Designing Impactful Visualisations for your Data

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Microsoft

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Future Processing

About me

dataMinds.be Co-Leader

@BenniDeJagere

/bennidejagere

sessionize /bennidejagere

Microsoft Most Valuable Professional Data Platform

#SayNoToPieCharts

inetum realdolmen Positive digital flow Enterprise Data Architect

Let’s set expectations

What not to do ☺

(Intro to) Psychology of Visualisation

The right visual and colours for the job

Inclusive Design

Demo: Use Case

www.citibikenyc.com/system-data

Public Open Data

Starts June 2013

Information about every trip

- Longer than 60 seconds
- Starts at public station

Masterdata

https://i0.wp.com/thenypost.files.wordpress.com/2013/12/citibike1.jpg

Data Visualisation – (Random) Thoughts

Graphs and charts

Tell a story

Pie Charts!

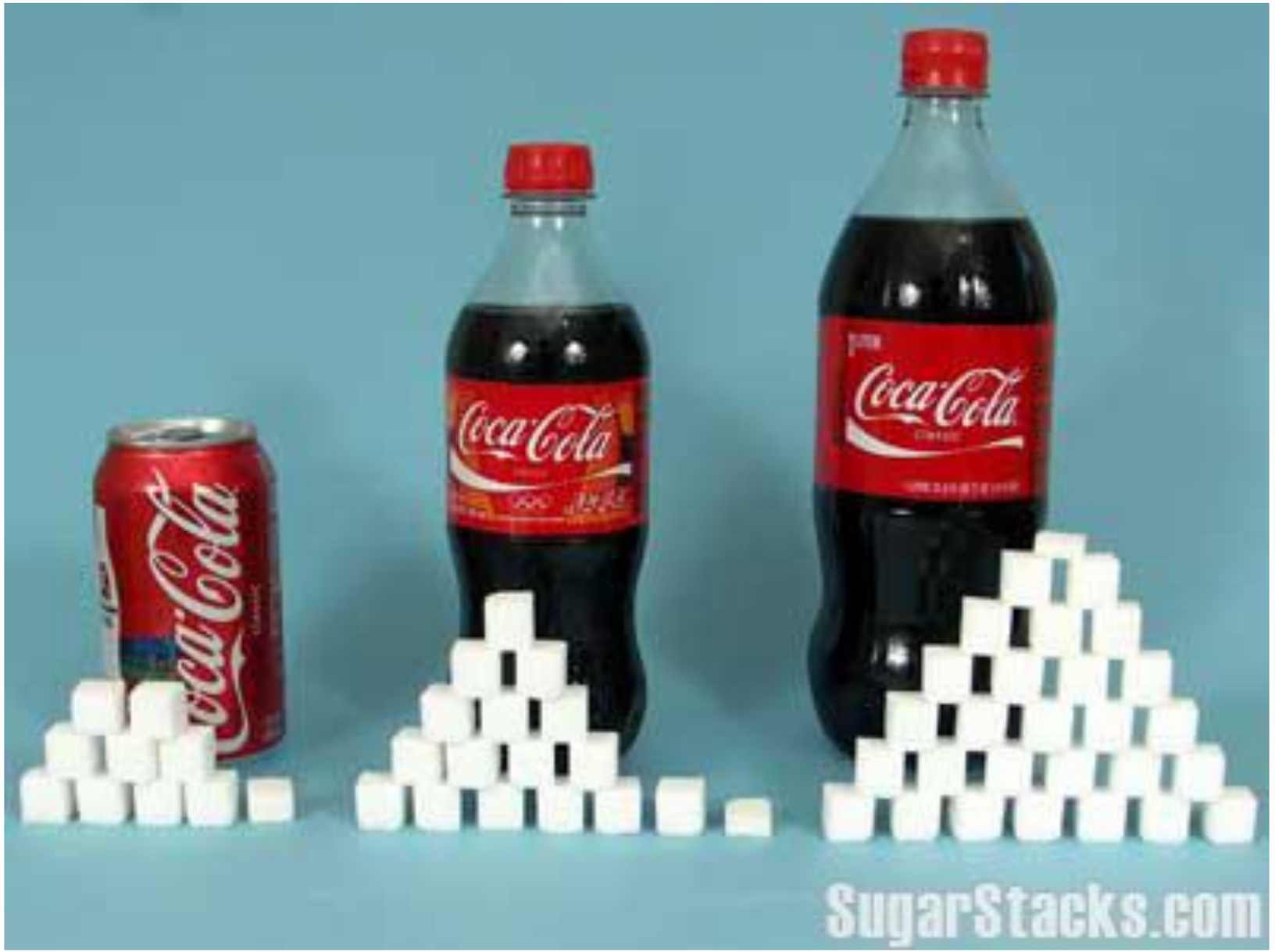
Something I should think through more often

Maps

Looks easy, but is hard

Just slap some things on there!

Etc..



Mark Milligan
@MarkMilliganDPT

Would you eat 6 donuts?

Dr. Glaucomflecken
@DGlaucomflecken

Honestly my take away from this chart is that donuts are healthier than I thought

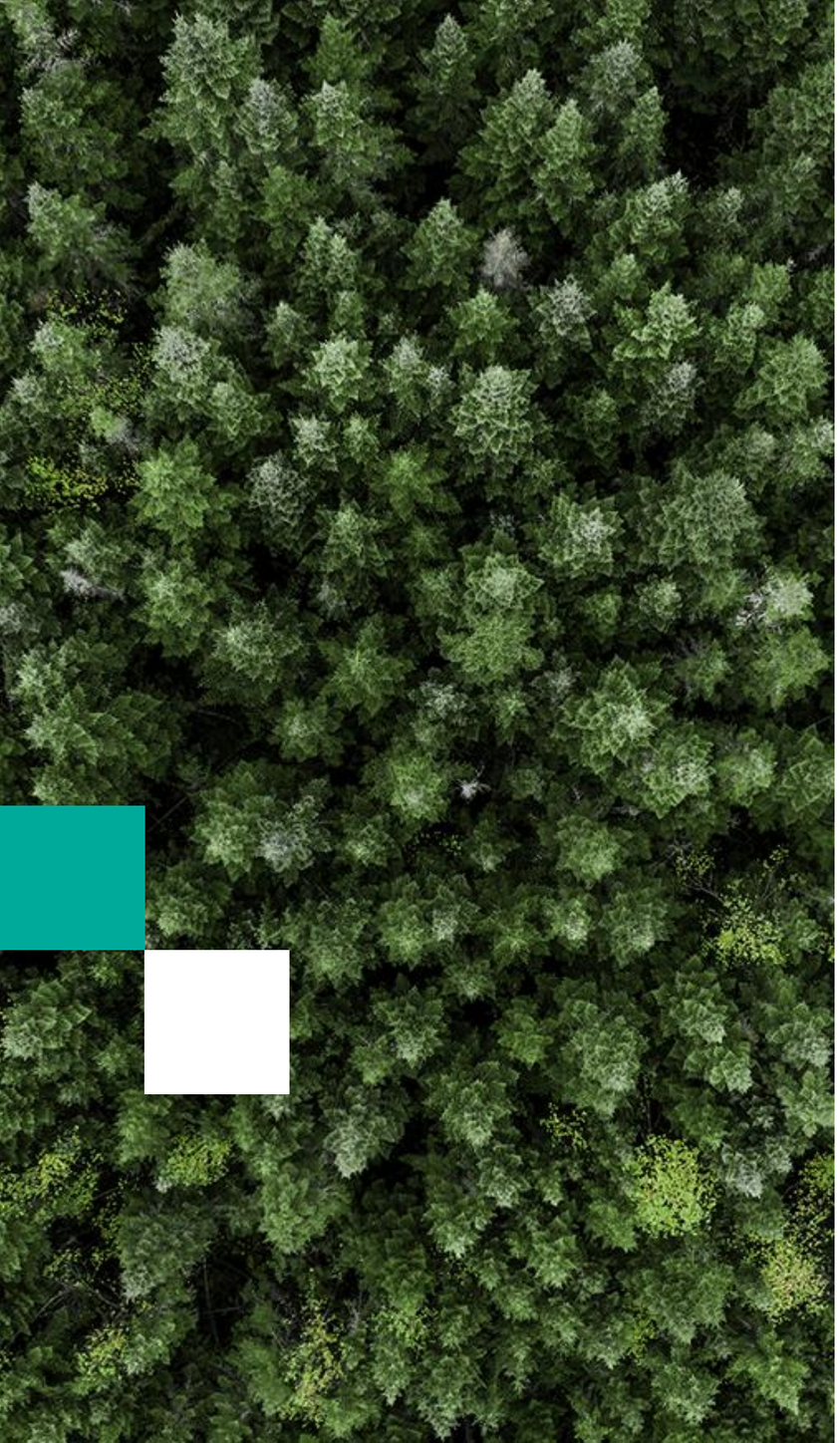
Some things to keep in mind

Have no fear of perfection – you'll never reach it

Salvador Dali

Data Visualisaton is Intelligence made visible

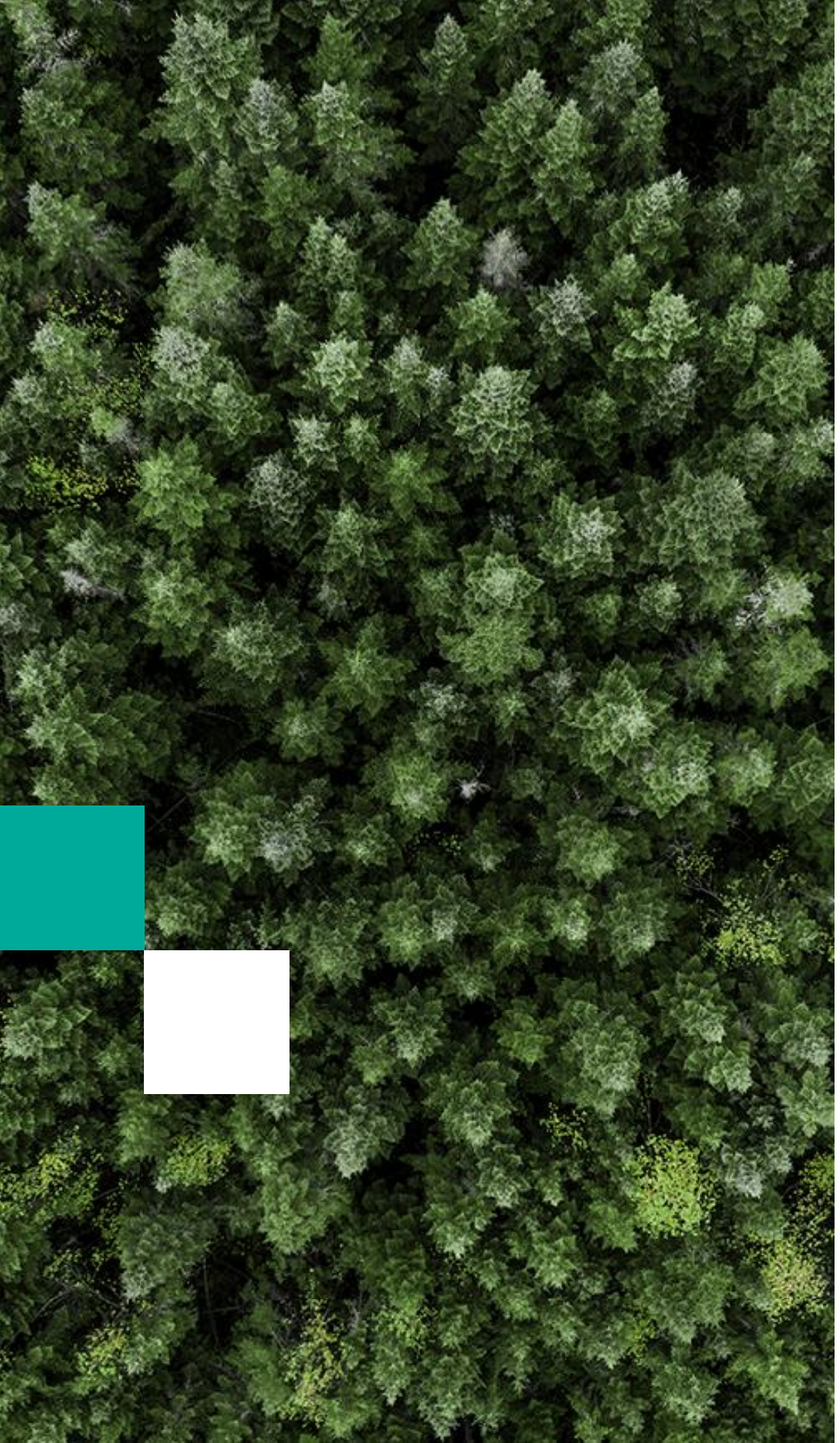
Data Visualisation is the intermediary between information and understanding



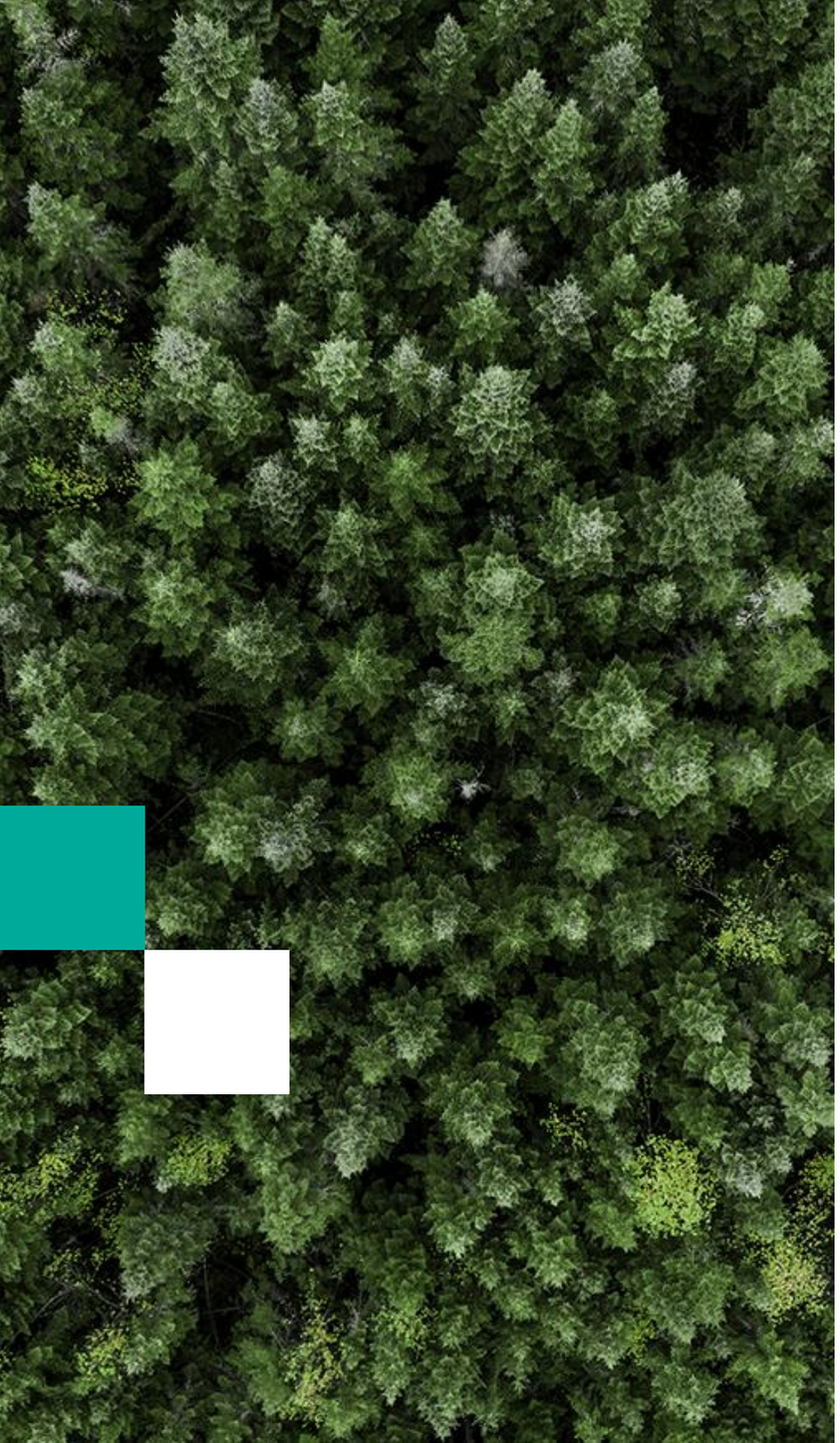
A wild data visualisation appeared!

Bilister, der forvolder betydelig legemsskade på andre

Kilde: Rigsadvokaten / Anklagemyndigheden. Tallene viser antal domme for overtrædelse af straffelovens paragraf 249. Tallet for 2020 er opgjort pr. 7. november.



History Taught Us Well



Why?

Why Data Visualisation Matters

A good visualization gives ways to research data, investigate curious cause-effect relationships

Data Visualisation helps us

- Identify insights otherwise unnoticed
- Understand data quickly
- Identify relationships and patterns
- Pinpoint emerging trends
- Communicate our findings as a story to others

90% of all information transmitted to our brains is *visual*.
People remember:

Iconic memory

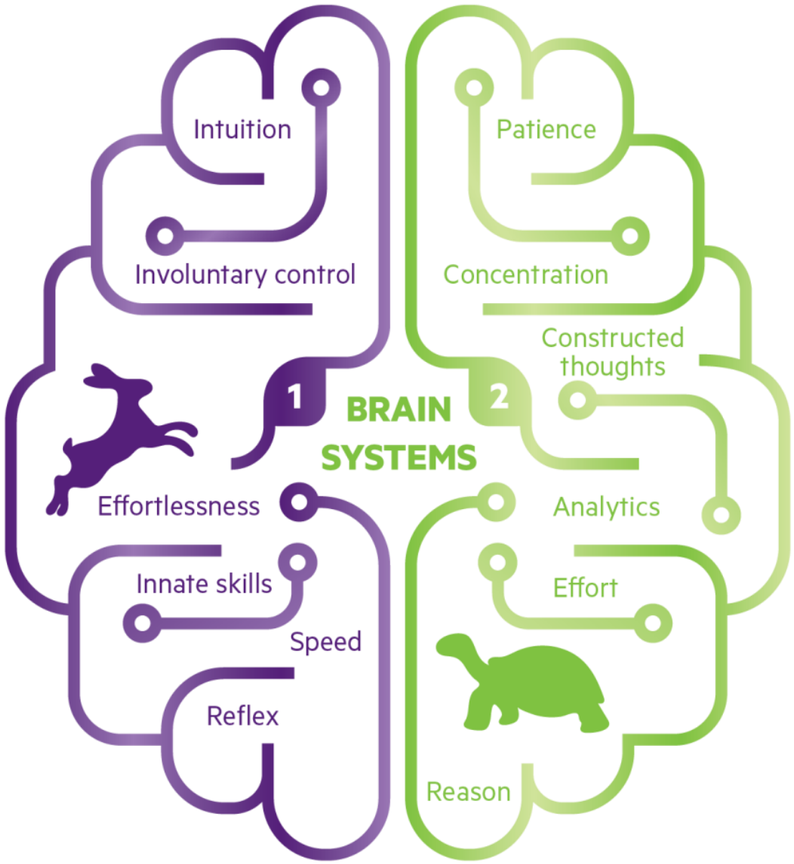
Short term memory

Long term memory

Brain Analysis

70% A significant amount of human brain is dedicated to visual processing.

Cognitive Science for data visualisations



https://medium.com/@ryansheffer/founders-need-to-think-slow-move-fast-6b683e94c110
https://bombbomb.com/blog/video-for-sales-thinking-fast-and-slow-kahneman/
https://www.amazon.com/Thinking-Fast-Slow-Daniel-Kahneman/dp/0374533555

Cognitive Science for data visualisations

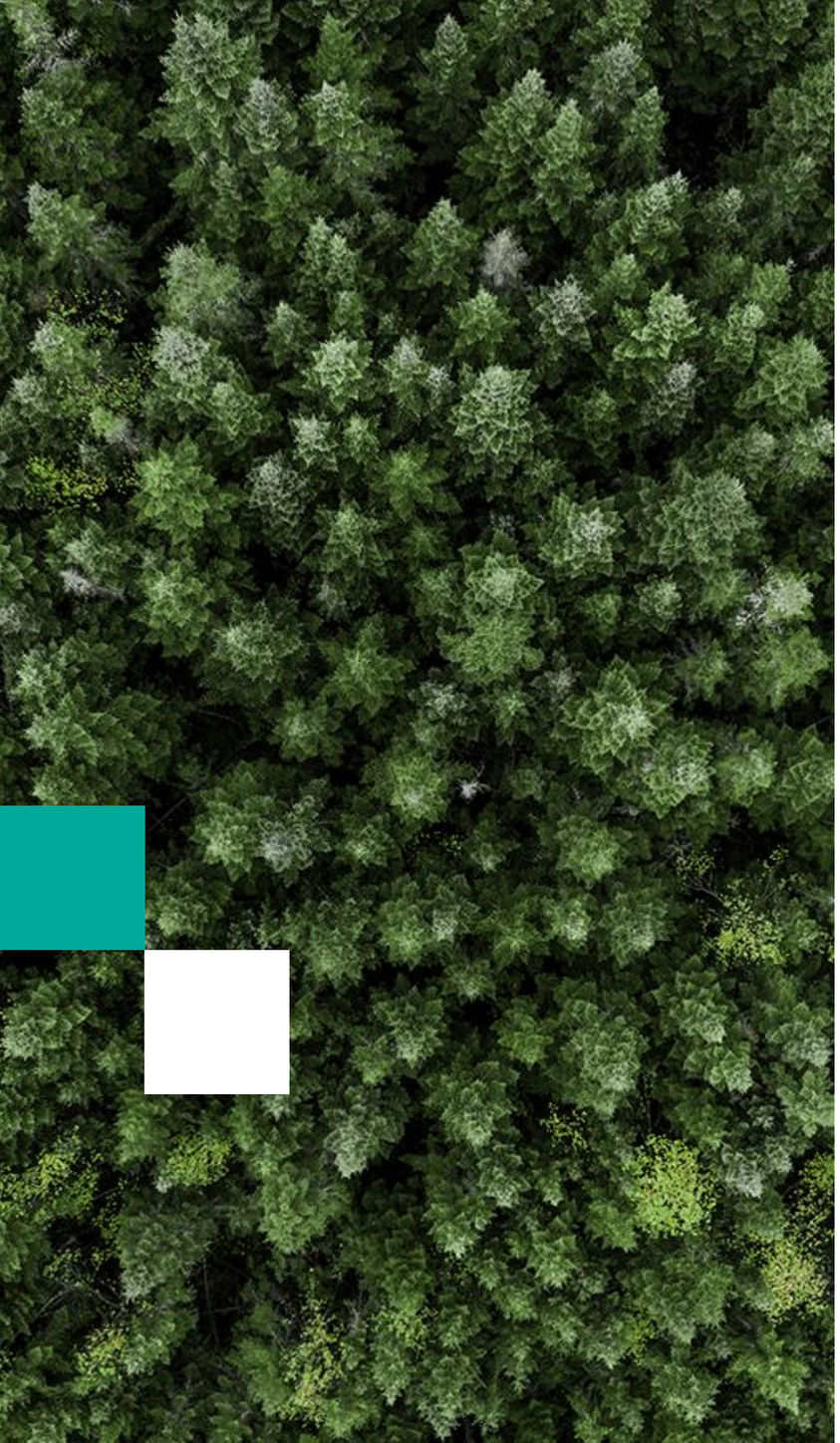
23 x 14 = ?

Cognitive Science for data visualisations

https://www.youtube.com/watch?v=ClTS8qlhAx4

23 x 14 = 322

Creating Data Visualisations appeals to both our Artistic and Scientific side



Preattentive Attributes

Preattentive Attributes

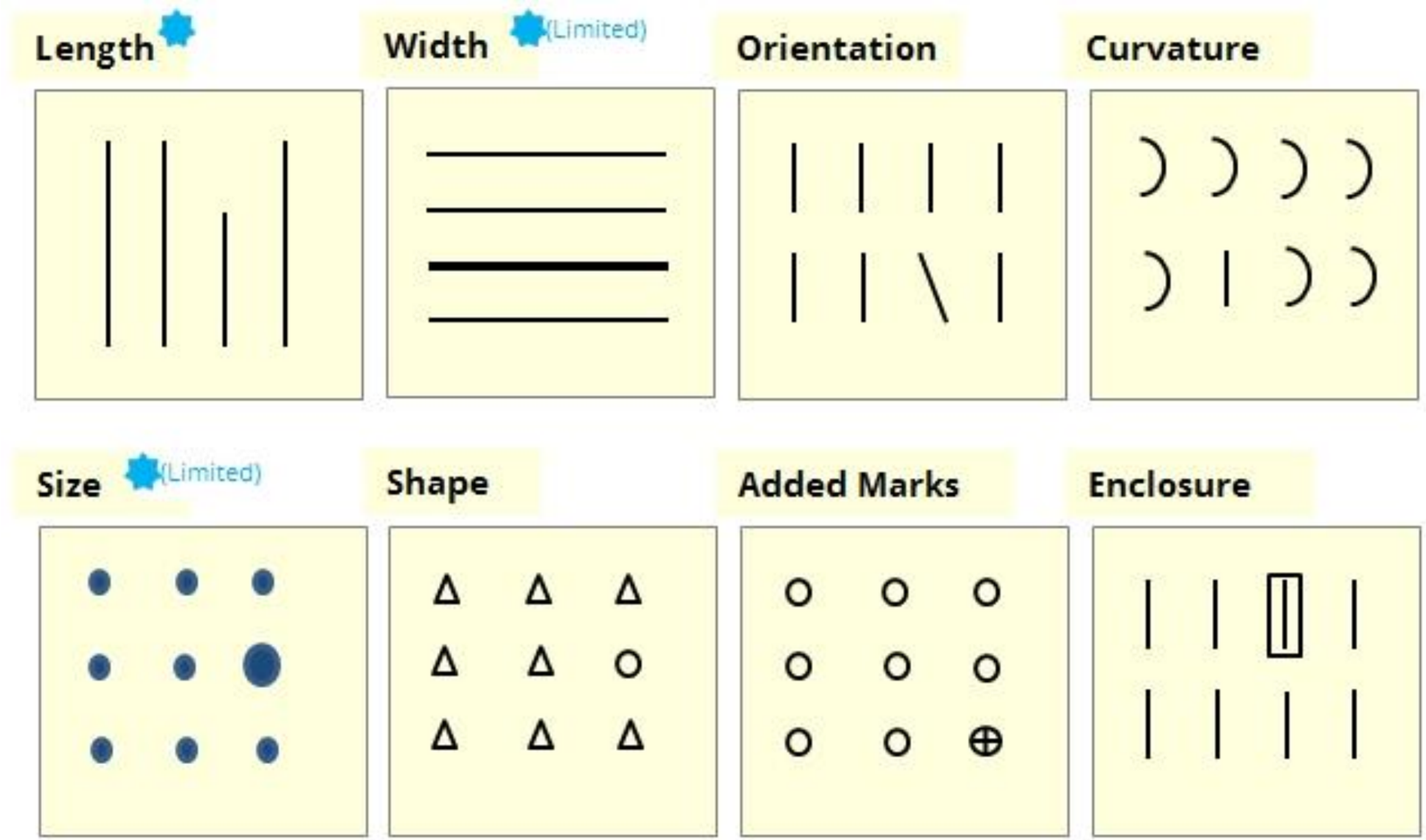
4 basic properties

1. Colour
2. Form
3. Movement
4. Spatial Positioning

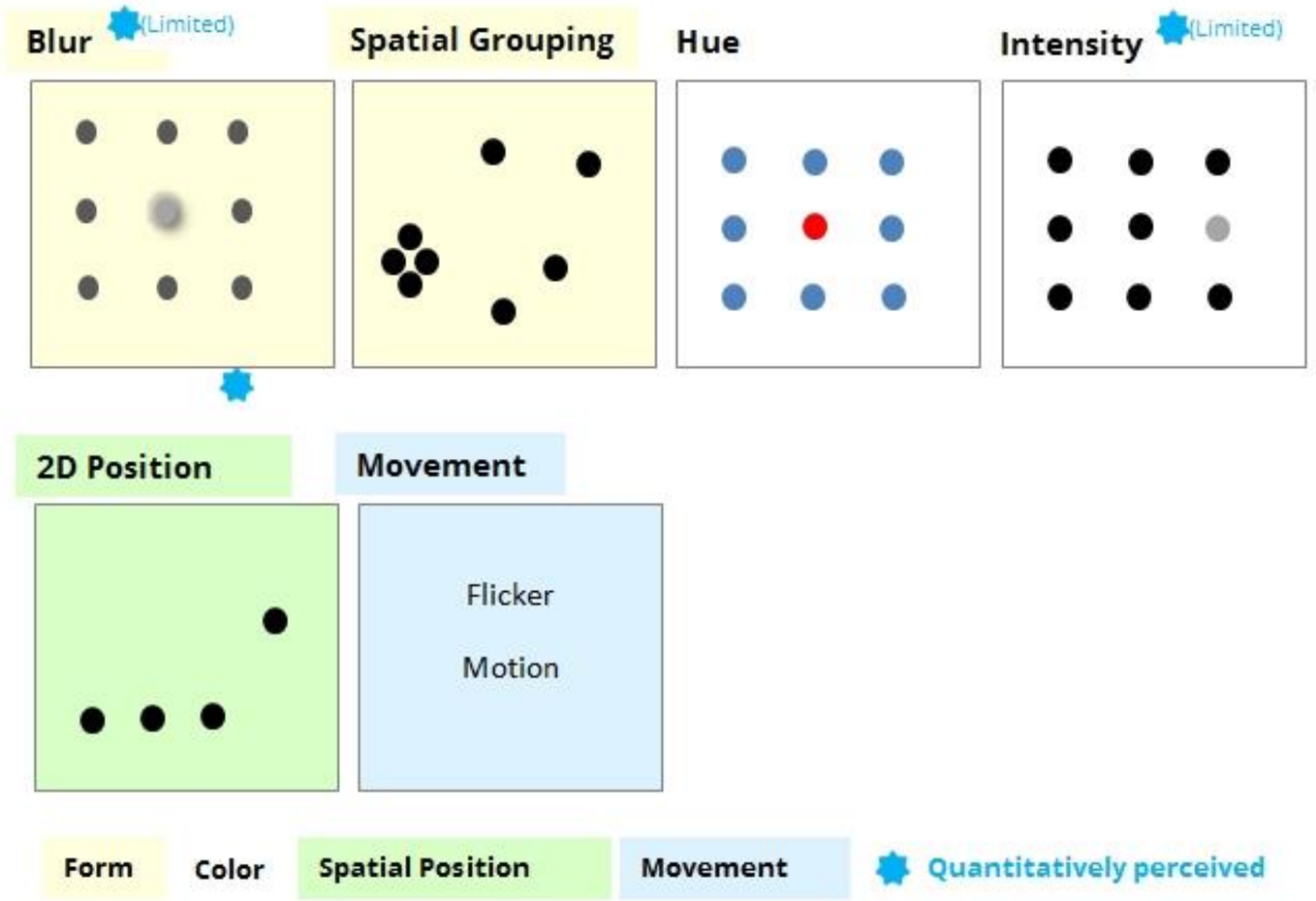
The human brain processes these properties with ease

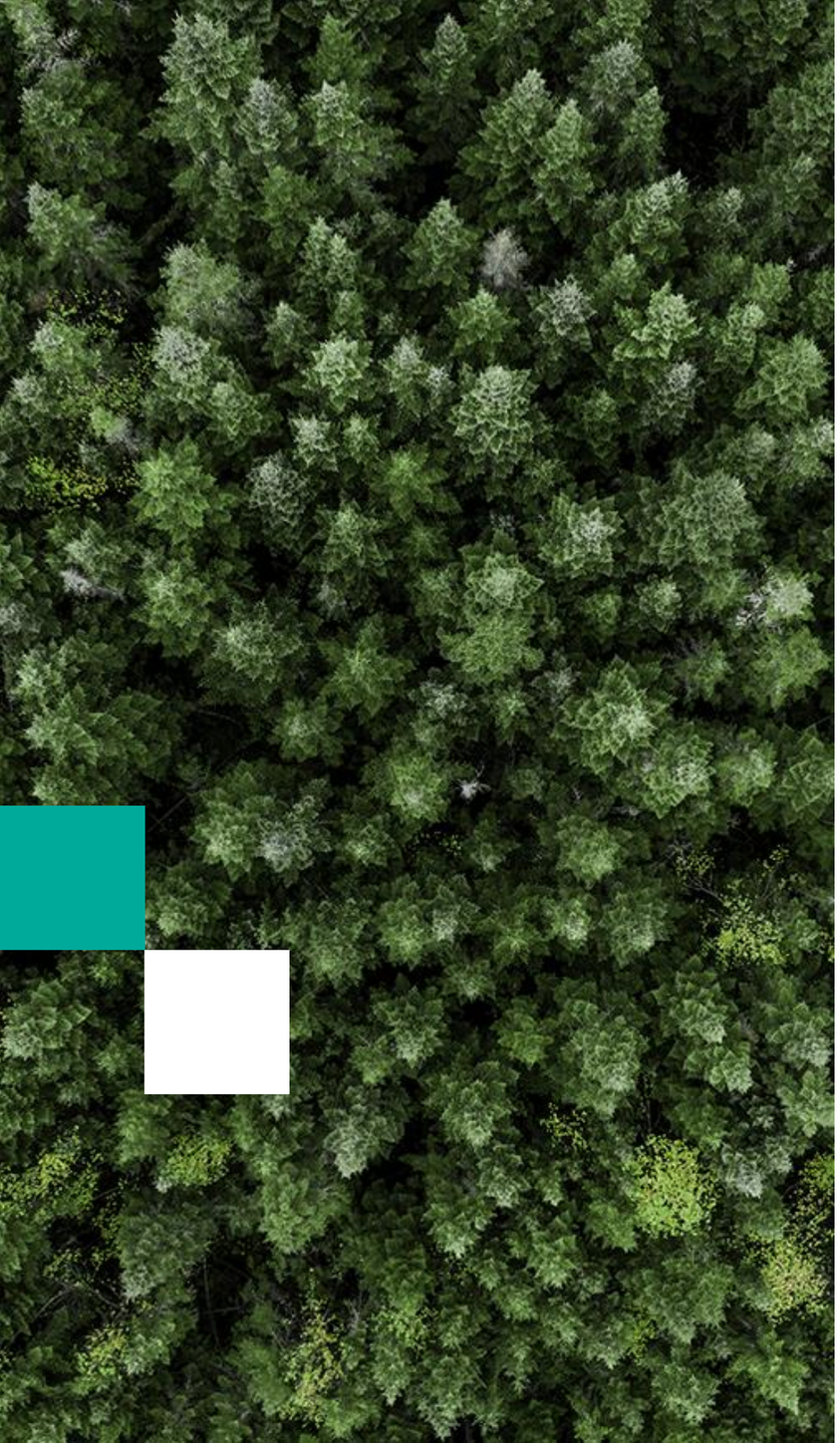
Occurs within 200 milliseconds of exposure to the visual

Preattentive Attributes



Preattentive Attributes





Principles of Visual Perception


GE$TALT

Gestalt Principles of Visual Perception

Great designers understand the powerful role that psychology plays in visual perception.

What happens when someone's eye meets your design creations?

How does their mind react to the message your piece is sharing?

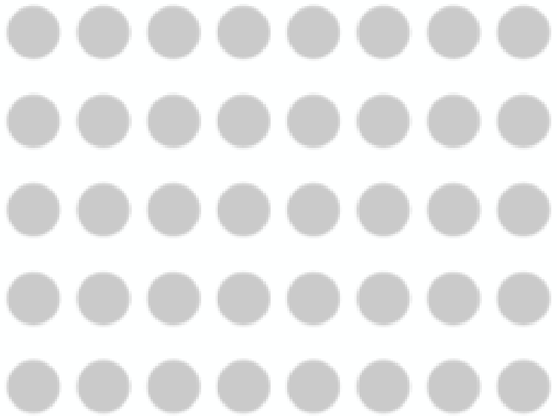
Gestalt Principles of Visual Perception

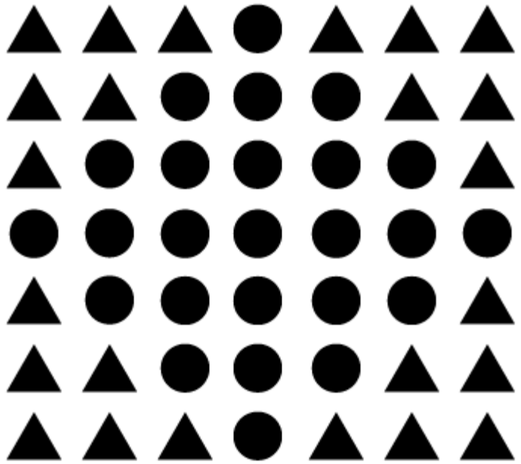
Helps us determine which elements are most effective in a given situation

Hold power to influence our visual perception

Allows designers to direct attention to specific points of focus, take action, or provoke behavioural change

Help us design data visualisations that are intuitive, beautiful and functional

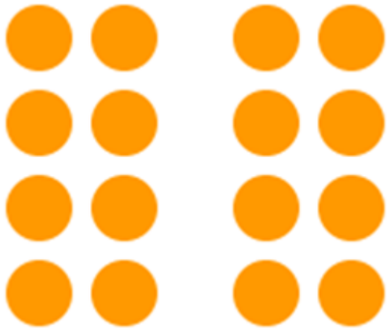




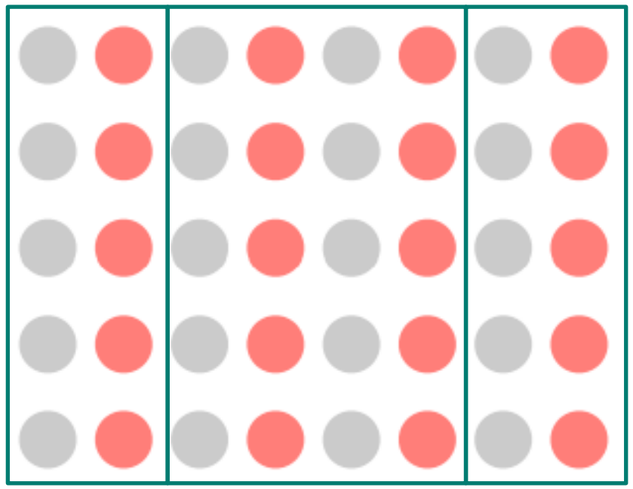
Similarity

This is perceived to be one group and the components somehow related to each other.

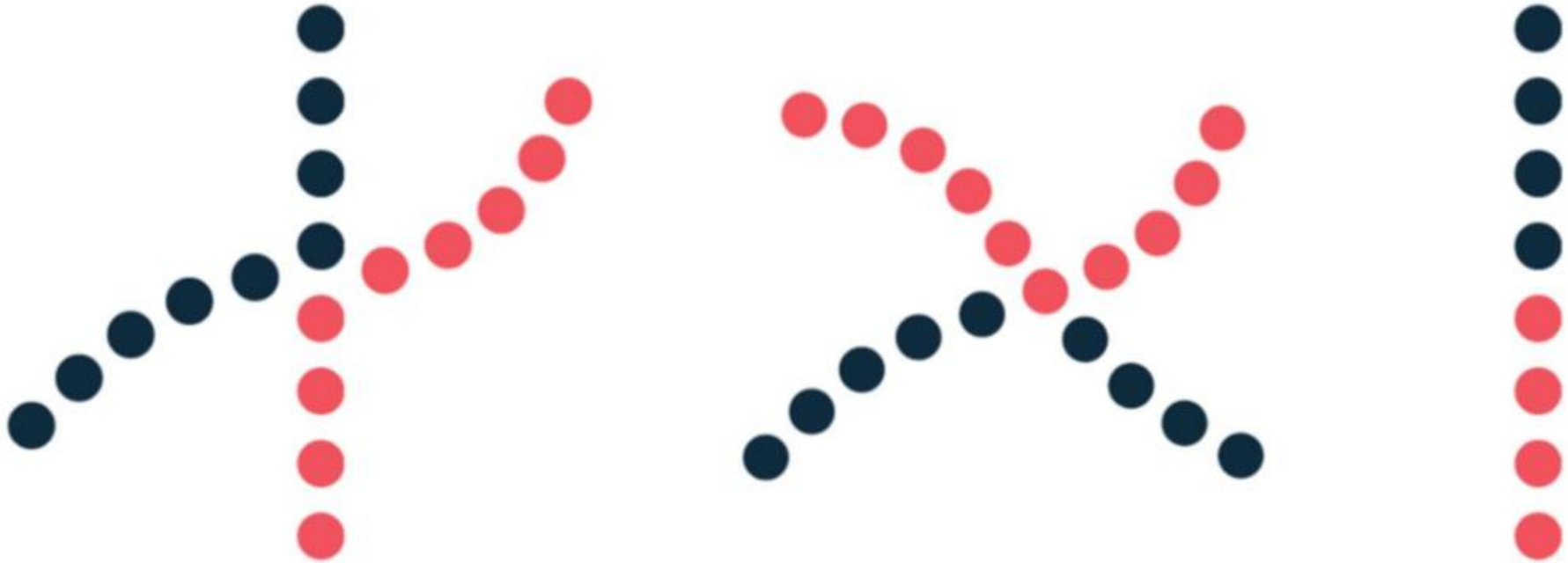
We perceive two groups here, and understand that there are differences between them.



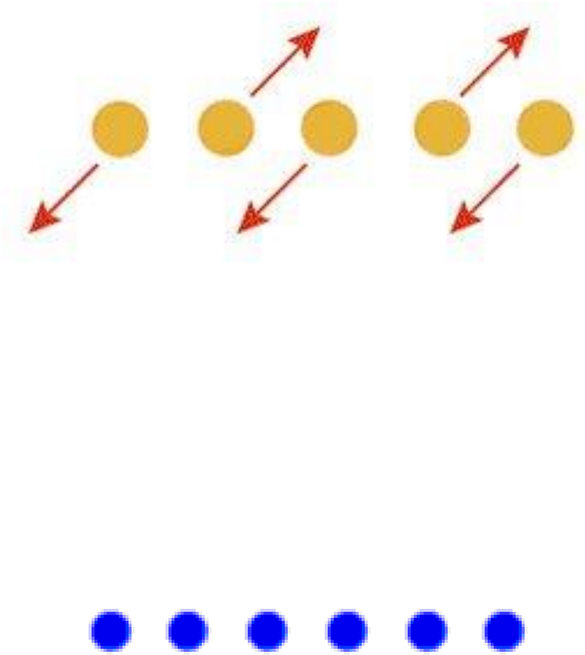
Proximity



Common Regions

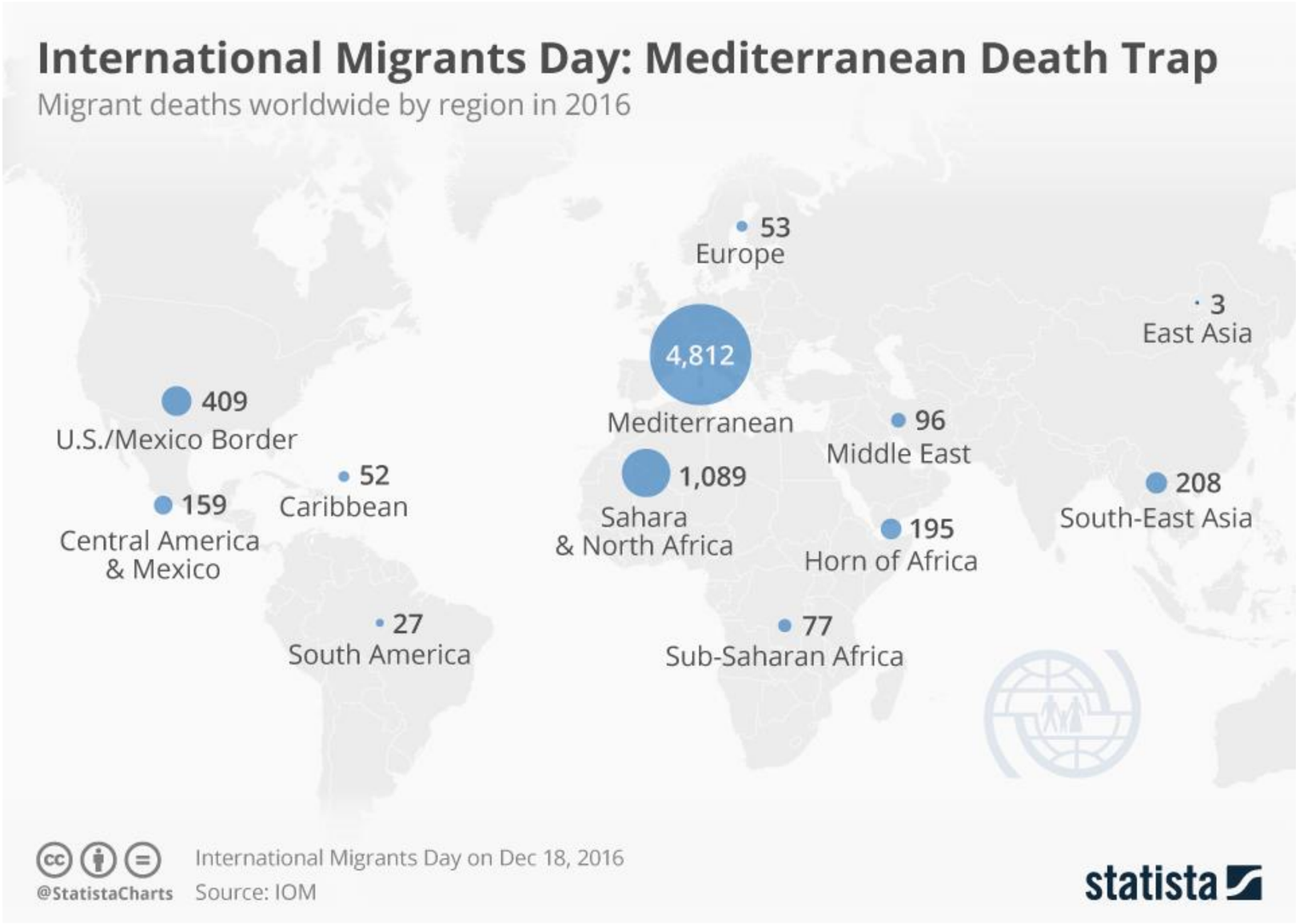


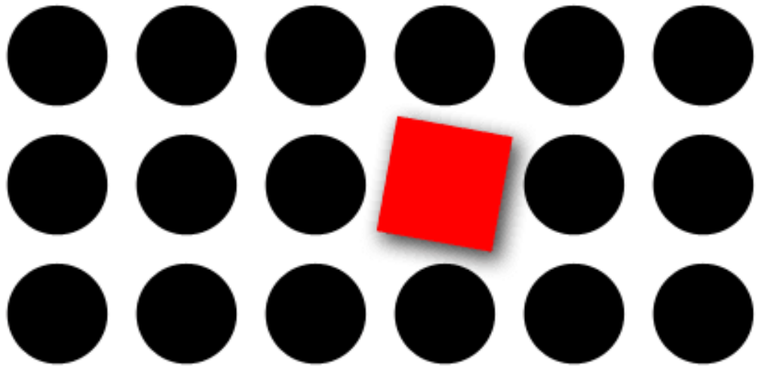
Continuity



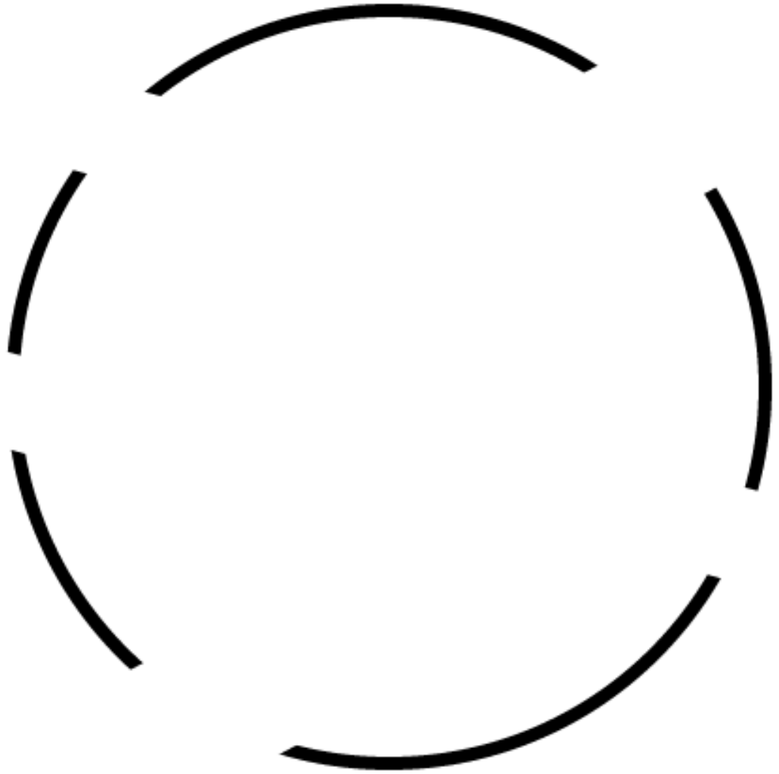
Common Fate

Figure - Ground

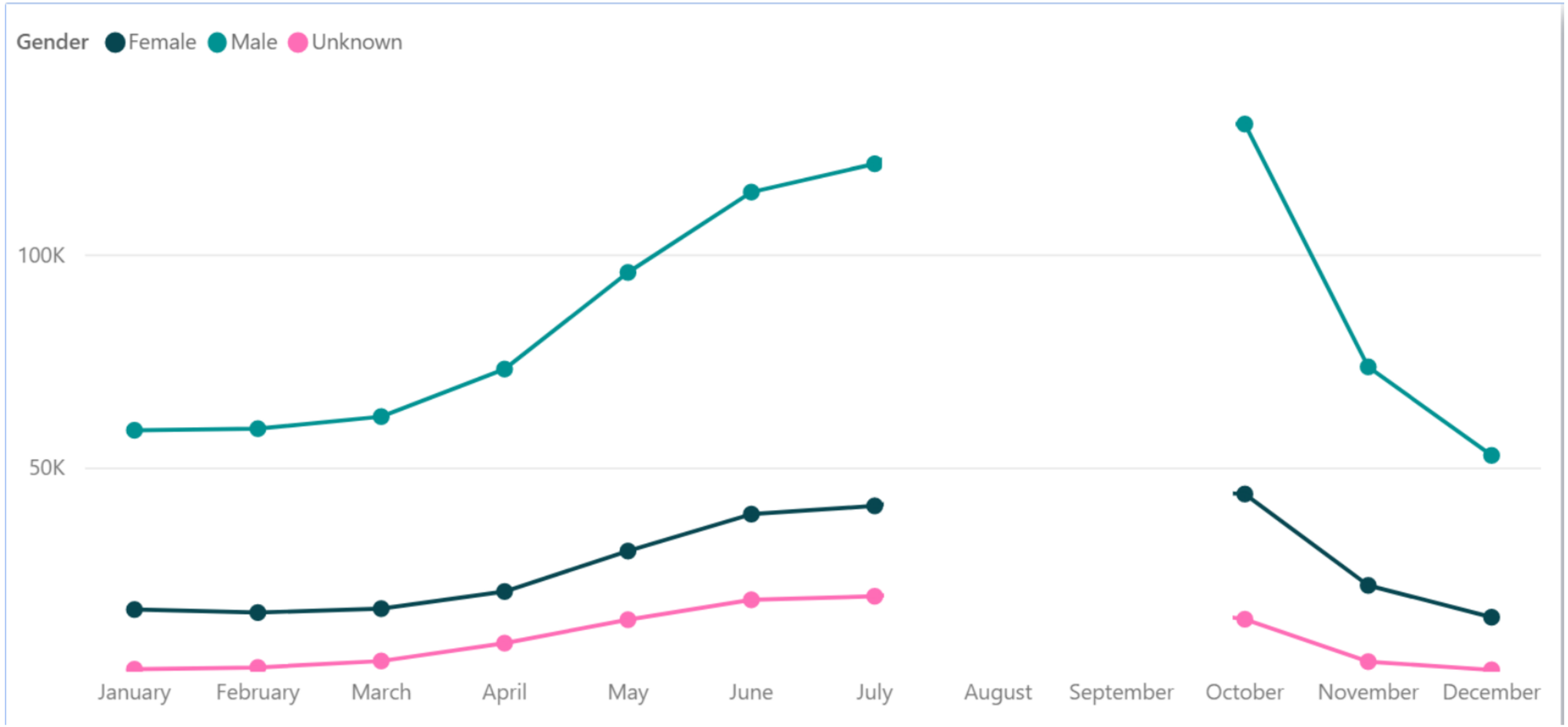

International Migrants Day: Mediterranean Death Trap
Migrant deaths worldwide by region in 2016
53
Europe
3
East Asia
4,812
Mediterranean
409
U.S./Mexico Border
96
Middle East
52
Caribbean
1,089
Sahara
& North Africa
208
South-East Asia
159
Central America
& Mexico
195
Horn of Africa
27
South America
77
Sub-Saharan Africa
@StatistaCharts
International Migrants Day on Dec 18, 2016
Source: IOM
statista

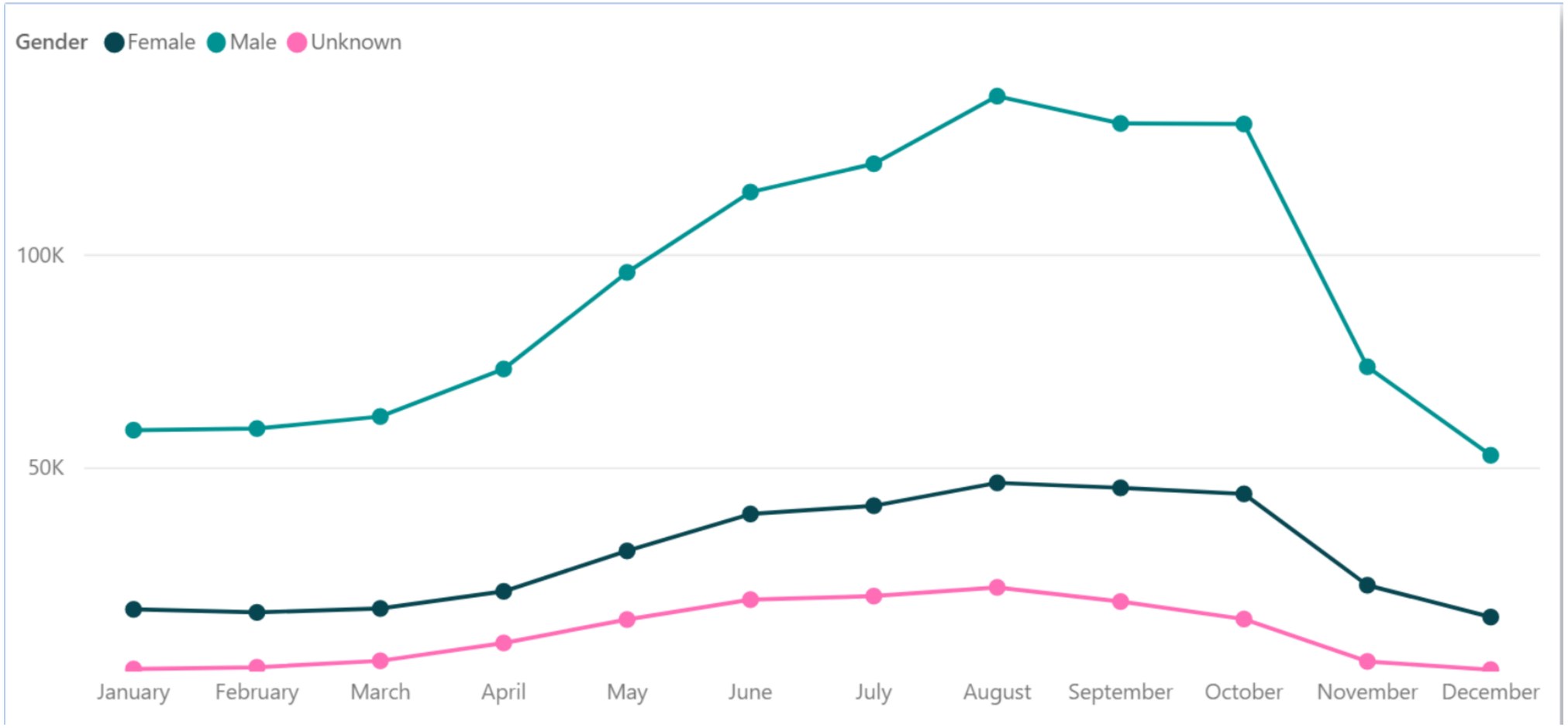


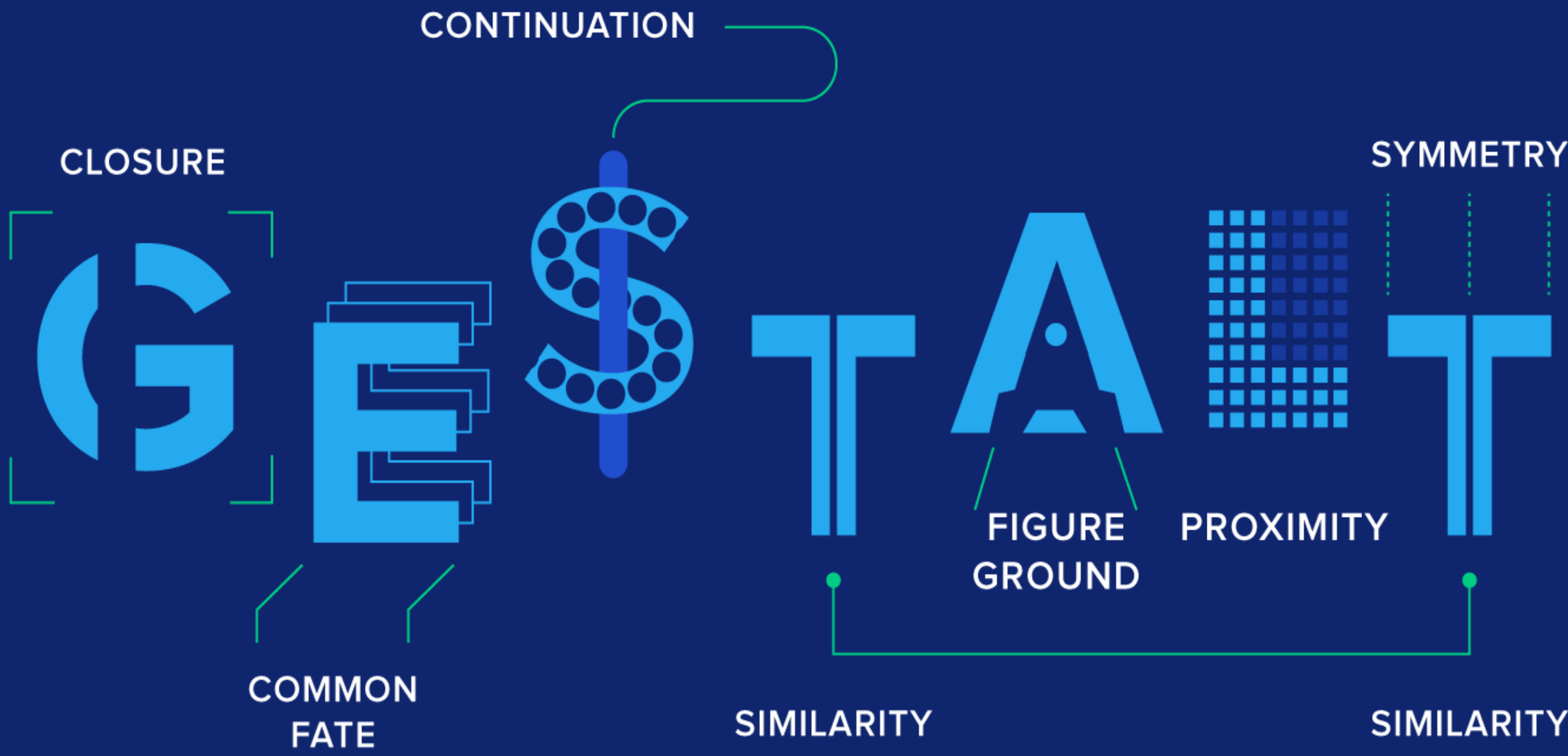
Focal Point

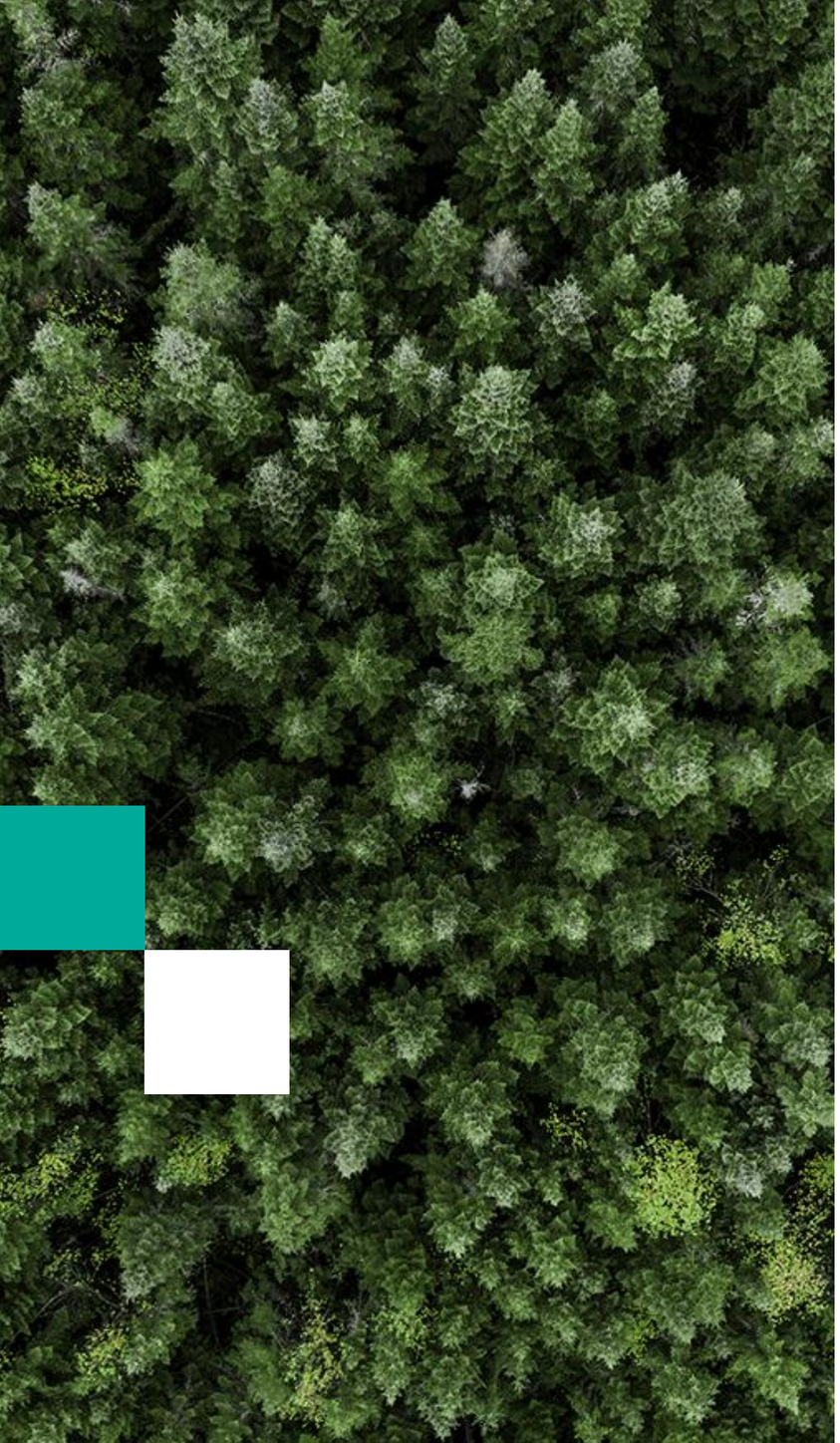


Closure






CONTINUATION
CLOSURE
SYMMETRY
FIGURE
GROUND
PROXIMITY
COMMON
FATE
SIMILARITY
SIMILARITY



The right visual

Choosing the right visual - Context

Explore your data!

Speak with the business, if possible

Familiarise yourself with :

- Business Context
- What does it mean when ..

Choosing the right visual – Context

Pay extra attention to :

- Amounts, Distributions, Proportions
- X-Y relationships
- Geospatial data
- Uncertainty

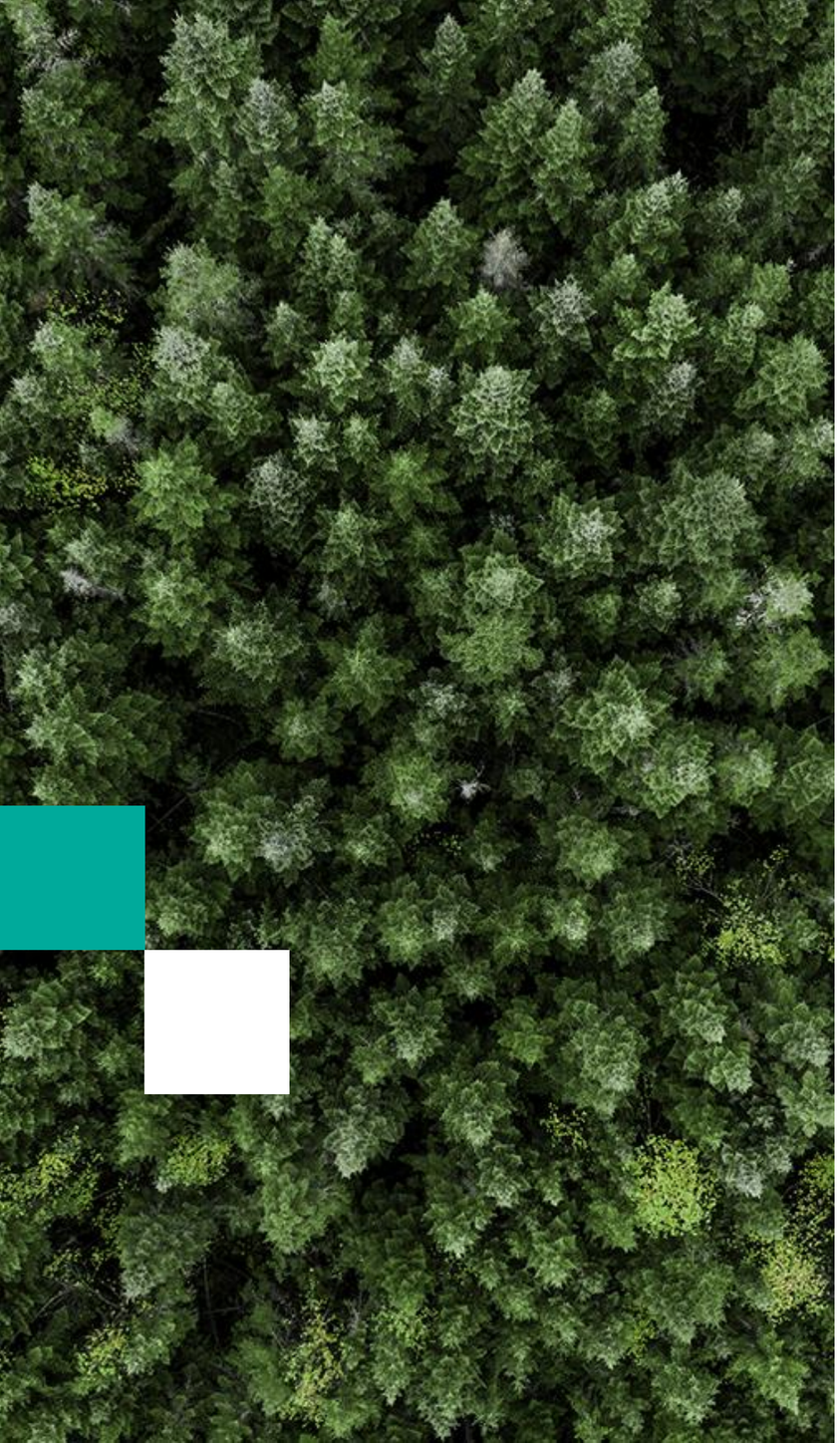
Choosing the right visual

FT visual vocabulary

https://ft-interactive.github.io/visual-vocabulary/

Data to viz

https://www.data-to-viz.com/#explore



Colour Theory

Colour Theory

Colours are subjective, not every person responds the same

Colours have different cultural meaning

Colour Theory is based on research, to help us decide

Colour Theory

Let’s focus on the HSL Model

Hue

- Aligns to what people describe as a colour

Saturation

- Intensity of said colour
- Scaled on how much the colour differs from neutral grey (0%)

Luminance

- Describes the spectrum of a hue from dark, based on the amount of black added

Step 1: Decide what the colours will represent

Know your data, perform data exploration

Decide on the aspect of your data that you want to represent

Stick to one aspect per colour

Colour scales can be used as well

Step 2: Understand your data scale

Sequential – when data values go from low to high

Divergent – when data has data points at both ends of the scale, with an important pivot in the middle.

Qualitative – when the data does not have an order of magnitude.

Step 3: Look for obvious options

Look at the data and it’s application

Is there an occurence in nature, or in-person?

Is there a corporate style guide?

Try to pick colours users will easily understand

Step 4: Decide on your hues

Sequential data usually requires one hue, using luminance or saturation to define scale.

Changes in luminance and saturation are hard to perceive

- With a scale containing more than five data points, consider two hues

Step 4: Decide on your hues

Divergent data requires two hues, decreasing in saturation or luminance towards a neutral (usually white, black or gray).

Qualitative data requires as many hues as values

Step 5: Be Consistent

Upon deciding with your colours, be consistent

Users will develop a mental map

Increased familiarity helps the preattentive attributes

Step 6: Don’t fear grey

Not everything has to be a vibrant colour

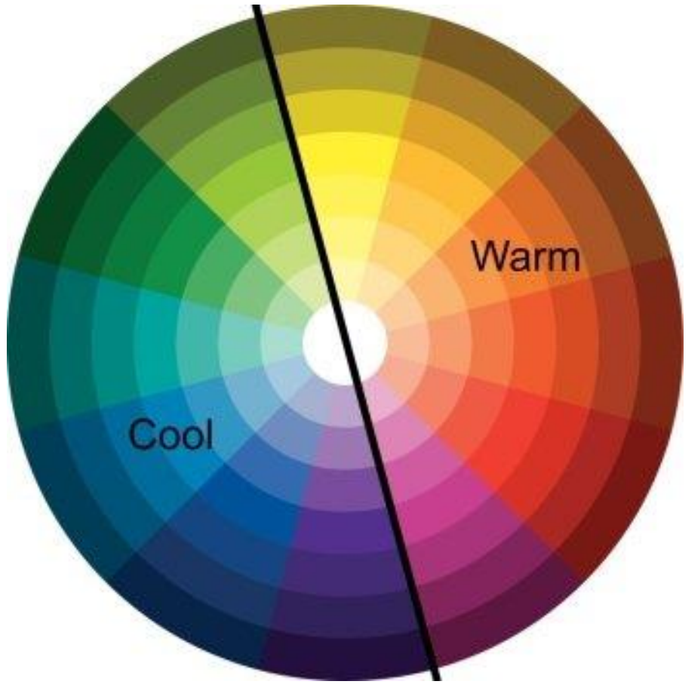
Use white and grey to add contrast to your report

Consider creating your report in grey, black and white before choosing colours

Step 7: Create your palette

Look at online resources (ie. ColorBrewer, Adobe Color)

Decide on your warm or cool colours as a base

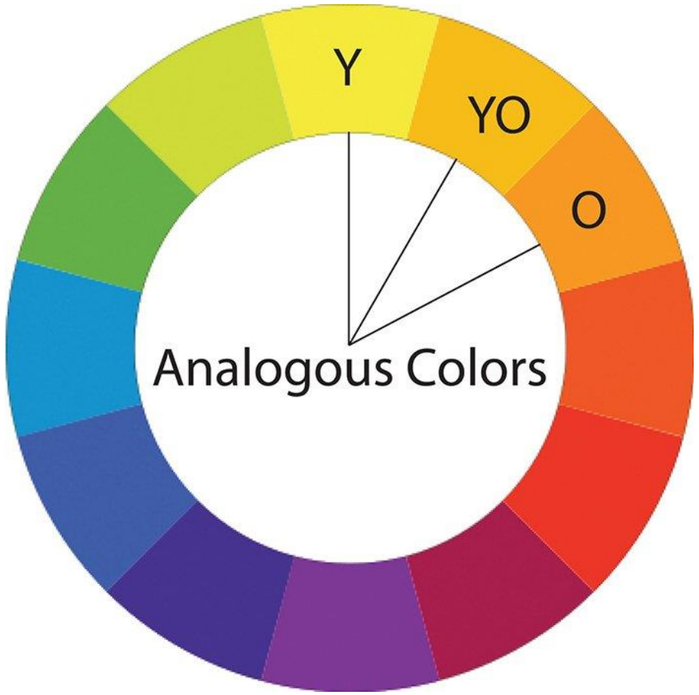


Step 7: Create your palette

Monochromatic – shades of a single hue, ideal for sequential data.

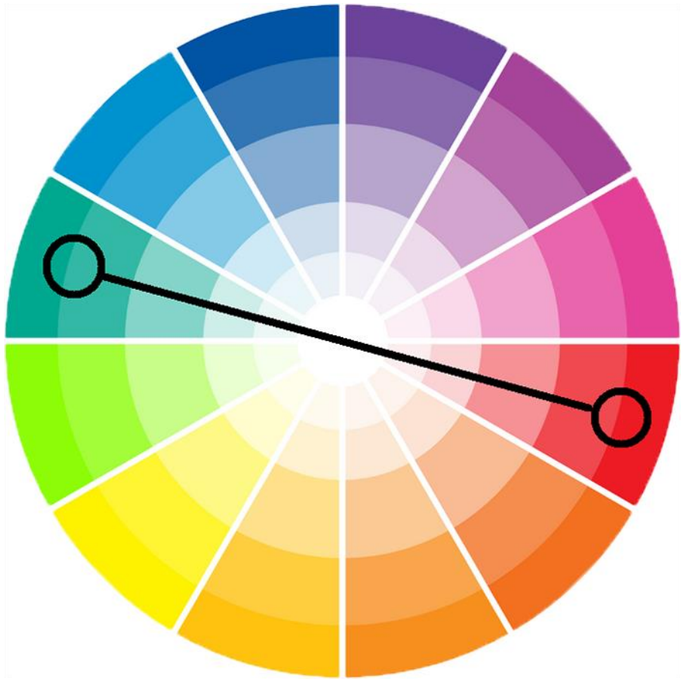
Step 7: Create your palette

Analogous colors – colors that sit beside each other on the color wheel. These provide a more varied alternative for sequential data visualization.



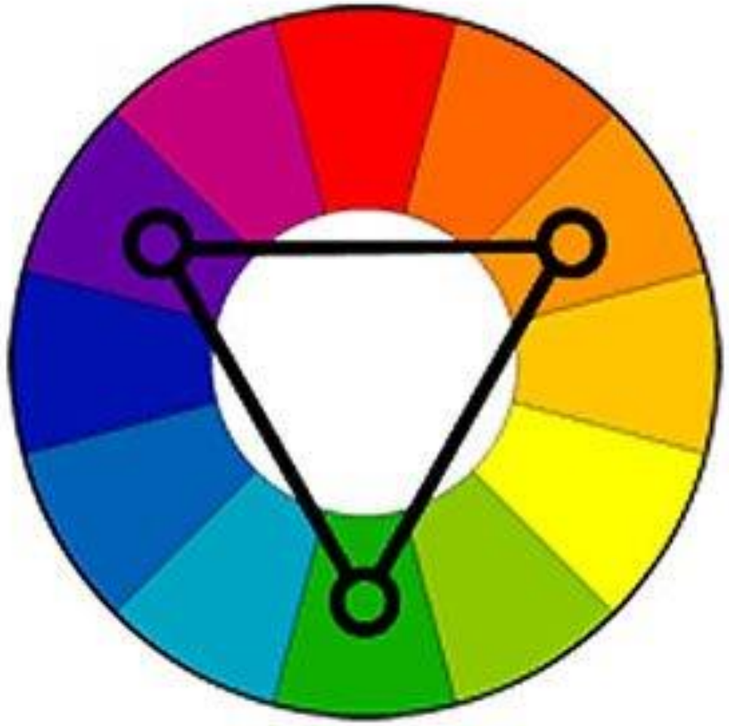
Step 7: Create your palette

Complementary colors – from opposite sides of the color wheel. When paired with a neutral (e.g. white or gray) these palettes are perfect for diverging data.



Step 7: Create your palette

Triadic colors – 3 colors equally spaced around the wheel, which are a good starting point for a qualitative palette.



Step 8: Make sure everyone is invited

Keep accessiblity in mind when visualising your data

Accessiblity Checklist – Meagan Longoria

https://whocanuse.com/

http://www.color-blindness.com/coblis-color-blindness-simulator/

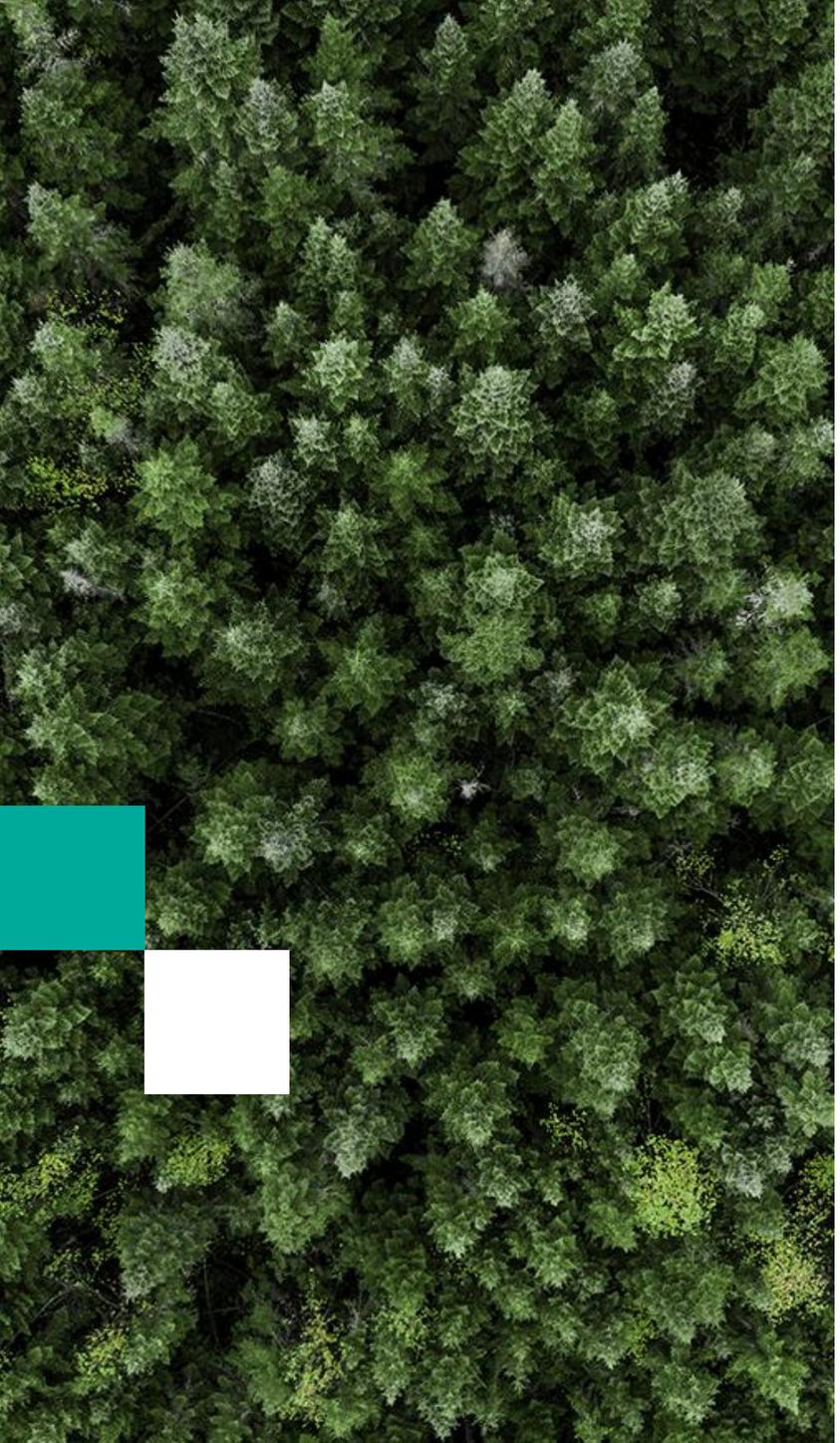
http://www.vischeck.com/vischeck/vischeckImage.php

Step 9: Create a theme file

Creating a theme file helps your consistency

And easily share your presets with different users

PowerBI.tips has a theme generator



Takeaways

Takeaways

Remove Clutter and Avoid Visual & Data Overload

Manage White Space

Leverage Gestalt Principles

Use the Power of Preattentive Attributes!

Colours are key, use them wise

Keep accessibility in mind

Tell a Story!

Now you do it!

Participate in the Workout Wednesday Challenges

Follow the hashtag #WOW2021 on Twitter

OR

- Meagan Longoria (@Mmarie)
- Shannon Lindsay (@shan_gsd)
- David Eldersveld (@dataveld)
- Spencer Baucke (@JSBaucke)

Reading Material

https://www.datapine.com/blog/best-data-visualization-books/?fbclid=IwAR1lb77vZR3Sx4NX0Dua6bzyZaCctIfNbFUTS7jHOAzLBcPGtvY_rsQpgS0

- Alberto Cairo
- Stephen Few
- Donald Miller
- Edward R. Tufte
- Cole Nussbaumer Knaflic
- Steve Wexler

References

https://viz.wtf/

https://www.reddit.com/r/DataIsUgly

https://www.reddit.com/r/dataisbeautiful

https://datasavvy.me/design-concepts-for-better-power-bi-reports/

Prathy's Blog... -

http://daydreamingnumbers.com/blog/preattentive-attributes-example/

https://learnforeverlearn.com/preattentive/

References

https://www.smashingmagazine.com/2014/03/design-principles-visual-perception-and-the-principles-of-gestalt/

https://www.usertesting.com/blog/gestalt-principles

https://practicalpie.com/gestalt-principles/
https://vizzendata.com/2020/07/06/utilizing-gestalt-principles-to-improve-your-data-visualization-design/

http://daydreamingnumbers.com/concepts/gestalt-laws-data-visualization/

https://www.interaction-design.org/literature/article/preattentive-visual-properties-and-how-to-use-them-in-information-visualization

Resources

Adobe Color - https://color.adobe.com/create/color-wheel

i want hue - https://medialab.github.io/iwanthue/

Colormind.io - http://colormind.io/

ColorBrewer - https://colorbrewer2.org/

Colours from an image - https://html-color-codes.info/colors-from-image/#

Canva - https://www.canva.com/color-palette/#

Dribble colors - https://dribbble.com/colors/e8e230?percent=30

Colours co - https://coolors.co/browser/latest/1

Colors Hexa - https://www.colorhexa.com/3589a1

Color Combos - https://www.colorcombos.com/popular-color-combinations/2