# How to use Data for Evil

## A Guide on how to Mislead with Data

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# Who Am I?

- Owner & Data Scientist @ RLE Analytics
- Adjunct Professor of Data Science @ Villanova
- Masters from Villanova
- Undergrad from Drexel
- Maryland Native; DelCo Import
- Best of all: Dad

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# Manipulating people with data is nothing new

# Lying with Statistics

"Figures often beguile me, particularly when I have the arranging of them myself; in which case the remark attributed to [then British Prime Minister, Benjamin Disraeli] would often apply with justice and force: 'There are three kinds of lies: **lies, damned lies, and statistics**.'"

- Mark Twain, 1907

(emphasis and underline my own)

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Alright, then let’s get lying…


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# How to do Data Visualizations [badly]!

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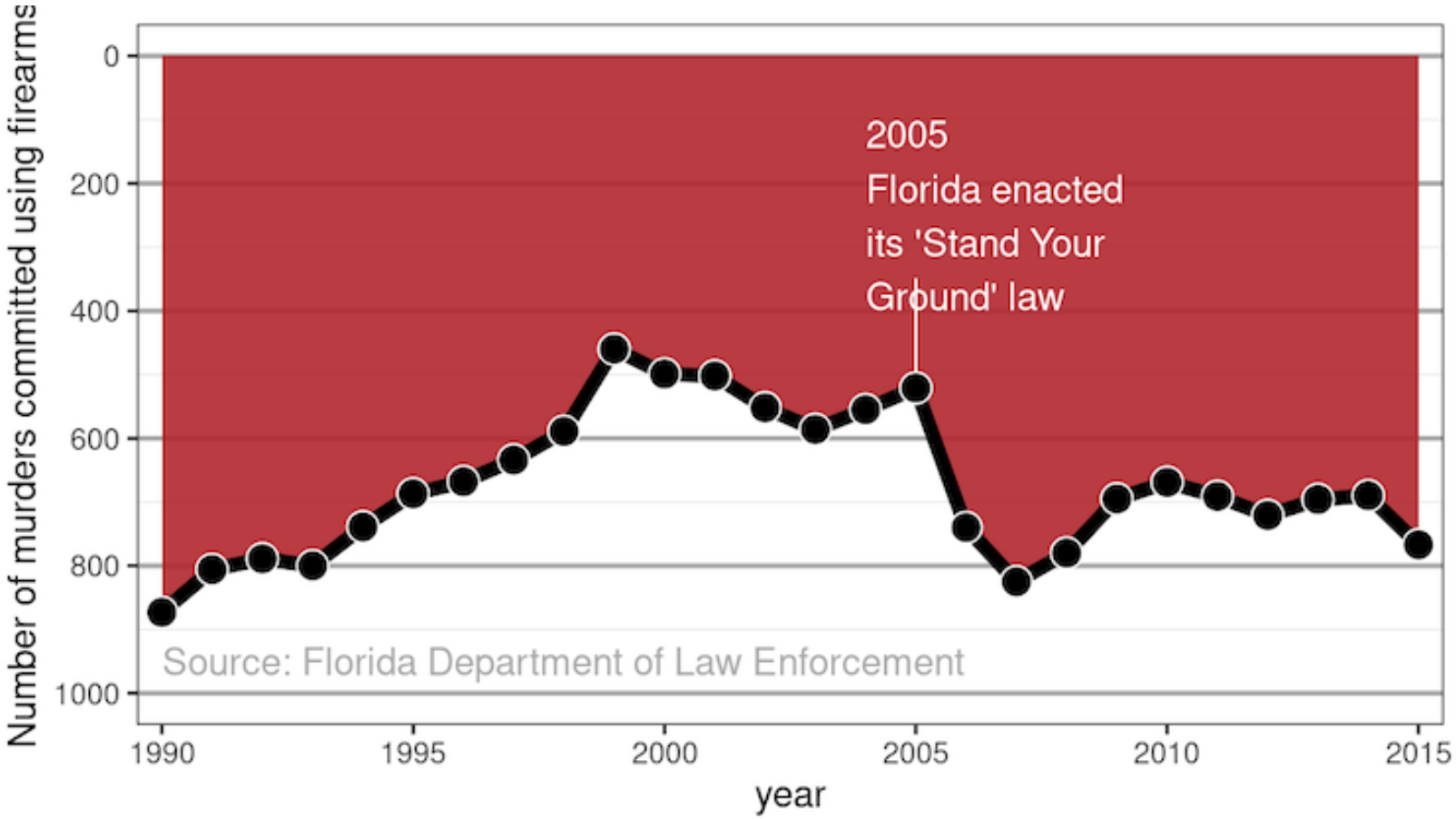
# Obviously, the ‘Stand Your Ground’ law was a good thing if you don’t like murder committed with a firearm

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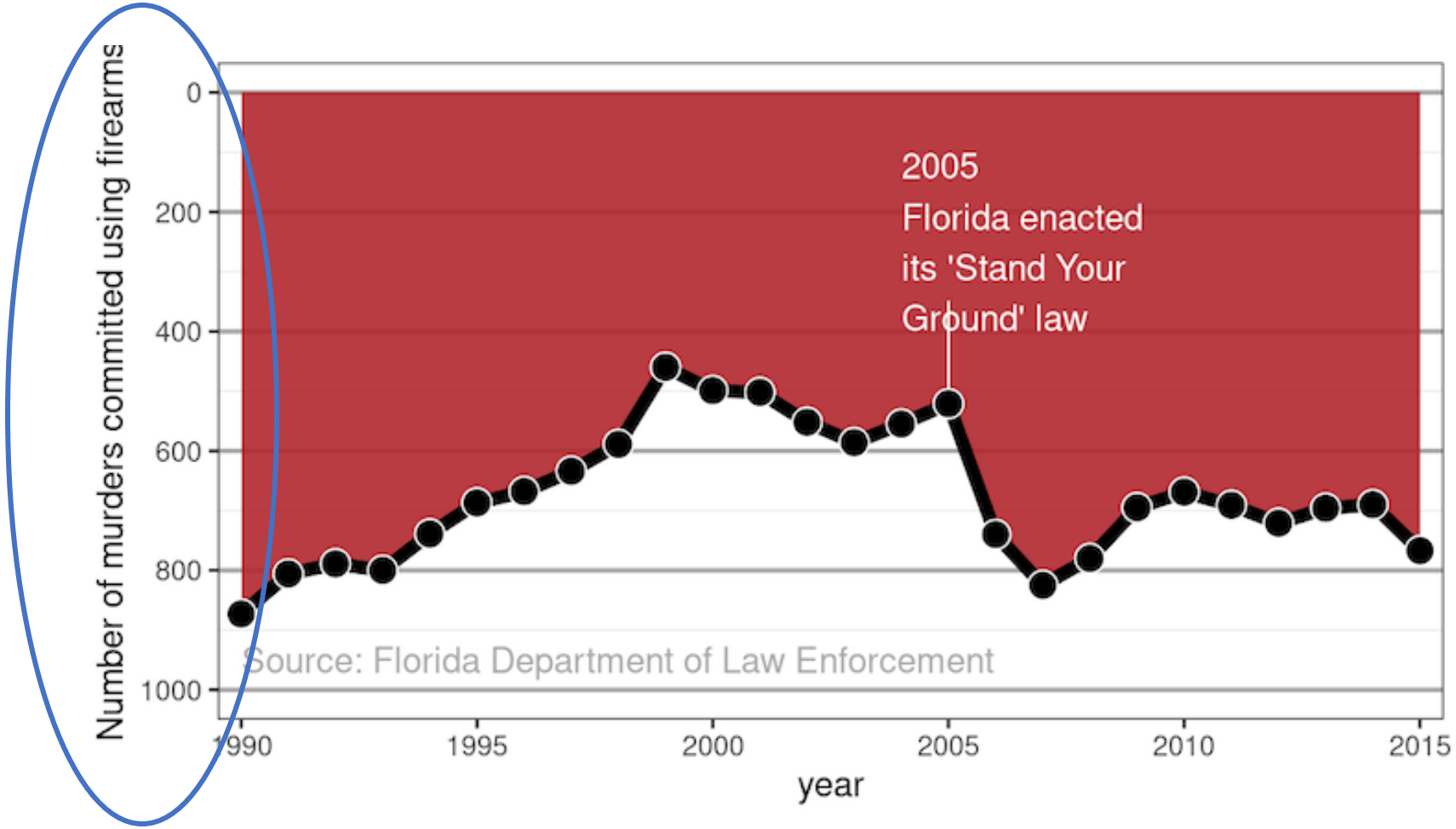
# Lesson 1: Don’t like the trend? Just flip the axis!

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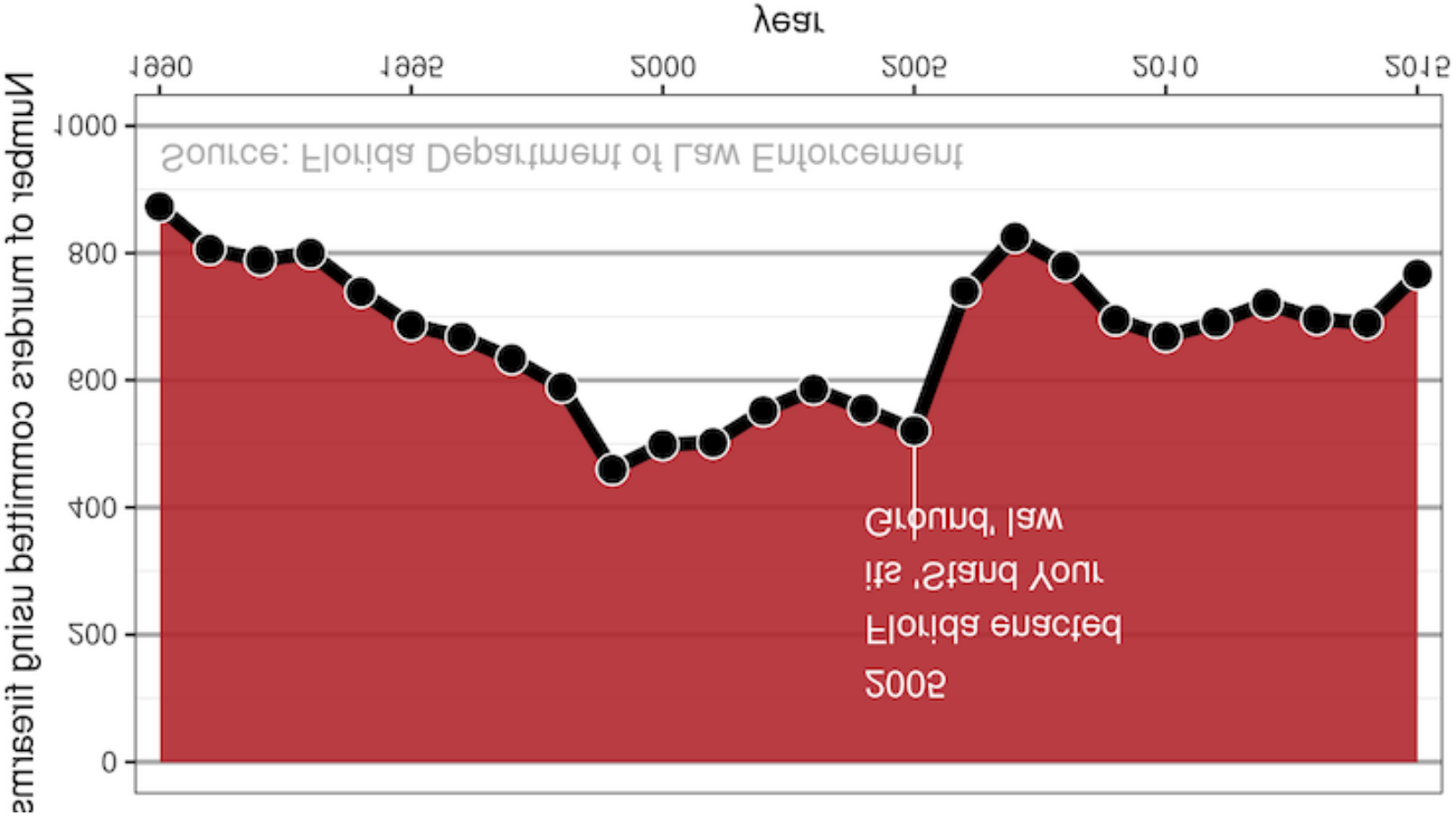
# There we go – I fixed it (kind of)

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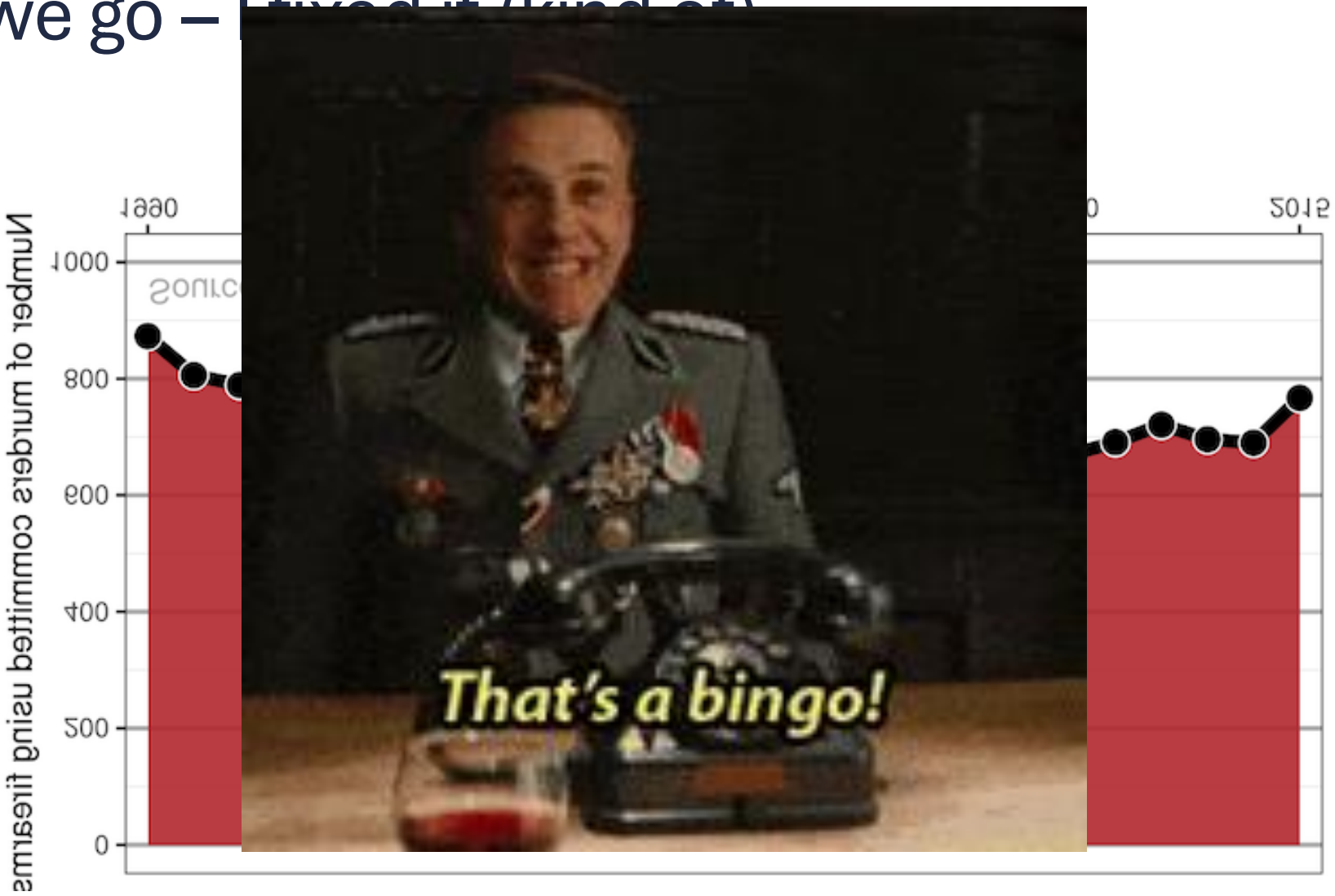


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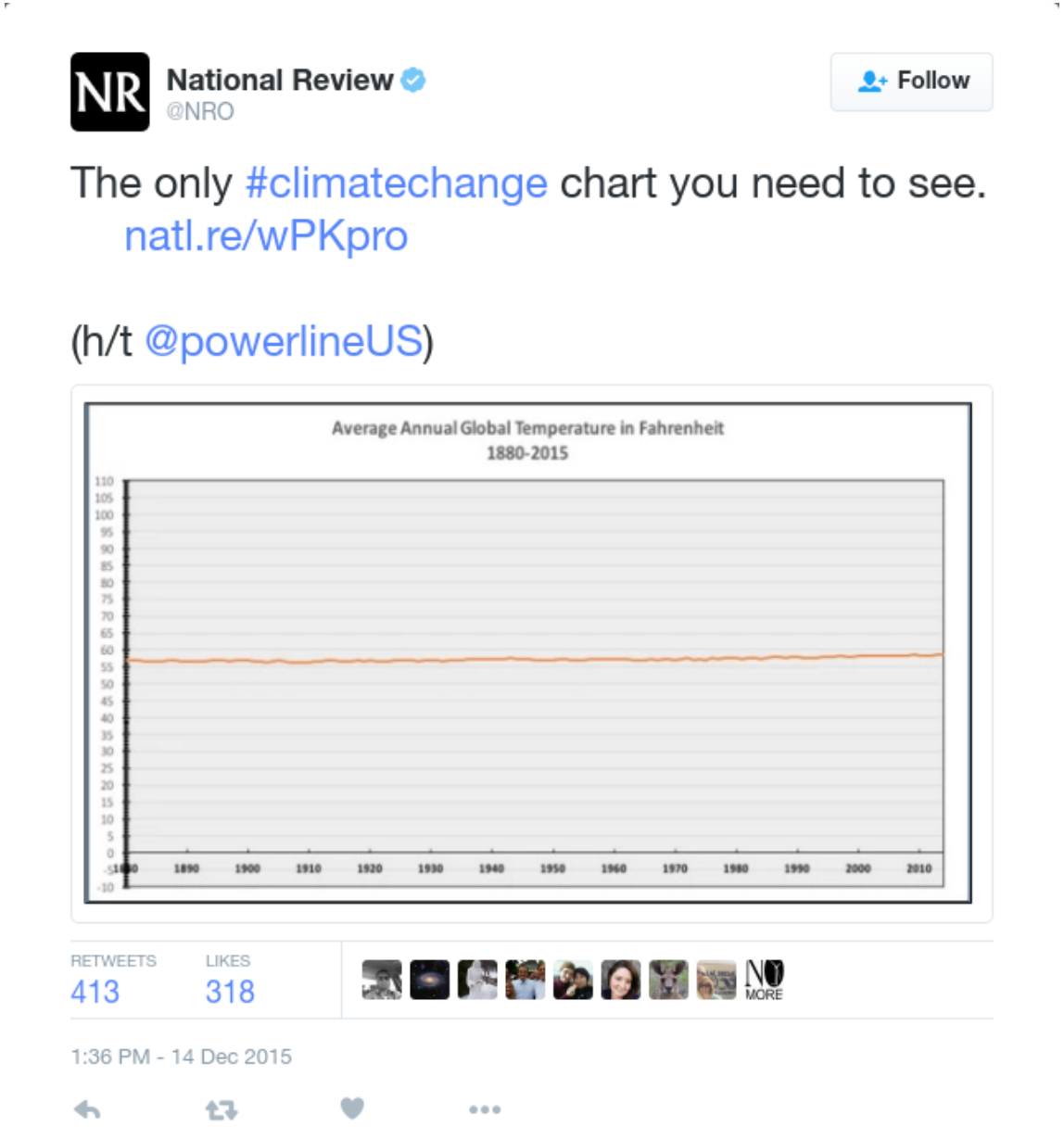
You people out there worried about climate change are foolish

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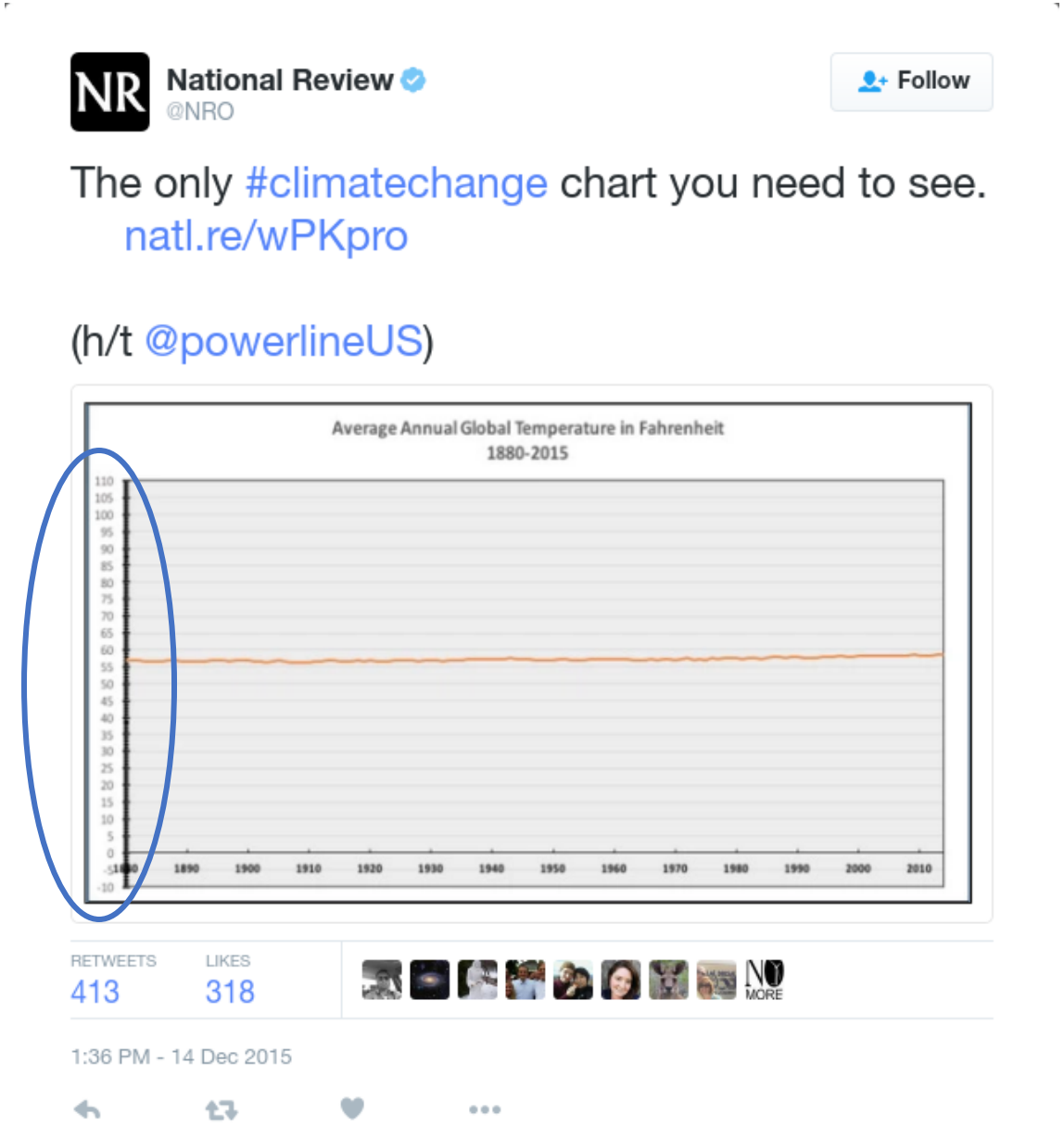
# Lesson 2: Don’t like the trend? Zoom out the y-axis…

by like, a **LOT**

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Everything looks smaller from far away!


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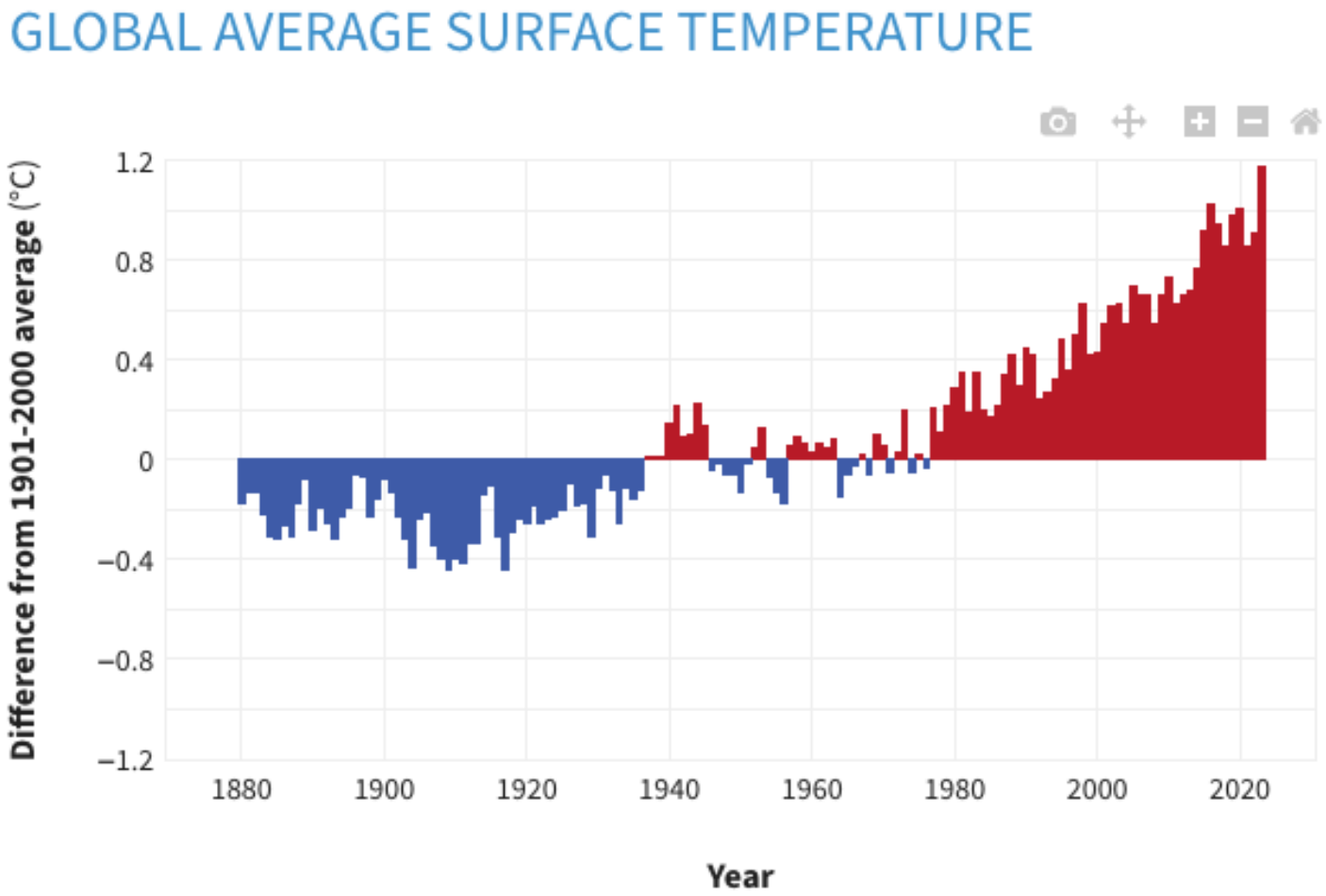
# These fusspots out here putting out reasonable global warming visualizations…

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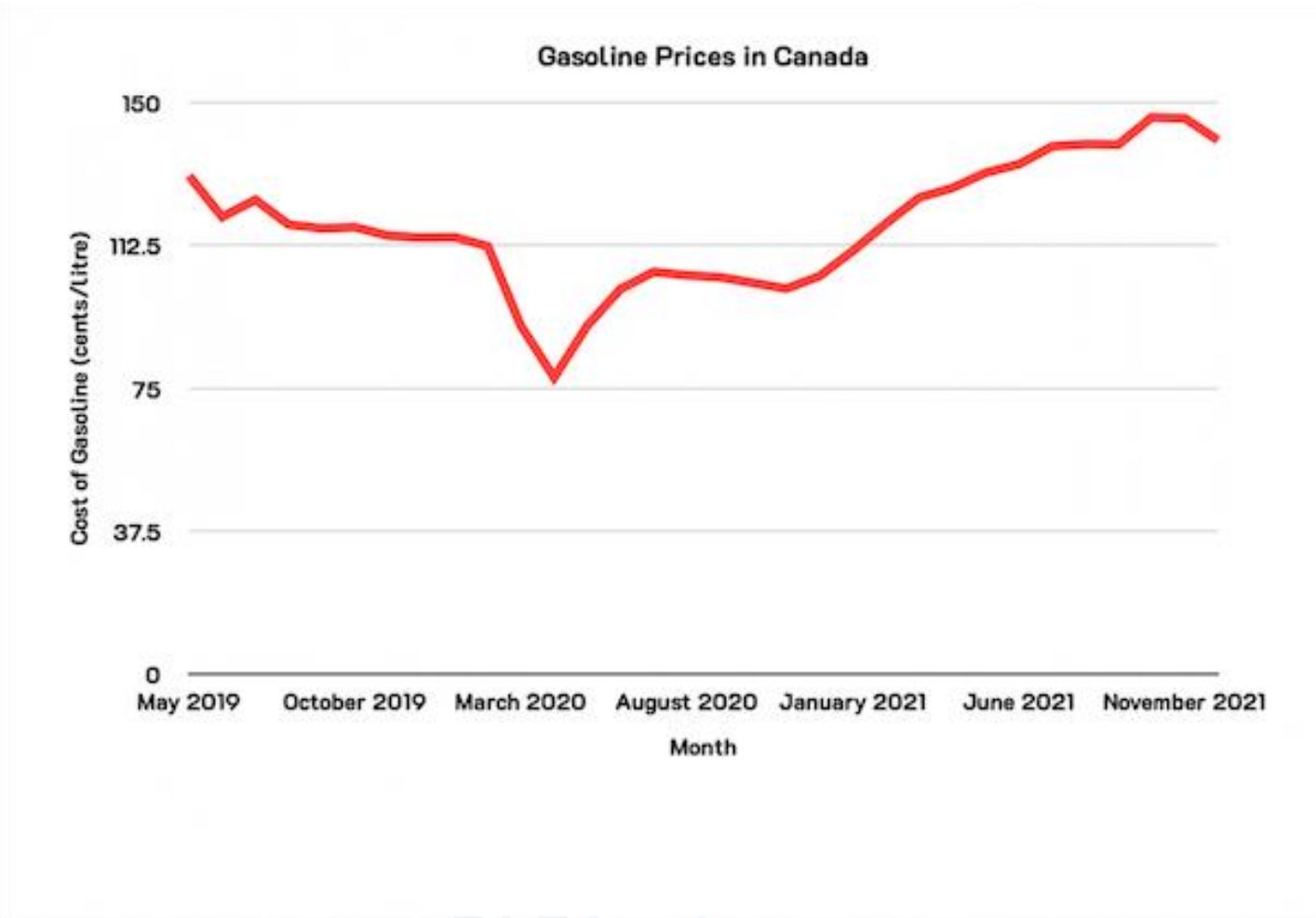
# Flipping the axis or zooming out not your speed? Still have an inconvenient trend?

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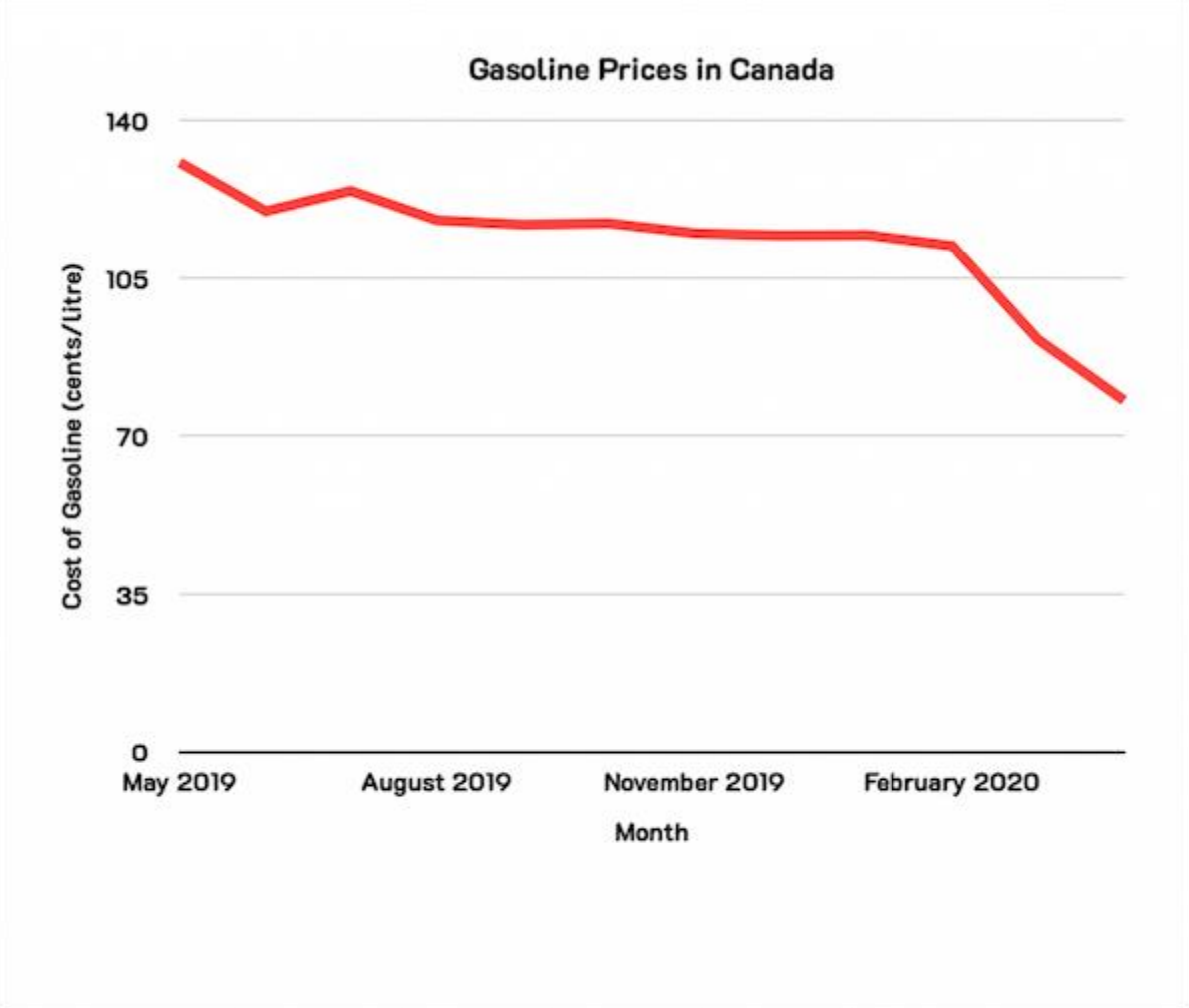
Lesson 3: Omit the inconvenient data! Now we have the trend the way we like it.

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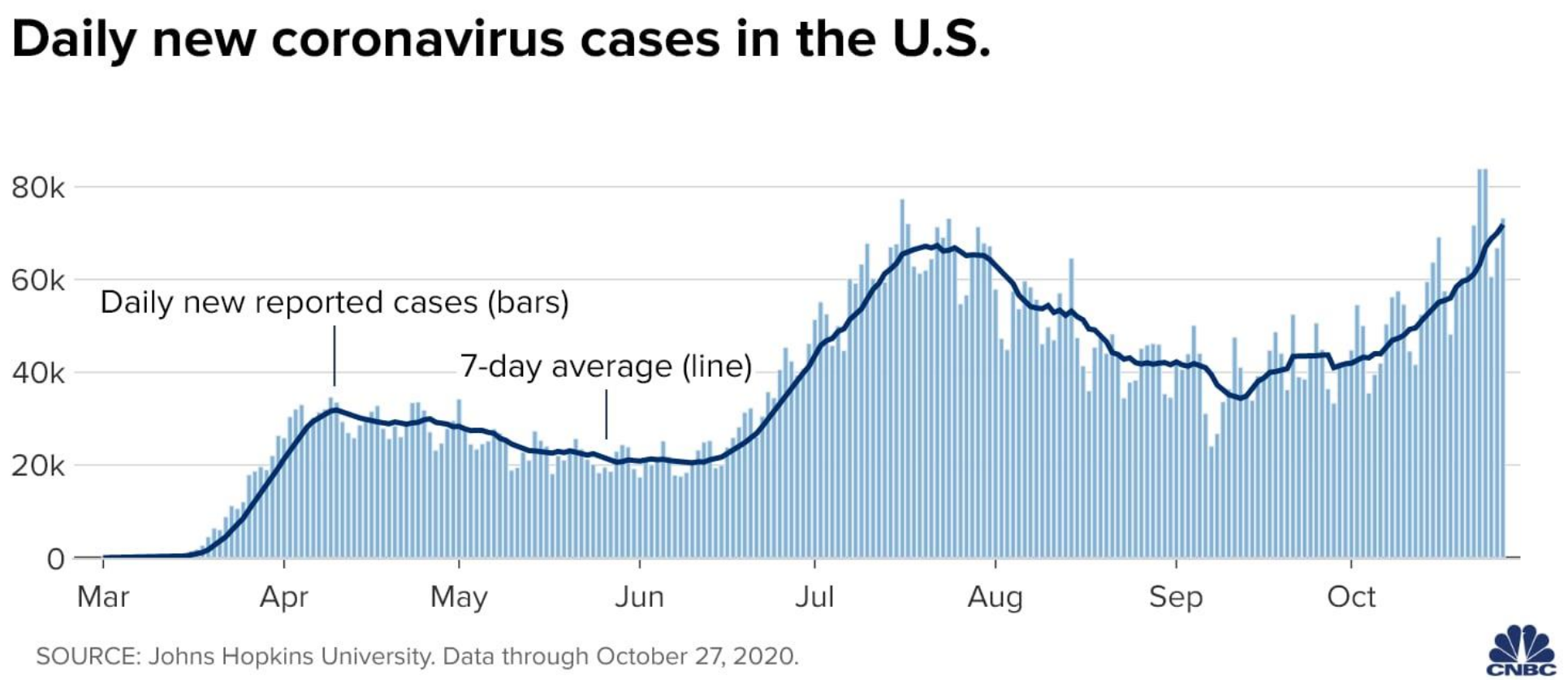
# Getting desperate for good news and the last few tricks are played out?

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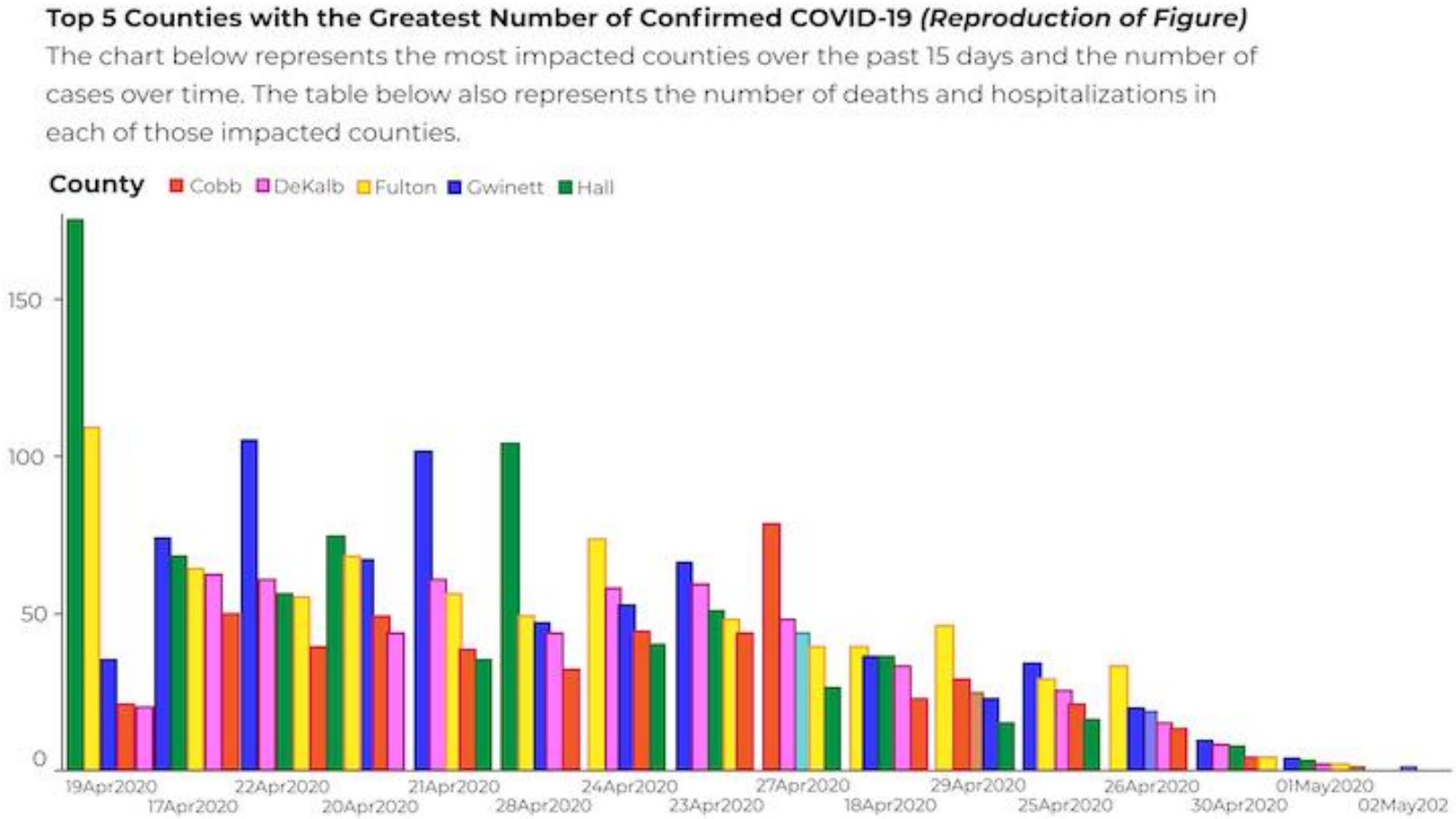
# Lesson 4: Forget about ordinality! Change the order of dates to make it obvious that your policies are working perfectly

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**Top 5 Counties with the Greatest Number of Confirmed COVID-19** ***(Reproduction of Figure)***

The chart below represents the most impacted counties over the past 15 days and the number of cases over time. The table below also represents the number of deaths and hospitalizations in each of those impacted counties.





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Lesson 4: Forg
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-19 *(Reproduction of Figure)*
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aths and hospitalizations in

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17Apr2020

20 01May2020
30Apr2020 02May202


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# Beyond Data Viz! Let’s Build Some Predictive Models!

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Hey – You have a face! Let me use a picture of it to predict your sexual orientation?

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Hey – You have a face! Let me use a picture of it to predict your sexual orientation?

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# BECAUSE WE CAN, BIZNATCHES!

- Y. Wang and Kosinski (2018) used [Machine Learning] to build a classifier for sexual orientation based on pictures of people's faces
- The authors claim that if given five images of a person's face, their model would correctly predict the sexual orientation of 91% of men and 83% of women

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- Y. Wang
  classifi
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- The aut
  model
  men ar


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# Lesson 5a: If you are going to be suspicious, go all in… don’t take time to call out potentials for harm

The authors highlight the potential harm that their work could do in their abstract:

*“Additionally, given that companies and governments are increasingly using computer vision algorithms to detect people’s intimate traits, our findings expose a threat to the privacy and safety of gay men and women.”*

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# Lesson 3 Revisited: Definitely only show the favorable statistics

- The authors claim that if given five images of a person's face, their model would correctly predict the sexual orientation of 91% of men and 83% of women
- I wonder how these statistics look if we segmented between heterosexual and homosexual individuals? Gallup estimates that 7.2% of adults identify as LGBT in 2022 – very imbalanced data.
- If we were to just predict everyone is heterosexual, then we'd be 92.8% correct… Better than their model (oops). *Quick shout out to a student of mine, Joey C., who highlighted this in our discussion last week.*

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# Lesson 5b: Ignore the people and their “facts,” too…

A subsequent article in The New Yorker also notes that:

*“the study consisted entirely of white faces, but only because the dating site had served up too few faces of color to provide for meaningful analysis.”*

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# Moving beyond faces – let's build models to tackle criminal recidivism!

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# An Algorithm can do better than judges, who get hungry

There is a criminal recidivism algorithm used in several states

The algorithm returns predictions about how likely a criminal is to commit another crime based on a survey of 137 questions

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# None of the questions, however, ask about race, so why then does ProPublica think the algorithm is biased?

“Black defendants were still 77 percent more likely to be pegged as at higher risk of committing a future violent crime and 45 percent more likely to be predicted to commit a future crime of any kind.”

# Final Lesson: Figure out as many **proxy variables** as possible to hide the fact that you are using race and other protected variables in your algorithm

- Consider that one of the survey questions is “was one of your parents ever sent to jail or prison?”
- Who is more likely to answer this question “yes?” Why?

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Remember: These Lessons will Ensure your Success!


# Thank you!


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