

4. Chart Aesthetics

Gestalt Principles

The **Gestalt principles** are the “laws” of human perception.

They describe how humans group similar elements, recognize patterns and simplify complex images when they perceive objects.

Designers use them to organize content on charts, dashboards, websites, and other interfaces so that they be **aesthetically pleasing/easy to understand**.

Gestalt Principles

“Gestalt” is German for “unified whole”.

The first principles were devised in the 1920s by German psychologists Wertheimer, Koffka (“the whole is greater than the sum of the parts”), Kohler.

Aim: understand how we gain meaning from the chaotic stimuli around us.

The Gestalt principles are a set of “laws” which address the natural compulsion to find order in disorder. According to this, the mind “informs” what the eye sees by **perceiving a series of individual elements as a whole.**

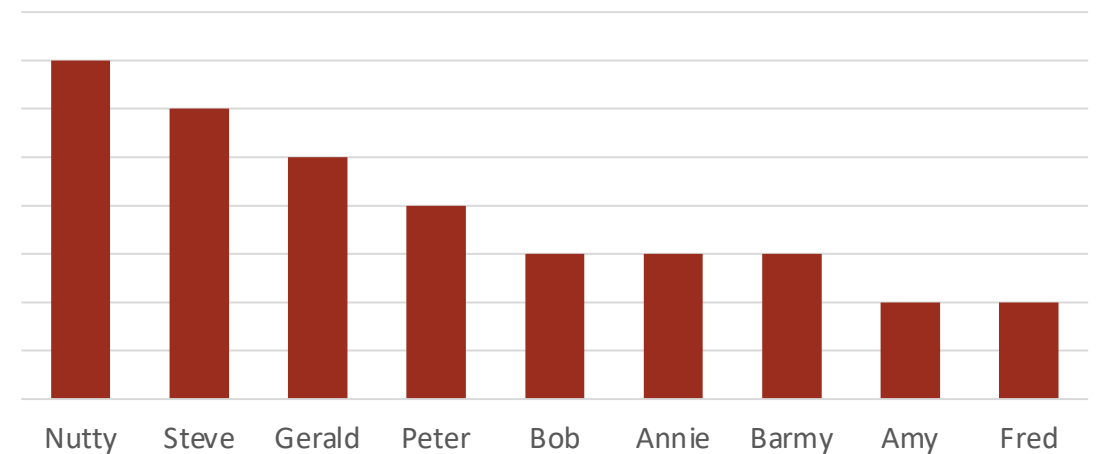
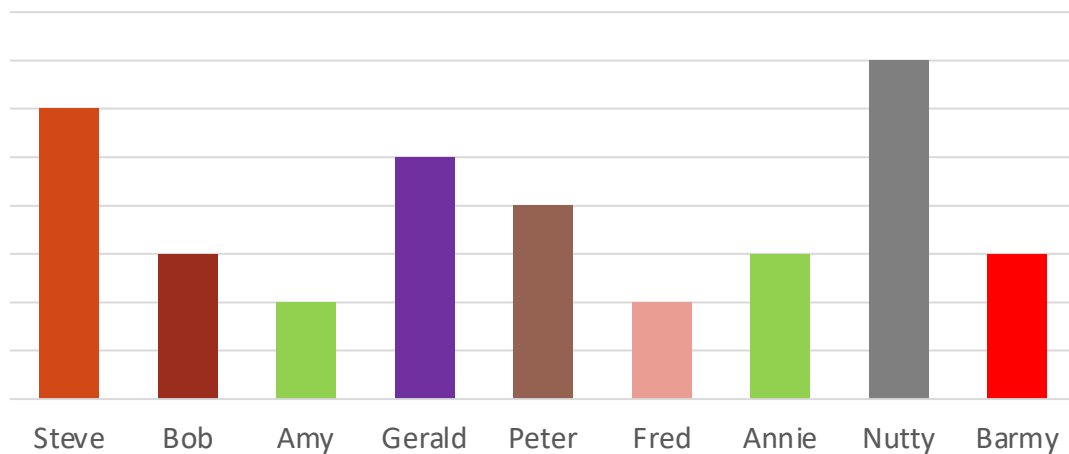
Gestalt Principles

- simplicity
- continuation
- proximity
- similarity (invariance)
- focal point
- isomorphic correspondence
- figure / ground duality
- common fate*
- closure*
- uniform connectedness*

Gestalt Principles – Simplicity

The brain has a preference for **simplicity** – it tends to process simple patterns faster than patterns that are more complex.

Lesson: arrange data simply and logically wherever possible.

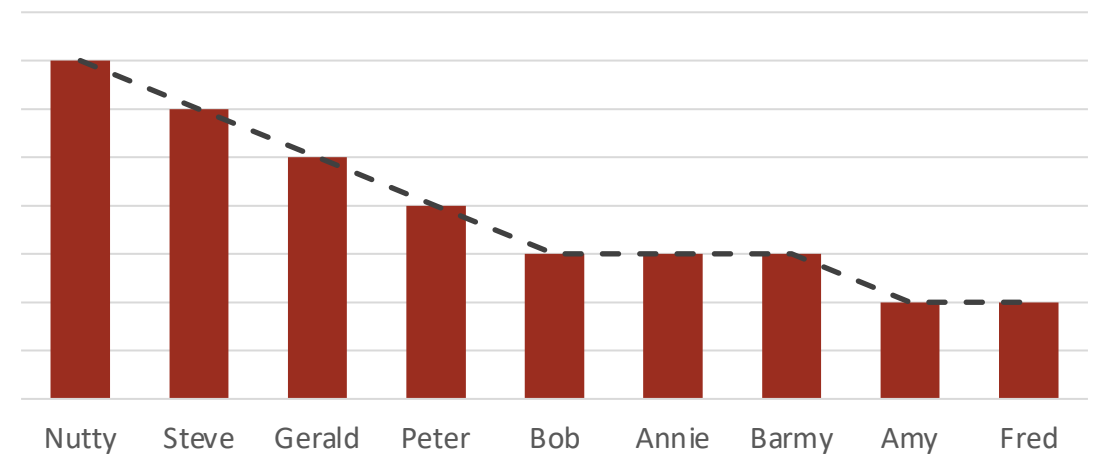
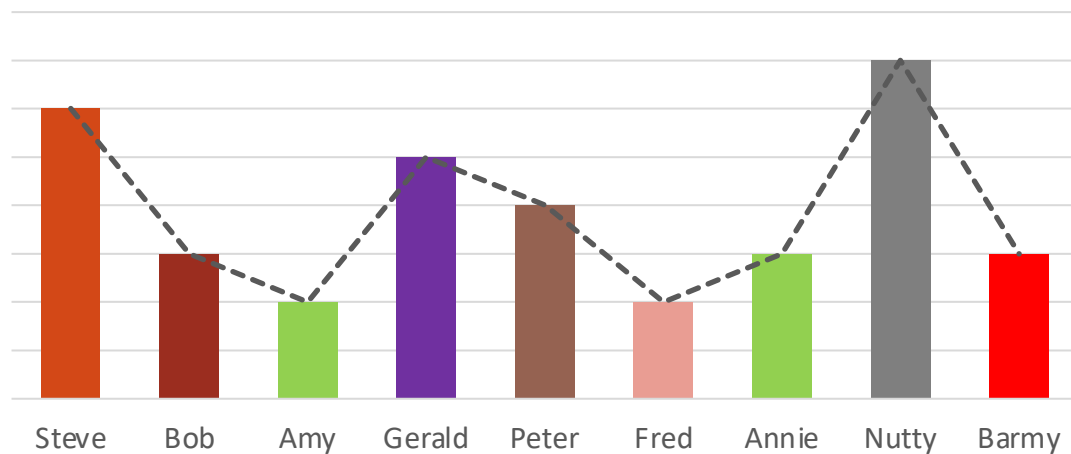


Gestalt Principles – Continuation

Our eyes group things that are **aligned** (e.g., sorted from high to low).

In the chart on the right the eyes follow a **continuous path**; it makes the whole chart more readable because of the continuous downward direction

Lesson: arrange objects in a line to facilitate grouping and comparison.



Gestalt Principles – Proximity

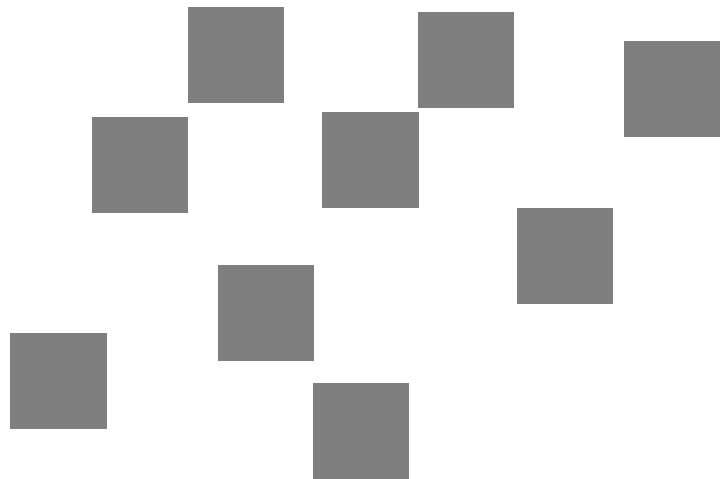
Objects/shapes that are in **proximity** (close) appear to form **groups**.

The effect generated by the collected group is more “powerful” than that generated by separate elements.

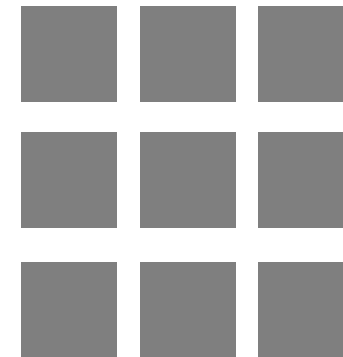
Elements which are grouped together create the **illusion** of shapes/planes in space, even if the elements are not touching.

Lesson: understand the chart’s priorities and create groupings through proximity that support those priorities.

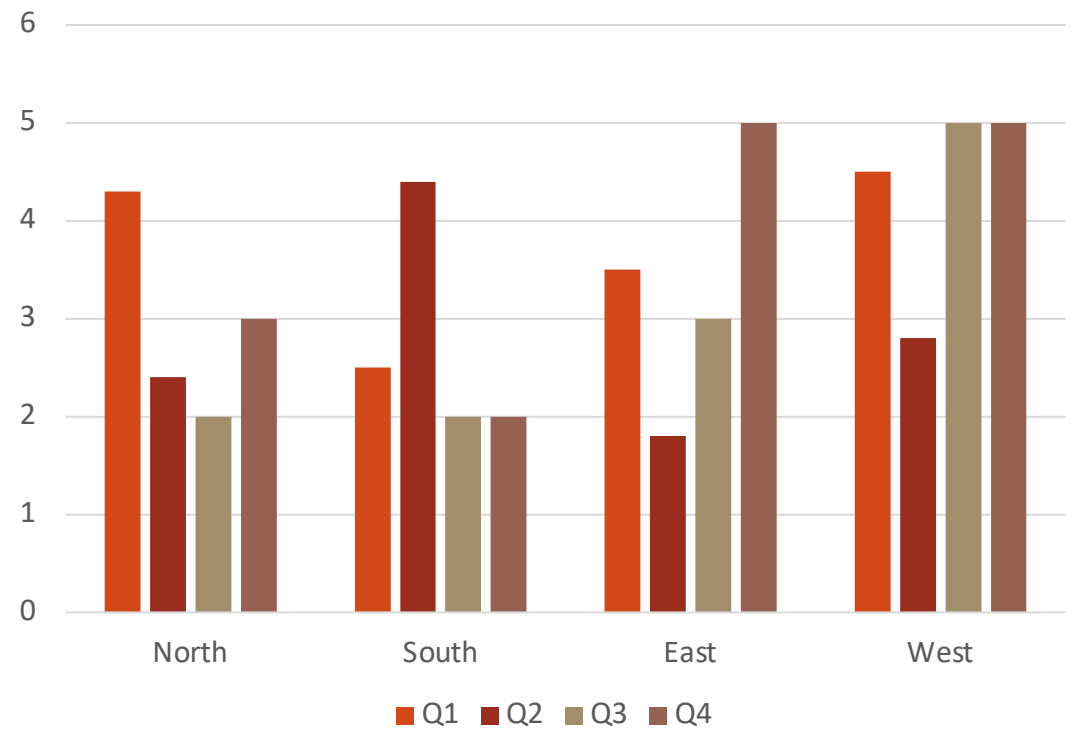
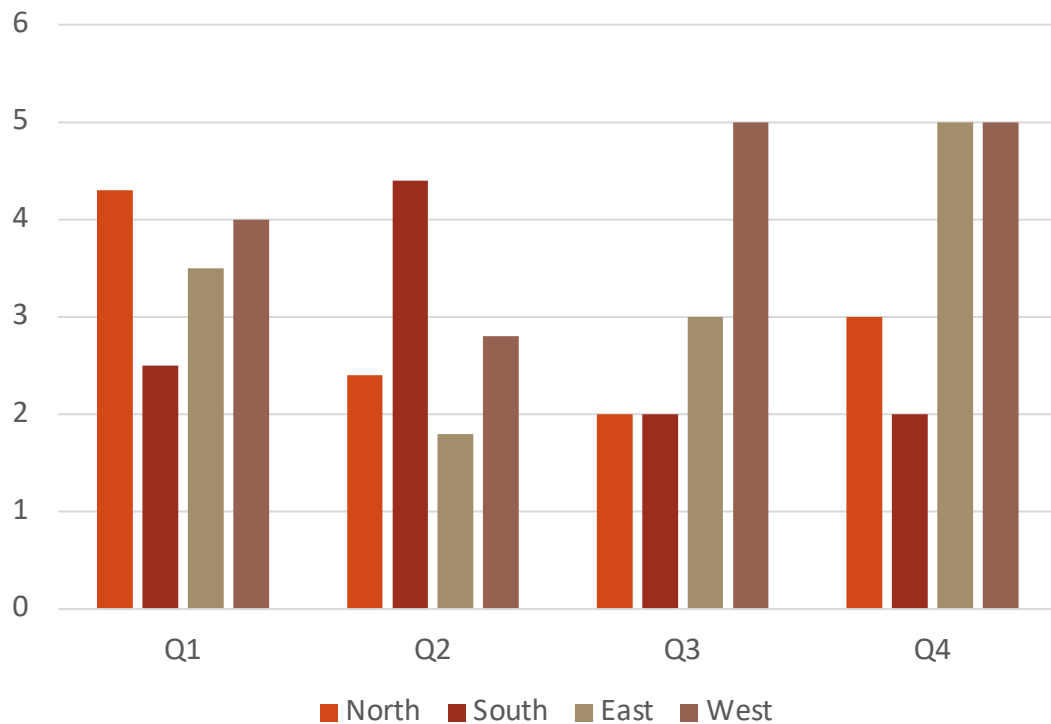
Gestalt Principles – Proximity



VS



Gestalt Principles – Proximity



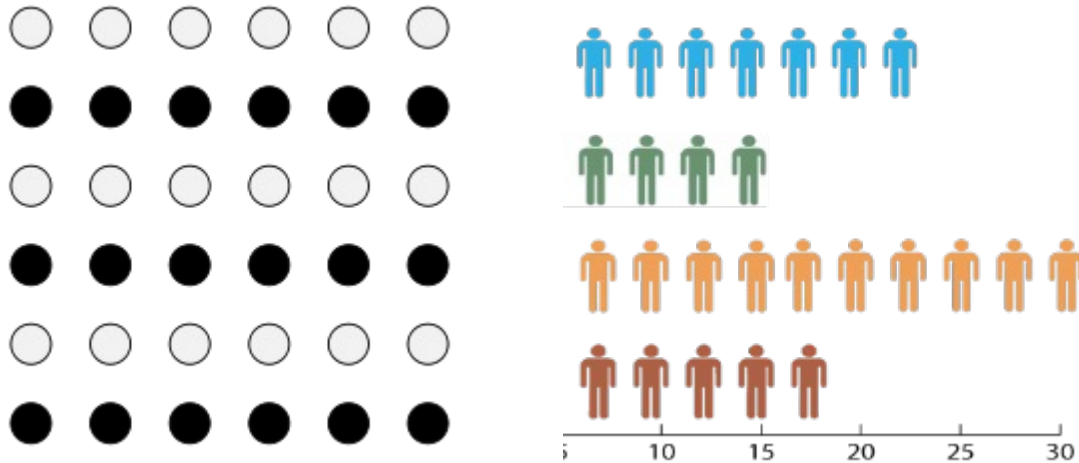
Gestalt Principles – Similarity

Stimuli that physically resemble each other are viewed as **part of the same object**; stimuli that don't are viewed as part of a different object.

Similarity and proximity often come together to form a **visual hierarchy**. Either principle can dominate the other, depending on their application and combination.

Lesson: use similar characteristics to establish relationships and to encourage groupings of objects.

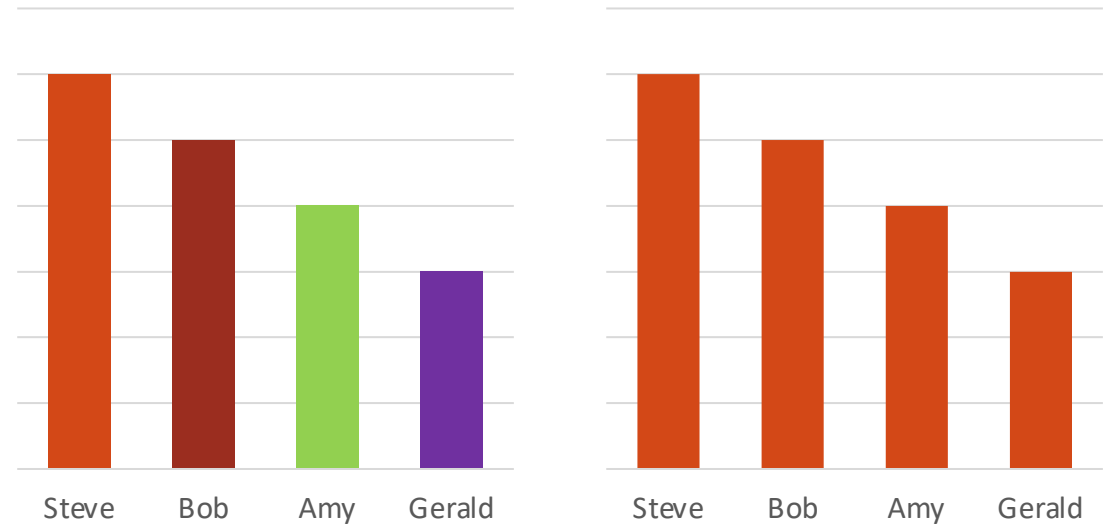
Gestalt Principles – Similarity



In these examples, similarity dominates over proximity: we see rows before we see columns.

Gestalt Principles – Similarity

Making things similar can reduce cognitive load (colour).

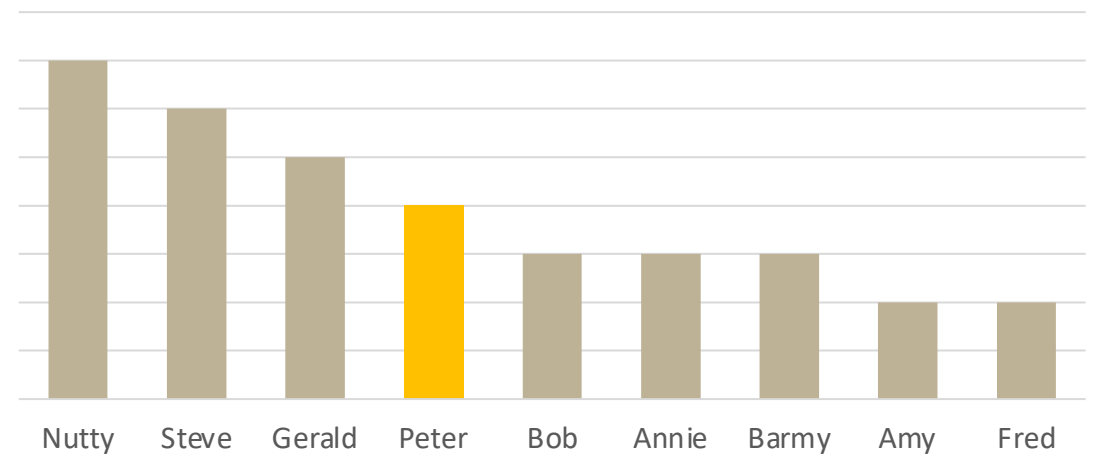
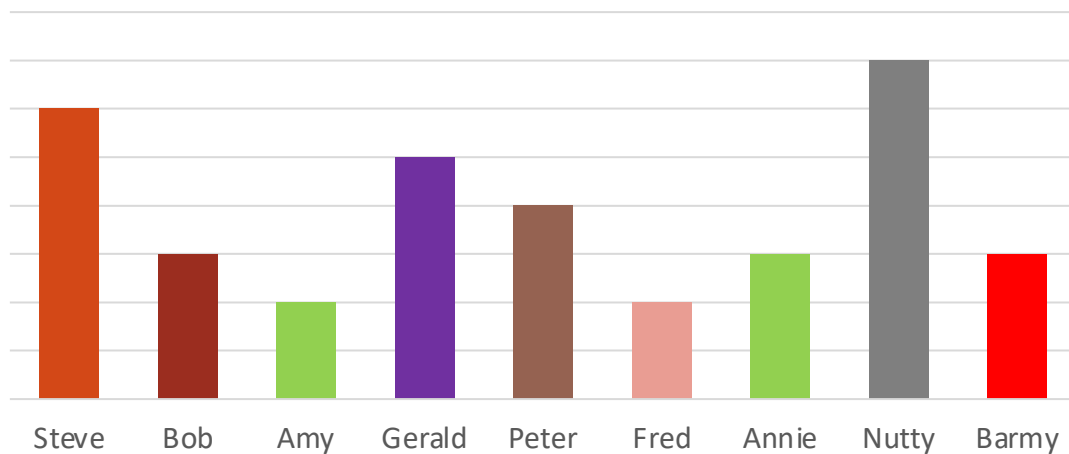


Gestalt Principles – Focal Point

In opposition to similarity, the **focal point** principle states that distinctive-looking objects can create a focal point.

To highlight one salesperson's performance, make their bar graph color different.

Lesson: use different characteristics to highlight and create focal points.

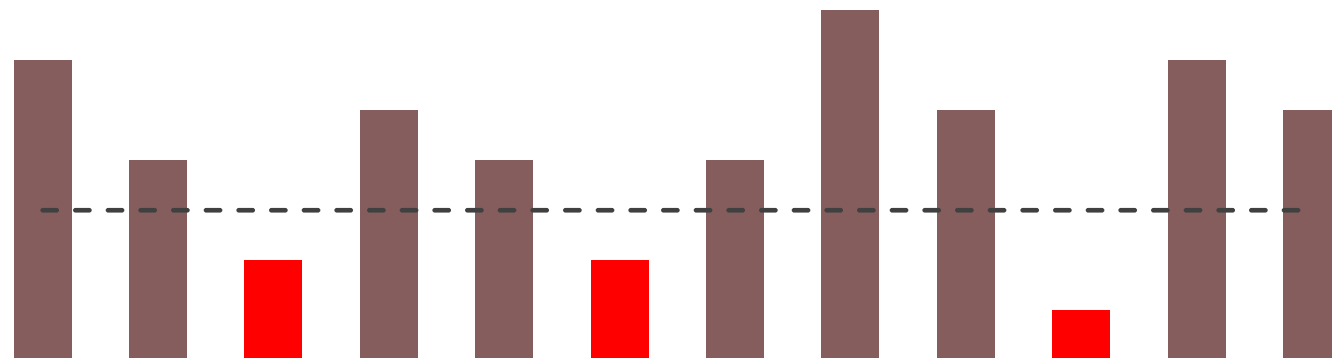


Gestalt Principles – Correspondence

People interpret and respond to images based on past/shared experiences (in particular, for the selection of chart colours).

Red is often associated with “**bad**” and **green** with “**good**” (colour-blindness?). We can colour-code charts accordingly.

Lesson: stick to well-established conventions/best practices (even if boring!)



Gestalt Principles – Duality

Chart elements are either perceived as **figures** (focus) or as (back)**ground**.

Foreground objects are **promoted** by the brain, background objects are **demoted**.

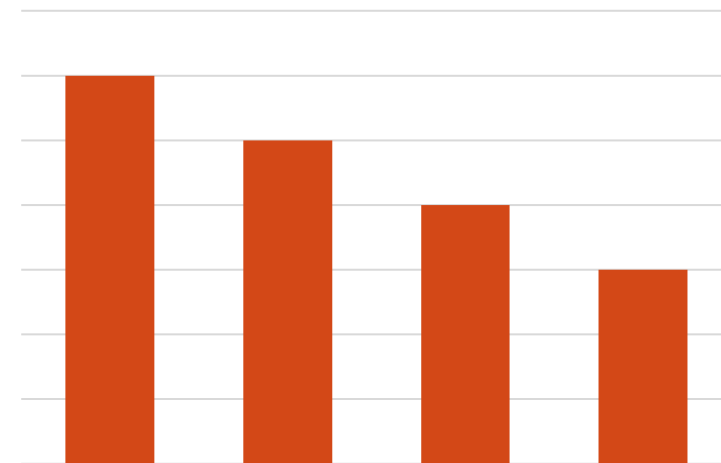
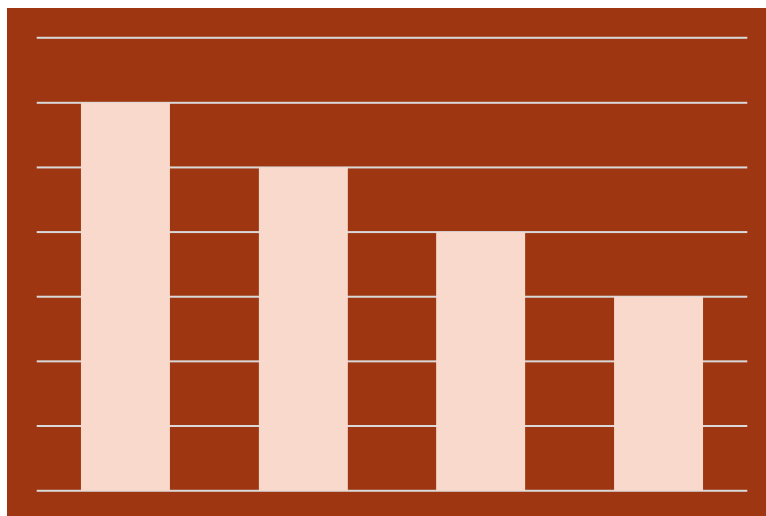
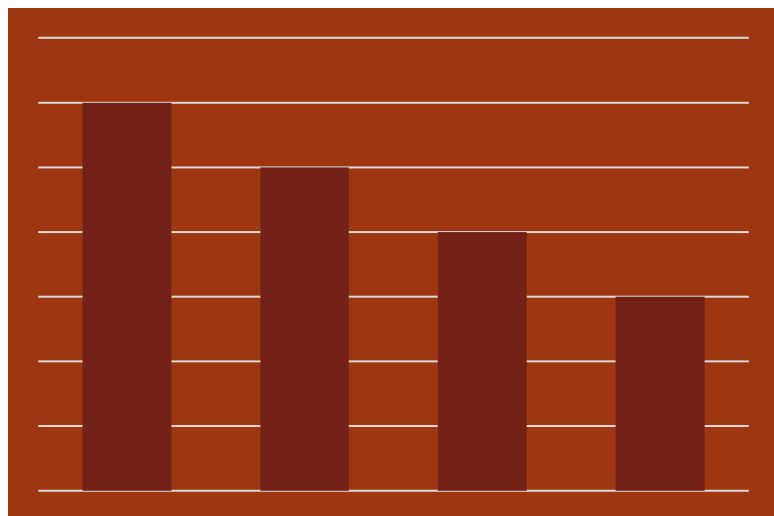
Strong contrast makes it easier to distinguish between the two types of objects.

Lesson: ensure there is enough contrast between the chart foreground (figures) and their background.

Gestalt Principles – Duality

Because of the **low contrast** between the figure and background in the chart on the left, there is an **additional cognitive load**.

Increasing the contrast on the right improves readability.



Decluttering

Clutter is the enemy!

Every element on a page adds cognitive load

- identify and remove anything that isn't adding value
- think of cognitive load as mental effort required to process information (lower is better)

Tufte refers to the **data-to-ink ratio** – “the larger the share of a graphic’s ink devoted to data, the better”

In *Resonate*, Duarte refers to this as “**maximizing the signal-to-noise ratio**” where the signal is the information or the story we want to communicate.

Decluttering

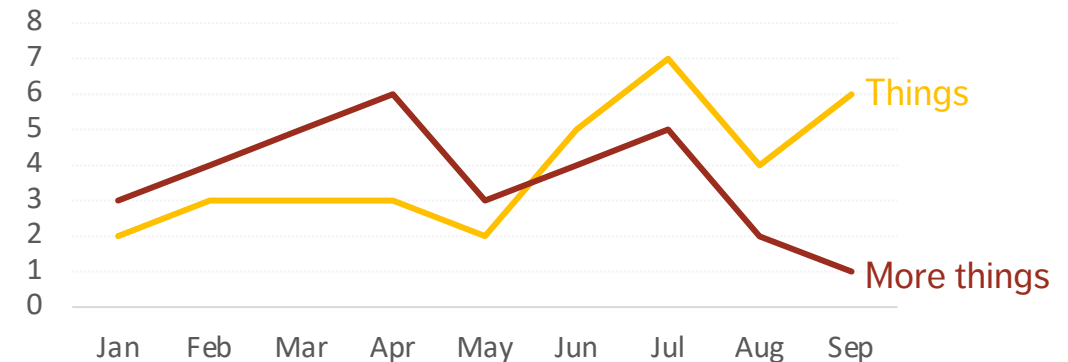
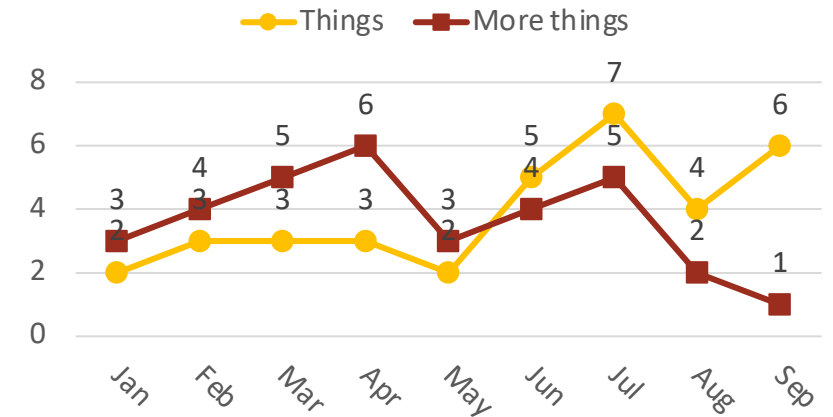
Use the Gestalt Principles to **organize/ highlight** data in the chart.

Align all elements (graphs, text, lines, etc.):

- don't rely on eye, use position boxes and values

Charts:

- remove border, gridlines, data markers
- clean up axis labels
- label data directly



Decluttering

Use **consistent** fonts, font size, colour and alignment.

Don't rotate text to anything other than 0 or 90 degrees (however: English/French incompatibility with vertical text).

Use **white space**:

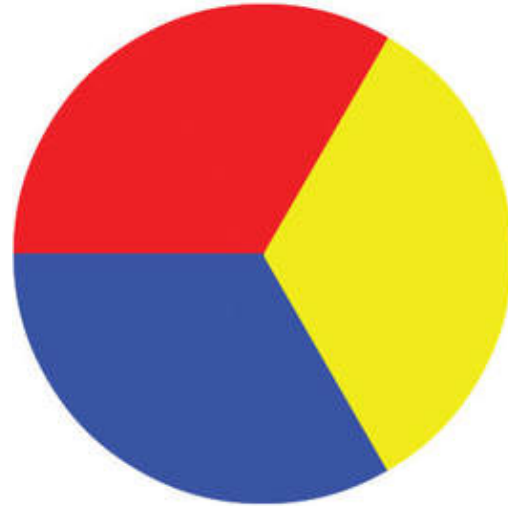
- margins should remain free of text and visuals
- don't stretch visuals to edge of page or too close to other visuals
- think of white space as a border

Colour Theory

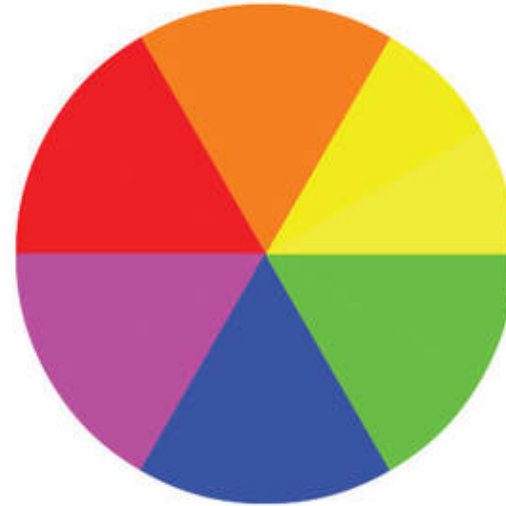
It is a complicated topic – here is a start:

- <http://www.deanenettles.com/webexamples/colorexamples/>
- <https://www.sessions.edu/color-calculator/>

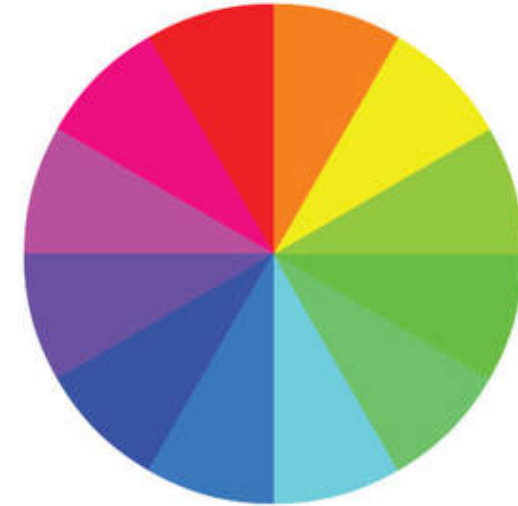
Colour wheels:



Primary Colours



Secondary Colours



Tertiary Colours

Colour Schemes

Achromatic (colourless, using only blacks, whites and grays)



Monochromatic (1-colour schemes)



Complementary (colours directly across from each other on the colour wheel)



Split complementary (2 of the 3 colors are adjacent; 1 of the colours is opposite)



Colour Tips

When it comes to colour, **less is more**: use it sparingly (graphic designers are taught to “get it right, in black and white”).

Based on the Gestalt Principles, **monochrome** schemes can be effective.

When appropriate, pick corporate identity scheme (this maximizes buy in).

Create a **template** (and stick to it).

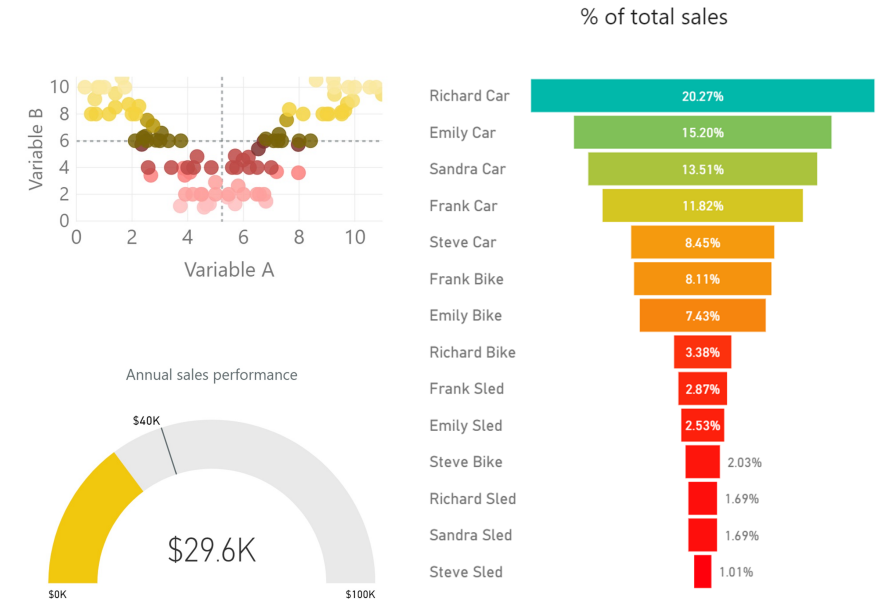
Upload images to see what charts look like for flavours of colourblindness:

- <https://www.color-blindness.com/coblis-color-blindness-simulator> (not the only tool)

Size Considerations

Assuming that the charts has been decluttered:

- things of equal importance size similarly
- other things scale to importance



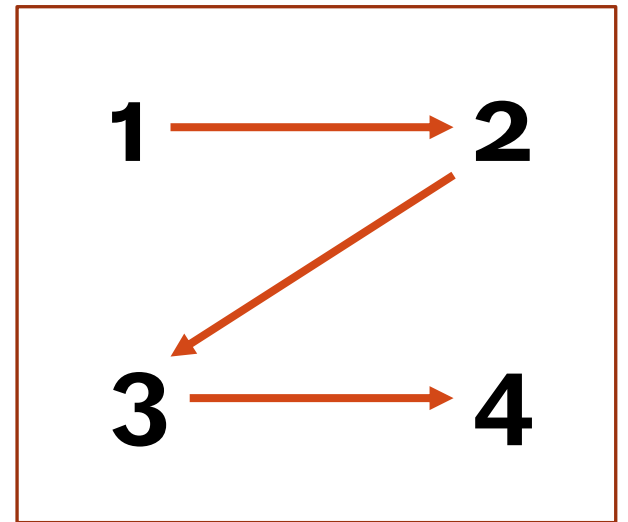
Position Considerations

How should the elements be placed in a chart/dashboard?

In the West, most people start at the **top left** and zig-zag all the way to the **bottom right**.

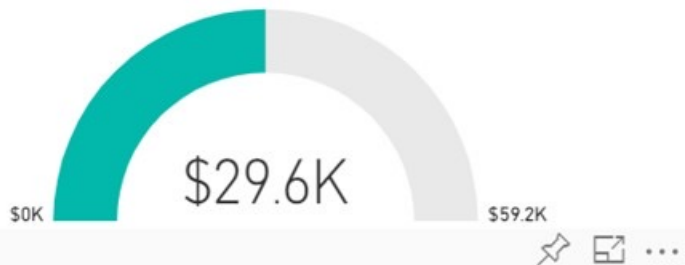
Simple rule: don't make people work too hard

- main message: top left/top right
- info in order of preference
- people concentrate less as they scan so get less complex as you move to bottom corner



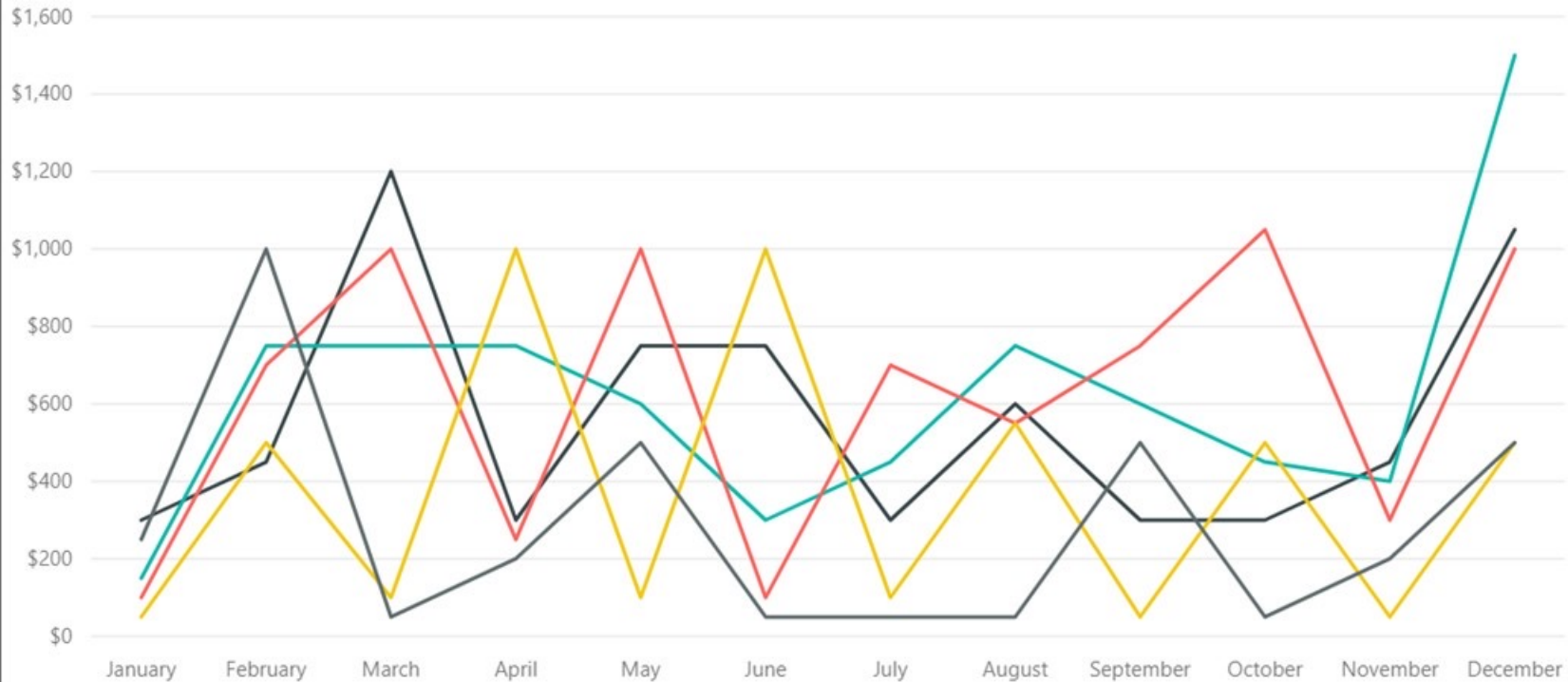
Sales Dashboard

\$ sales



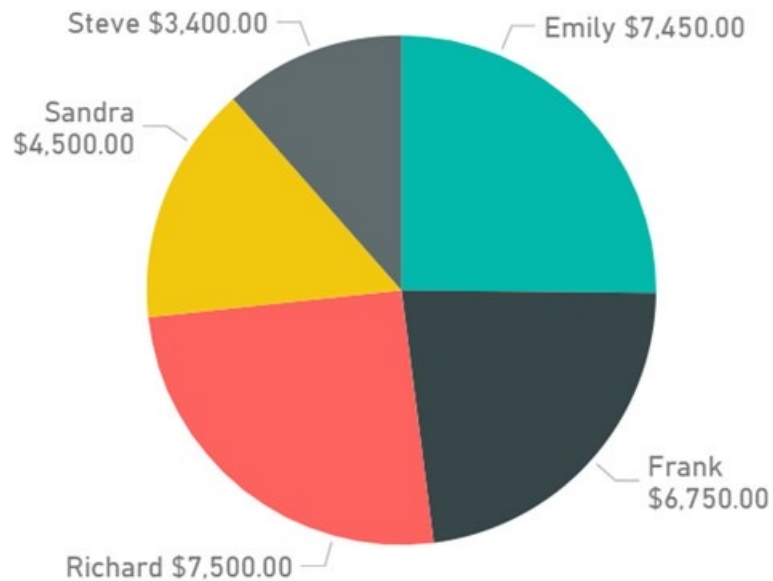
\$ sales by Month and Salesperson

Salesperson ● Emily ● Frank ● Richard ● Sandra ● Steve



\$ sales by Salesperson

Salesperson ● Emily ● Frank ● Richard ● Sandra ● Steve



\$ sales by Product and Salesperson

Product ● Car ● Bike ● Sled

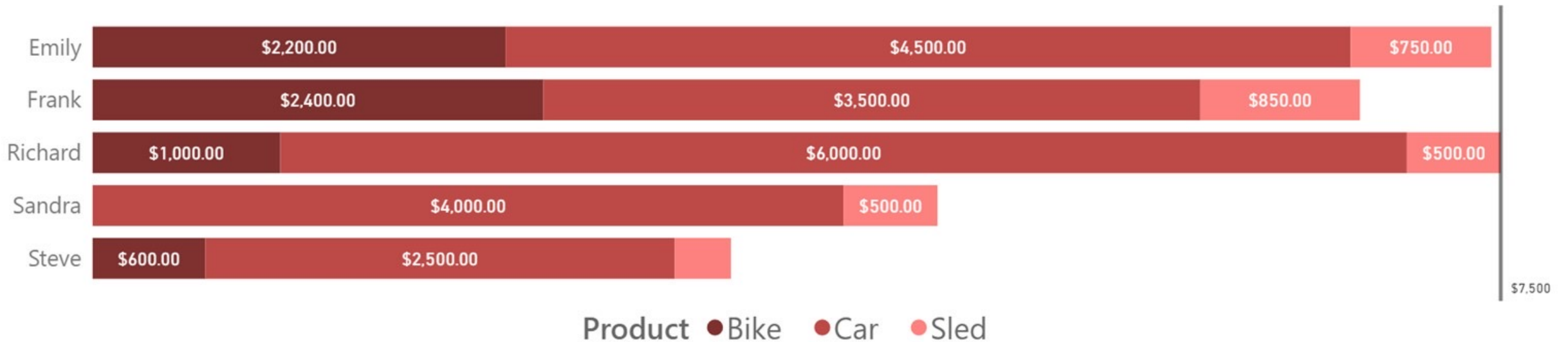


Sales Dashboard

Annual Sales for 2017

Total Sales

\$29.6K



Suggested Reading

Chart Aesthetics

The Practice of Data Visualization
Essentials of Visual Design

[The Mechanics of Visual Perception](#)

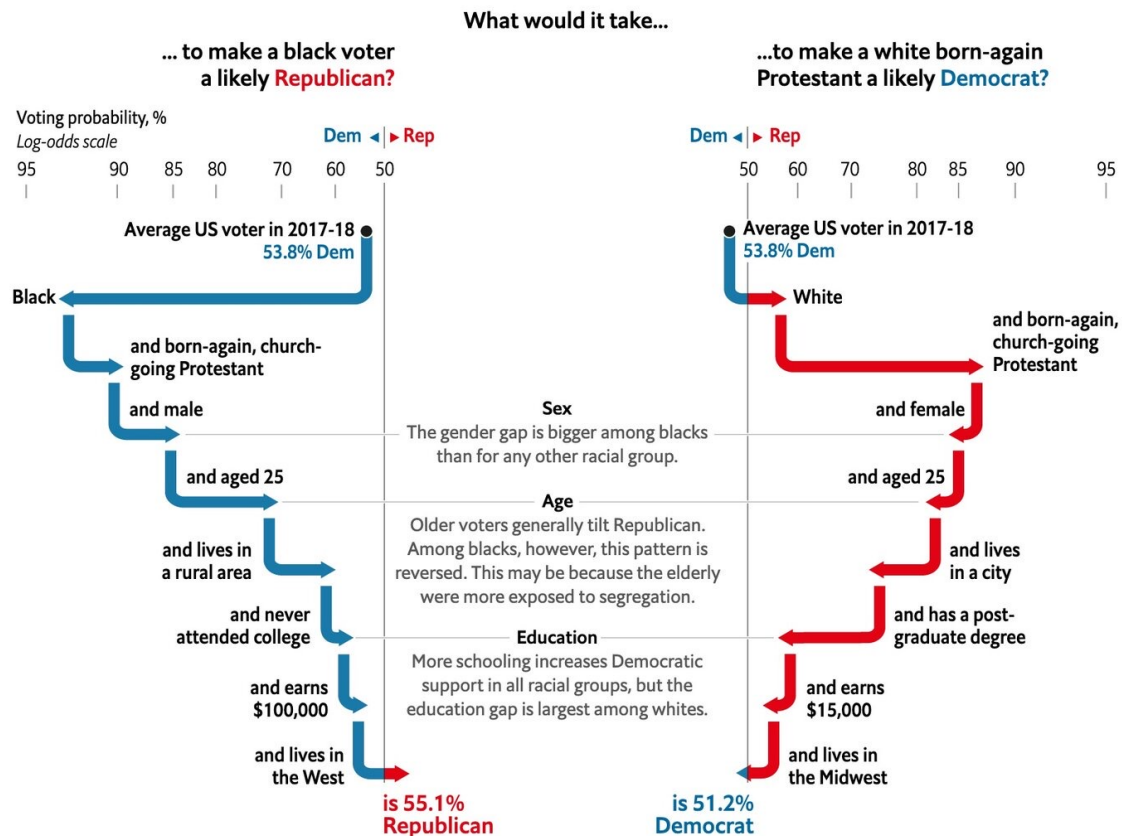
[Visual Design](#) (except for *The Grammar of Graphics*)

Exercises

Chart Aesthetics

Comment on the aesthetics of the following charts, according to:

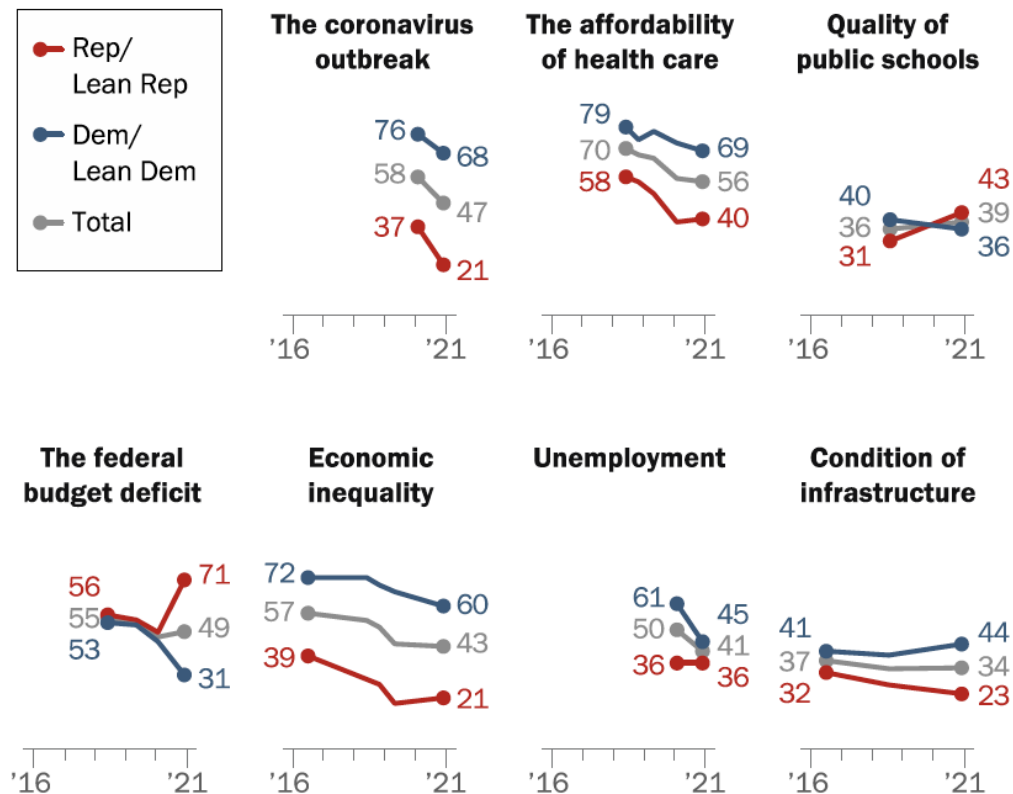
- Gestalt principles
- use of colours
- lack of clutter
- size and position
- etc.



Sources: YouGov; *The Economist*

Republican concern about the budget deficit increases sharply; Democratic concern declines

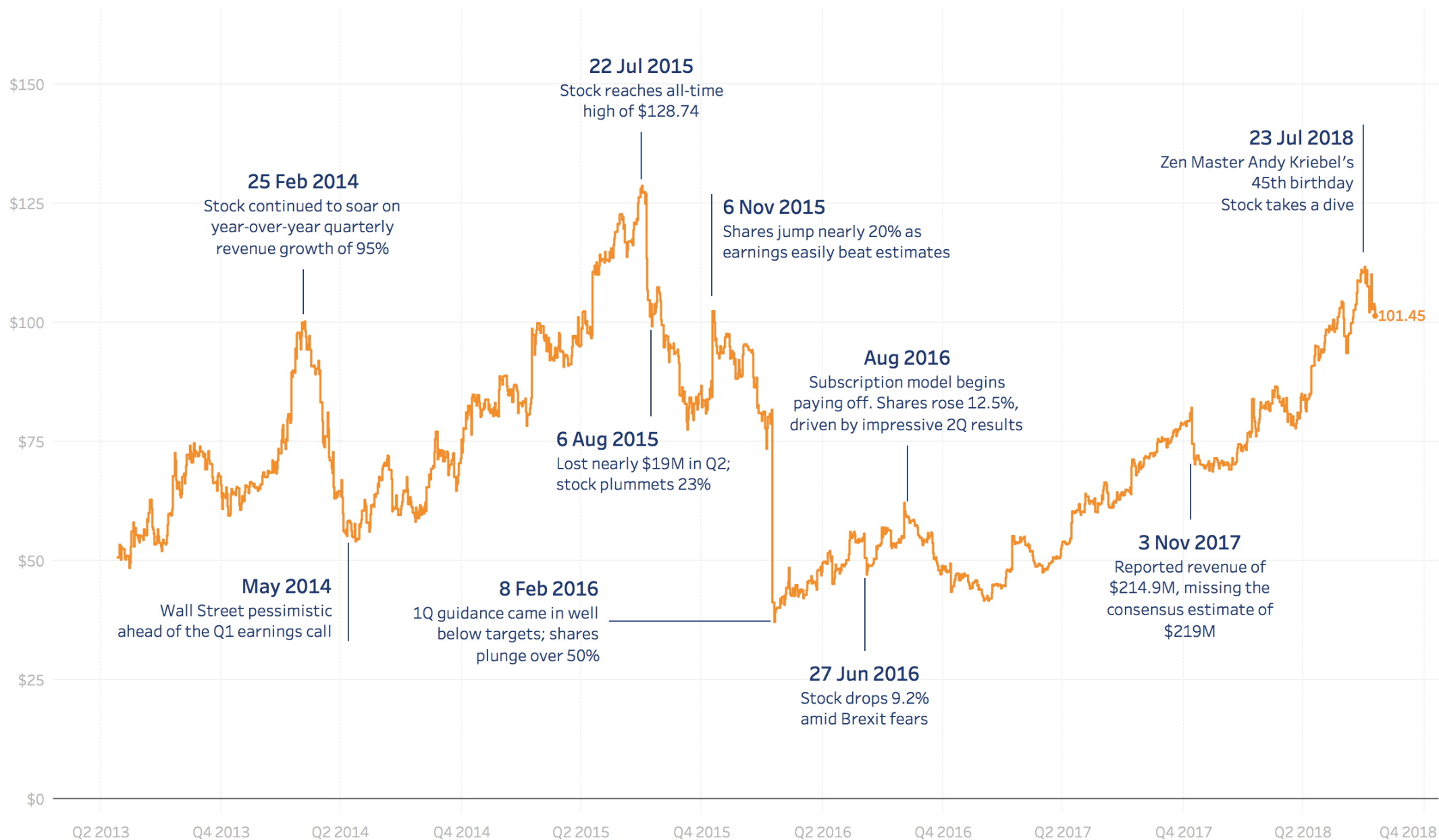
% who say ___ is a very big problem in the country today



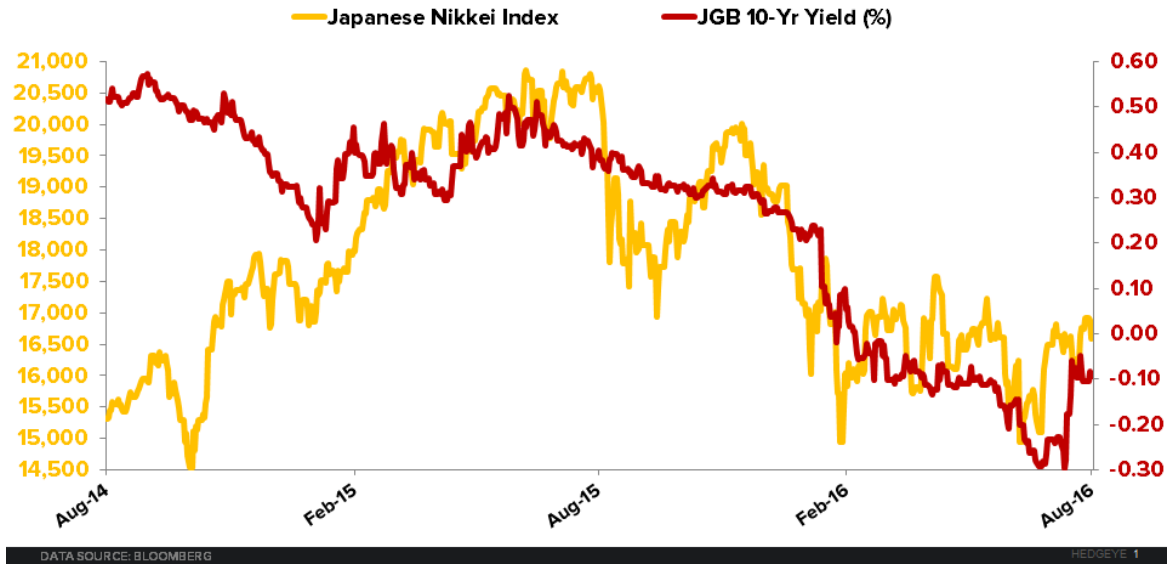
Note: March 2019 and earlier wording for economic inequality was "The gap between the rich and poor." See topline for details.

Source: Survey of U.S. adults conducted April 5-11, 2021.

The Roller Coaster Ride of Tableau's Stock

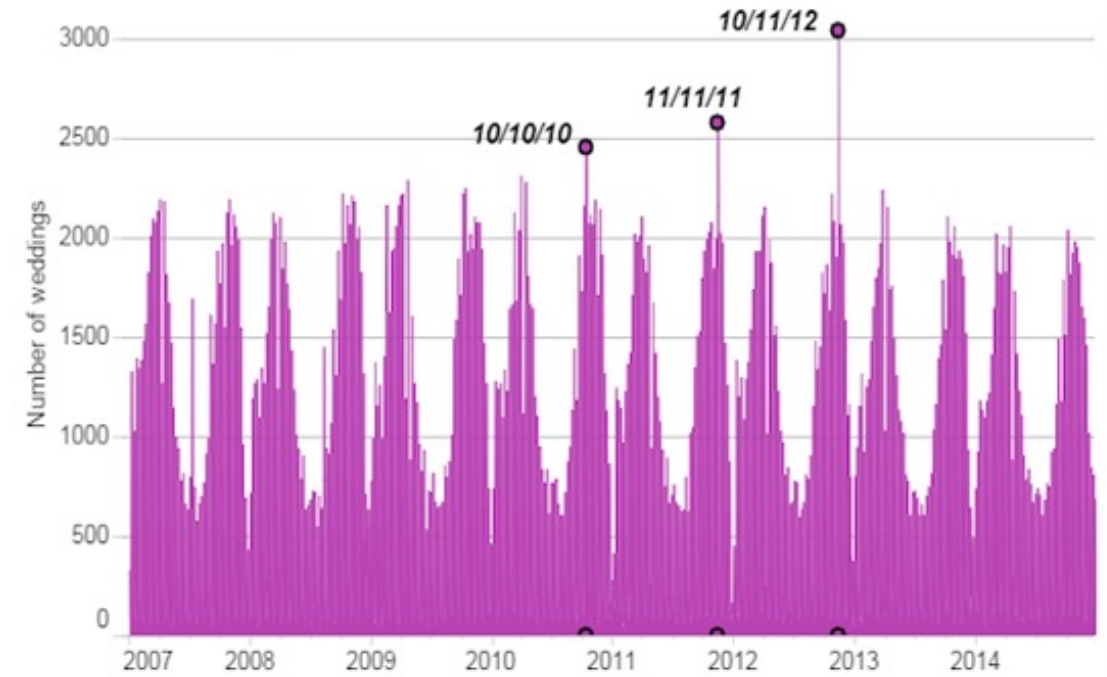


BAD ISN'T GOOD FOREVER: JAPAN

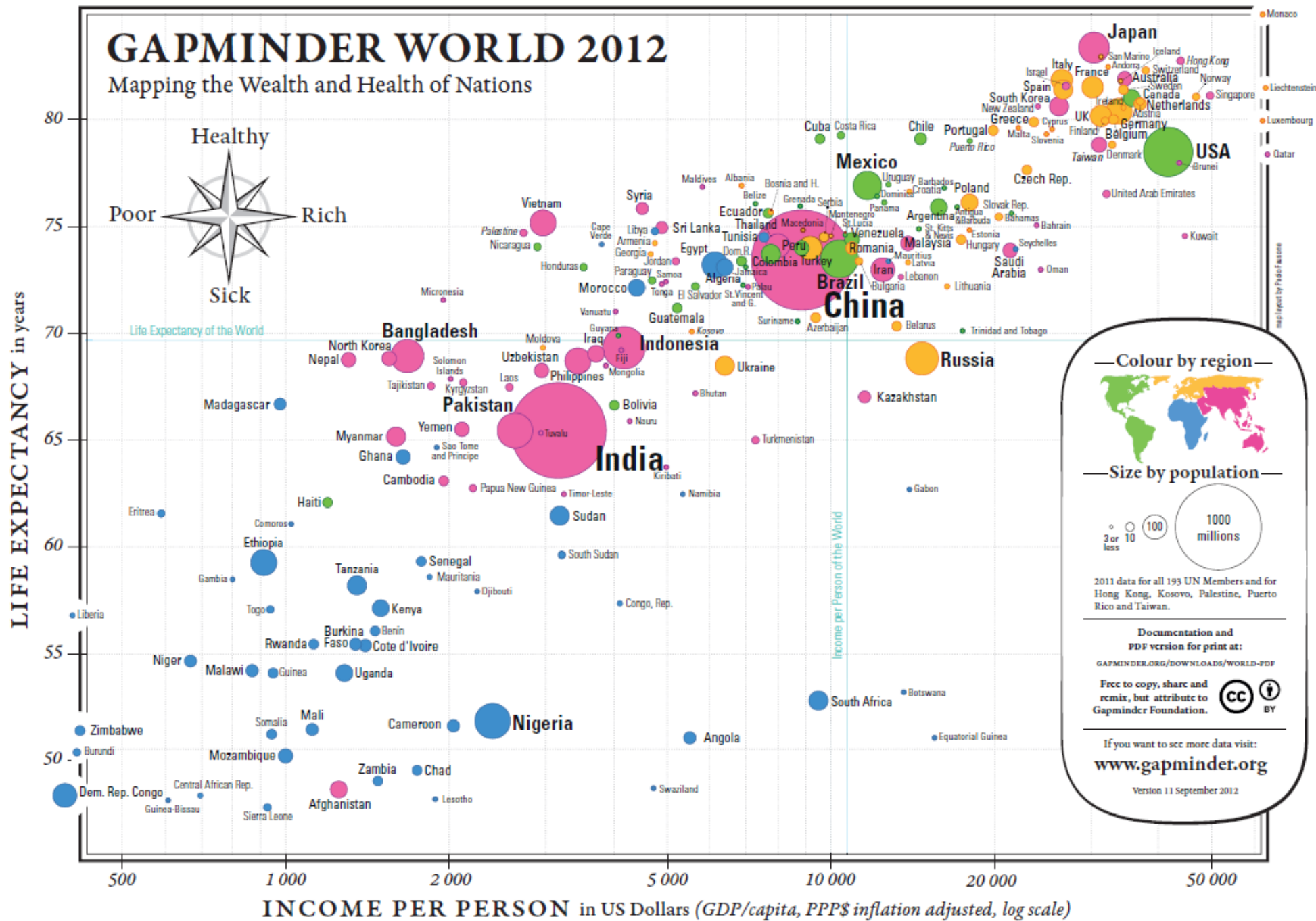


Weddings in Australia

The most popular wedding dates form repeating or sequential number patterns.



Graphic: Inga Ting | Source: ABS 2015



INCOME PER PERSON in US Dollars (GDP/capita, PPP\$ inflation adjusted, log scale)