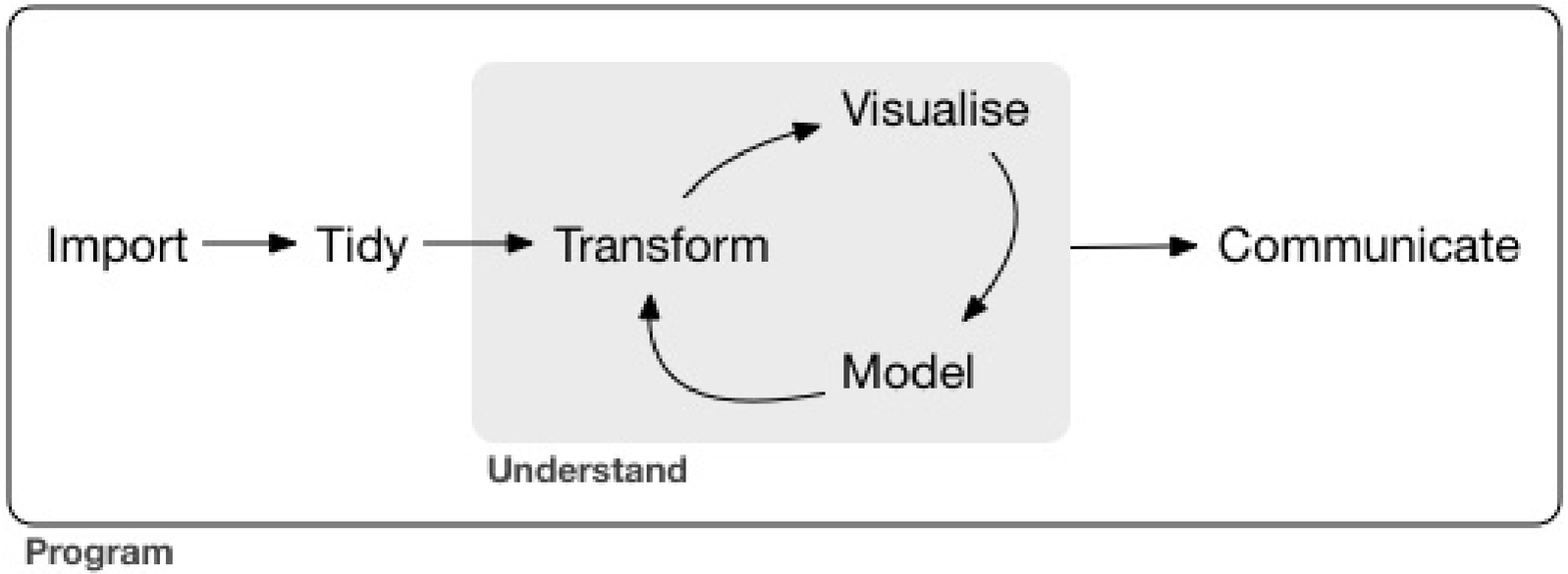
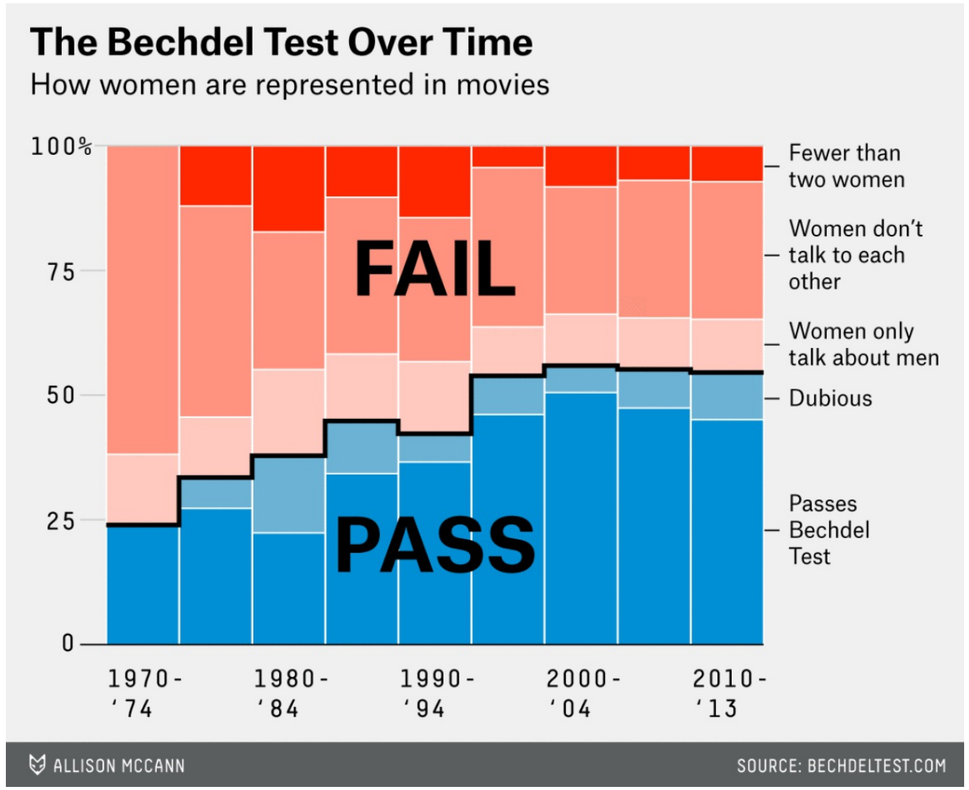
2. Focus on the data/science research pipeline



Creating effective data stories is the key

- Each topic builds on previous topics towards improving communication using data



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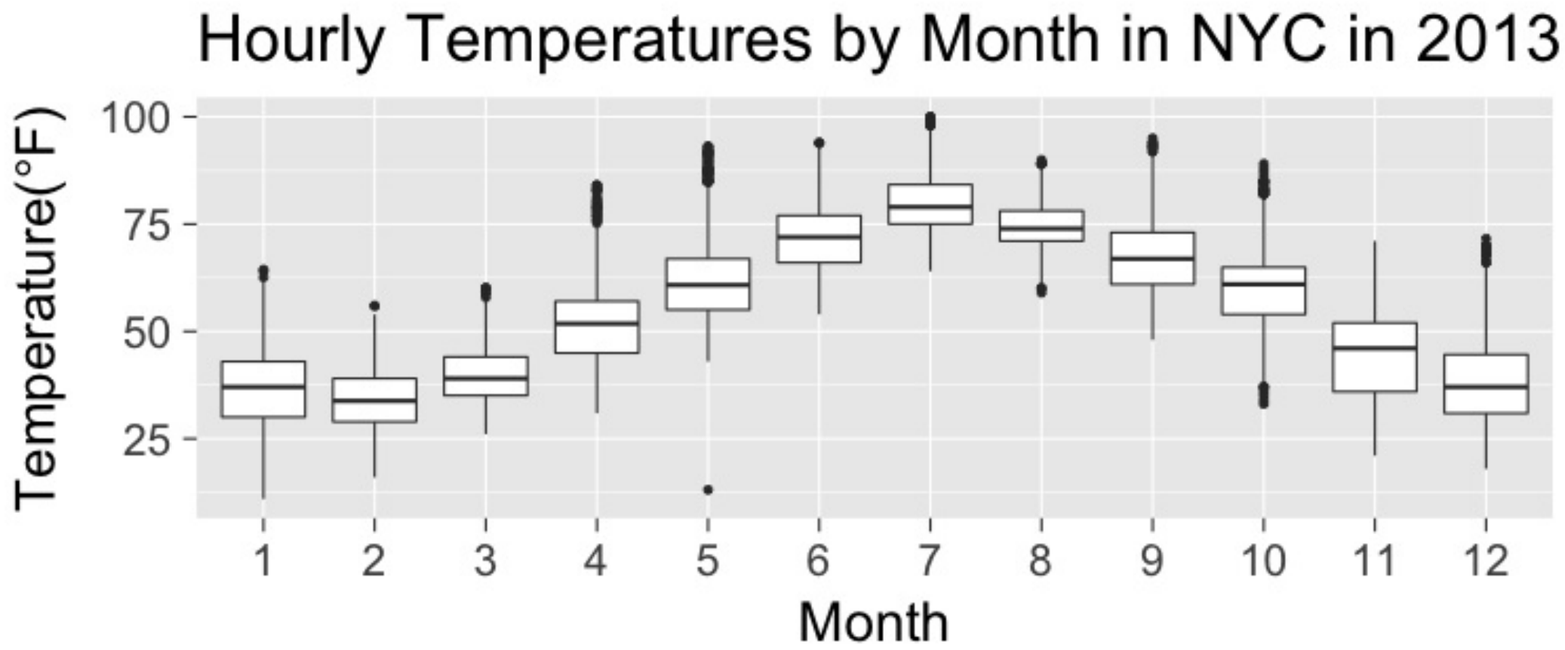
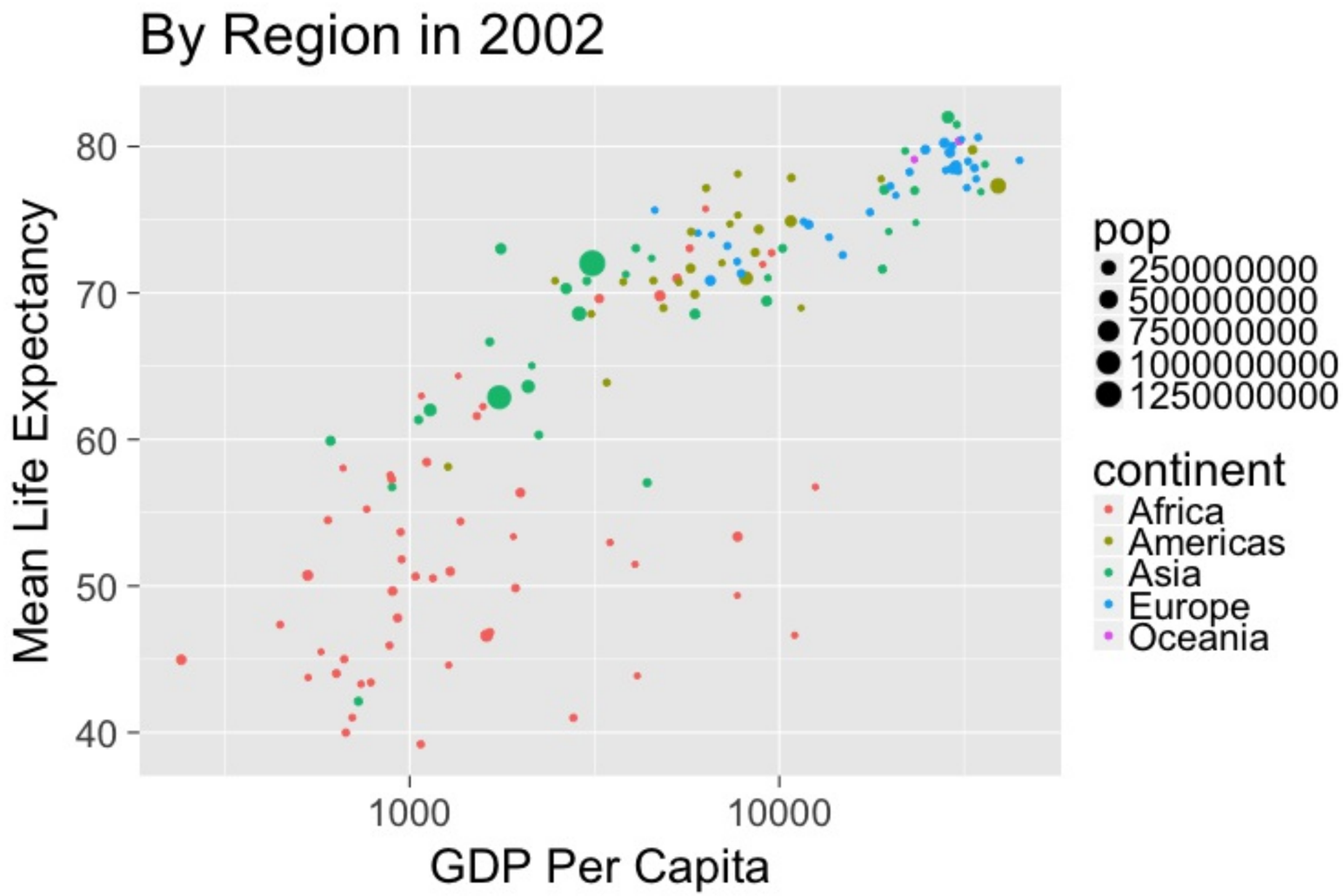
3. It's all about the data

- Use modern R packages with rich, interesting, open data



Have data visualization be the driver



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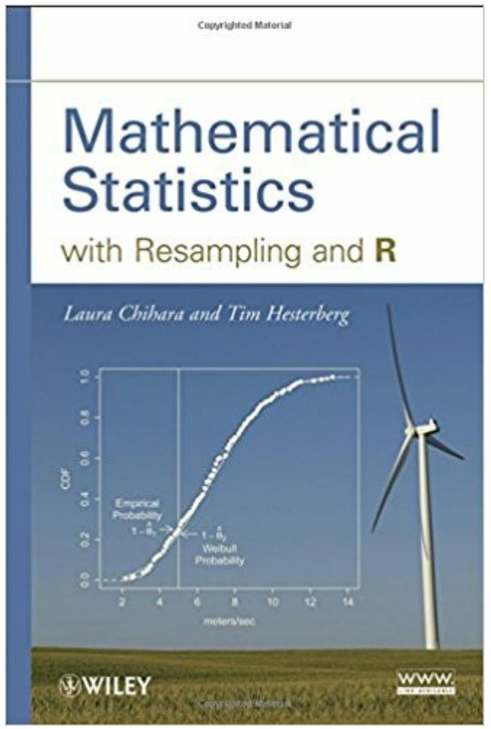
4. Use simulation/resampling instead of probability

From Albert's 300-level ~~Mathematical Statistics~~ Theory of Statistics:



Reinforce concepts instead of equations, formulas, and probability tables

- Build the Central Limit Theorem using computation
- Check for assumptions needed for traditional inference using algorithmic thinking

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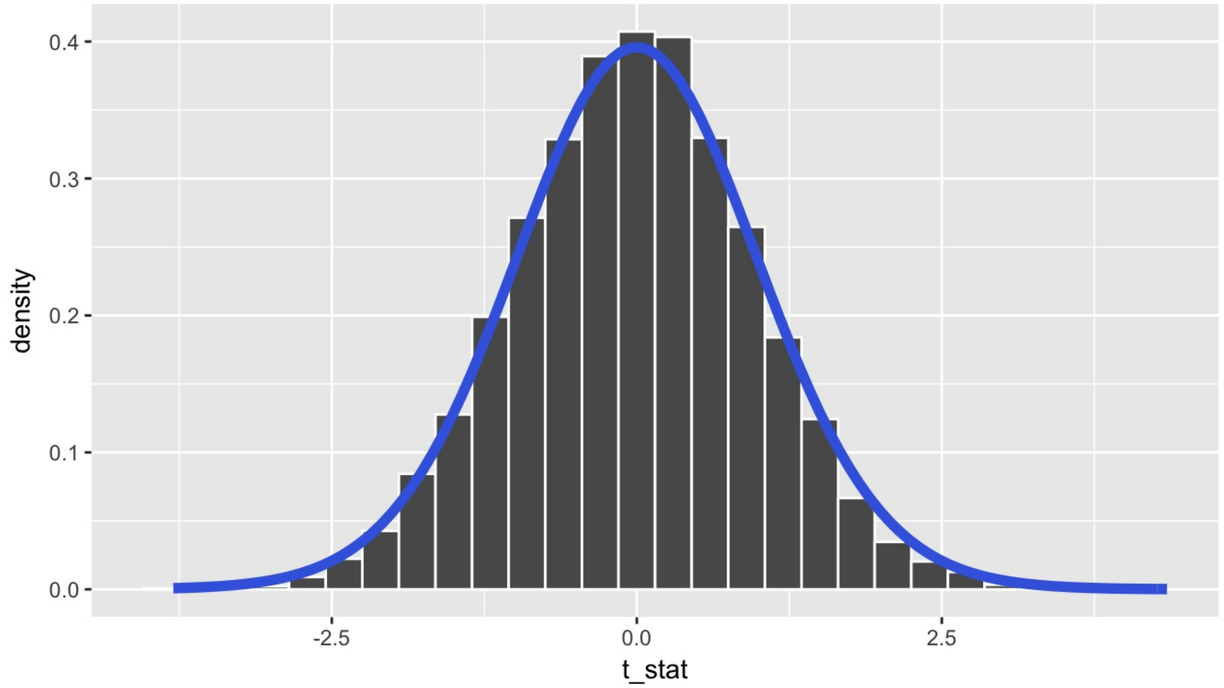
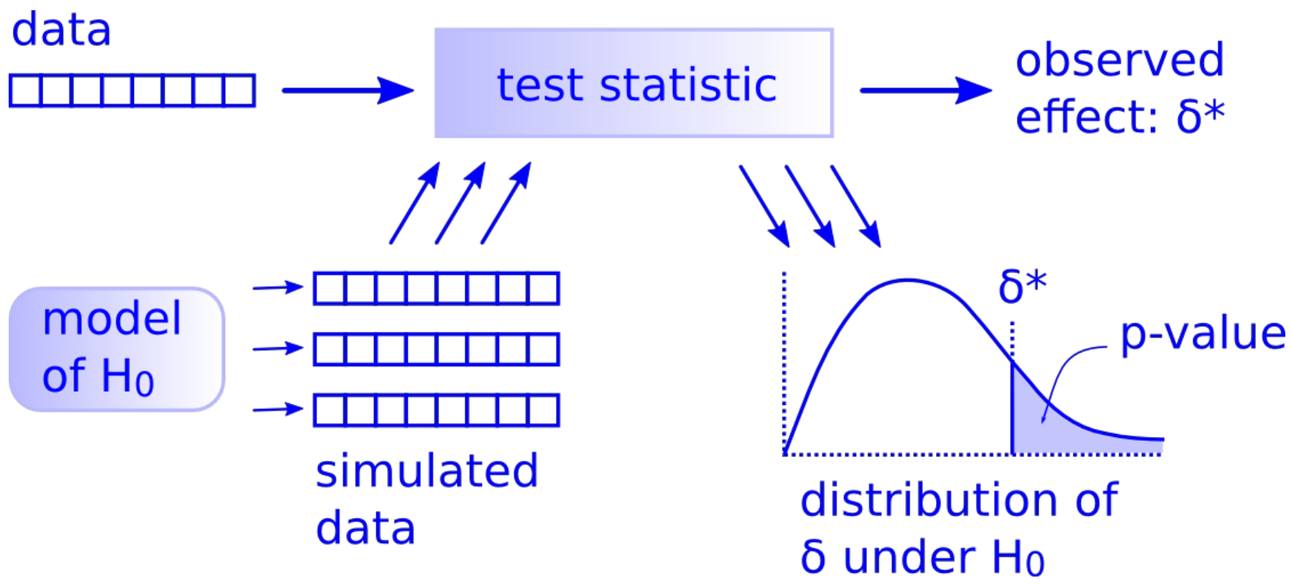


Inspiration and common theme

There is only ONE (hypothesis) test!

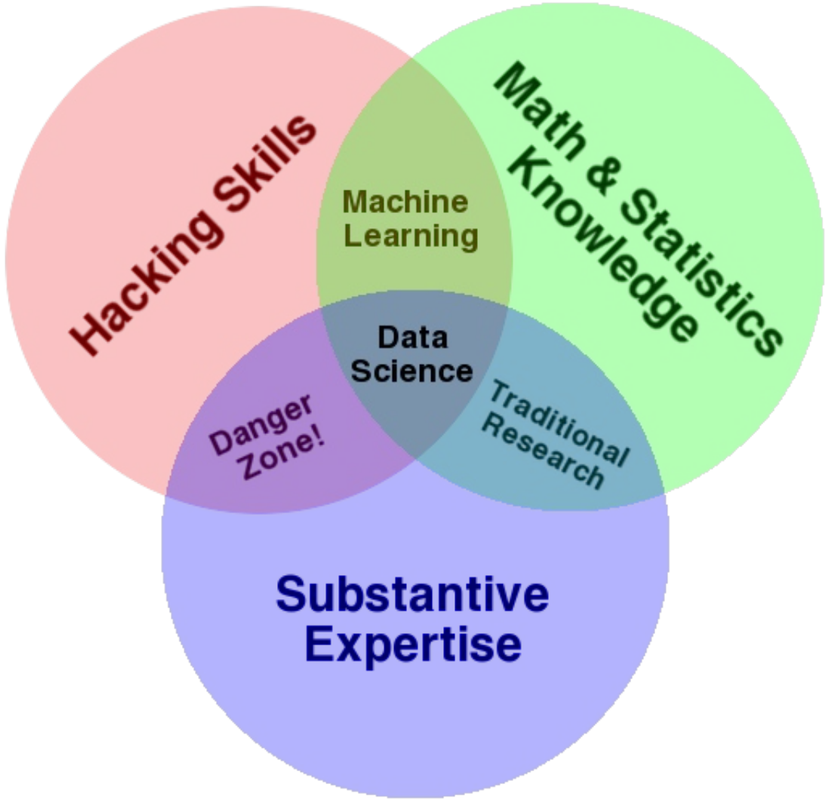


5. Don’t fence off students from the computation pool, throw them in!

- Scaffold & support as a good foreign language professor would

Developing a needed skill

- Coding will be a basic skill on par with reading and writing.



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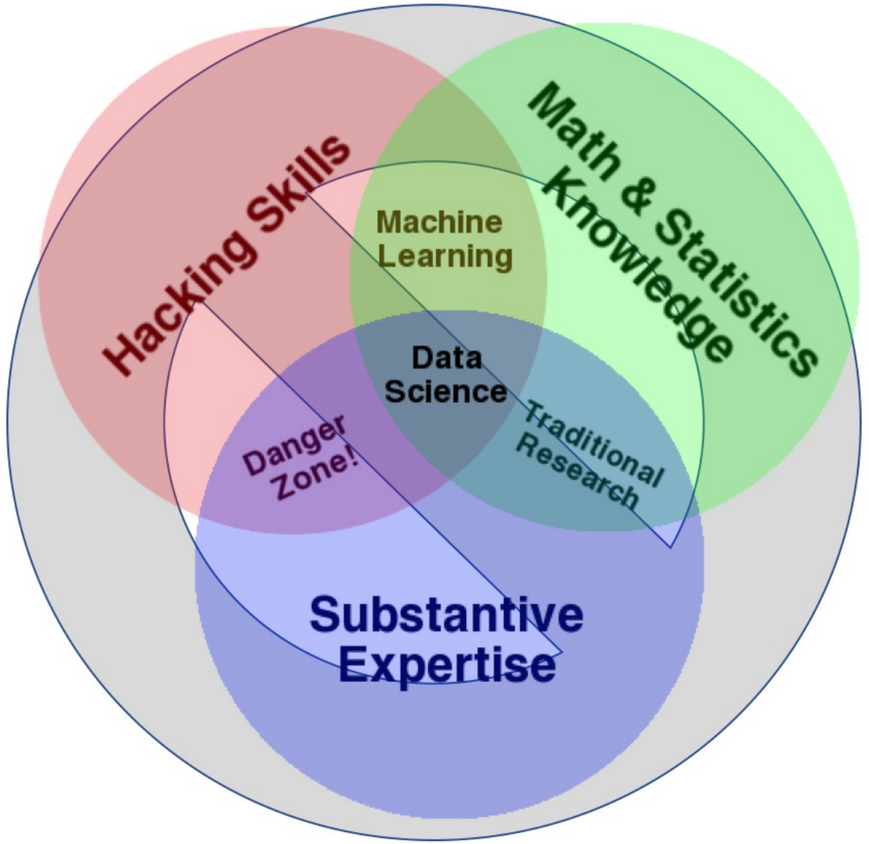
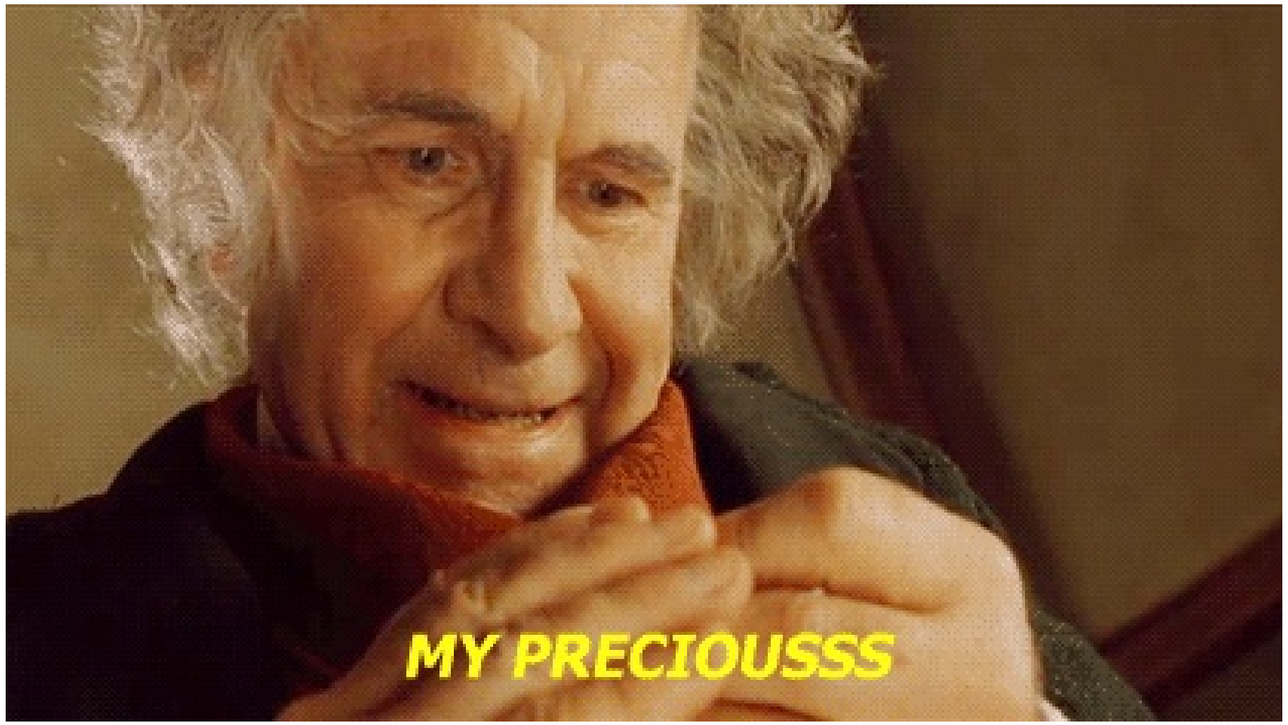


6. Complete reproducibility with bookdown

- Put it all out there

- Ultimately the best textbook is one you've written yourself



The bookdown R package

- Write an entire book using R and Markdown
- Rapid iteration and easily-updateable
- Exports book to multiple formats
- Slick cross-references
- Textbook has versions not editions
- Wikipedia model for intro stats/data science

- A bookdown book about writing with bookdown

ModernDive

An Introduction to Statistical and Data Sciences via R

Authors: Chester Ismay, Albert Y. Kim and you?

ModernDive.com

OR

ModernDive.org

Supplementary materials to the textbook

The `fivethirtyeight` R package

- Data sets that balance being
  - rich enough to answer meaningful questions with,
  - real enough to ensure that there is context, and
  - realistic enough to convey to students that data as it exists "in the wild" often needs processing.

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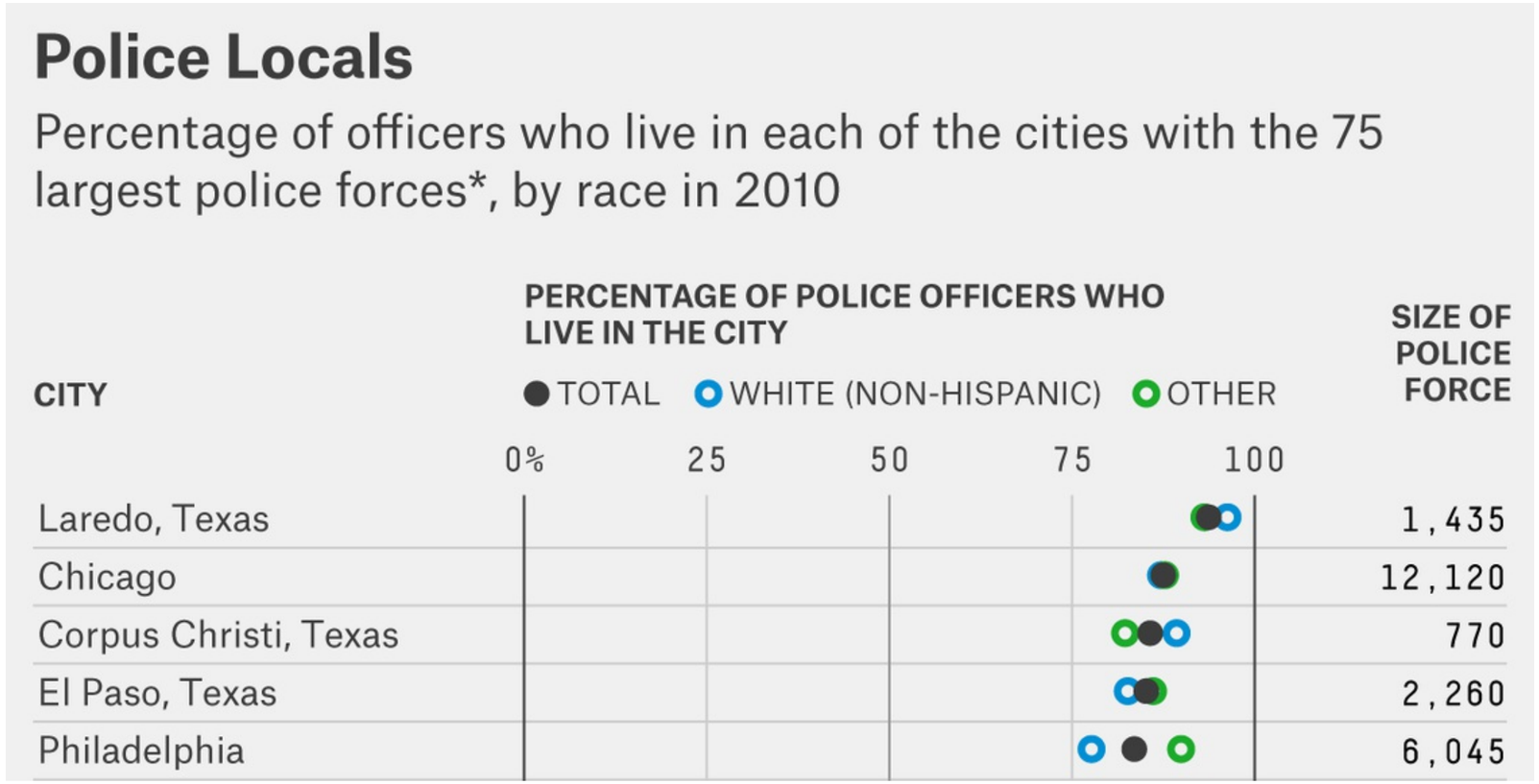
- Data sets that balance being
  - rich enough to answer meaningful questions with,
  - real enough to ensure that there is context, and
  - realistic enough to convey to students that data as it exists "in the wild" often needs processing.
- Easily and quickly accessible to novices, so that we minimize the prerequisites to research.

The `fivethirtyeight` R package



DataCamp course

FREE COURSE

Effective Data Storytelling using the tidyverse

Continue Course

0 Videos · 30 Exercises · 15 hours · 30 Participants · 2550 XP

Course Description

This course is designed to supplement and build on the content covered at http://moderndive.com . It assumes that you have completed the Introduction to R course on DataCamp at https://www.datacamp.com/courses/free-introduction-to-r .

1 Applying R Basics

20%

Exploring the basics of R on a data set based on the fivethirtyeight.com "Most Police Don't Live In The Cities They Serve" article.

Investigate the properties of a data frame — 70 xp

Instructor(s):

Chester Ismay

Albert Y. Kim

Chester's Social Statistics course webpage

Schedule

The references to **Chapters/Sections** here correspond to the **MODERN DIVE into Data with R** book. Be sure to check the **DataCamp** link above for more details on the DataCamp (DC) assignments. More details on the Problem Sets (PS) are available in the link above for Problem Sets.

Search:

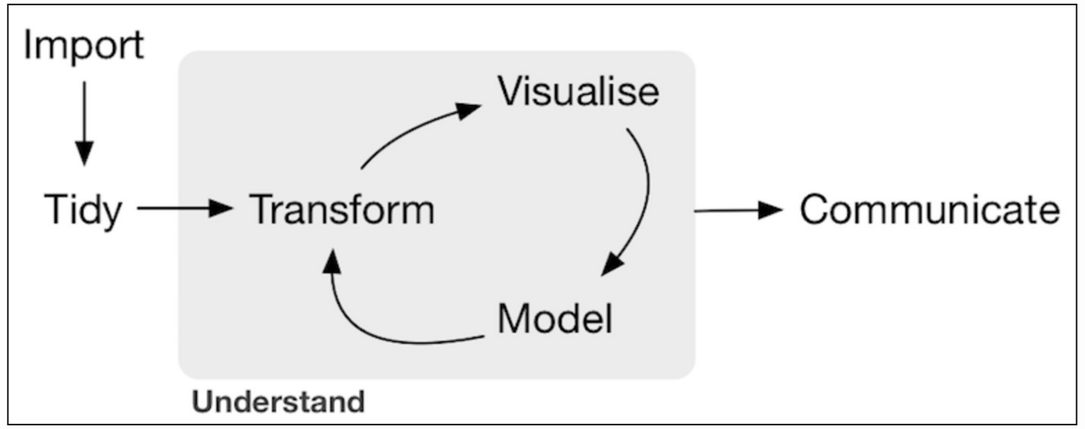
Weekday	Date	Content / Assessment	Material Due
All	All	All	All
Tuesday	January 31	Introduction (Chapters 1 and 2)	-
Thursday	February 2	Introduction to R on DataCamp	-
Tuesday	February 7	Review of Introduction to R on DataCamp	DC course: Introduction to R

Albert's Intro to Stat & Data Sciences course webpage

Intro to Stat & Data Sciences

Slack RStudio Server Problem Sets Syllabus

Fork me on GitHub



Topics

- Slides. Also in HTML format.
- Learning checks.
- ModernDive textbook. Feedback form here.

What's to come

- Add more interactive shiny apps into the book
- Create more Review Questions at chapter ends using `fivethirtyeight` and other open data sources
- Design and share instructor resources
- Finish DataCamp course to supplement and assist with more immediate feedback

ModernDive.com

- Join us for a workshop with many more details at USCOTS at Penn State on May 17-18
- Slides created via the R package xaringan by Yihui Xie.
- Source code for ModernDive
  - Feel free to modify the book as you wish for your own needs! Just please list the authors as "Chester Ismay, Albert Y. Kim, and YOU!"
- Fill out form to receive updates using MailChimp
- Email us at chester@moderndive.com or albert@moderndive.com
- Follow us on Twitter: @old_man_chester, @rudeboybert

These slides available at http://bit.ly/moderndive-causeweb
Source code for slides at https://github.com/ismayc/causeweb2017