Data storytelling

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IAT 355

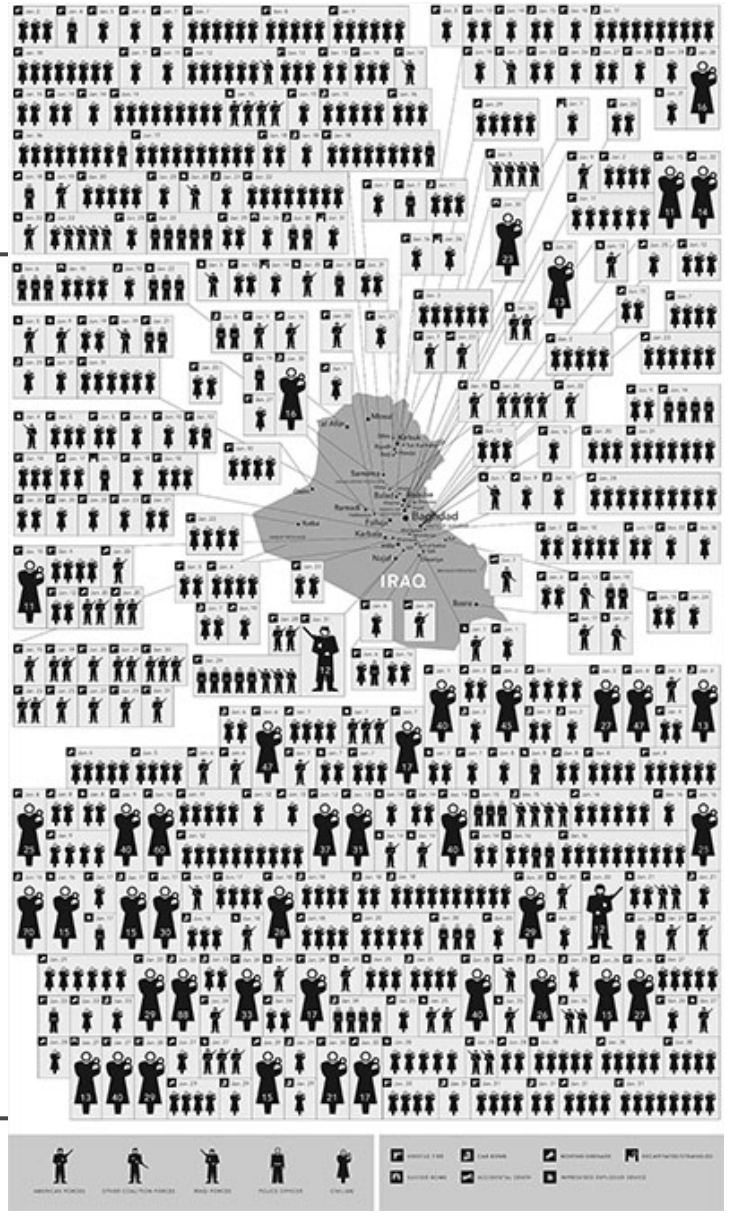
SFU

SCHOOL OF INTERACTIVE ARTS + TECHNOLOGY

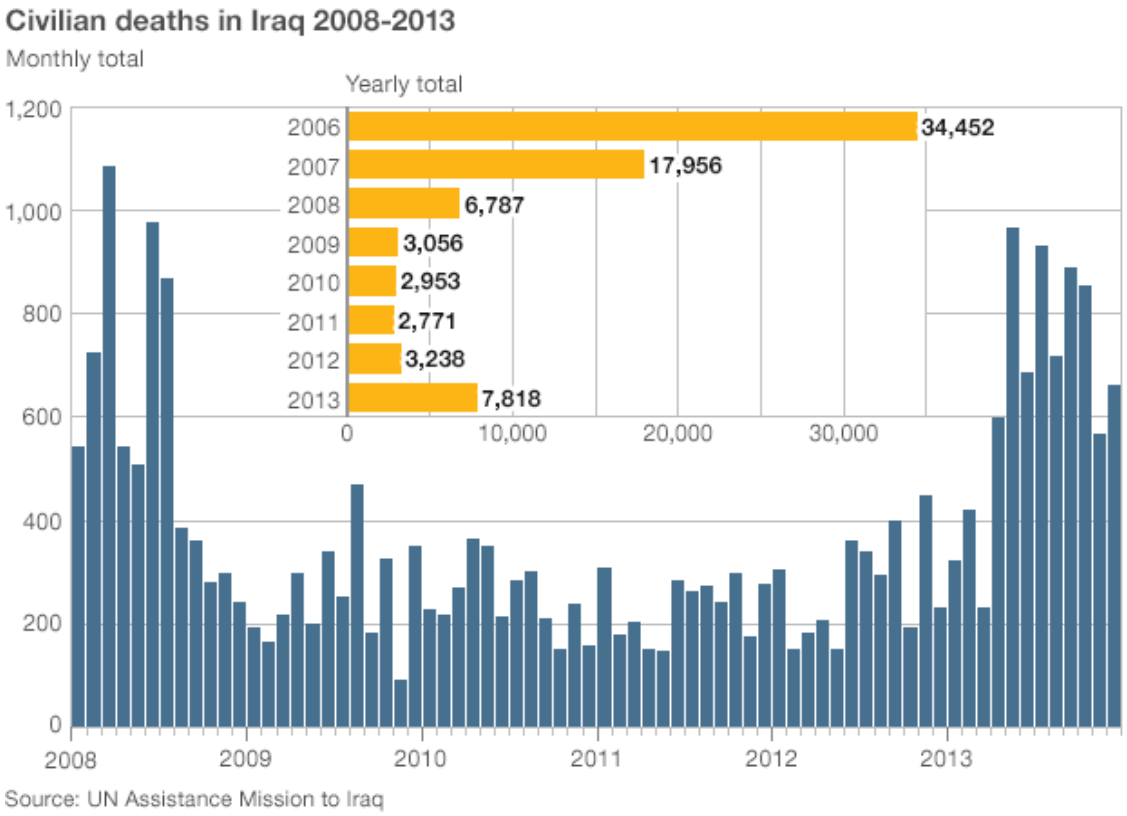
Administrivia

- A5
- Final project demonstration showcase
- Pilot user review
- Reports

What's wrong with this vis?



Is this better ?



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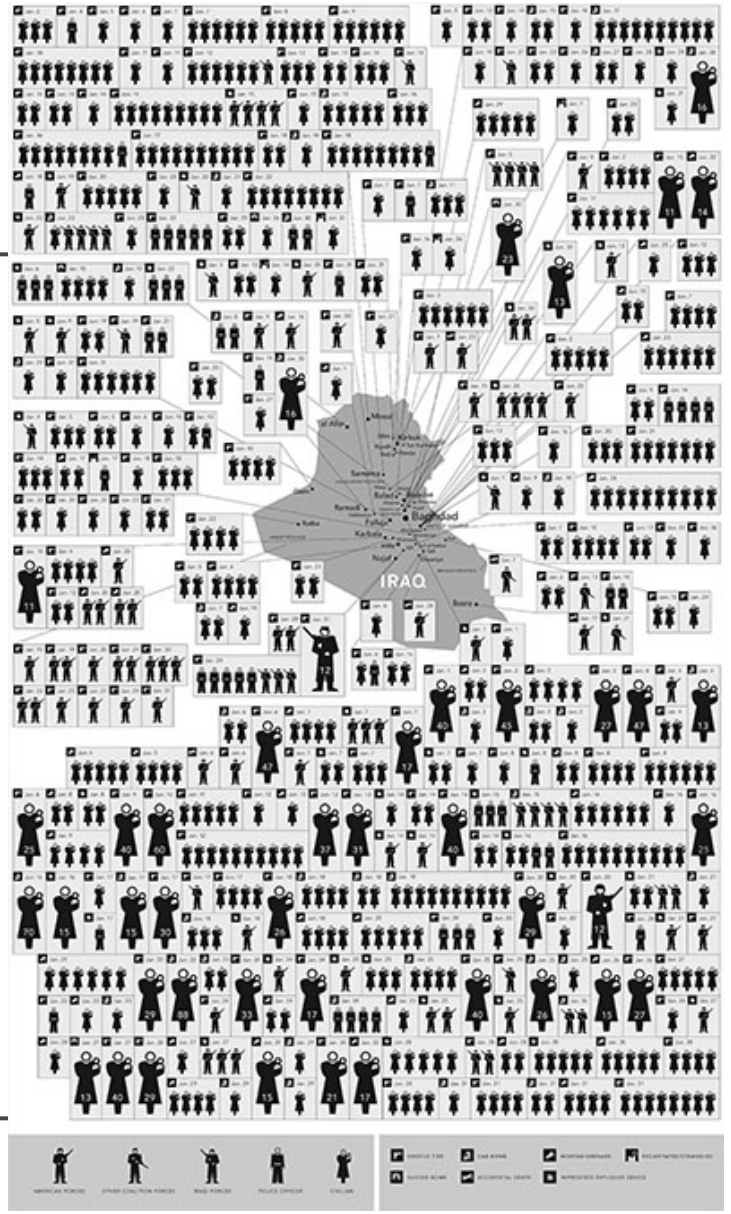
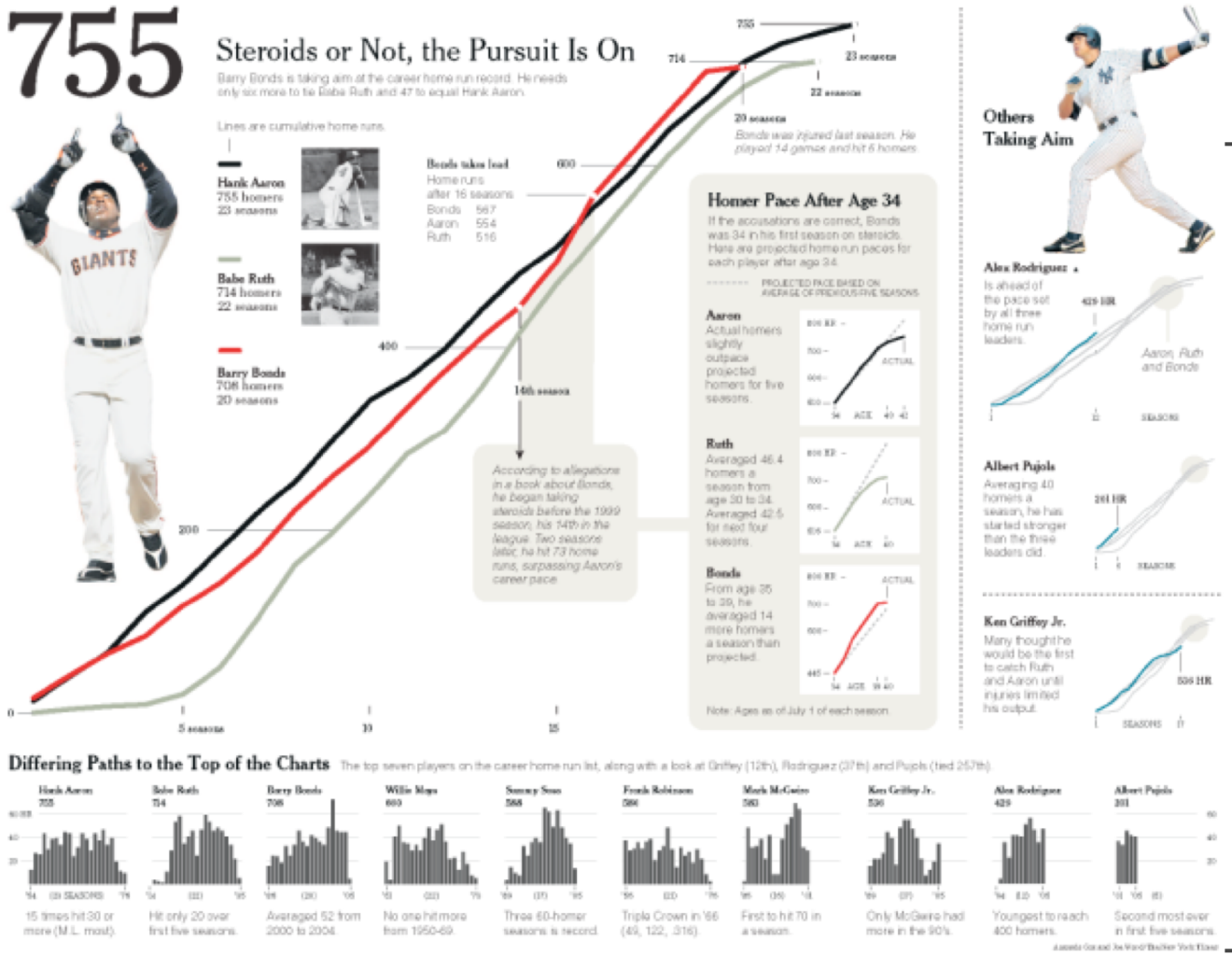


Telling stories with data



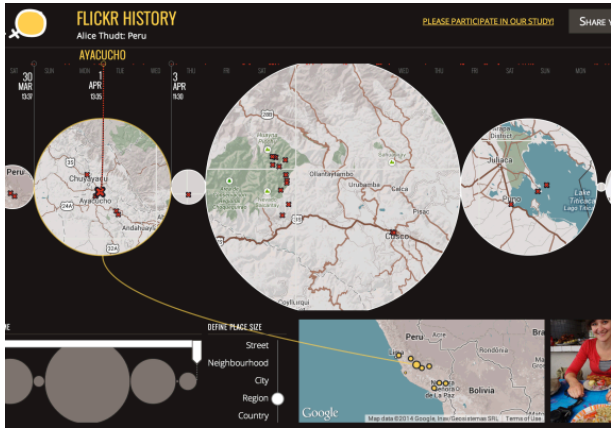
Edward Segel, Jeffrey Heer. **Narrative Visualization: Telling Stories with Data** *IEEE Trans. Visualization & Comp. Graphics (Proc. InfoVis)*, 2010

Interactive data stories

- NY Times Interactive Visualizations (recession/recovery 2014)
  http://www.nytimes.com/interactive/2014/06/05/upshot/how-the-recession-reshaped-the-economy-in-255-charts.html

- What's really warming the world?
- http://www.bloomberg.com/graphics/2015-whats-warming-the-world/

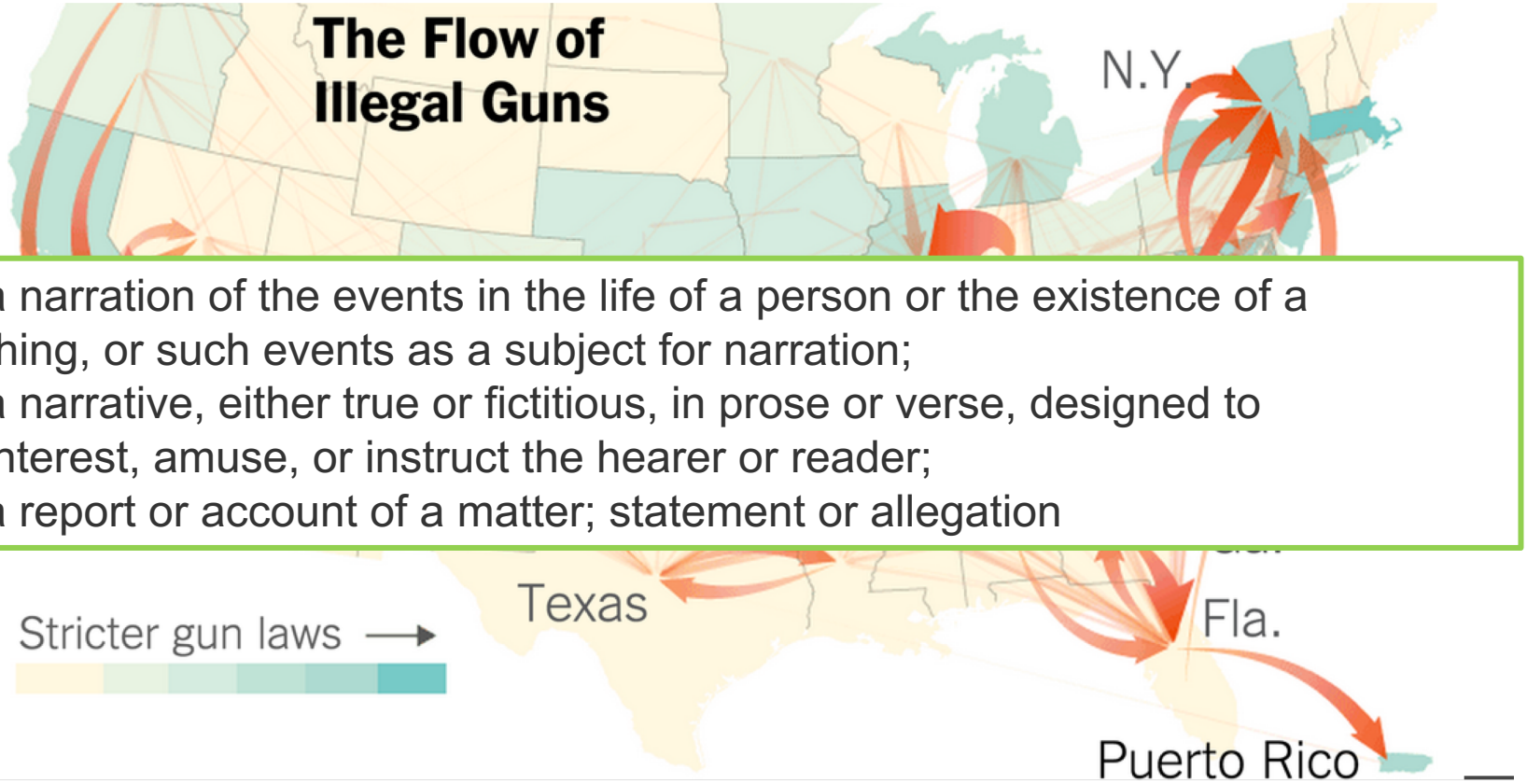
- Personal narratives and journals
- http://alicethudt.de/portfolio/visual-mementos/



Visualization as part of narrative

- *http://edition.cnn.com/SPECIALS/war.casualties/index.html*
- *http://www.angelamorelli.com/water/*
- Hans Rosling's TED talk with Gapminder

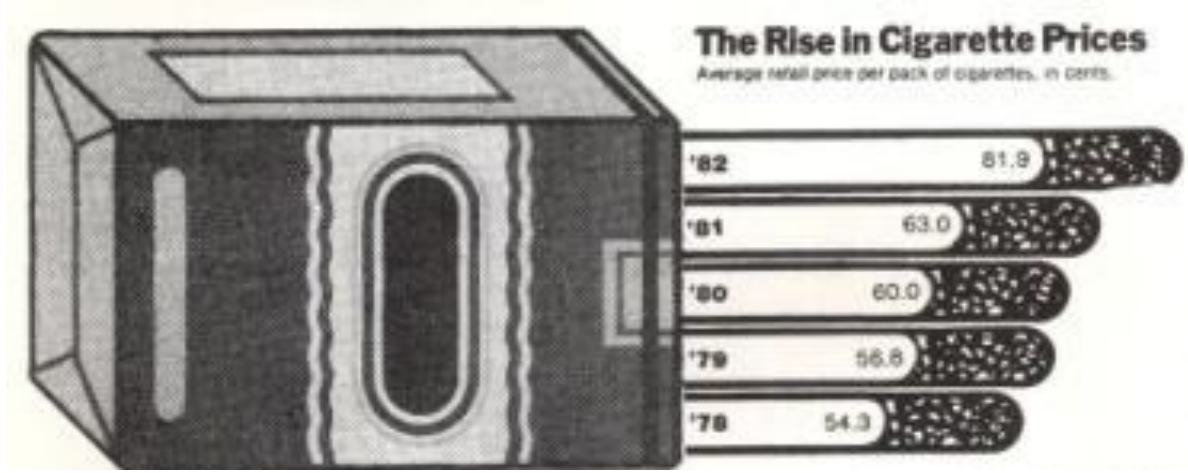
(Why) is this a story?

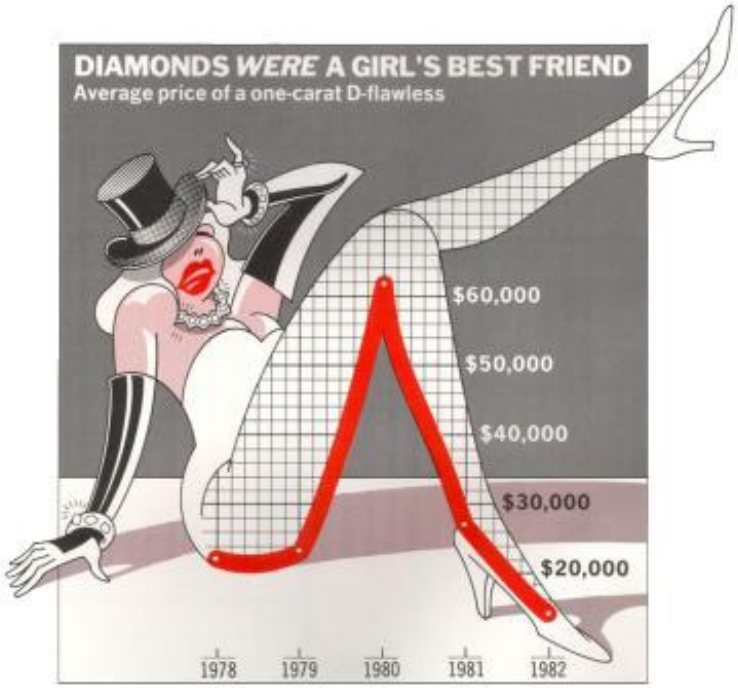


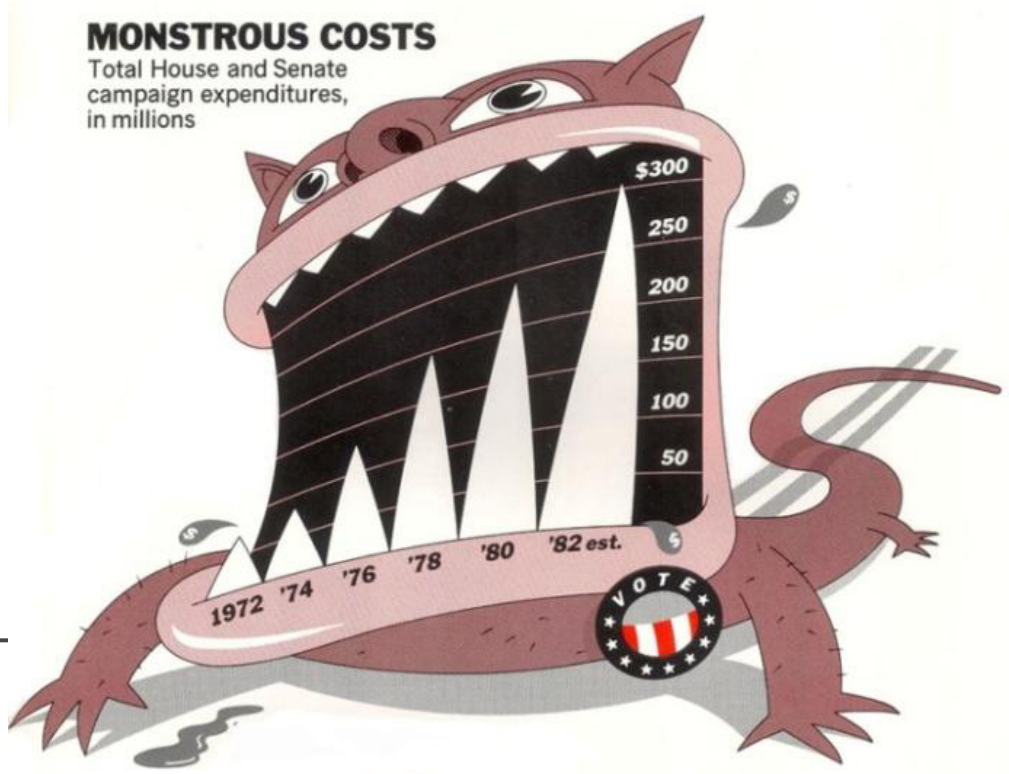
a narration of the events in the life of a person or the existence of a thing, or such events as a subject for narration;
a narrative, either true or fictitious, in prose or verse, designed to interest, amuse, or instruct the hearer or reader;
a report or account of a matter; statement or allegation

http://www.nytimes.com/interactive/2015/11/12/us/gun-traffickers-smuggling-state-gun-laws.html

InfoGraphics



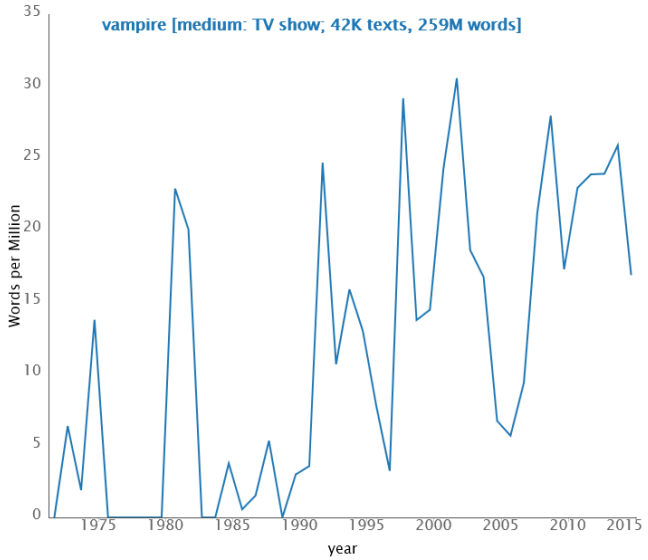




Infographics versus Data Visualizations (Krum, 2014)

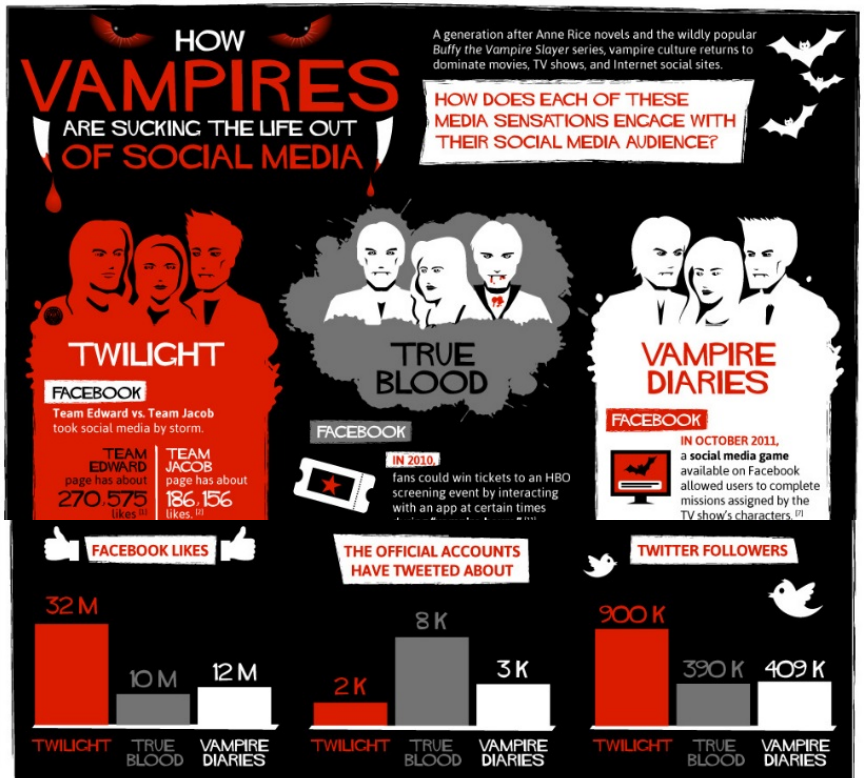
Data visualization –

a visual representation of data



Occurrences of the word "vampire" in TV Show Dialog (1970-2014) from movies.benschmidt.org

Infographics –data visualizations, text, images to tell a complete story

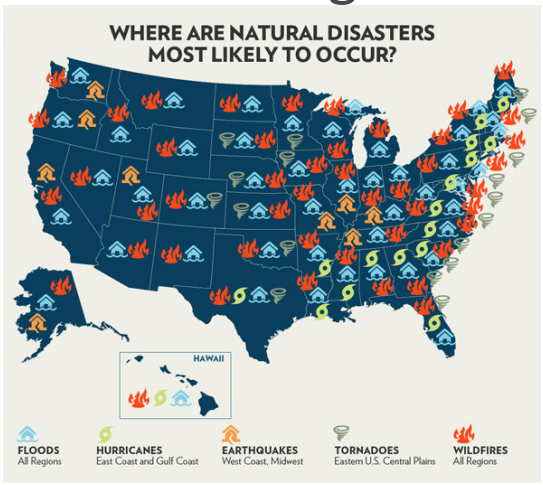


http://infographics.idlelist.com/how-vampires-are-sucking-the-life-out-of-social-media/

The value of infographics

How do infographics help us deal with big data?
Information overload?

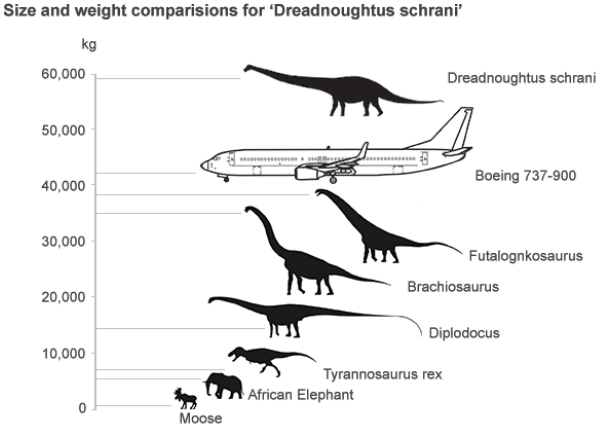
Pattern recognition



http://dailyinfographic.com/preparing-your-home-for-a-natural-disaster-infographic

text

Picture



http://www.bbc.com/news/science-environment-29050114

Storytelling through infographics

Not different from the storytelling tips from before, but from a slightly different angle…

From: Krum, R. (2014). Cool infographics: Effective Communication with Data Visualization (Figure 1-21).

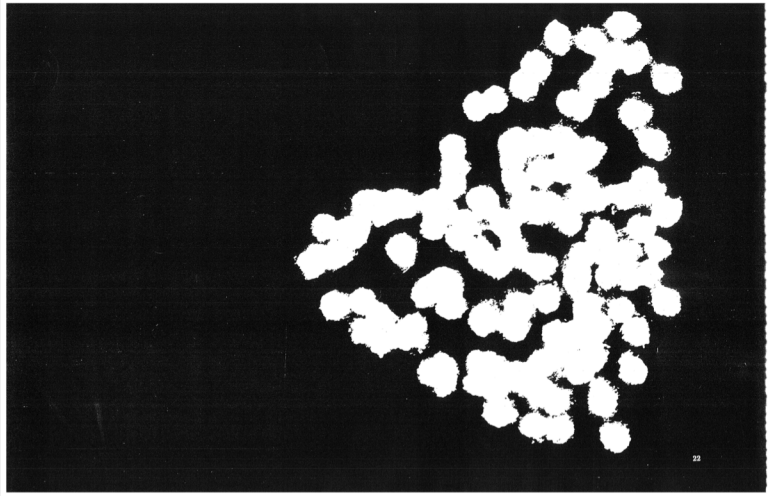
Other Design Tips for Infographics from Krum

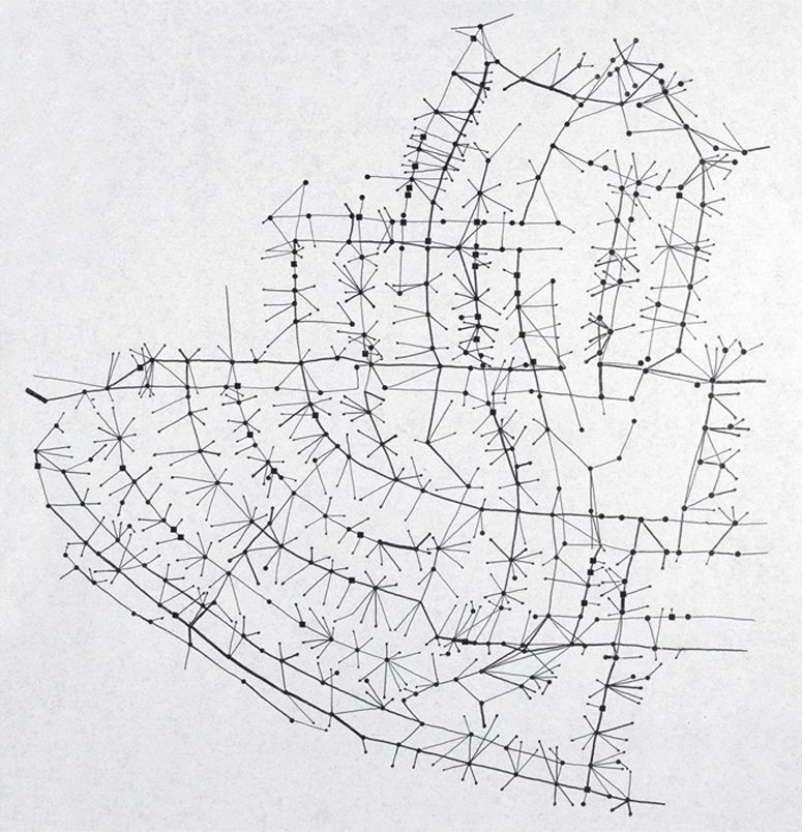
- 5-second rule
- Tell one story really well
- Minimize text – visualize when possible
- Eliminate legends when possible
- Be data transparent (cite your sources)

http://en.ilovecoffee.jp/posts/view/79

Adapted from Krum, R. (2014). Cool infographics: Effective Communication with Data Visualization.

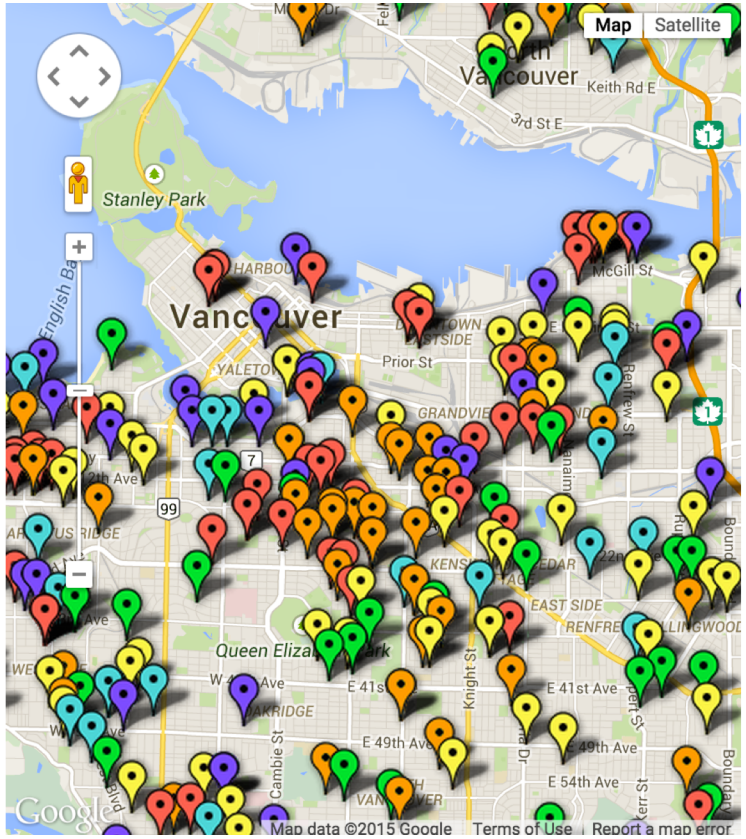
Is that all?

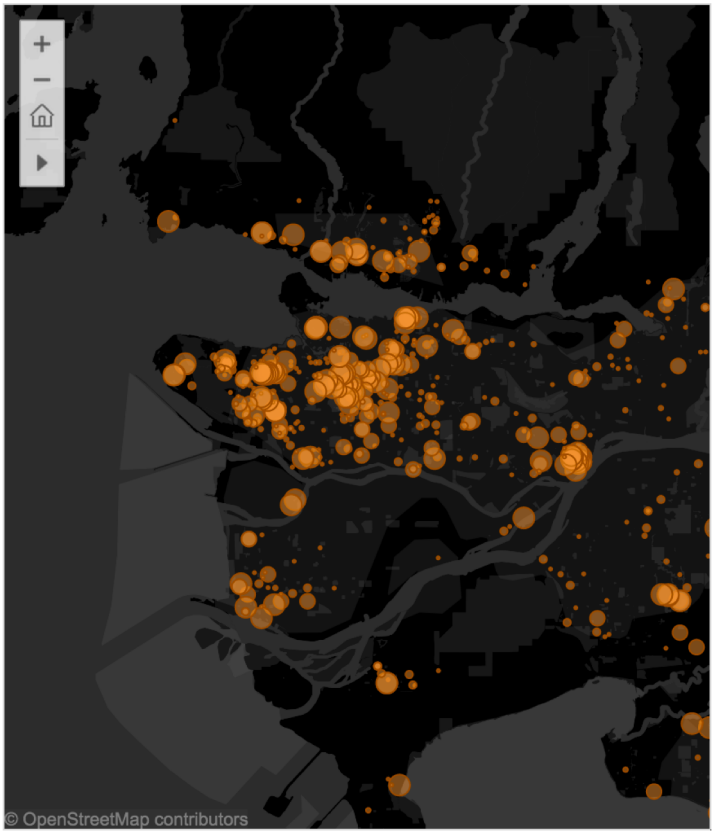




Same data

Different story





http://blogs.vancouversun.com/2014/11/05/650-submissions-to-2014-trick-or-treat-count-map/

What makes a data story?

- Story: all of the events in a narrative, those presented directly to an audience and those which might be inferred

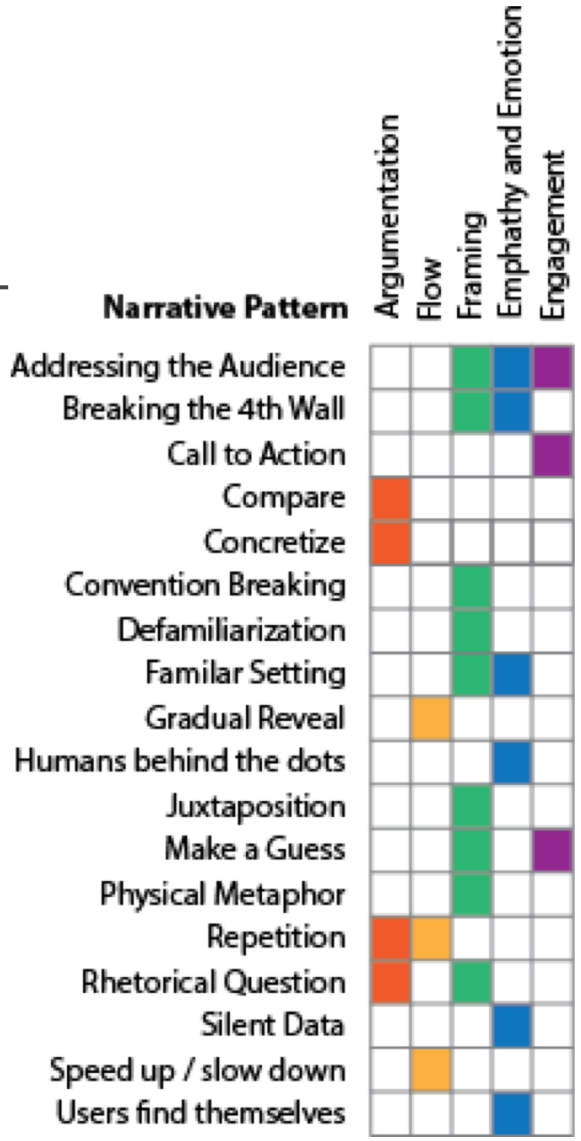
- Narrative: the ’telling’ of a sequence of [those] events [. . .] [which] shapes the events, characters, arrangement of time, etc. in very particular ways so as to invite particular positions towards the story on the part of the audience

The Media Students Book

Narrative patterns

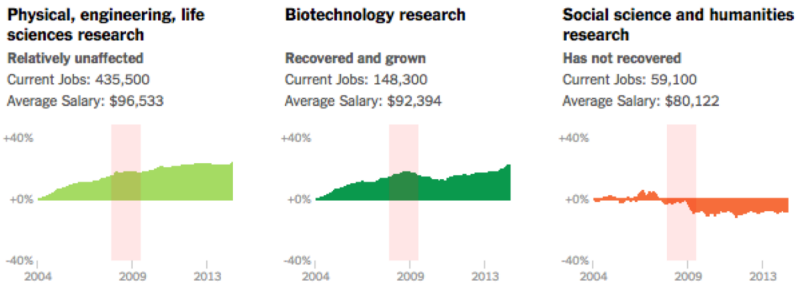
A narrative pattern is a structure that recurs in the same or different stories and serves a specific narrative purpose.

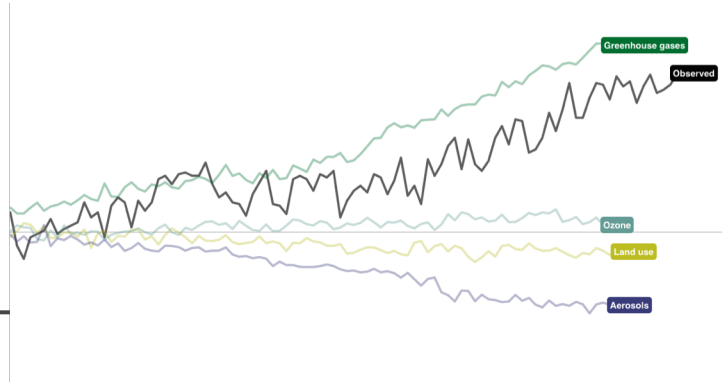
- Argumentation
- Flow
- Framing
- Empathy and emotion
- Engagement



Argumentation

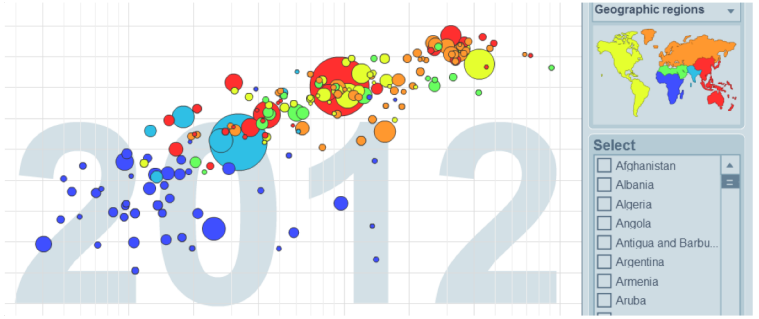
- Rhetorical questions
  - What If I told you : you eat 3496 liters of water?”
- Comparison
  - Show different data sets/values
- Repetition
  - What’s really warming the world?



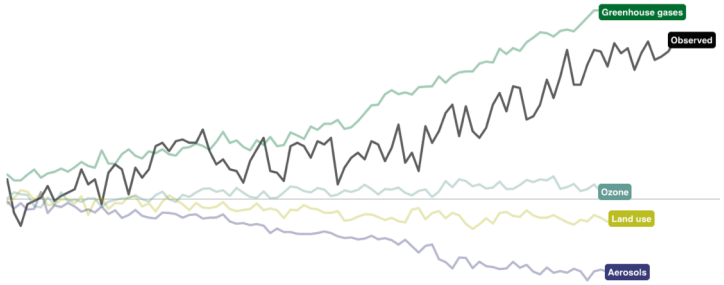


Flow

- Rhythm, order and pacing
  - gapminder

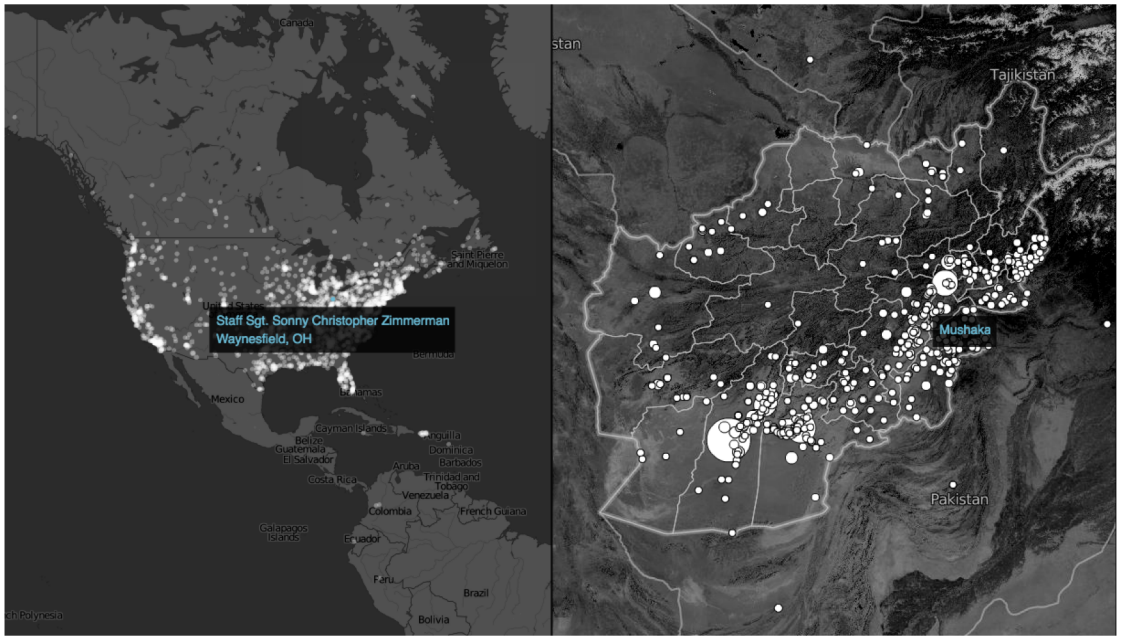


- Gradual reveal
  - Bloomberg climate warming



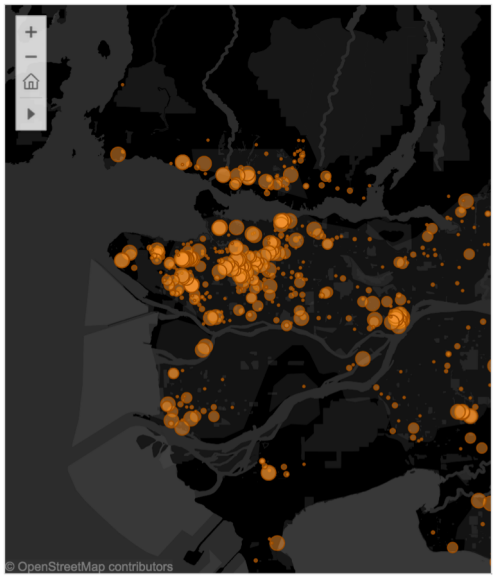
Empathy and emotion

- Humans behind the dots



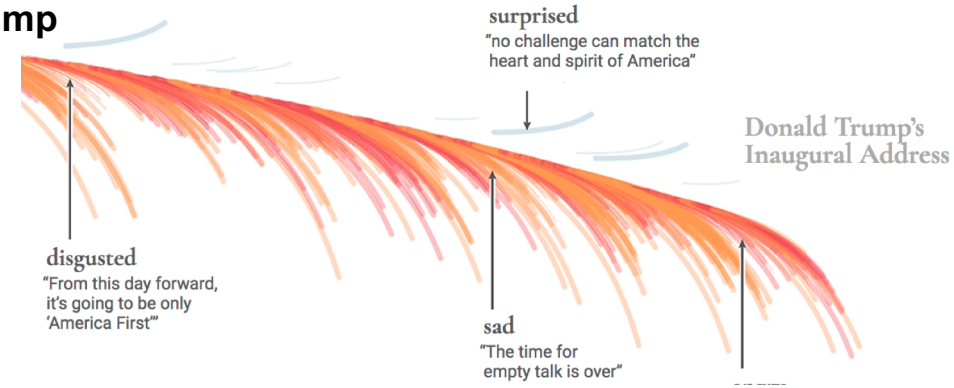
Empathy

- User finds herself

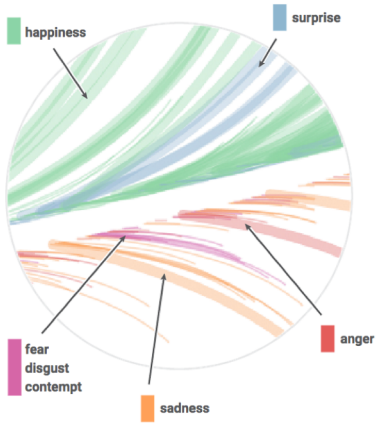


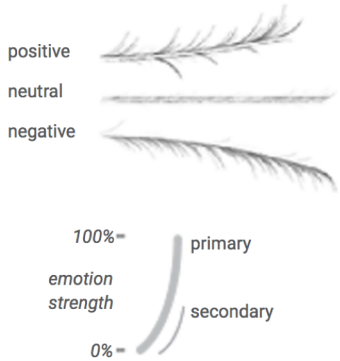
Affect and emotion

Trump



Clinton





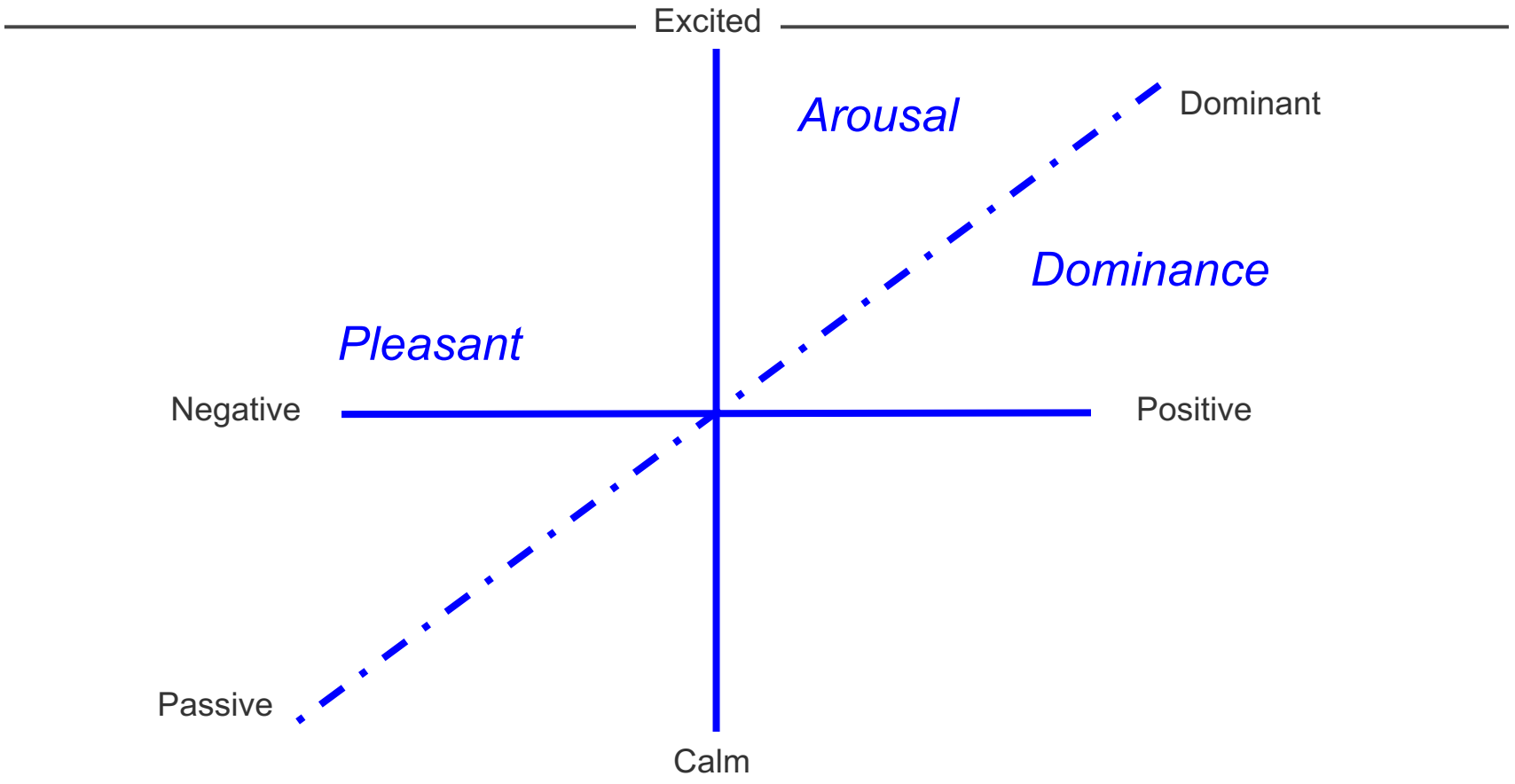
(Why) does this work?

This works

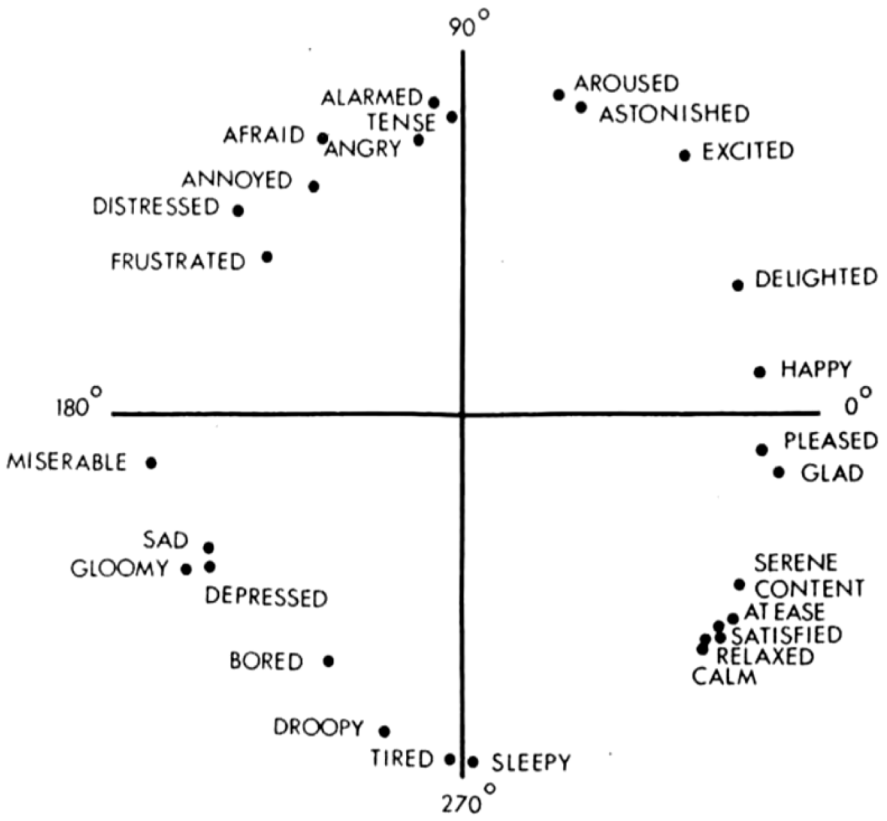
Psychological background: how we make sense of the world

- Cognitive system: thinking, interprets based on reasoning models
  - Induction, deduction, prediction: problem solving
  - Strategy, tactics, ideation..
- Affective system: rapidly “judges” the environment on response to threat, stimulus and experience
  - Emotion
  - Experience
  - Impressions, feelings, “a sense of”

Affect model



Posner, Jonathan, James A. Russell, and Bradley S. Peterson. "The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology." Development and psychopathology 17.03 (2005): 715-734.


90°
ALARMED
TENSE
AFRAID
ANGRY
ANNOYED
DISTRESSED
FRUSTRATED
AROUSED
ASTONISHED
EXCITED
DELIGHTED
HAPPY
180°
0°
PLEASED
GLAD
MISERABLE
SAD
GLOOMY
DEPRESSED
BORED
SERENE
CONTENT
AT EASE
SATISFIED
RELAXED
CALM
DROOPY
TIRED
SLEEPY
270°

Affect

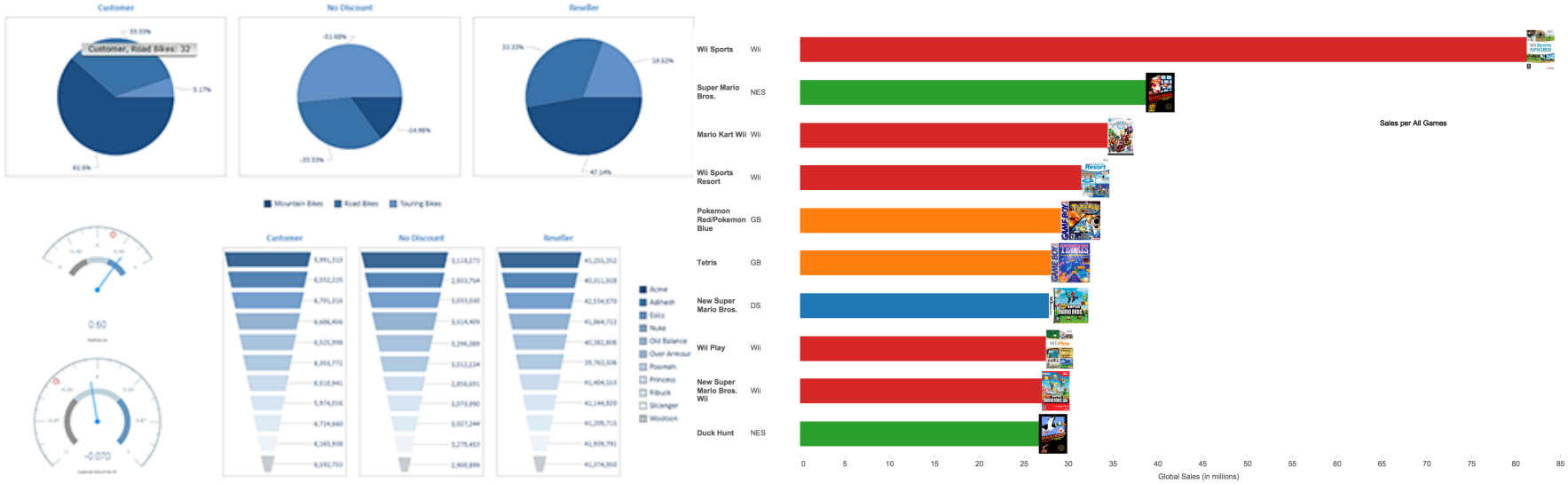
- Information Visualization : **represent** data
- Affective Visualization : **evoke** an experience/feeling
- Affective and cognitive information processing systems interact and reinforce each other

Affect matters in stories

So what does this mean for visualization design?

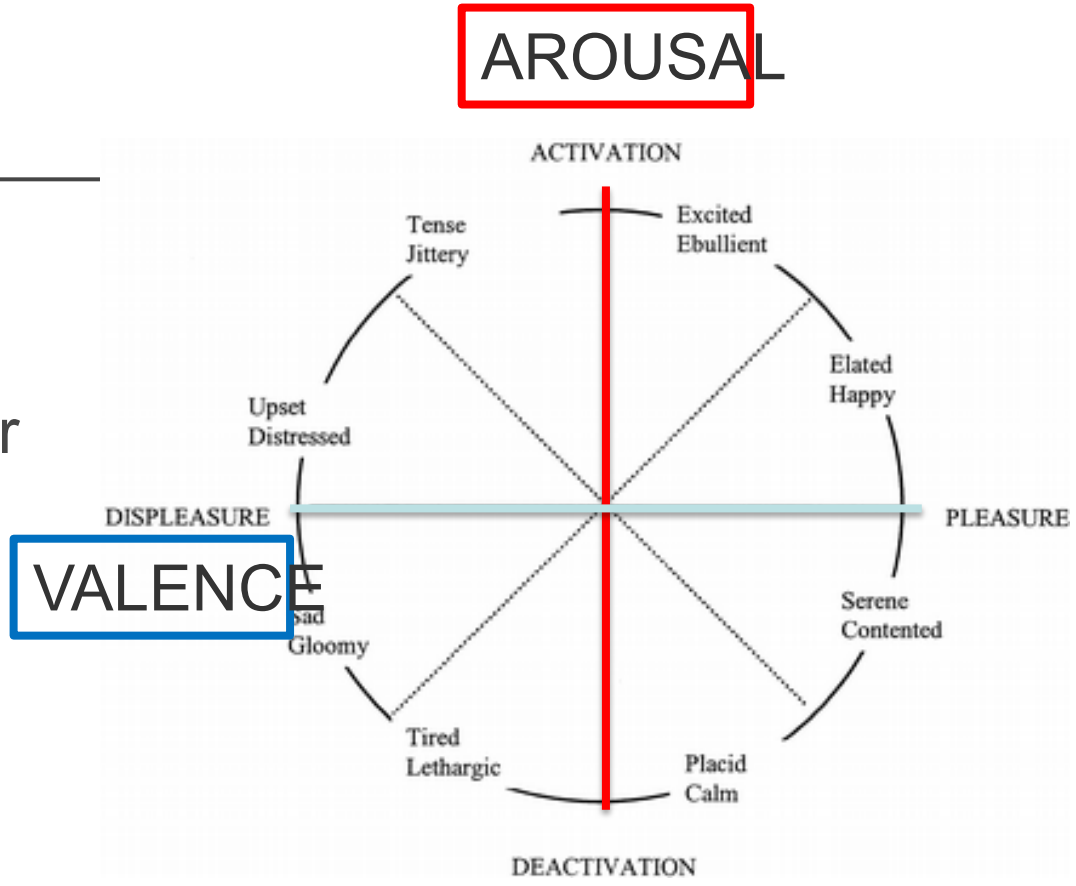
- Explicit
  - Properties of the data
  - Storytelling, narrative and flow
- Implicit
  - Message, persuasion
  - Enhance engagement, reinforce cognition

Affectively different



Affect Theory

- Feelings
- Emotions, moods
- Experiential responses or states



Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological review*, *110*(1), 145

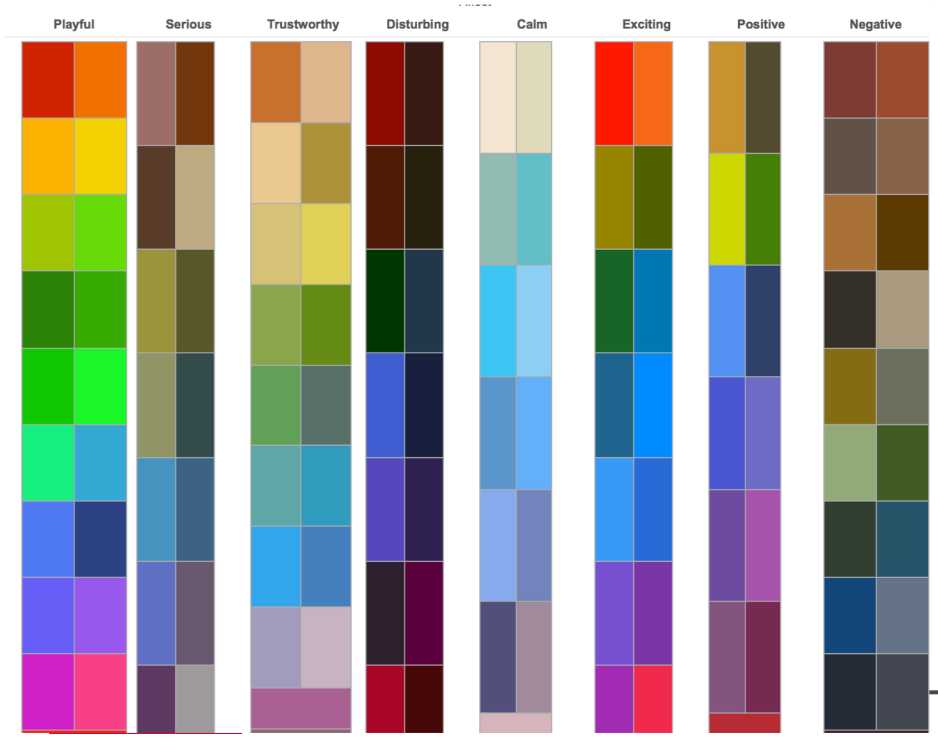
Relevant affect?

- Basic Emotions
- Experiential impressions
  - Trust
  - Curiosity, interest, “worthiness” – willingness to engage, get closer
  - Attracting, reassuring

- “Environmental” judgments
  - Serious
  - Playful

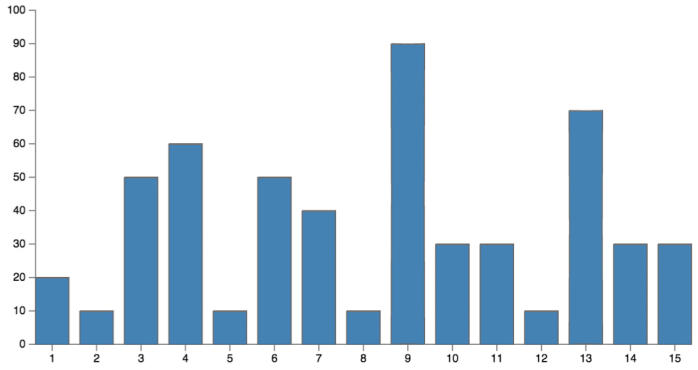
Visual features for affective vis?

Trust ? Playful ? Serious? Disturbing?



Playful Serious Trust Disturbing Calm Exciting Positive Negative

Urgent? Tentative? Strong? Light? Threatening? Encouraging?



Affect Mapping

Disturbing

Exciting

Playful

Negative

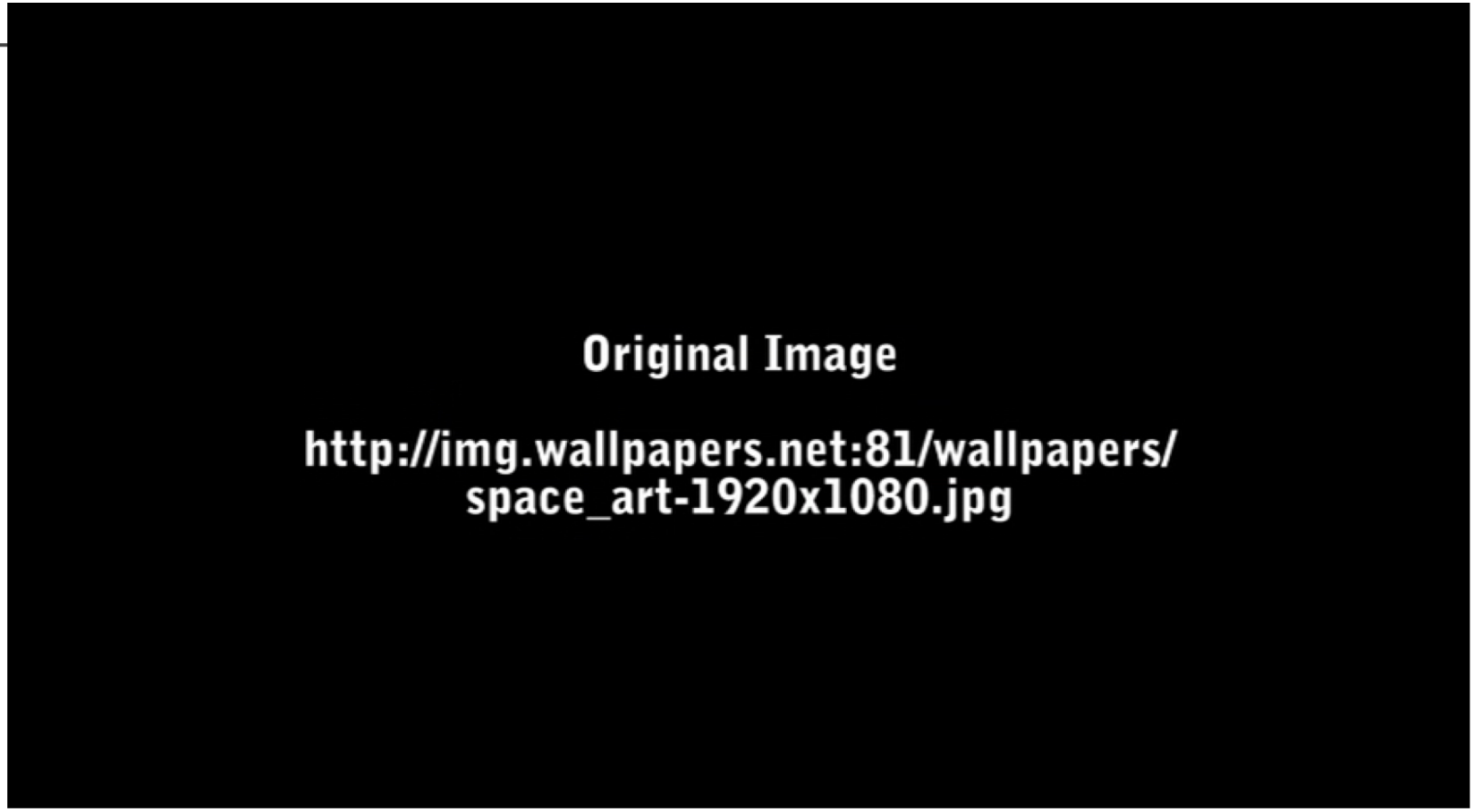
Positive

***Trust*?**

Serious

Calm

Example:Motion brushes for affect



Storytelling

- Internal emotions
  - Aroused after the reader enter the *storyworld*
  - Identification
  - Emotional memories
  - Sympathy or empathizing *with story characters*

- External emotions
  - Aroused when the reader meets the narrative structure
  - Curiosity: “What will happen next?” or “What happened before?”
  - Surprise: “What? How (or why) could it happen?”

K. Oatley, “A taxonomy of the emotions of literary response and a theory of identification in fictional narrative,” Poetics, 23(1), pp. 53–74, Jan. 1995.

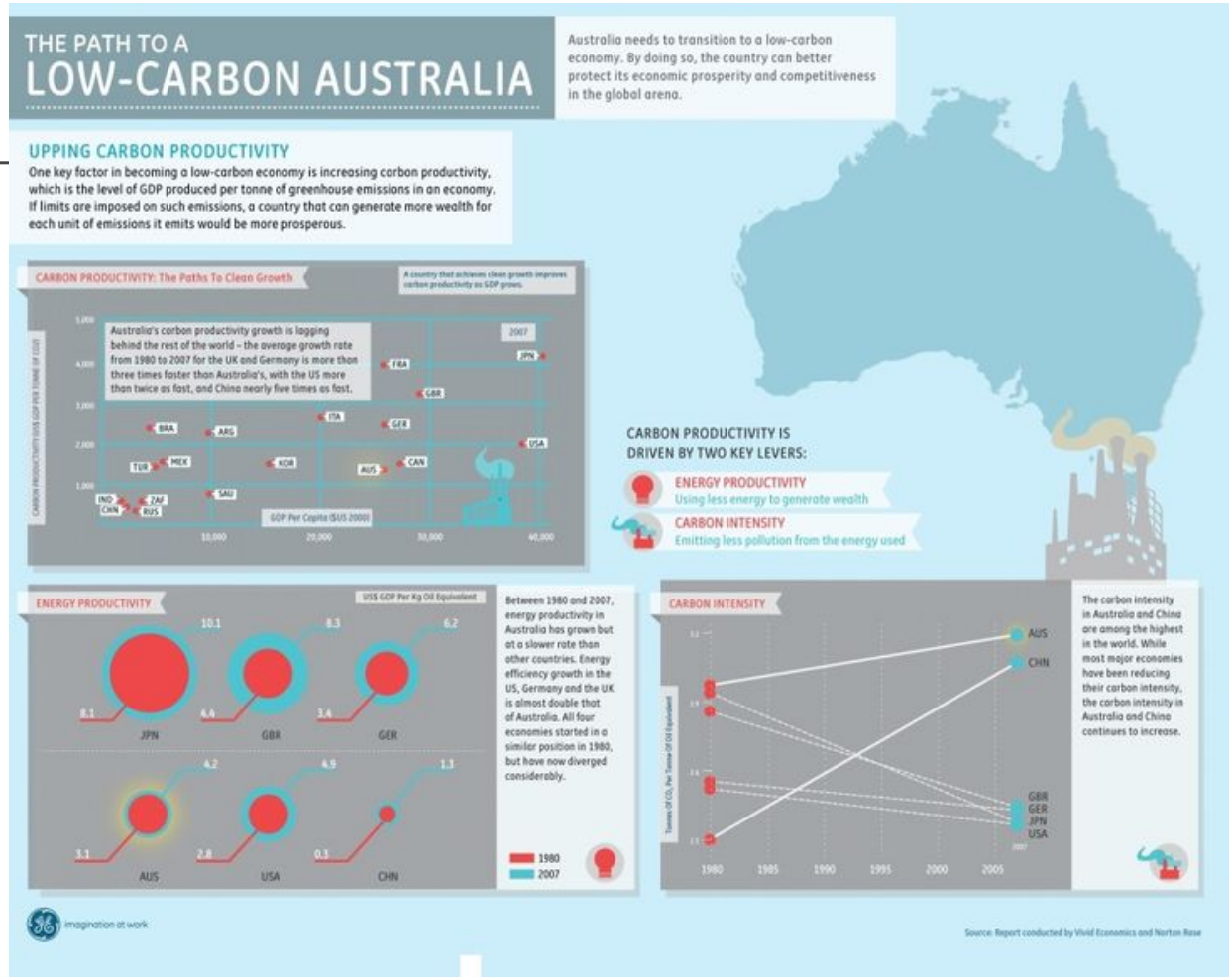
Engagement

- Addressing the audience

Can you live on the mimimum wage?
http://www.nytimes.com/interactive/2014/02/09/opinion/minimum-wage.html

Engagement

- Call to action



Engagement

- Emotion (Stolen years, periscopic)
- Rhetorical questions (breaking the 4th wall)
- Engage the user in predictions (make a guess)
  - *http://www.nytimes.com/interactive/2015/05/28/upshot/you-draw-it-how-family-income-affects-childrens-college-chances.html?_r=0*
- Simulation
  - *http://ig.ft.com/sites/climate-change-calculator*

- Games
  - The Energy Tree

Are there ”analytic” stories?

- Narrative for problem solving

- About exploring solutions and assumptions rather than step-by-step
- Explanatory narrative to remember process and motivations (why I did this?)

- “micro-stories”: evidence and insights to develop understanding

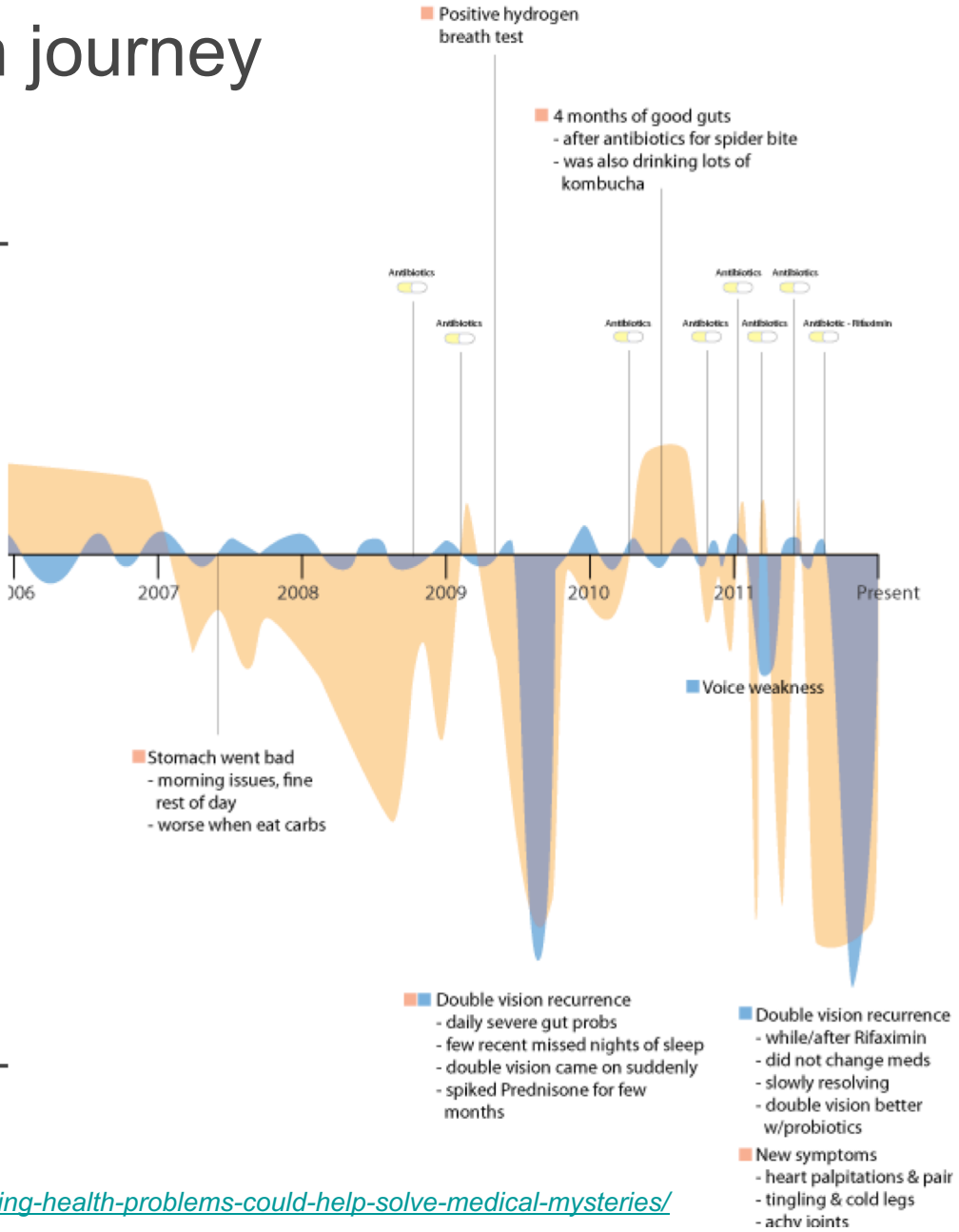
Case: A personal health journey

Personal log of patient's experience with auto-immune disease

- Katie McCurdy

Developed as a journalling exercise

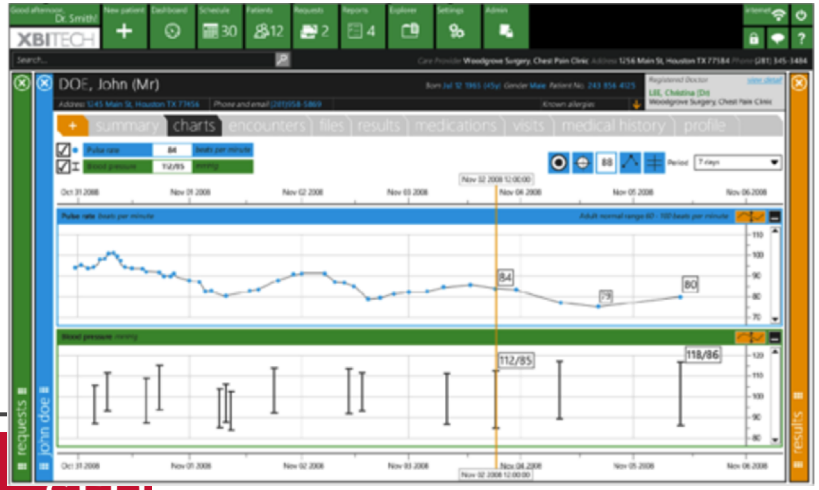
- Used as a storytelling "prop" for her interactions with doctors
- Means of grounding **dialogue**

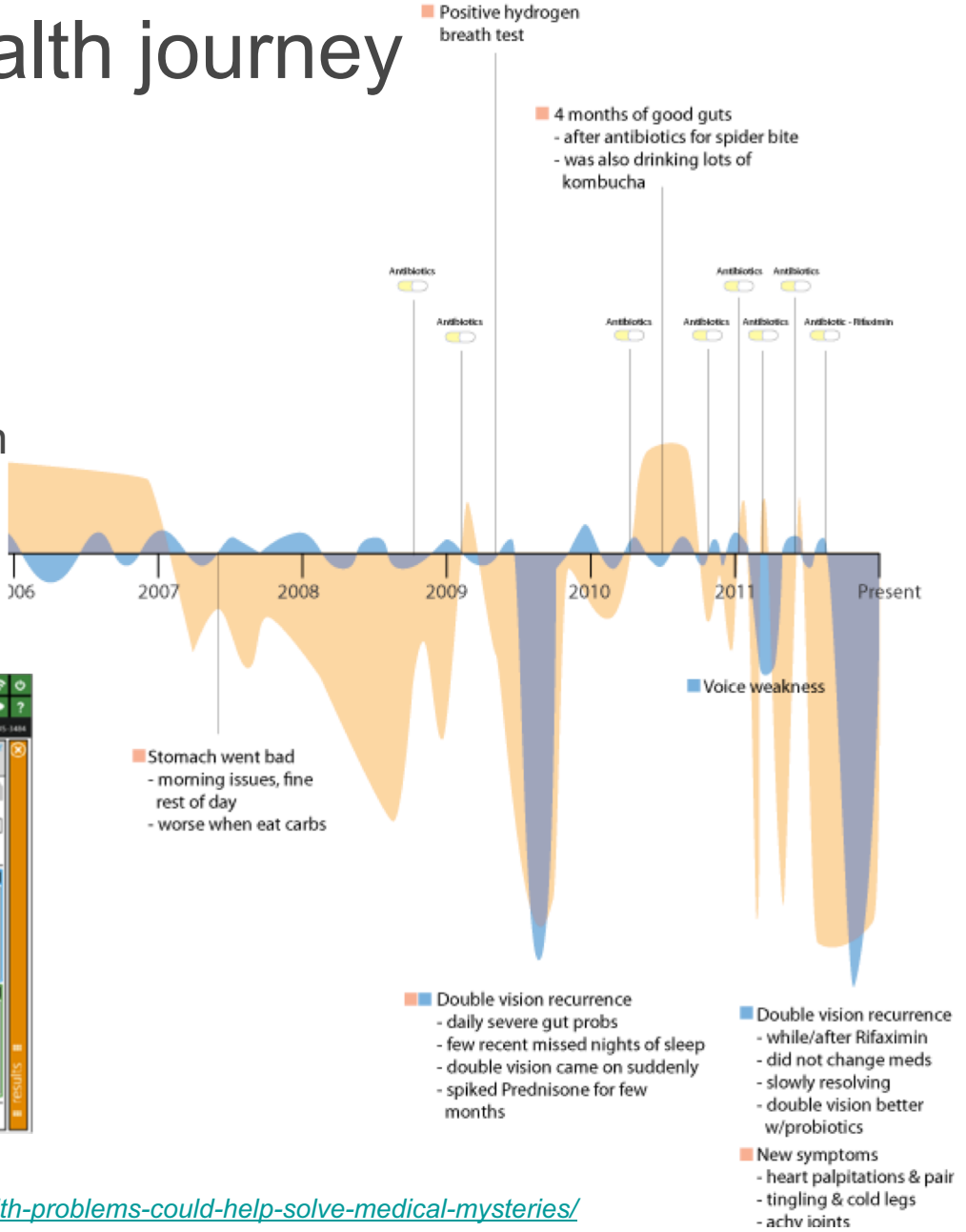


https://sensical.wordpress.com/2011/11/16/how-visualizing-health-problems-could-help-solve-medical-mysteries/

Case: A personal health journey

- "I prepared this graph from memory only. I don't currently have possession of my medical records, but I would like to get them and create a real, scientific representation of my medical history – overlaid with how I was doing over that time period"





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