Time

Session 13

PMAP 8921: Data Visualization with R
Andrew Young School of Policy Studies
Summer 2025

Plan for today

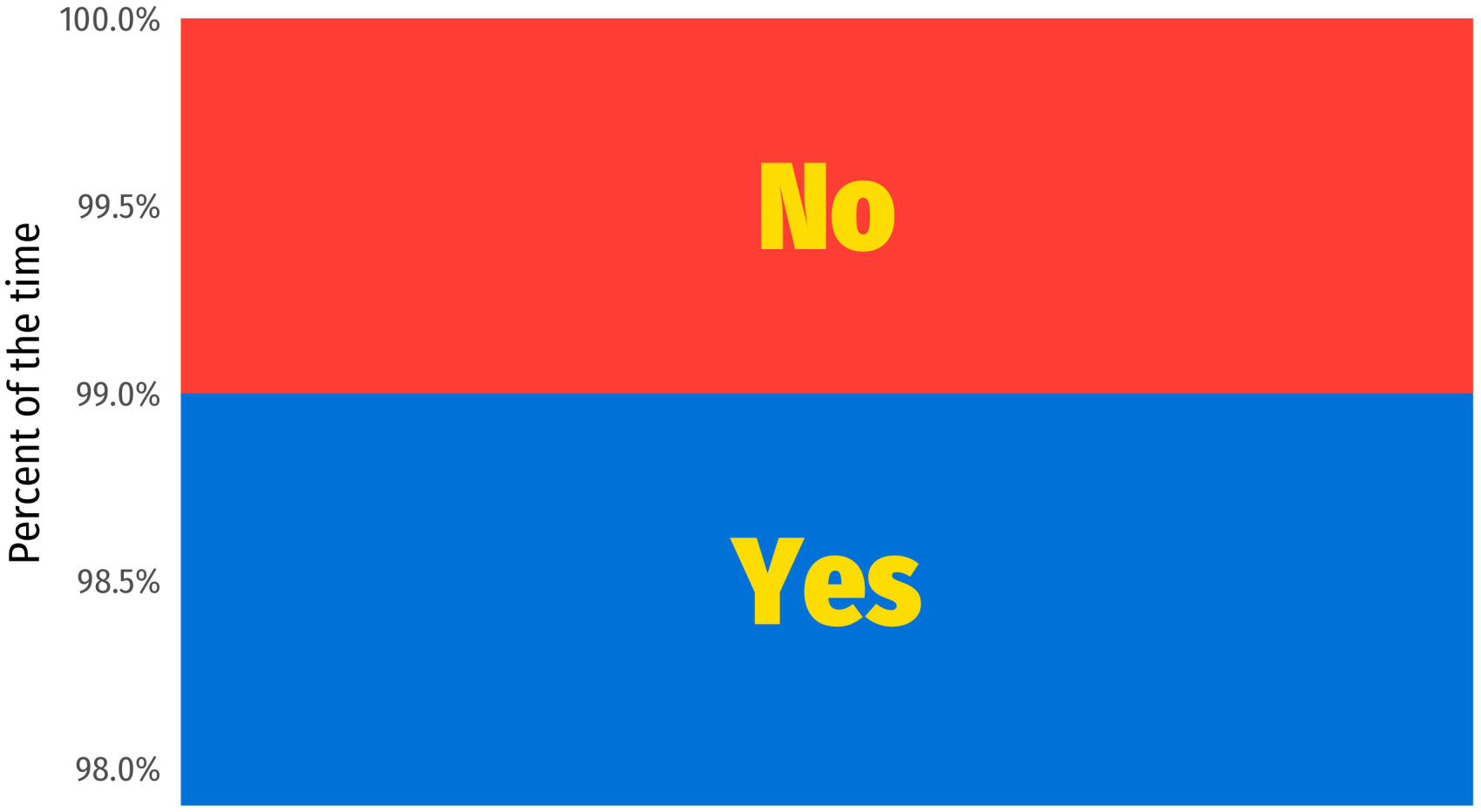
Axis issues

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!

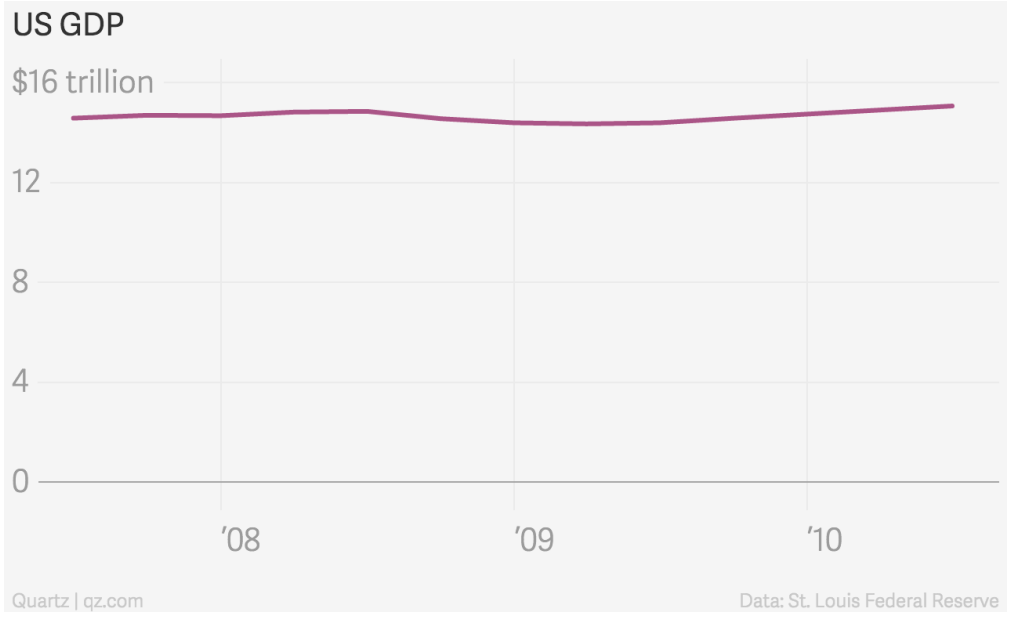
When small movements matter

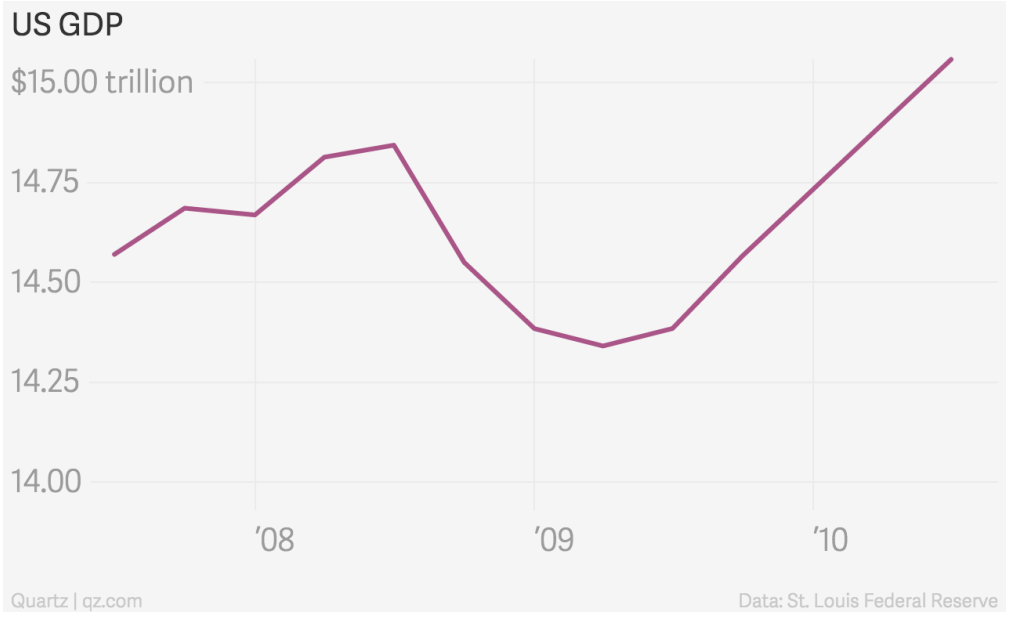
When the scale itself is distorted

When zero values are impossible

When is it okay to truncate?

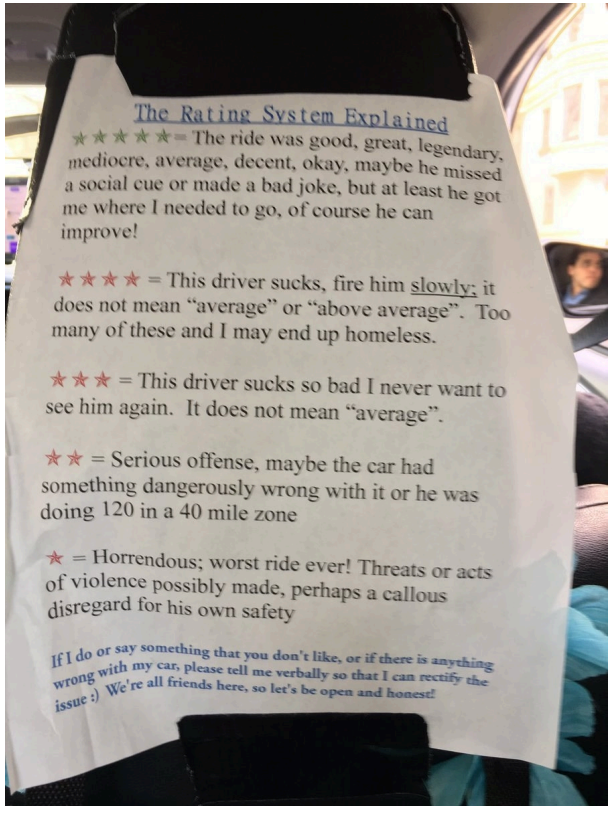
When small movements matter

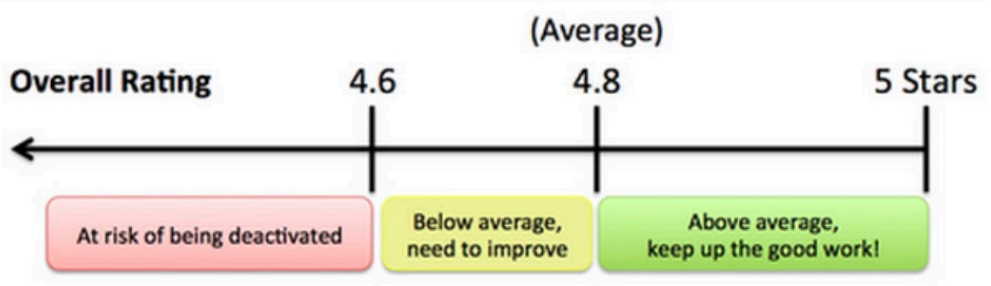




When is it okay to truncate?

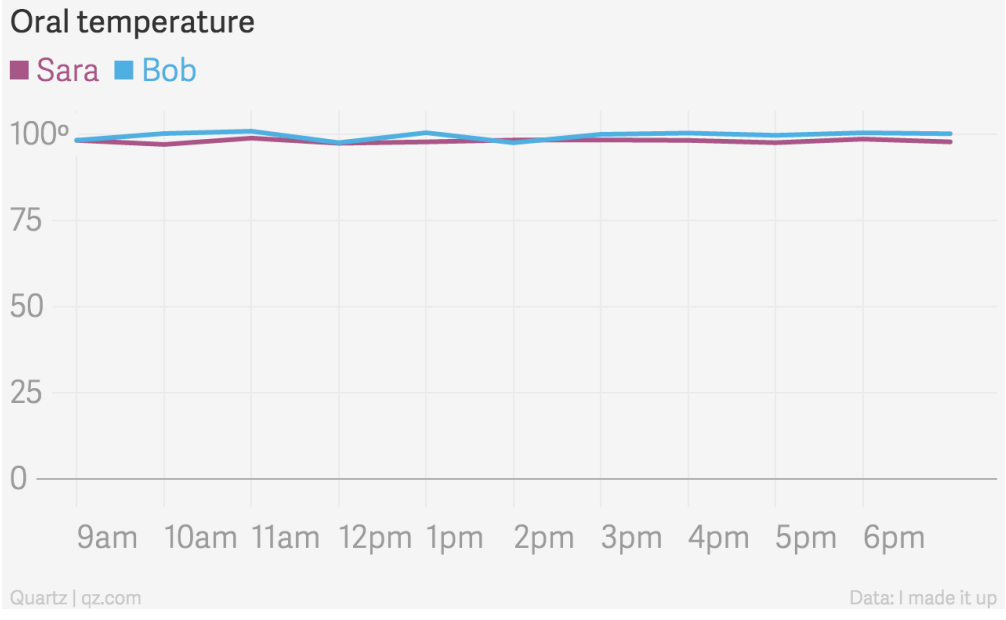
When the scale itself is distorted

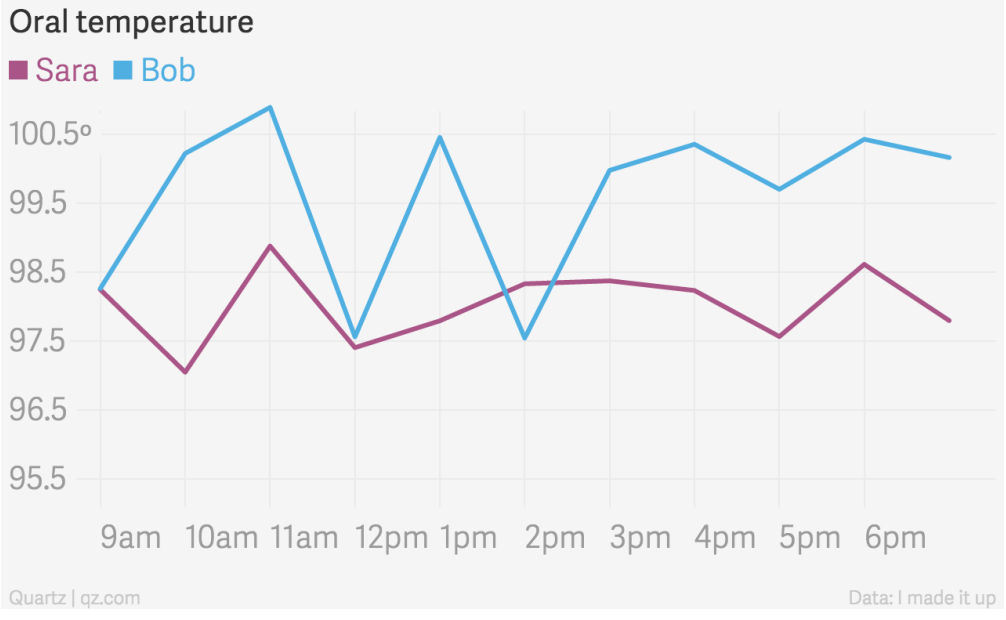




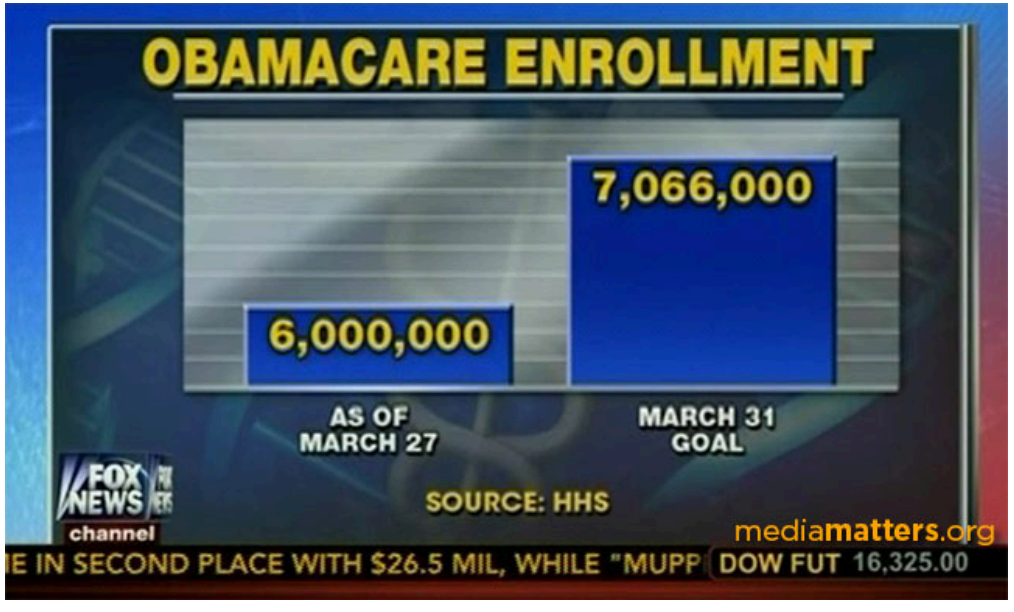
When is it okay to truncate?

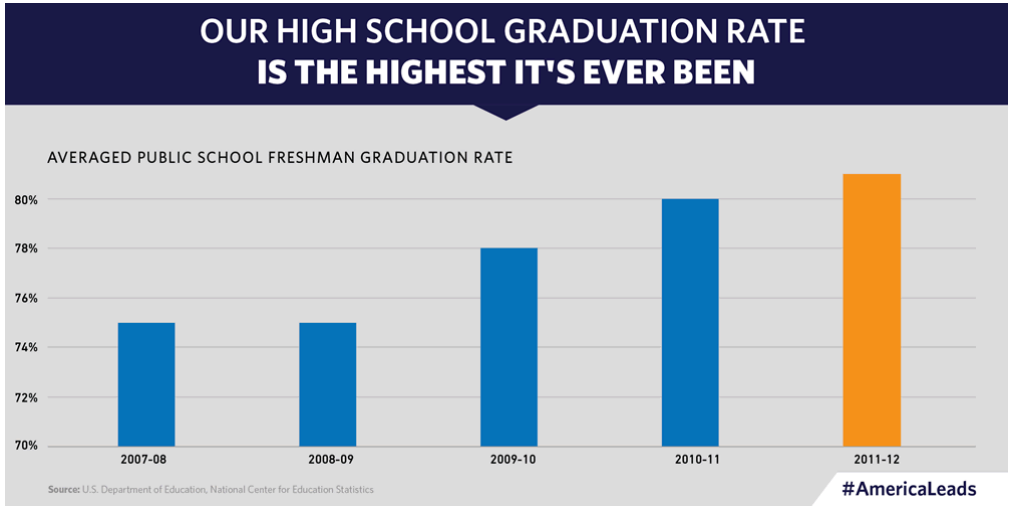
When zero values are impossible





Never on bar charts



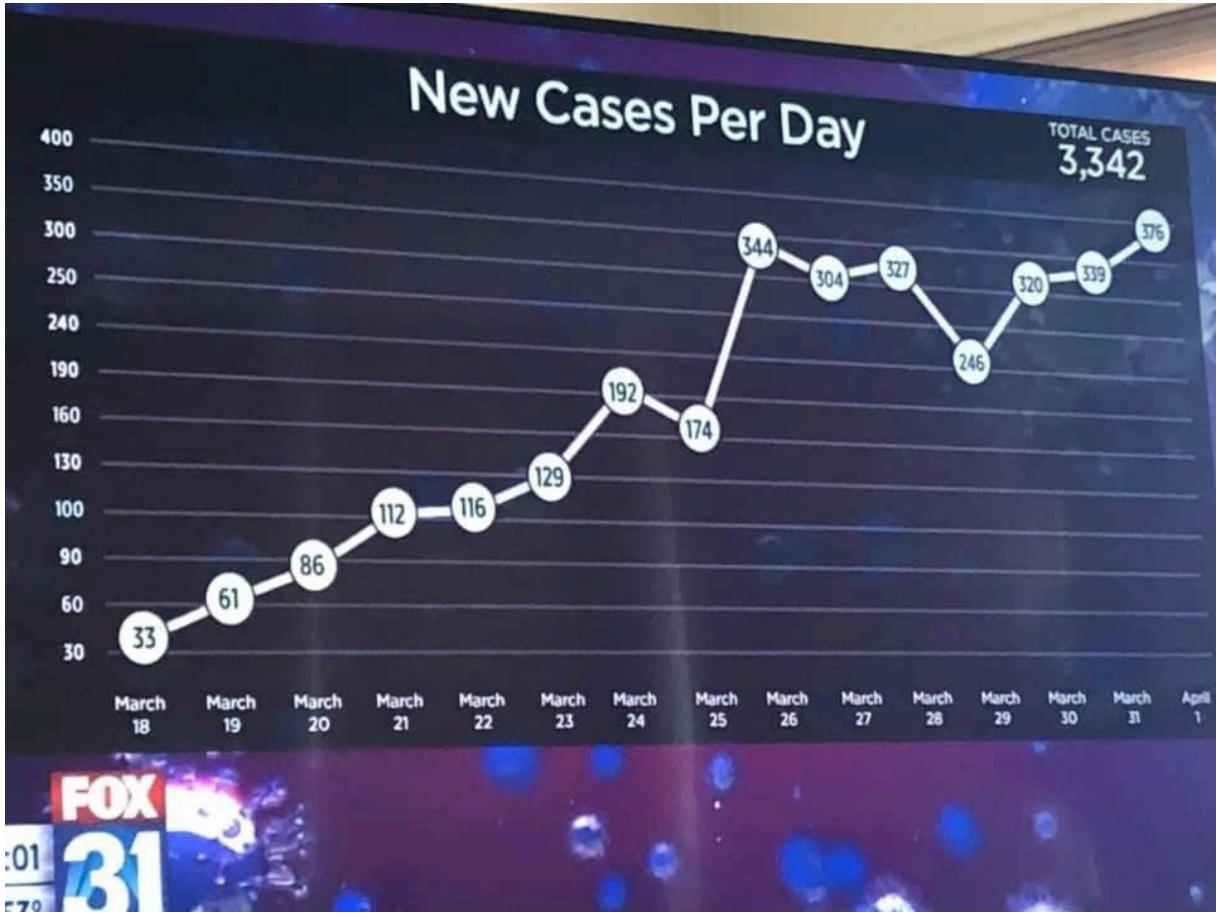


Zero is okay too!

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

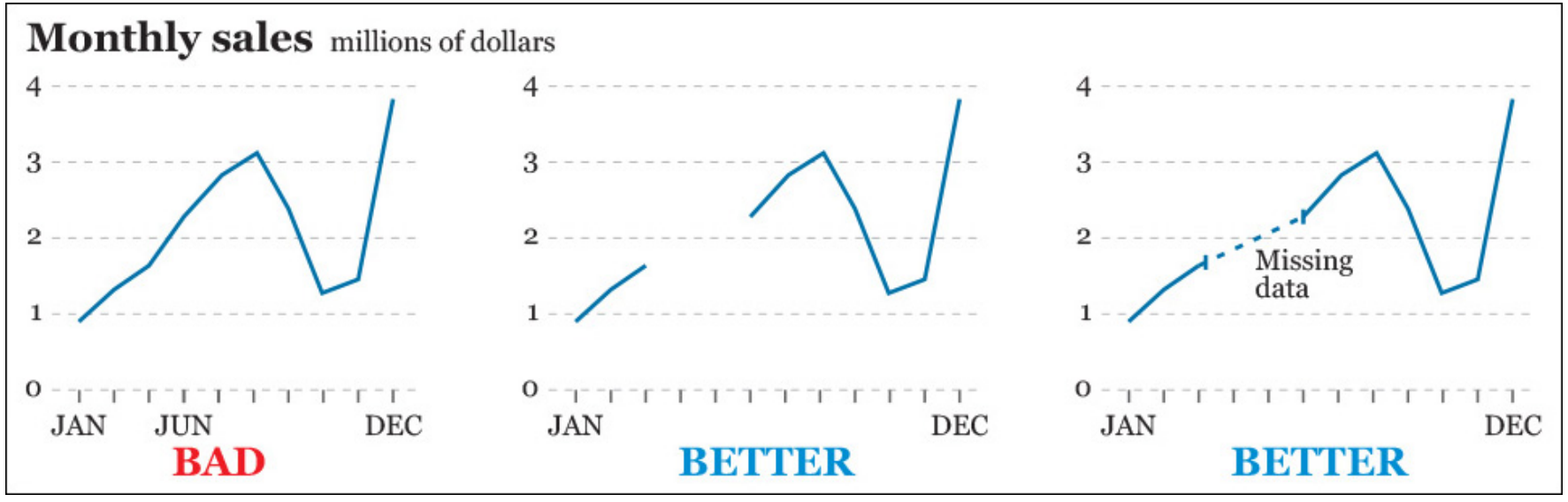
It's often a good idea!

Keep axis scales consistent

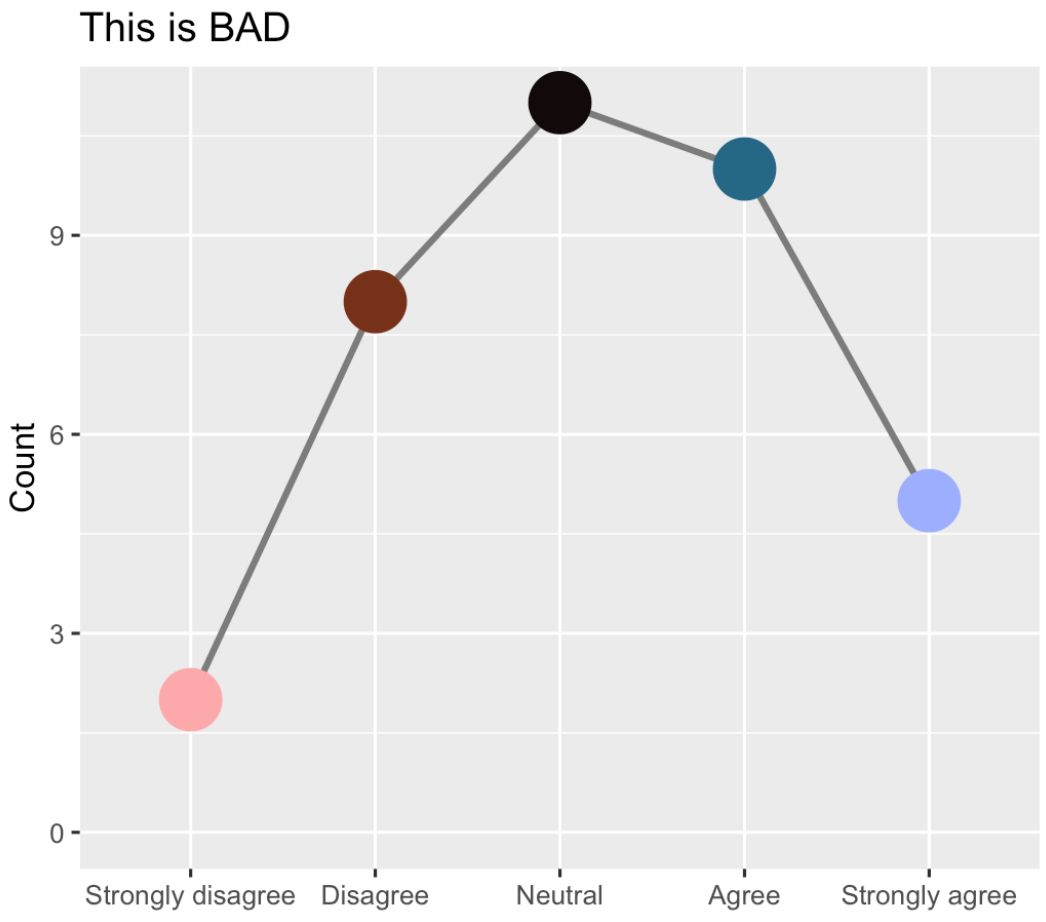


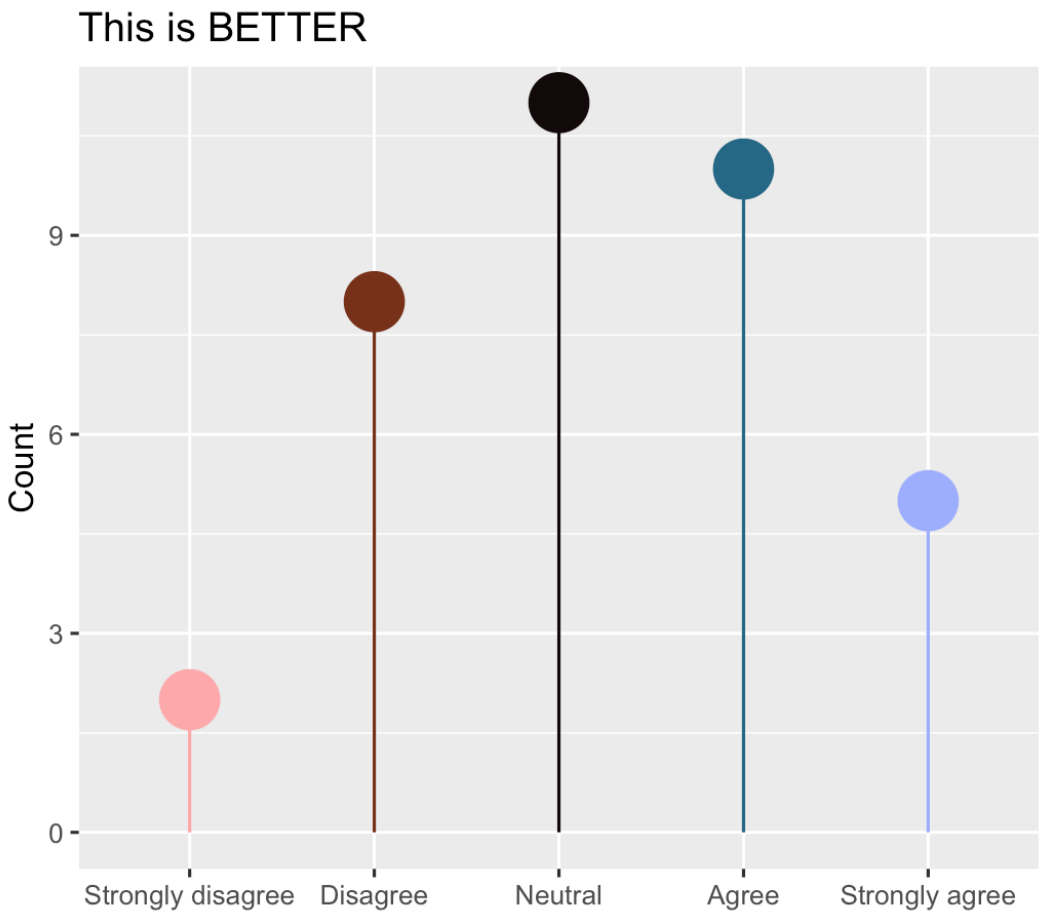
FOX affiliate in Colorado reporting on COVID-19 cases

Keep axis scales consistent



Don’t impute across categories





Visualizing time

Showing changes over time

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

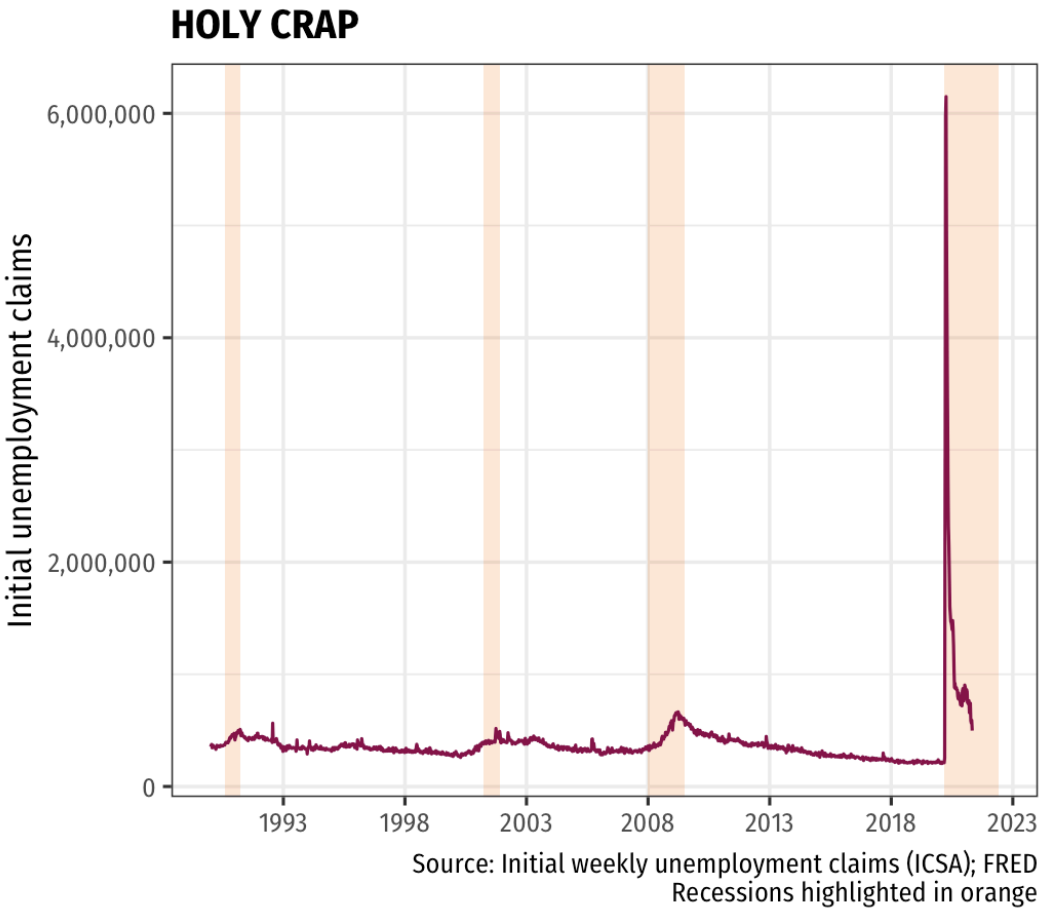
Can be used as `x`, `y`, `color`, `fill`, `facet`, and even animation

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()`



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

Time on x-axis + `geom_tile()`

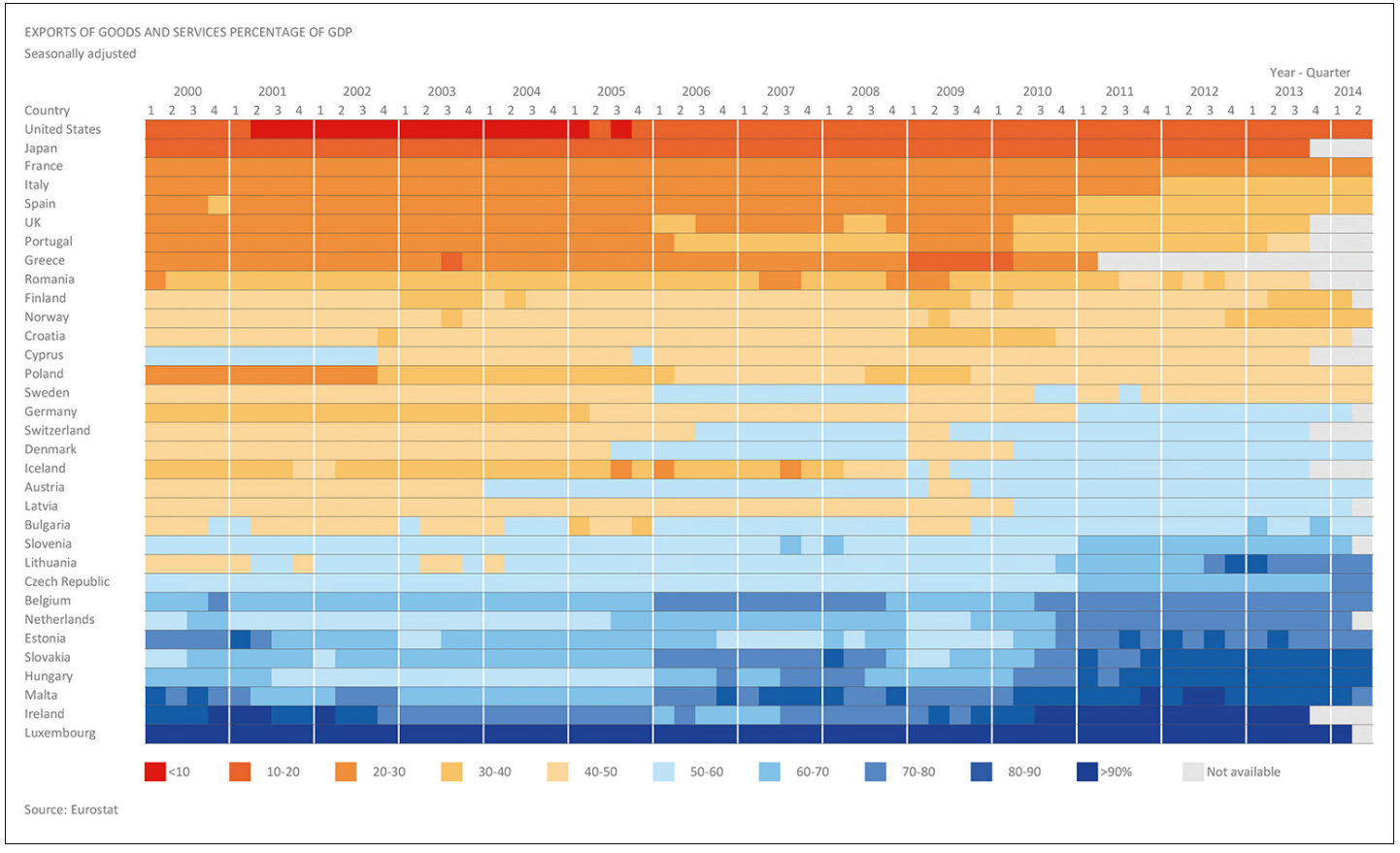
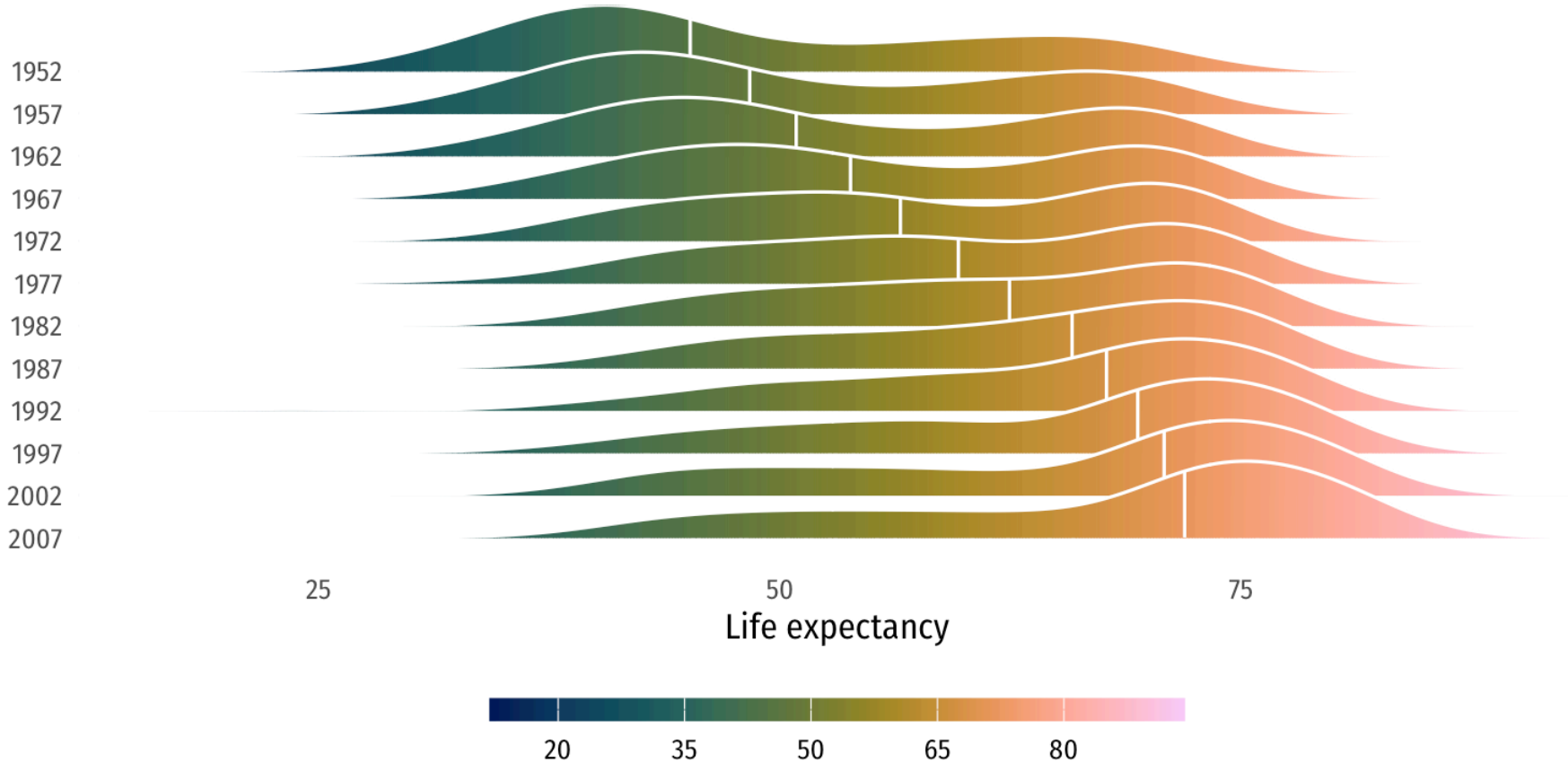


Figure 8.28 in Alberto Cairo's *The Truthful Art*: Heat map by Jorge Camões

Time on y-axis + `geom_density()`



Time in animation + `geom_point()`

Time in maps

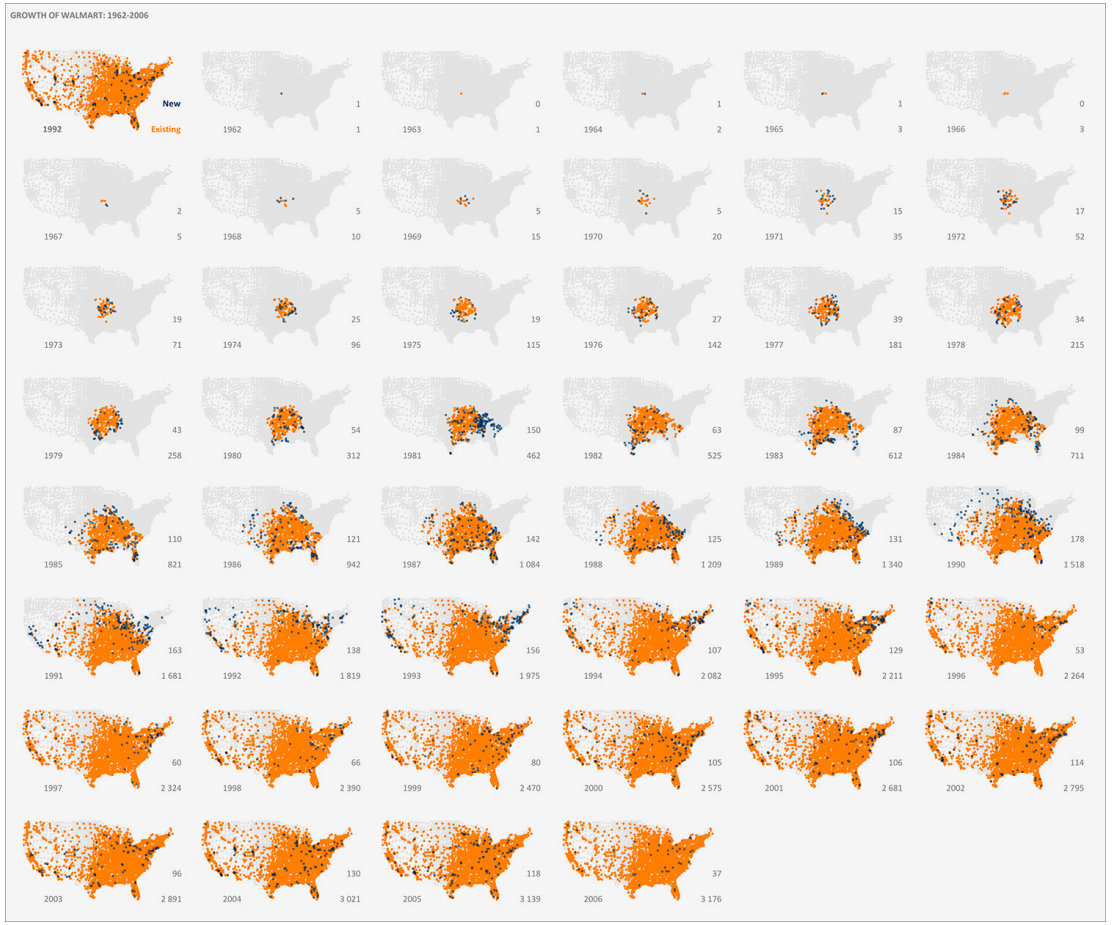
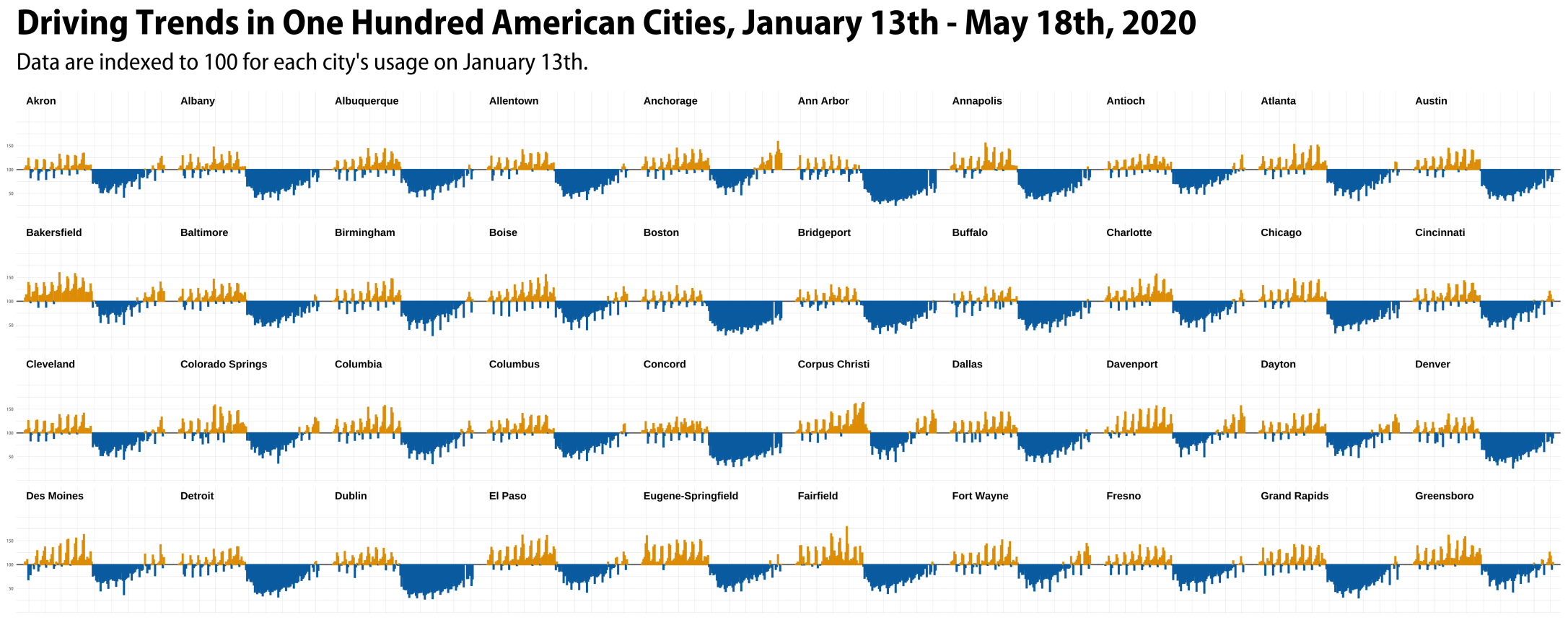


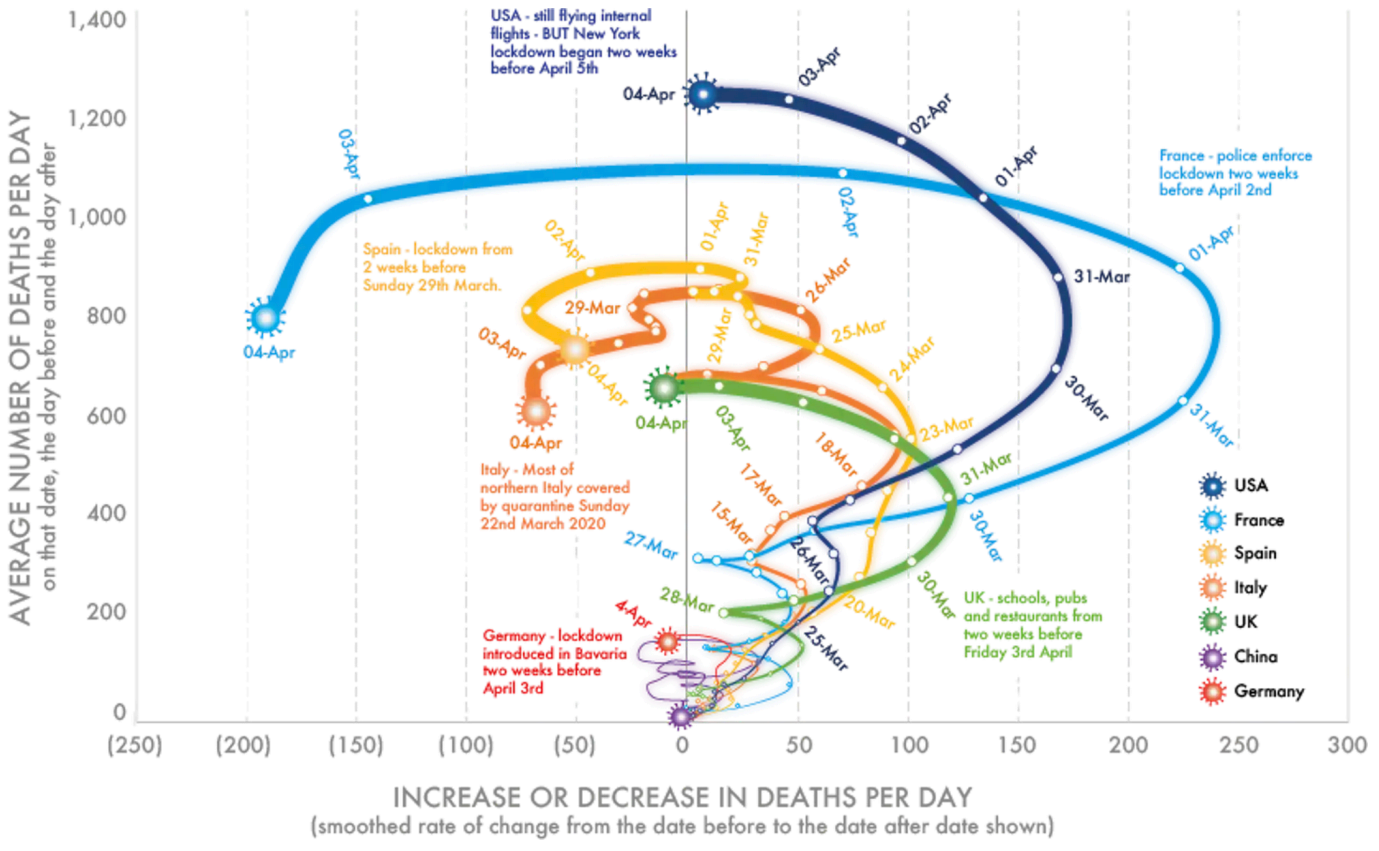
Figure 8.30 in Alberto Cairo's *The Truthful Art*: Map of the spread of Walmart by Jorge Camões

Time in `geom_col()` + small multiples



Kieran Healy, "The Kitchen Counter Observatory"

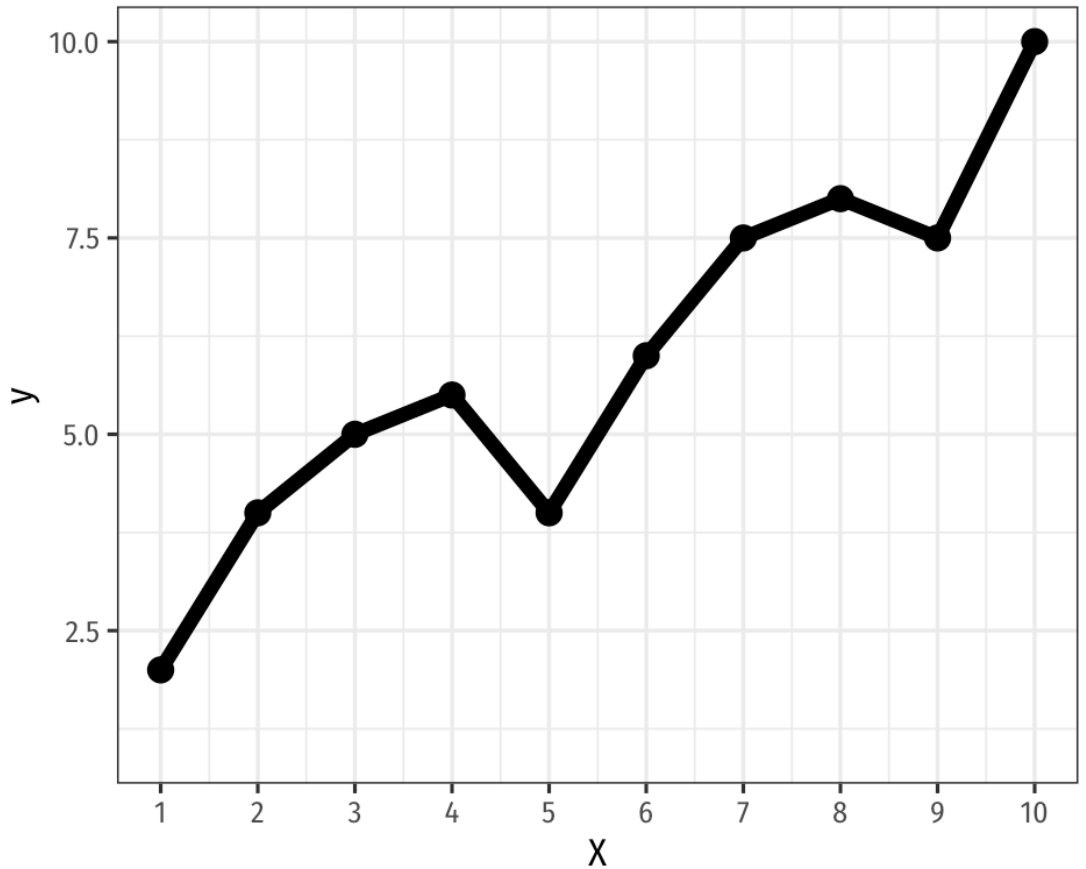
Don't go wild with time mapping!

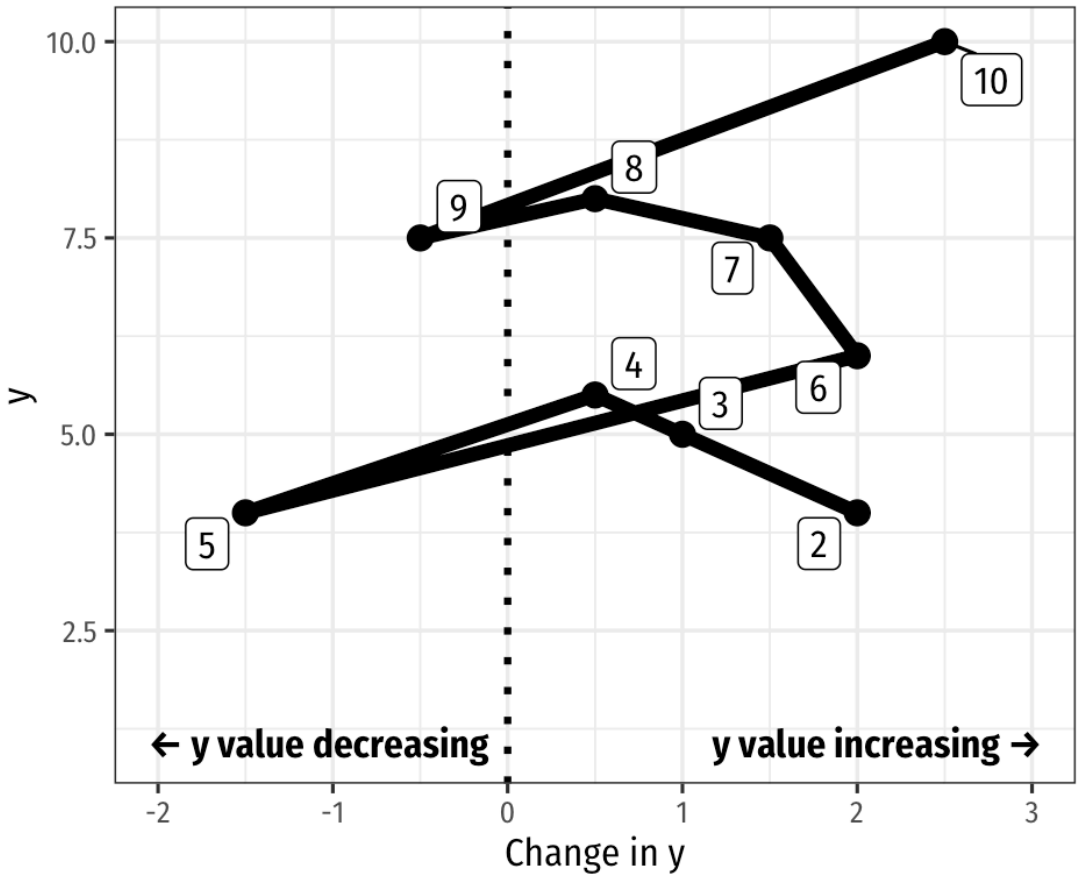


Danny Dorling/Kirsten McClure, Author provided

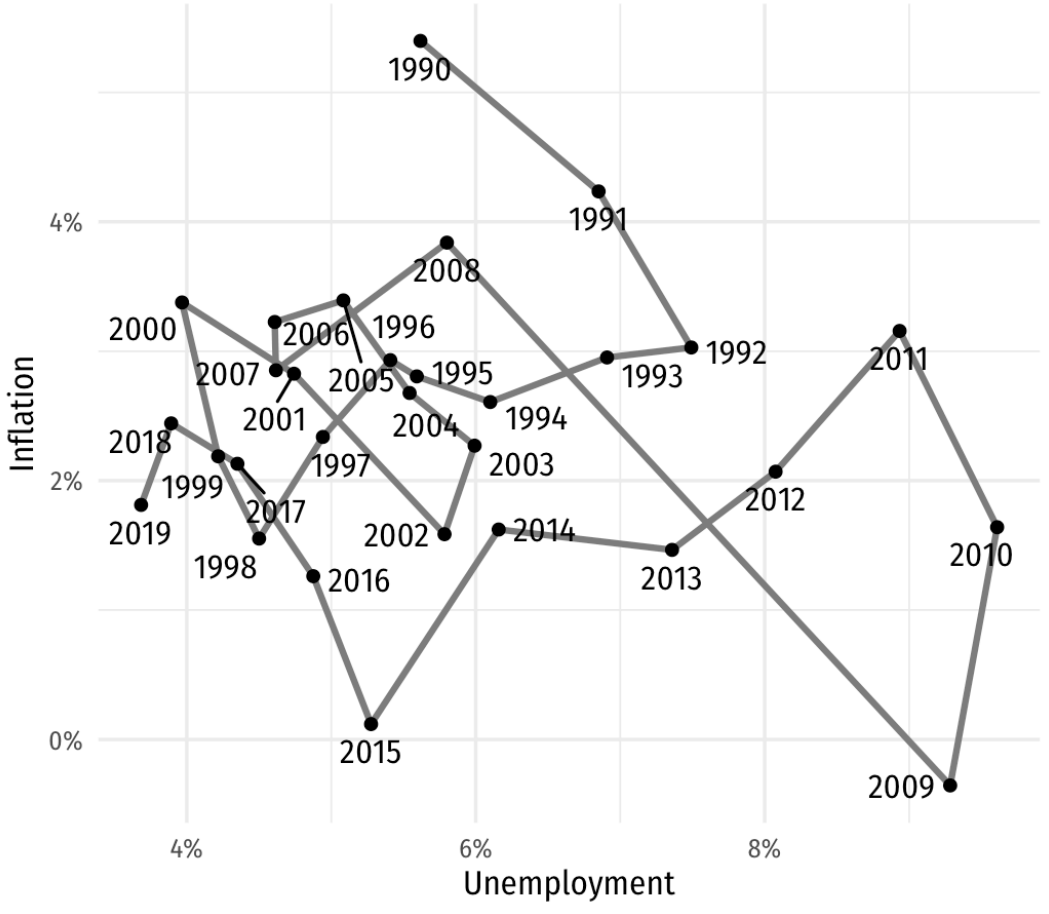
Tornado plot: When a curve crosses the left of the central axis, the number of deaths per day falls

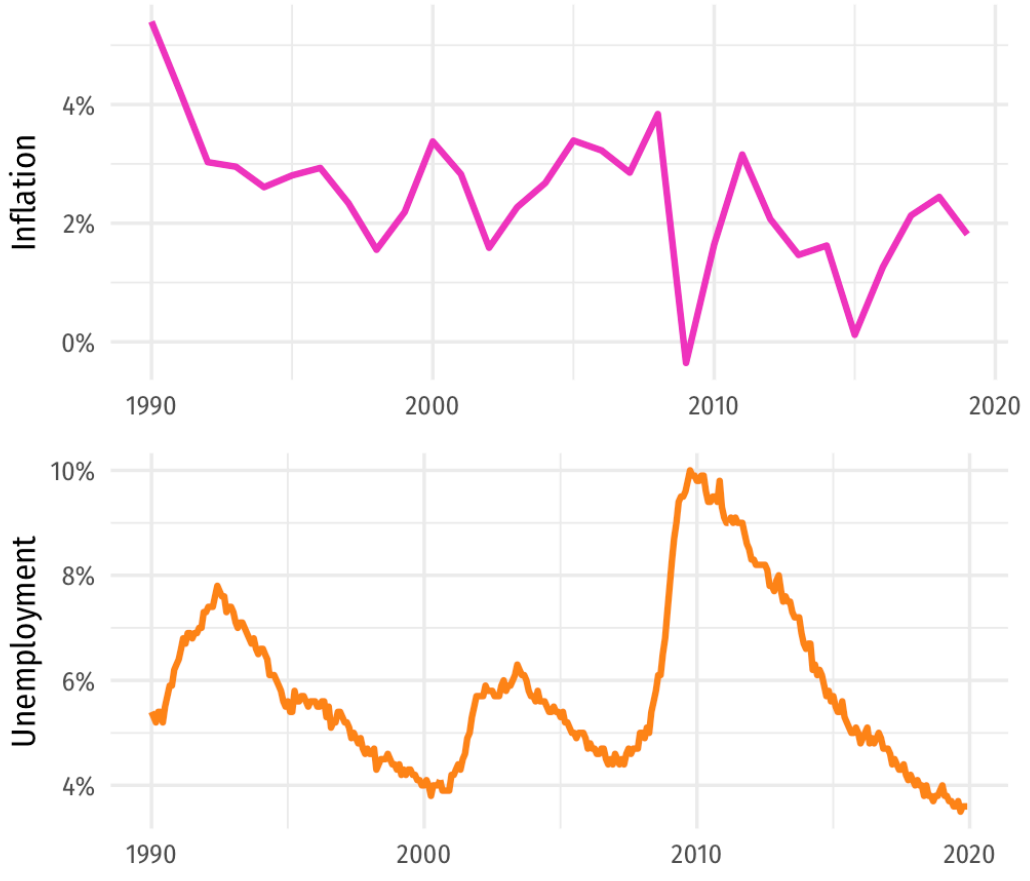
Interpreting tornado plots





Better with multiple plots



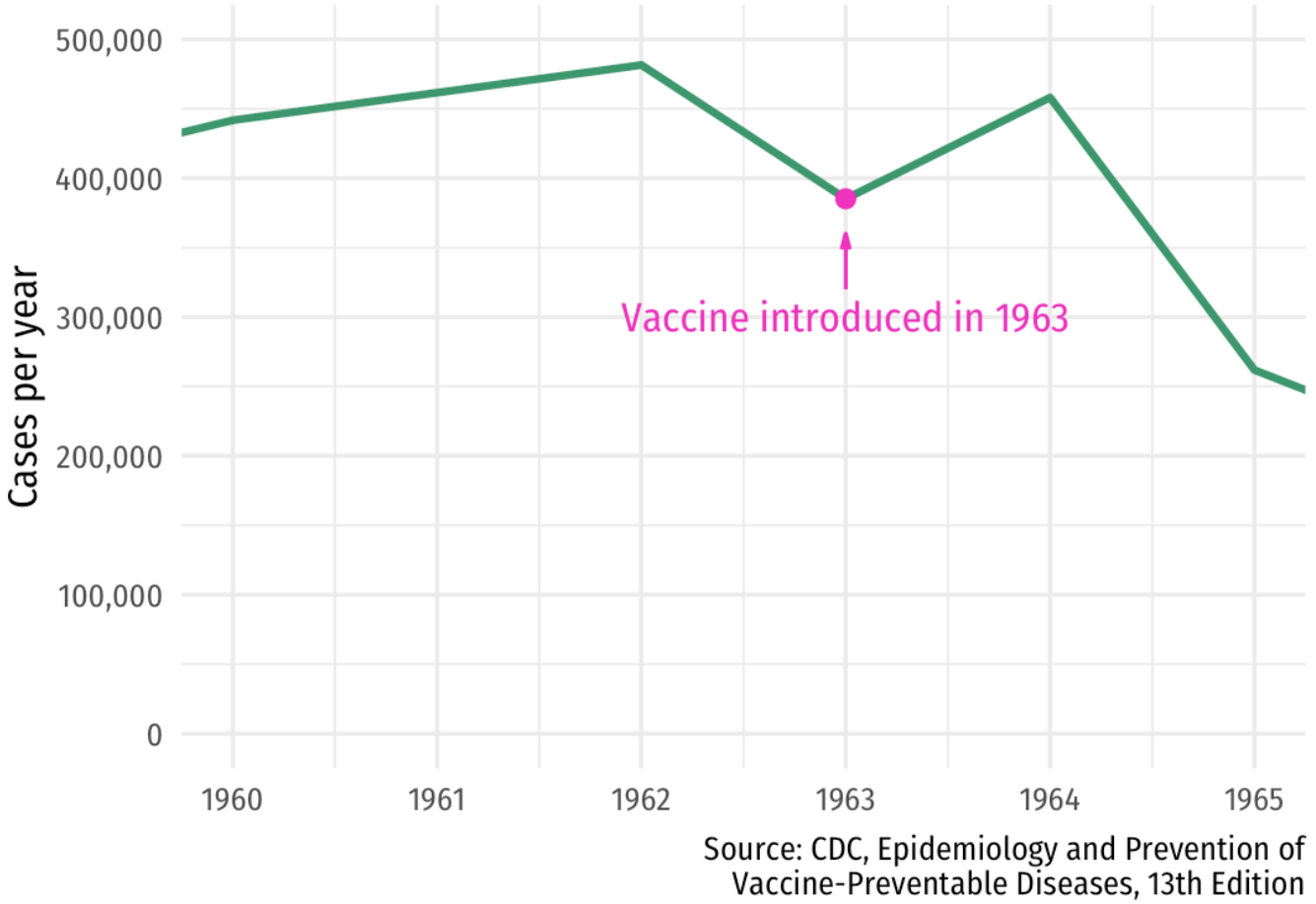


Starting, ending, and decomposing time

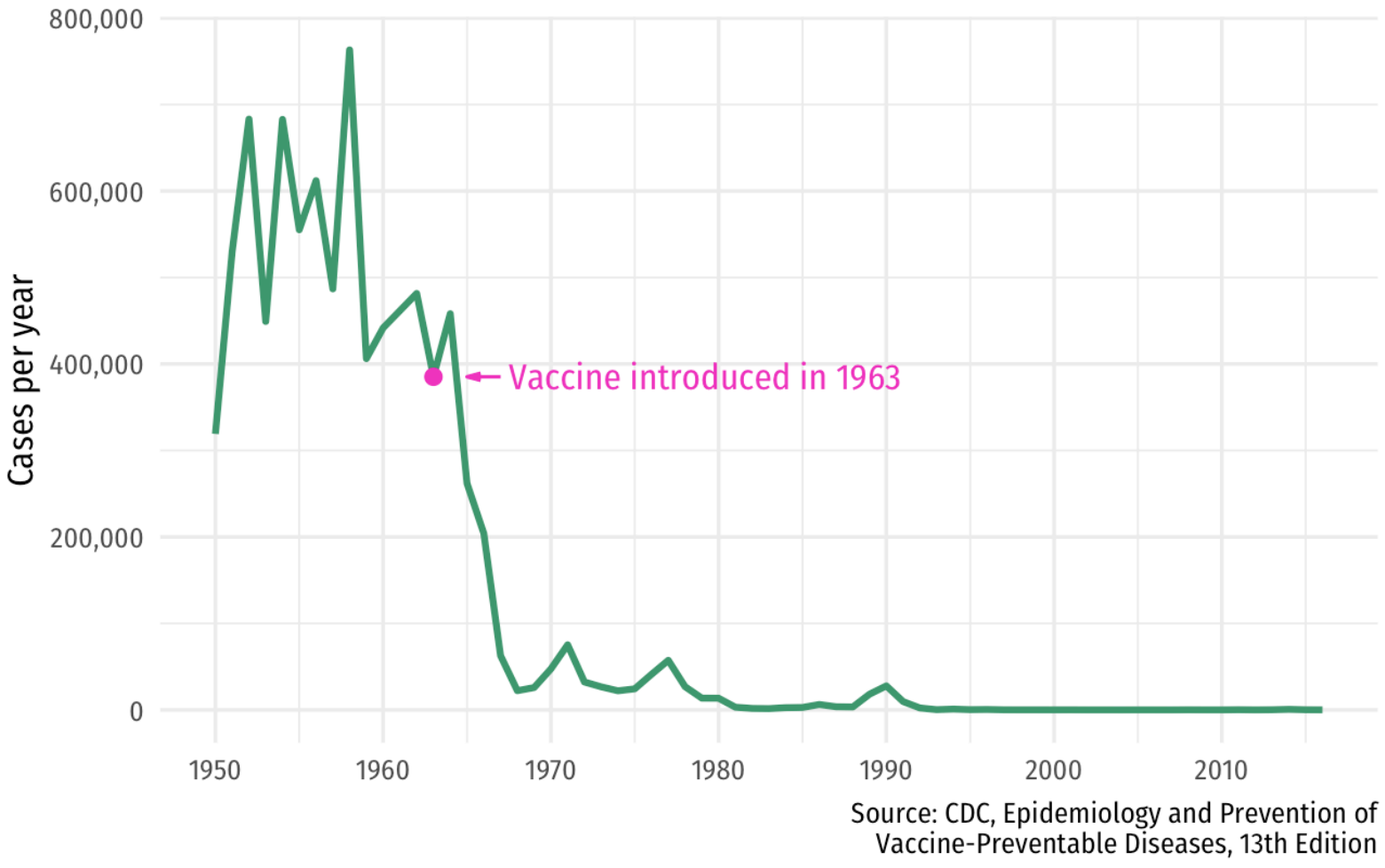
You always have to choose a start and end point

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

Measles vaccine was pretty effective!



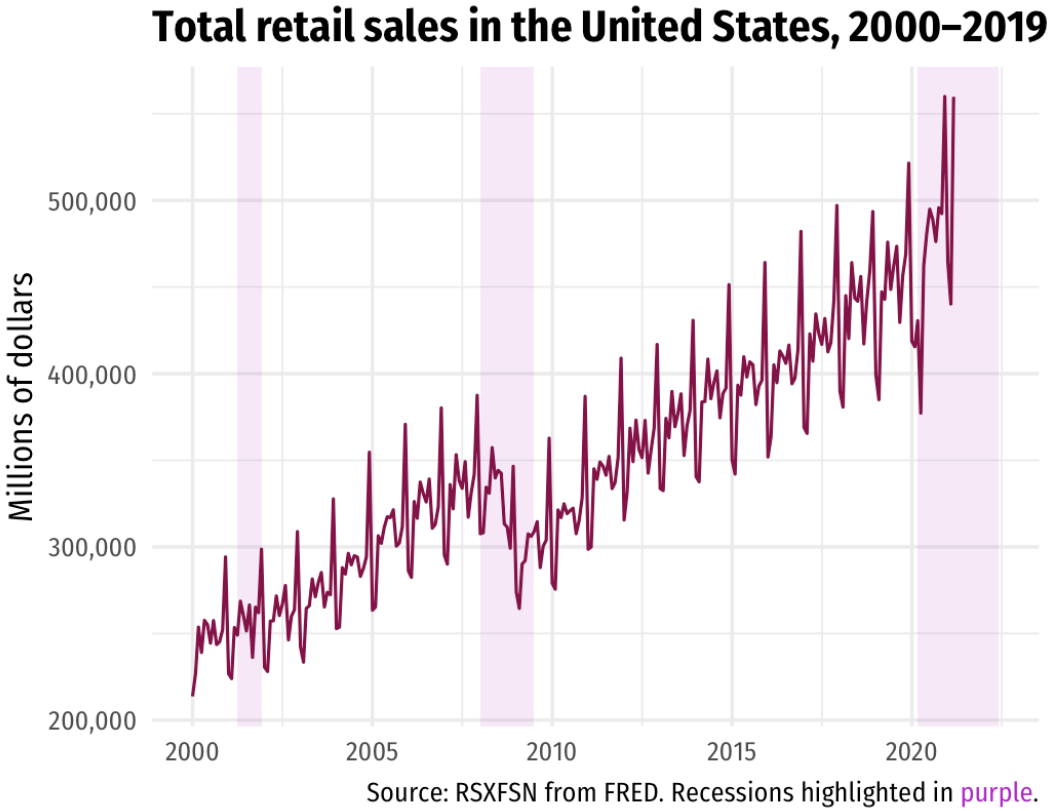
Measles vaccine was *incredible*!



Seasonality

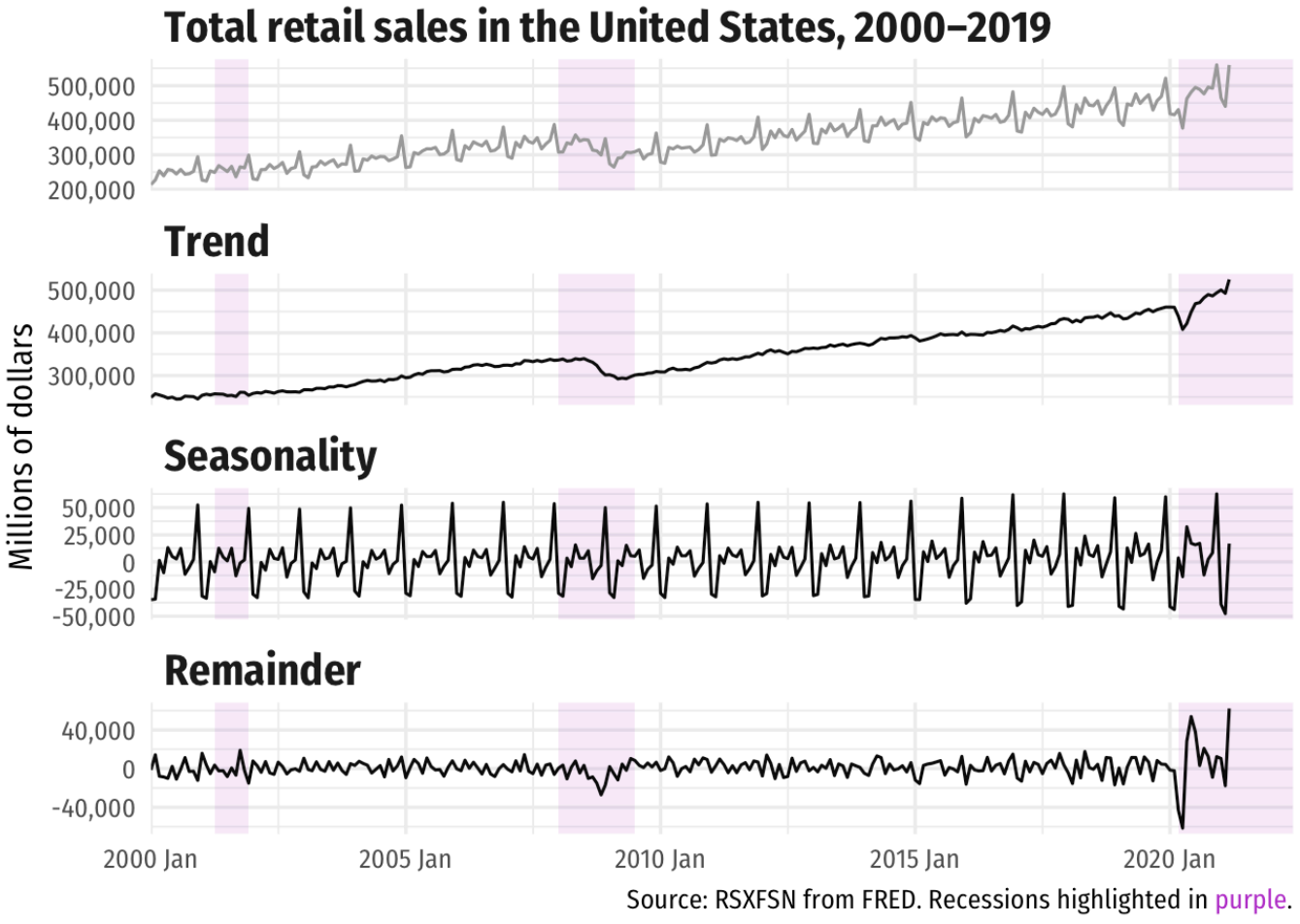
Don't mistake seasonality for actual trends

Source: RSXFSN from FRED



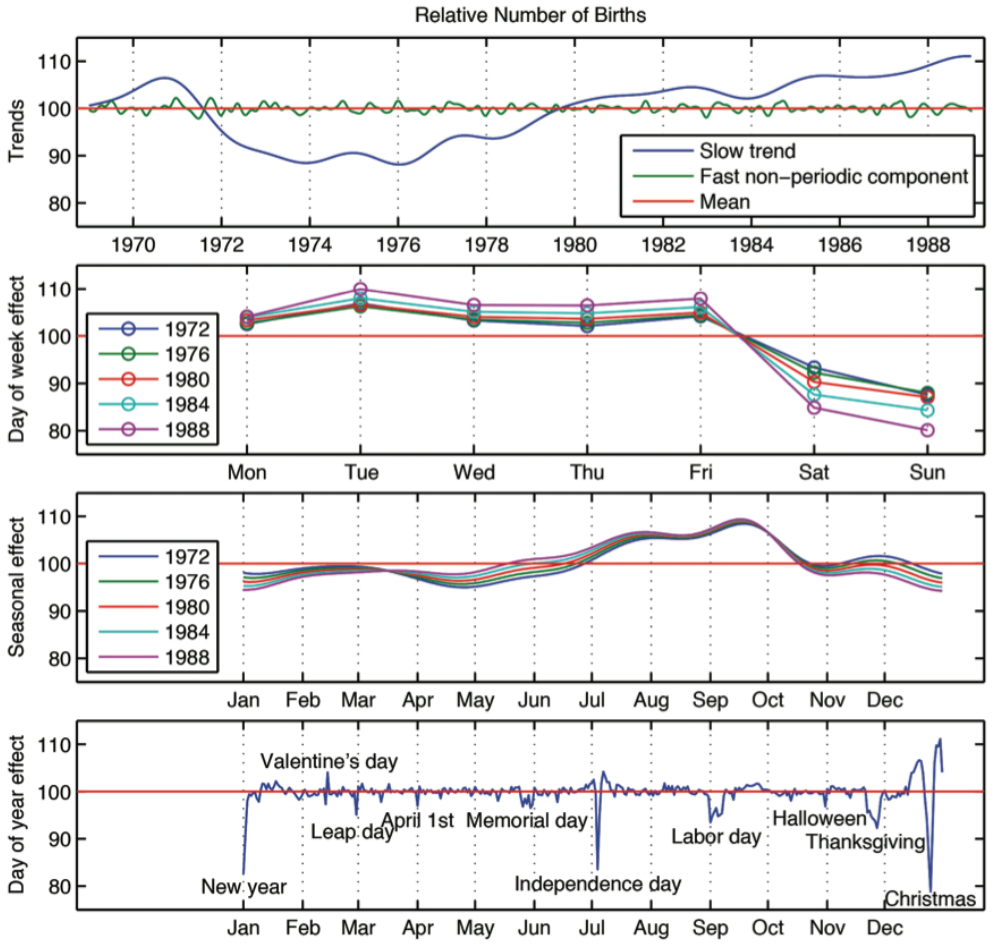
Source: RSXFSN from FRED. Recessions highlighted in purple.

Decomposition



Source: RSXFSN from FRED. Recessions highlighted in purple.

Birthday decomposition



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