7. Stories and Illustrations

[based on an idea from S. McCloud, *Making Comics*]

Words and Images

A picture is worth a thousand words (vs. a picture is worth 1000 words).

Words bring an unparalleled level of **specificity**. There is no image so vague that words cannot lock it into a **desired meaning**.

Some concepts and names can only be clearly expressed **through words**.

[S. McCloud, *Making Comics*]

“Look, it’s Kelly Donovan, twin brother of the Xander actor on *Buffy the Vampire Slayer*, plus Humphrey Bogart wearing a Freddy Mercury mask, and a robot duplicate of former U.N. Secretary General Boutros Boutros-Ghali!”

[based on an idea from S. McCloud, *Making Comics*]

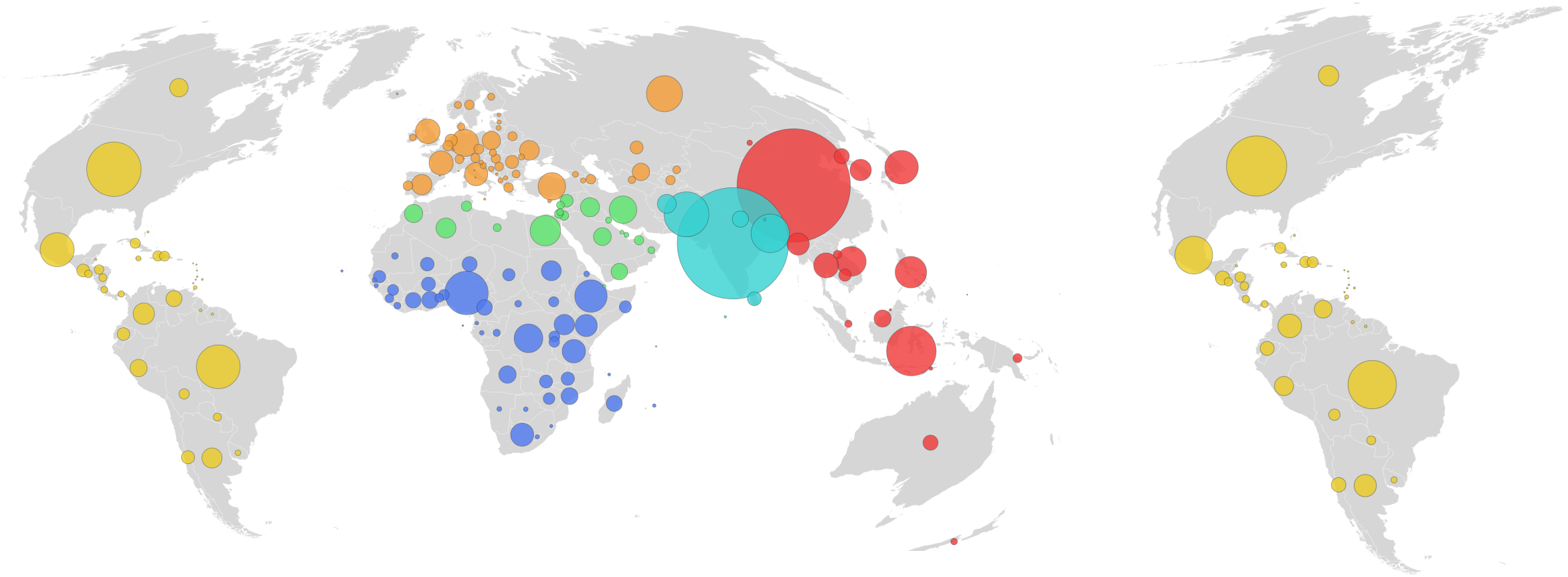
Visual Storytelling Choices

Communicating with **clarity** means that audience comprehension remains the **ultimate goal:**

- choice of **moment** is 'connecting the dots', showing only what matters to the story;
- choice of **frame** is creating and directing the audience's focus;
- choice of **image** is selecting the right charts for the story, with emphasis on simplicity and ability to convey the message;
- choice of **word** is clearly and persuasively communicating ideas in seamless combination with the charts;
- choice of **flow** is guiding the audience from one chart to the next, from one page to the next, and creating a transparent and intuitive 'reading' experience, by arranging pages in a dashboard, charts on a page, and elements within charts intelligently.

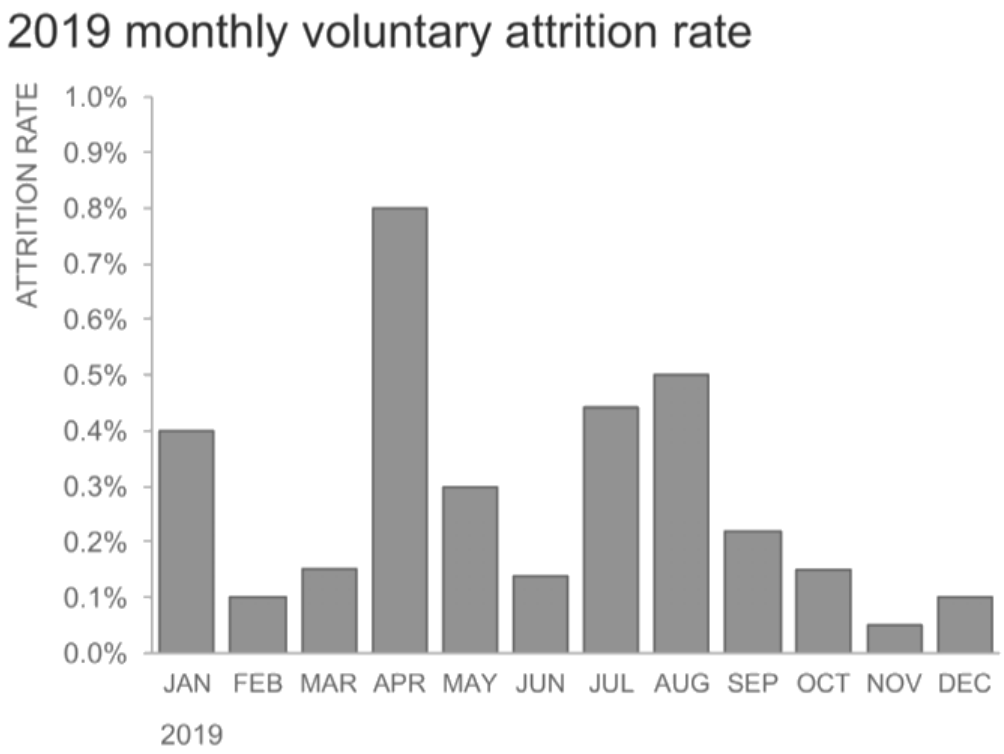
[Gapminder Tools]

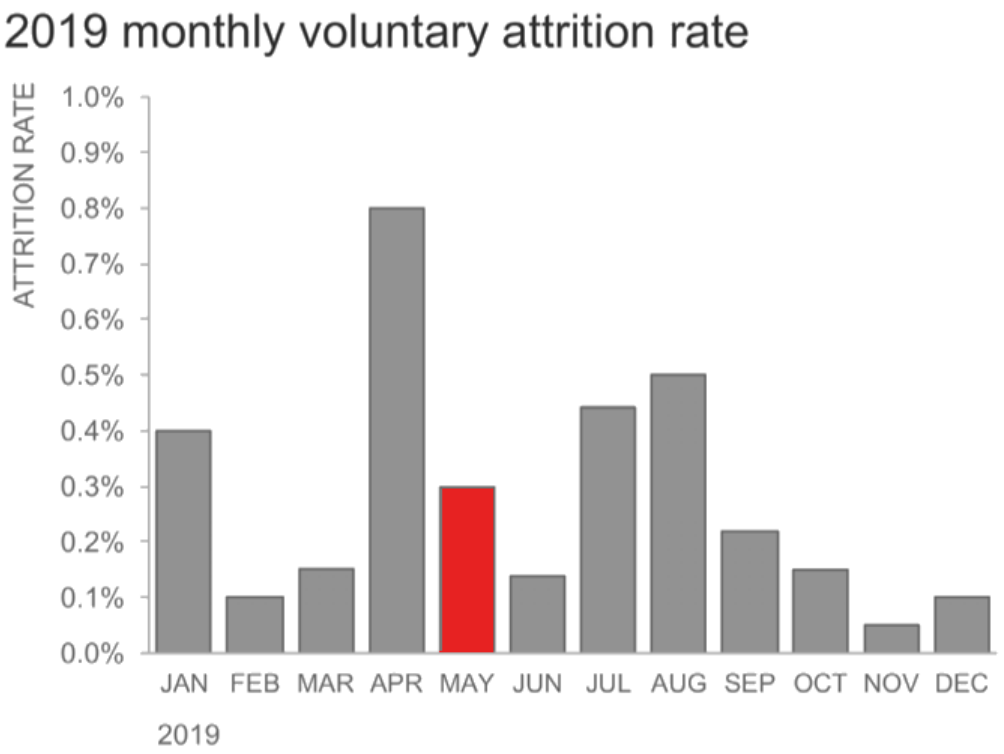
Choice of Moment



[C. Nussbaumer Knaflic, *Storytelling With Data*]

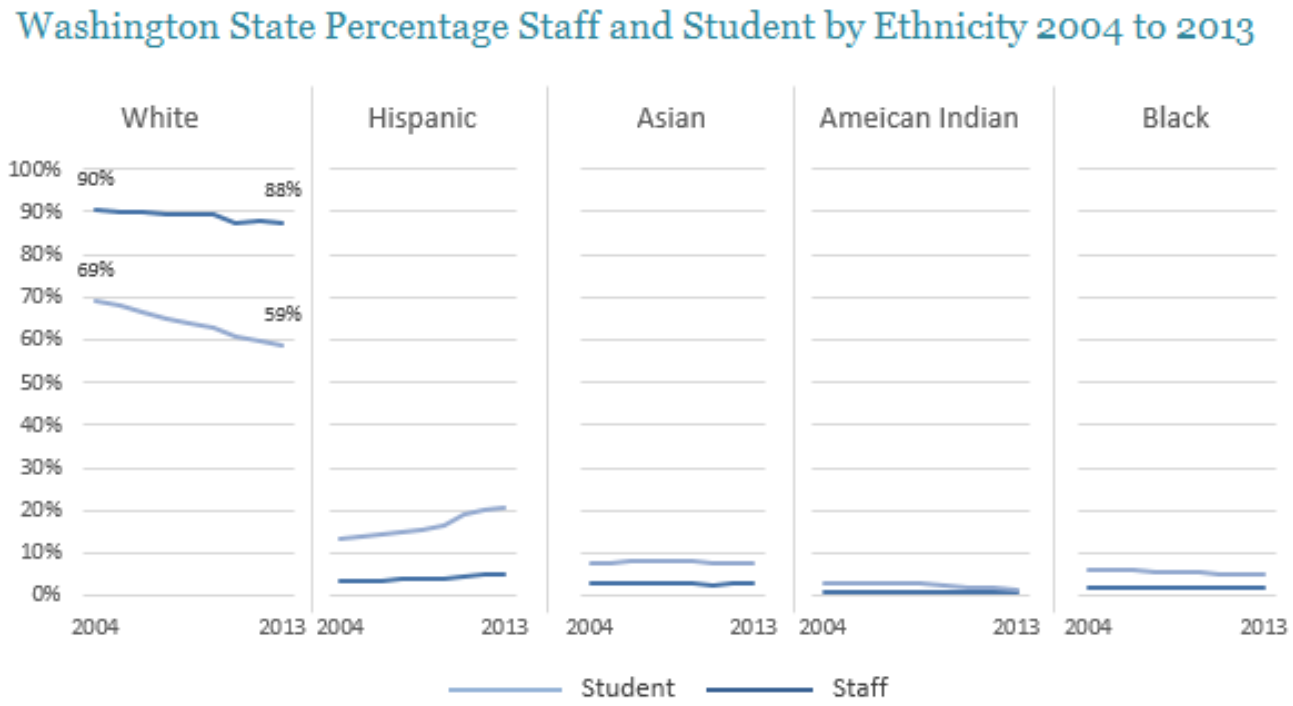
Choice of Frame

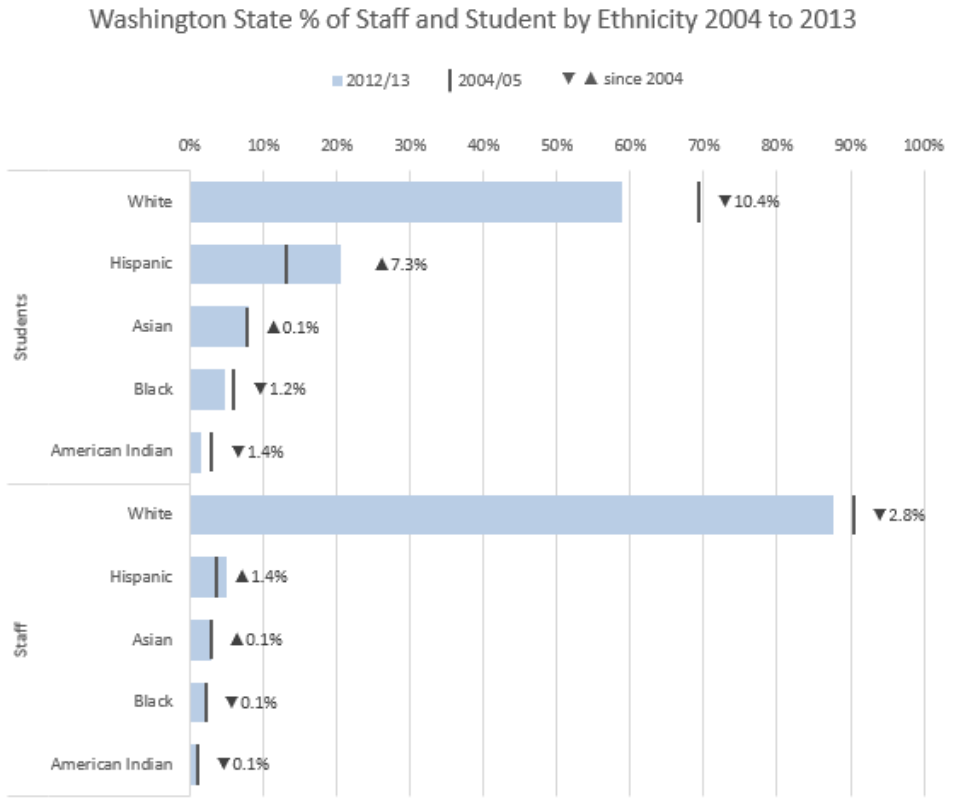




[Author unknown]

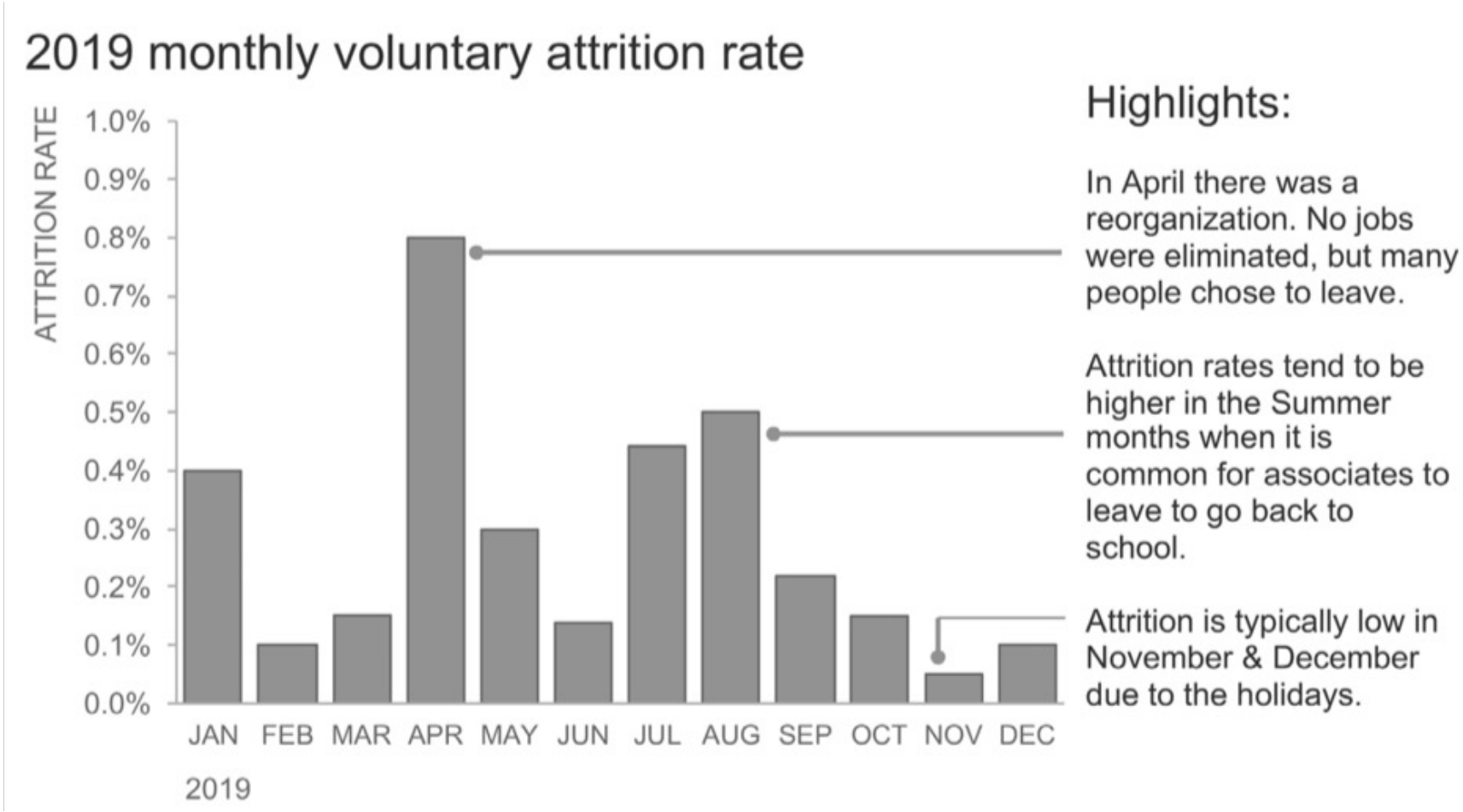
Choice of Image





[C. Nussbaumer Knaflic, *Storytelling With Data*]

Choice of Word



[based on an idea from S. McCloud, *Making Comics*]

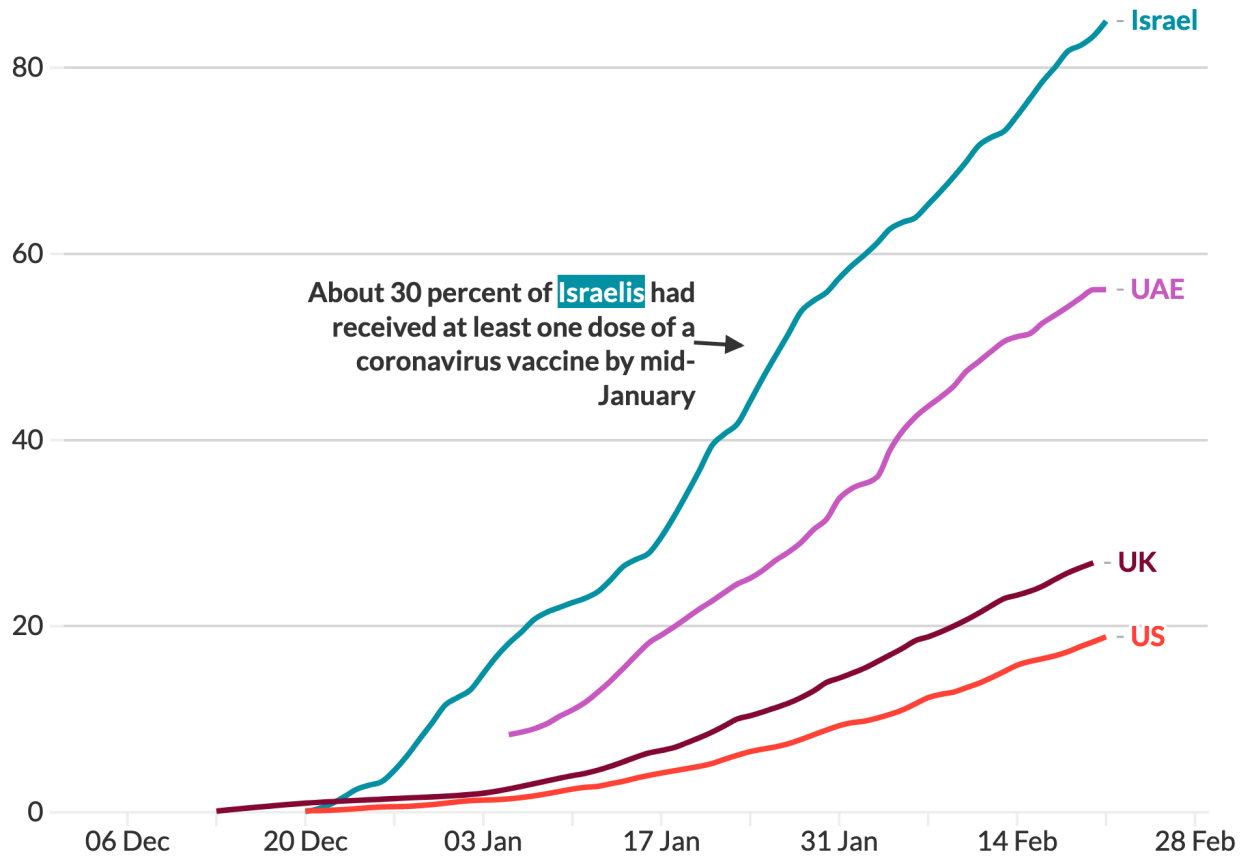
Visual Storytelling Combinations

- **text-specific**, where text provides all that is needed to know and the charts illustrate some aspects of the story that is described
- **chart-specific**, where the charts provide all that is needed to know and the text accentuates some aspects of the story that is shown
- **duo-specific**, where text and charts are both telling roughly the same story
- **intersecting**, where text and charts work together in some respects but also contribute to the story independently
- **interdependent**, where text and charts combine to convey an aspect of the story that neither could convey alone
- **parallel**, where words and charts follow seemingly different storylines, without intersecting

[https://flourish.studio/blog/accessible-chart-design]

Cumulative vaccination doses administered in Israel, UAE, UK and US

Cumulative doses administered per 100 residents • Data last updated 24 Feb



Source: ECDC/OWID • Graphic: Flourish • Embed this

Session 3

[P. Tickell, The Story of the Impossible Train]

I have a story I'd like to tell you. It's about a train, and a group of people who live on that train and know of nothing else.

This train has been moving since anyone can remember. The people on the train can't imagine a time when the train wasn't moving, and when they were not on the train. Everyone works to keep the train moving. The train never stops.

It never stops. It cannot stop.

People on the train live in constant churn. The work to keep the train moving is hard, and inhumane. On the train, people are treated with cruelty and oppression. Some are treated worse than others. But nobody is truly living.

Sometimes they get breaks, but it is hard.

One day, a fire breaks out in one of the carriages of the train.

There is panic. The fire spreads throughout the whole train… Without getting off the train everyone is going to die.

Then the impossible happens.

The brakes no-one believed existed start to work. In the emergency, no-one notices how extraordinary it is that the train is stopping. They're too focused on the fire. The old rules go out the window.

For years on the train, the "worker class" of people have been dying from the awful conditions of the work they have to do on the train. They sleep in the aisles and sometimes have nowhere to sleep at all.

Suddenly, there are orders to house them and treat their ailments.

The train stops, and people begin to get off. Apart from the sound of the fire, suddenly there is a great silence.

Session 3

A HISTORY OF THE ATOM: THEORIES AND MODELS

How have our ideas about atoms changed over the years? This graphic looks at atomic models and how they developed.

SOLID SPHERE MODEL

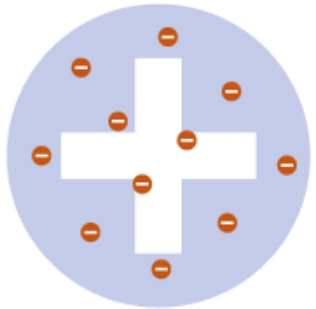
JOHN DALTON

1803

Dalton drew upon the Ancient Greek idea of atoms (the word 'atom' comes from the Greek '*atomos*' meaning indivisible). His theory stated that atoms are indivisible, those of a given element are identical, and compounds are combinations of different types of atoms.

- + RECOGNISED ATOMS OF A PARTICULAR ELEMENT DIFFER FROM OTHER ELEMENTS
- − ATOMS AREN'T INDIVISIBLE - THEY'RE COMPOSED FROM SUBATOMIC PARTICLES

PLUM PUDDING MODEL



J.J. THOMSON

1904

Thomson discovered electrons (which he called 'corpuscles') in atoms in 1897, for which he won a Nobel Prize. He subsequently produced the 'plum pudding' model of the atom. It shows the atom as composed of electrons scattered throughout a spherical cloud of positive charge.

- + RECOGNISED ELECTRONS AS COMPONENTS OF ATOMS
- − NO NUCLEUS; DIDN'T EXPLAIN LATER EXPERIMENTAL OBSERVATIONS

NUCLEAR MODEL

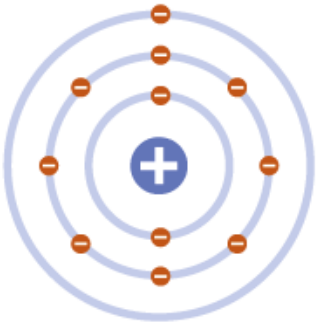
ERNEST RUTHERFORD

1911

Rutherford fired positively charged alpha particles at a thin sheet of gold foil. Most passed through with little deflection, but some deflected at large angles. This was only possible if the atom was mostly empty space, with the positive charge concentrated in the centre: the nucleus.

- + REALISED POSITIVE CHARGE WAS LOCALISED IN THE NUCLEUS OF AN ATOM
- − DID NOT EXPLAIN WHY ELECTRONS REMAIN IN ORBIT AROUND THE NUCLEUS

PLANETARY MODEL



NIELS BOHR

1913

Bohr modified Rutherford's model of the atom by stating that electrons moved around the nucleus in orbits of fixed sizes and energies. Electron energy in this model was quantised; electrons could not occupy values of energy between the fixed energy levels.

- + PROPOSED STABLE ELECTRON ORBITS; EXPLAINED THE EMISSION SPECTRA OF SOME ELEMENTS
- − MOVING ELECTRONS SHOULD EMIT ENERGY AND COLLAPSE INTO THE NUCLEUS; MODEL DID NOT WORK WELL FOR HEAVIER ATOMS

QUANTUM MODEL

ERWIN SCHRÖDINGER

1926

Schrödinger stated that electrons do not move in set paths around the nucleus, but in waves. It is impossible to know the exact location of the electrons; instead, we have 'clouds of probability' called orbitals, in which we are more likely to find an electron.

- + SHOWS ELECTRONS DON'T MOVE AROUND THE NUCLEUS IN ORBITS, BUT IN CLOUDS WHERE THEIR POSITION IS UNCERTAIN
- + STILL WIDELY ACCEPTED AS THE MOST ACCURATE MODEL OF THE ATOM

[http://dataphys.org/list/]

A Word About Accessibility

A table can be translated to Braille, but that's not always possible for charts.

Describing the features and emerging structures in a visualization is a possible solution... **if they can be spotted**.

Analysts must produce clear and meaningful visualizations, but they must also describe their features in a fashion that allows all to "see" the insights.

But this requires them to have "seen" all the insights, which is not always necessarily the case (if at all possible).

A Word About Accessibility

Data Perception:

- texture-based representations
- text-to-speech
- sound/music
- odor-based or taste-based representations (?!?)

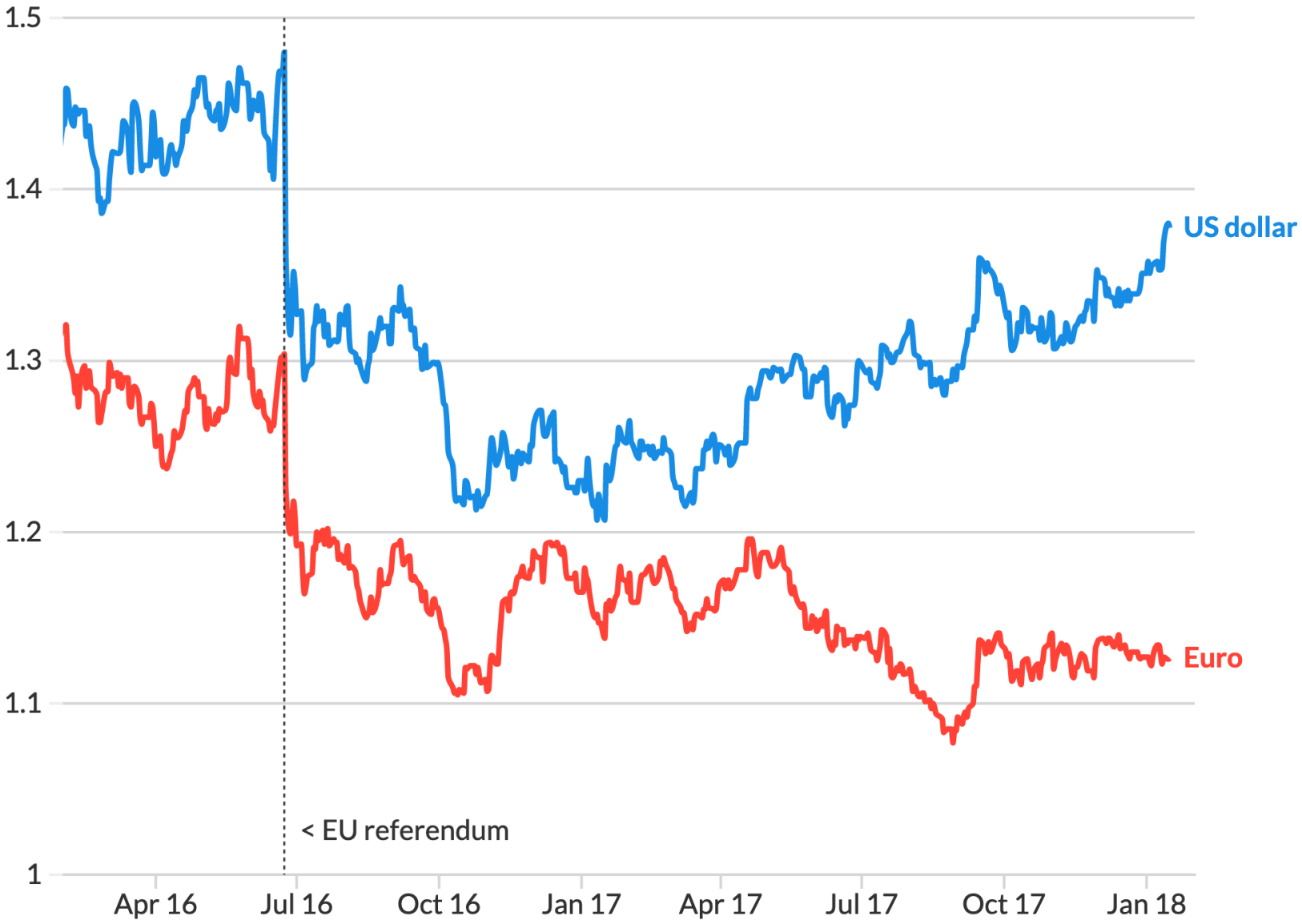
Sonifications:

- TRAPPIST Sounds : TRAPPIST-1 Planetary System Translated Directly Into Music
- Listening to data from the Large Hadron Collider, L. Asquith

[https://flourish.studio/blog/accessible-chart-design]

The value of the pound has fallen, particularly since the EU referendum

Euros and US $ per £



A line chart showing the value of the pound in relation to euros and US dollars. A large drop is visible after the EU referendum in June 2016. Just before the referendum you could get 1.48 US dollars and 1.3 euros for each pound. After the referendum it fell to 1.29 US dollars and 1.16 euros – a fall of around 12%.

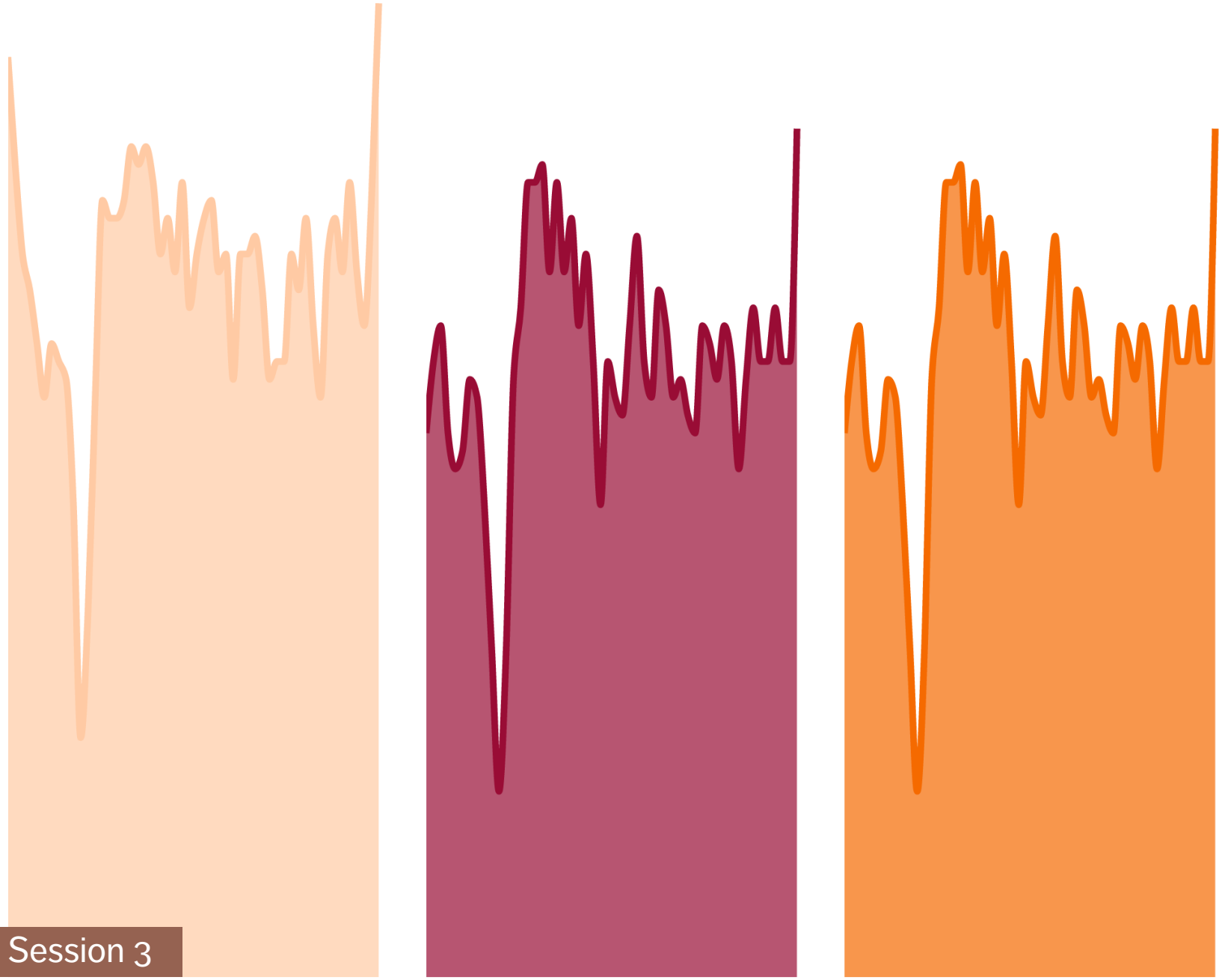
Source: Bank of England

Fail (1.46:1)

Pass (8.52:1)

Partial pass (3.02:1)

[https://flourish.studio/blog/accessible-chart-design]



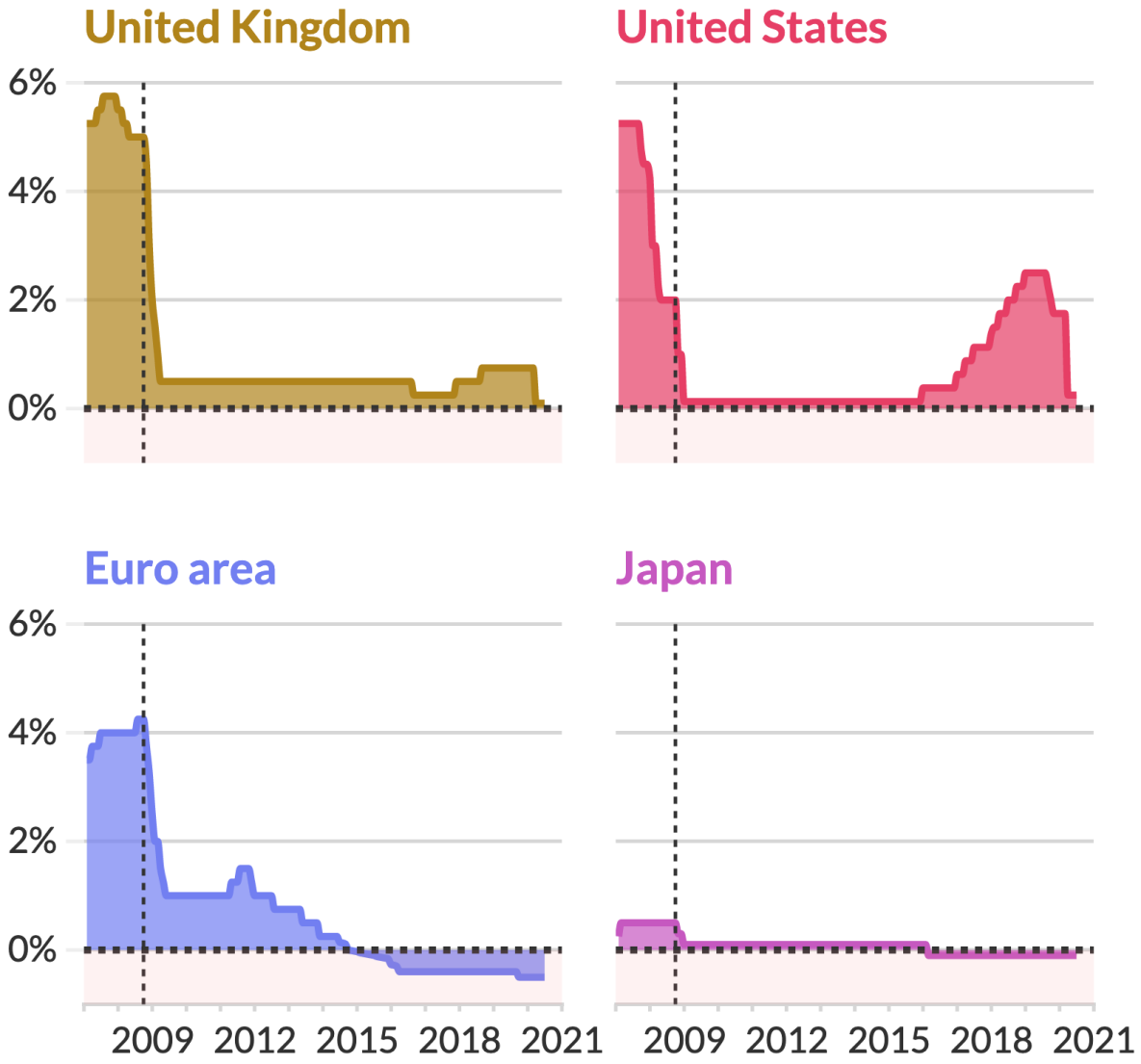
Use colors that are bold and clear enough for people to see both text and graphical elements.

Web Content Accessibility Guidelines (WCAG) suggest meeting the WCAG AA requirements.

To check if your color (and font size) choices are AA accessible you can use a contrast checker website.

For colours to be AA accessible they need to have a contrast ratio of at least **3:1** for **graphical elements**, and **4.5:1** for **normal text**.

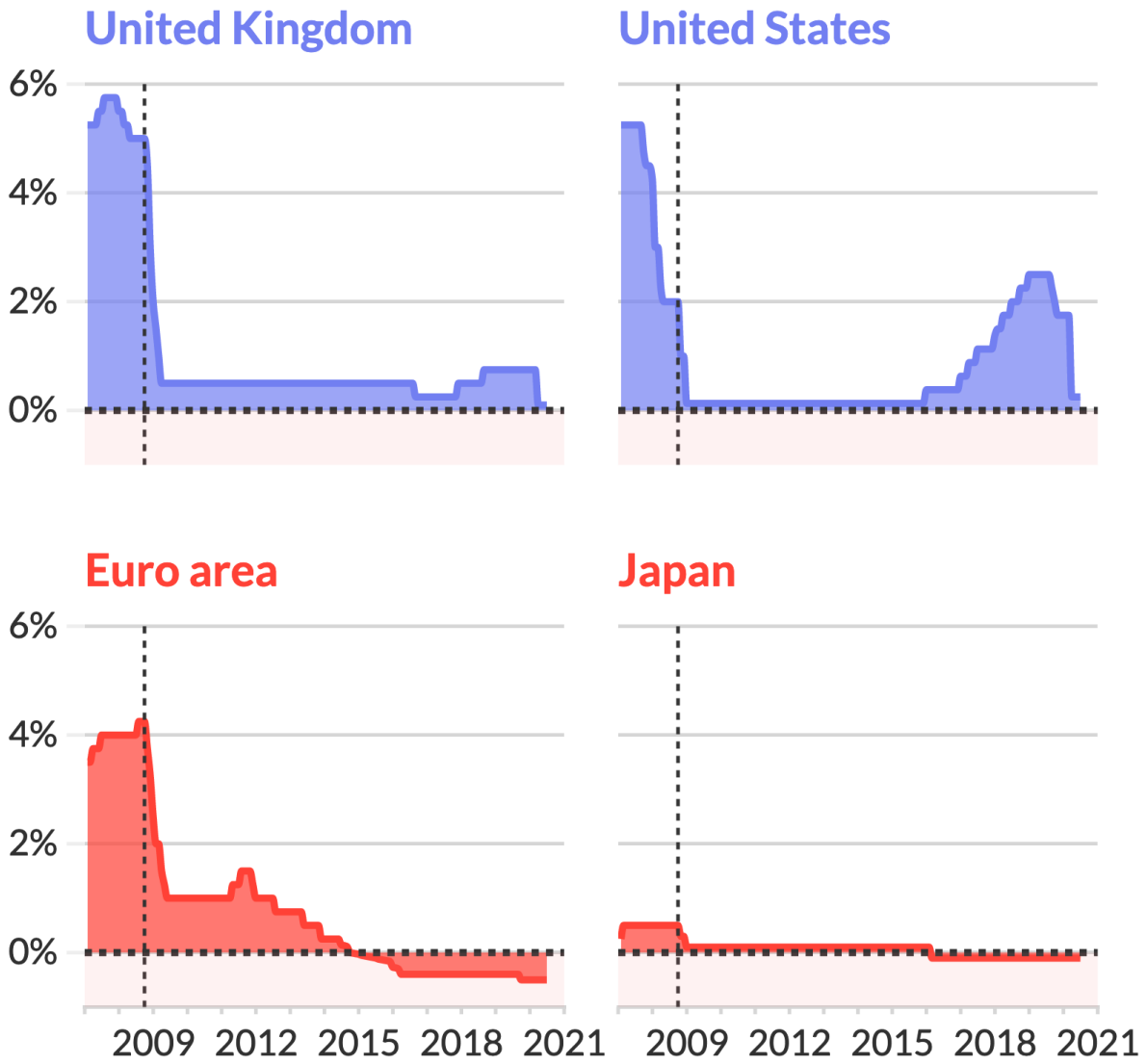
Interest rates have been falling since the financial crisis, and have even gone negative in some countries



Source: ONS

Session 3

Interest rates have been falling since the financial crisis, and have even gone negative in some countries

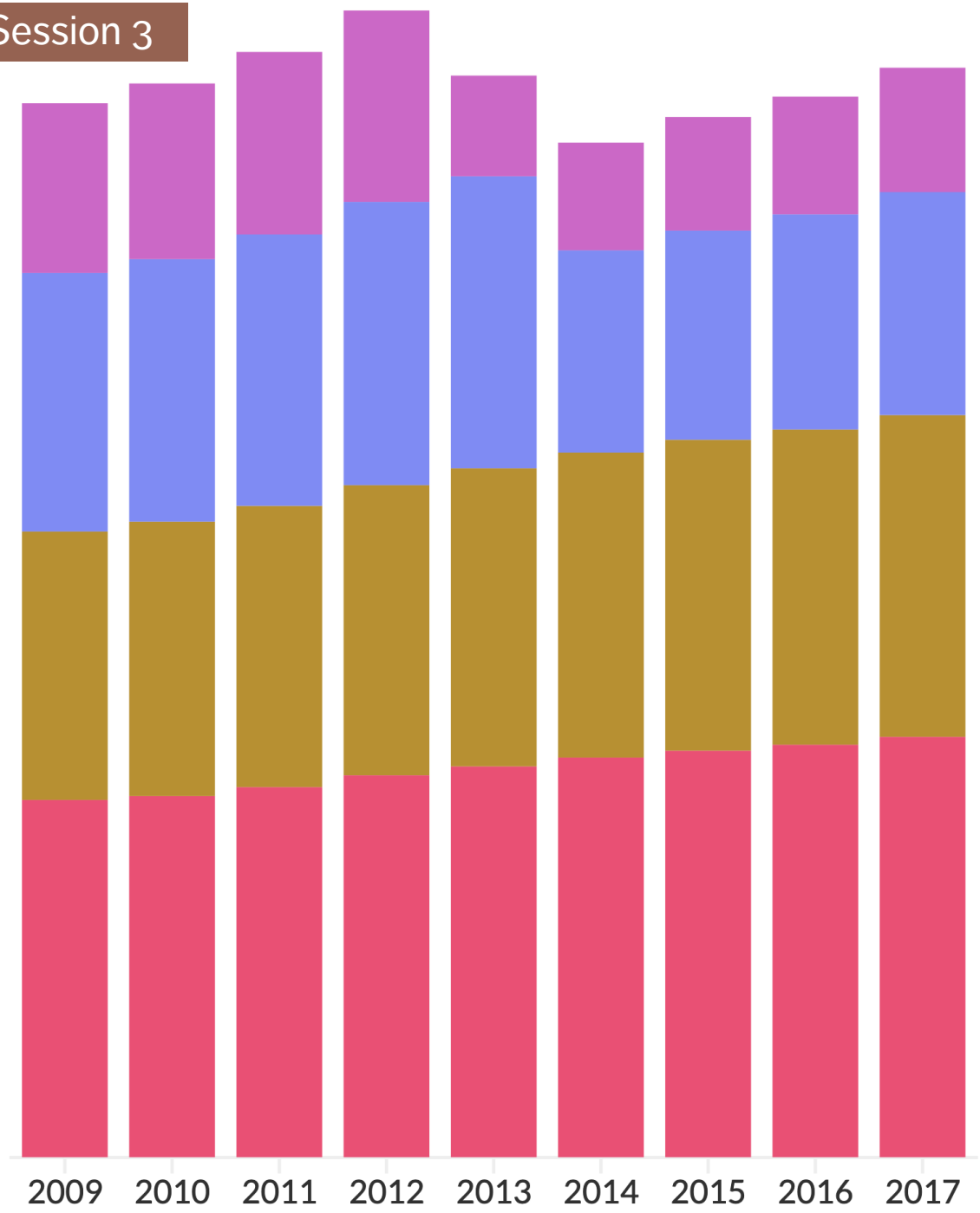


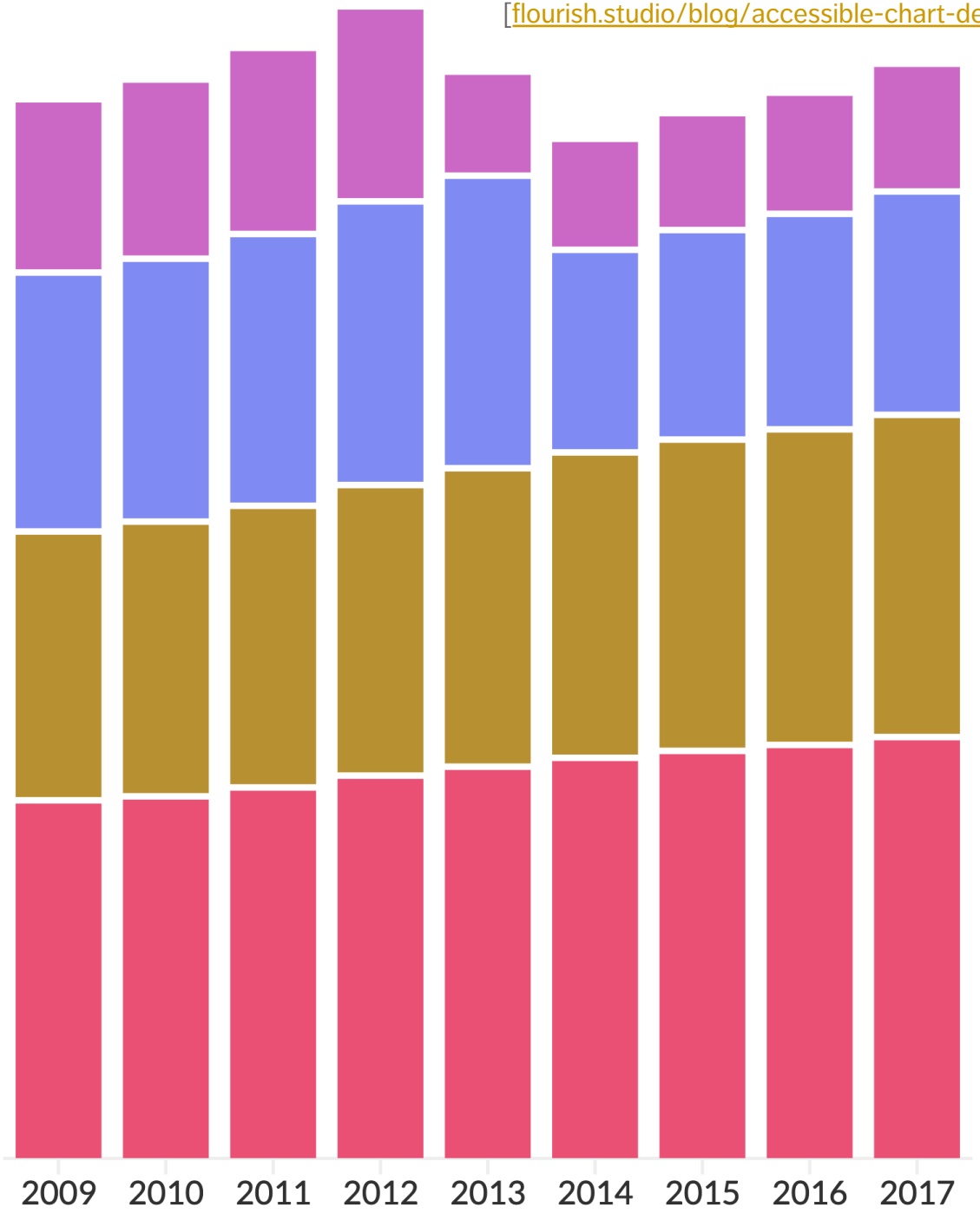
Source: ONS

[https://flourish.studio/blog/accessible-chart-design]

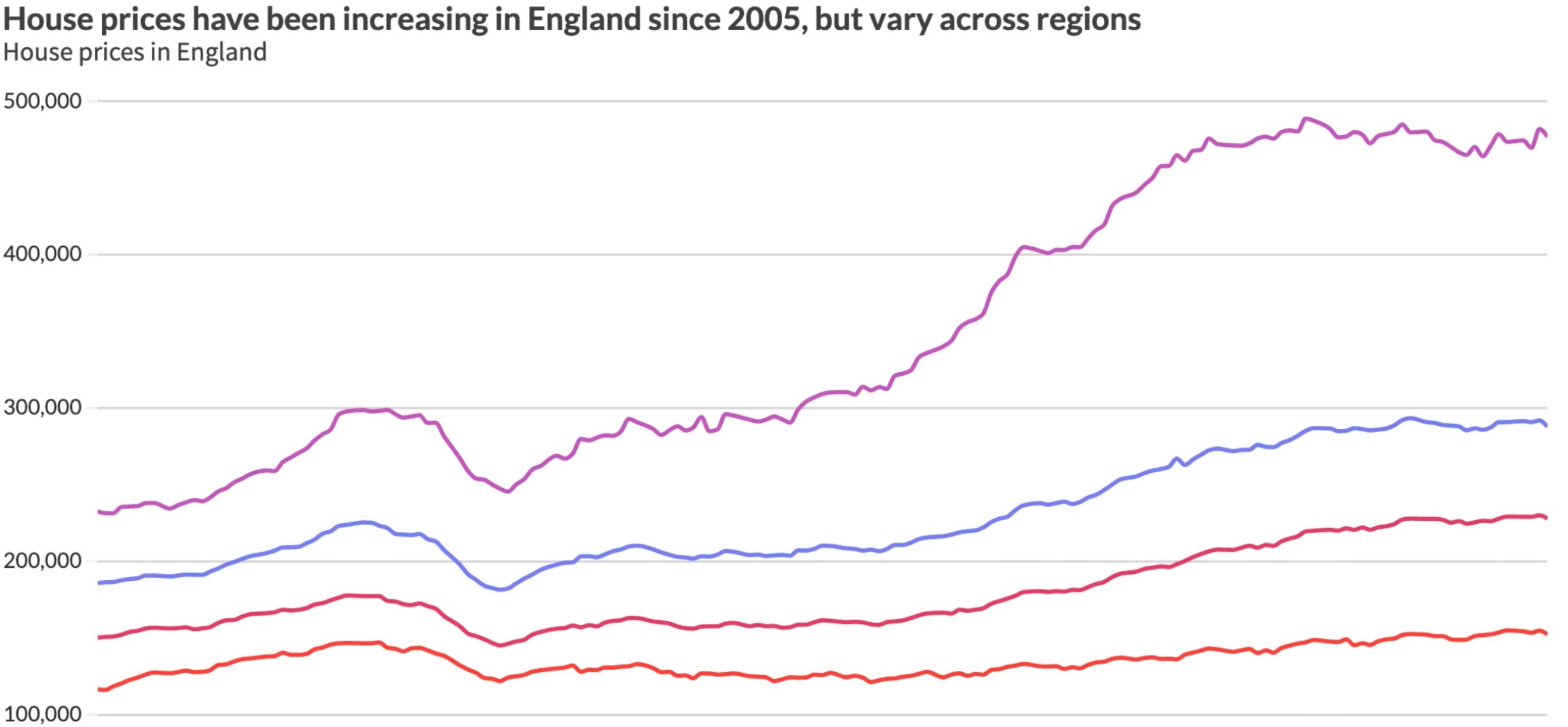
Session 3

[flourish.studio/blog/accessible-chart-design]





[https://flourish.studio/blog/accessible-chart-design]



Session 3

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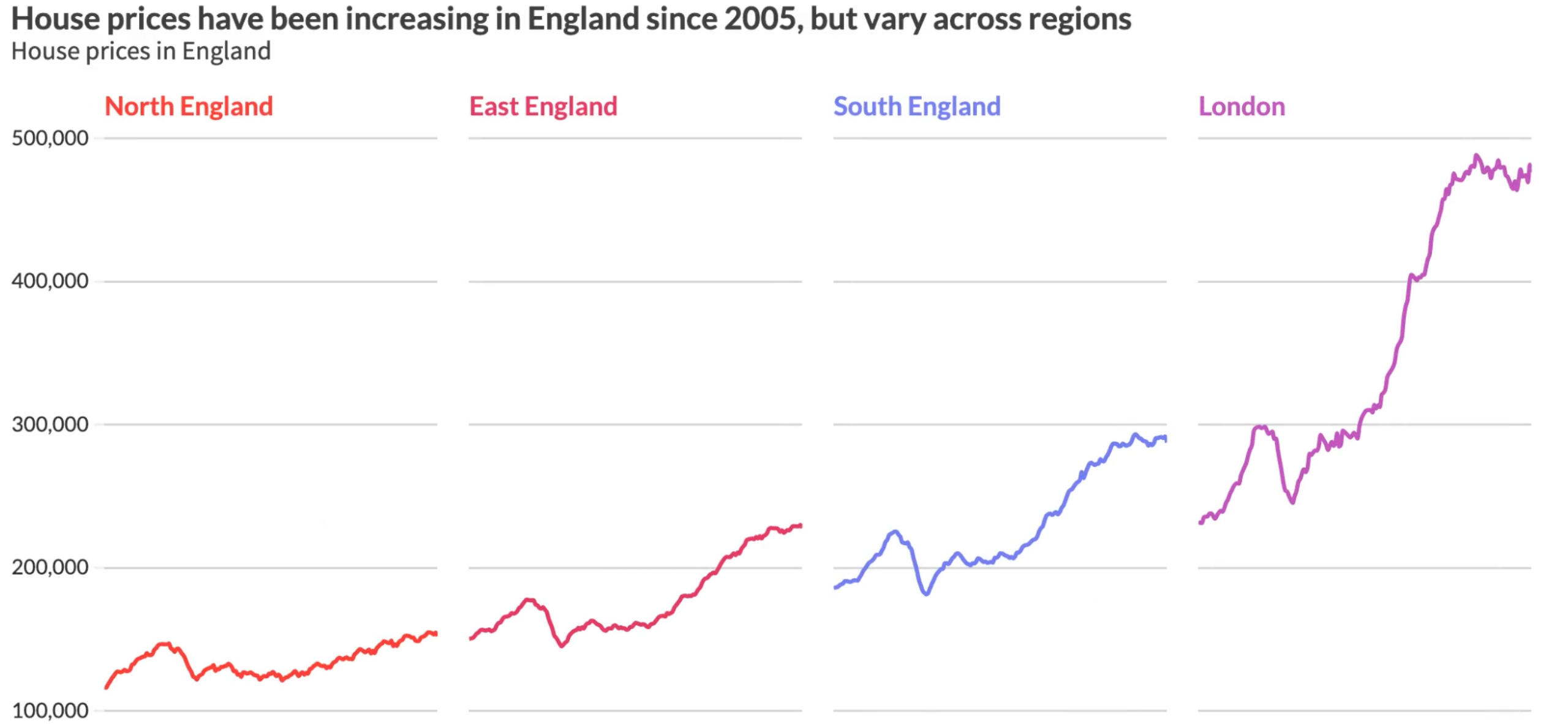

Suggested Reading

Stories and Illustrations

S. McCloud, *Making Comics: Storytelling Secrets of Comics, Manga and Graphic Novels*. Harper, 2006.

The Practice of Data Visualization
Visualization and Storytelling

Effective Storytelling Visuals

- Stories and Illustrations

Exercises

Stories and Illustrations

1. Think of a work-related story.
   a. Create a sketch that could illustrate this work story.
   b. What visual storytelling choices and combinations would you consider using?
   c. Would accessibility considerations change the way in which the story is presented to the audience?

2. Re-cast the stories presented in this course (or any other stories, as you wish) using different visual storytelling choices and combinations.

3. Re-cast the data stories in this course (or any other stories, as you wish) using different visual storytelling choices and combinations.