Gov 50: 1. Introduction

Matthew Blackwell

Harvard University

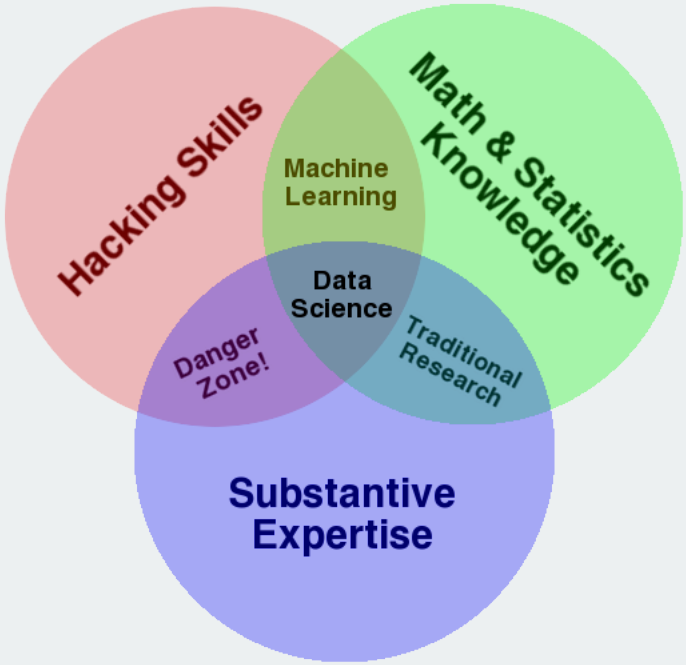
Roadmap

1. Welcome and Motivation

2. Course Details

1/ Welcome and Motivation

What is data science?



- **Data science**: wrangling, visualizing, and analyzing data to understand the world

Credit: Drew Conway

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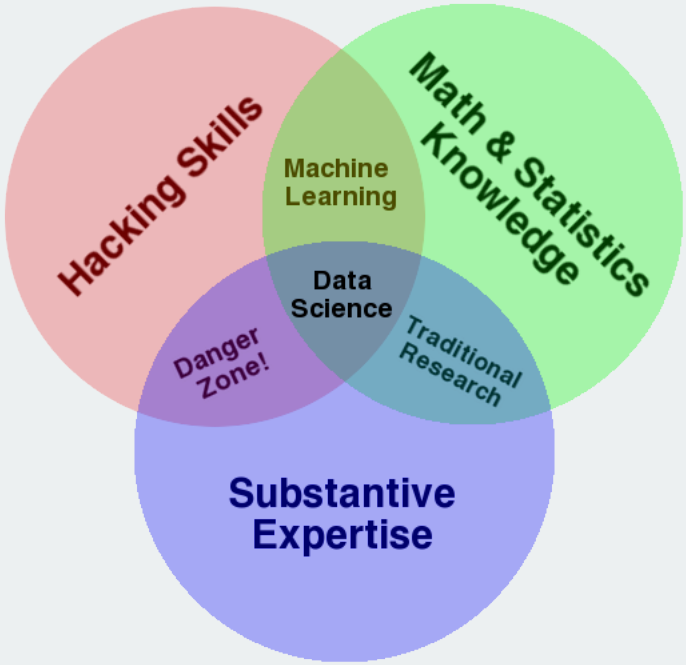


- **Data science**: wrangling, visualizing, and analyzing data to understand the world
- Who does data science? Tech companies, non-tech companies, nonprofits, governments.

Credit: Drew Conway

Glassdoor's No. 3 best job in the U.S. has seen job growth surge 480%

BY **MEGHAN MALAS**

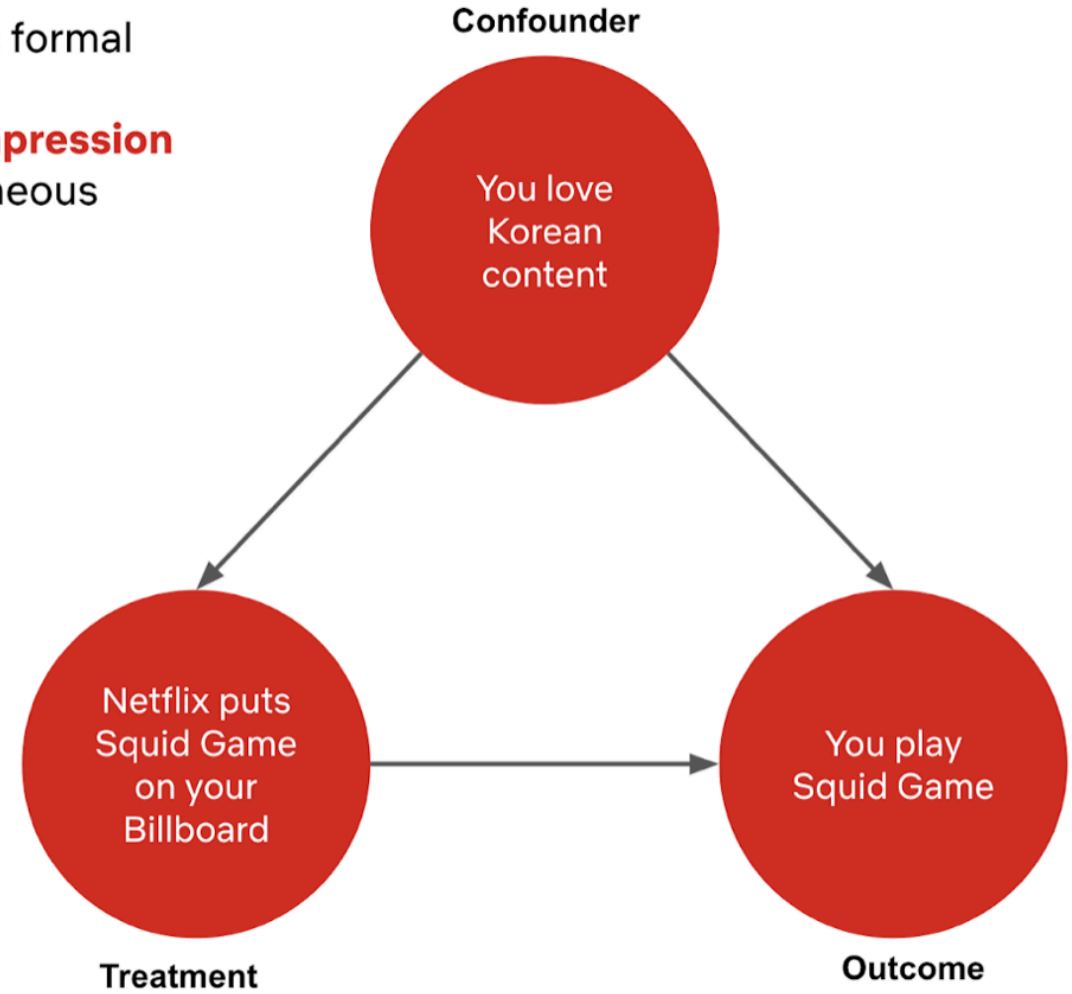
March 08, 2022, 1:12 PM

A COMMUTER BOARDS A BAY AREA RAPID TRANSIT (BART) TRAIN IN THE NEW MONTGOMERY STATION IN SAN FRANCISCO, CALIFORNIA, AS SEEN IN MARCH 2022. (PHOTOGRAPHER: DAVID PAUL MORRIS—BLOOMBERG/GETTY IMAGES)

What problems are data scientists working on?

Causality

Causal Inference provides formal tools to tease out the true **incremental** value of an **impression** for each profile: Heterogeneous Treatment Effect (**HTE**)



Compared to machine learning, causal inference allows us to build a robust framework that controls for confounders in order to estimate the true incremental impact to members

Prediction

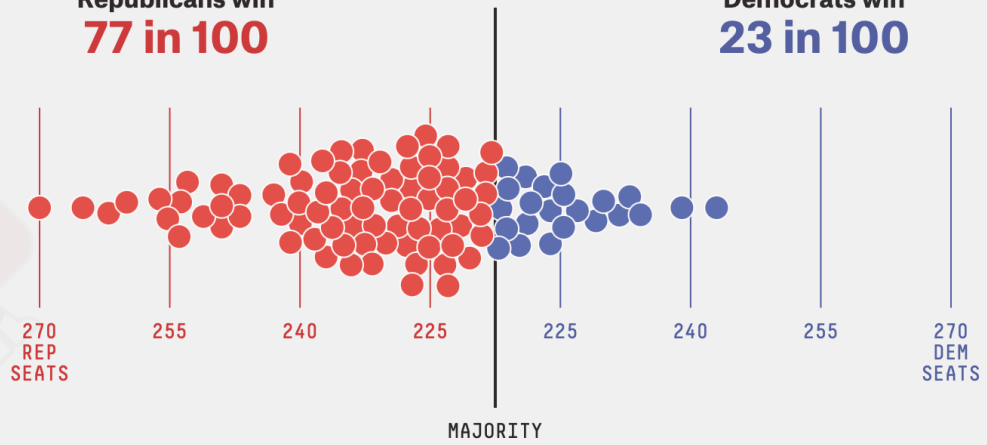
UPDATED 17 MINUTES AGO

Republicans are *favored* to win the House

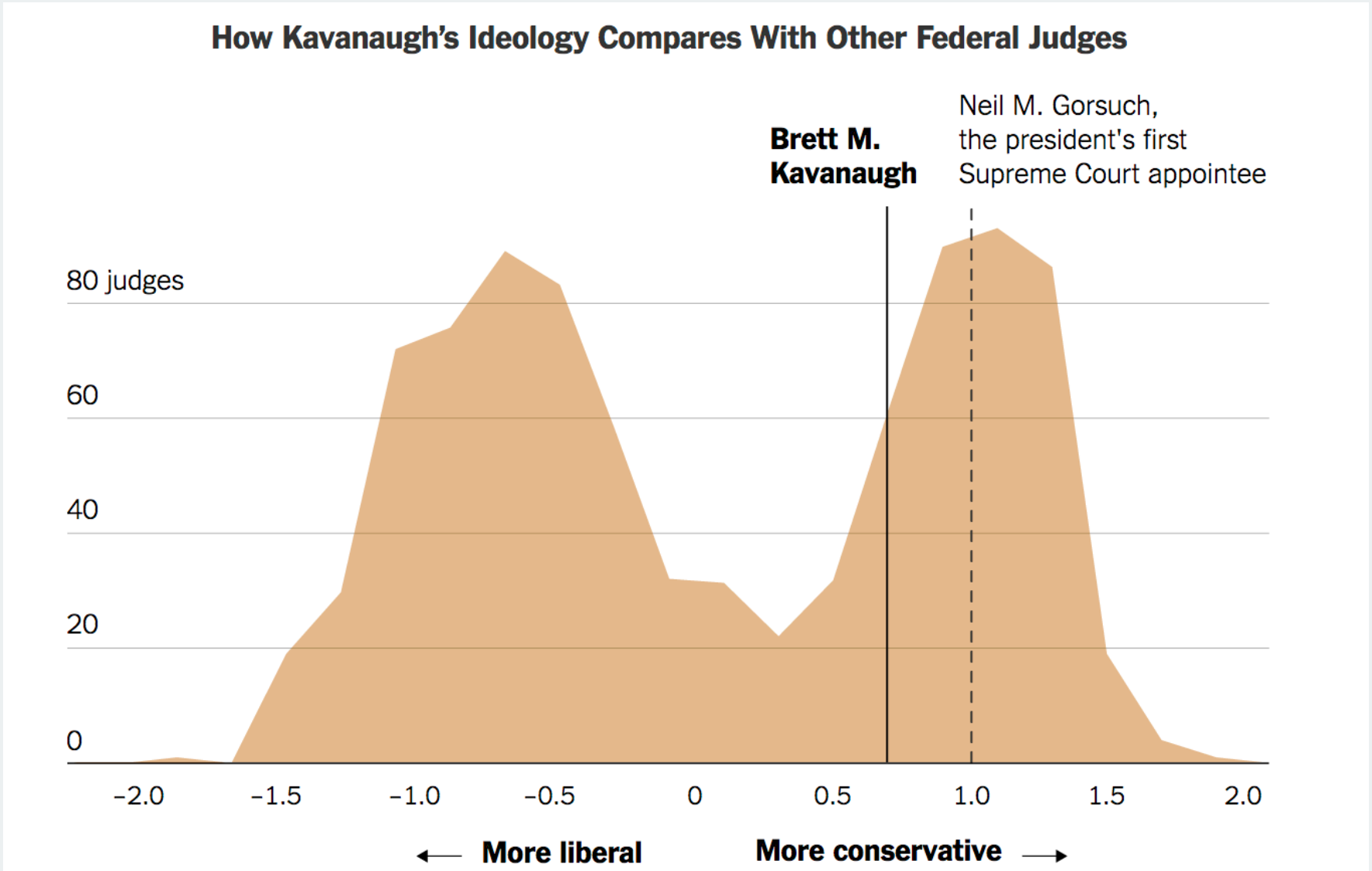
The Deluxe version of our model simulates the election 40,000 times to see which party wins the House most often. This sample of 100 outcomes gives you an idea of the range of scenarios the model considers possible.

Republicans win
77 in 100

Democrats win
23 in 100



Measurement



Understanding the socioeconomic world

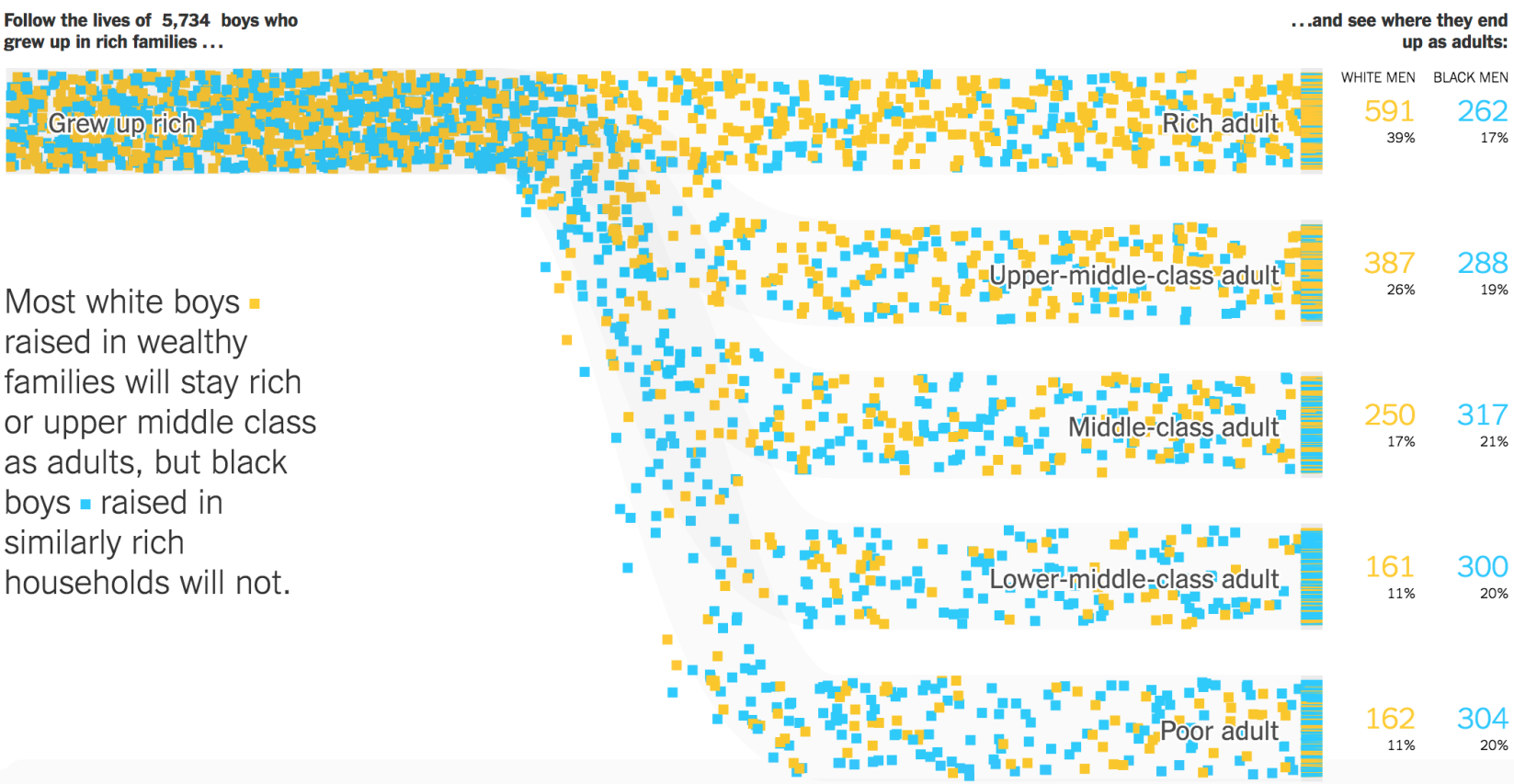
HOME SEARCH

The New York Times

SHARE

Extensive Data Shows Punishing Reach of Racism for Black Boys

By **EMILY BADGER, CLAIRE CAIN MILLER, ADAM PEARCE** and **KEVIN QUEALY** MARCH 19, 2018

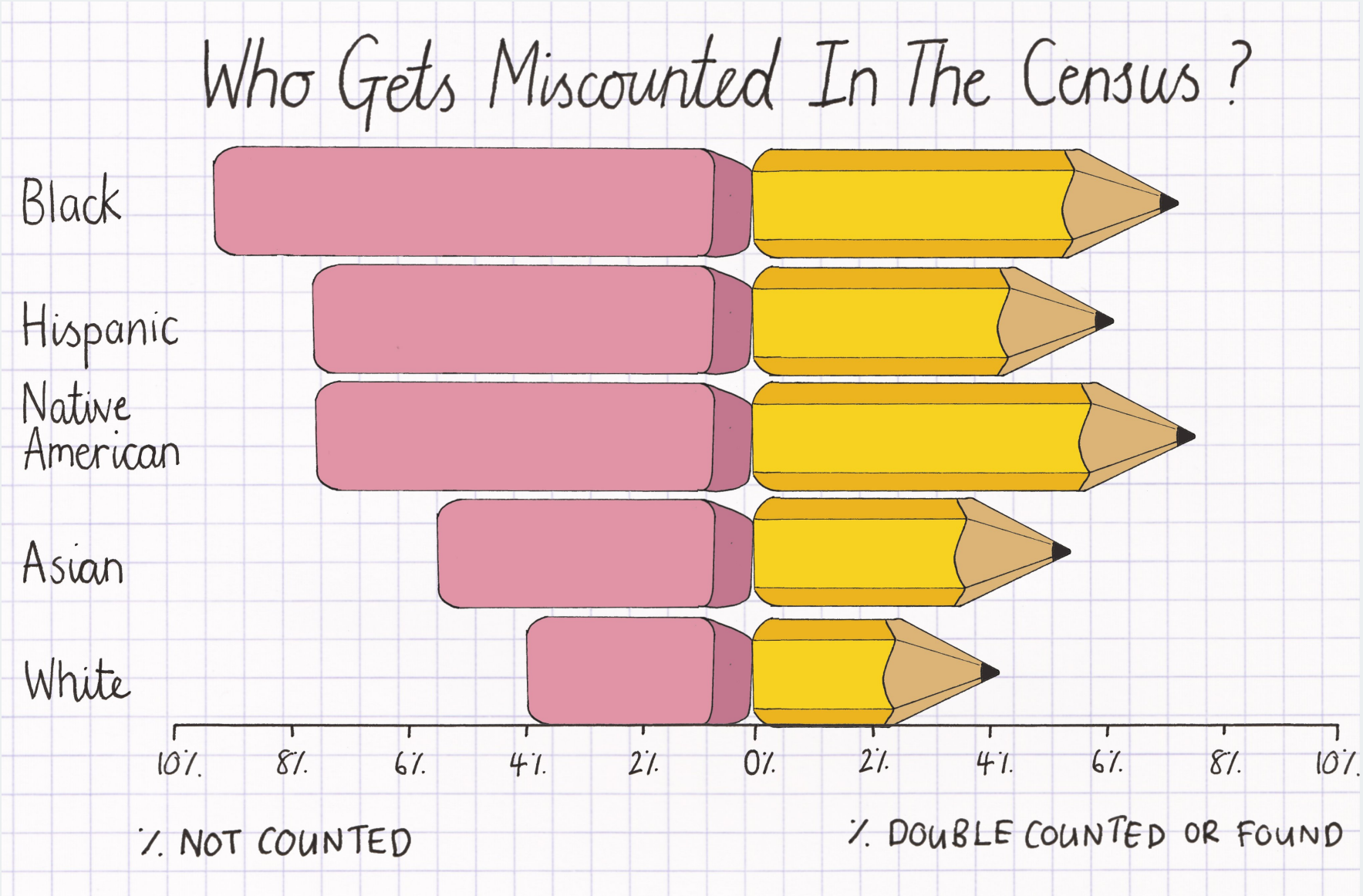


Adult outcomes reflect household incomes in 2014 and 2015.

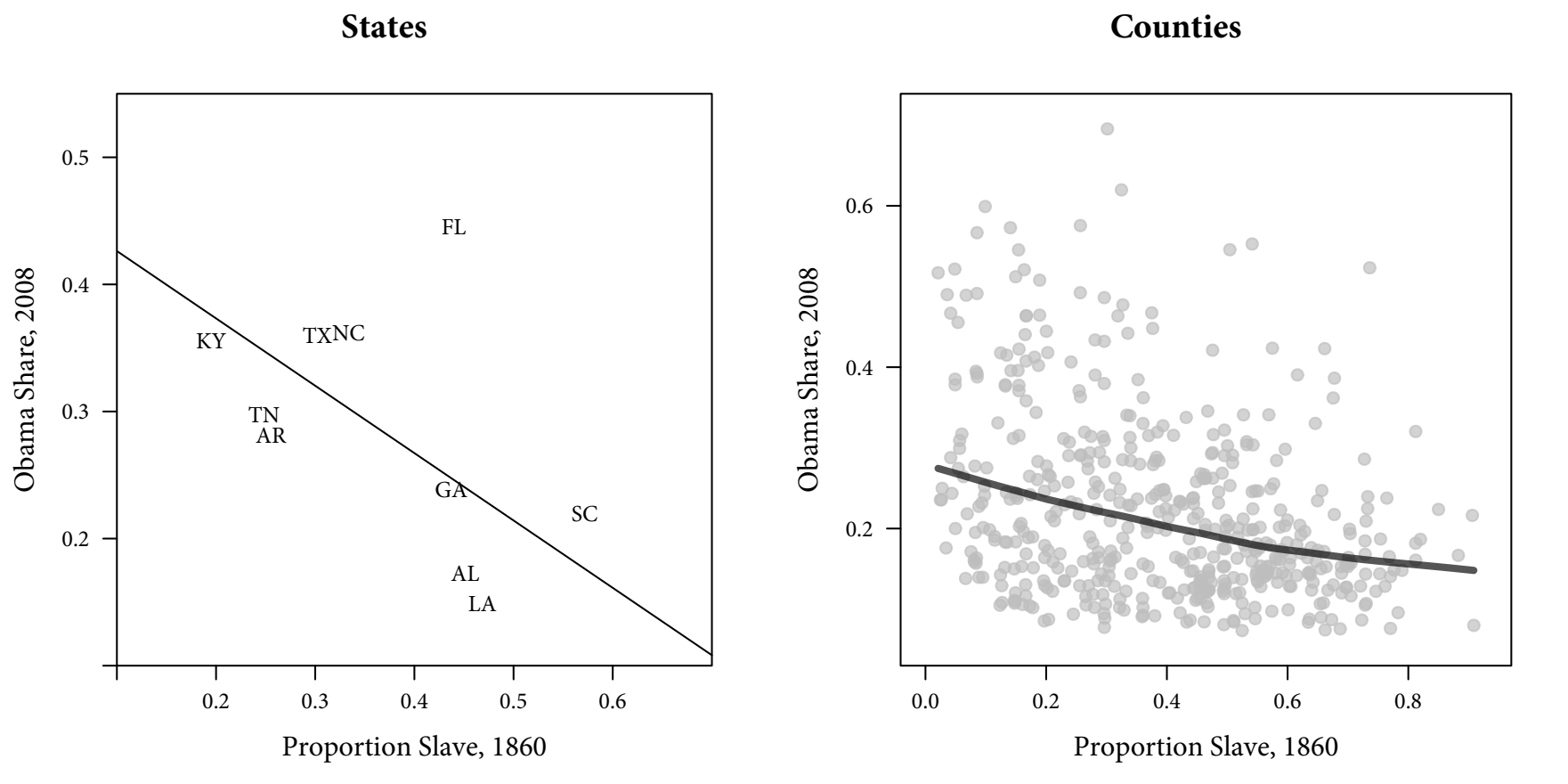
Making government work better

Topic	Day	Week	Month	QTR
311 CALL CENTER PERFORMANCE			0.94	0.93
CODE ENFORCEMENT ON-TIME %	1.23	1.24	1.24	1.24
CODE ENFORCEMENT TRASH COLLECTION	1.25	1.18	1.15	1.10
GRAFFITI ON-TIME %	0.33	0.13	0.20	0.27
MISSED TRASH ON-TIME %	1.21	1.20	1.20	1.20
PARKS MAINTENANCE ON-TIME %	0.82	0.83	0.90	0.88
POTHOLE ON-TIME %	1.25	0.88	0.69	0.67
SIGN INSTALLATION ON-TIME %	1.00	0.23	0.24	0.49
SIGNAL REPAIR ON-TIME %	1.25	1.25	1.10	1.09
STREETLIGHT ON-TIME %	0.55	0.60	0.56	0.54
TREE MAINTENANCE ON-TIME %	1.19	1.18	1.17	1.13
ON-TIME PERMIT REVIEWS	0.88	0.88	0.85	0.81
LIBRARY USERS	1.51	1.42	1.43	1.42
BPS ATTENDANCE				0.90
BFD RESPONSE TIME	0.91	0.94	0.94	0.94
BFD INCIDENTS	1.03	0.92	0.93	0.94
EMS RESPONSE TIME	0.90	0.84	0.84	0.84
PART 1 CRIMES	2.26	1.48	1.41	1.40

Combining art and data to inform



Understanding how the past matters



2/ Course Details

About me

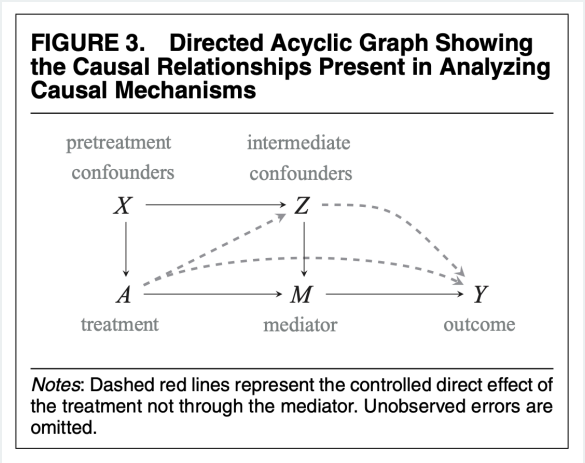
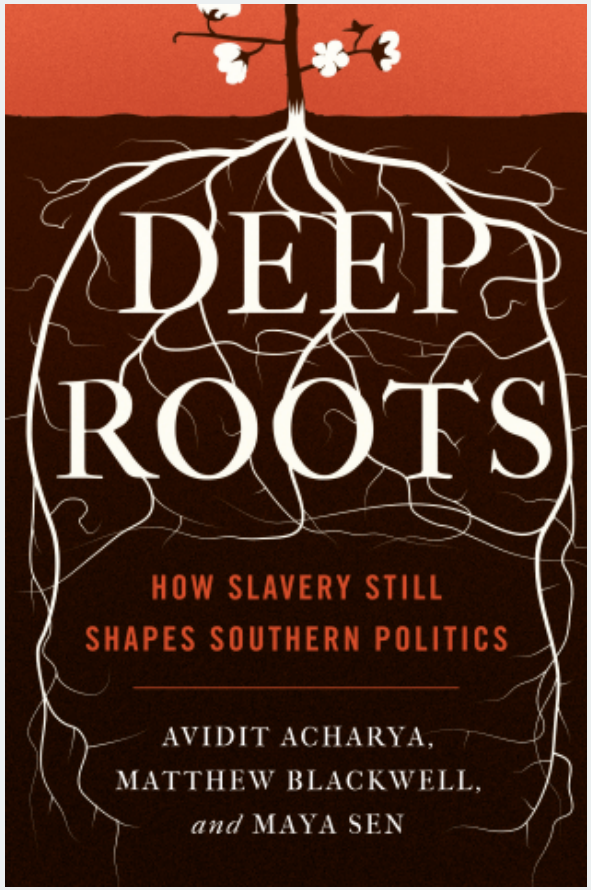


FIGURE 3. Directed Acyclic Graph Showing the Causal Relationships Present in Analyzing Causal Mechanisms

Notes: Dashed red lines represent the controlled direct effect of the treatment not through the mediator. Unobserved errors are omitted.



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- Understand uncertainty in data analysis and how to quantify it
- Use professional tools like R, RStudio, git, and GitHub

Teaching philosophy

- Deliberate pacing and tons of support.

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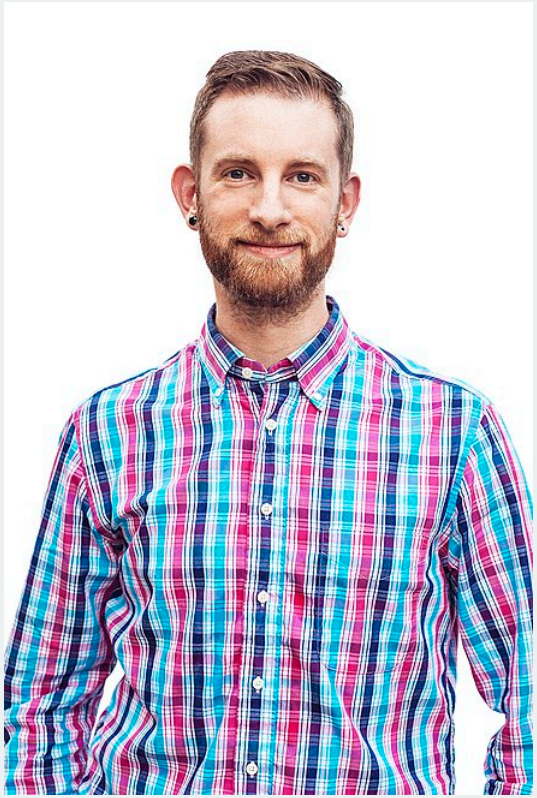
- Practice, practice, practice.

Pep talk, part I



Hadley Wickham (chief data scientist at RStudio)

It's easy when you start out programming to get really frustrated and think, "Oh it's me, I'm really stupid," or, "I'm not made out to program." But, that is absolutely not the case. Everyone gets frustrated. I still get frustrated occasionally when writing R code. It's just a natural part of programming. So, it happens to everyone and gets less and less over time. Don't blame yourself. Just take a break, do something fun, and then come back and try again later.

Pep talk, part II

Hadley Wickham 
@hadleywickham

The only way to write good code is to write tons of shitty code first. Feeling shame about bad code stops you from getting to good code

10:11 AM · Apr 17, 2015 · Echofon

892 Retweets **55** Quote Tweets **1,144** Likes

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- Optional speaker series with industry data scientists, TBA!

Teaching fellows

Angelo Dagonel

Dorothy Manevich

Sooahn Shin

Dominic Valentino

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- Lots of help in section, study halls, office hours.

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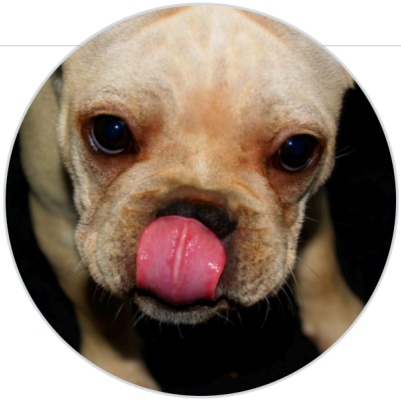
  - Your GitHub profile can showcase your amazing new skills with data!

Sample GitHub profile

Overview | Repositories 227 | Projects | Packages | Stars 808



Mara Averick
batpigandme

Follow

742 followers · **136** following

@tidyverse
Missoula, MT
@dataandme

Achievements

x2 x3

Beta Send feedback

batpigandme / README.md

Hieeeee! I'm Mara. 👋

```
> # I'm the tidyverse developer advocate
> tidyverse::tidyverse_logo()
 __  _     __    .     ⬡           ⬢  .
 / /_(_)__/ /_ ___  _____ _______ ___
/ __/ / _  / // / |/ / -_) __(_-</ -_)
\__/_/\_,_/\_, /|___/\__/_/ /___/\__/
     ⬢   . /___/      ⬡      .      ⬢
>
```

Followers 742 | Follow @dataandme 47k

Popular repositories

night-owlish Public
🌙🦉 An RStudio, tmThemes, and Ace editor adaptation of @sdras' Night Owl VS Code theme...
CSS ☆ 125 49

tverse_contributing Public
"contributing to the tidyverse" from rstudio::conf(2018)
☆ 23

GovCodes workshops

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    - Good to attend if Problem Set 0 is giving you trouble.

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    - First item in your public data portfolio

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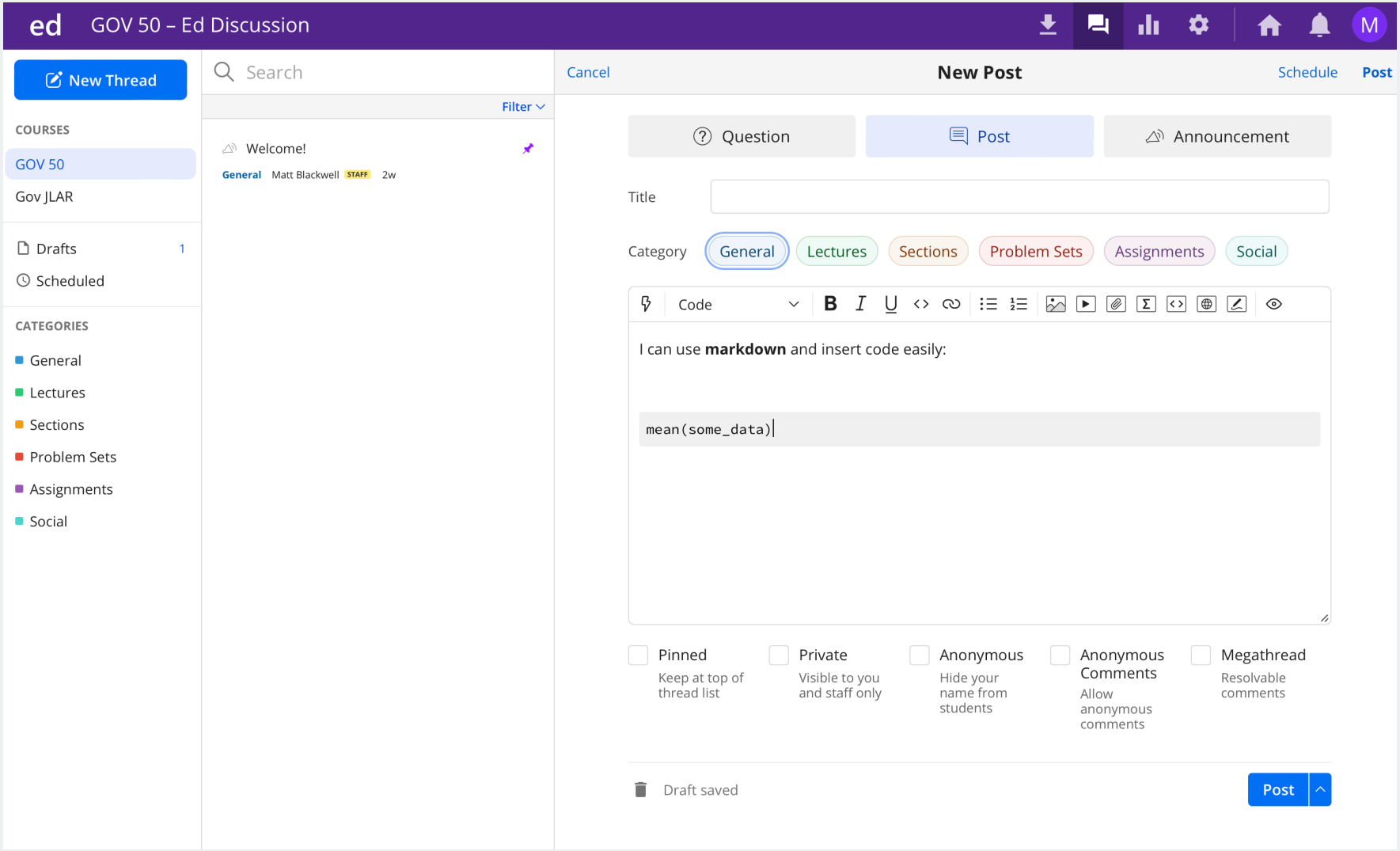
- Lecture/HW won't be the first time you're trying some code!

Ed discussion board



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- **Bump-up**: we bump up grades of students close to the cutoff who make valuable contributions to the course.

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- Bottom line: **we want you to succeed in this class!**

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- **Tell your friends**: data science is more fun with friends along for the journey.