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Designing Impactful Visualisations for your Data



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Belgium



About me



dataMinds.be Co-Leader



@BenniDeJagere



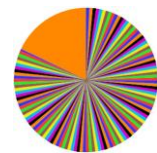
/bennidejagere



sessionize /bennidejagere



Data Platform



#SayNoToPieCharts



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



https://elidesc.com/wp-content/uploads/2012/07/Velo_Antwerpen.jpg

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 Visualisation 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

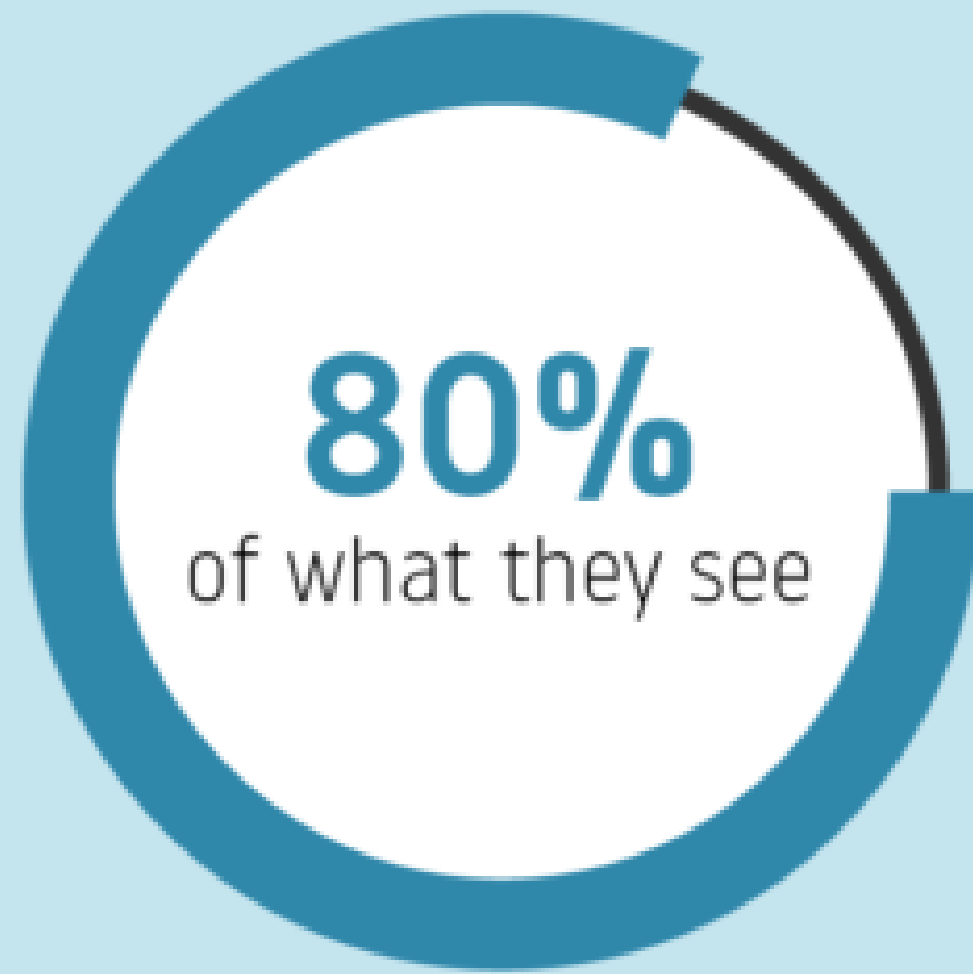
- Understand data quickly

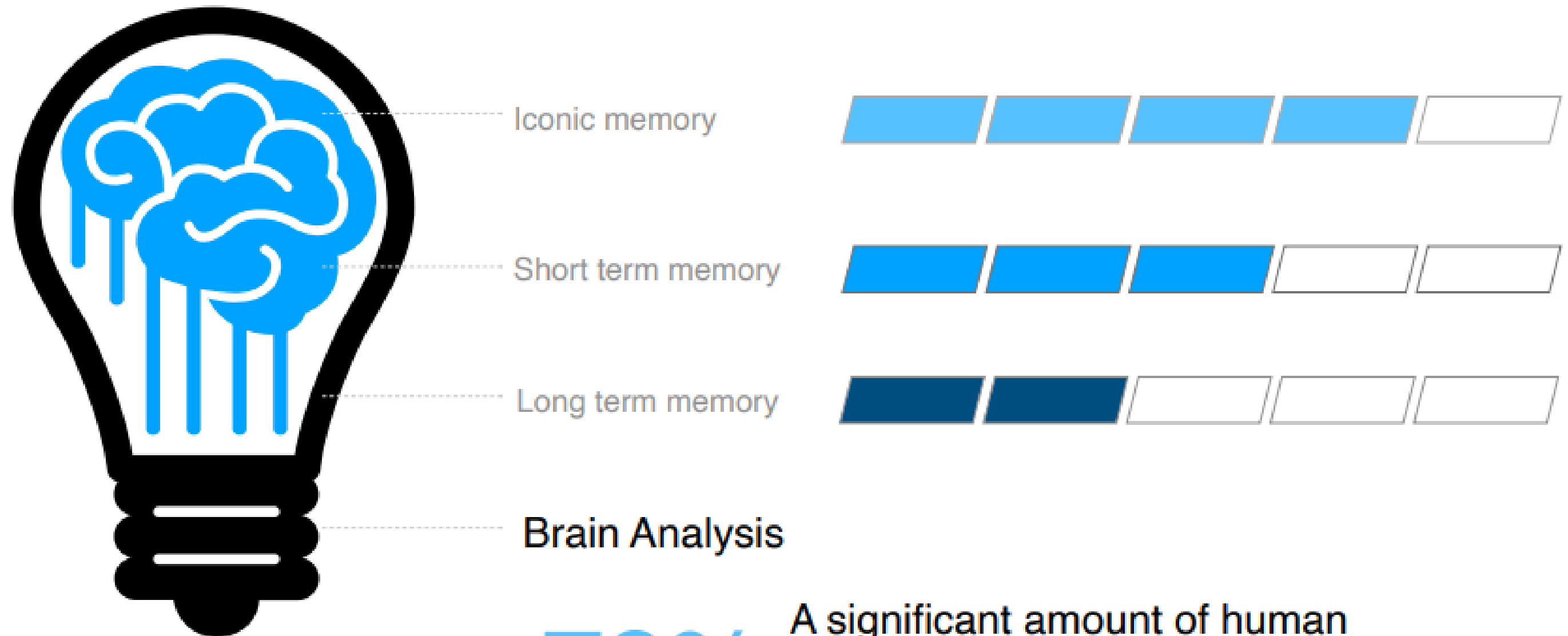
- Identify relationships and patterns

- Pinpoint emerging trends

- Communicate our findings as a story to others

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





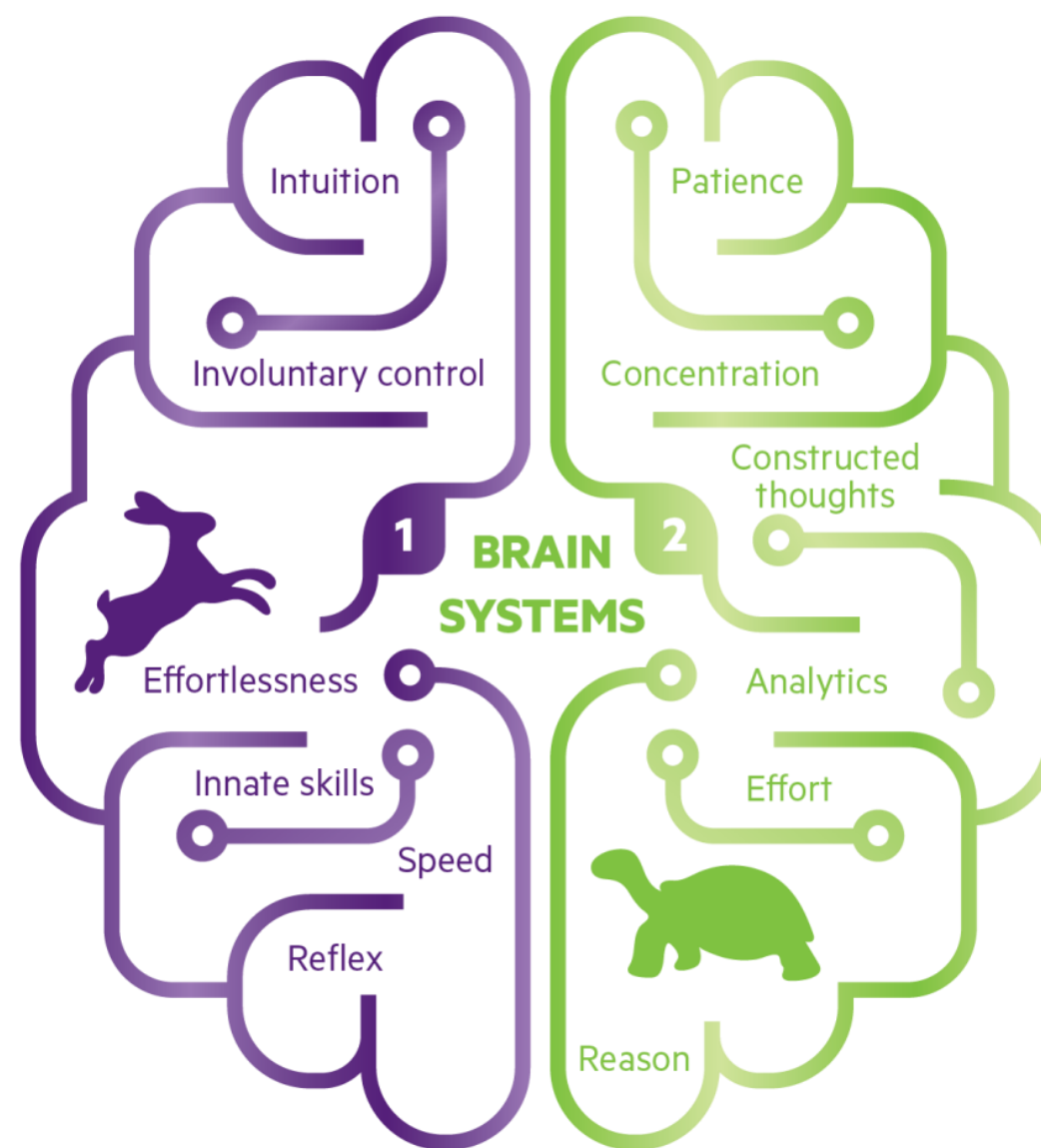
Brain Analysis

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 = ?

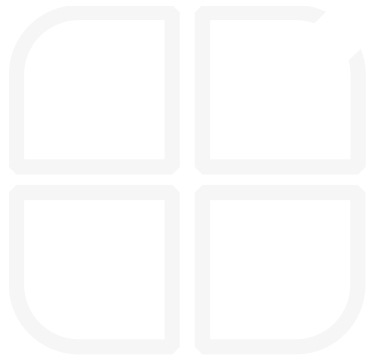


Cognitive Science for data visualisations



<https://www.youtube.com/watch?v=CITS8qlhAx4>

$$23 \times 14 = 322$$



Creating Data Visualisations appeals to both our
Artistic and Scientific side



Preattentive Attributes



Preattentive Attributes

4 basic properties

1.Colour

2.Form

3.Movement

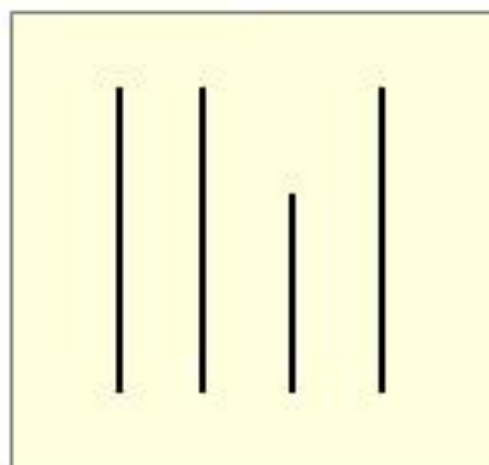
4.Spatial Positioning

The human brain processes these properties with ease
Occurs within 200 milliseconds of exposure to the visual

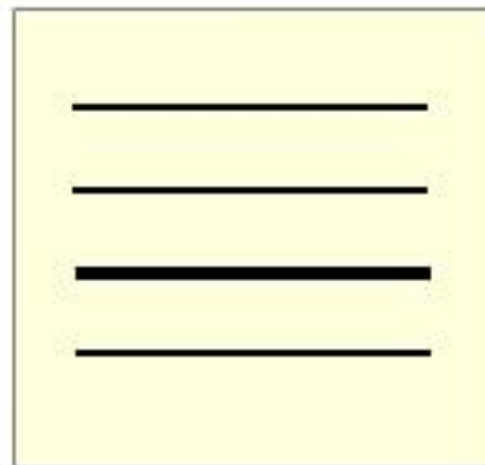


Preattentive Attributes

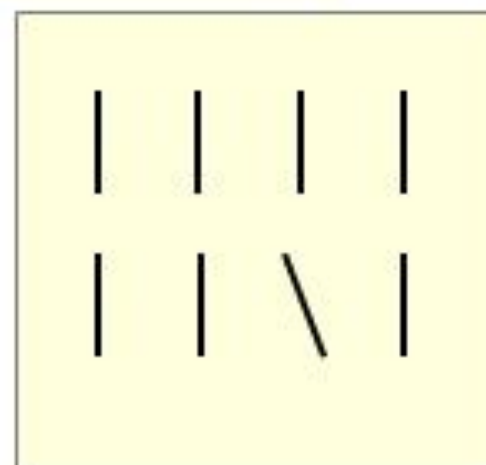
Length 



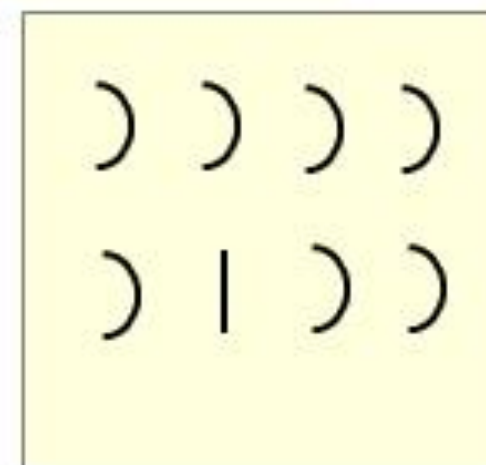
Width  (Limited)



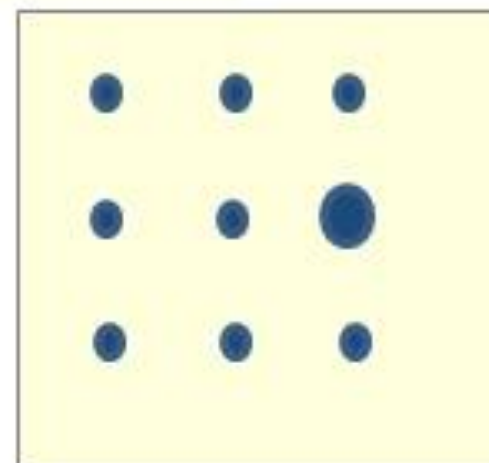
Orientation



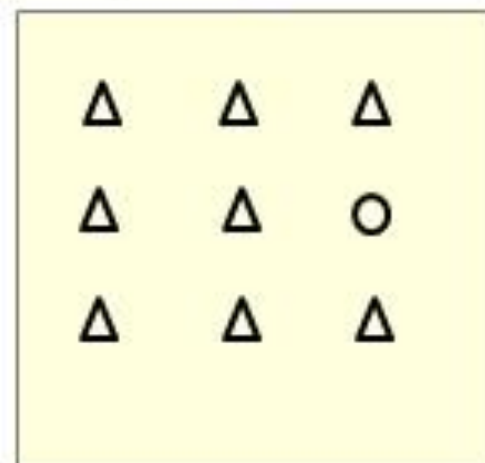
Curvature



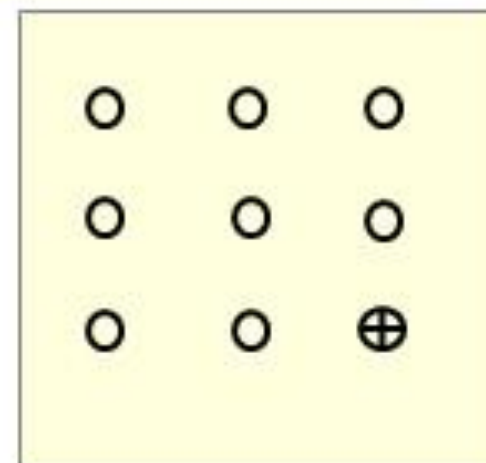
Size  (Limited)



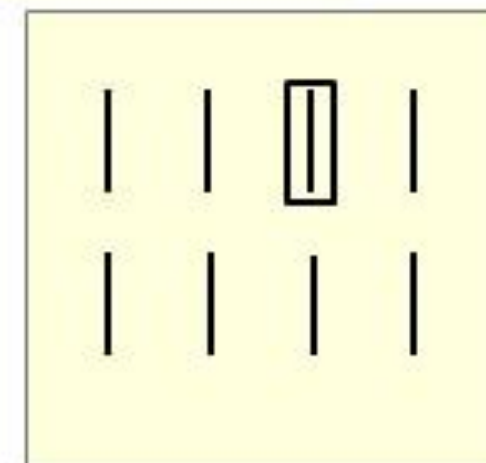
Shape



Added Marks

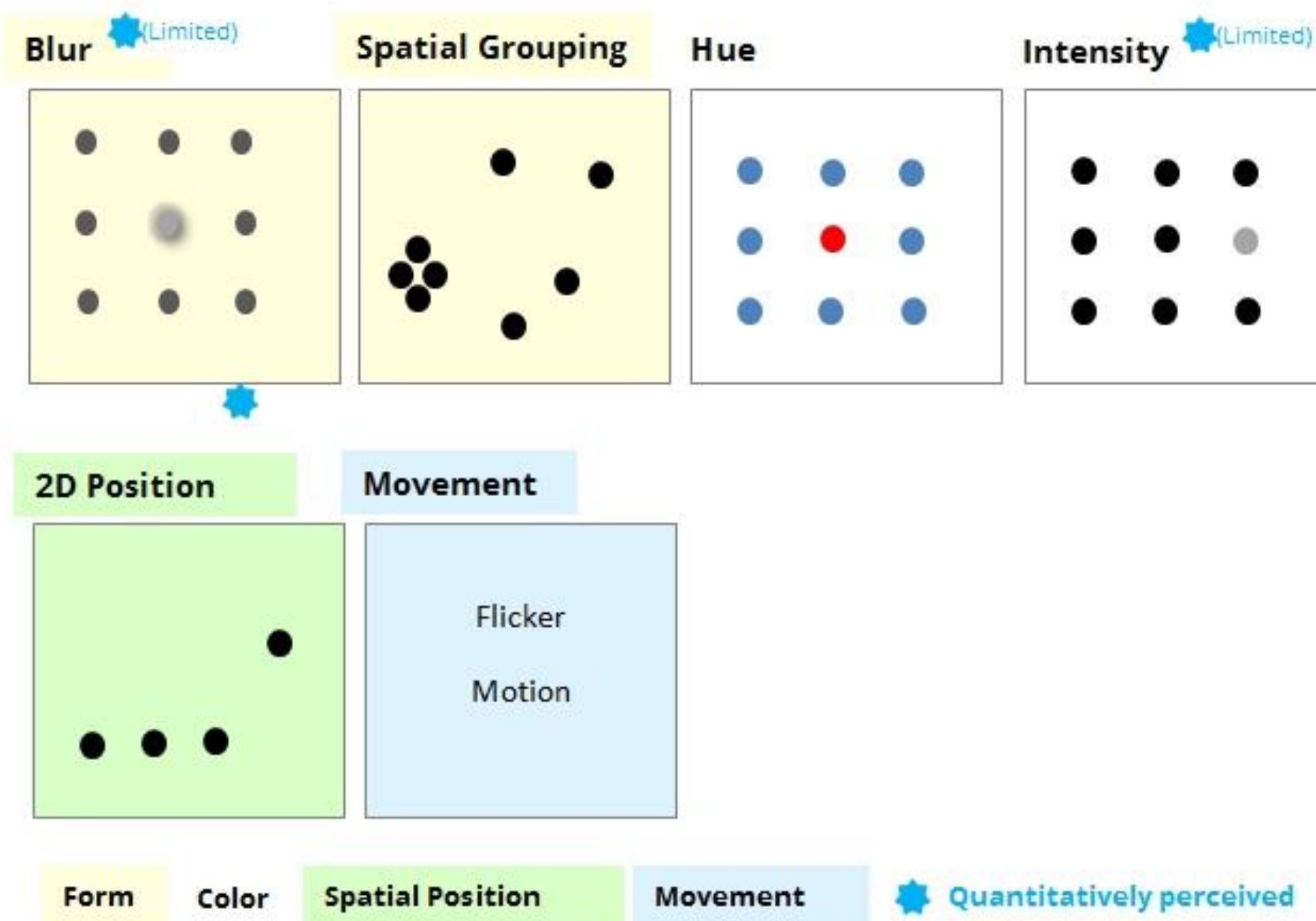


Enclosure



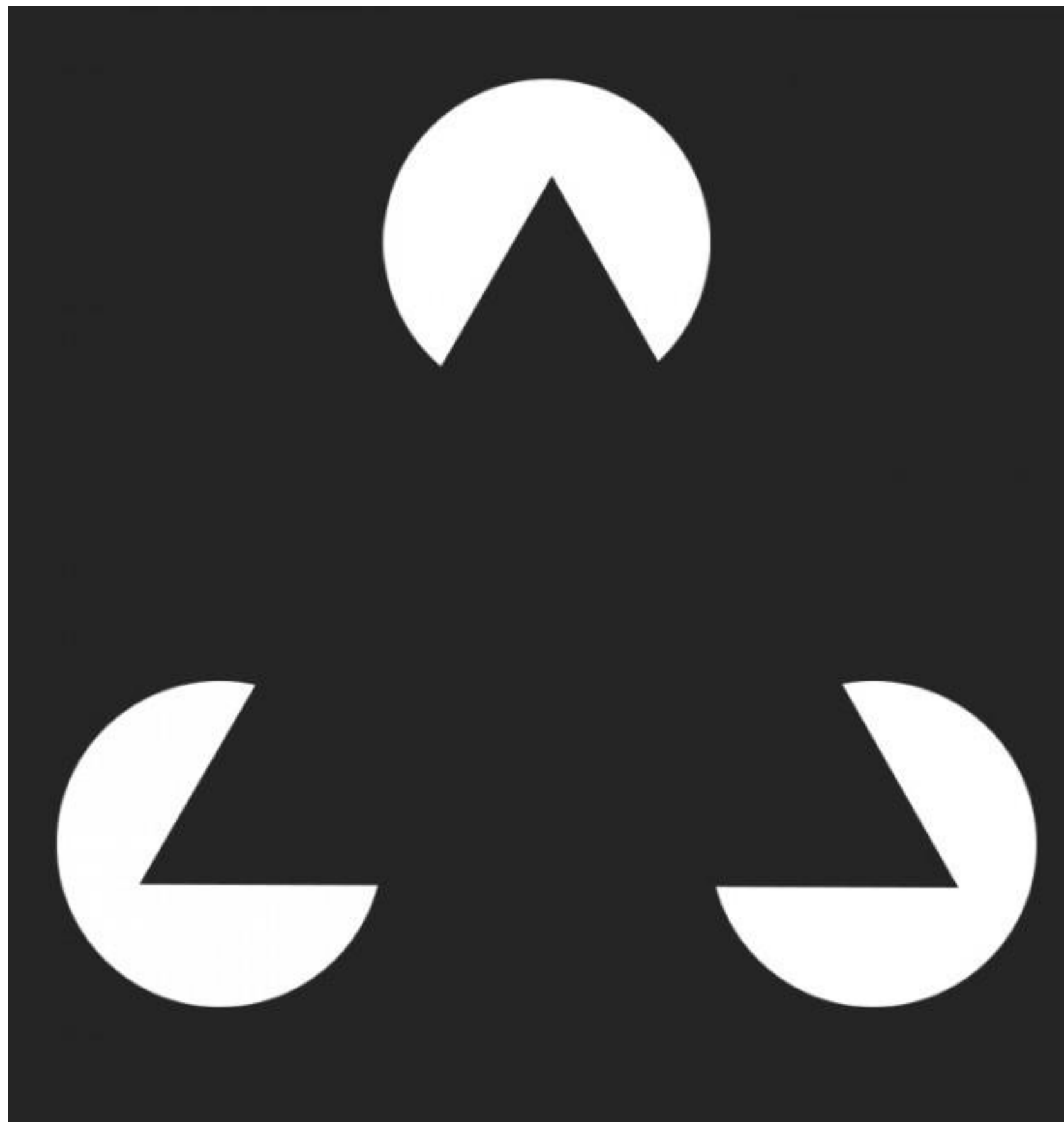


Preattentive Attributes



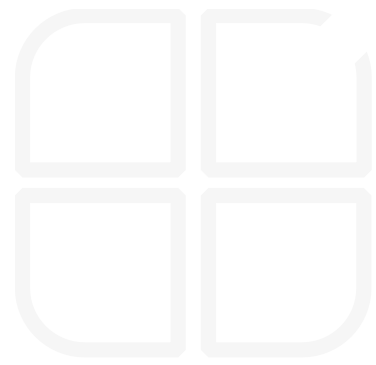


Principles of Visual Perception









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

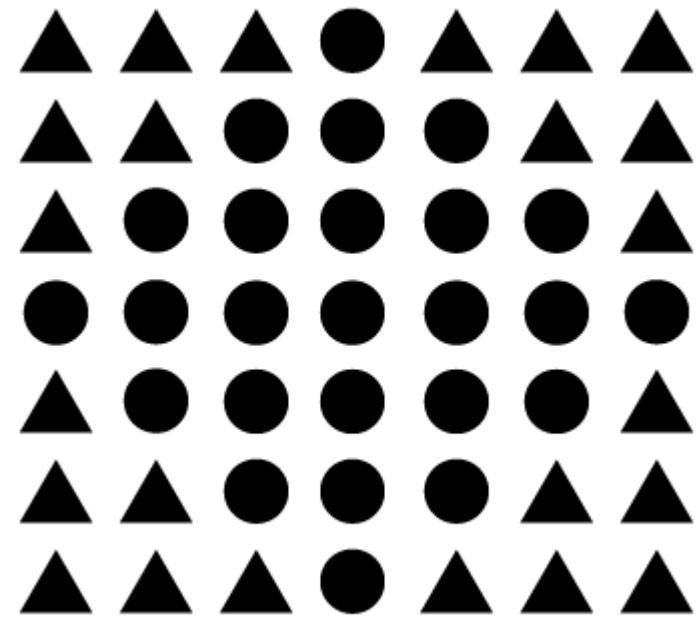
Helps us determine which elements are most effective in a given situation

Hold power to influence our visual perception

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

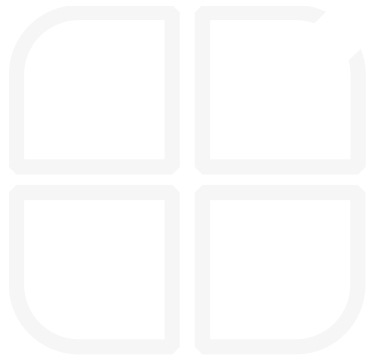
Help us design data visualisations that are intuitive, beautiful and functional





Similarity

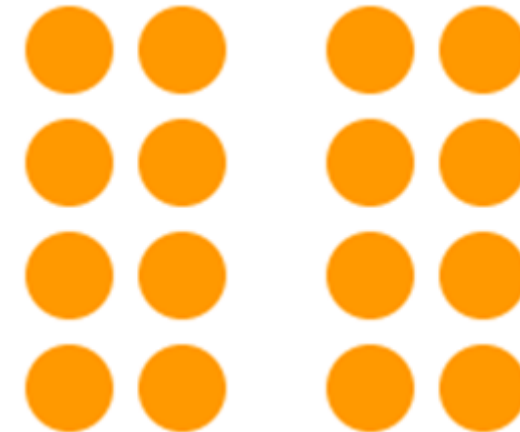




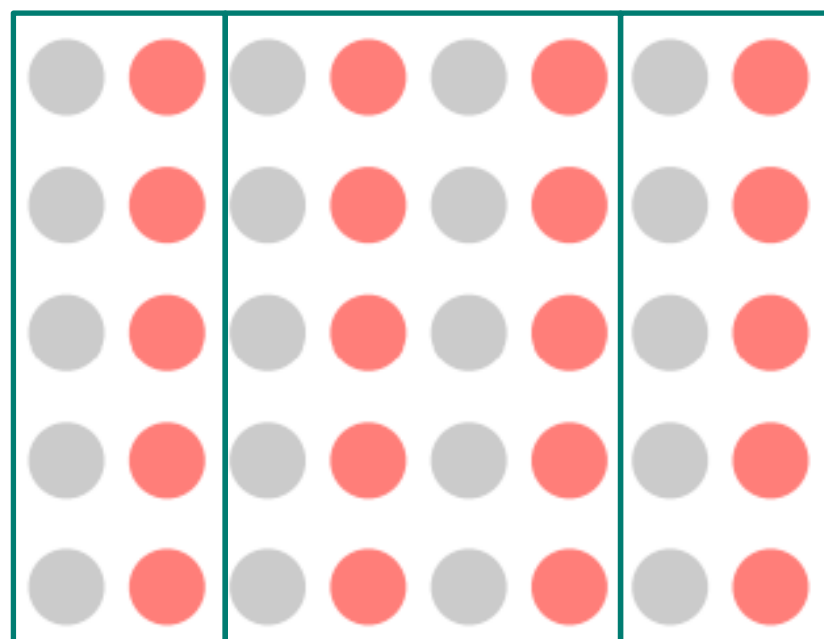
This is perceived to be one group and the components somehow related to each other.



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



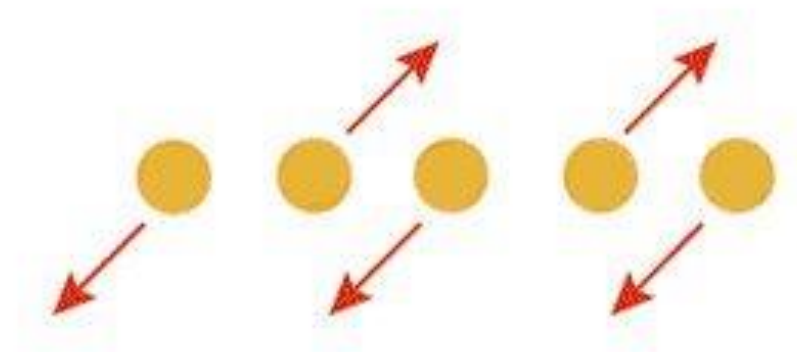
Proximity



Common Regions



Continuity



Common Fate

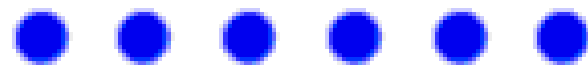


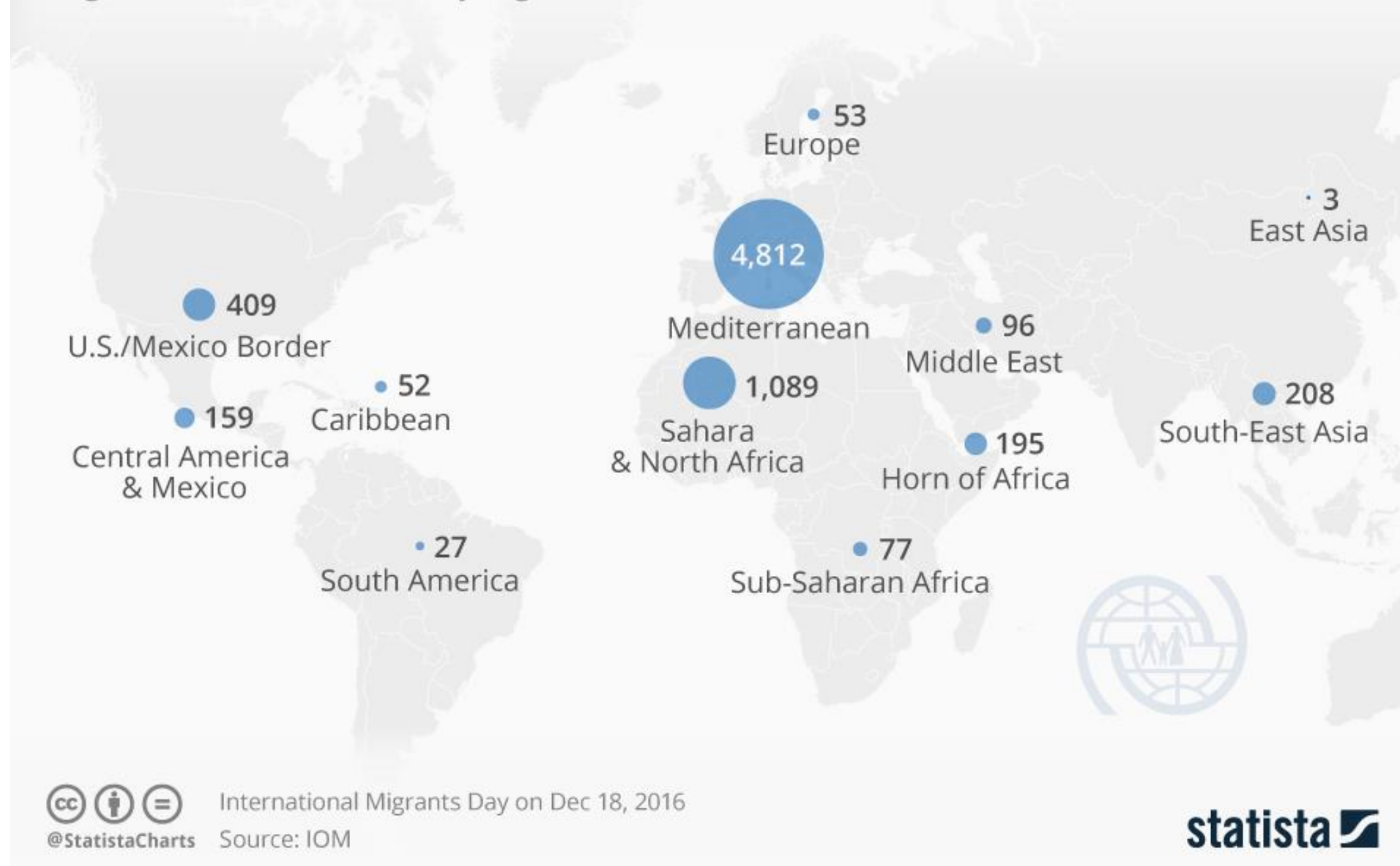


Figure - Ground



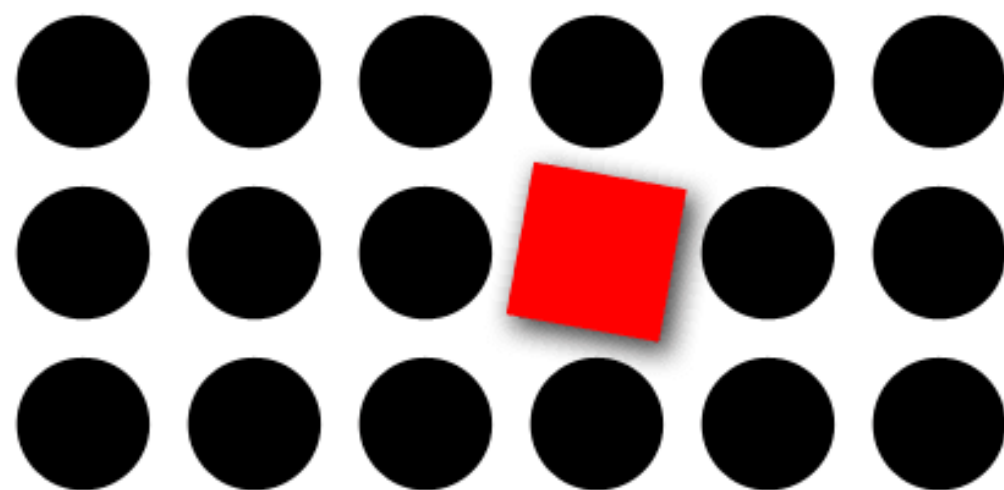
International Migrants Day: Mediterranean Death Trap

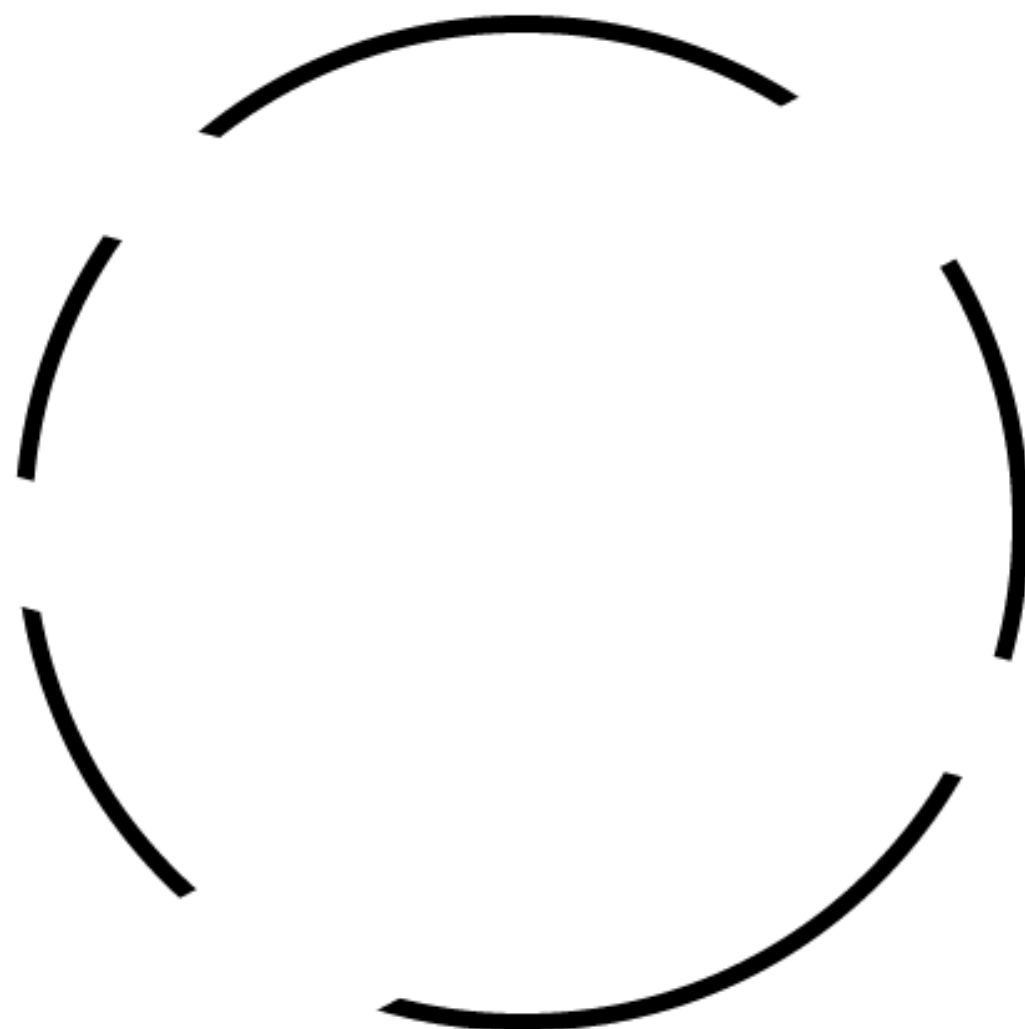
Migrant deaths worldwide by region in 2016



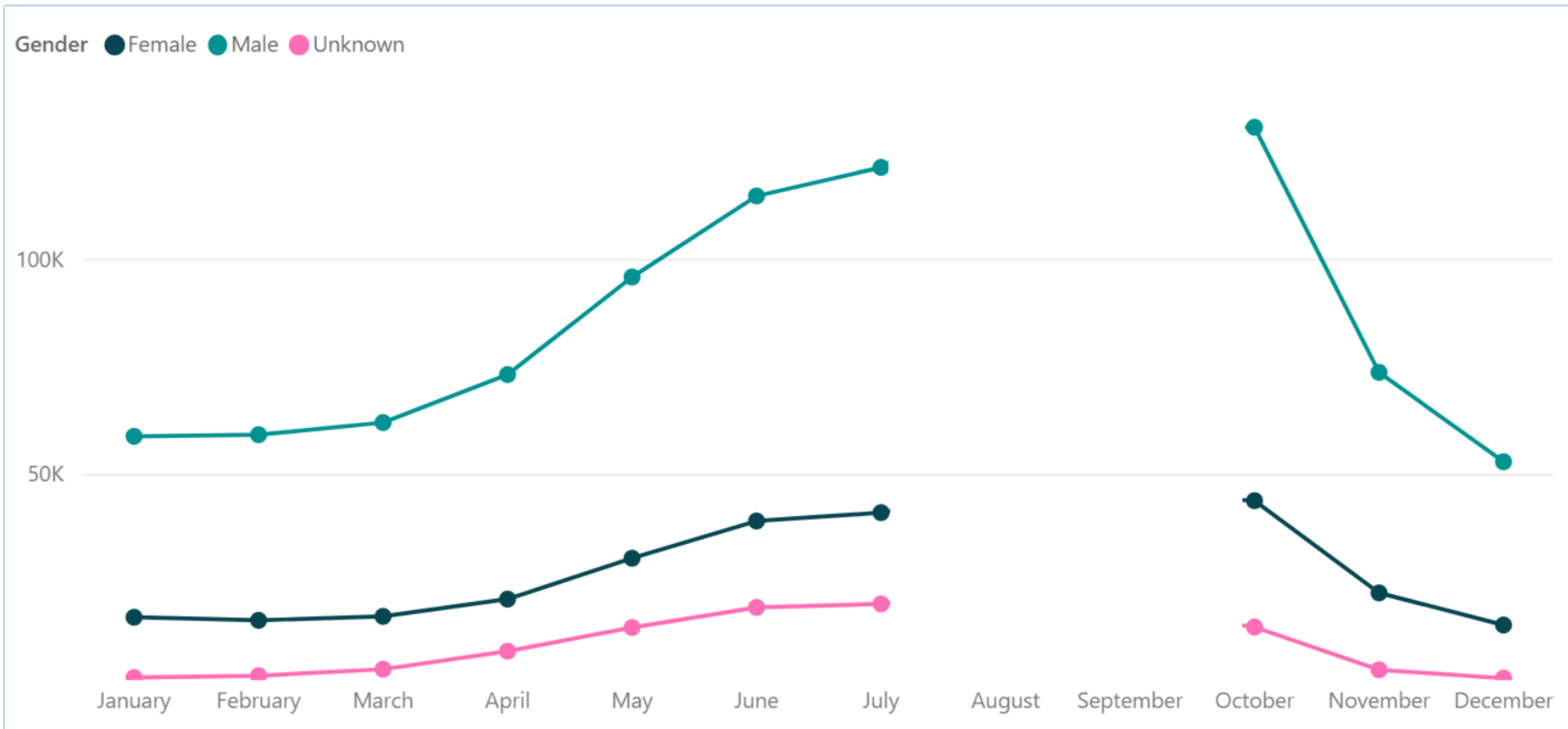


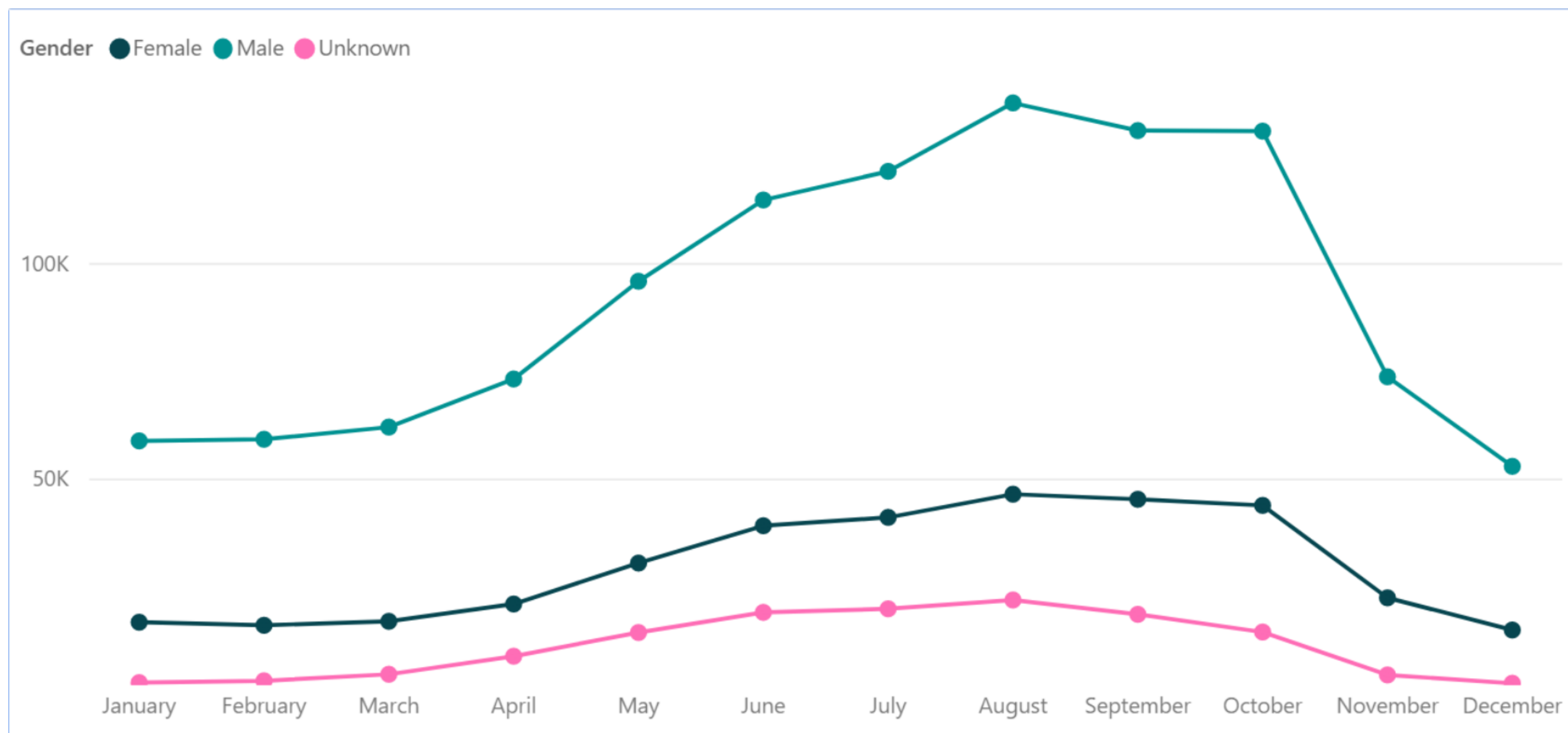
Focal Point

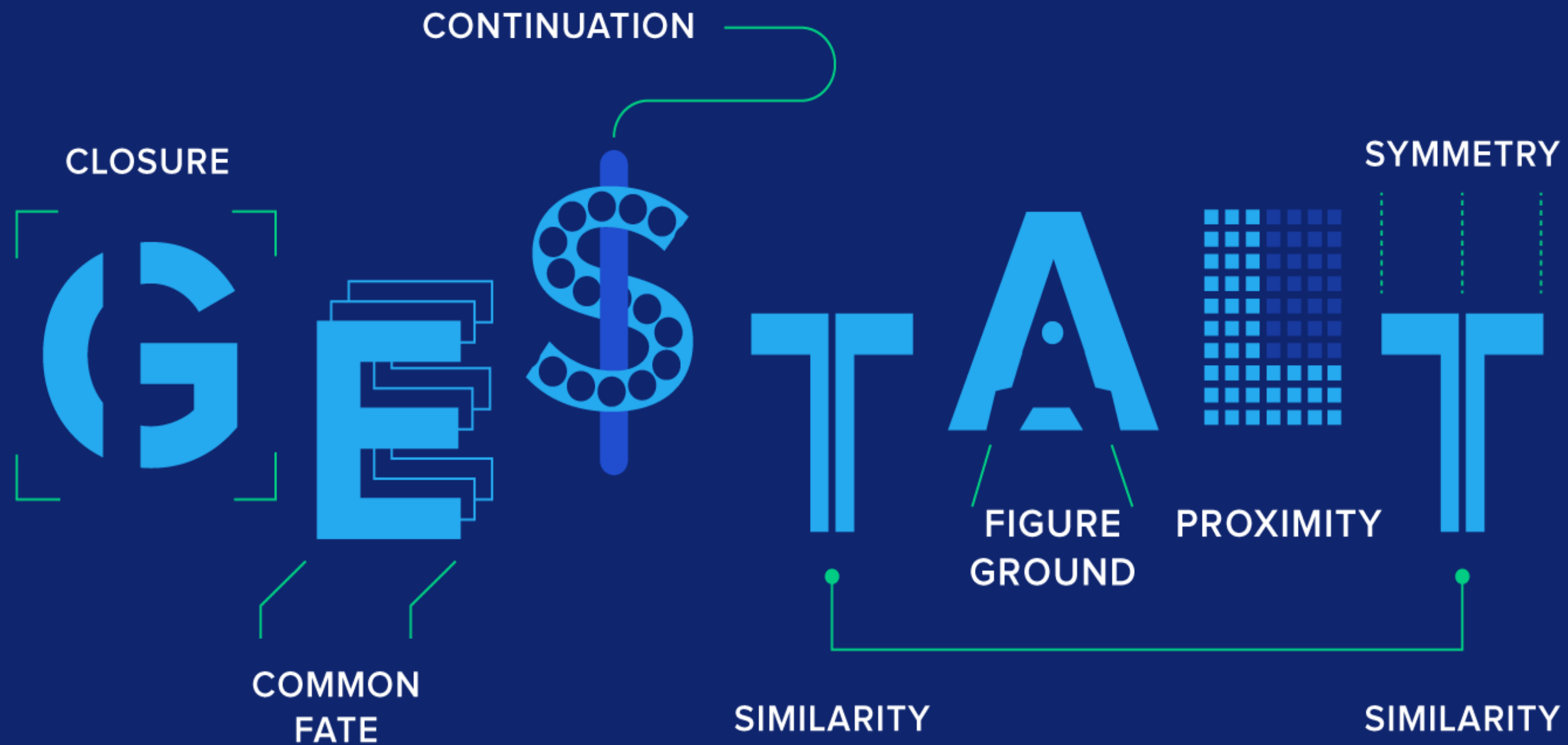




Closure









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 occurrence 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

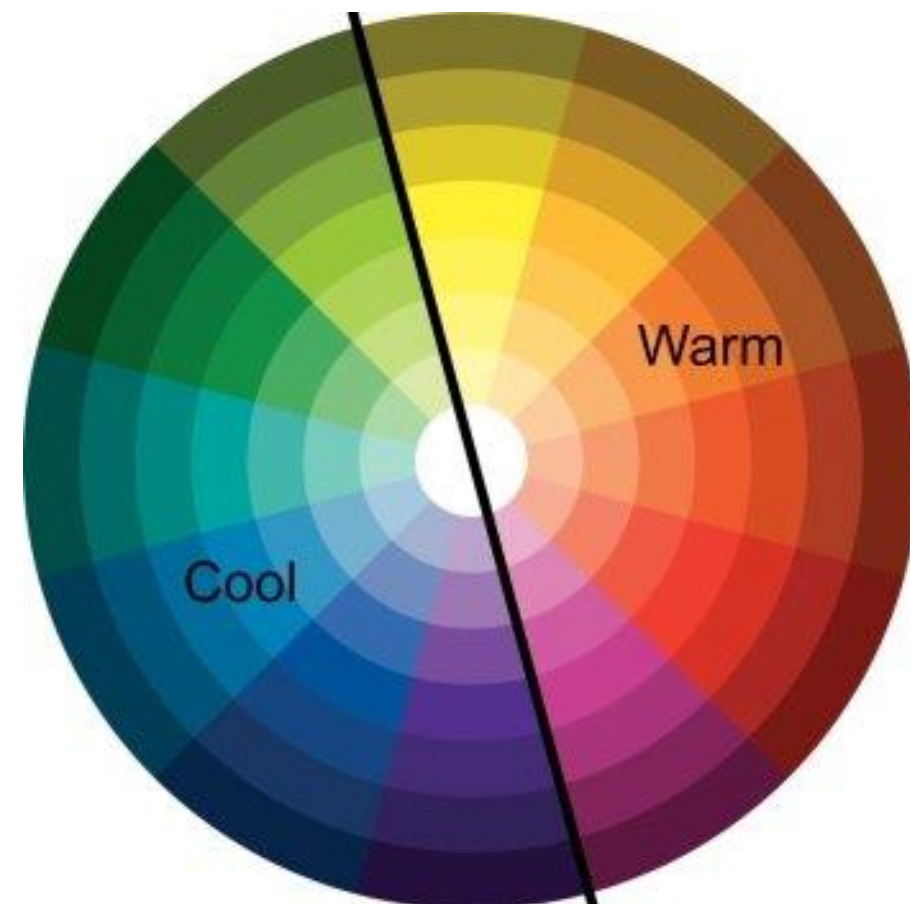
Consider creating your report in grey, black and white before choosing colours



Step 7: Create your palette

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

Decide on your warm or cool colours as a base

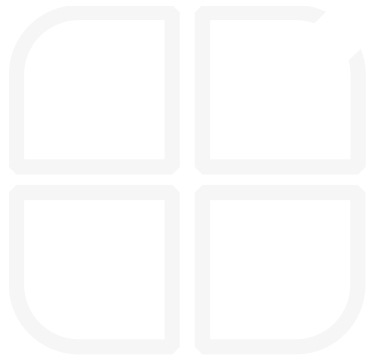




Step 7: Create your palette

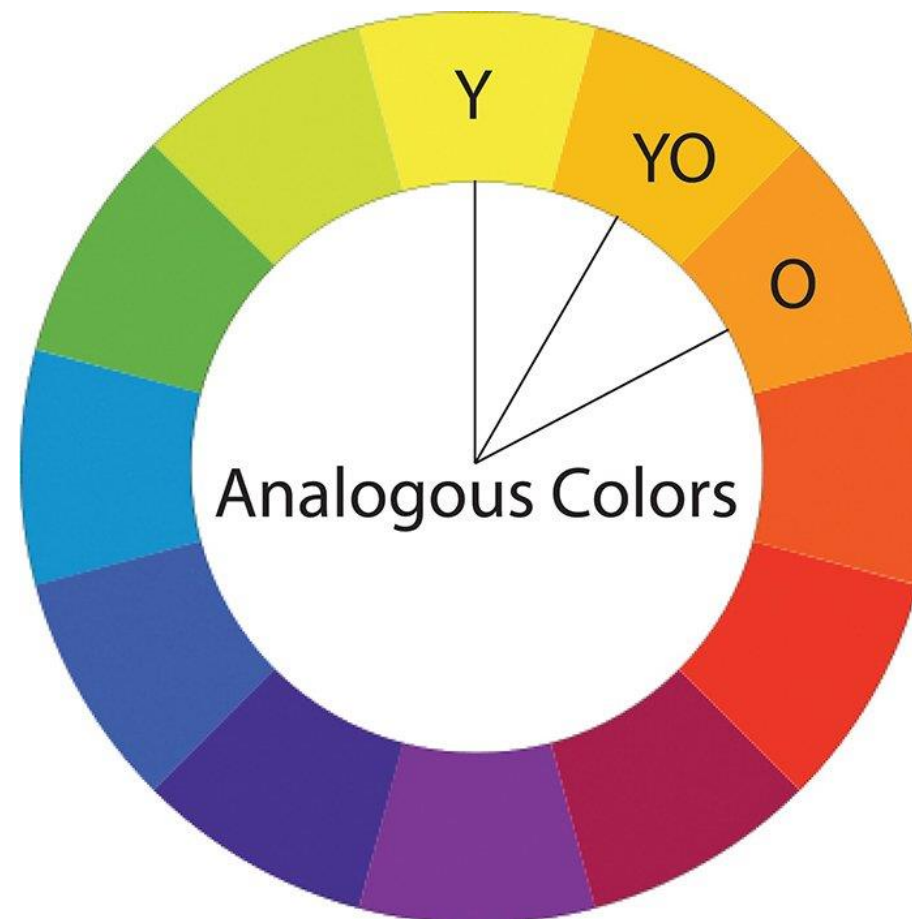
Monochromatic – shades of a single hue, ideal for sequential data.





Step 7: Create your palette

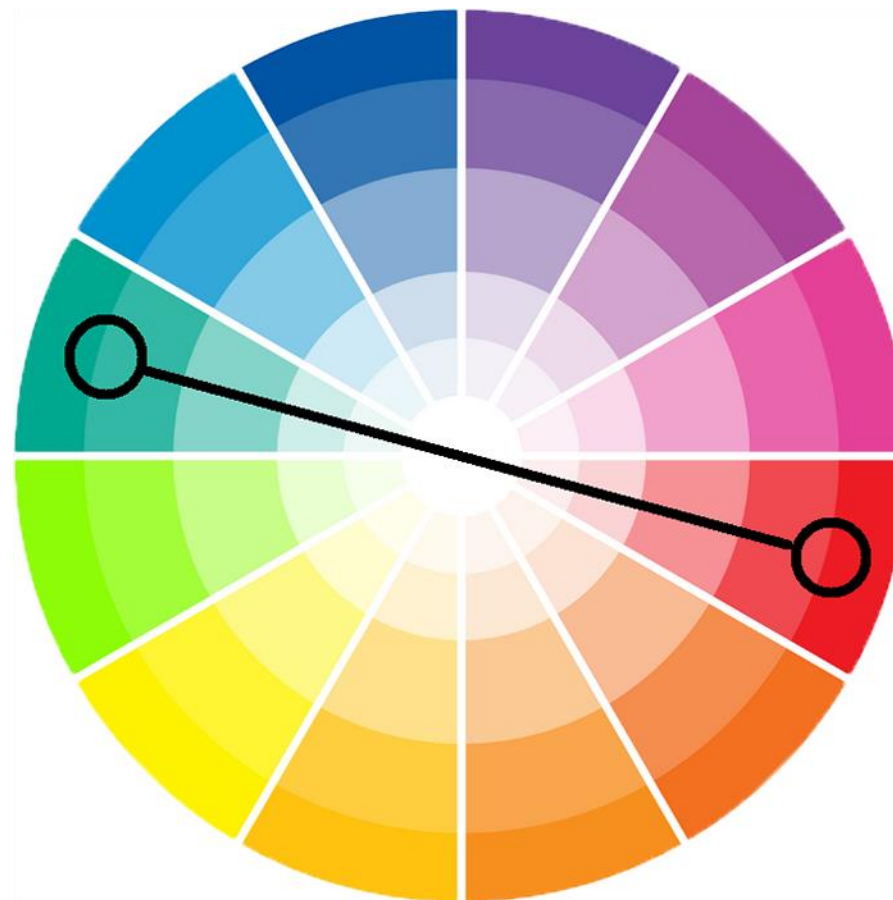
Analogous colors – colors that sit beside each other on the color wheel. These provide a more varied alternative for sequential data visualization.





Step 7: Create your palette

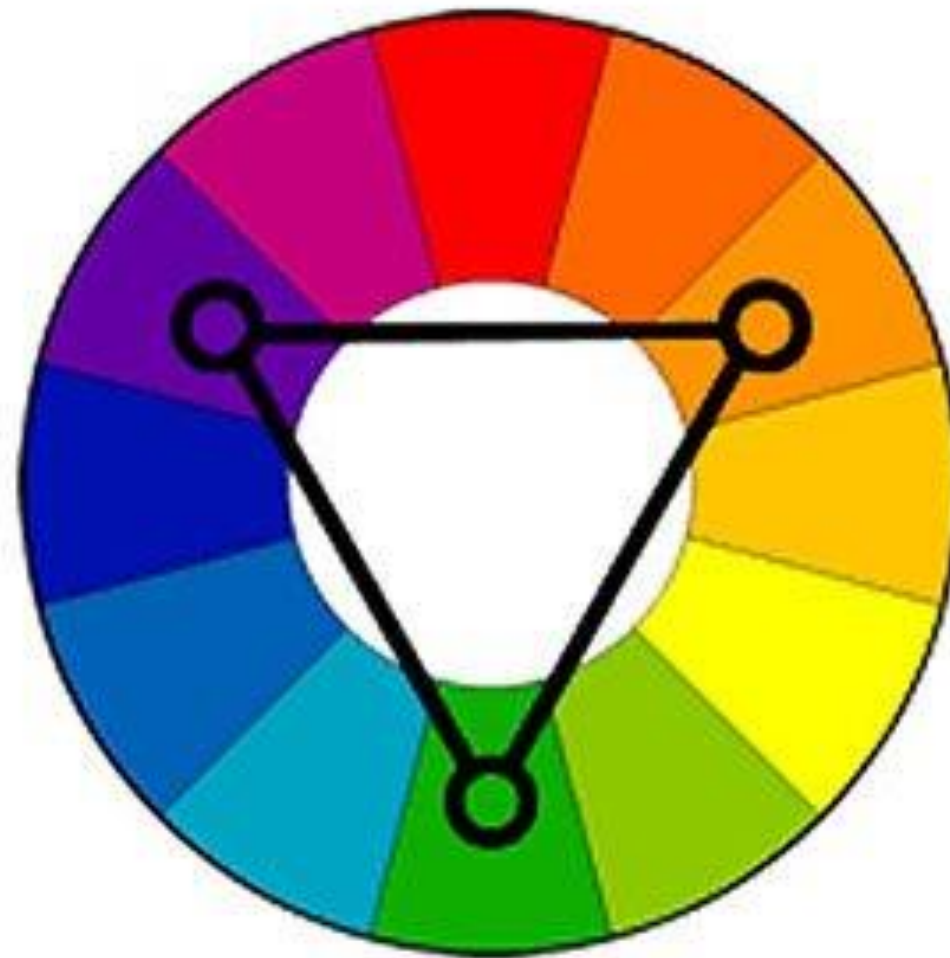
Complementary colors – from opposite sides of the color wheel. When paired with a neutral (e.g. white or gray) these palettes are perfect for diverging data.





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 accessibility in mind when visualising your data

[Accessibility Checklist – Meagan Longoria](#)

<https://whocanuse.com/>

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

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



Step 8: Make sure everyone is invited

	Men	Women
Red-green (Overall)	7 to 10%	—
Red-green (Caucasians)	8%	—
Red-green (Asians)	5%	—
Red-green (Africans)	4%	—
Monochromacy	—	—
Rod monochromacy (disfunctional, abnormally shaped or no cones)	0.00001%	0.00001%
Dichromacy	2.4%	0.03%
Protanopia (L-cone absent)	1% to 1.3%	0.02%
Deutanopia (M-cone absent)	1% to 1.2%	0.01%
Tritanopia (S-cone absent)	0.001%	0.03%
Anomalous Trichromacy	6.3%	0.37%
Protanomaly (L-cone defect)	1.3%	0.02%
Deuteranomaly (M-cone defect)	5.0%	0.35%
Tritanomaly (S-cone defect)	0.01%	0.01%



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 Knaflitz](#)

[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/#>

Dribbble colors - <https://dribbble.com/colors/e8e230?percent=30>

Colours co - <https://colors.co/browser/latest/1>

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

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



Questions / Answers

Thank you for watching this session.
Please ask your question to the moderation team.

Any **expert** started out as a **beginner**.

Become an **intern**!

Mail your CV to internship@realdolmen.com

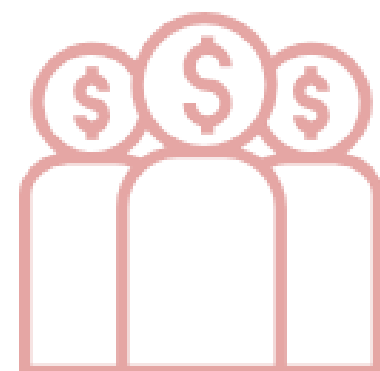
acADDemICT track



Unique 3 months education given by field experts

Full employee benefits

Like an Audi A1
and free fuel!



Build custom solutions for our customers

With **innovative** technology



Your **personal guide**
helps you kickstart
your career



Choose your future by **creating** it.

Mail your CV to
recruitment@realdolmen.com



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27 000
CONSULTANTS



2019 (Pro Forma)
€ 2.3
BILLION
IN REVENUE



26 COUNTRIES

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LUXEMBOURG, POLAND, MOROCCO, ROMANIA,
SWITZERLAND, BRAZIL, TUNISIA, COLOMBIA, COTE D'IVOIRE,
PERU, USA, ANGOLA, CAMEROON, SINGAPORE, ENGLAND,
UAE, RP OF PANAMA, CHILI, COSTA RICA,
DOMINICAN REPUBLIC, ARGENTINA

6
ACTIVITIES

- + CONSULTING
- + APPLICATION & INFRASTRUCTURE SERVICES
- + SYSTEM INTEGRATION
(Business Solutions, ERP, CRM, PLM...)
- + OUTSOURCING
- + VALUE ADDED RESELLING
- + SOFTWARE:
 - 4 vertical solutions :
*Local government, Insurance,
Healthcare social, Retail*
 - Transverse Solutions
*Time Management (Chronotime)
DDM (Business Document)*

MORE

- + Proximity-Intimacy-Agility
- + Industrialisation-Automation
- + Innovation-Business



5
VALUES
& PRINCIPLE
OF ACTION

SOLIDARITY

We have a united entrepreneurial spirit.

AMBITION

Our local power fosters our global success.

EXCELLENCE

Our culture of excellence is a product of our daring.

ENGAGEMENT

We grow but stay close to our clients.

INNOVATION

We are constantly co-inventing the technology based business of our customers

inetum.
Positive digital flow

6 INNOVATION
CENTERS

PARIS, NANTES, LYON,
GHENT, LISBON, MADRID
Casablanca & Warsaw in 2021

**GROUP
ALLIANCES**

SAP, Microsoft, Oracle,
Salesforce

.....
AWS, IBM, Sage, HRAccess

.....
PTC, Siemens, Dassault

10 GROUP
PRACTICES

DIGITAL BANKING ■
DIGITAL INSURANCE ■ DIGITAL RETAIL ■
DIGITAL UTILITIES ■ E-HEALTHCARE ■
INDUSTRY 4.0 ■ SMART CITIES ■
DIGITAL TELECOM ■
DIGITAL TRANSPORT ■
SMART DATA & AI ■

7
BUSINESS SECTORS

- FINANCIAL SERVICES
- INDUSTRIES
- PUBLIC-HEALTHCARE
- TELECOM-MEDIA-TECHNOLOGIES
- ENERGY-UTILITIES-CHEMICALS
- RETAIL-CONSUMER GOODS
- TRANSPORTATION-TRAVEL-SERVICES

21 SERVICE CENTERS

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COLOMBIA (Bogota) ■
FRANCE (Lille, Lyon, Meudon, Nantes, Toulouse) ■
INDIA (Pune) ■ MOROCCO (Casablanca) ■
POLAND (Warsaw-Poznan-Lublin) ■
PORTUGAL (Lisbon-Covilha-Bragança) ■
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