

Session 11

PMAP 8921: Data Visualization with R Andrew Young School of Policy Studies Fall 2023

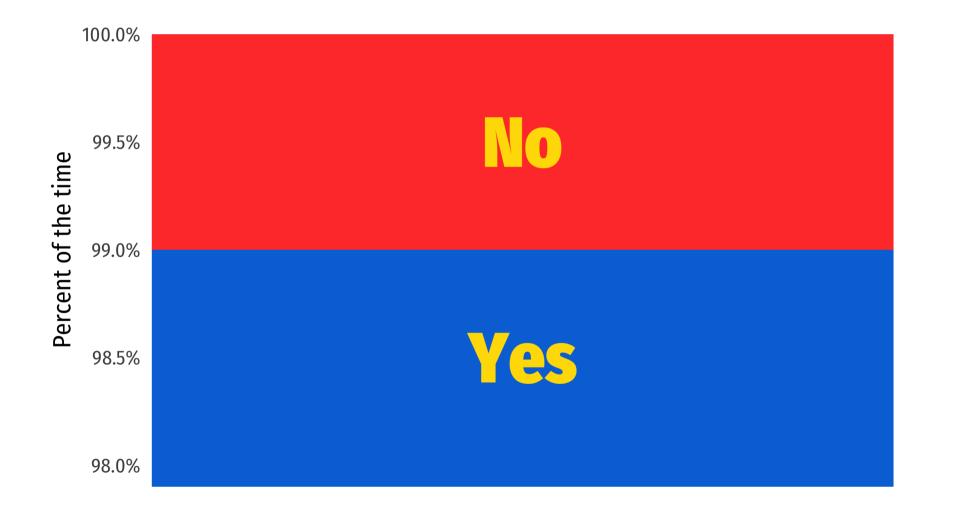
Plan for today

Axis issues

Visualizing time

Starting, ending, and decomposing time Axis issues

Is truncating the y-axis misleading?



Don't be too extreme!

It is actually more legal to truncate the y-axis than you might think!

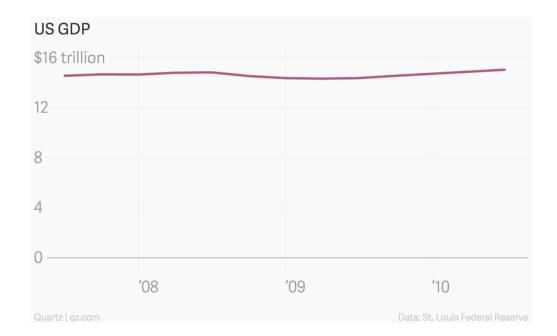
When small movements matter

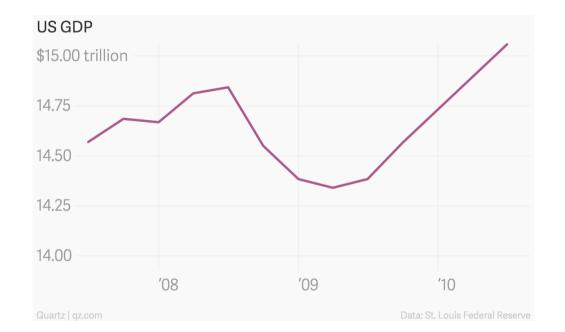
When the scale itself is distorted

When zero values are impossible

When is it okay to truncate?

When small movements matter





When is it okay to truncate?

When the scale itself is distorted

The Rating System Explained **** = The ride was good, great, legendary, mediocre, average, decent, okay, maybe he missed a social cue or made a bad joke, but at least he got me where I needed to go, of course he can improve!

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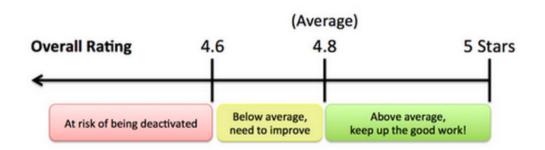
 $\star \star \star \star =$ This driver sucks, fire him <u>slowly</u>; it does not mean "average" or "above average". Too many of these and I may end up homeless.

 $\star \star \star$ = This driver sucks so bad I never want to see him again. It does not mean "average".

 \star = Serious offense, maybe the car had something dangerously wrong with it or he was doing 120 in a 40 mile zone

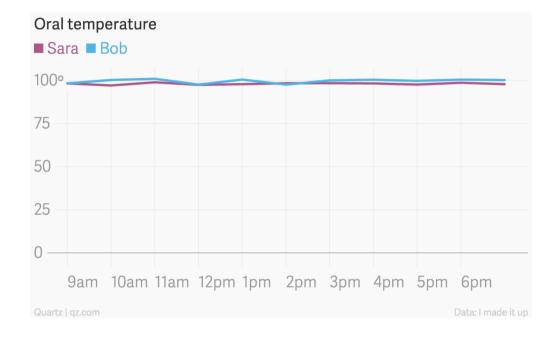
 \star = Horrendous; worst ride ever! Threats or acts of violence possibly made, perhaps a callous disregard for his own safety

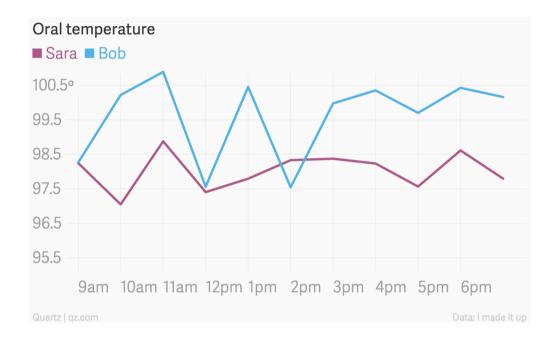
If I do or say something that you don't like, or if there is anything with my car, please tell me verbally so that I can rectify the wrong We're all friends here, so let's be open and honest!



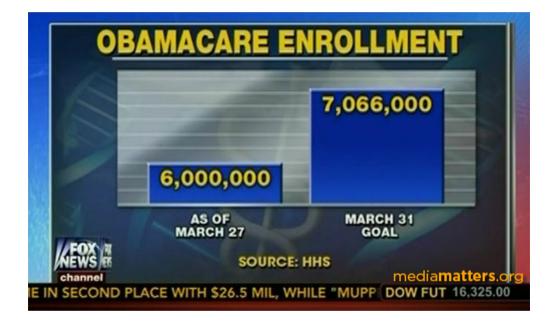
When is it okay to truncate?

When zero values are impossible

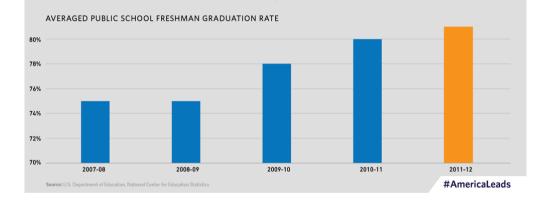




Never on bar charts



OUR HIGH SCHOOL GRADUATION RATE IS THE HIGHEST IT'S EVER BEEN



Zero is okay too!

Just because you don't *have to* start at 0 doesn't mean you should *never* start at 0

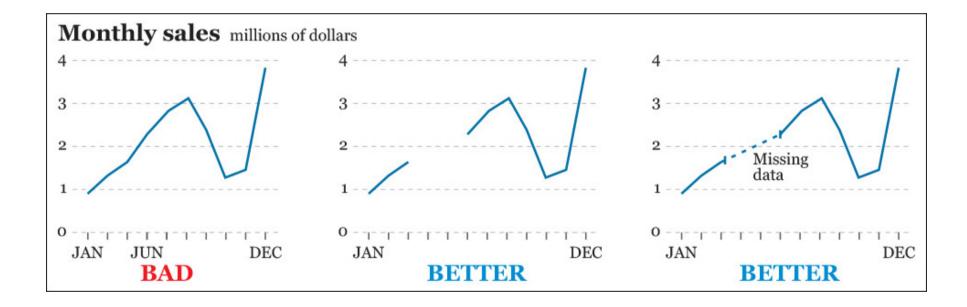
It's often a good idea!

Keep axis scales consistent

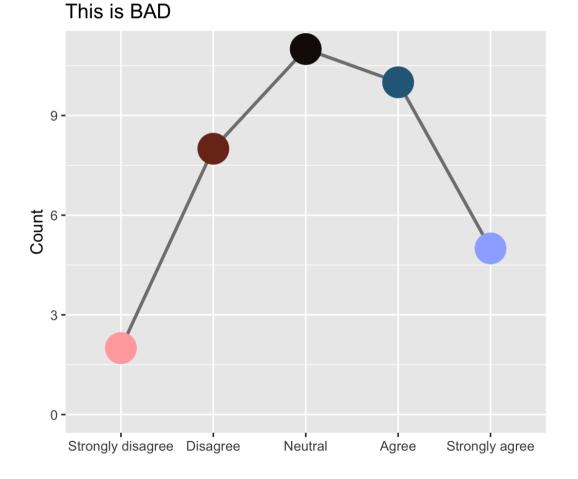


FOX affiliate in Colorado reporting on COVID-19 cases

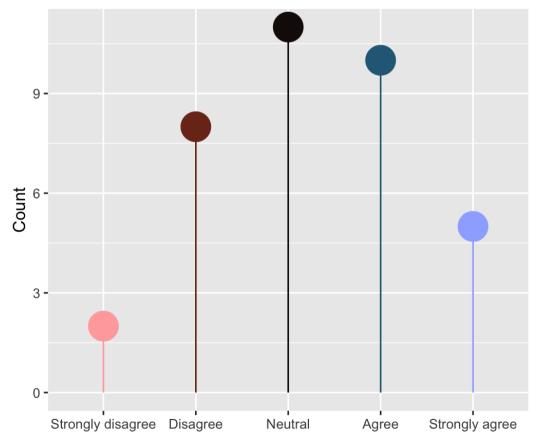
Keep axis scales consistent



Don't impute across categories



This is BETTER



Visualizing time

Showing changes over time

Time is just a variable that can be mapped to an aesthetic

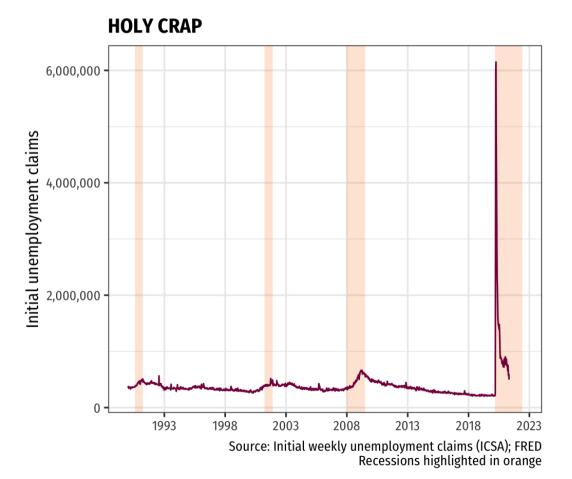
Can be used as x, y, color, fill, facet, and even animation

Can use all sorts of geom S: lines, columns, points, heatmaps, densities, maps, etc.

In general, follow reading conventions to show time progression:



Time on x-axis + geom_line/col()



The New York Times " "All the News That's Fit to Print" U.S. UNEMPLOYMENT IS WORST SINCE DEPRESSION eorgia Killing Puts Spotlight on a Police Force's Troubled Histo nril's Rate of 14.7% Long Path to Arrests of ofFoonom In Flynn Case, If West Wing Russia Inquiry Still Jen't Saf Is Any Offic s Barr's Target As Official Toll Ignores Reality, Marico's Hospitale Are Overry A Courd Wally I have imothy Ega

Front page of the New York Times, May 9, 2020

Time on x-axis + geom_tile()

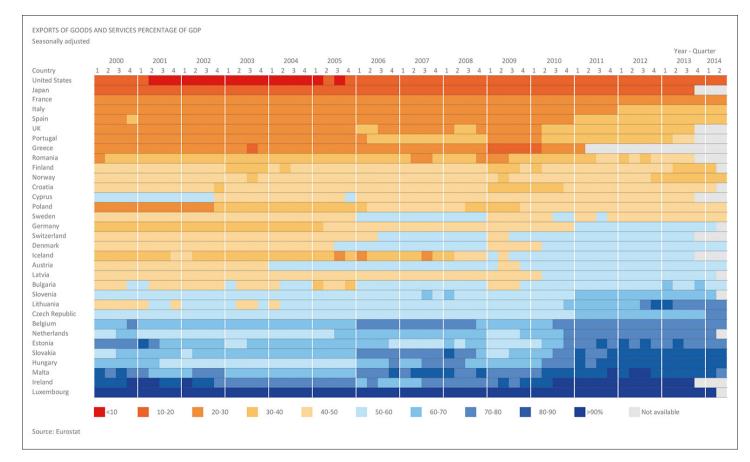
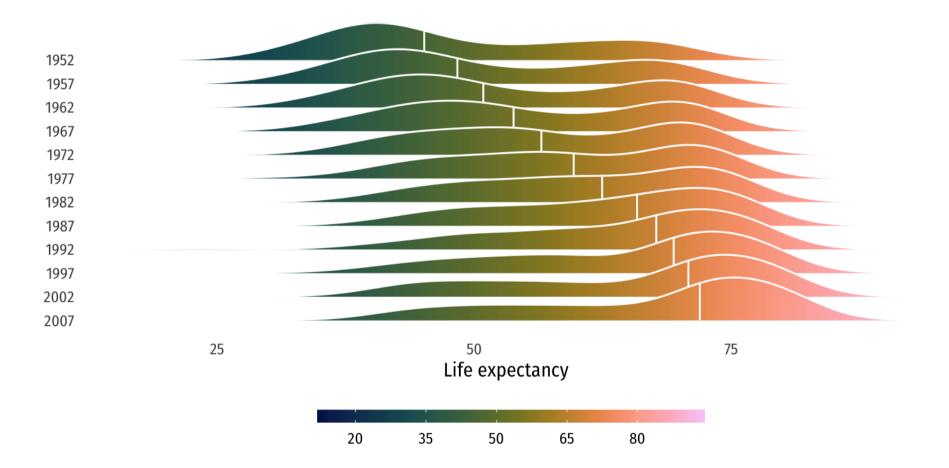


Figure 8.28 in Alberto Cairo's *The Truthful Art*: Heat map by Jorge Camões

Time on y-axis + geom_density()



Time in animation + geom_point()



Time in maps

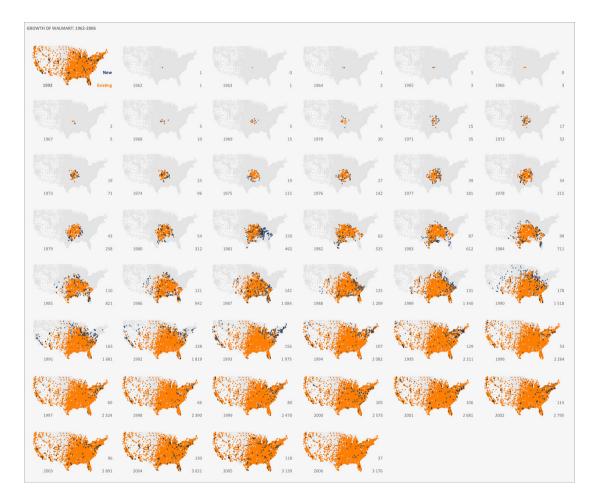
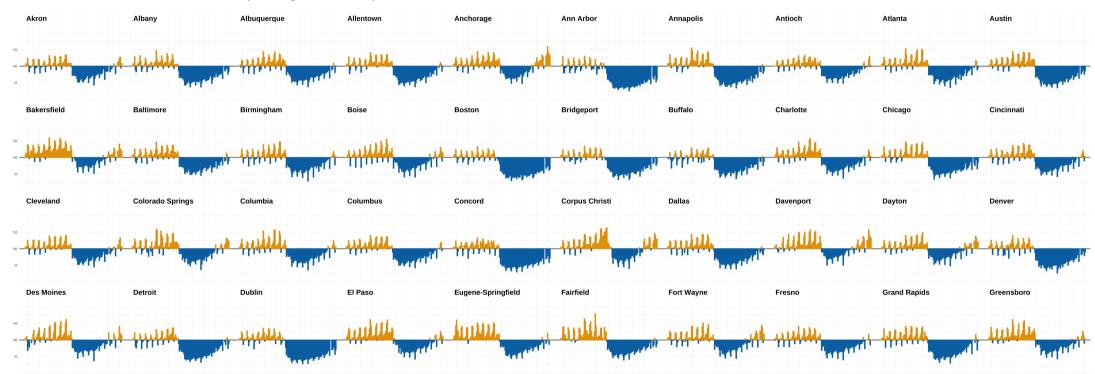


Figure 8.30 in Alberto Cairo's *The Truthful Art*: Map of the spread of Walmart by Jorge Camões

Time in geom_col() + small multiples

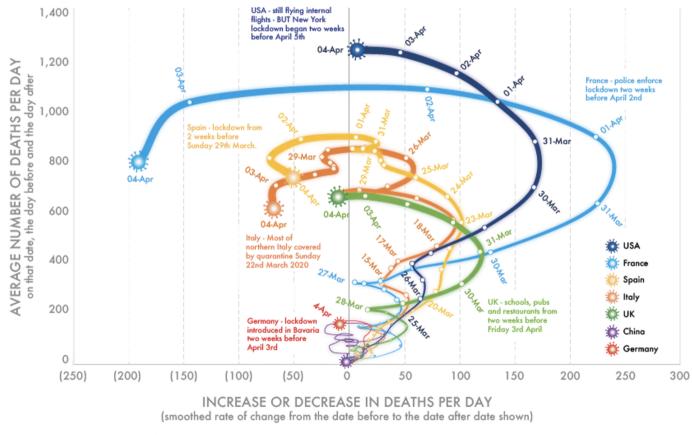
Driving Trends in One Hundred American Cities, January 13th - May 18th, 2020



Data are indexed to 100 for each city's usage on January 13th.

Kieran Healy, "The Kitchen Counter Observatory"

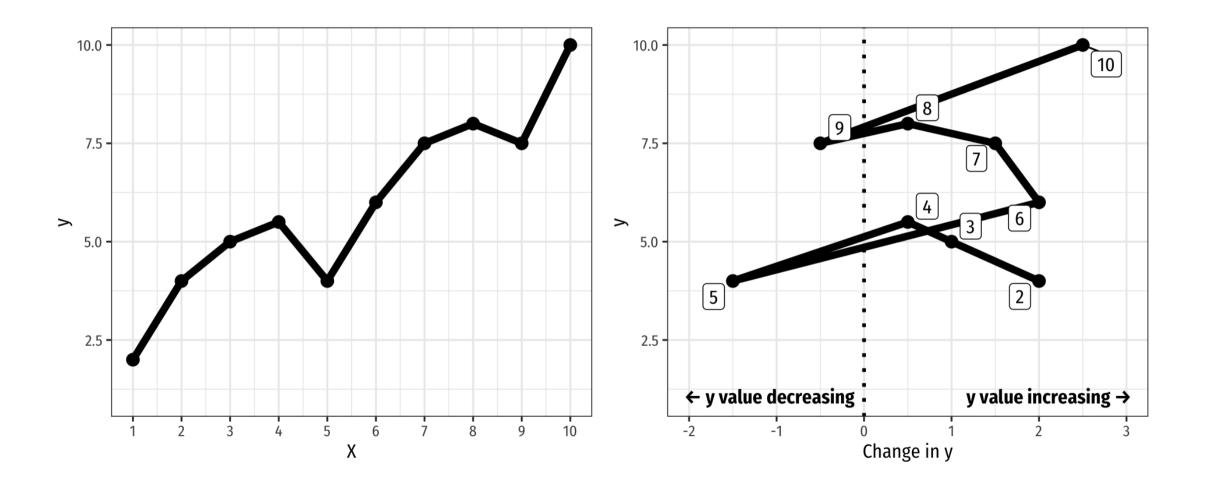
Don't go wild with time mapping!



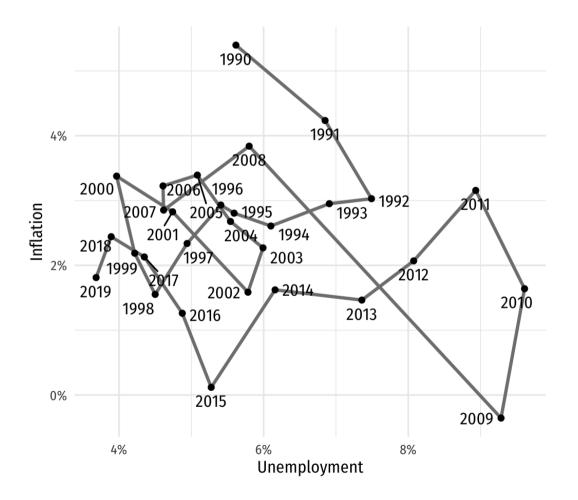
Danny Dorling/Kirsten McClure, Author provided

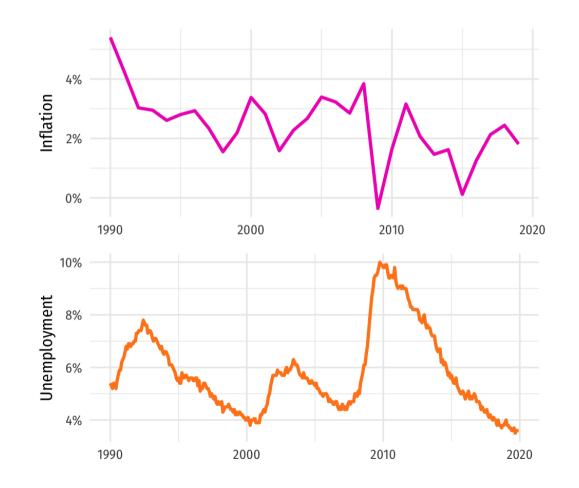
Tornado plot: When a curve crosses the left of the central axis, the number of deaths per day falls

Interpreting tornado plots



Better with multiple plots



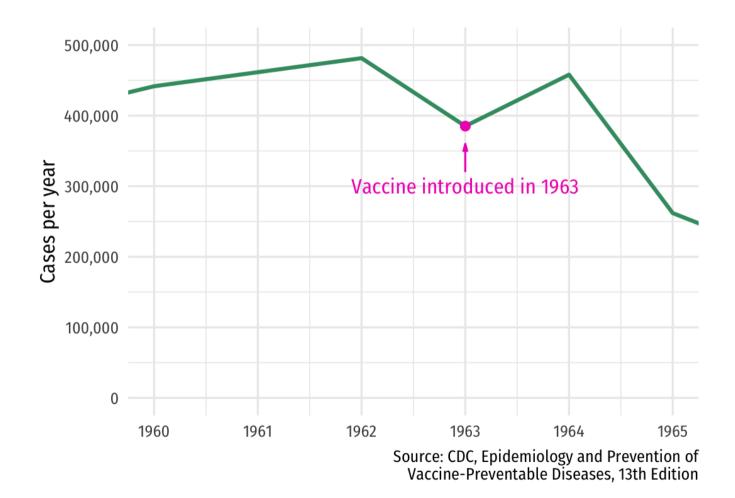


Starting, ending, and decomposing time

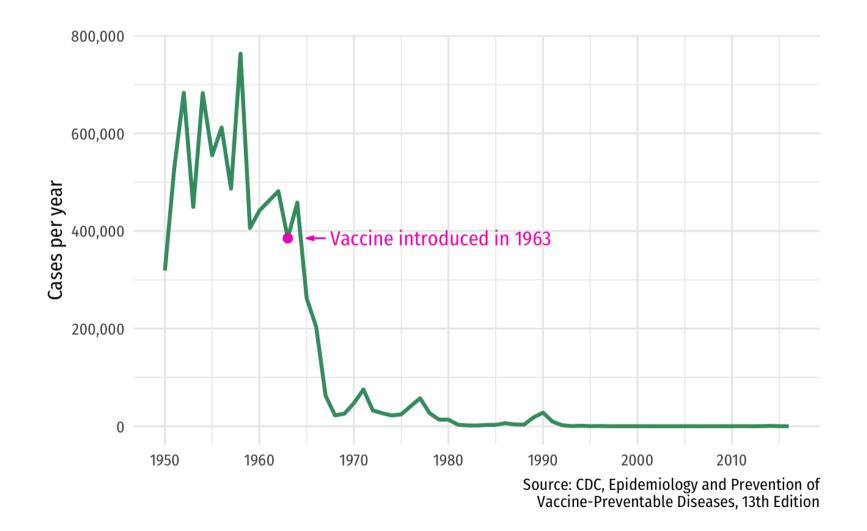
You always have to choose a start and end point

Start and end at reasonable times that help maintain the context of the story

Measles vaccine was pretty effective!

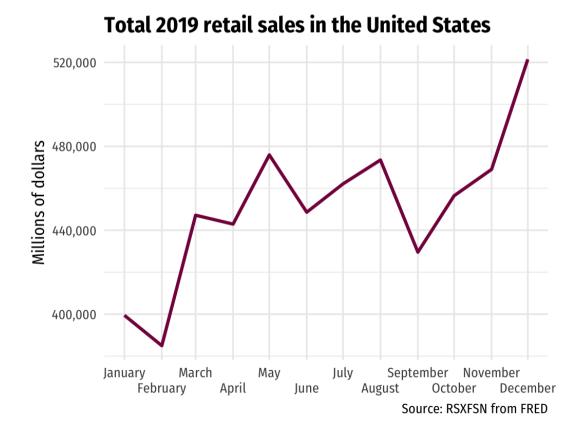


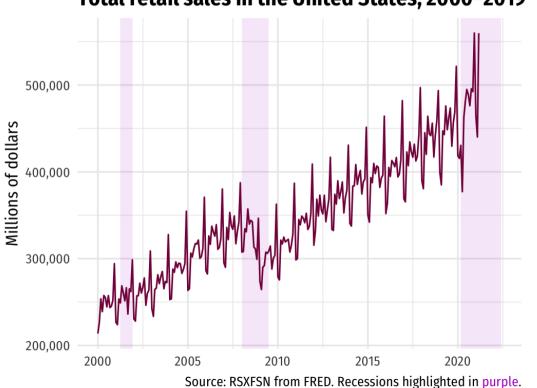
Measles vaccine was incredible!





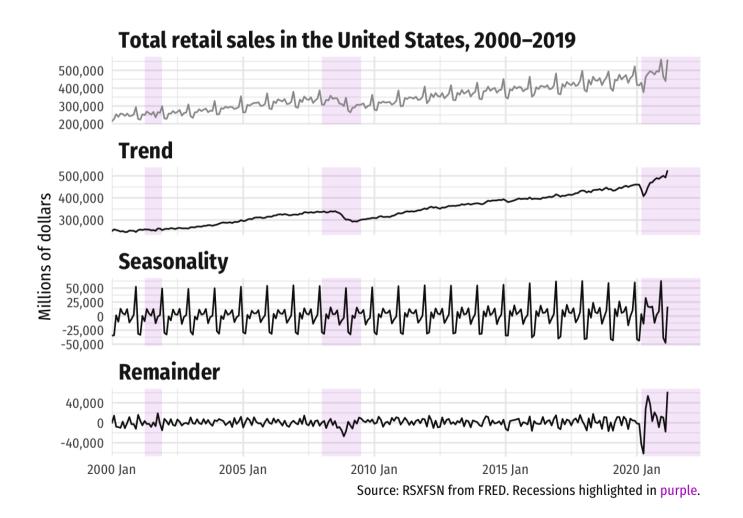
Don't mistake seasonality for actual trends



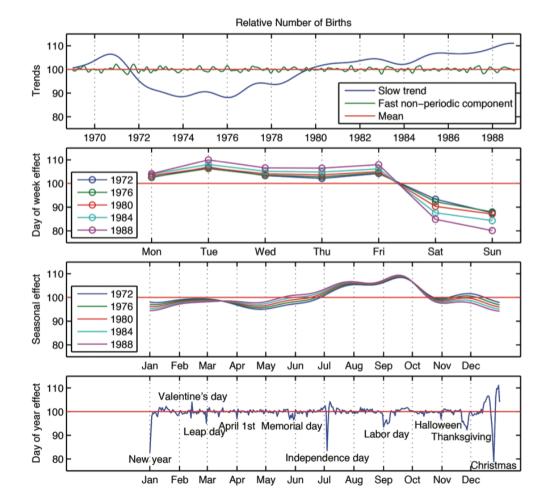


Total retail sales in the United States, 2000–2019

Decomposition



Birthday decomposition



Cover of Andrew Gelman, et al., Bayesian Data Analysis