



What is Data Visualization? Why use it?



**“Data visualization is
viewed by many
disciplines as a modern
equivalent of visual
communication”**





Objectives

After completing this section of the course you should understand:

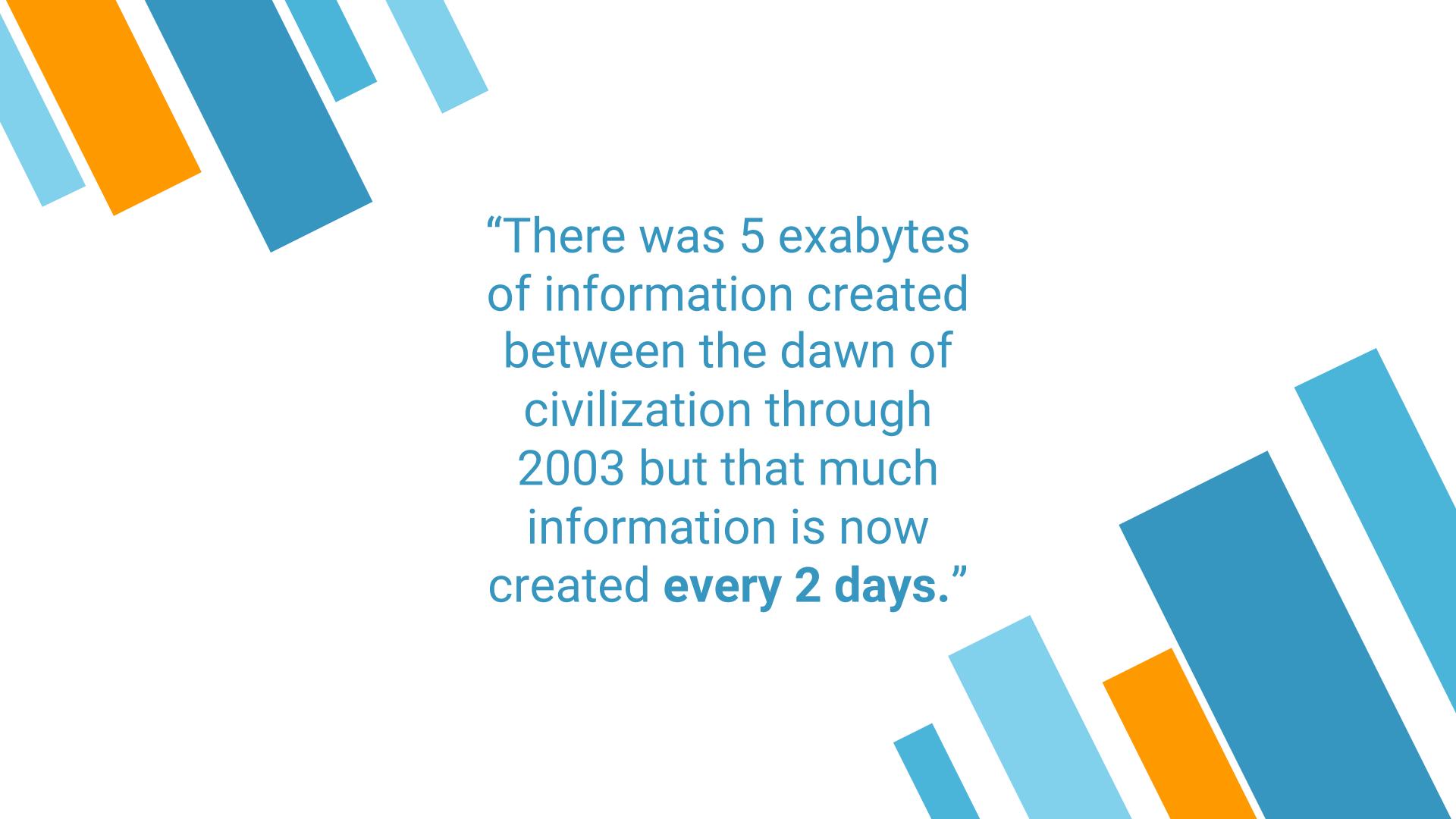
- » The Big Concepts of Communication
 - » Channeling your audience
 - » How to best define Data Visualization?
 - » The basis of Visual Perception
 - » Why do we use Data Visualization?
- 

Concepts of Communication

The 4x4 model for Knowledge Content



**“Getting the right
people to the right
content at the right
time”**



“There was 5 exabytes
of information created
between the dawn of
civilization through
2003 but that much
information is now
created **every 2 days**.”

2018 This Is What Happens In An Internet Minute



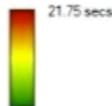
2019 This Is What Happens In An Internet Minute



Sources:

<https://www.visualcapitalist.com/what-happens-in-an-internet-minute-in-2019/>

Media: Diapers-01.jpg
Time: 00:00:00.000 - 00:00:06.033
Participant filter: All



Ex[®] gentle for the most sensitive skin.

So you have sensitive skin, add the chemicals and moisture to it and you have diaper rash.

Baby Ex[®] diaper's unique high-absorbency natural-blend cotton provides cotton-soft, extra thick, gel-free protection for your baby's sensitive skin. The chlorine-free materials and sorbent polymers is non-toxic and non-irritating. Clinically tested and pediatrician recommended for babies with allergies and sensitive skin.



U3TM

If you are not satisfied with the baby leakage protection, you will get your money back. Read more about our leakfree guarantee at www.baby.com

Participant filter: All

10.43 secs



Energy gel core for the most sensitive skin.

With the unique energy gel core, add the essentials and moisture to your baby's skin. It's gentle, effective and safe.

The Baby Wipes unique high-absorbency natural-blend cotton fiber provides cotton-soft, extra thick, gel-free protection for baby's sensitive skin. The chlorine-free materials and polymers is non-toxic and non-irritating. Clinically tested and dermatologist recommended for babies with allergies and sensitive skin.



TM

If you are not satisfied with the baby leakage protection, you will get your money back. Read more about our leakfree guarantee at www.baby.com



Information Overload is a Myth

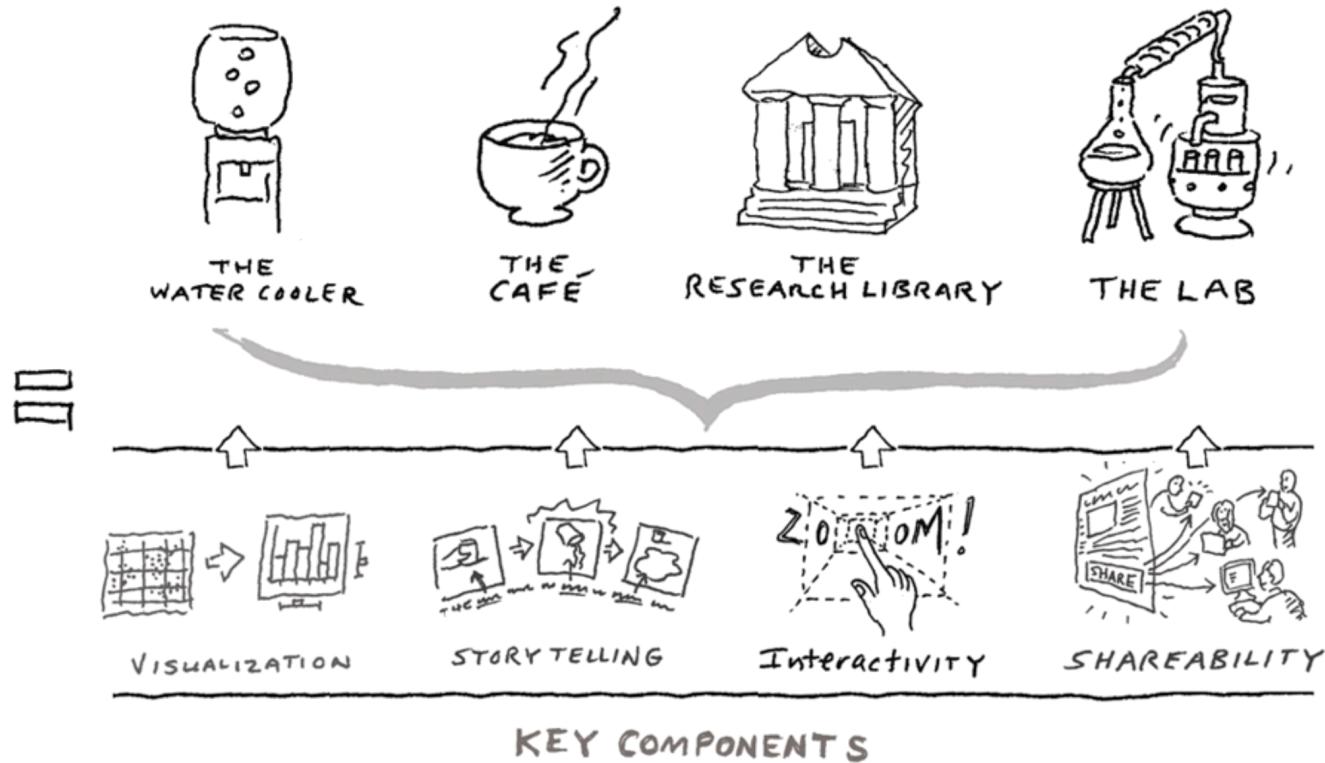
People are generally
empowered by choice
and access to
information online

BUT do **question the**
accuracy of the
information they get



4x4

A MODEL FOR
KNOWLEDGE
CONTENT



The 4x4 approach is the secret
to presenting content in a way

THE WATER COOLER



Succinct! Direct!
Compelling!

THE CAFÉ



Some length, But
not Deep study!

THE RESEARCH LIBRARY



that engages your audience,
stepping them into the right level

of content based on their needs,
and improving outcomes,

THE LAB



from that
Content.

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THE WATER COOLER
THE CAFÉ
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THE LAB



Succinct! Direct!
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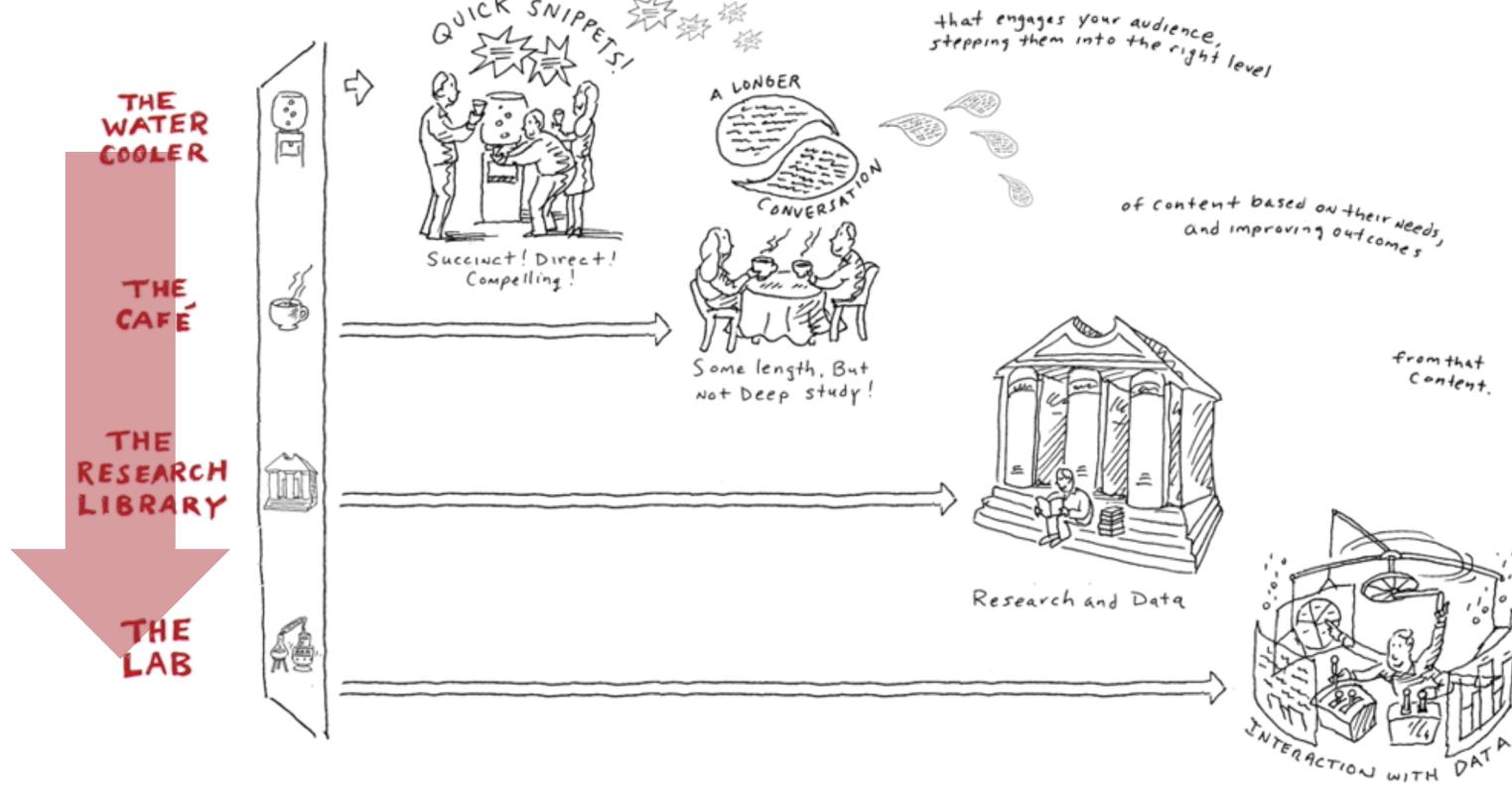
Some length, But
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that engages your audience,
stepping them into the right level

of content based on their needs,
and improving outcomes,

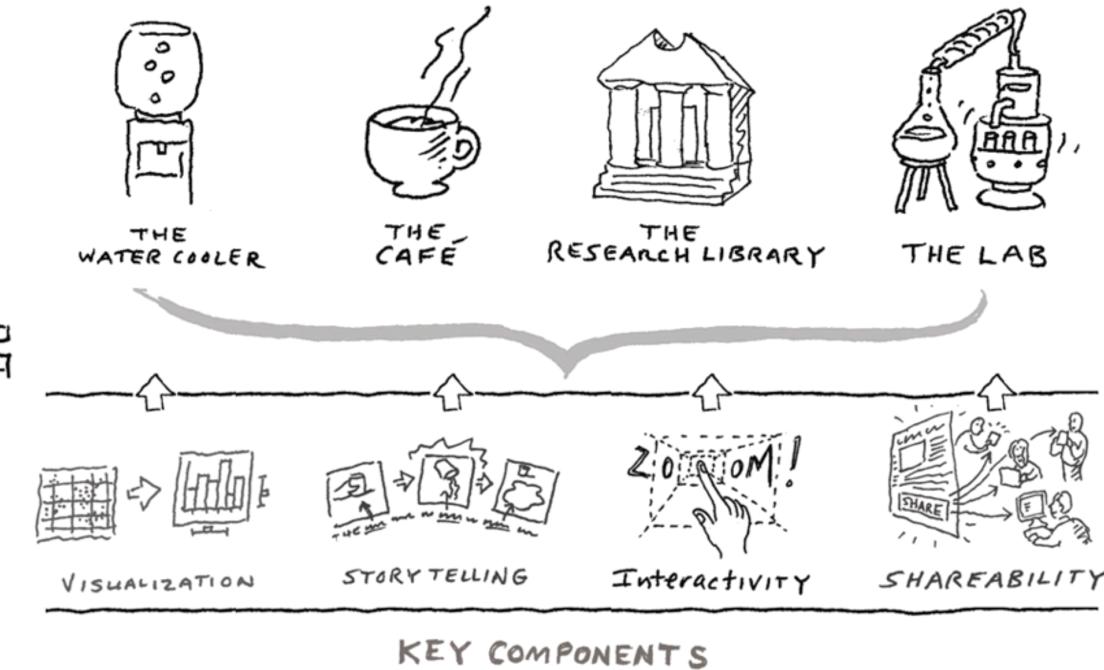
from that
Content.





4x4

A MODEL FOR
KNOWLEDGE
CONTENT



Channeling your Audience



Adjusting to your Audience

» Kid's circus



» Sophisticated Audience





Knowing your audience

- » Culture
 - » Consumption context/channel
 - » True believers or skeptics?
 - » Level of expertise
 - » Accessibility
 - » Action
- 
- 

Culture affects

- » Language
- » Perspective
- » Context
- » ...



So what is Data Visualization?

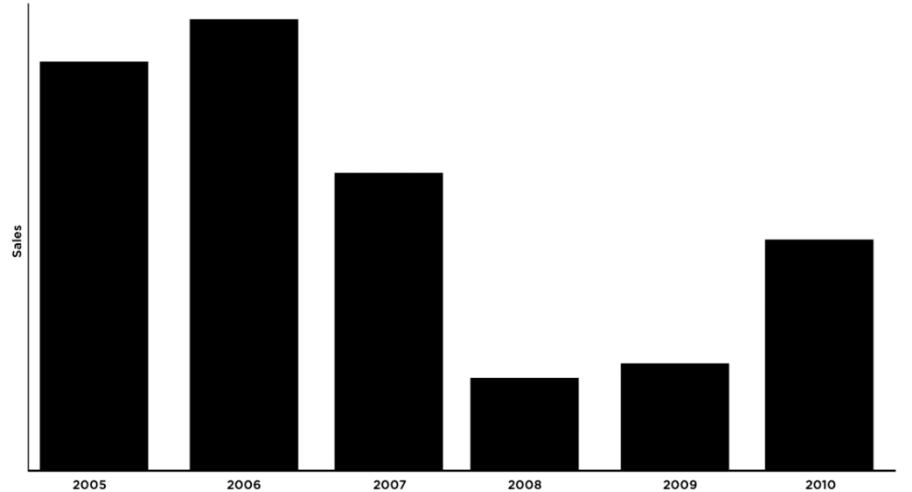
It is data visualized...

The poor, lowly bar chart

- » The best for 2 variables
- » Identify tops and bottoms
- » Obvious headline and overall story

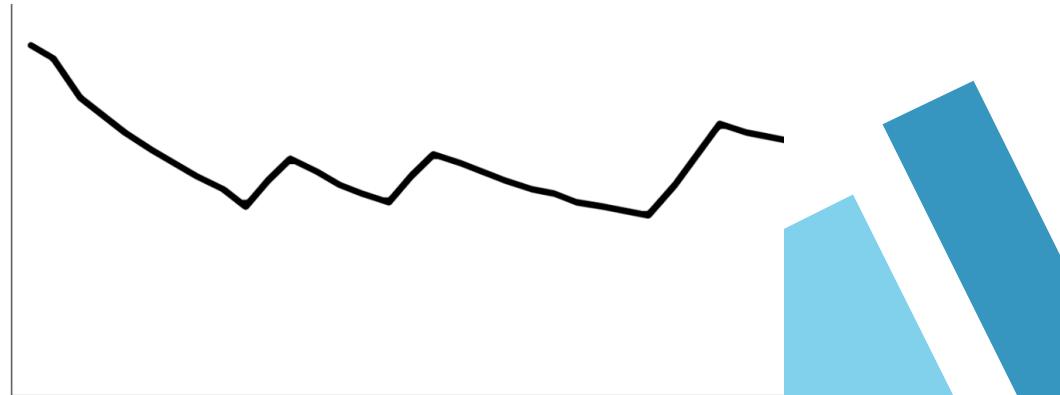
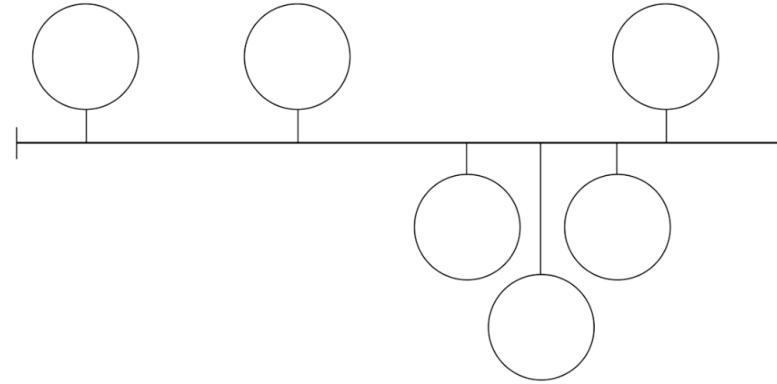


Why should I not do a bar chart?

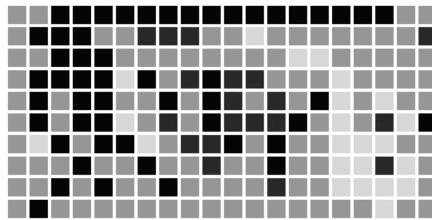
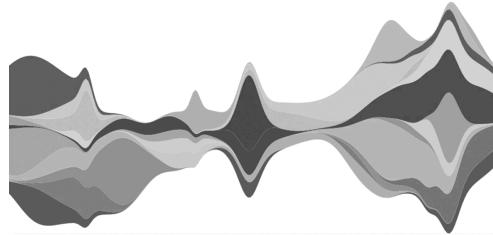
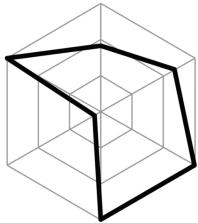
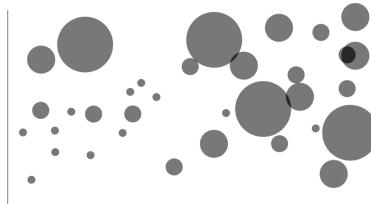
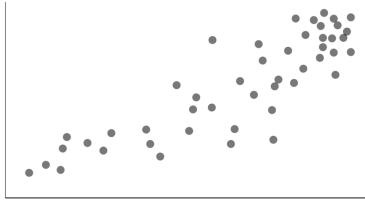


The line chart

- » The best for timed data
- » Timeline for
Infographics
- » Obvious headline and
overall story



And a cohort of chart types



Charles Minard – Napoleon's March

Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813.
Dessiné par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie; le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été pris dans les ouvrages de M. M. Chiers, de Léger, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davout, qui avaient été détachés sur Minsk et Mohilow et qui rejoignirent vers Orscha et Witebsk, avaient toujours marché avec l'armée.

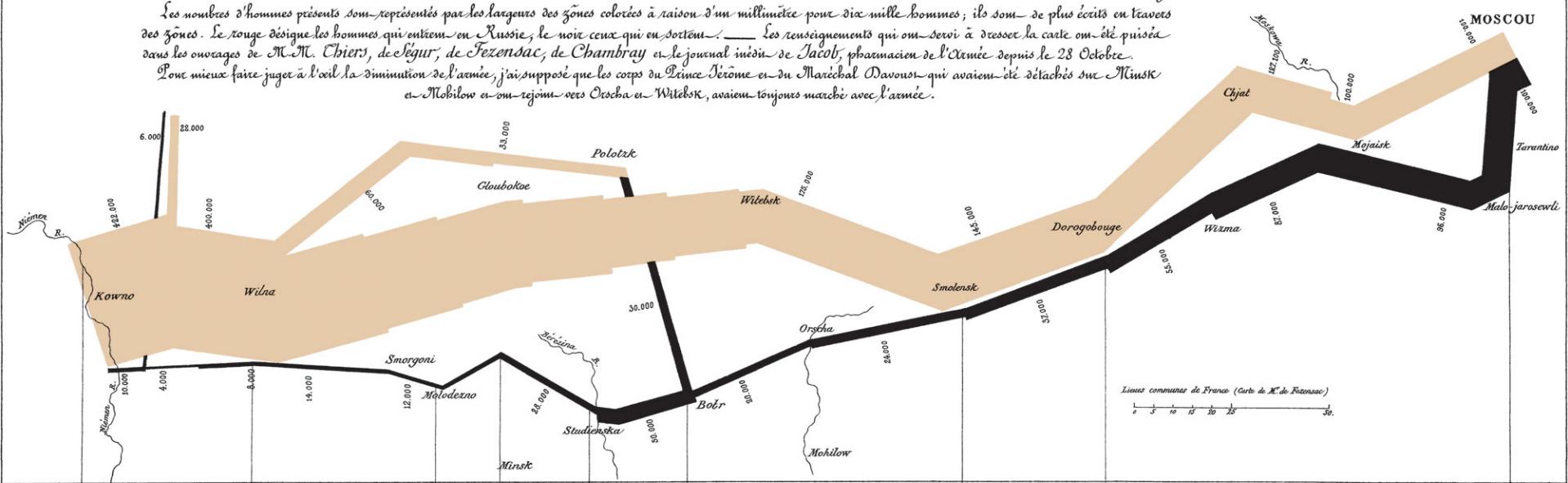
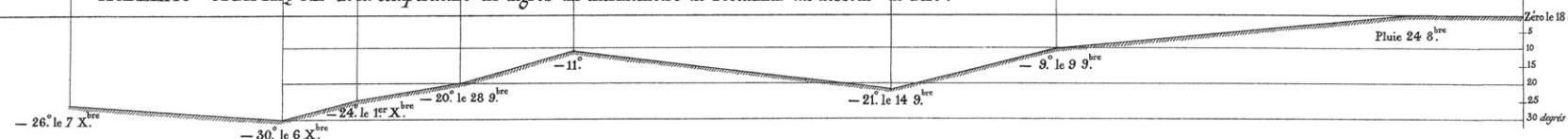


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les cosaques passent au galop
le Niémen gelé.

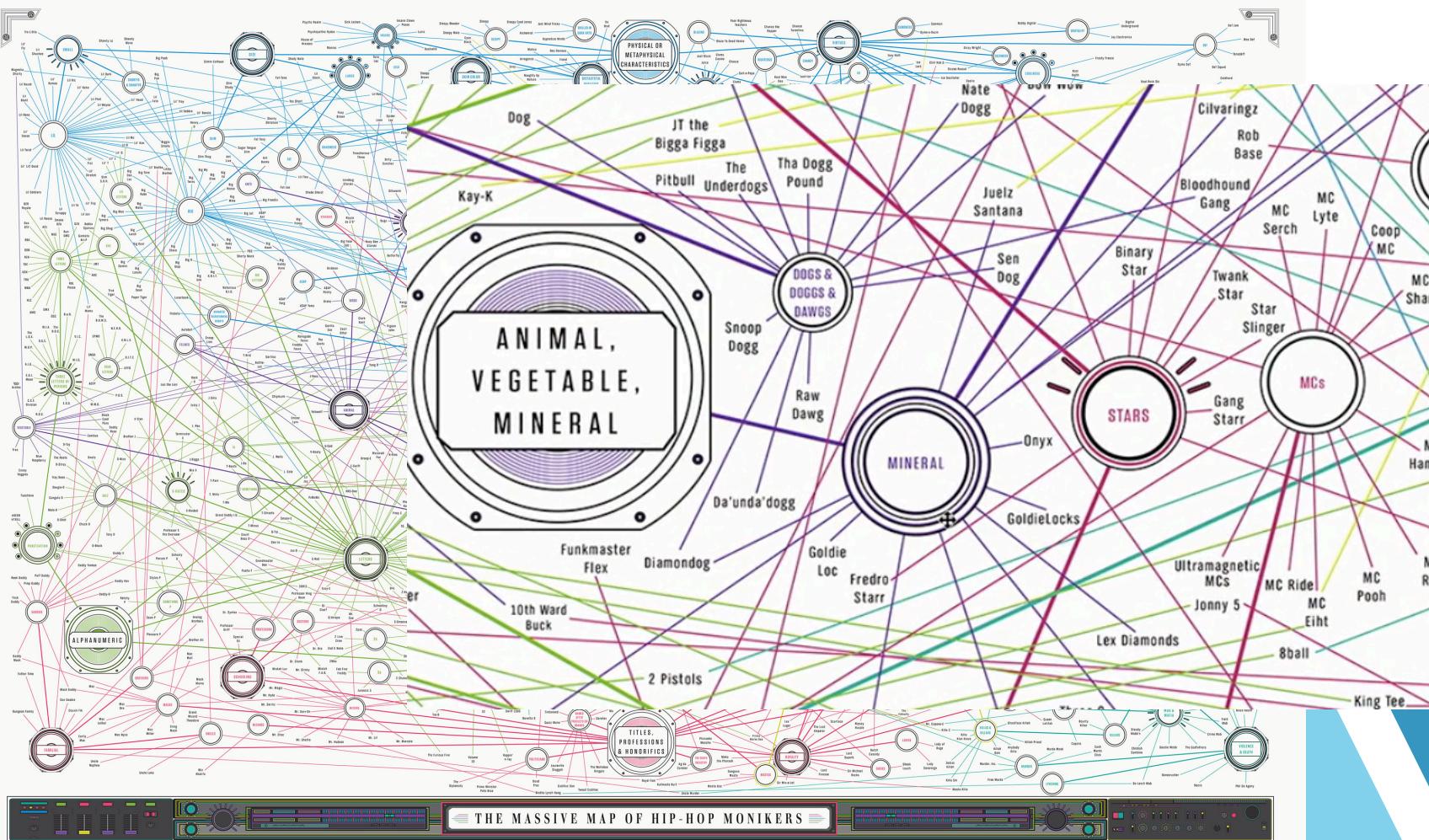


Autog. par Regnier, S. Pas. S^e Marie S^e G^e à Paris.

Imp. Lith. Regnier et Dureuil.

Sources:

https://en.wikipedia.org/wiki/Charles_Joseph_Minard



Sources:

<https://popcharlab.com>



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ASK What makes a good Data Visualization?



ACCURATE

ASK

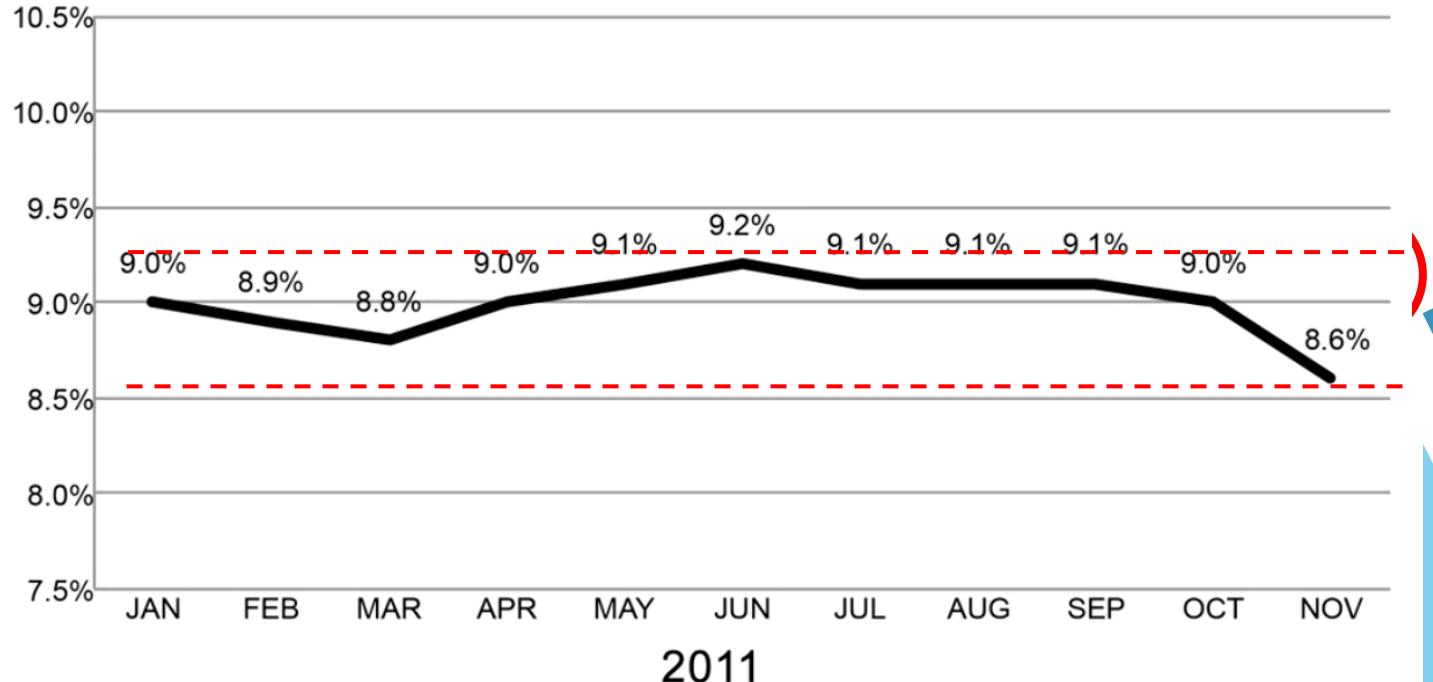
STORY



KNOWLEDGE

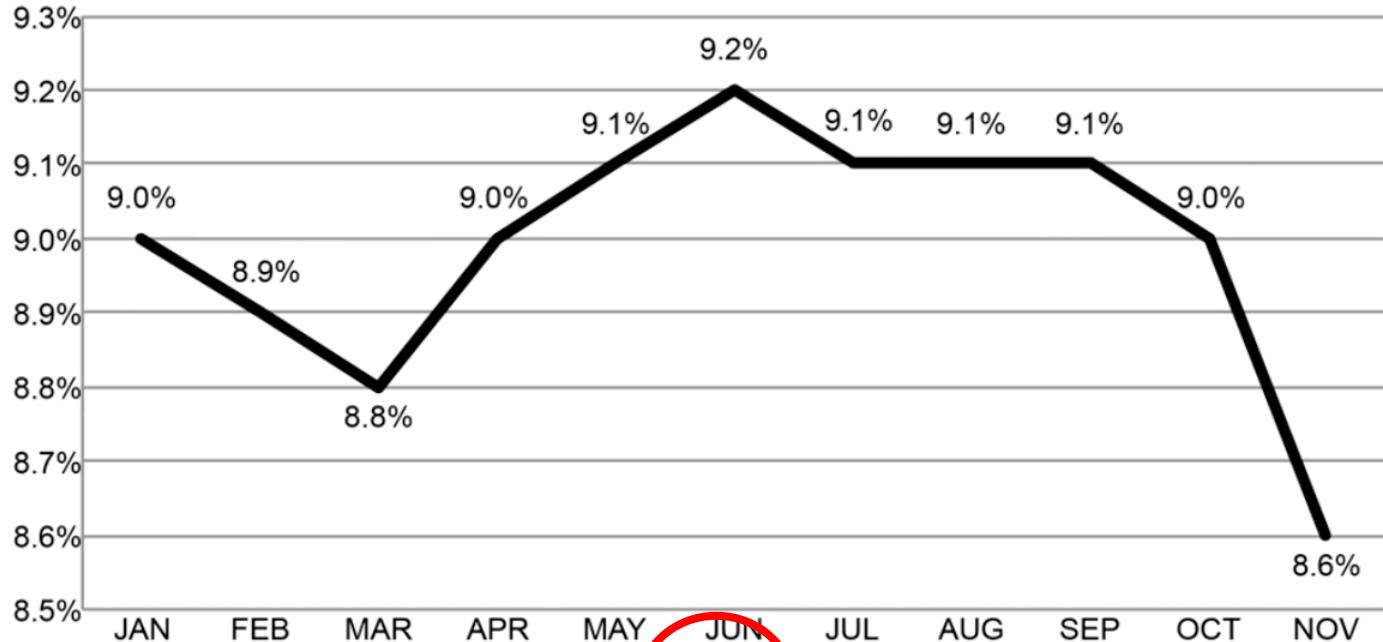
ASK – Accuracy

The Unemployment Rate Under President Obama



ASK – Accuracy

The Unemployment Rate Under President Obama



2011

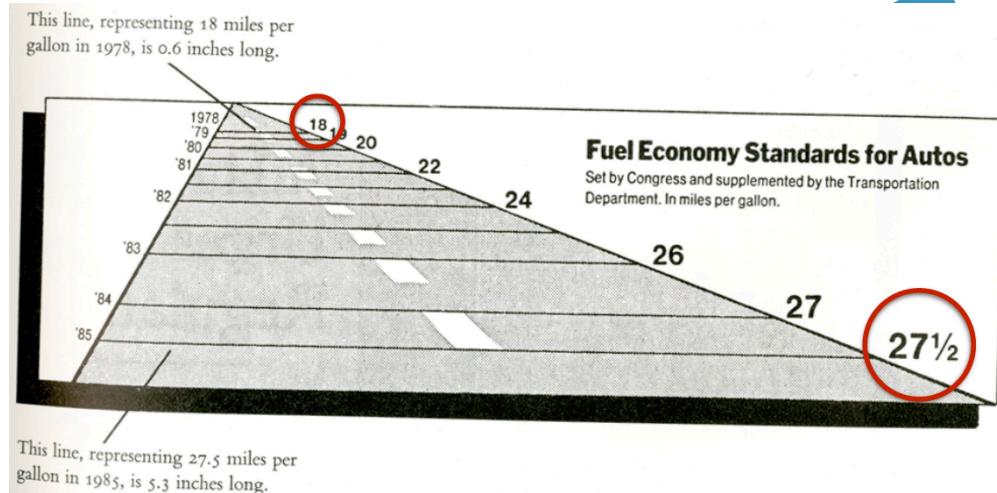
ASK – Accuracy

The “Lie Factor” is a value to describe the relation between the size of effect shown in a graphic and the size of effect shown in the data.

$$\text{Lie Factor} = \frac{\text{Size of effect shown in graphic}}{\text{Size of effect in data}}$$

where $\text{Size of Effect} = \frac{|2\text{nd value} - 1\text{st value}|}{1\text{st value}}$

$$\text{Change in size of data} = \frac{|27.5 - 18.0|}{18} = 53\%$$



ASK – Accuracy

The “Lie Factor” is a value to describe the relation between the size of effect shown in a graphic and the size of effect shown in the data.

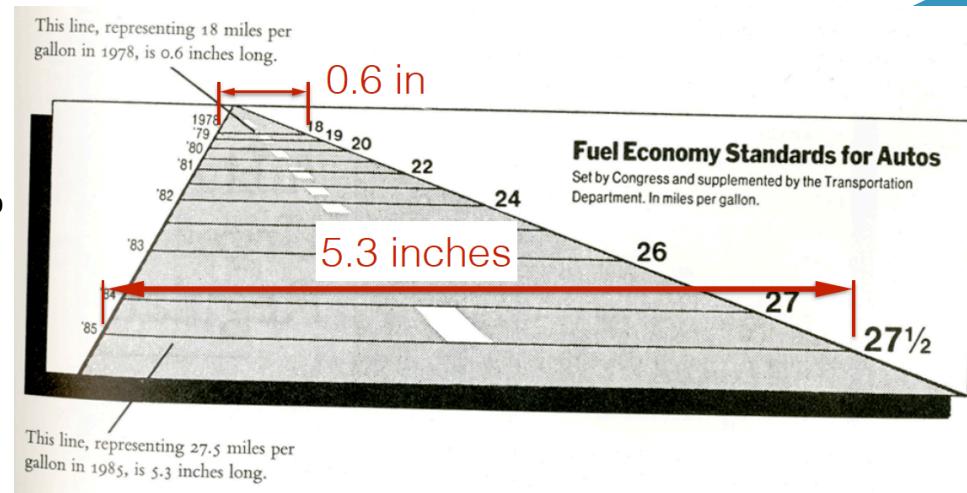
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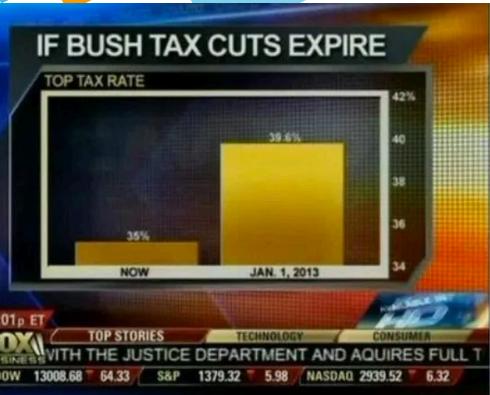
$$\text{Change in size of data} = \frac{|27.5 - 18.0|}{18} = 53\%$$

$$\text{Change in size of graphics} = \frac{|5.3 - 0.6|}{0.6} = 783\%$$

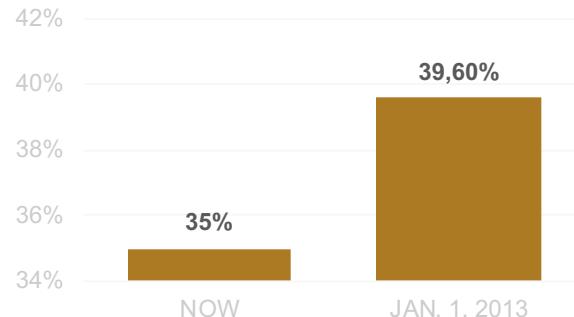
$$\text{Lie Factor} = \frac{783}{53} = 14.8$$



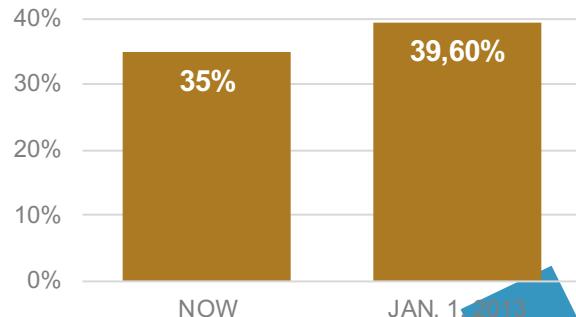
ASK – Accuracy



IF BUSH TAX CUTS EXPIRE
Top Tax Rate



IF BUSH TAX CUTS EXPIRE
Top Tax Rate



The “Lie Factor” –

The visual increase is **460%** (non-zero baseline)

The actual visual increase is **13%** (zero baseline)

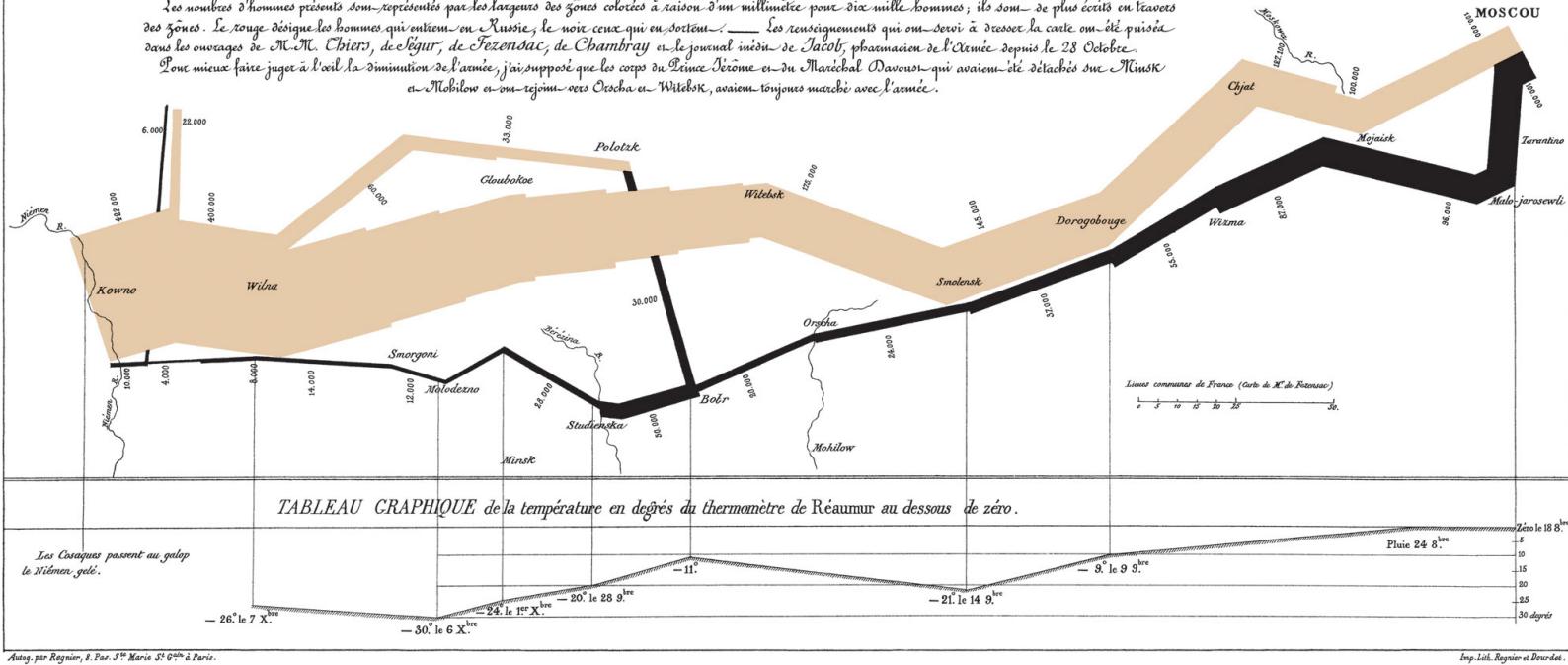
ASK – Story

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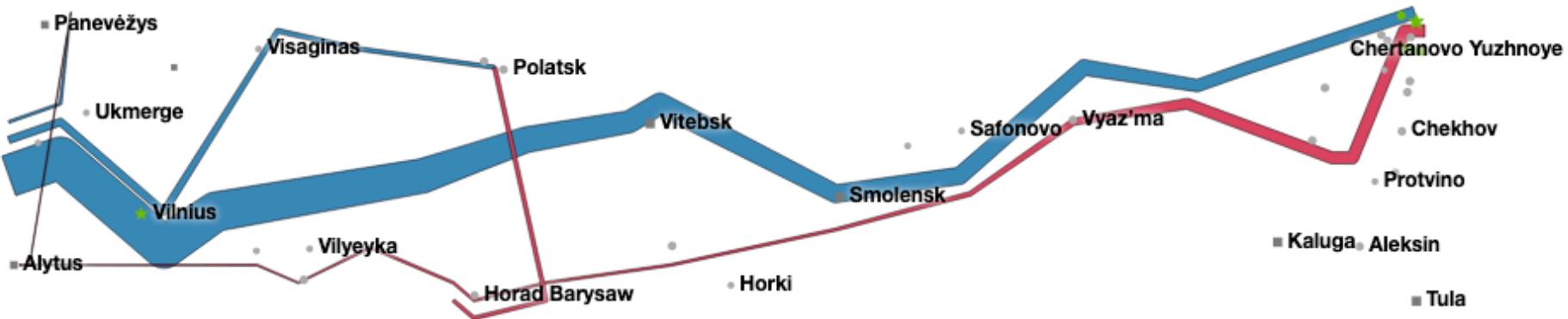
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Sources:

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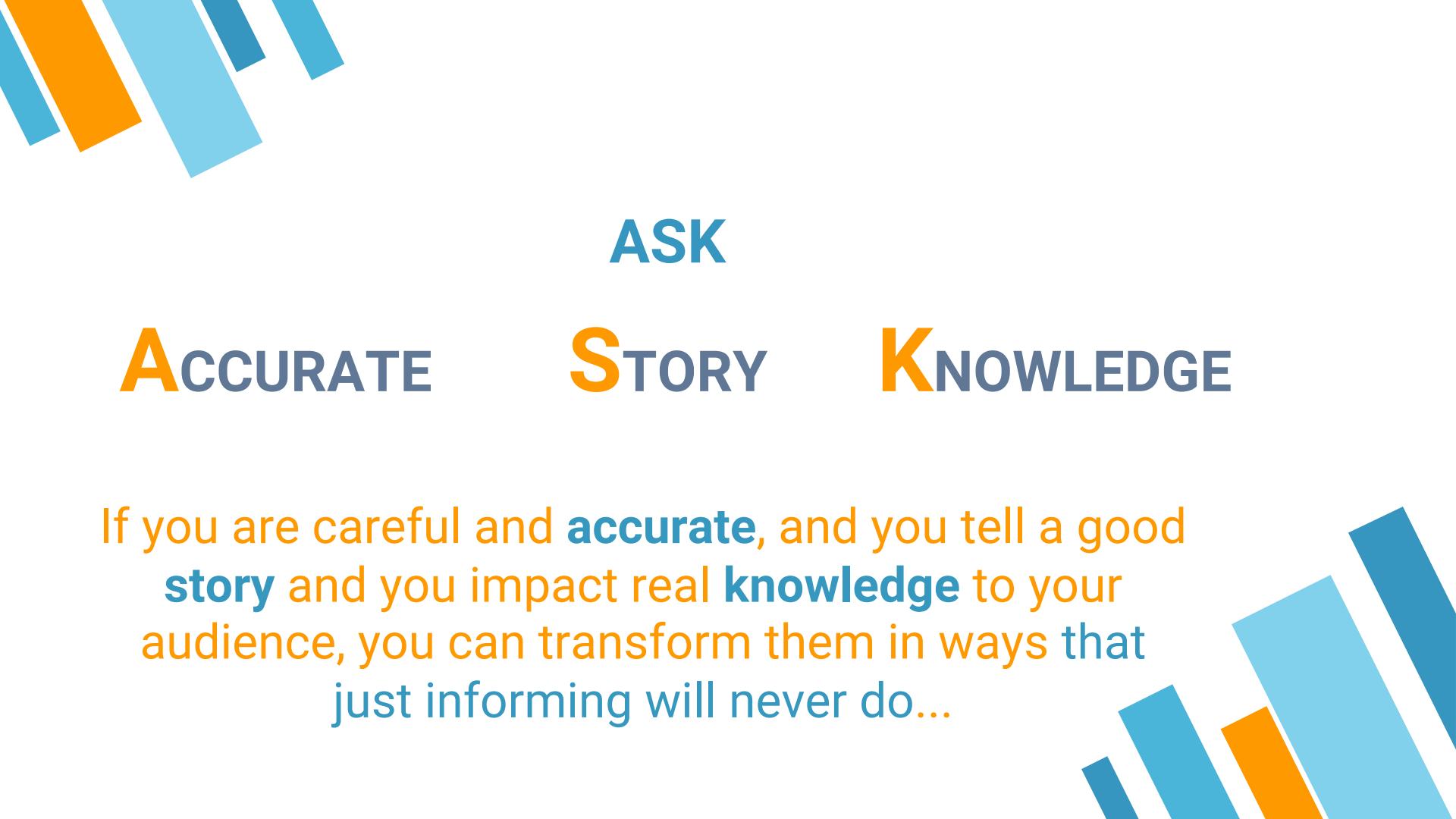
```
%brunel data('df') map('russia', 'belarus', 'lithuania') + path  
x(long) y(lat) color(direction) size(survivors:400%)  
split(group) legends(none) + map(labels) ::width=1000,  
height=350
```



ASK – Knowledge

- » John Snow had a theory about cholera.
- » He proved it was correct by mapping out death of cholera.





ASK ACCURATE STORY KNOWLEDGE

If you are careful and **accurate**, and you tell a good **story** and you impact real **knowledge** to your audience, you can transform them in ways that just informing will never do...

Visual Perception



Early forms of written language



Early forms of written language



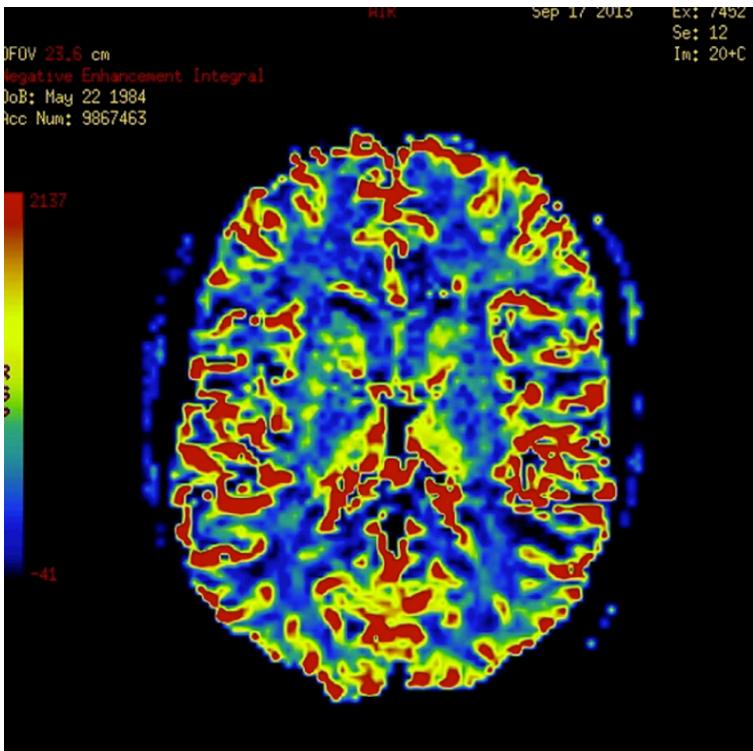
a learned man

learn·er /'lɜrnər/ noun [c] someone learning something: *a learner*

learn·ing /'lɜrnɪŋ/ noun [u] **1** the process of gaining knowledge and experience by studying **2** knowledge someone has gained, especially by

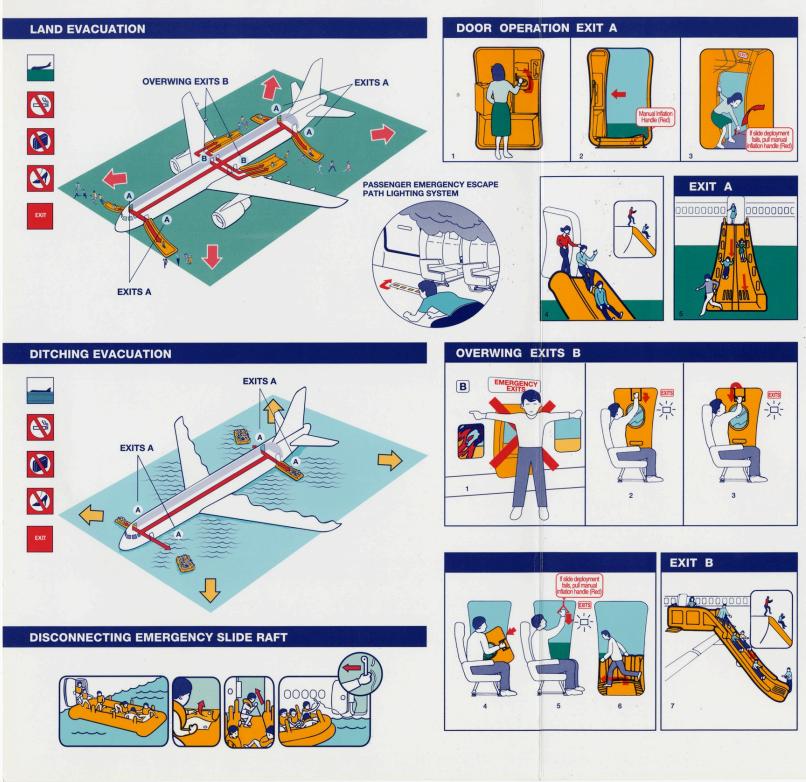
'learning curve noun [c] the rate at which you learn something: *I've never been on a learning curve like this before.*

How do human visually process things



- » 30-50% devoted to **visual processing**
- » 75% of our sensory receptors are in our **eyes**
- » 1/10th of second to **process** a virtual scene

How do human visually process things

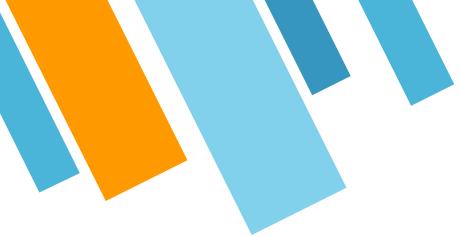


» 383% better performance on tasks when learning with **images vs. text**

» **Picture superiority effect:** remember 60% of something learned by imagery vs. 6% without

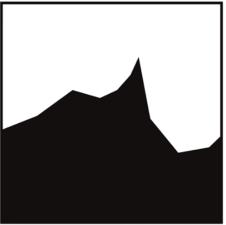
Gestalt Principles

- » Figure / Ground
- » Proximity
- » Similarity
- » Parallelism
- » Common fate
- » Closure
- » Continuity

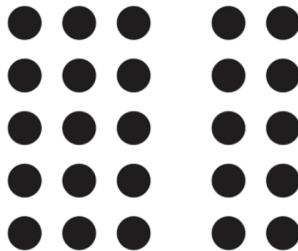


Gestalt Principles

» Figure / Ground

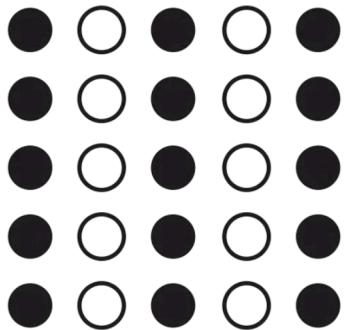


» Proximity

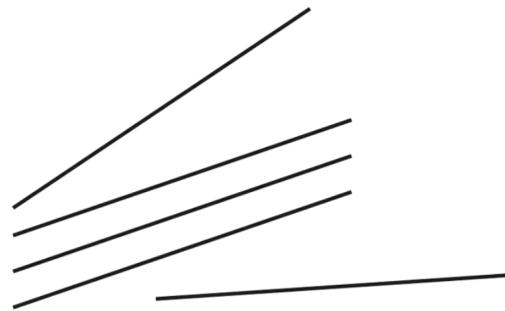


Gestalt Principles

» Similarity



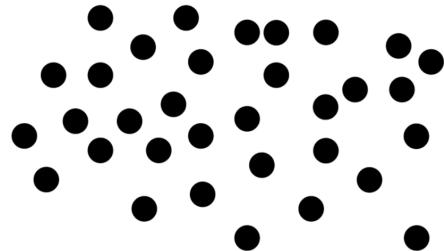
» Parallelism





Gestalt Principles

» Common Fate



» Closure and continuity

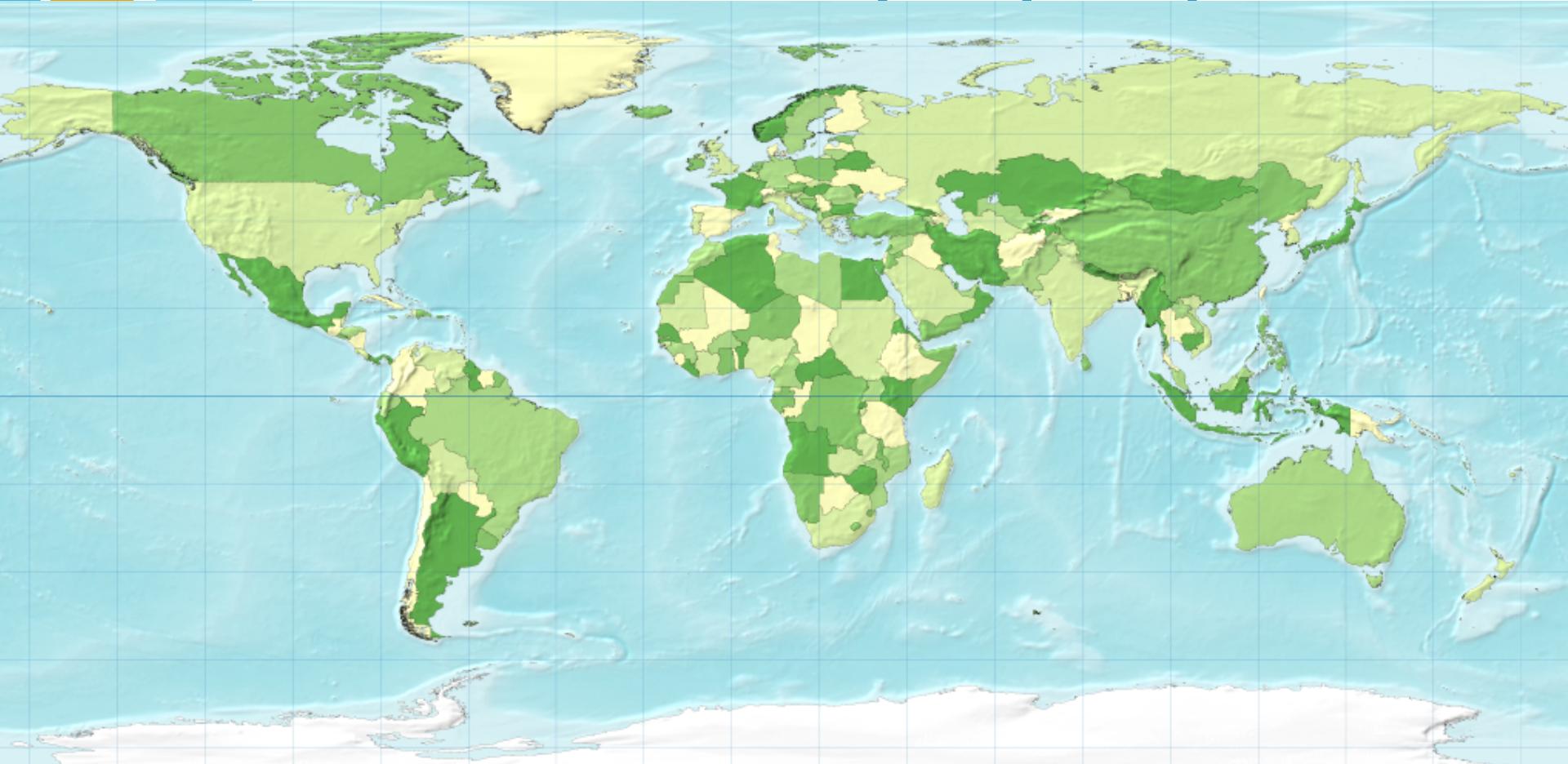


Gestalt Principles

- » Figure / Ground
- » Proximity
- » Similarity
- » Parallelism
- » Common fate
- » Closure
- » Continuity



How data can impact perception



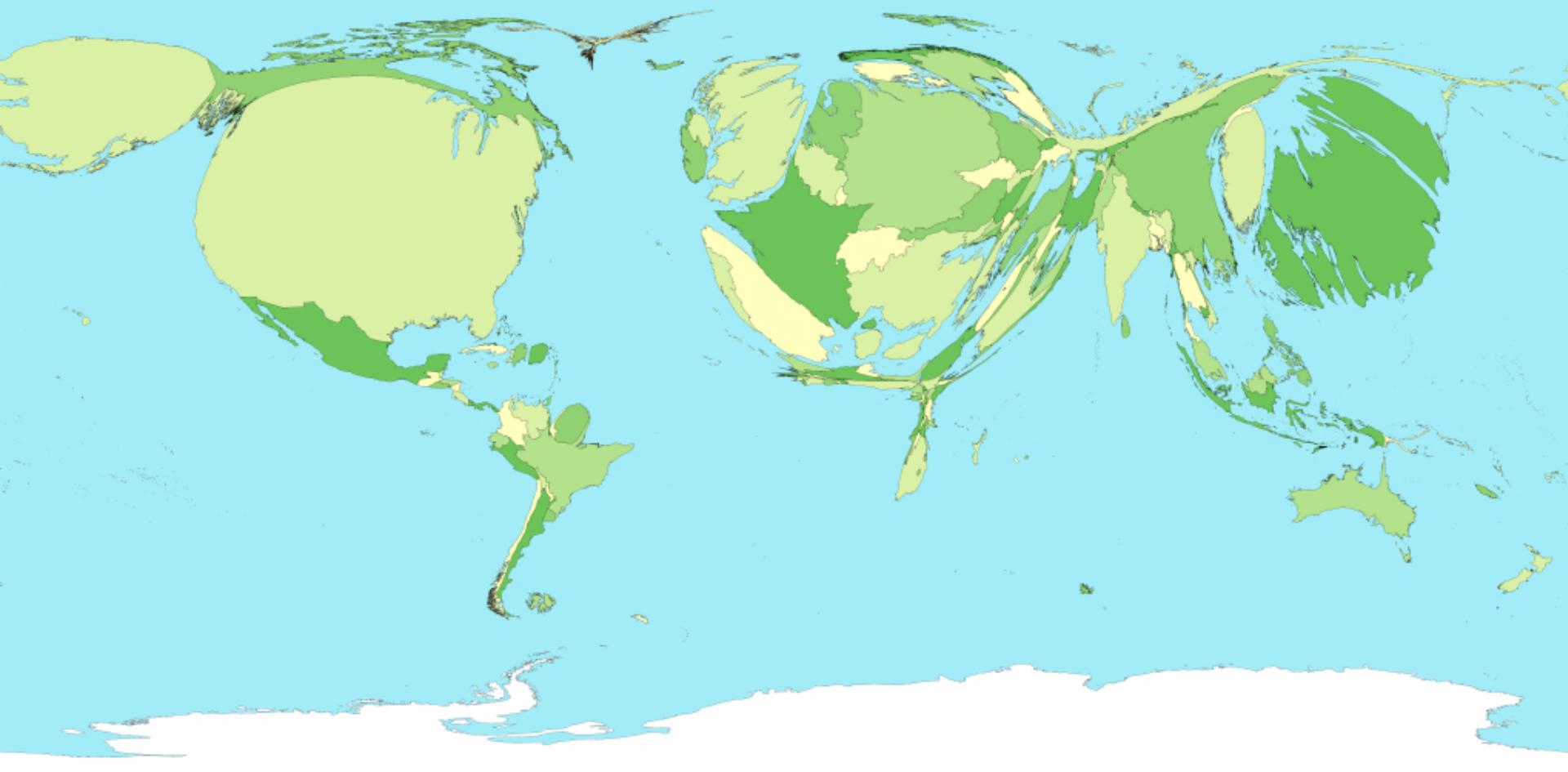


How data can impact perception



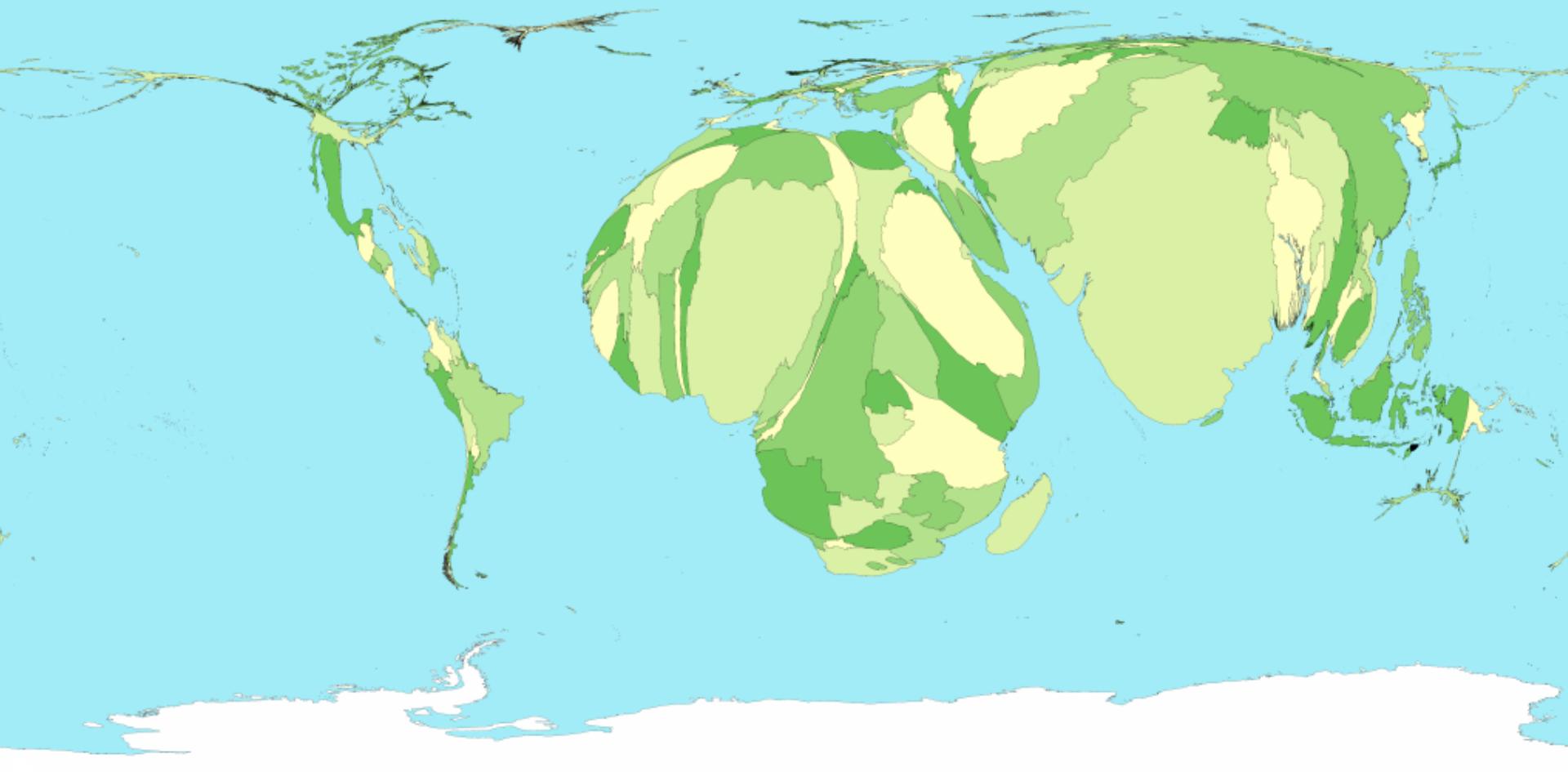


How data can impact perception



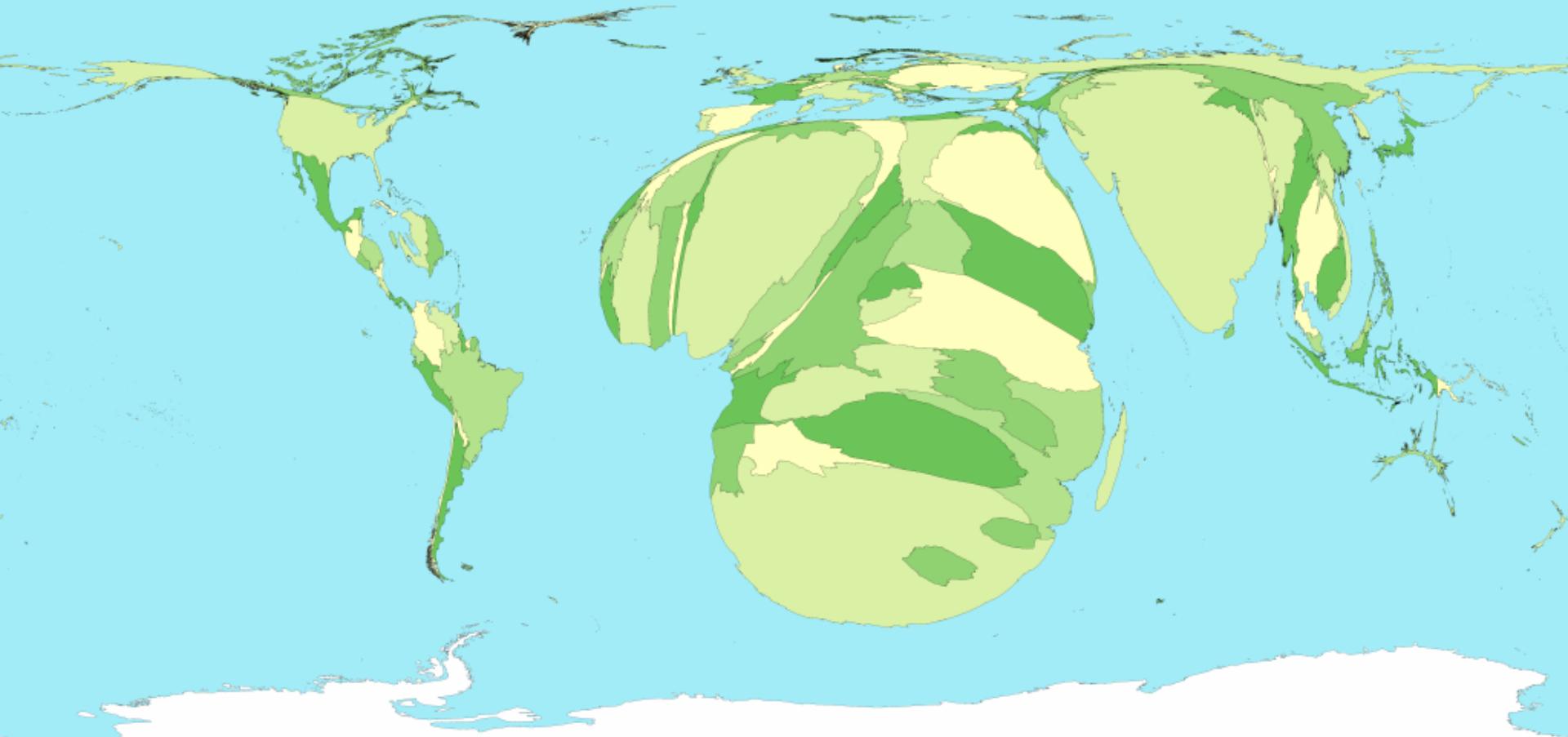


How data can impact perception



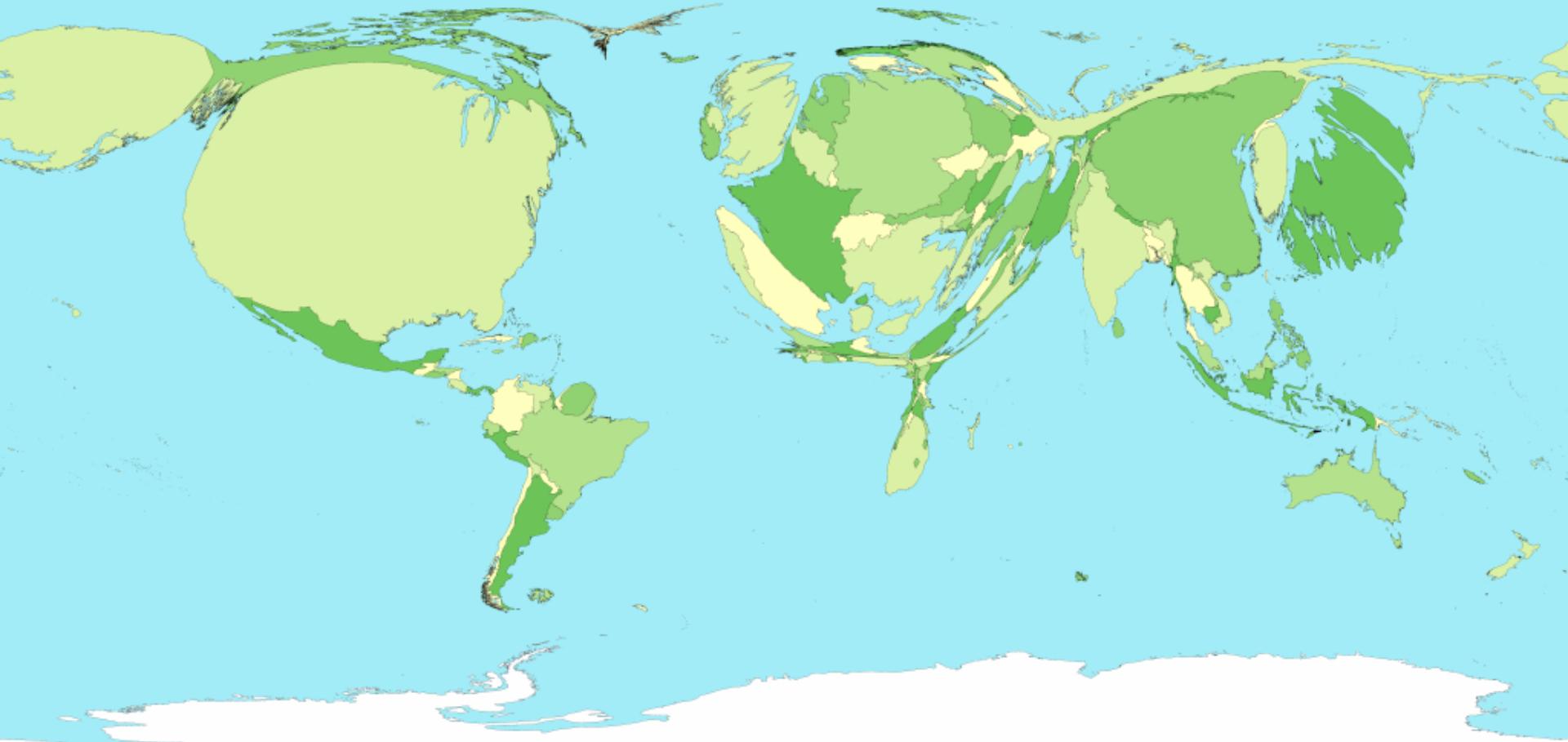


How data can impact perception



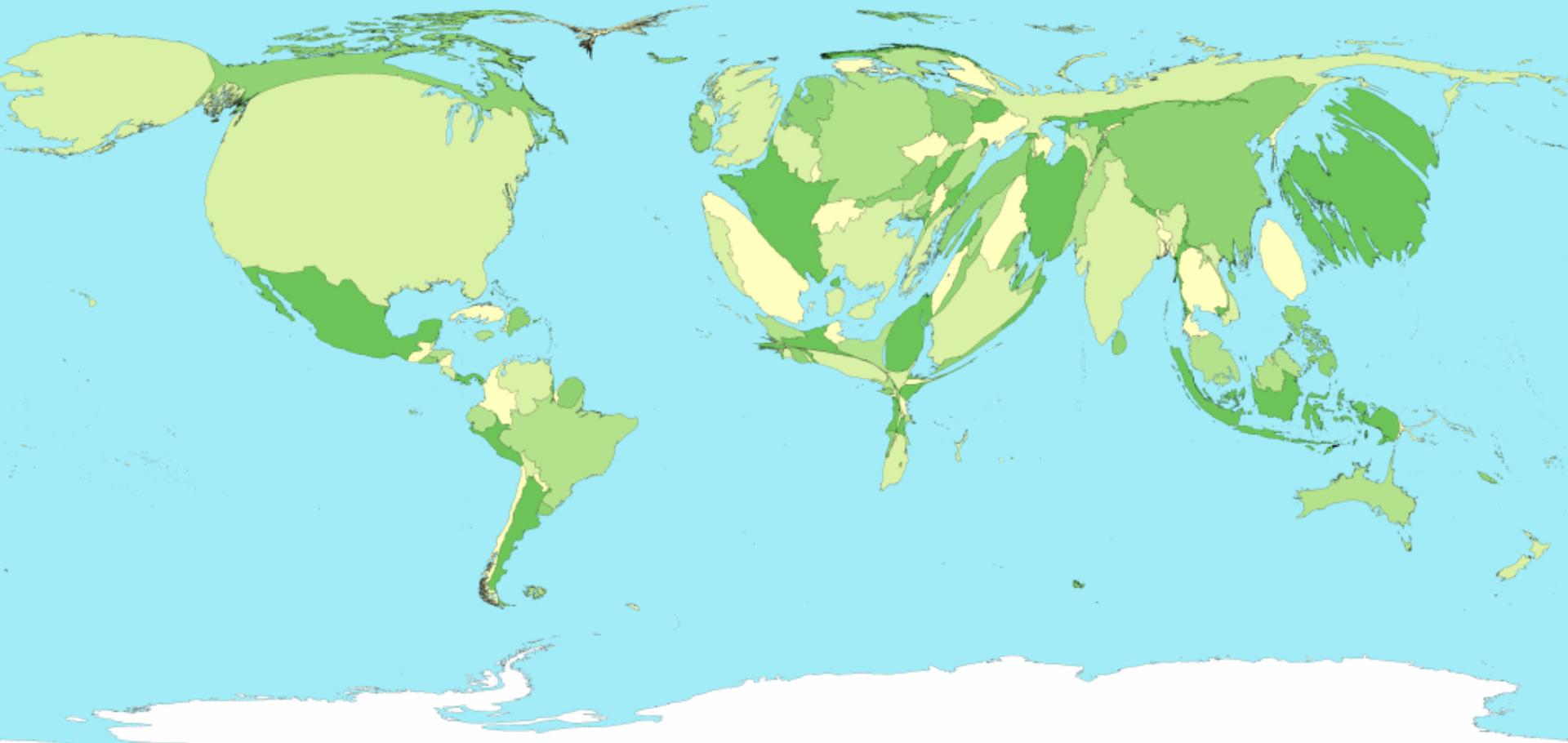


How data can impact perception



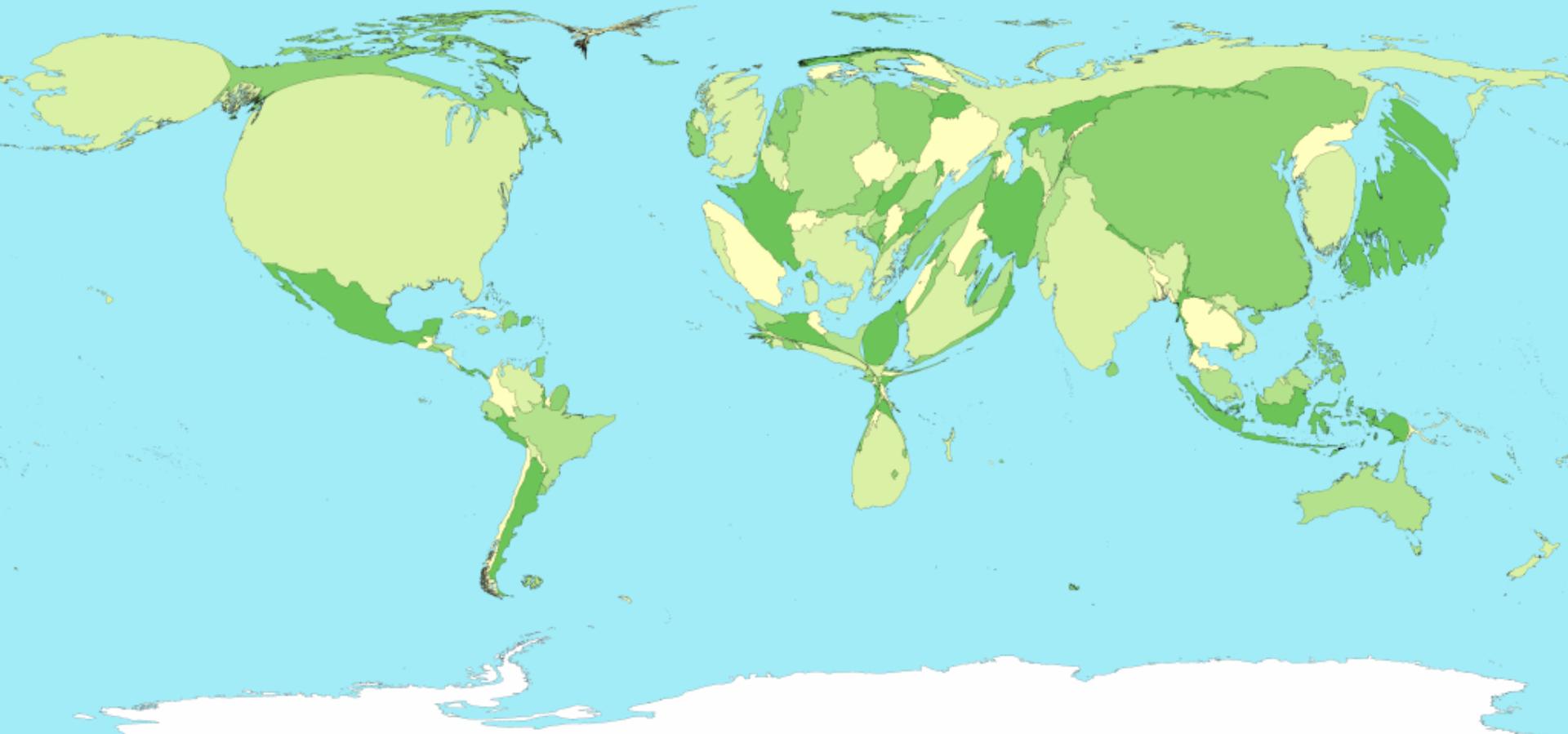


How data can impact perception





How data can impact perception



So what is YOUR PERSONAL definition of Data Visualization?

Mail to genard@fr.ibm.com
Subject: EDHEC MSc

6 reasons to visualize your data

- People are suffering information OVERLOAD**
Long wordy reports & boring DIY charts take too much effort to interpret.
Does this sound like your business?
- 83% of learning occurs visually**
Images are easier to digest
Infographics transform plain facts into visuals that are easier to remember.
What data are you not explaining clearly?
- Images are memorable**
Colour, contrast, rhythm & shapes make complex data in graphics easily remembered. Same reason why you remember TV ads.
Would you like people to remember your message but not have to pay big \$\$\$ for a TV ad?
- Images are more appealing**
Clever infographics attract your eye, arouse interest, appeal to your curiosity, make you smile & compel you to absorb data.
Does your data need to be more appealing?
- Make you an industry leader**
No matter how boring your industry, data viz can help **EVERY** business look like the leader.
How could you use data viz in your business? Talk to www.6design.com.au today.
- ABC + data viz = Infographics get shared**
Clever infographics are shared on blogs, websites & social media. Print versions are shared in papers & magazines. This all generates valuable brand awareness & boosts SEO. Would you like to go viral?

100% awesome



THANKS!

Any questions?

You can find me at

- » @manuGenard
 - » genard@fr.ibm.com
- 