Scatter plots

UNDERSTANDING DATA VISUALIZATION

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Data Evangelist at DataCamp

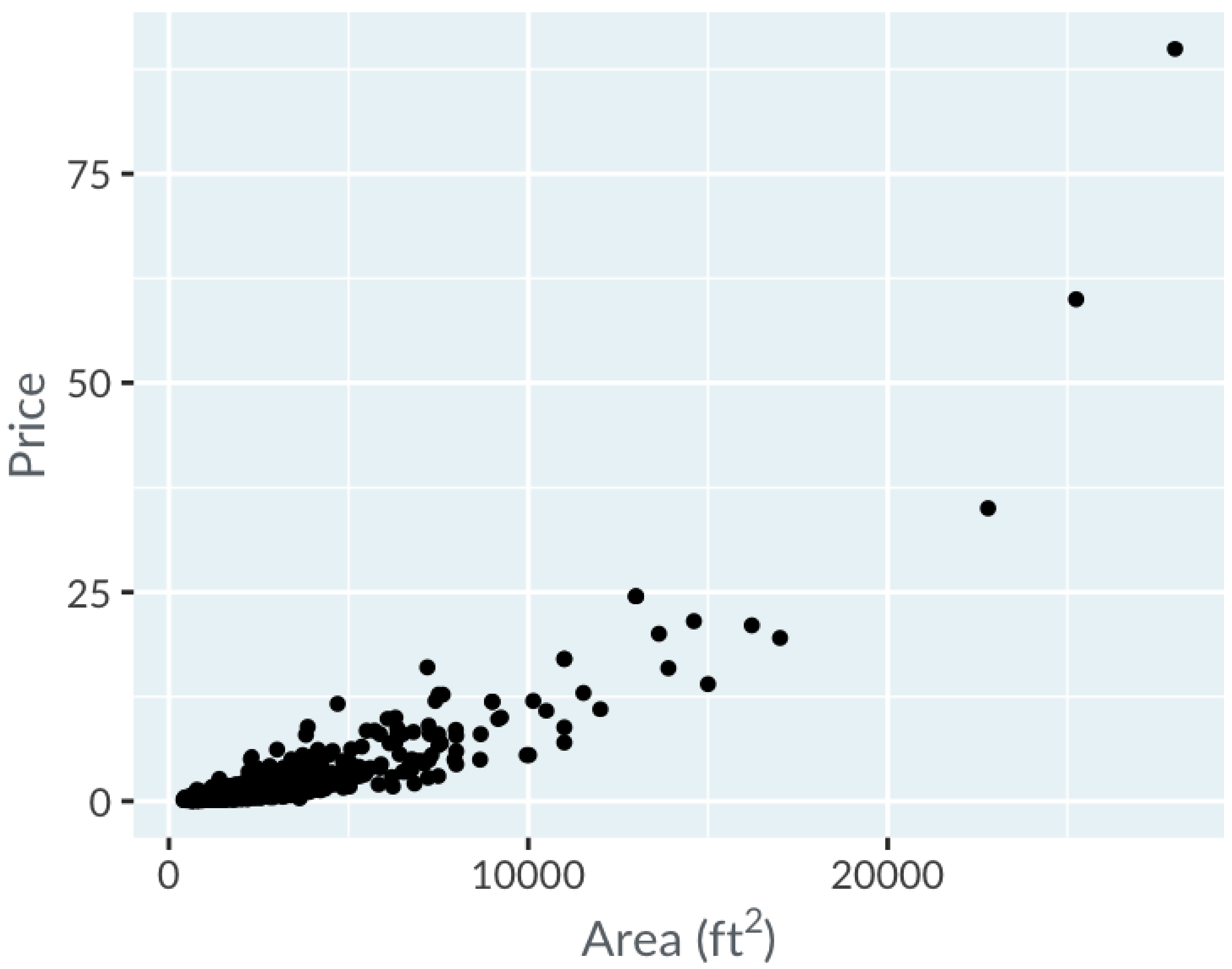
When should you use a scatter plot?

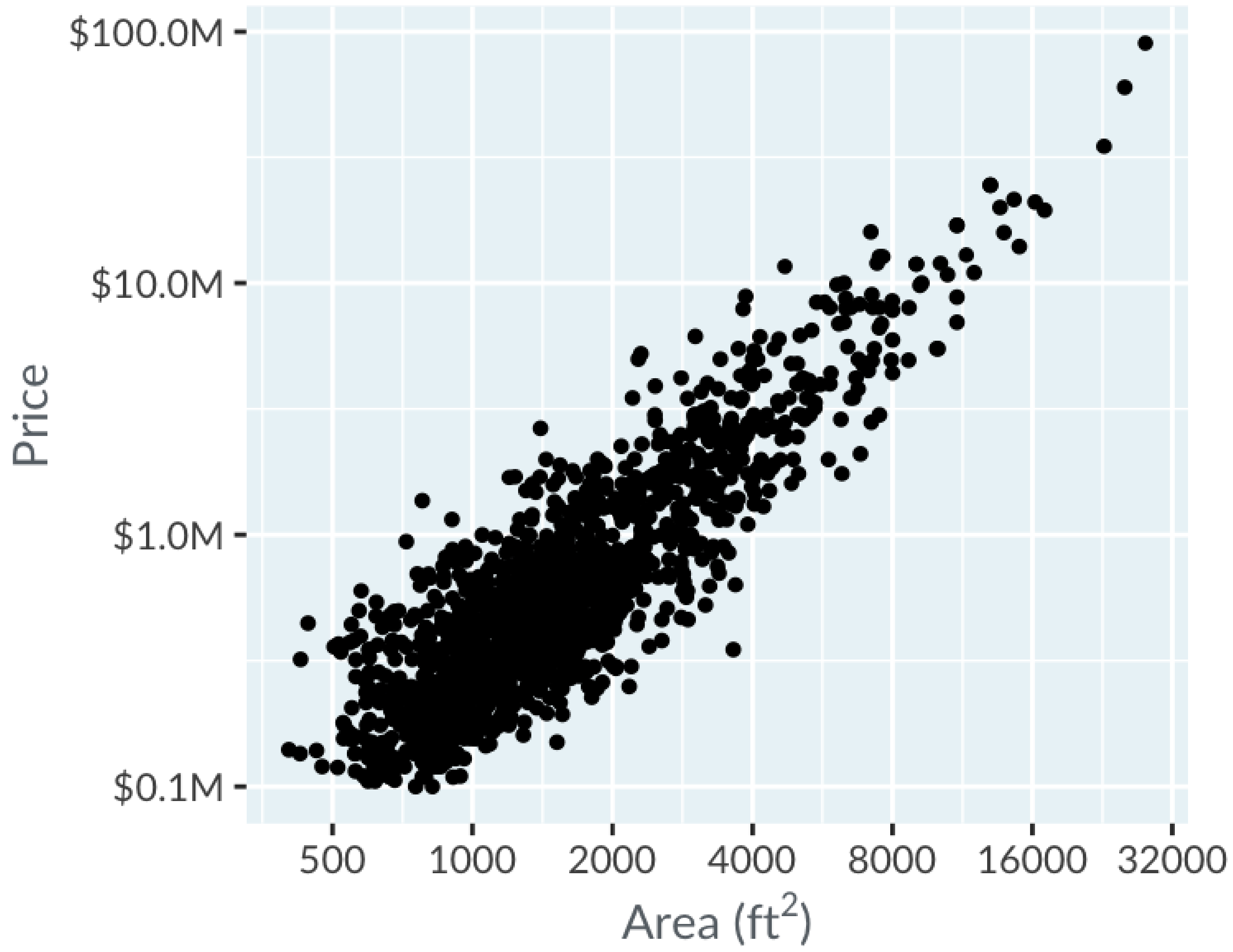
1. You have two continuous variables.
2. You want to answer questions about the relationship between the two variables.

Los Angeles County home prices

city	n_beds	price_musd	area_sqft
Long Beach	1	0.3250	846
Beverly Hills	3	2.1950	2930
Santa Monica	2	0.5740	1037
Santa Monica	1	0.5990	576
Beverly Hills	5	3.9500	5600
Long Beach	4	0.2999	1571
Westwood	3	0.6950	1913

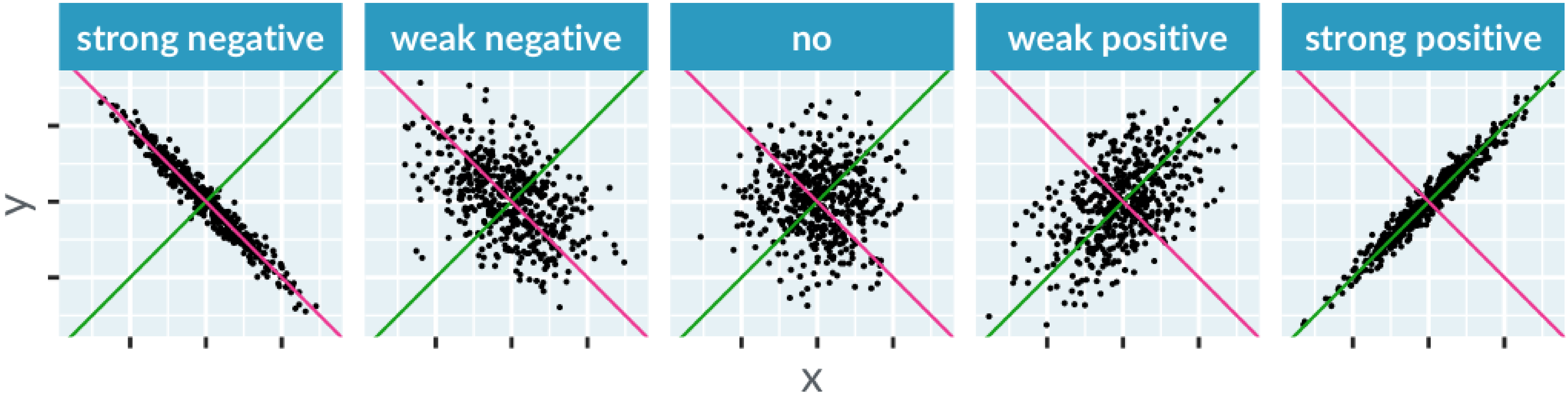
Prices vs. area



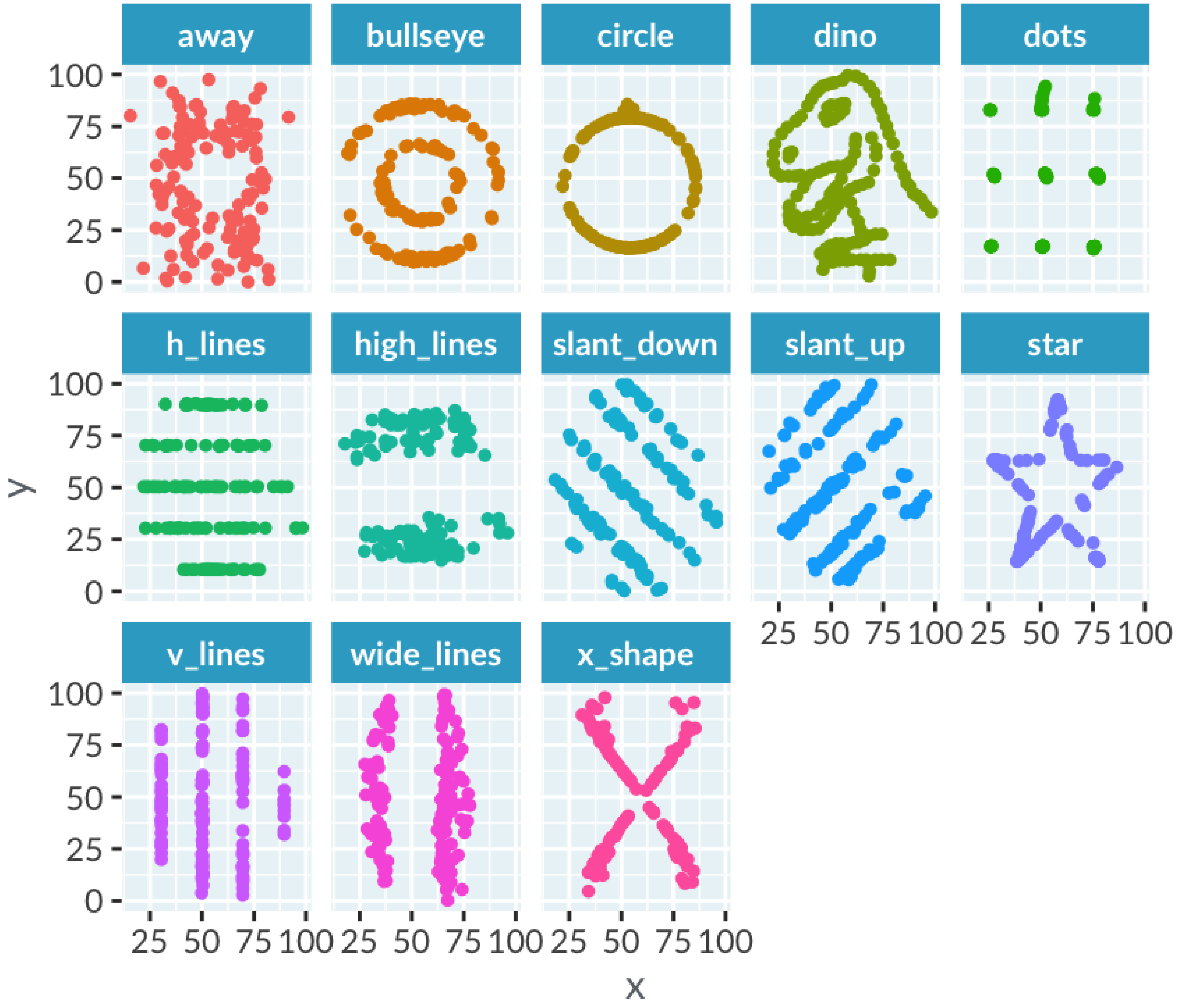


Correlation

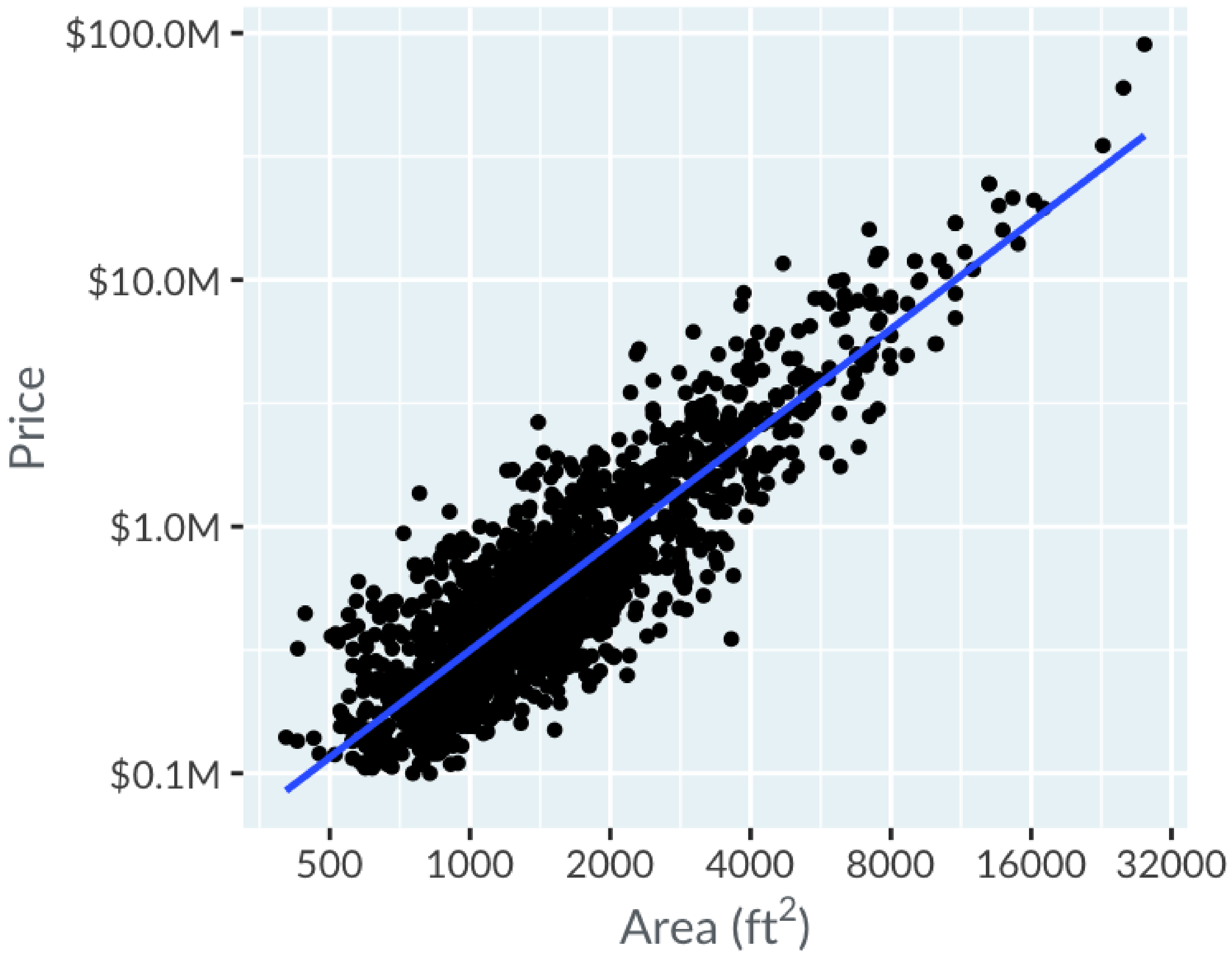
> How close are you to being able to fit a straight line through the points?



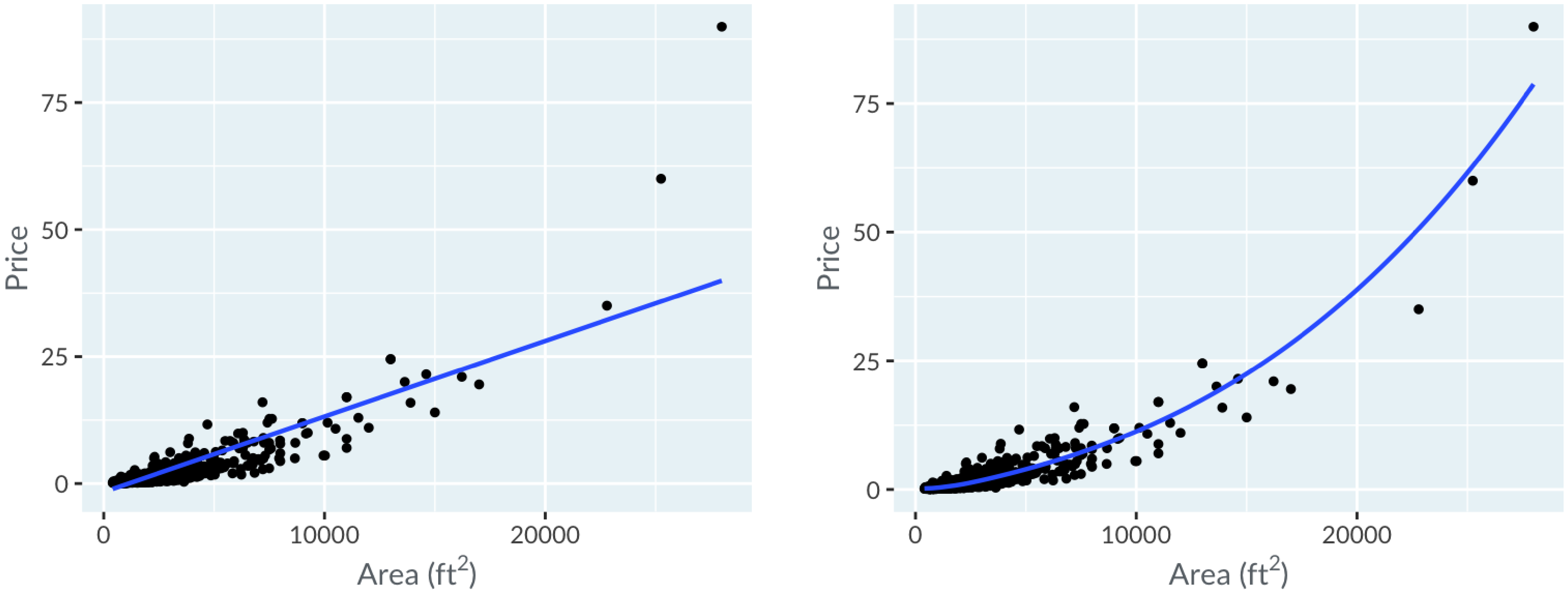
Sometimes correlation isn't helpful



Adding trend lines



Adding smooth trend lines



Let's practice!

UNDERSTANDING DATA VISUALIZATION

Line plots

UNDERSTANDING DATA VISUALIZATION

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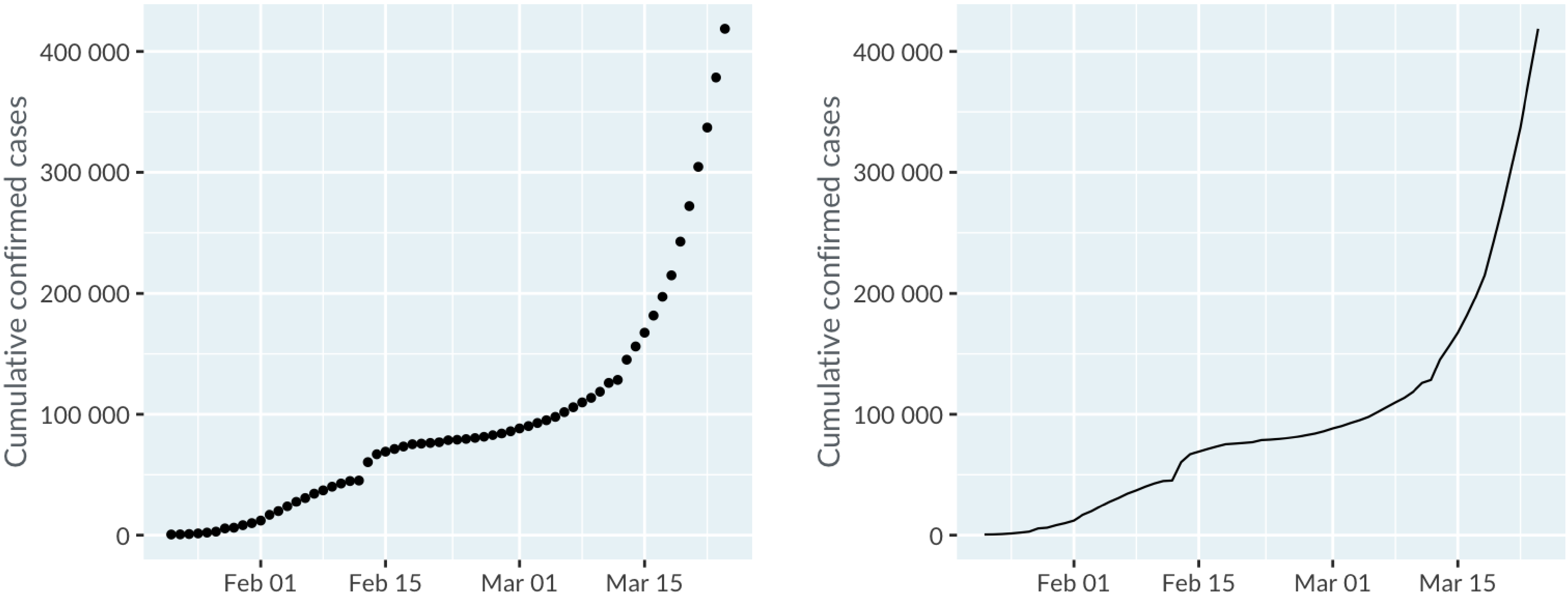
Worldwide COVID-19 coronavirus cases



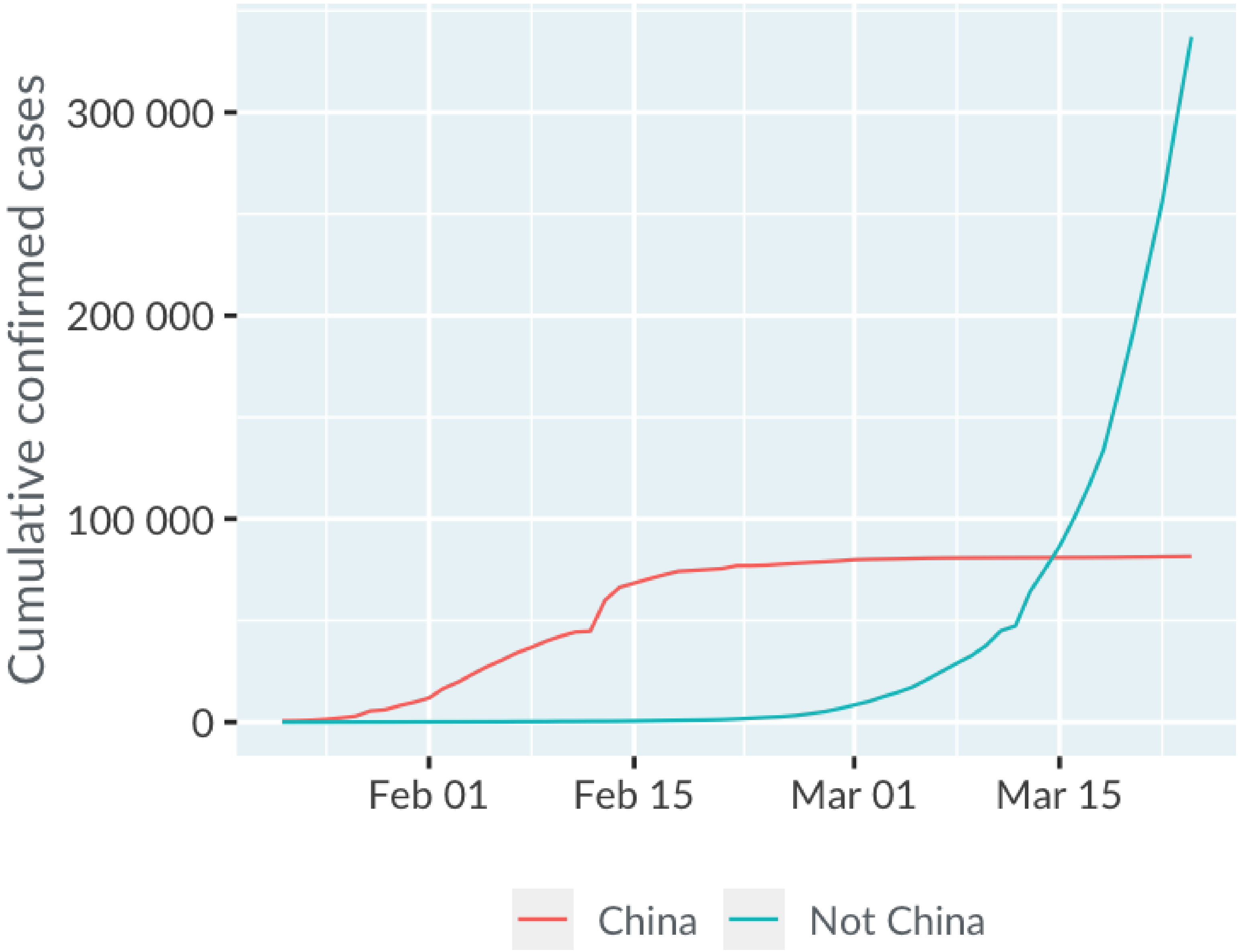
[1] https://github.com/RamiKrispin/coronavirus

When should you use a line plot?

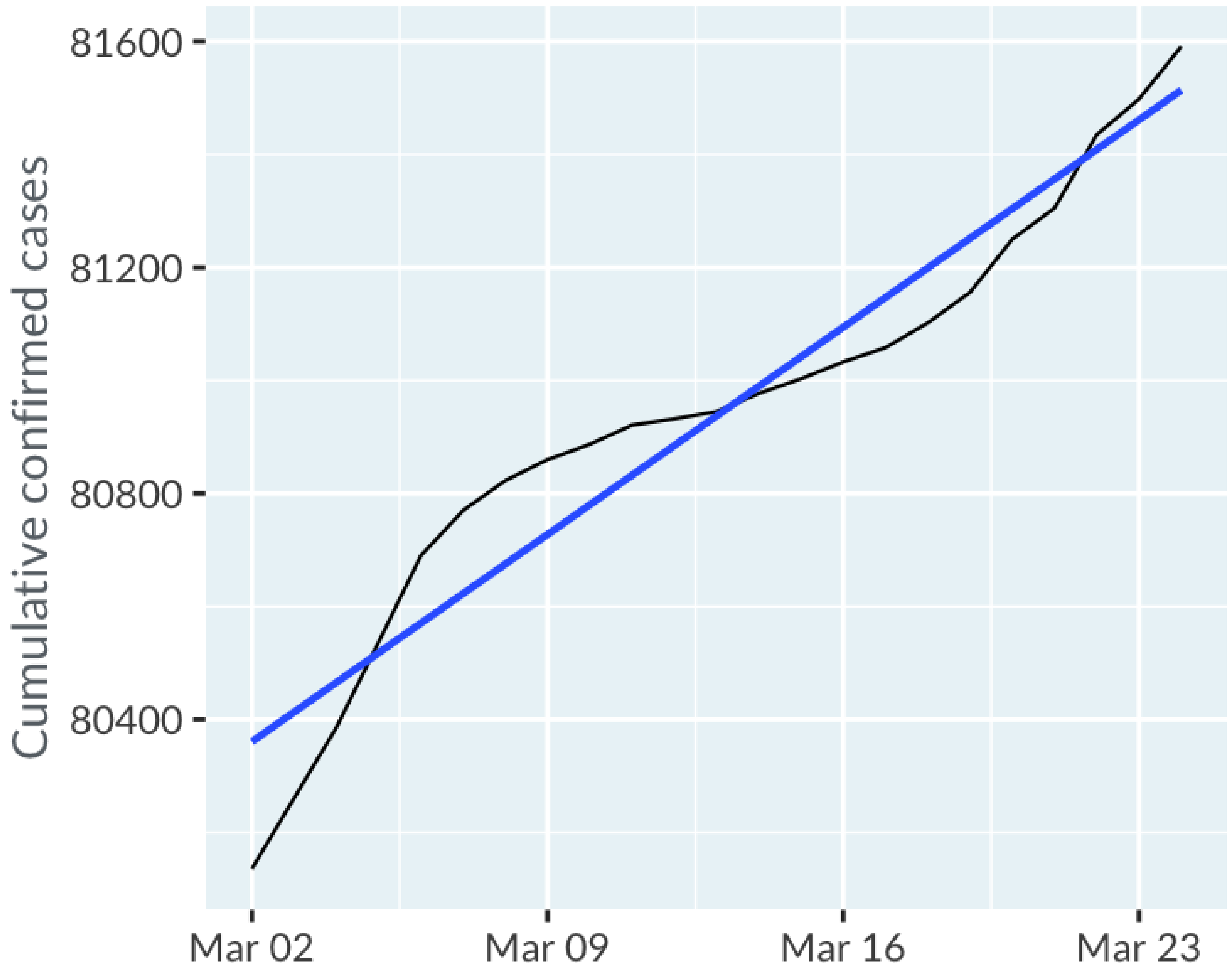
1. You have two continuous variables.
2. You want to answer questions about their relationship.
3. Consecutive observations are connected somehow.

Usually, but not always, the x-axis is dates or times.

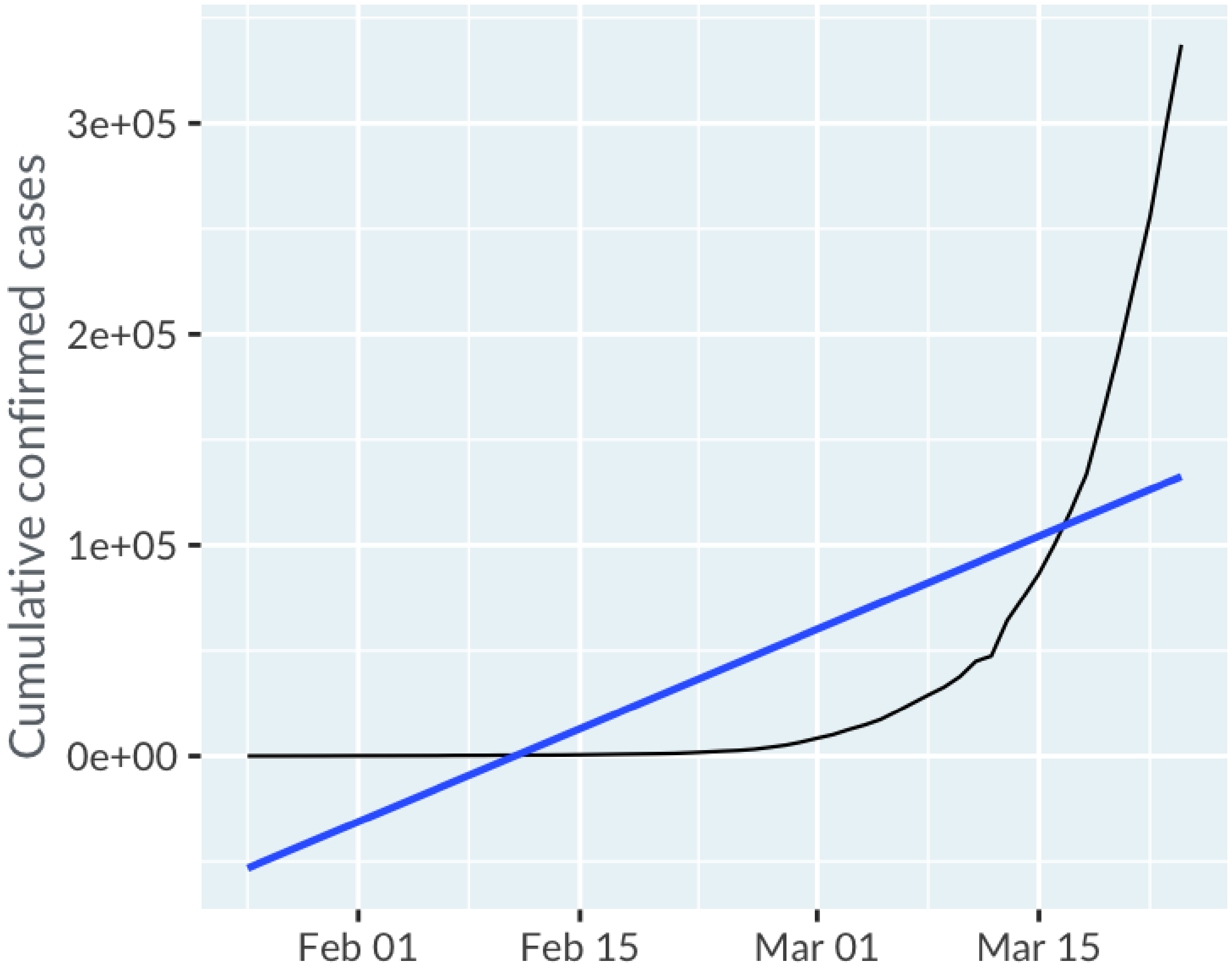
Comparing multiple lines

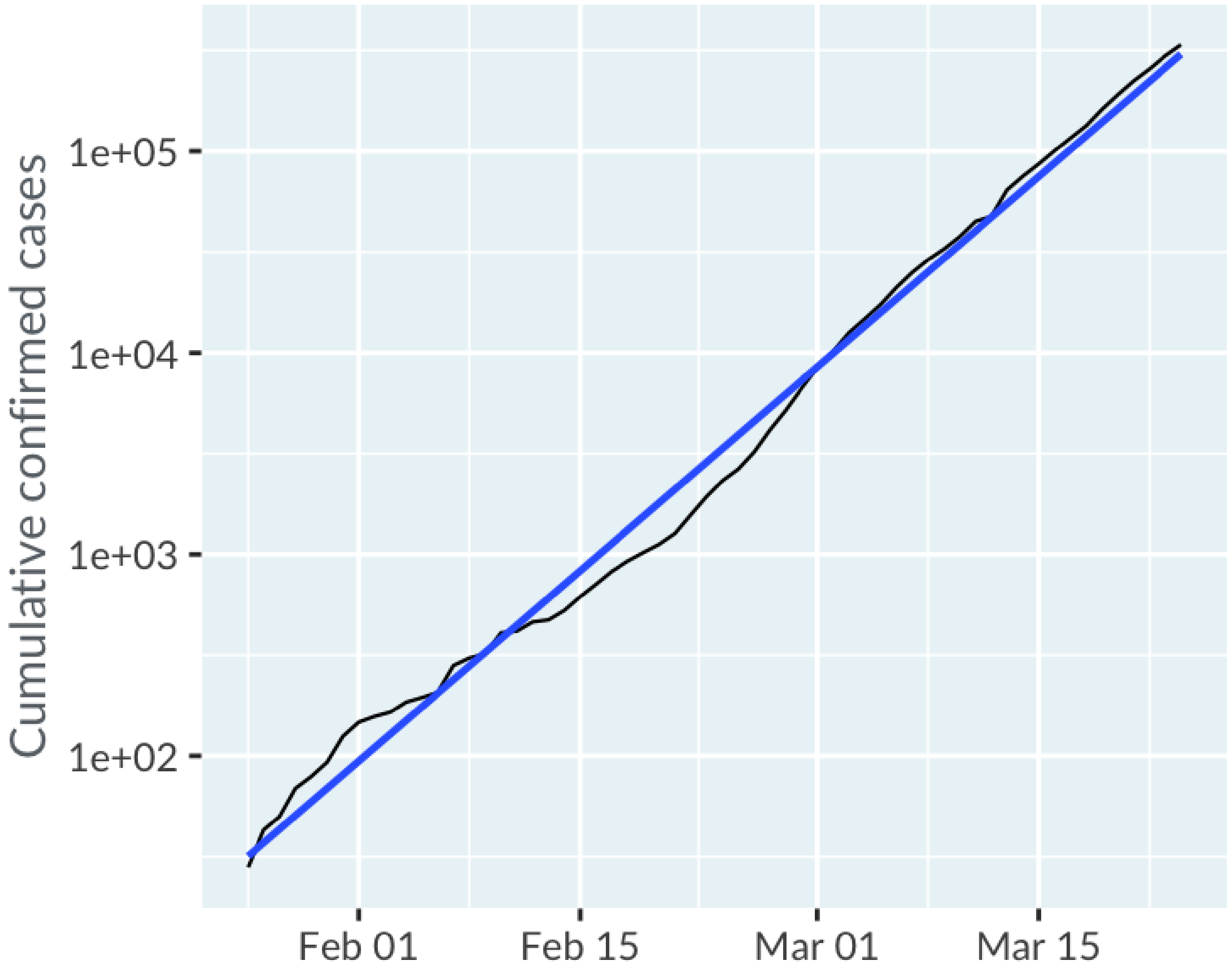


Trend lines

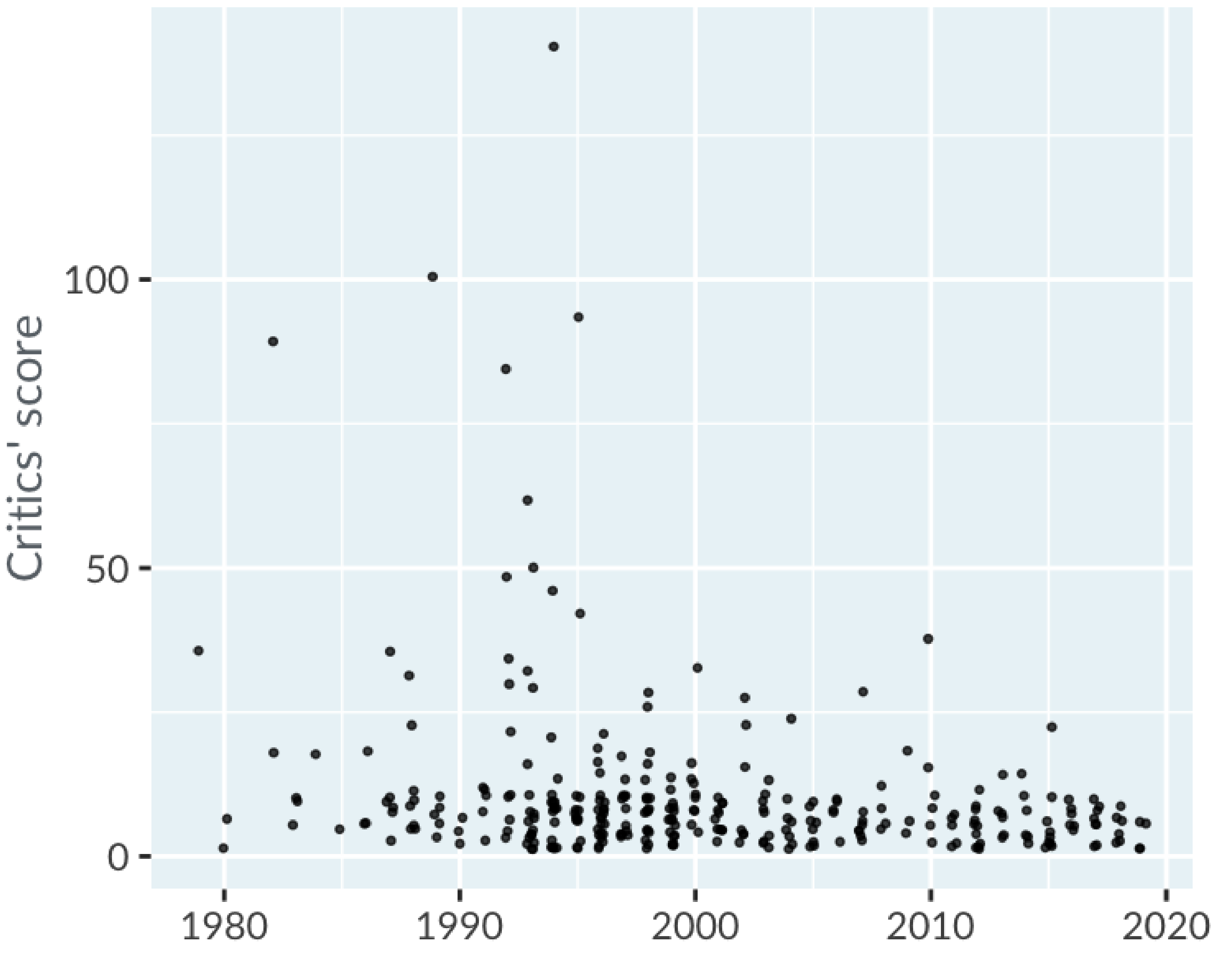

Cumulative confirmed cases
81600
81200
80800
80400
Mar 02
Mar 09
Mar 16
Mar 23

Trend lines + log scale



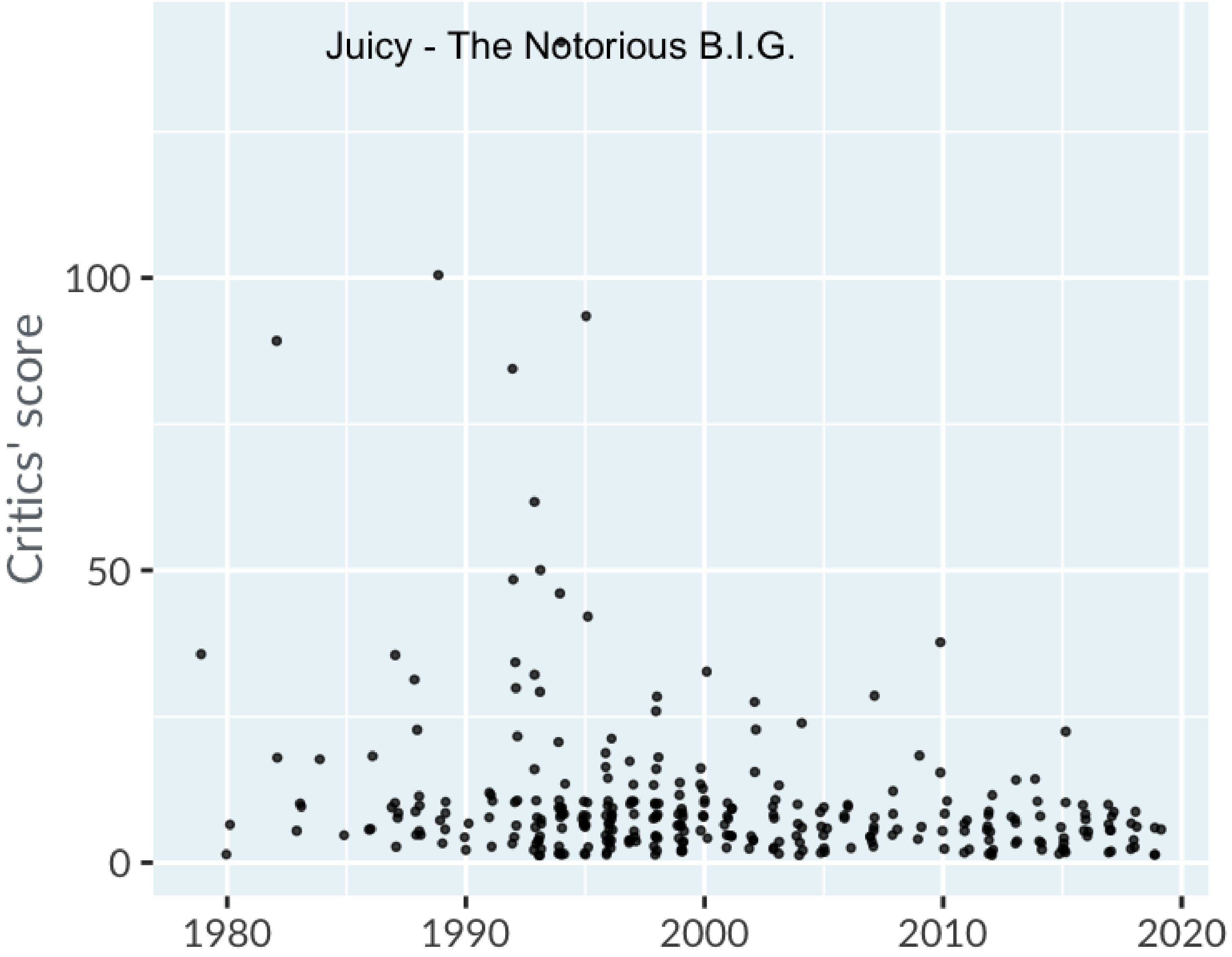


Time x-axis doesn't always imply line plot



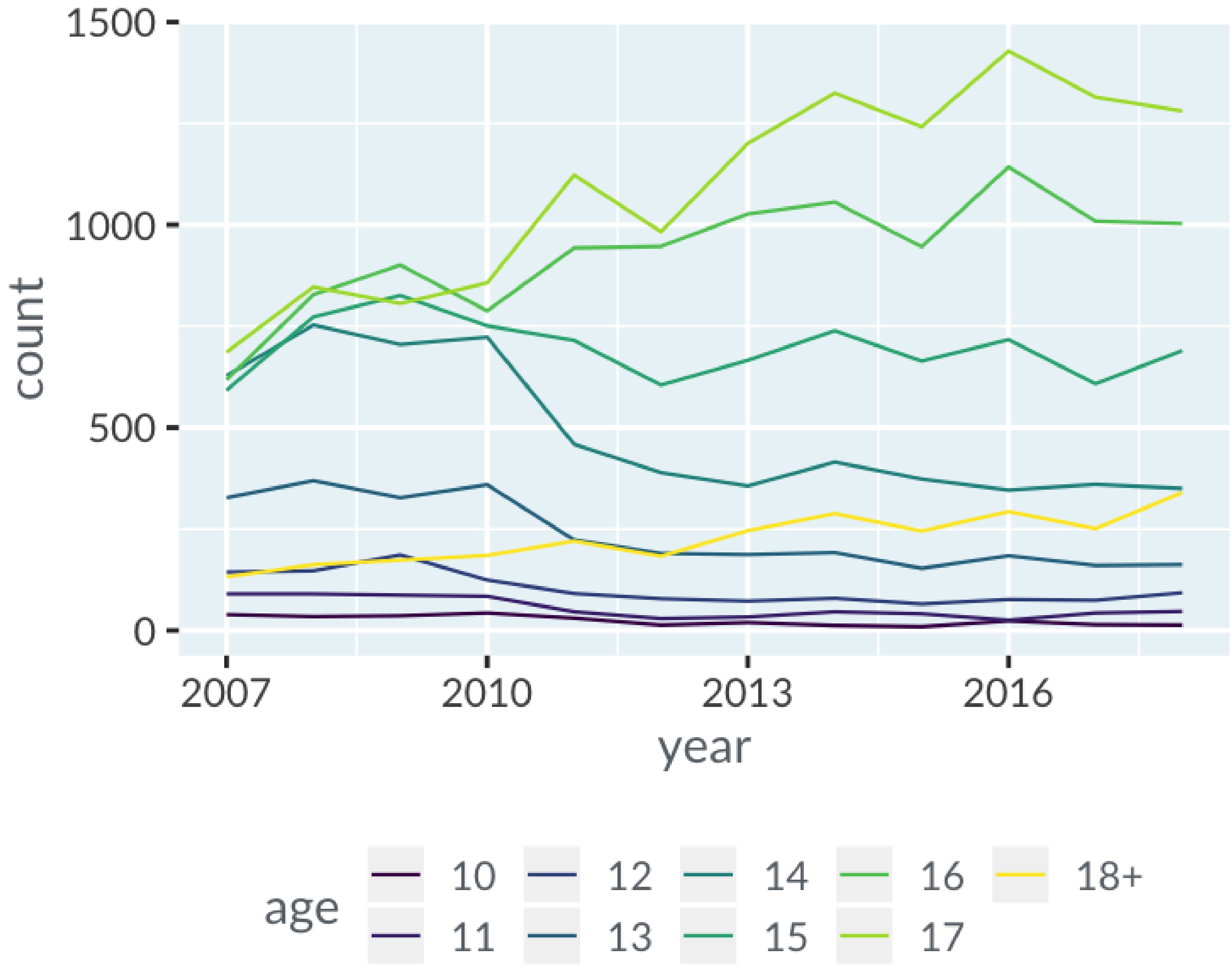
[1] https://blog.datawrapper.de/best-hip-hop-songs-of-all-time-visualized

Time x-axis doesn't always imply line plot



[1] https://blog.datawrapper.de/best-hip-hop-songs-of-all-time-visualized

Time x-axis doesn't always imply line plot



[1] https://opendata.swiss/en/dataset/statistik-der-jugendstrafrechtspflege-des-kantons-zuerich/resource/41430d20-d449-4a9b-bf91-3f9a16c9f229

Let's practice!

UNDERSTANDING DATA VISUALIZATION

Bar plots

UNDERSTANDING DATA VISUALIZATION

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When should you use a bar plot?

Most common cases:

1. You have a categorical variable.
2. You want counts or percentages for each category.

Occasionally:

1. You want another numeric score for each category, and need to include zero in the plot.

> When will I, will I be famous?
> I can't answer, I can't answer that

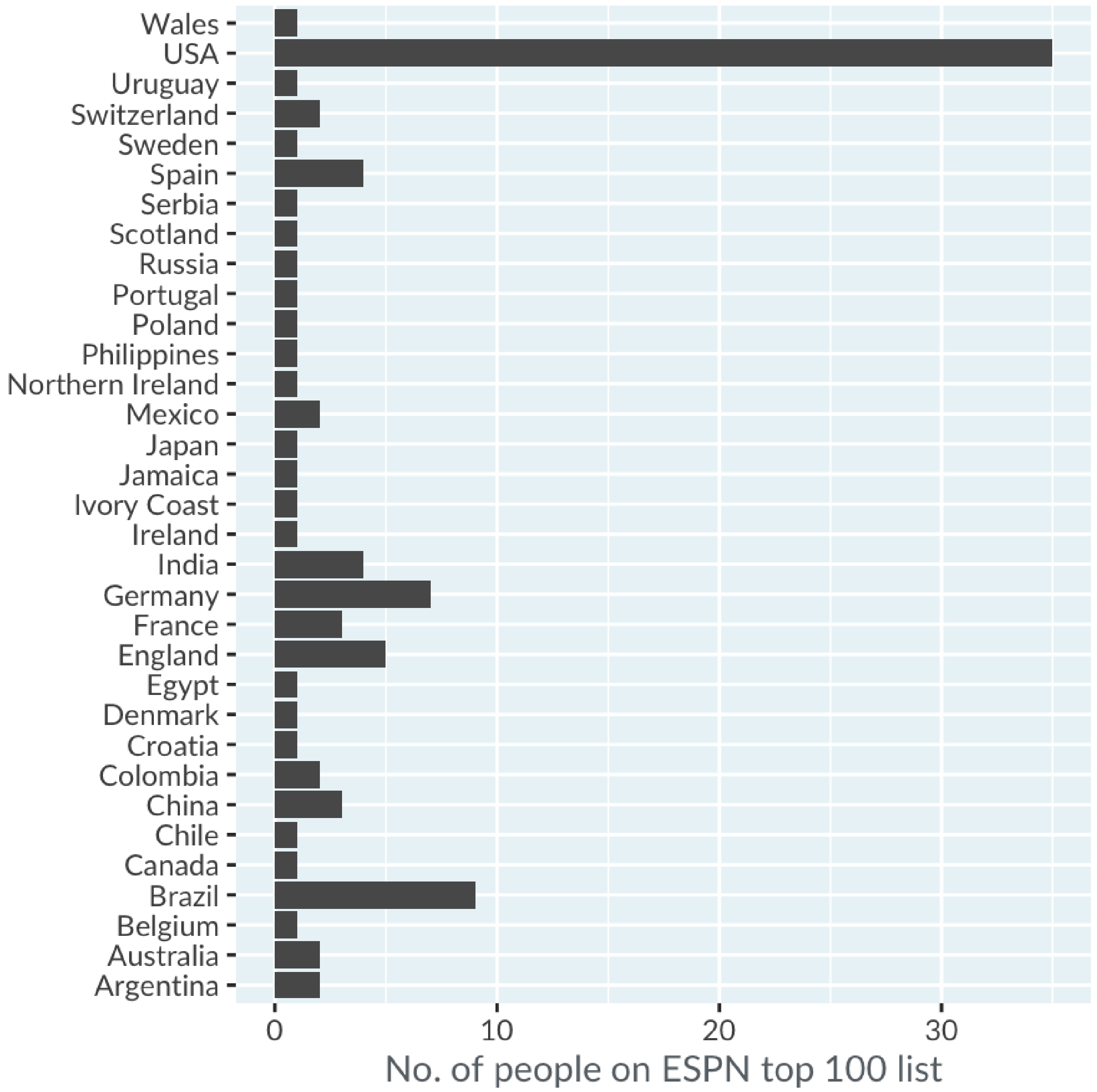
Bros – "When will I be famous?"

ESPN 100 most famous athletes from 2017

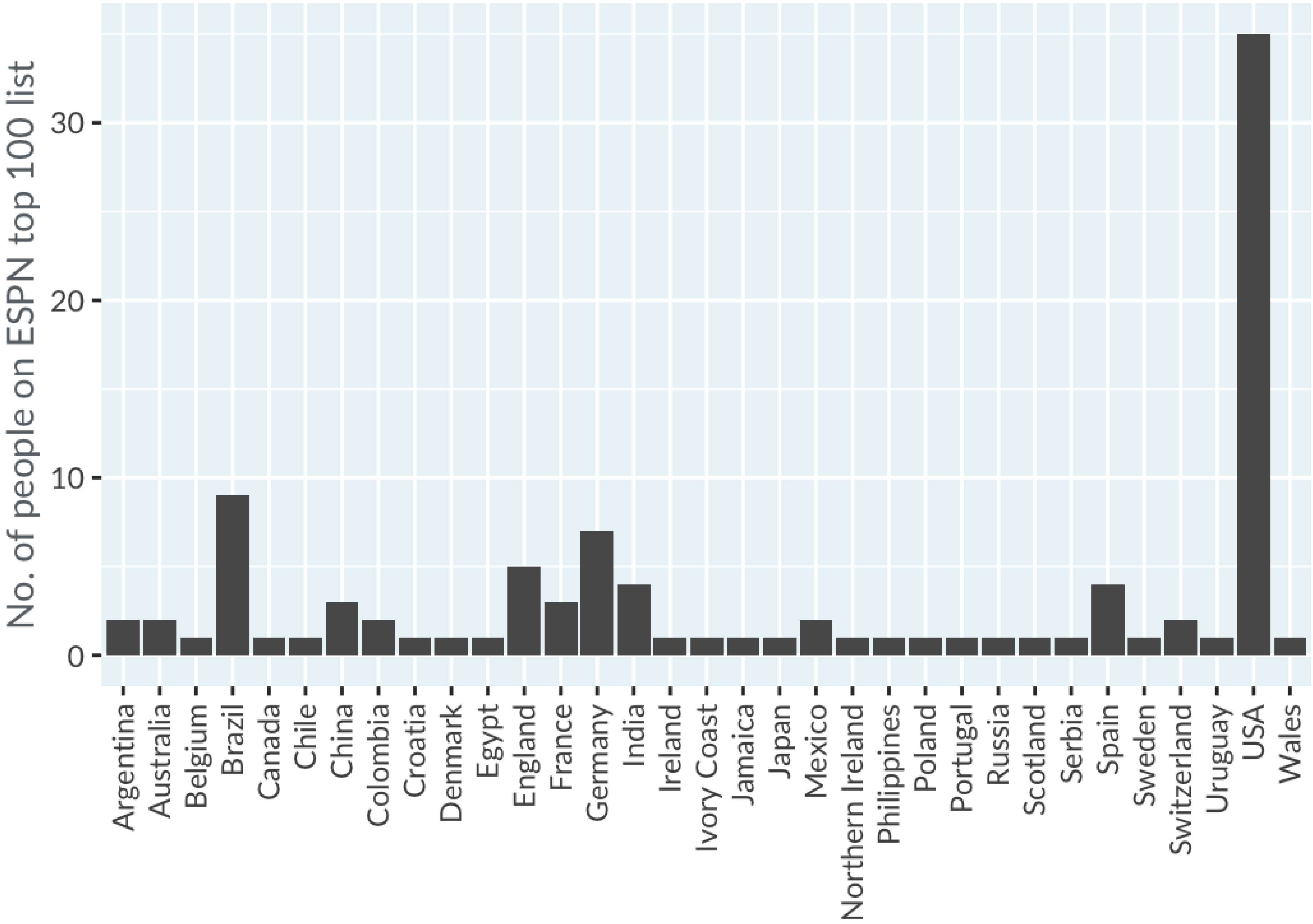
Rank	Last Name	First Name	Sport	Country
1	Ronaldo	Cristiano	Soccer	Portugal
2	James	LeBron	Basketball	USA
3	Messi	Lionel	Soccer	Argentina
4	Federer	Roger	Tennis	Switzerland
5	Mickelson	Phil	Golf	USA
...	...	...	...	...

[1] https://data.world/wesmagee/2017-espn-world-fame-100

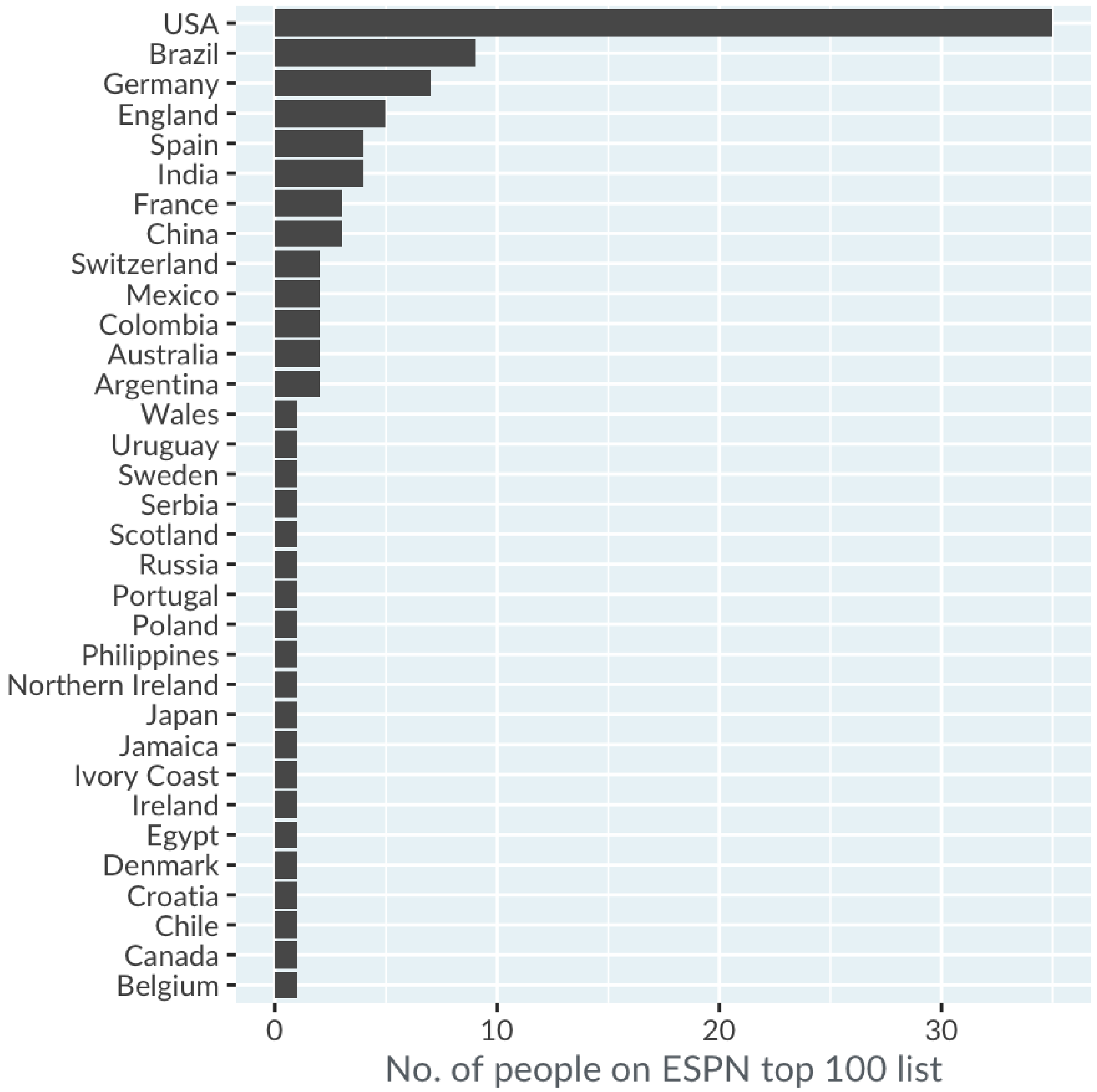
Bar plot of counts by country



Vertical bars



Sorting by count

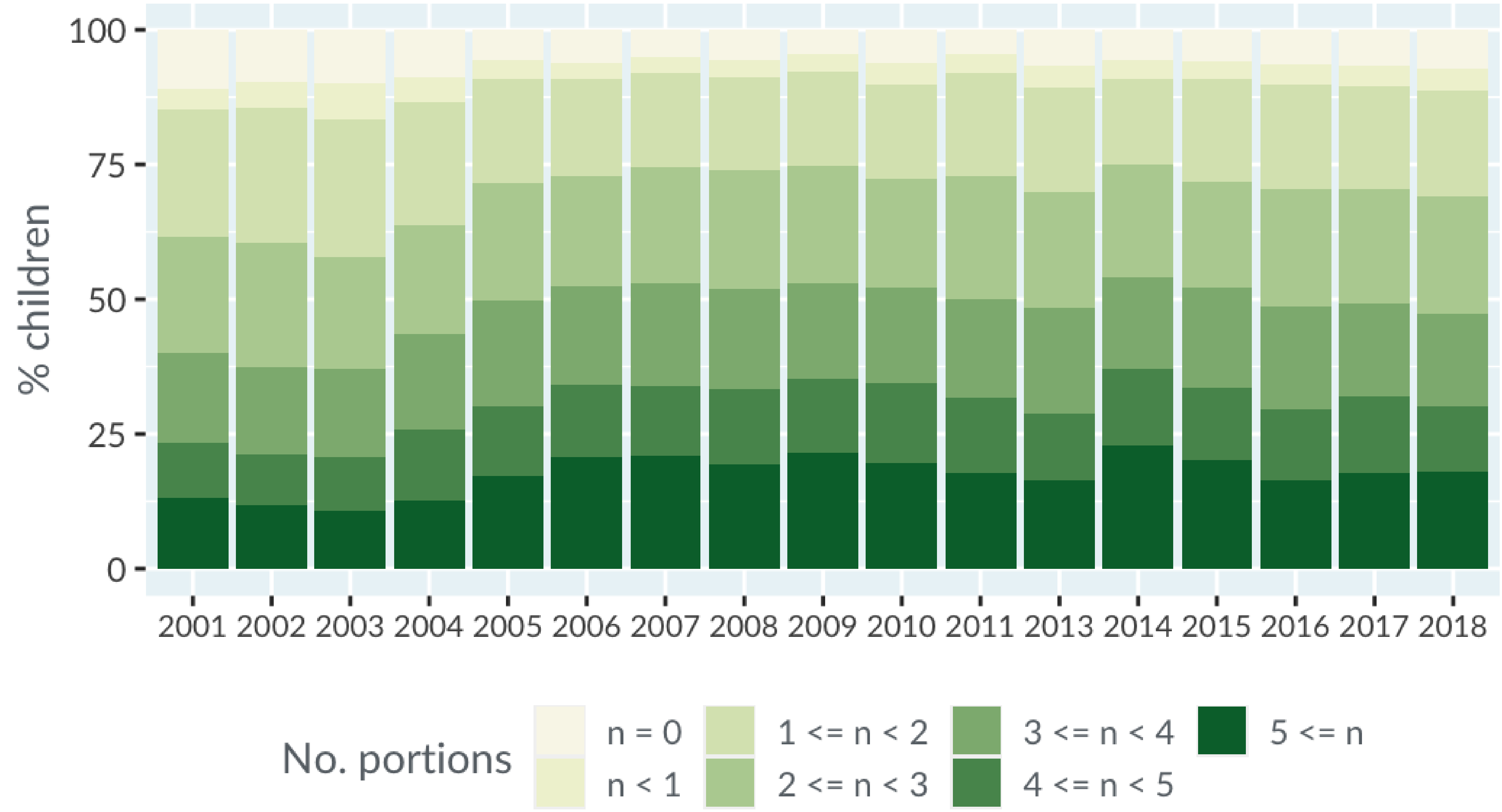


Children's fruit and veg consumption

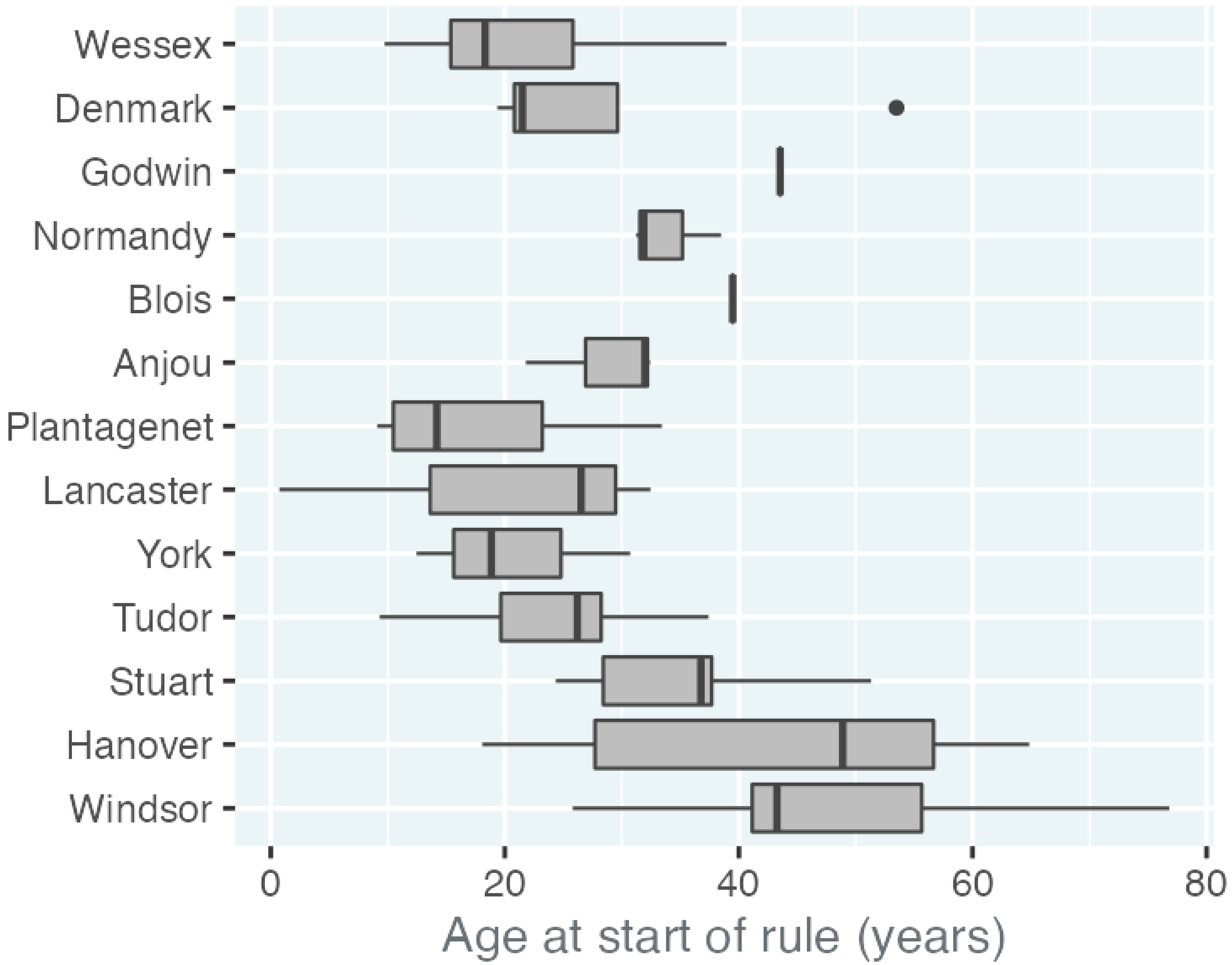
n_portions	year	pct_children
n = 0	2001	10.921779
n < 1	2001	3.843093
1 <= n < 2	2001	23.659102
...	...	...
4 <= n < 5	2018	12.28728
5 <= n	2018	17.87497

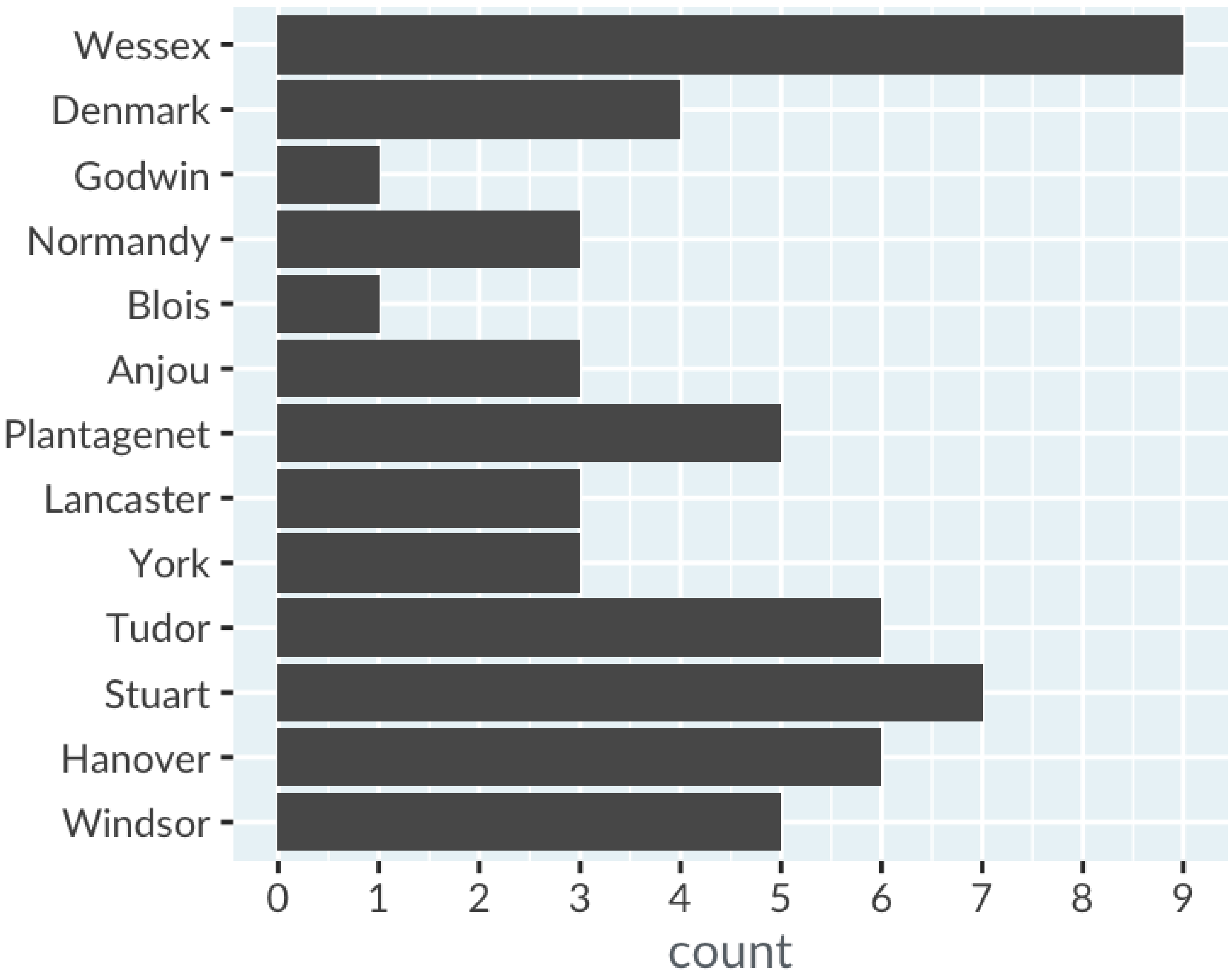
[1] https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2018/health-survey-for-england-2018-data-tables

Stacking bars

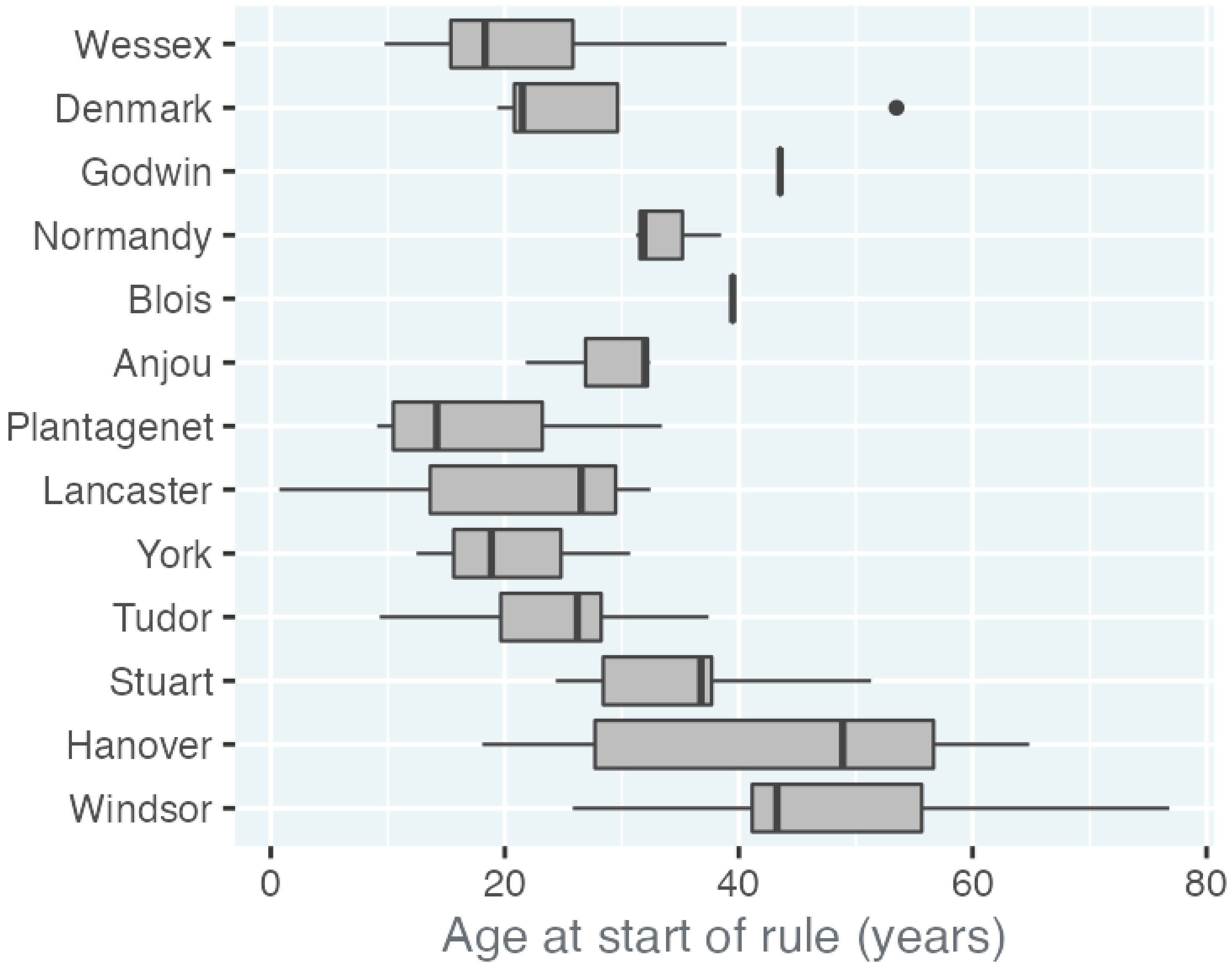


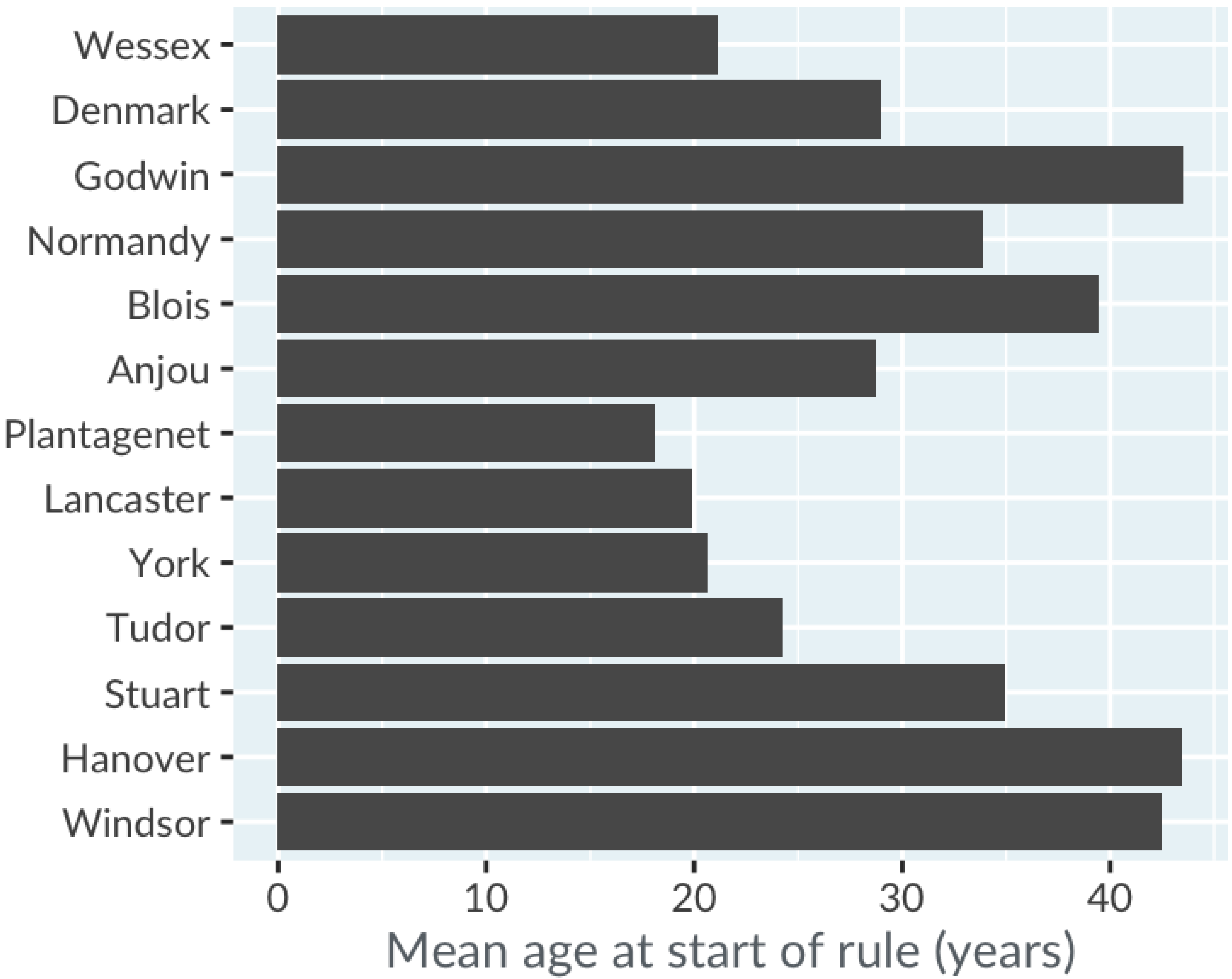
Bar plots vs. box plots





Other metrics than counts





Let's practice!

UNDERSTANDING DATA VISUALIZATION

Dot plots

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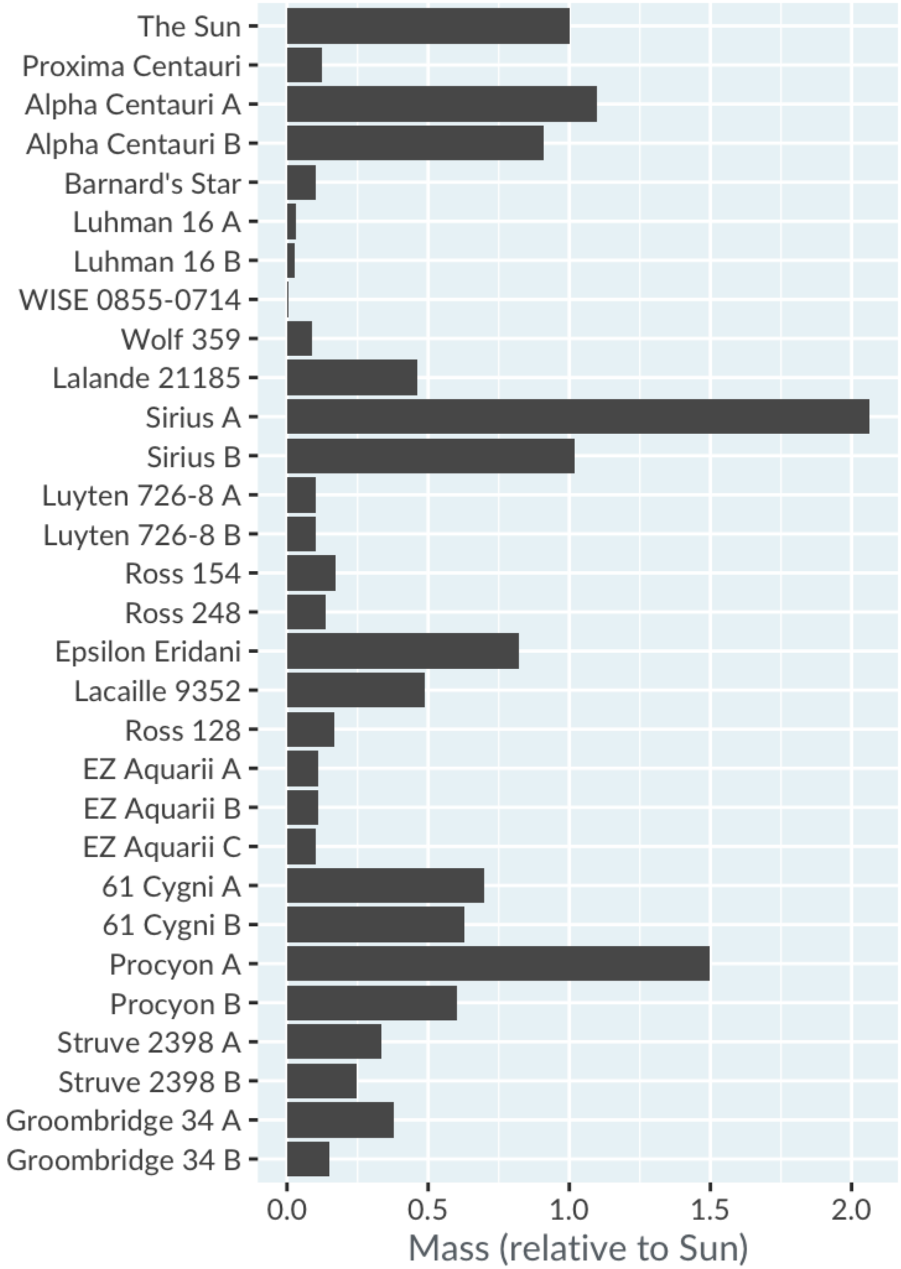
When should you use a dot plot?

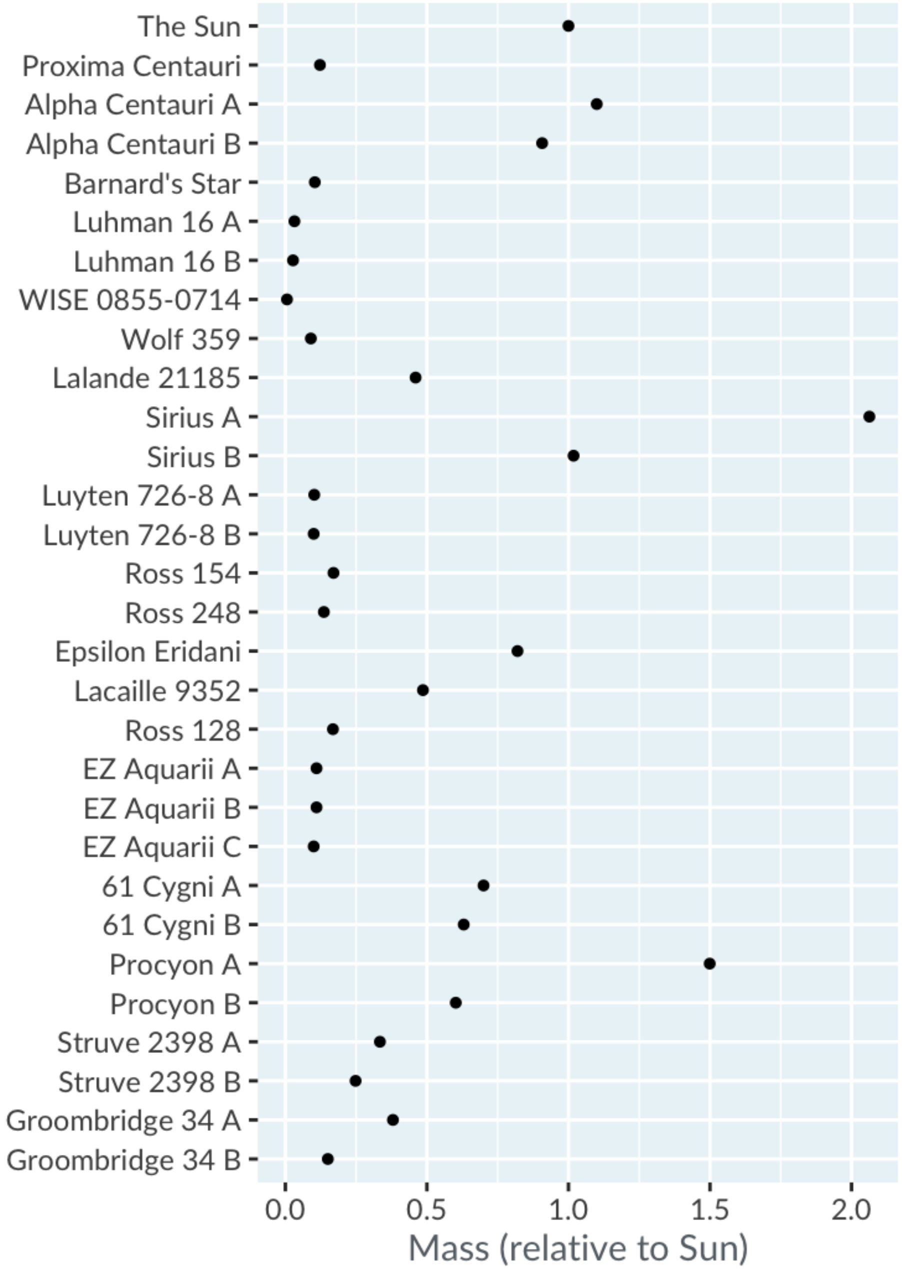
1. You have a categorical variable.
2. You want to display numeric scores for each category on a log scale, or
3. You want to display multiple numeric scores for each category.

Nearby stars and brown dwarfs

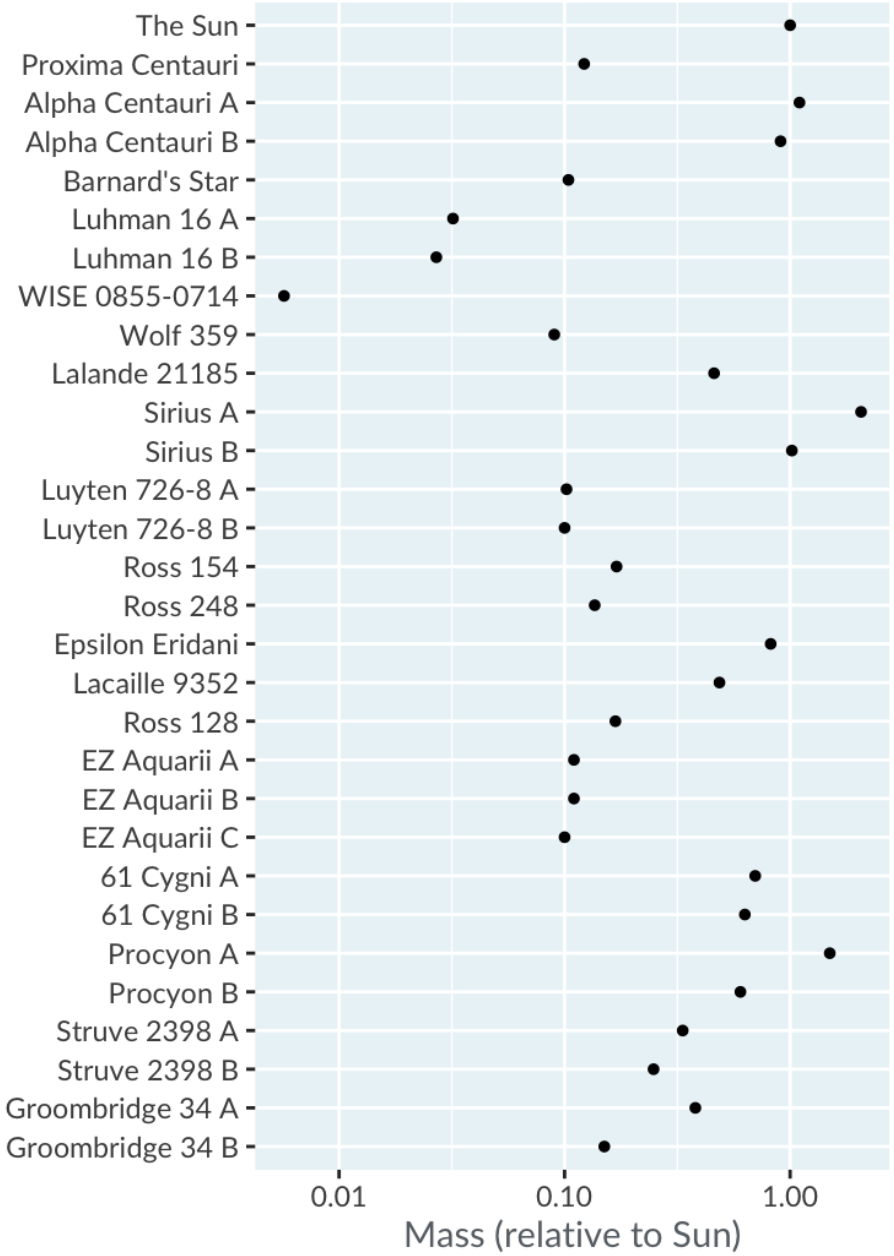
star	distance_ly	mass_sm
The Sun	0.0000158	1.0000
Proxima Centauri	4.2441000	0.1221
Alpha Centauri A	4.3650000	1.1000
Alpha Centauri B	4.3650000	0.9070
Barnard's Star	5.9577000	0.1040
Luhman 16 A	6.5029000	0.0320
...	...	...

Bar plot vs. dot plot

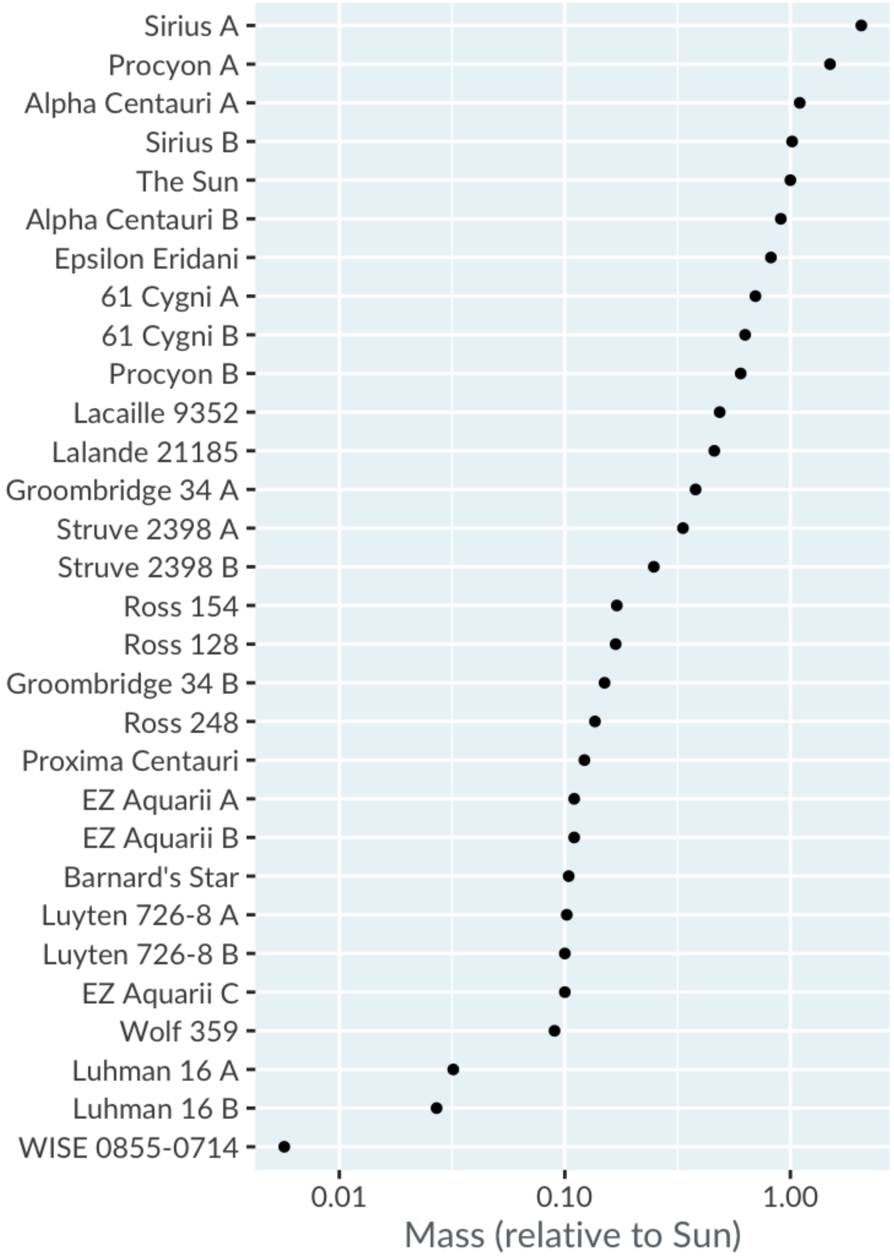




Log scales


The Sun
Proxima Centauri
Alpha Centauri A
Alpha Centauri B
Barnard's Star
Luhman 16 A
Luhman 16 B
WISE 0855-0714
Wolf 359
Lalande 21185
Sirius A
Sirius B
Luyten 726-8 A
Luyten 726-8 B
Ross 154
Ross 248
Epsilon Eridani
Lacaille 9352
Ross 128
EZ Aquarii A
EZ Aquarii B
EZ Aquarii C
61 Cygni A
61 Cygni B
Procyon A
Procyon B
Struve 2398 A
Struve 2398 B
Groombridge 34 A
Groombridge 34 B
0.01
0.10
1.00
Mass (relative to Sun)

Sorting rows



Let's practice!

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