

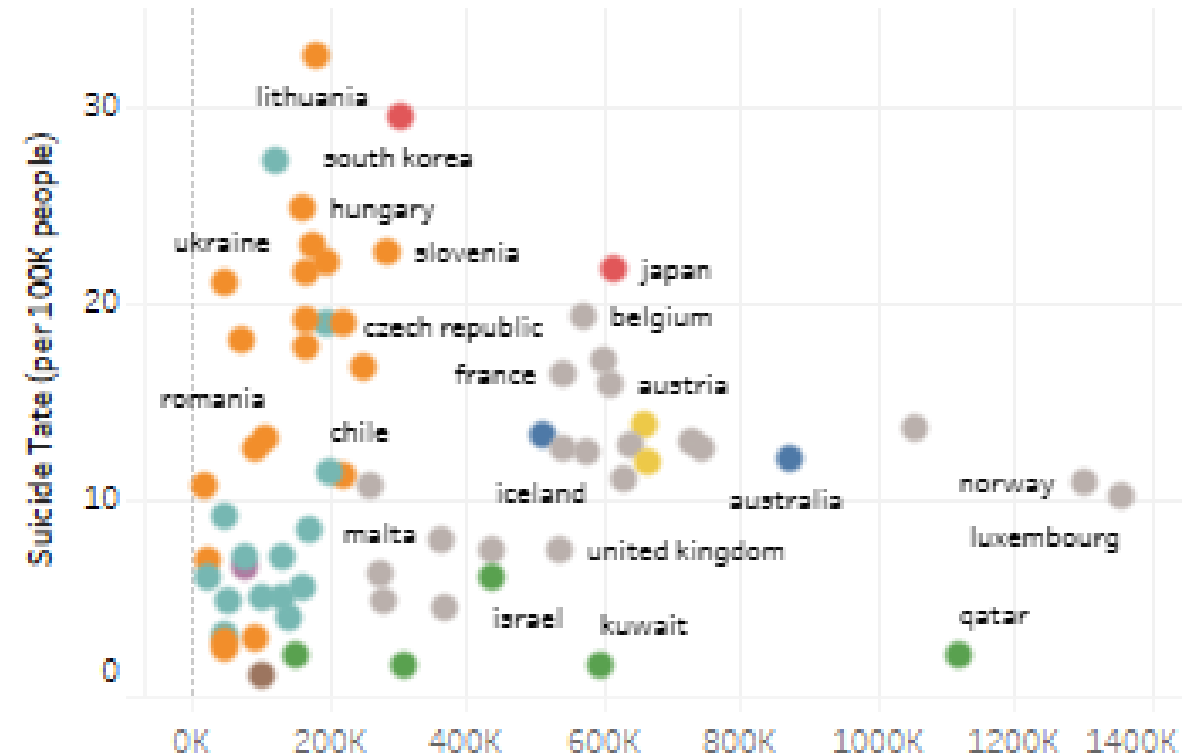
Presentation and Visualization. Perception (II)

Perception for design

Encoding Guidelines

by Colin Ware “Perception for design”

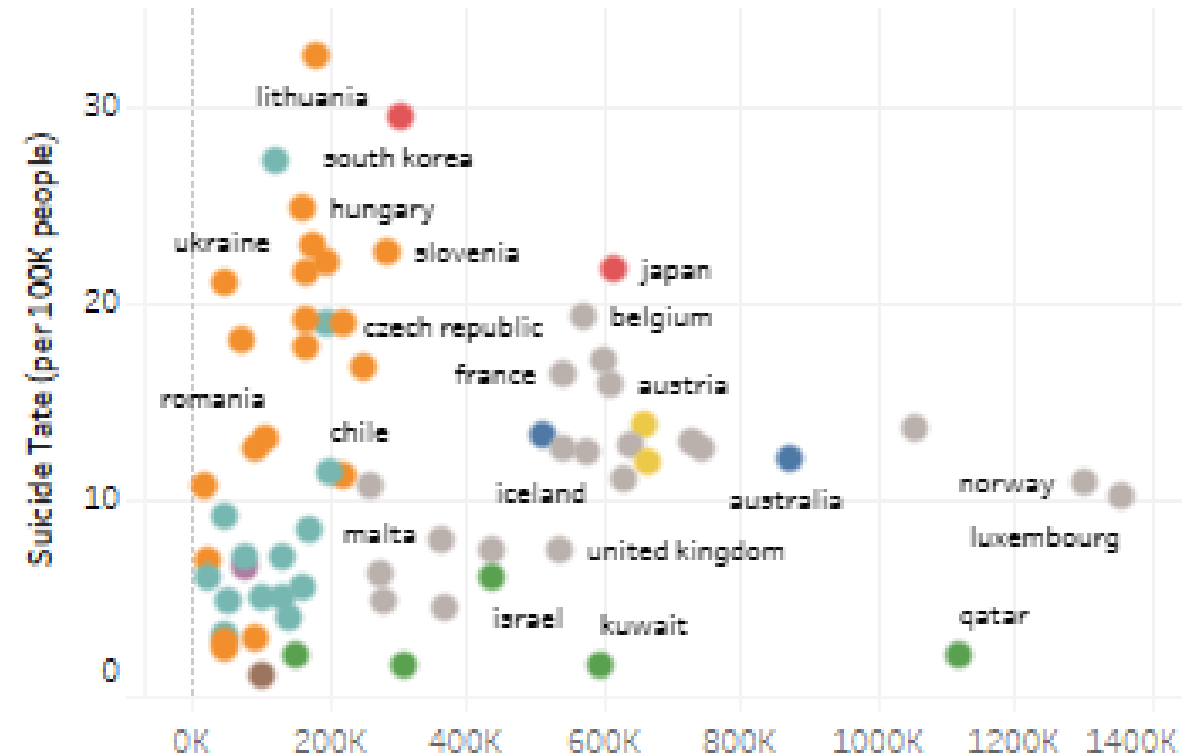
G5.2 “Use different visual channels to display aspects of data so that they are visually distinct”.



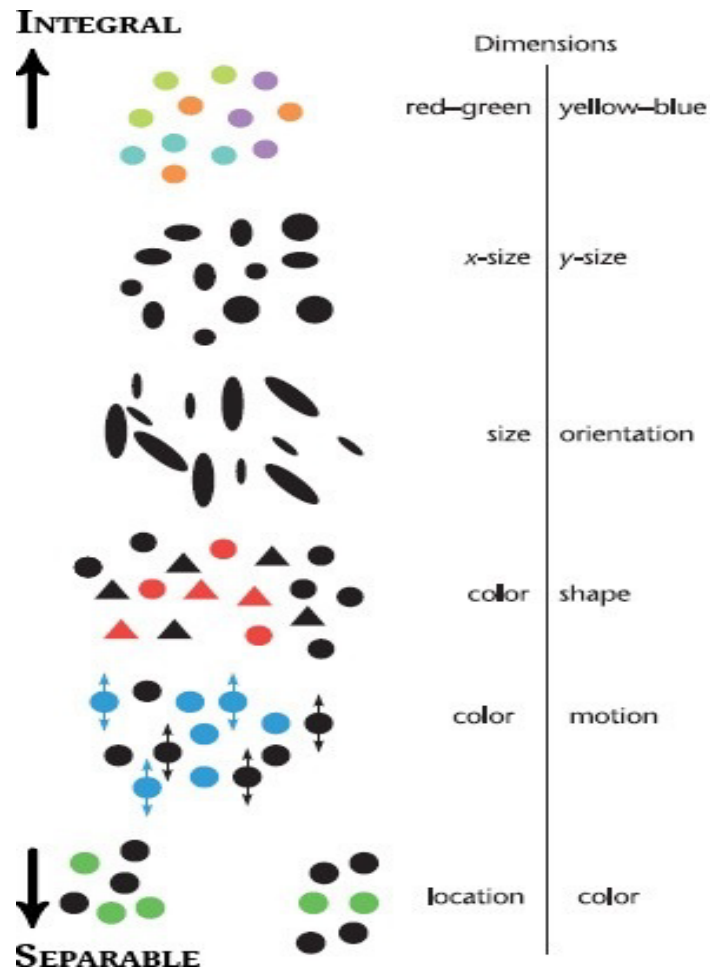
Encoding Guidelines

G5.14 “If it is important for people to **respond holistically** to a combination of two variables in a set of glyphs, map the variables to **integral glyphs** properties”.

G5.15 “If it is important for people to **respond analytically** to a combination of variables, making separate judgments on the basis of one variable or the other, map the variables to **separable glyph** properties”.



Separable vs Integral Glyph properties



- **Integral** dimensions are seen together
- **Separable** dimensions are seen separately

Encoding Guidelines

G5.7 “For **maximum pop out** a symbol should be the **only object** in a display that is **distinctive** on a particular feature channel; for example, it might be the only item that is coloured in a display where everything else is black and white”.

Benefits of slide software:

Visual: Visualizing information helps your readers see what you're explaining.

Versatile: It incorporates photos, illustrations, sketches, and even video if it's posted online.

Interactive: You can embed links and jump around the document itself or out to the Internet.

Tablet-ready: Its aspect ratio makes it easy to load onto devices.

Spreadable: Its modular nature allows slides to be incorporated into other decks and spread it throughout the organization.

Shareable: Platforms like SlideShare™ make it embeddable and shareable.

Encoding Guidelines

G5.8 “Use **positively asymmetric** preattentive cues for **highlighting**”.

Benefits of slide software:

Visual: Visualizing information helps your readers see what you're explaining.

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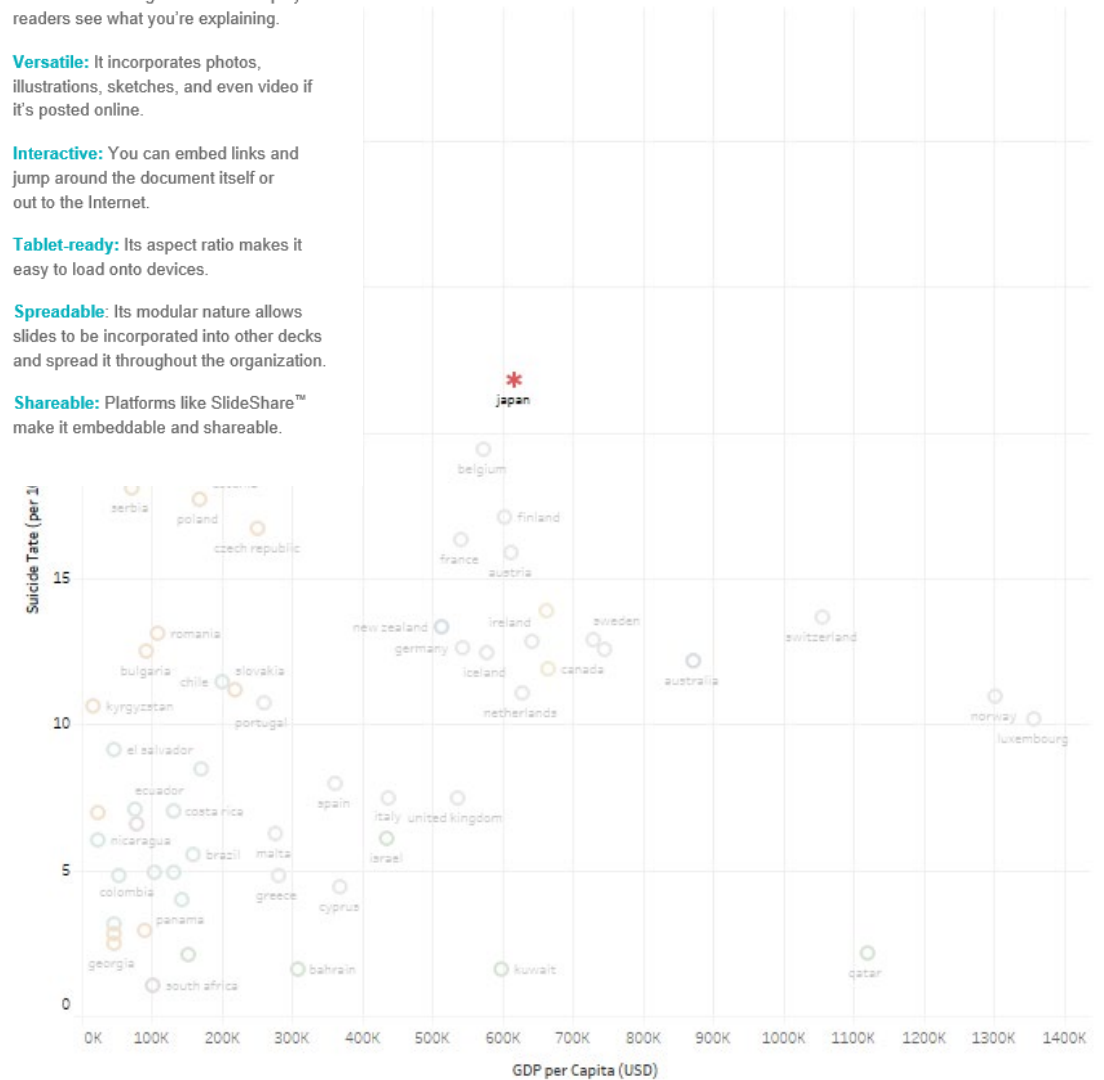
Interactive: You can embed links and jump around the document itself or out to the Internet.

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Spreadable: Its modular nature allows slides to be incorporated into other decks and spread it throughout the organization.

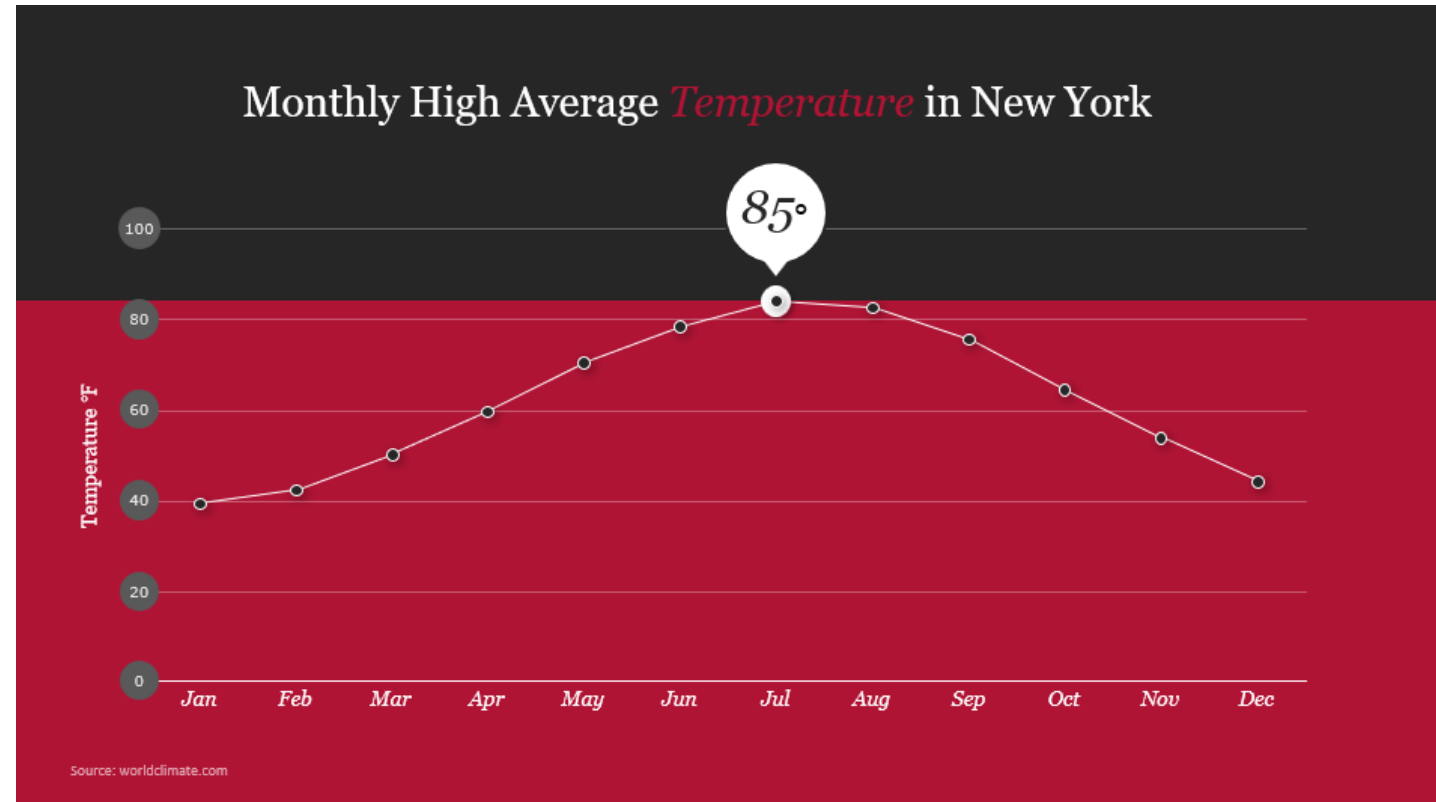
Shareable: Platforms like SlideShare™ make it embeddable and shareable.

Suicide Rate vs GDP per Capita



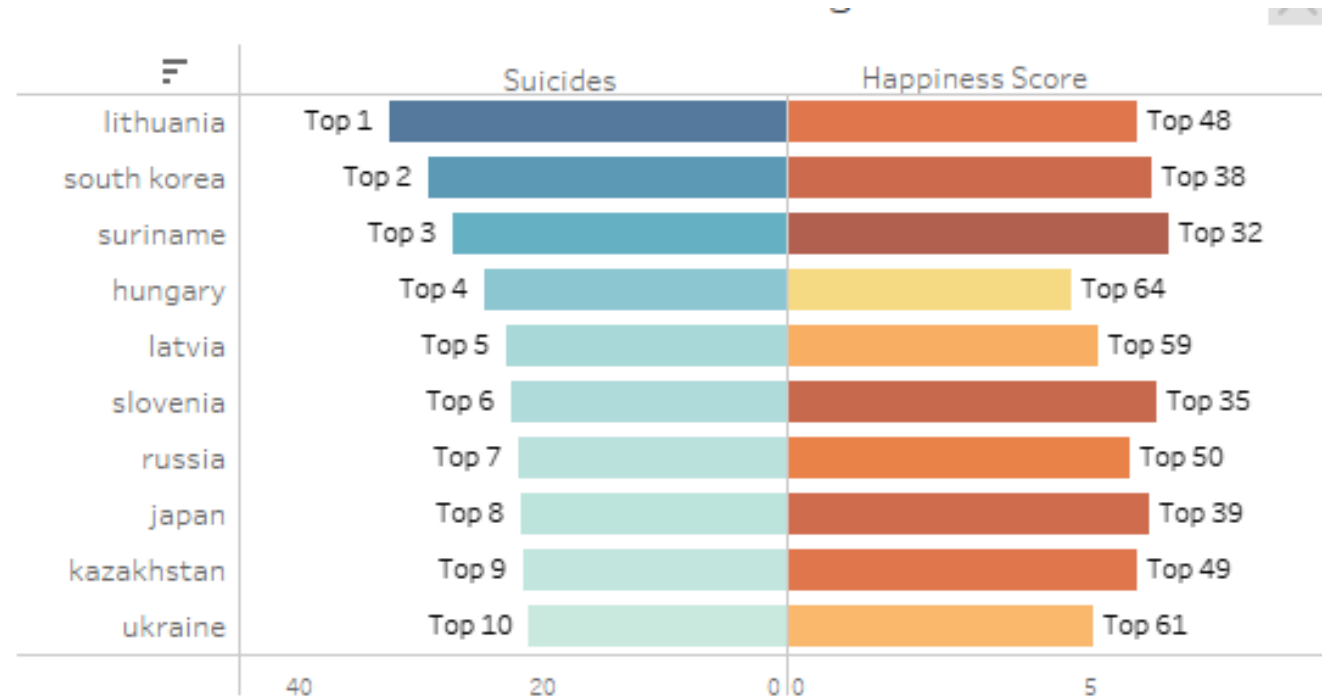
Encoding Guidelines

G5.9 “For highlighting, use whatever feature dimension **is used least** in other parts of the design”.



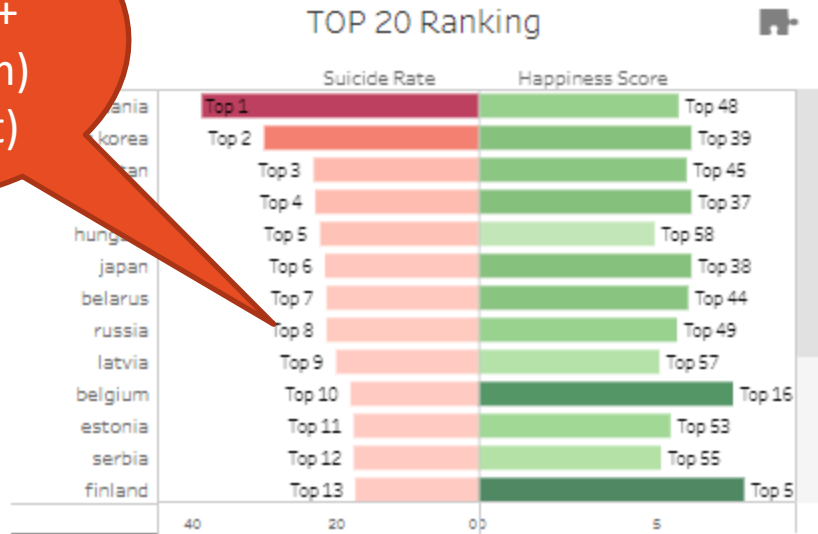
Encoding Guidelines

G5.11 “To make symbols in a set **maximally distinctive**, use **redundant coding** wherever possible; for example, make symbols differ in both shape and color”.

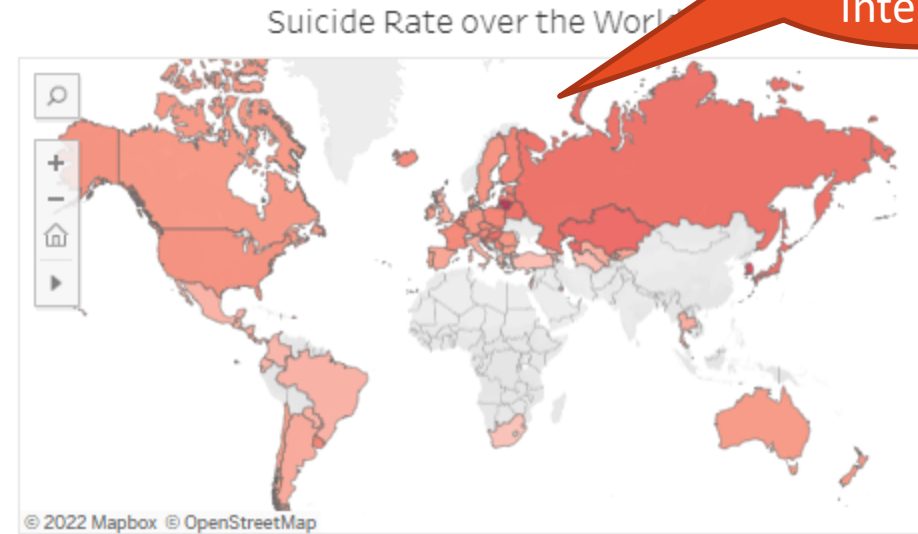


Presentation and Visualization

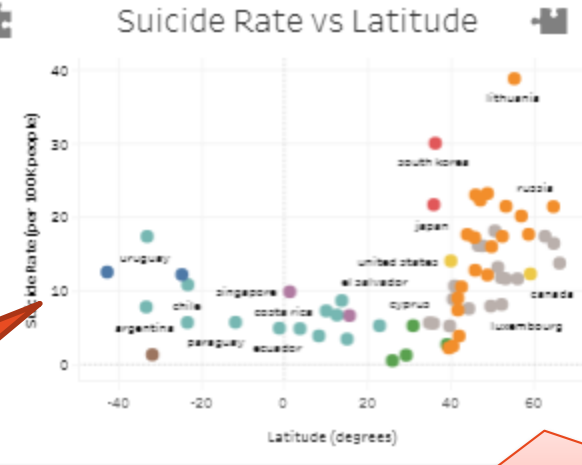
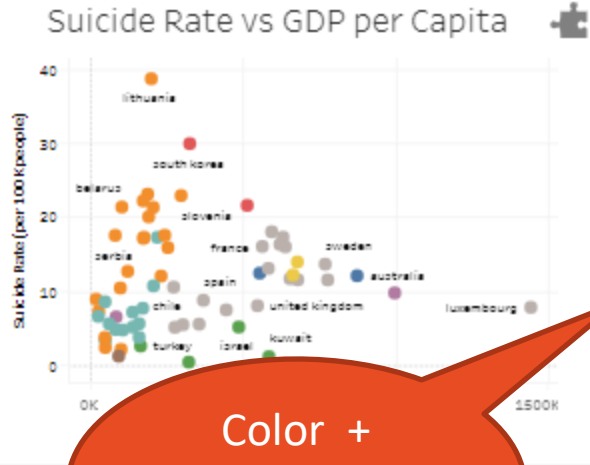
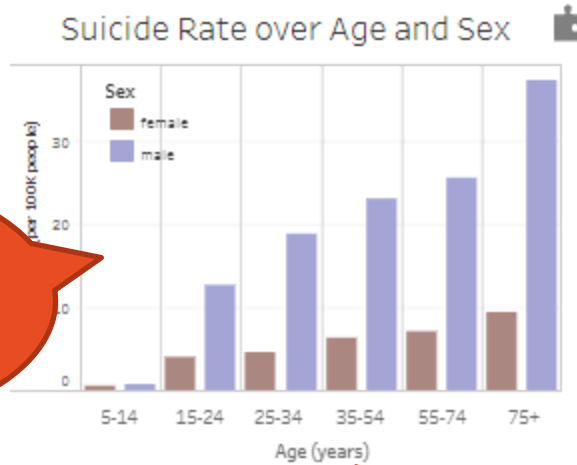
Color (Hue + Intensity) + length(Form) (redundant)



Color (Saturation + Luminosity) = Intensity



Color + length (Form) (separable)



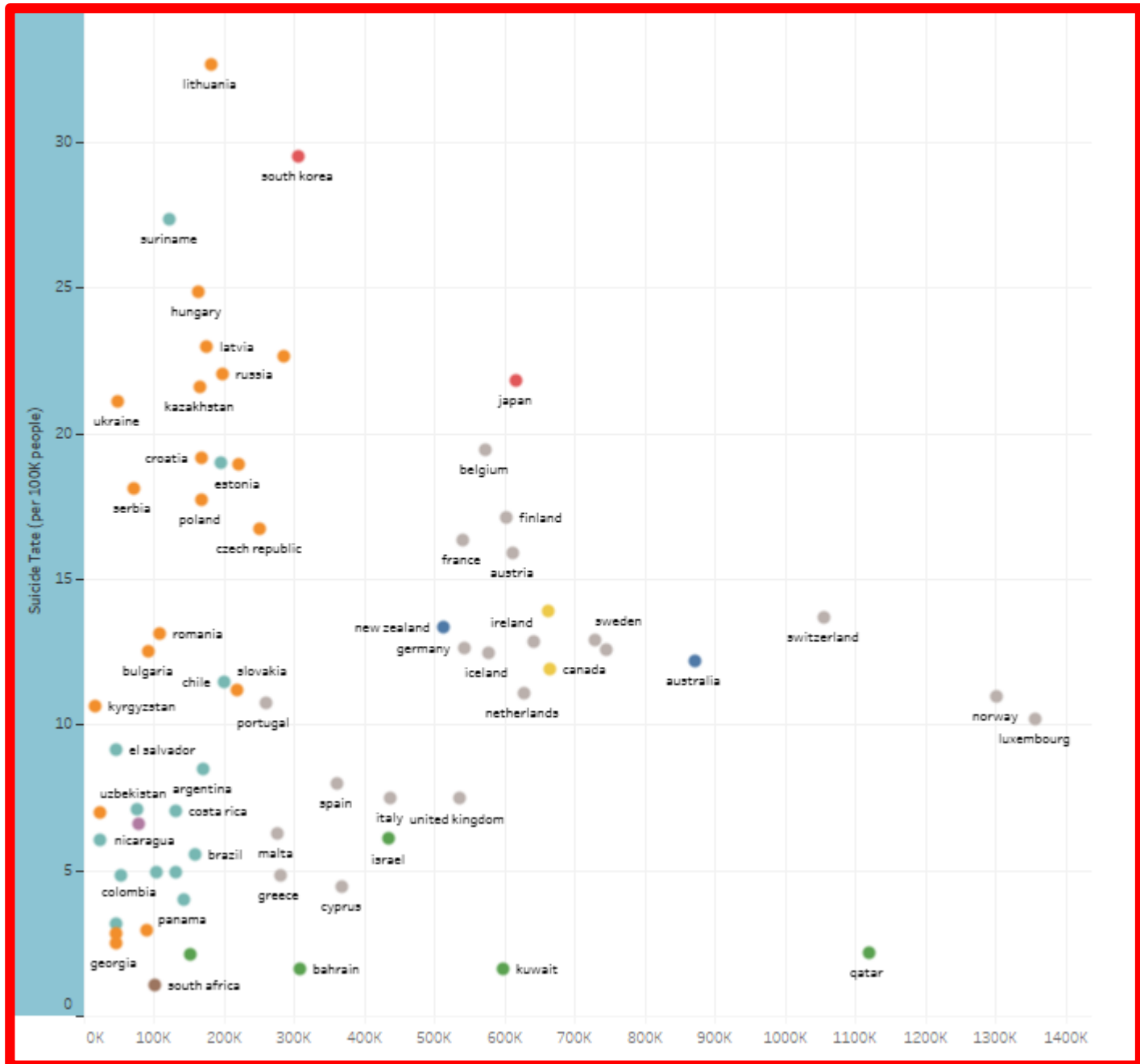
Color + Position (separable)

What do women...? What age ...?

How is Central and Eastern Europe GDP and suicide rate?

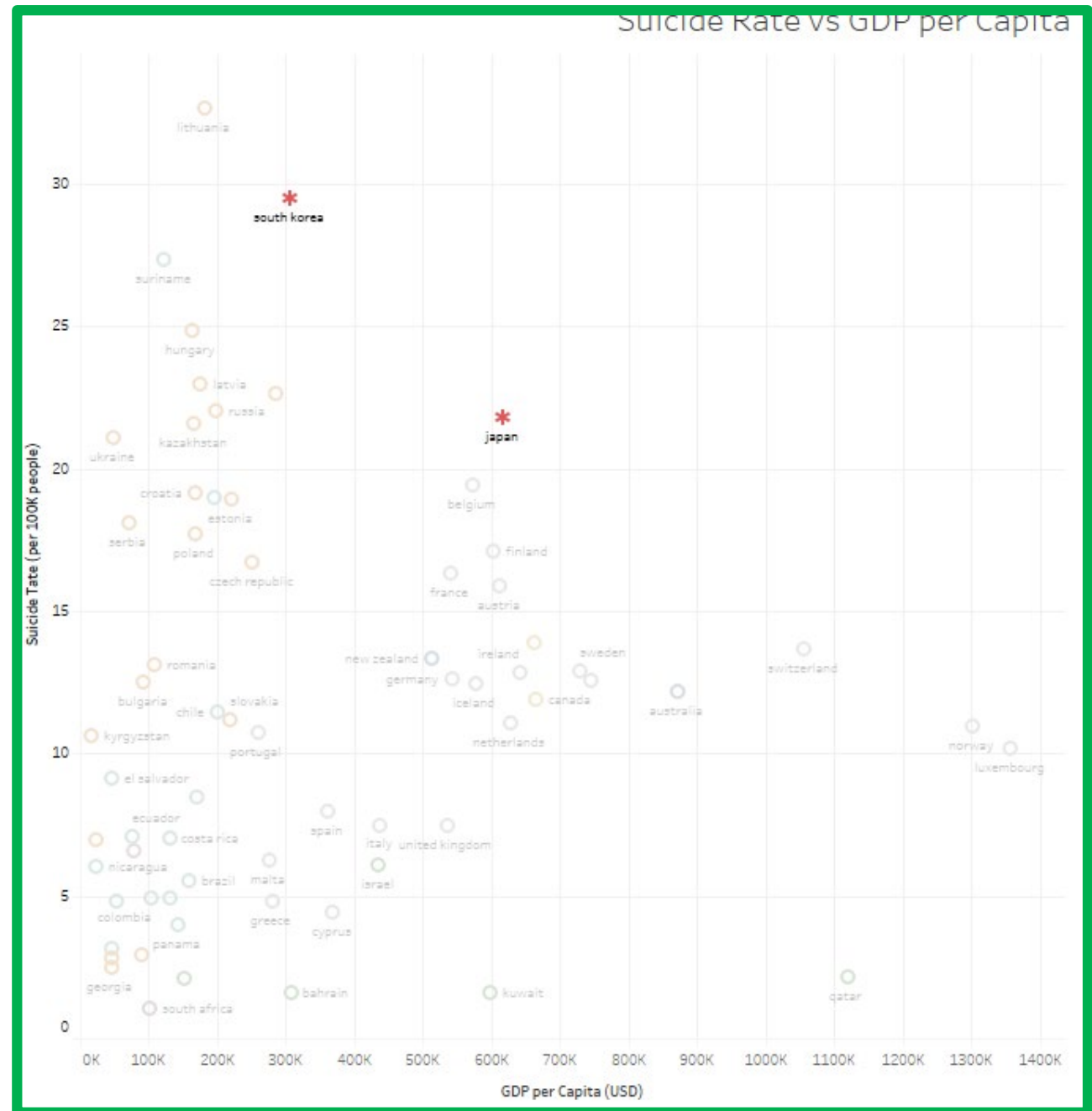
Encoding Guidelines

G5.3 “To make **symbols** easy to find, make them **distinct** from their background and from other symbols”.



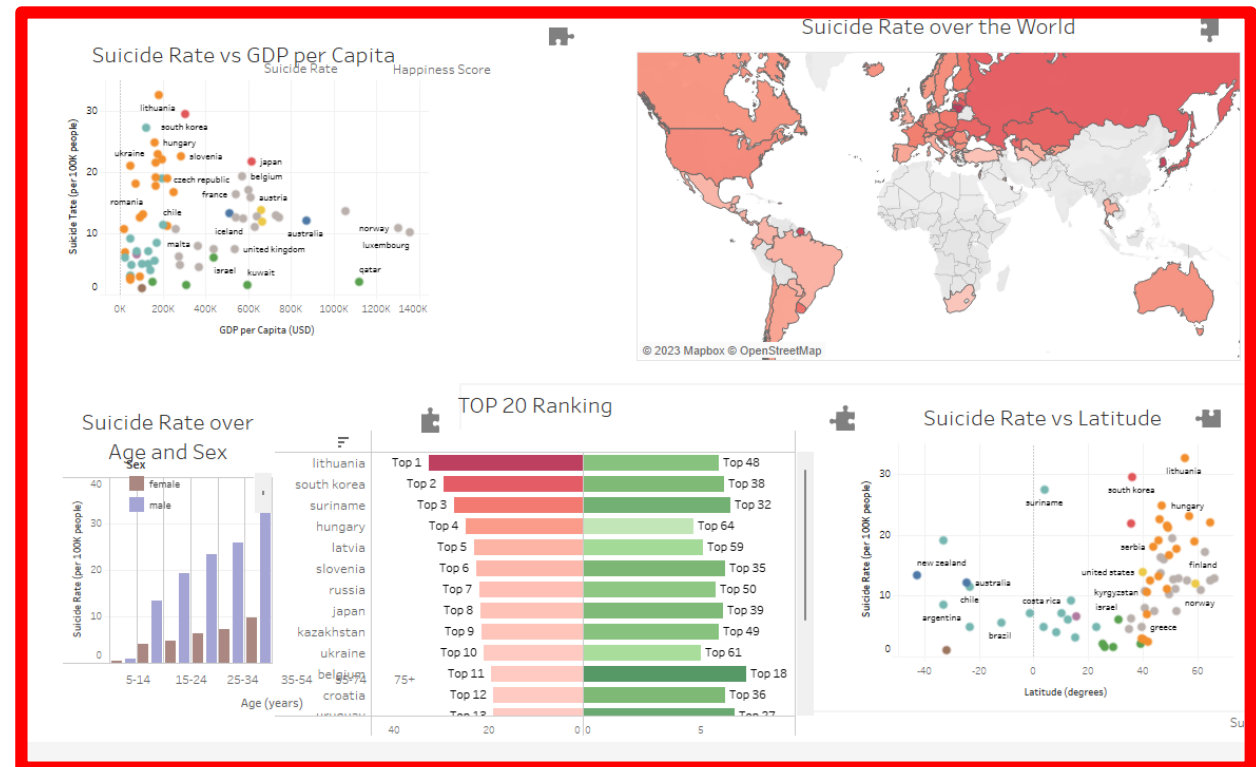
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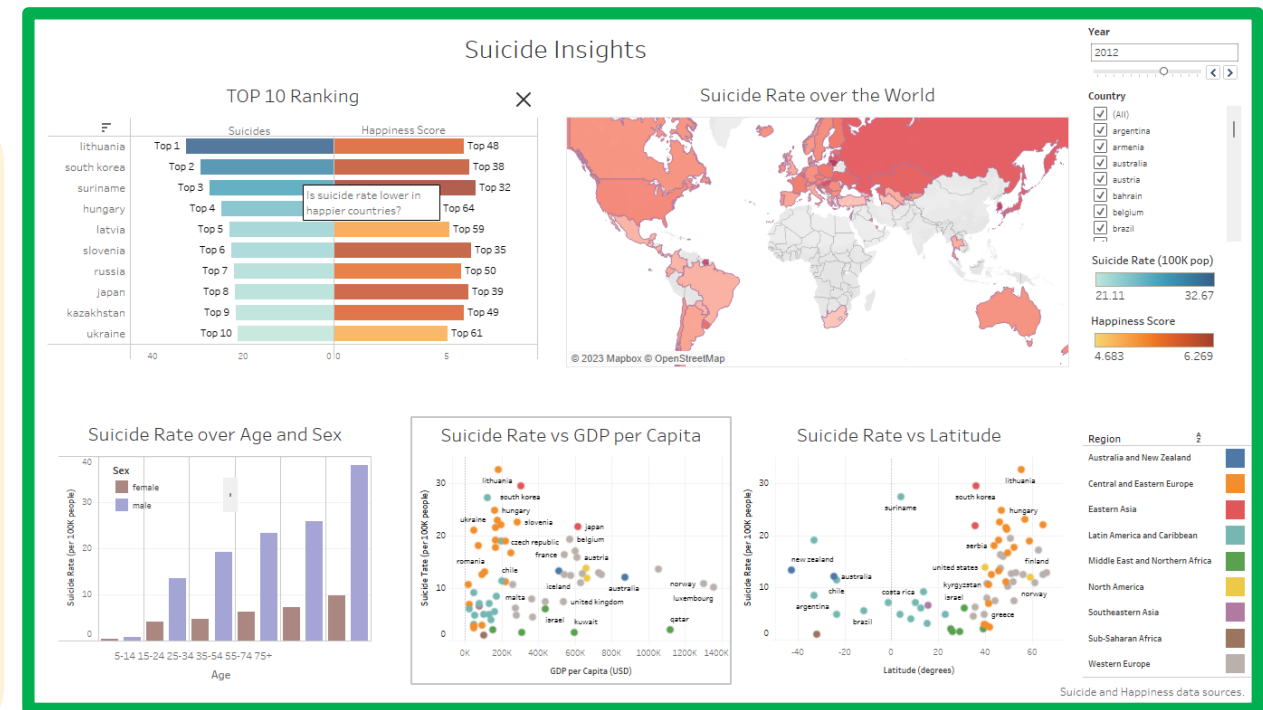
Encoding Guidelines

G6.1 “Place symbols and glyphs representing **related information close together**”.



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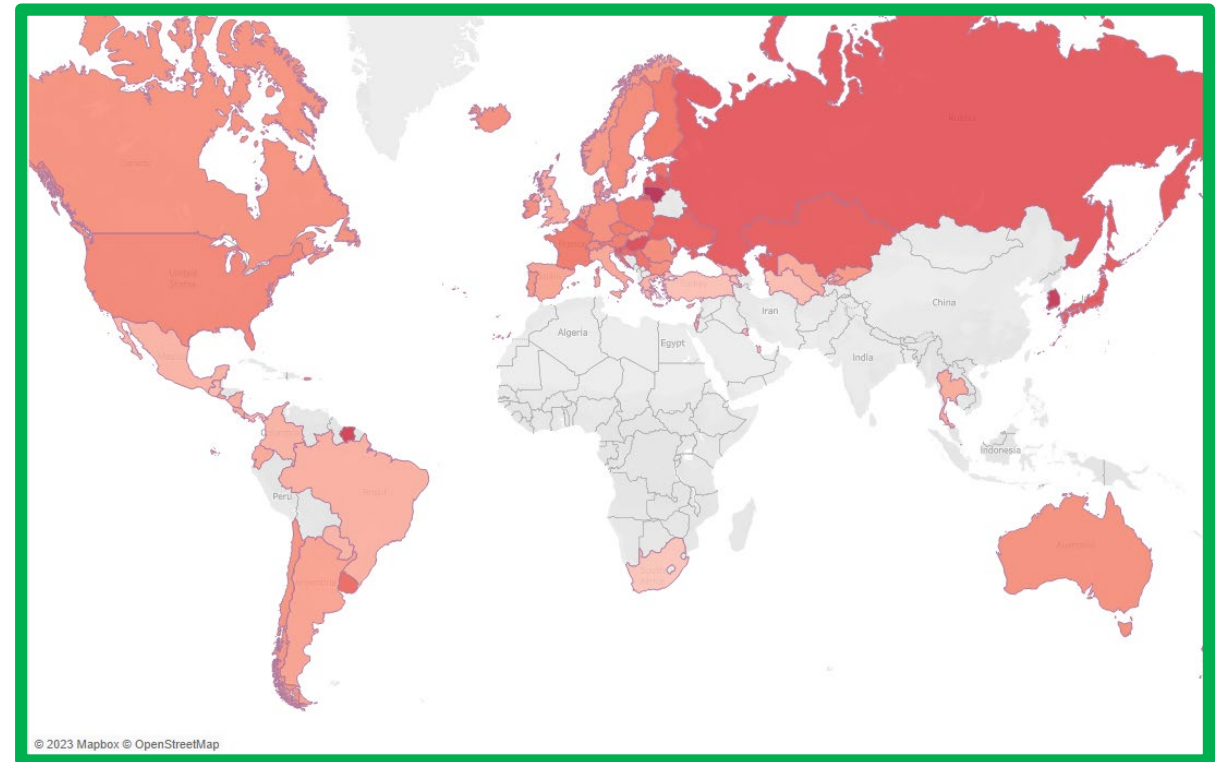
Encoding Guidelines

G6.2 “When designing a **grid layout** of a data set, consider coding rows and/or columns using low-level visual channel properties, such as **colour and texture**”.



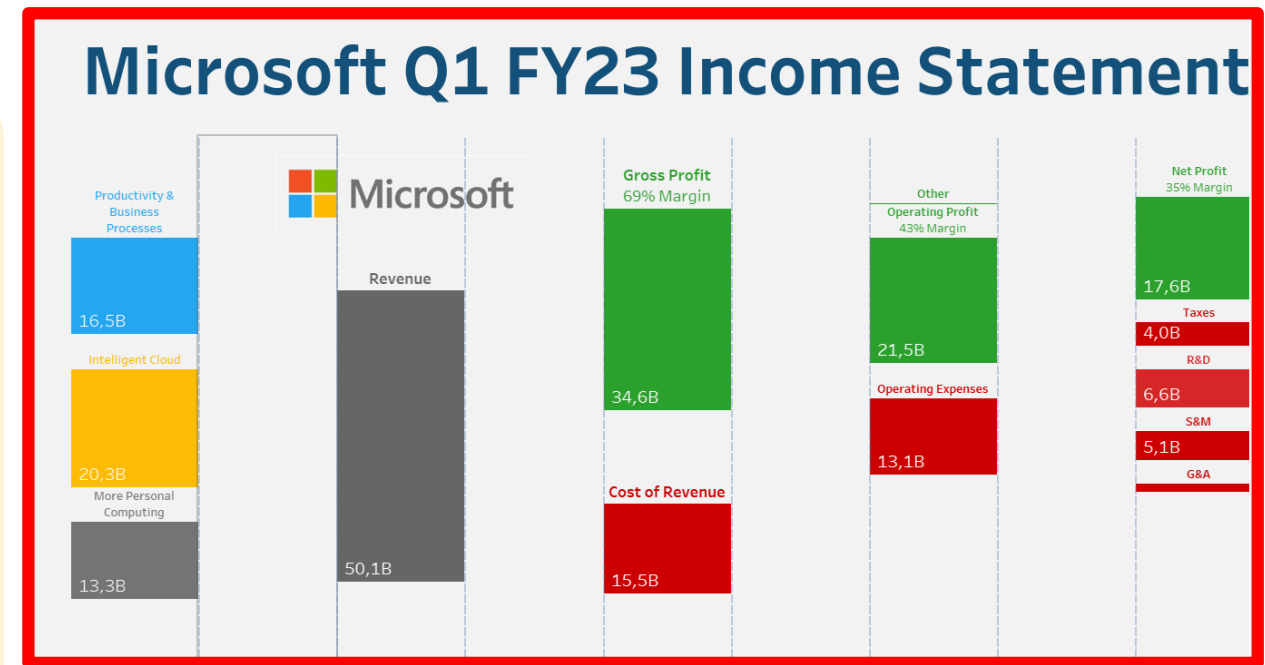
Encoding Guidelines

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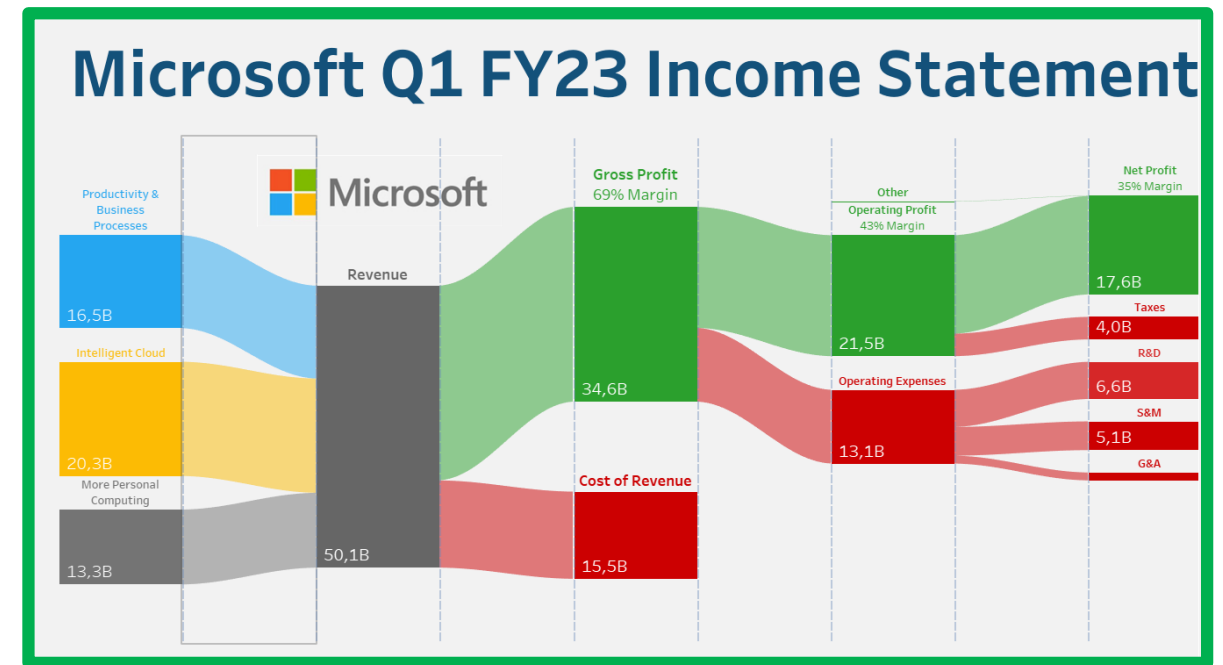
Encoding Guidelines

G6.3 “To show **relationships** between entities, consider linking graphical representations of data objects **using lines or ribbons of colour**”.



Encoding Guidelines

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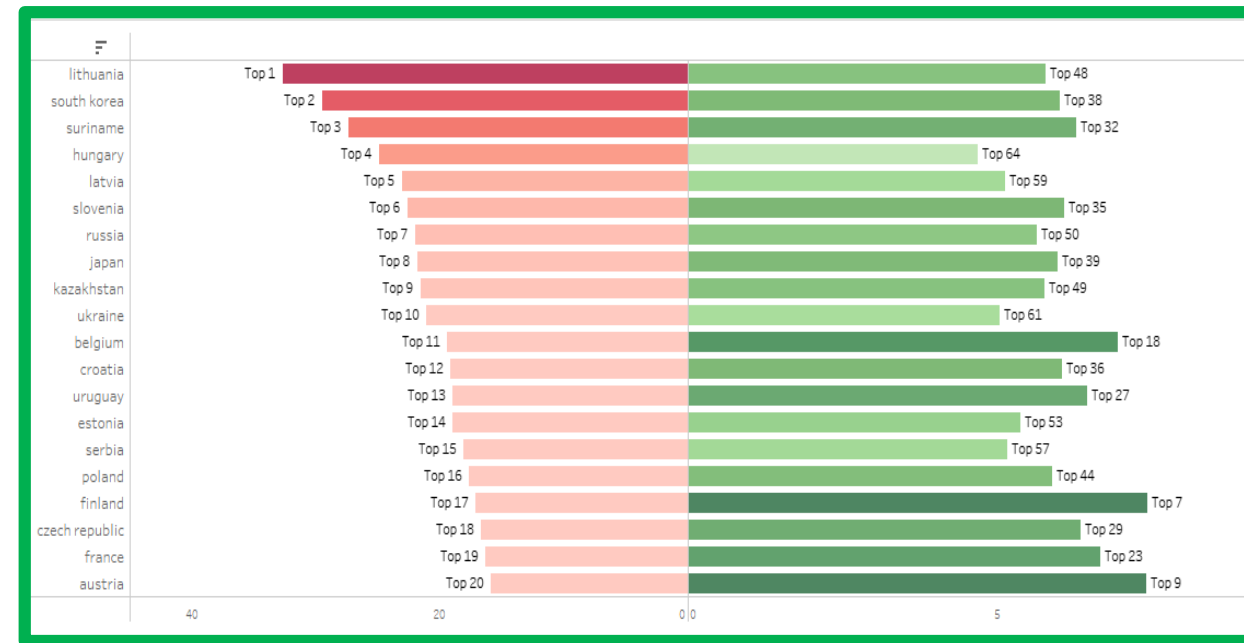
Encoding Guidelines

G6.4 “Consider using **symmetry** to make **pattern comparisons** easier. Symmetrical relations should be arranged on horizontal or vertical axes unless some framing pattern is used”.



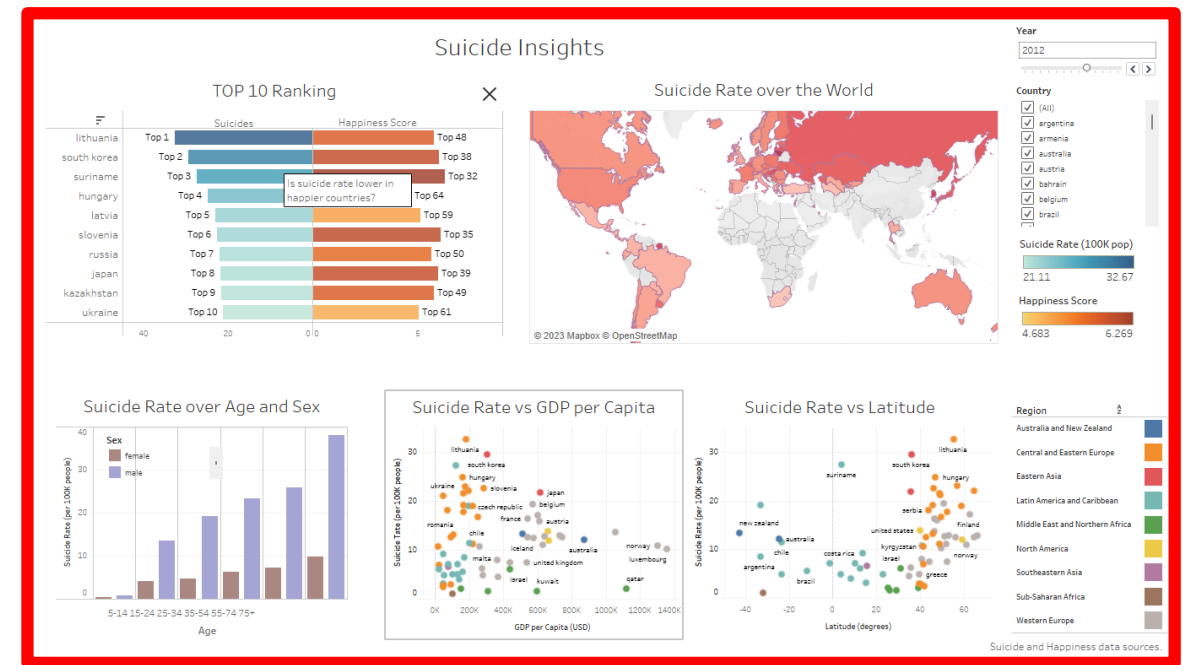
Encoding Guidelines

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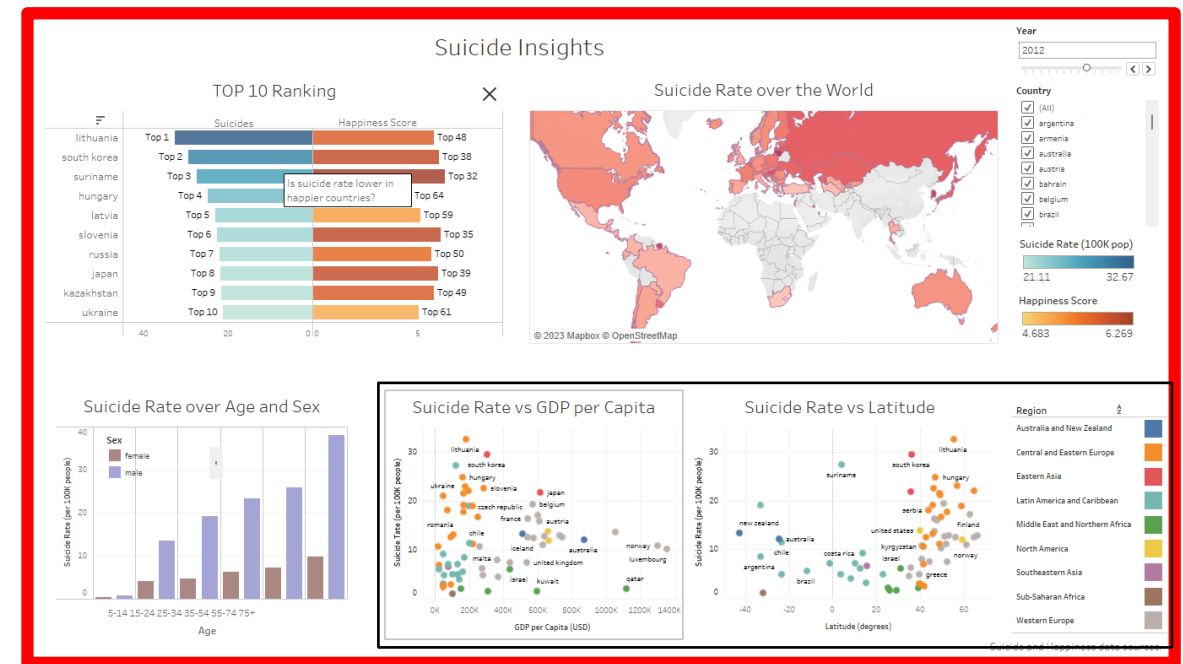
Encoding Guidelines

G6.5 “Consider putting **related information inside a closed contour**. A line is adequate for regions having a simple shape. Colour or texture can be used to define regions that have more complex shapes”.



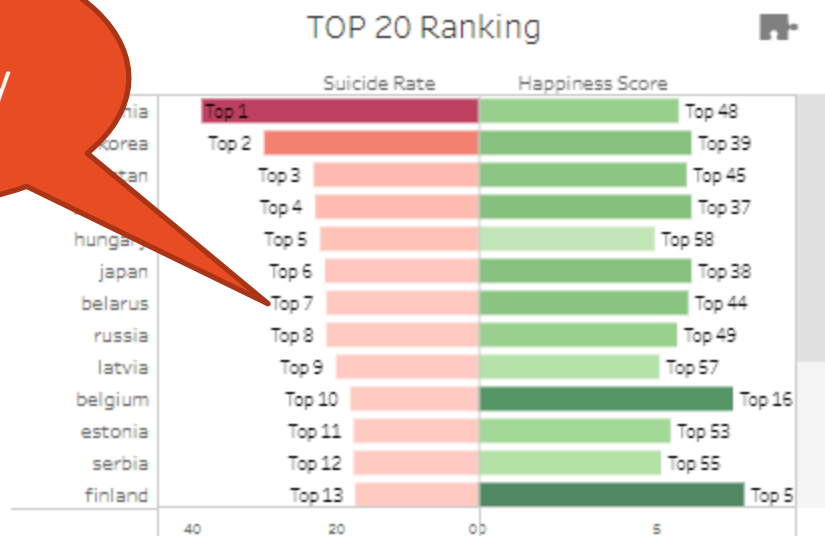
Encoding Guidelines

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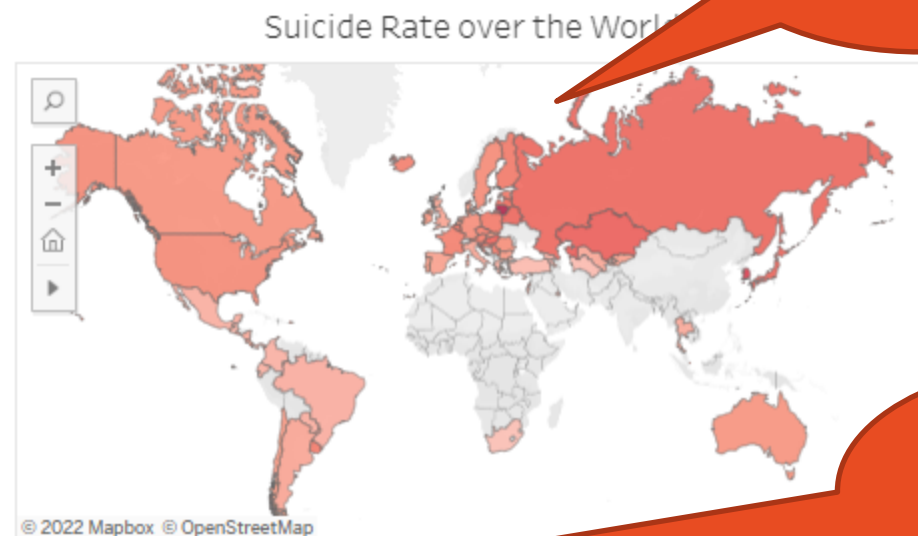


Presentation and Visualization

Symmetry

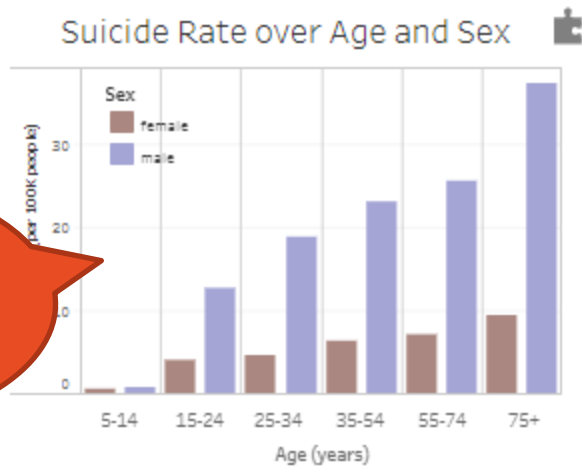


Similarity



Closure

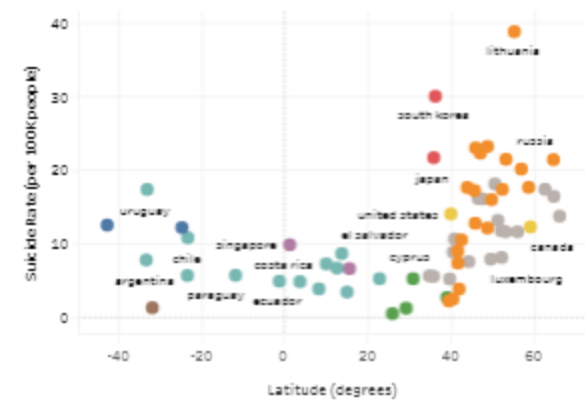
Similarity



Suicide Rate vs GDP per Capita

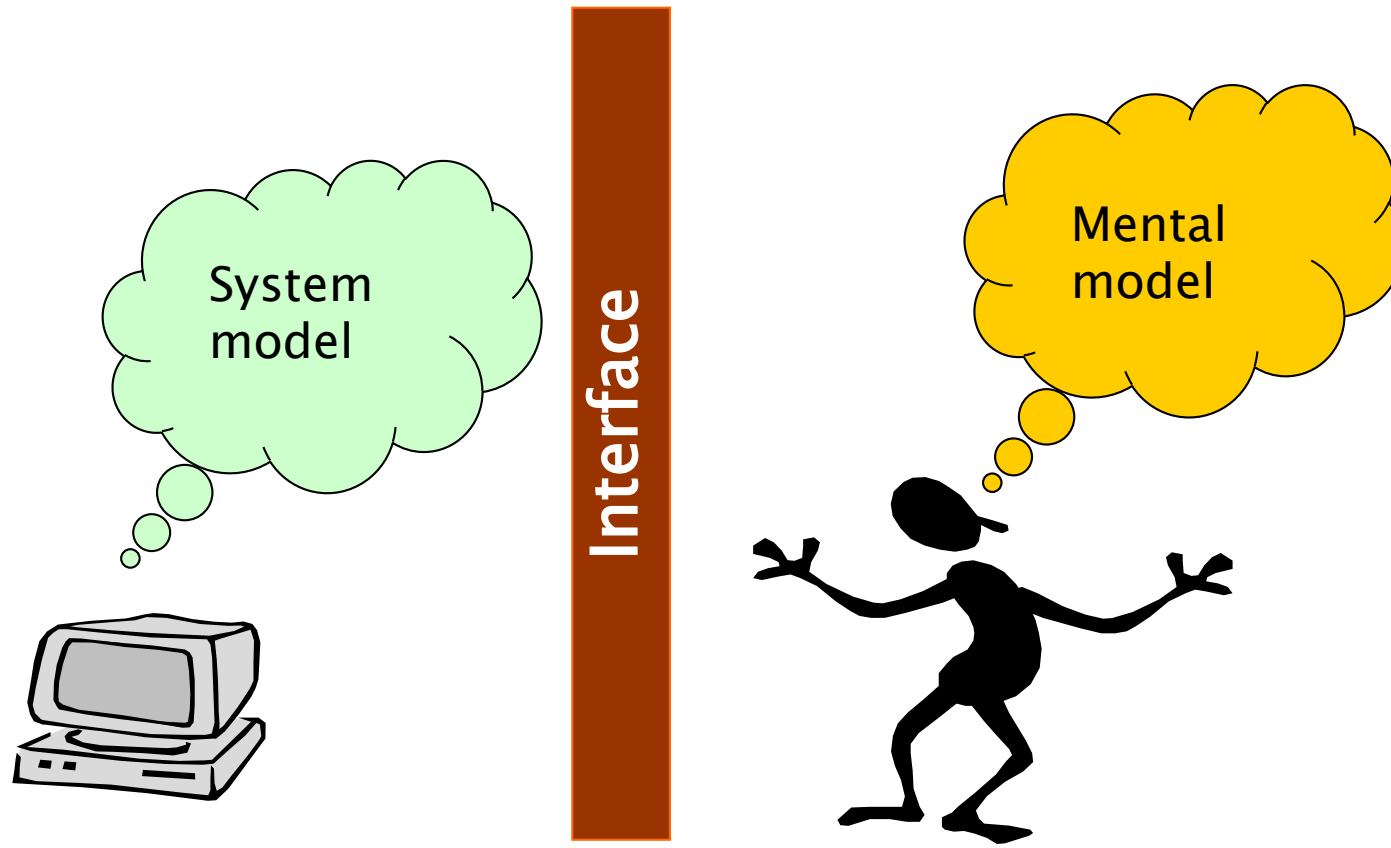


Suicide Rate vs Latitude

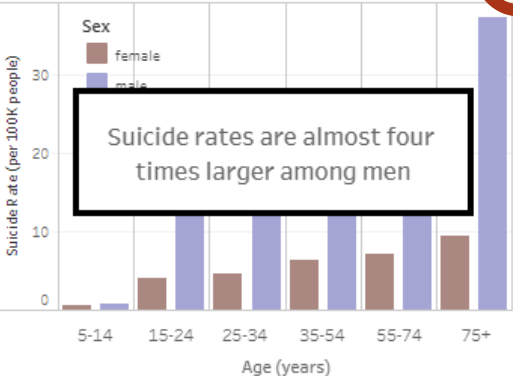


Proximity

Mental models



Suicide Rate over Age and Sex



Suicide rates are almost four times larger among men

Suicide Insights

TOP 20 Ranking



Click to order countries by their suicide ranking

Click to order countries by their happiness ranking

Slide to the leftmost part to see the average of all years

Select a country

Close Help

Suicide Rate (per 100K people)

Happiness Score (out of 10)

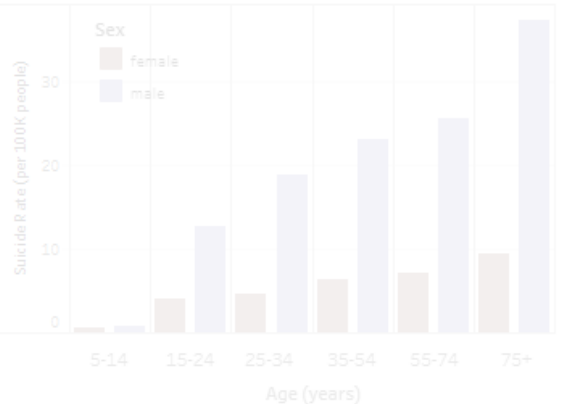
Exploration

Year: 2013

Country:

- ☒ (Todo)
- ☒ argentina
- ☒ armenia
- ☒ australia
- ☒ austria
- ☒ bahrain

Suicide Rate over Age and Sex



Suicide Rate vs GDP per Capita



Click on a puzzle piece for data insight

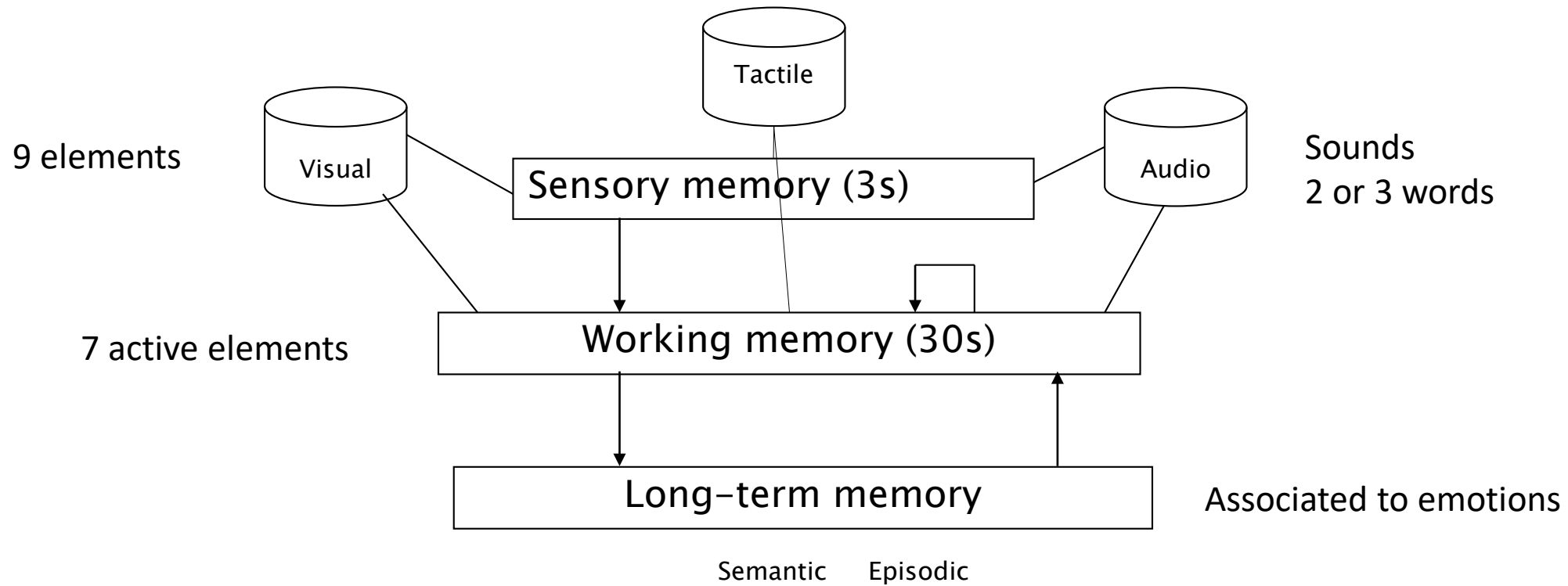
Suicide Rate vs Latitude



Select a region

Region	
Australia and New Zealand	
Central and Eastern Europe	
Eastern Asia	
Latin America and Caribbean	
Middle East and Northern Africa	
North America	
Southeastern Asia	
Sub-Saharan Africa	
Western Europe	

Memory



Try to remember

72410358291064351290

498 745 970 231 443 671 88

What do you have to take first on an ATM: money or card? Why?

Design principles

- Design based on recognition, not recall
- 7 ± 2
- Long tasks in small steps
- Avoid interferences within a channel, enrich with different channels

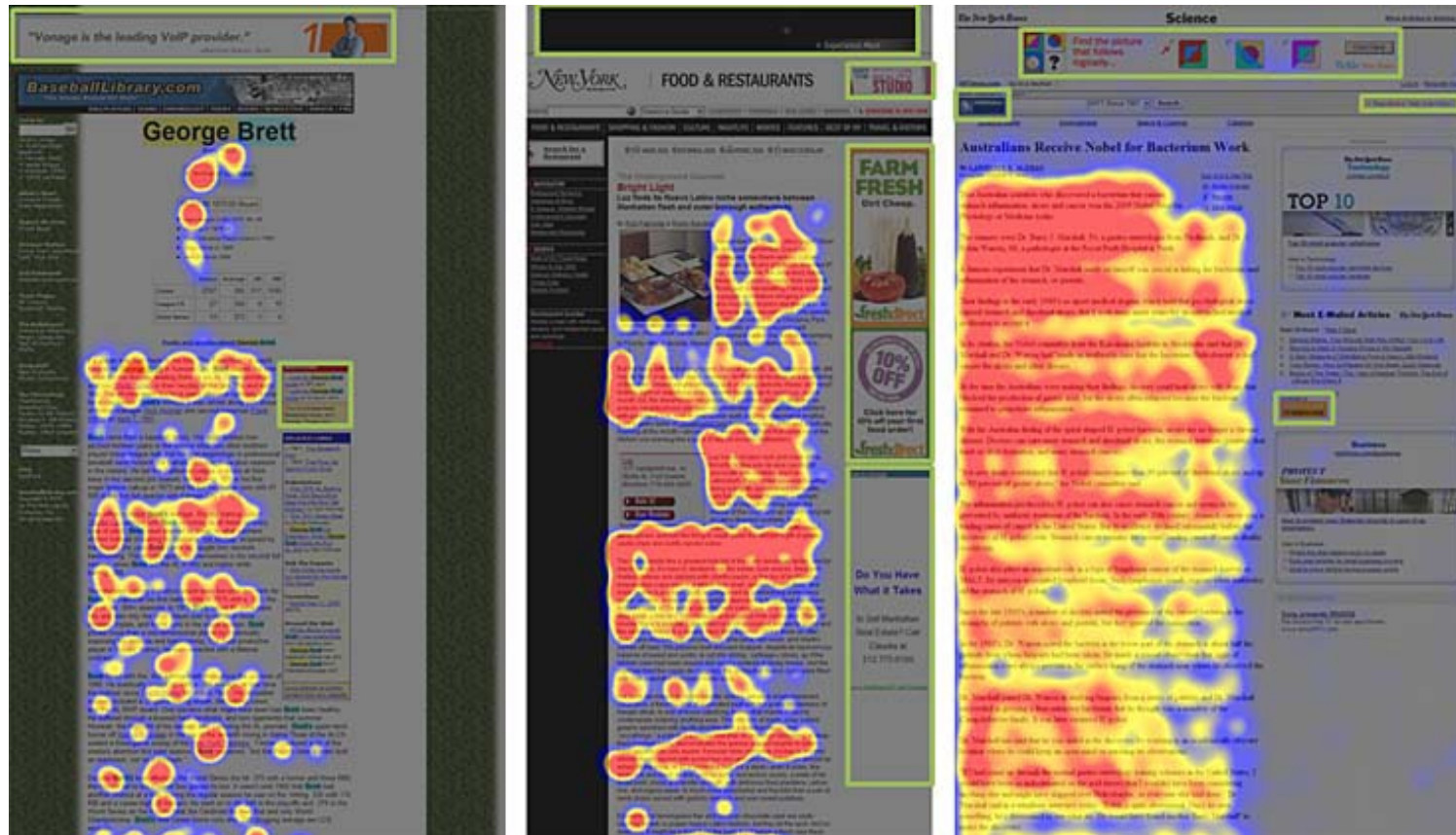
Attention

- Focused attention
 - All our attention in one event
- Divided attention
 - Our attention shifts between two or more events
 - Be careful with balance and interferences

Design principles

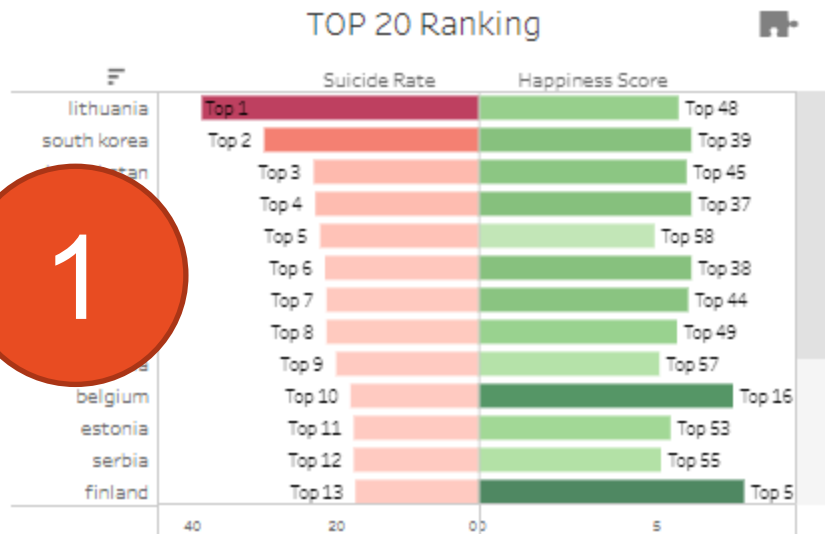
- Important information should receive focused attention, it shall appear in preeminent locations and have visual salience
- Secondary information may be on secondary locations or hidden, only visible on demand

Selective attention and reading patterns

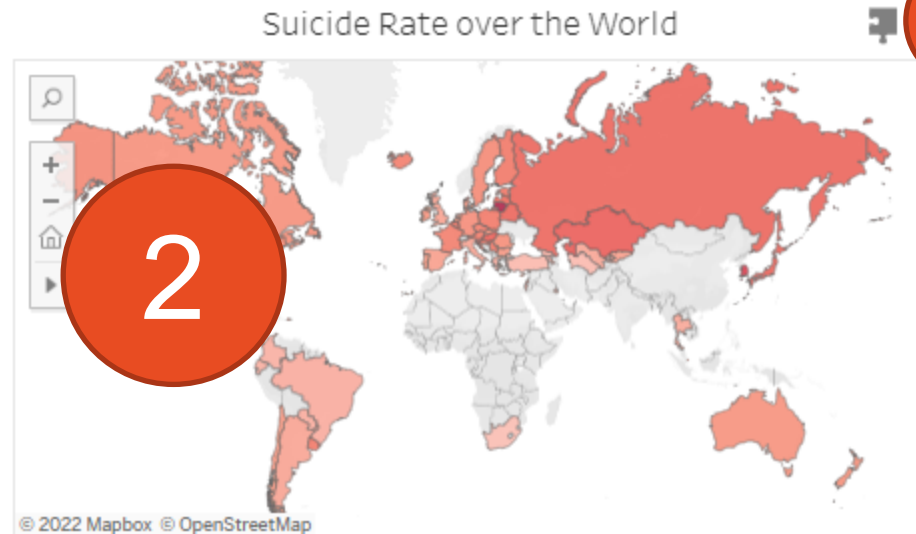


Source: <https://www.nngroup.com/articles/banner-blindness-old-and-new-findings/>

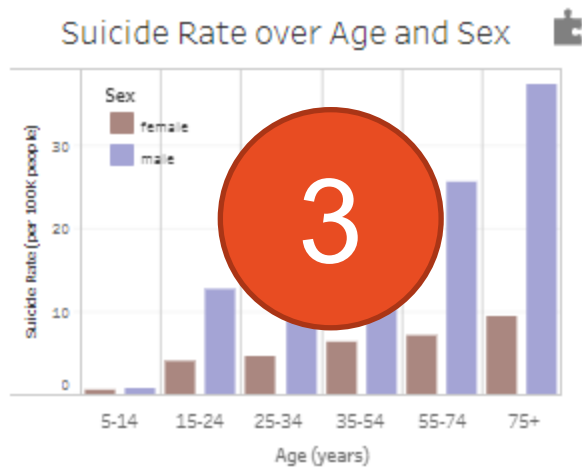
1



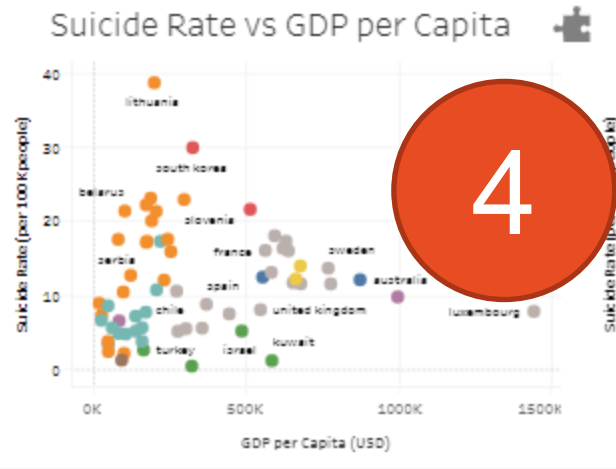
2



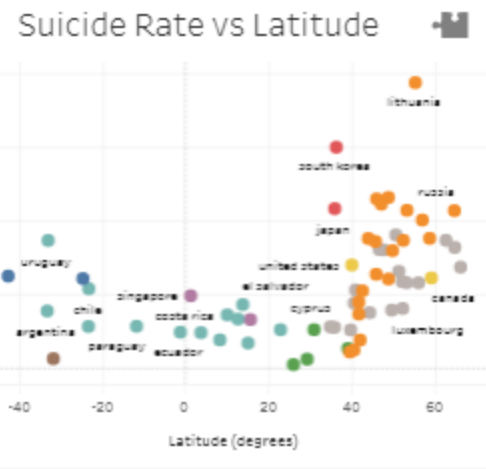
5



3



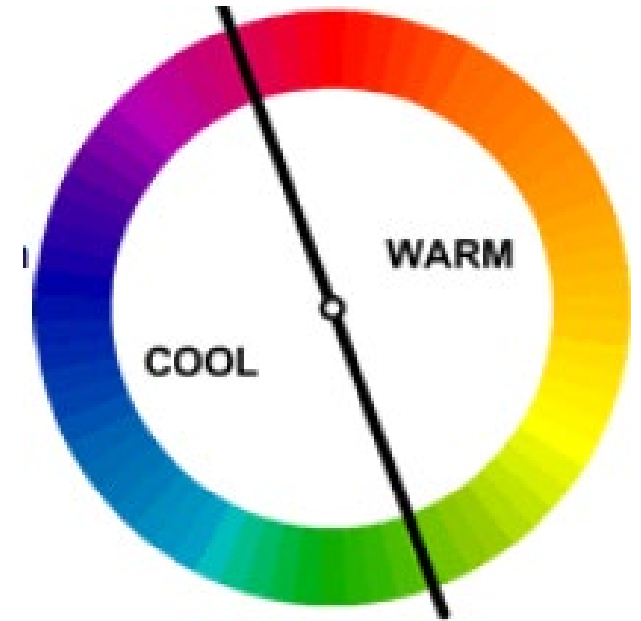
4



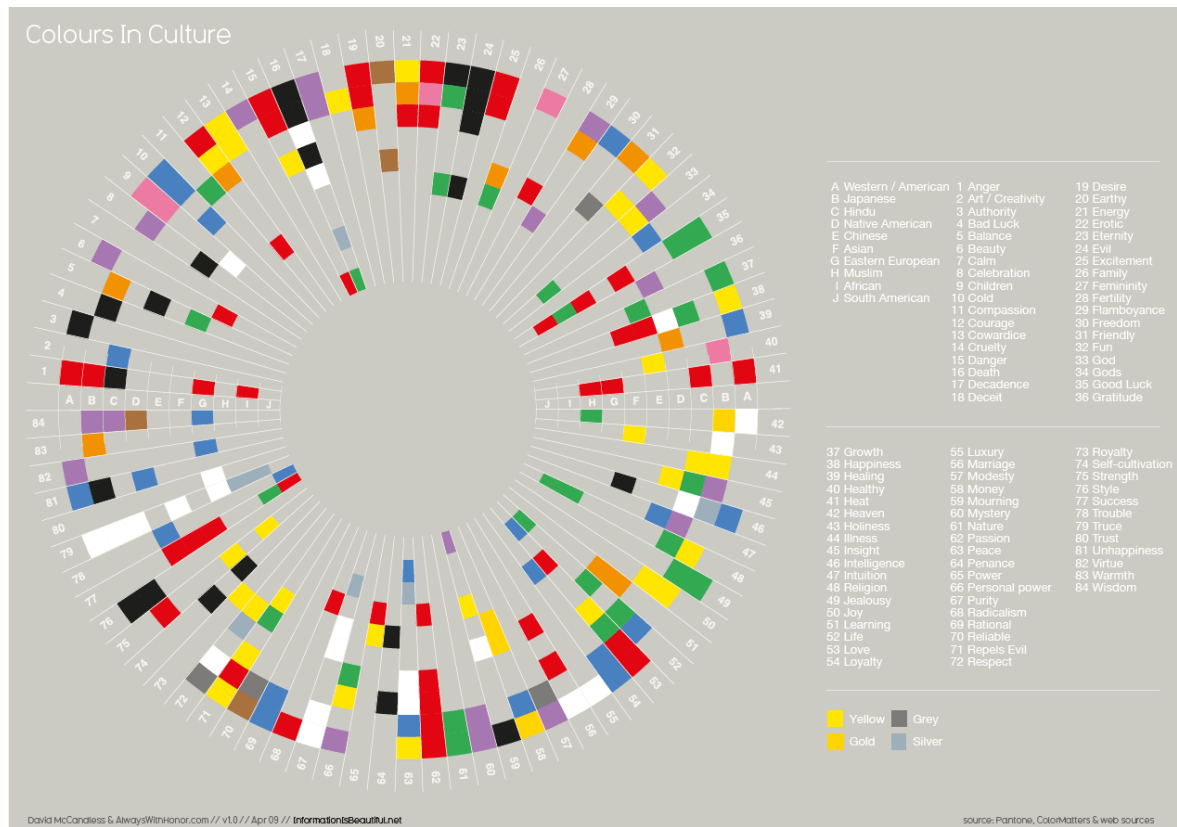
Colour

Colour affect our moods

- Colours affect us in numerous ways, both mentally and physically
- We can divide colours into warm and cool
 - Warm colours are energetic, and tend to advance in space.
 - Cool colours give calm, and tend to work better as background.



Colour meaning is a cultural issue

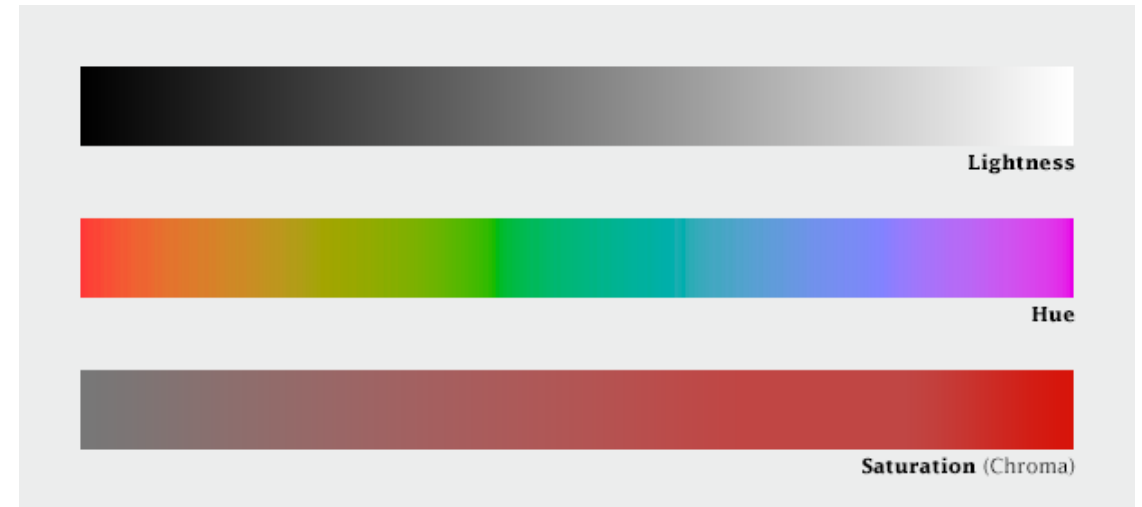


Specification of colors: perceptual dimensions

HSL: Hue Saturation Lightness

- Luminance / Lightness / Value : (it is relative) how much light appears to reflect an object in relation to the White on the scene
- Hue : what we associate to colour names
- Saturation (Chroma): Purity of the colour (vividness)

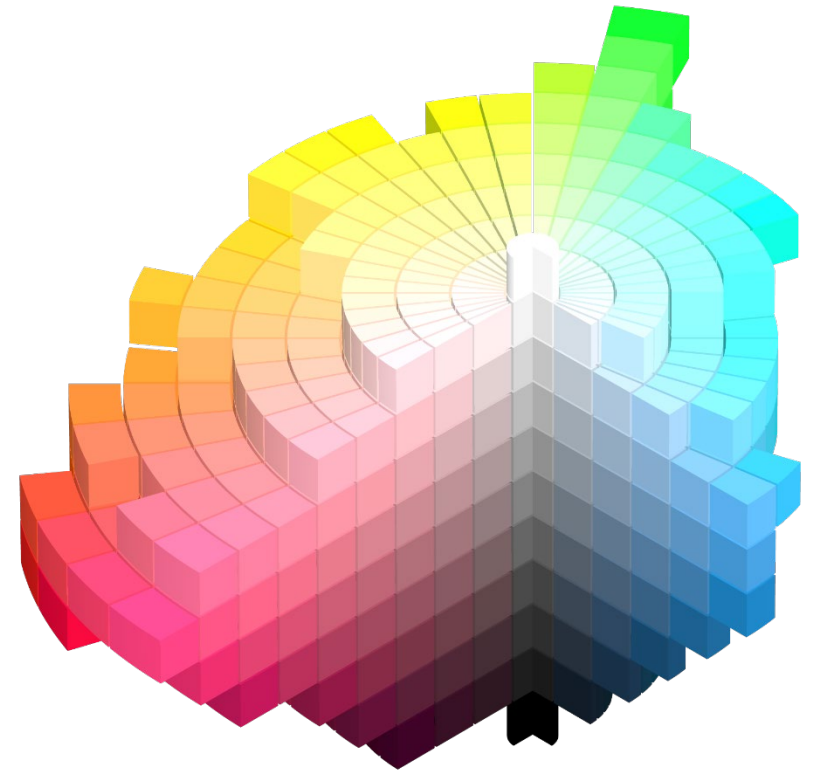
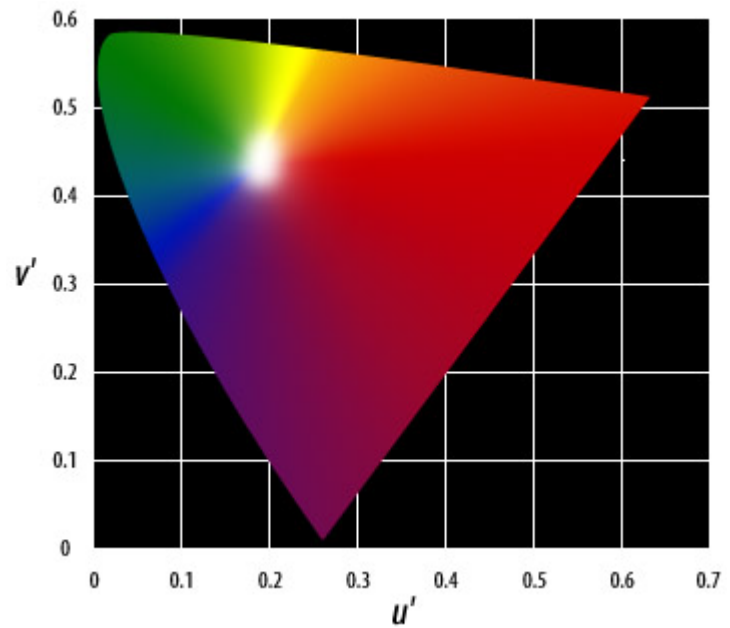
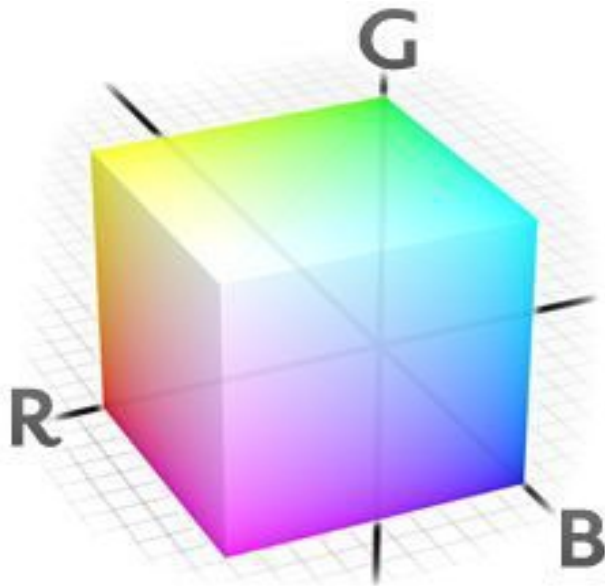
HSV or HSB (Value / Brightness)



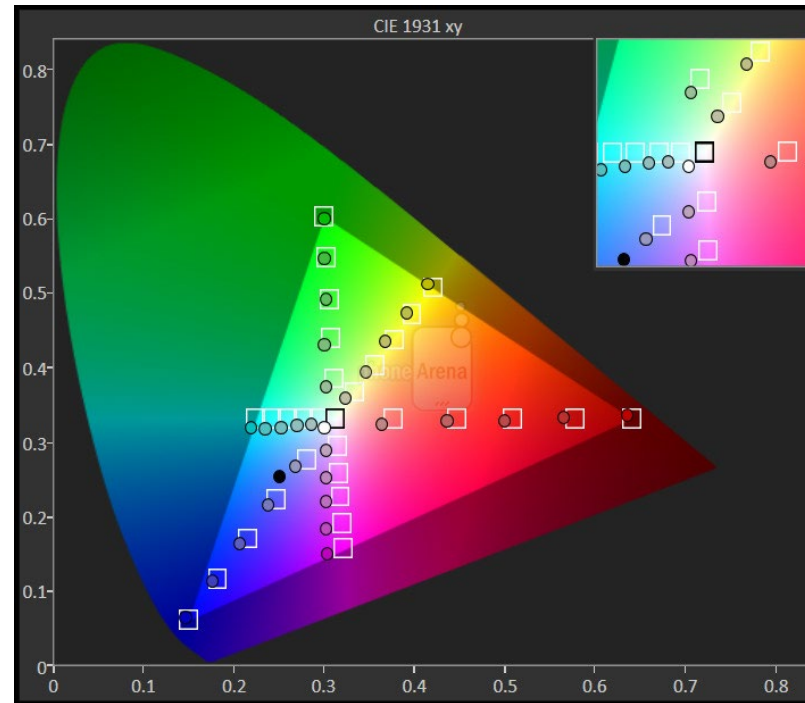
<http://hslpicker.com/>

<http://colorizer.org/>

Color spaces and perceptual uniformity



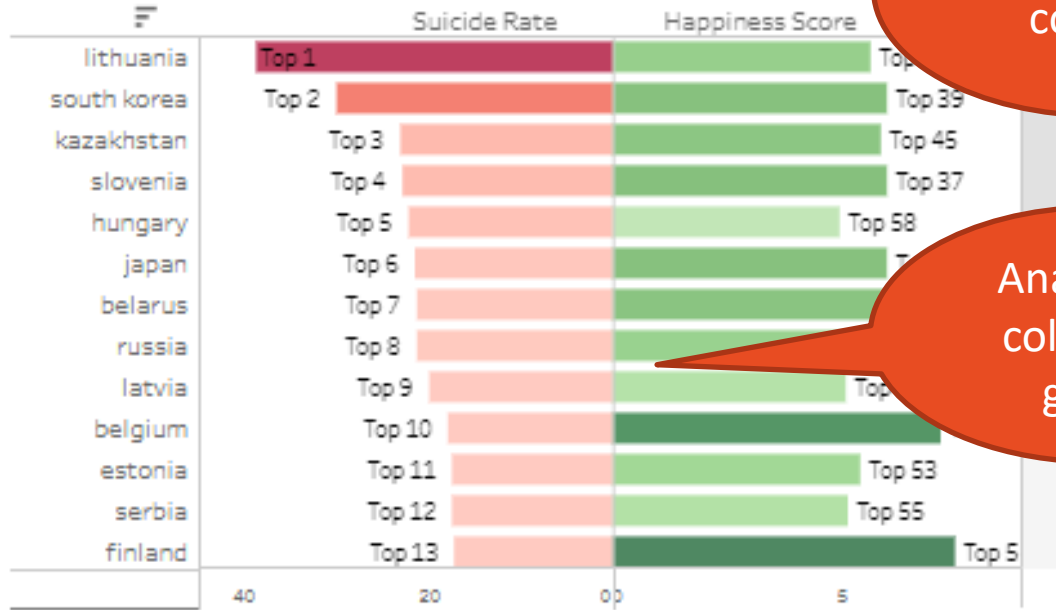
Color gamut



Color for charts

- Assign colour according to function:
 - Use contrast to highlight
 - Analogous colours to group
 - Use greys for context and axis when labelling with colour

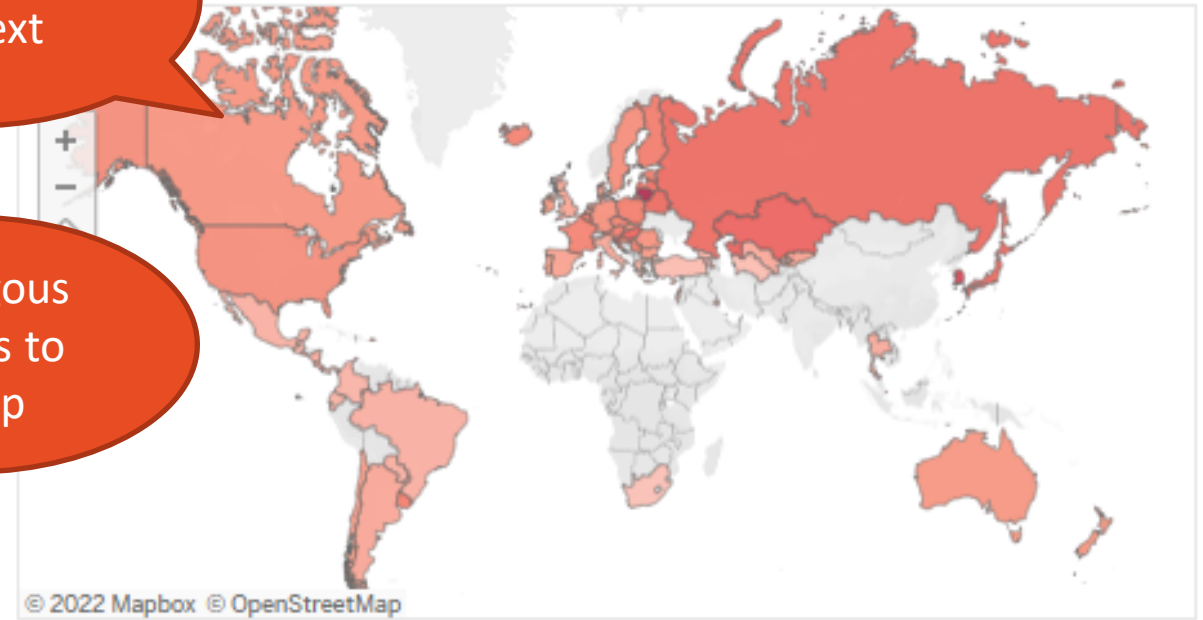
TOP 20 Ranking



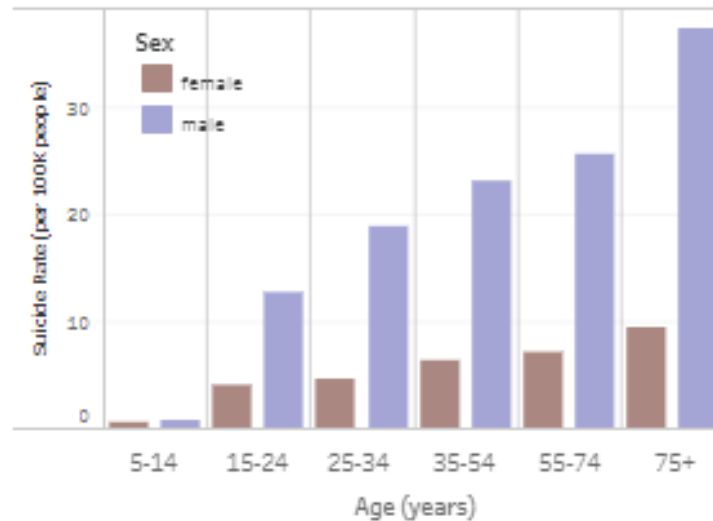
Greys for context

Analogous colours to group

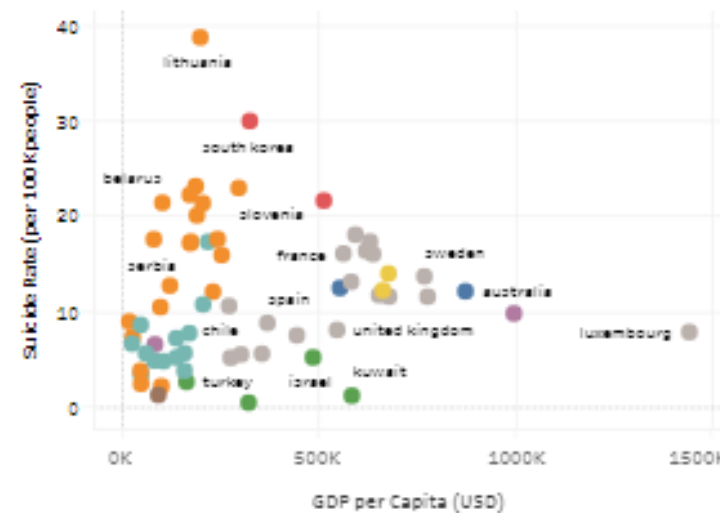
Suicide Rate over the World



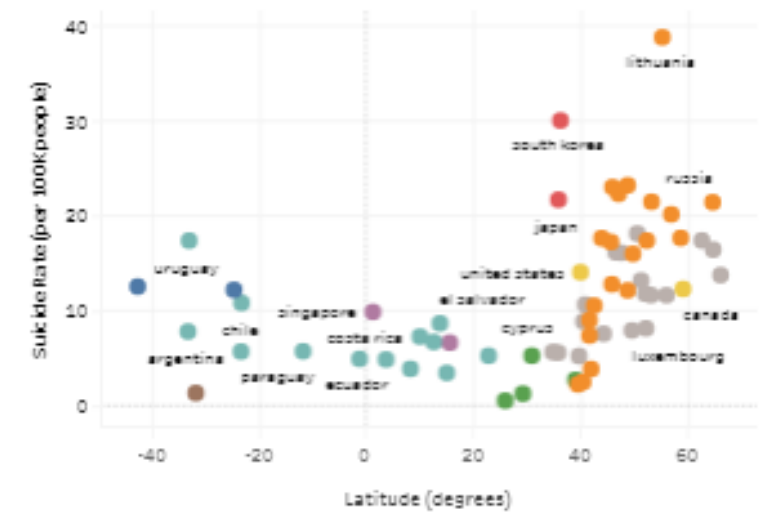
Suicide Rate over Age and Sex



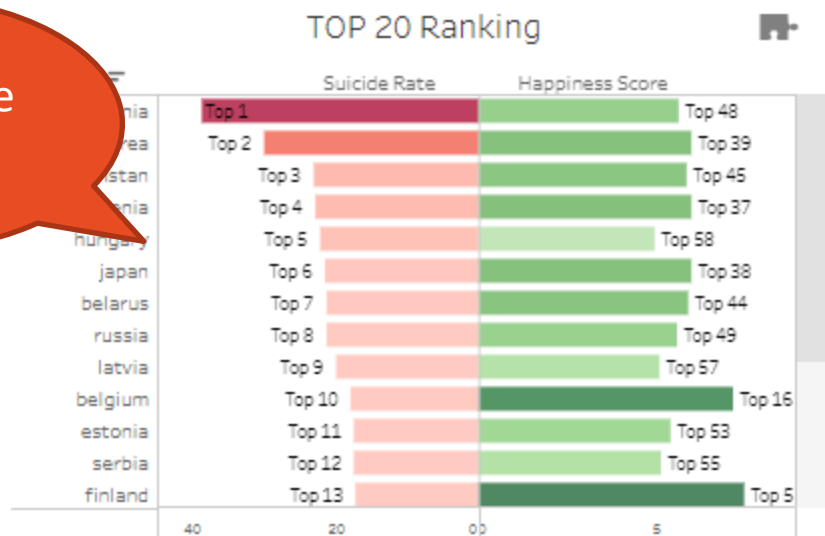
Suicide Rate vs GDP per Capita



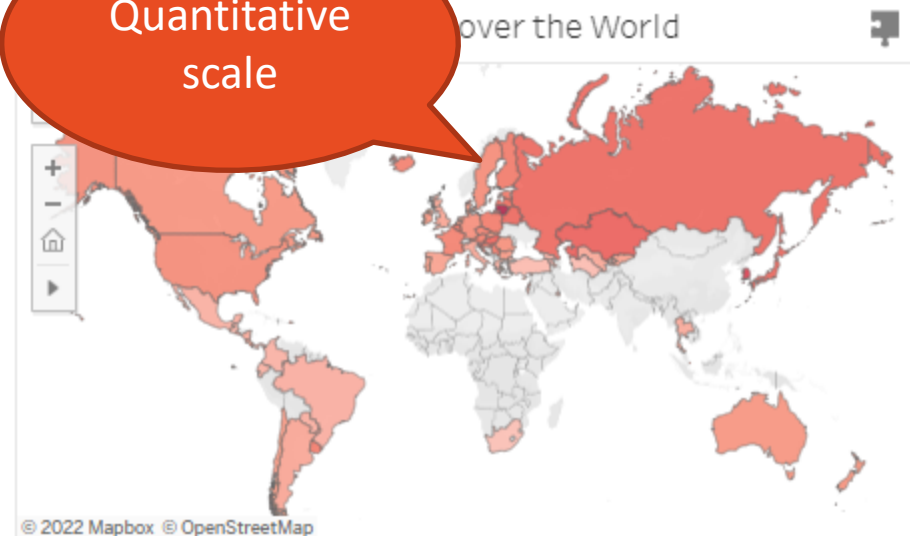
Suicide Rate vs Latitude



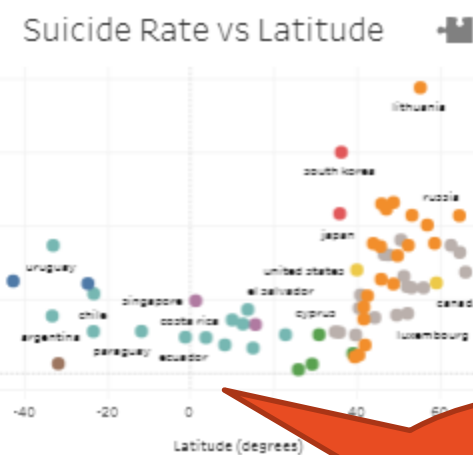
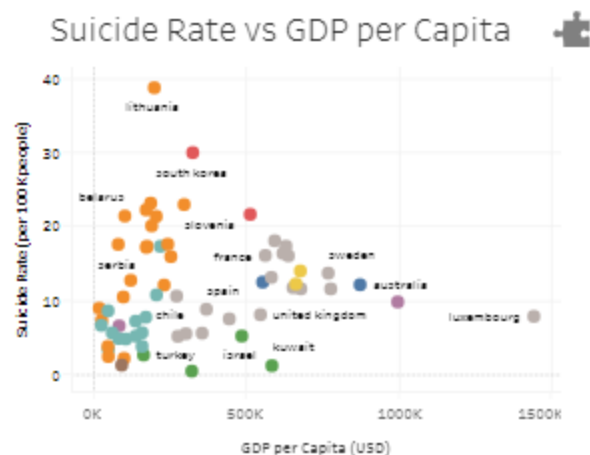
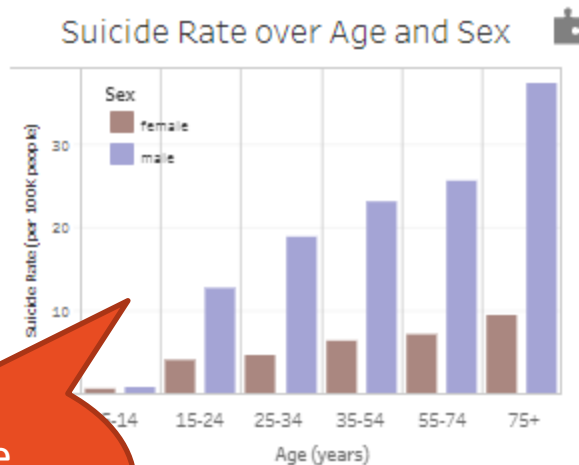
Quantitative
scale



Quantitative
scale



Qualitative
scale



Qualitative
scale

Color for maps

- Big areas: low saturation; Small areas: highly saturated
- Ensure hue and luminance contrast with the background (use a border if needed)
- For colour-blindness assure yellow-blue distinction
- See Cynthia Brewer [ColorBrewer tool](#)

Key ideas

1

Perception principles should guide our visualization decisions.

2

Encoding, layout, highlighting have their own rules.

3

The correct use of color is very important

Sources

- ★ Ware, C. (2020) Information visualization: perception for design. Burlington: Morgan Kaufmann.
- ★ The example Dashboard on the slides, is made by Muriel Rovira, Jael Freixanet, Emilio Tylson as last course (2021-2022) task..
- ★ Some highlight examples come from Duarte – Slidedocs templates or Animated Charts (www.Duarte.com)

Thanks you for your attention



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