

# Storytelling with Data

**Module 5: Analyze before you speak—audience analysis**

**Scott Spencer**  
Faculty and Lecturer  
Columbia University

# Agenda

Next deliverable, and today's objectives

Wearing shoes of the marketing executive

Heuristics and biases

Communicating to lessen bias

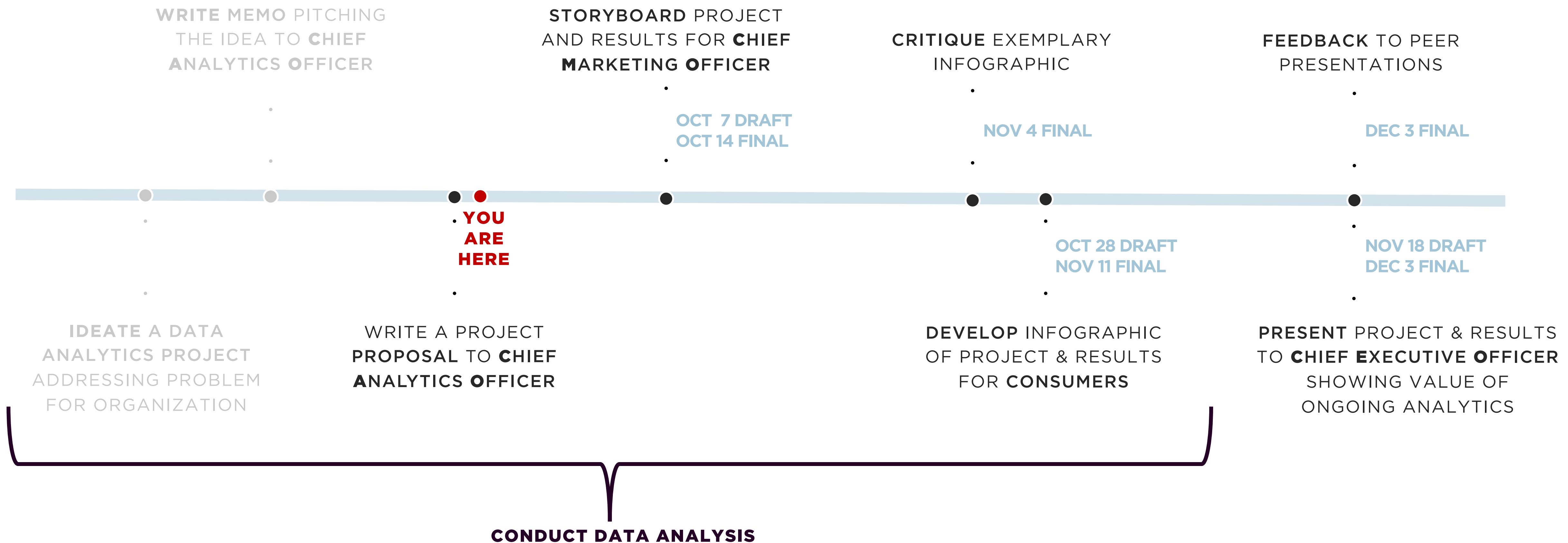
Comparison as narrative structure

Getting started with storyboards,  
a tool for testing narrative structure

# Upcoming deliverable

# Upcoming deliverable

In **Storyboard** form – describe (1) your project, (2) preliminary results or insights so far, and (3) why those results are interesting for the marketing team. Use a distinct narrative arc (beginning, middle, and end), be clear and accessible for the **CMO**.



# Today's Objectives

# Objectives

- 1 | Articulate the need for audience analysis and sensitivity in the applied analytics setting.
- 2 | Consider professional, demographic, cultural, and personal issues when building, contributing to, or managing an analytics team or project.

# **Communicating analytics with marketing: who's the CMO?**

## **“Technical” Chief Analytics Officer**

Leads an organization’s data analytics strategy, driving data-related business changes to transform company into a more analytics-driven one.

## **“Less-Technical” Chief Marketing Officer**

Leads responses to changing circumstances; shapes products, sales strategies, and marketing ideas, collaborating across the company.



David J Carr [Follow](#)

Strategy Director, ex-CD, Planning Director & Head of UX @ Digitas, DIG, Publicis, Chemistry & JWT, APG Gold & Google Planning Innovator of Year.

978 Following · 2.1K Followers · [Twitter](#)

Profile · Clap · Highlights · Responses

Latest

David J Carr Jan 28 · 9 min read

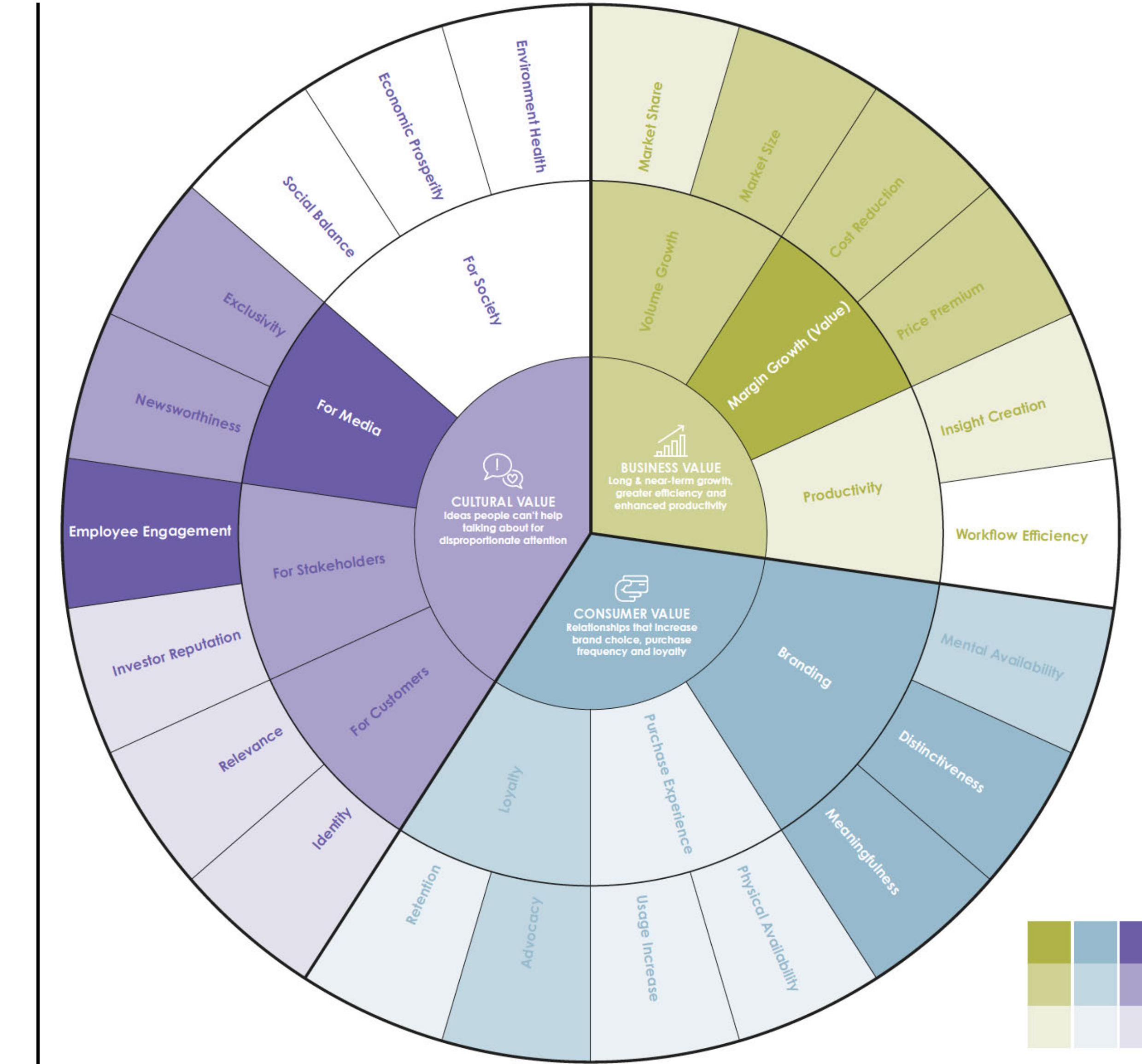
What Value do you Create? Marketing's 3 Types of Value

2.5K 13 responses

# What Value do you Create? Marketing's 3 Types of Value.

Carr

David is Director of Marketing Strategy and Analysis at Digitas, a global marketing agency.





## Marketing executives' understanding, and uses, of data

### Data drives marketing, can reveal biases



# Data is the new oil: dirty, misunderstood, polluting the world & pulled from all the wrong places

Carr

David is Director of Marketing Strategy and Analysis at Digitas, a global marketing agency.

### Limitations in data need to be understood, addressed

### Use of data is about truth and trust, requires openness about source and methodology

### Data is an AND, not an OR

This marketing director knows that marketing is data-driven. Further, "Data can often show the basis for our biases and intuition."

He also understands issues with use of data:

Sources of unique data can be limited.

Data is often corrupted, unhygienic, or mis-transformed when converting to information.

Data is often guestimated, panel-skewed, inaccurate, and not proven, but at the same time "treated as gospel."

Measured data is only part of the story; things that go unmeasured are important and can change what the total information mean from a business standpoint.

"The debate about the use of data in marketing and communications is really a debate about truth and trust, the two biggest issues in the world today."

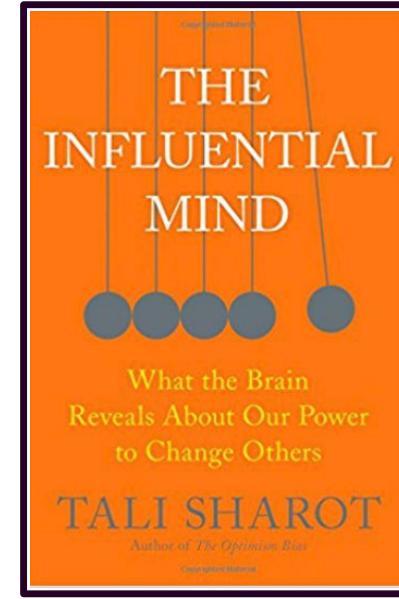
"Where data has been best used is where it combines with empathy and imagination to shift our way of thinking."

# Analyzing audiences, heuristics and biases

# The influential mind

*Sharot*

A London neuroscientist, her research focuses on decision-making, emotion, and influence.



## Learn what your audience is thinking

If we want to affect the behaviors and beliefs of the person in front of us, we need to first understand what goes on inside their head.

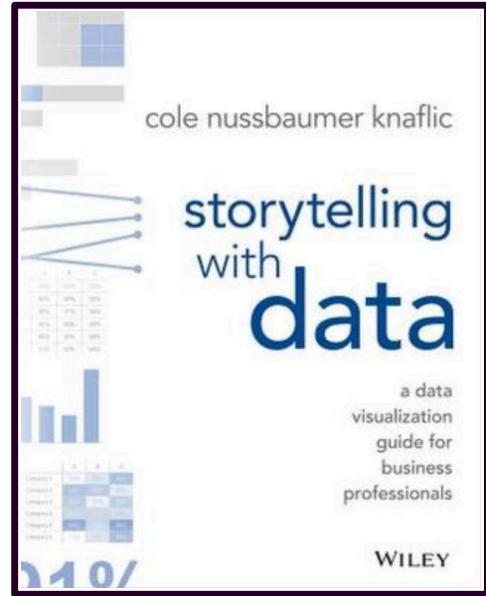
## Formula for changing beliefs

Four factors come into play when we form a new belief: our **old belief** (this is technically known as the “prior”), **our confidence in that old belief**, the **new evidence**, and **our confidence in that evidence**.

## Find common ground with audience's beliefs

When you provide someone with new data, they **quickly accept evidence that confirms their preconceived notions** (what are known as prior beliefs) and **assess counterevidence with a critical eye**.

Focusing on what you and your audience have in common, rather than what you disagree about, enables change.



# Storytelling with data

## Knafllic

The author is a consultant focused on visual displays. Her experience arose from human resources in Google where she applied theory learned as a student of Yale's Edward Tufte.

### Audience: questions to specifically answer

Who is the audience or decision maker?

What is your relationship with them?

What do you need them to know or do?

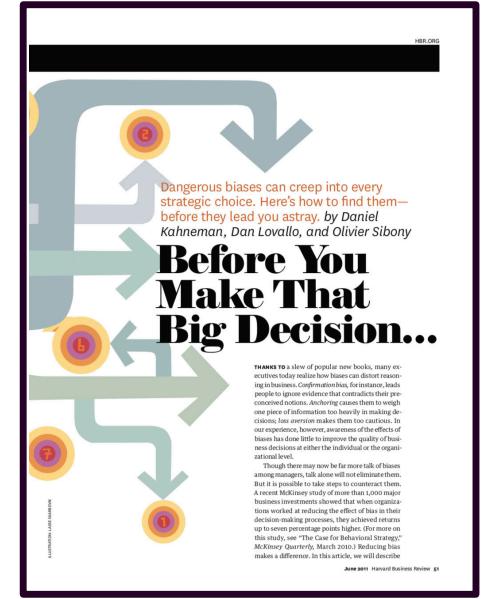
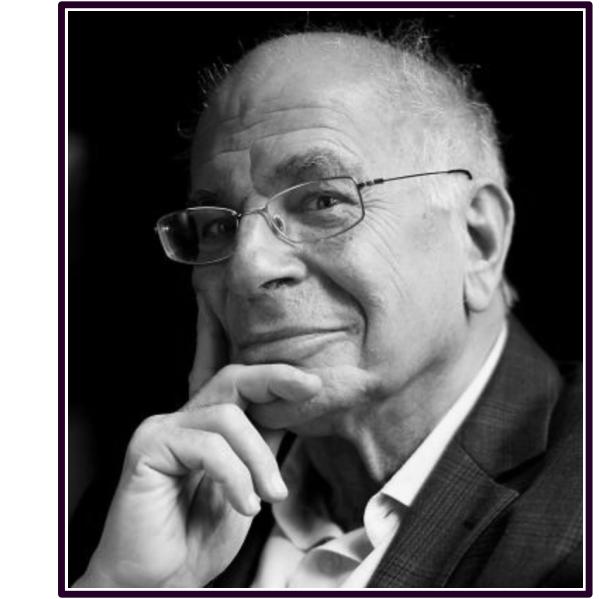
How will you communicate with them?

What tone do you want your communication to set?

What data are available to help make your point?

Is your audience familiar with these data?

What are audience biases as related to your messages?



# Before you make that big decision...

## Kahneman, co-authors

Awarded the Nobel-Prize in economics and senior scholar at Princeton, Kahneman introduced the idea of cognitive biases, and their impact on decision making.

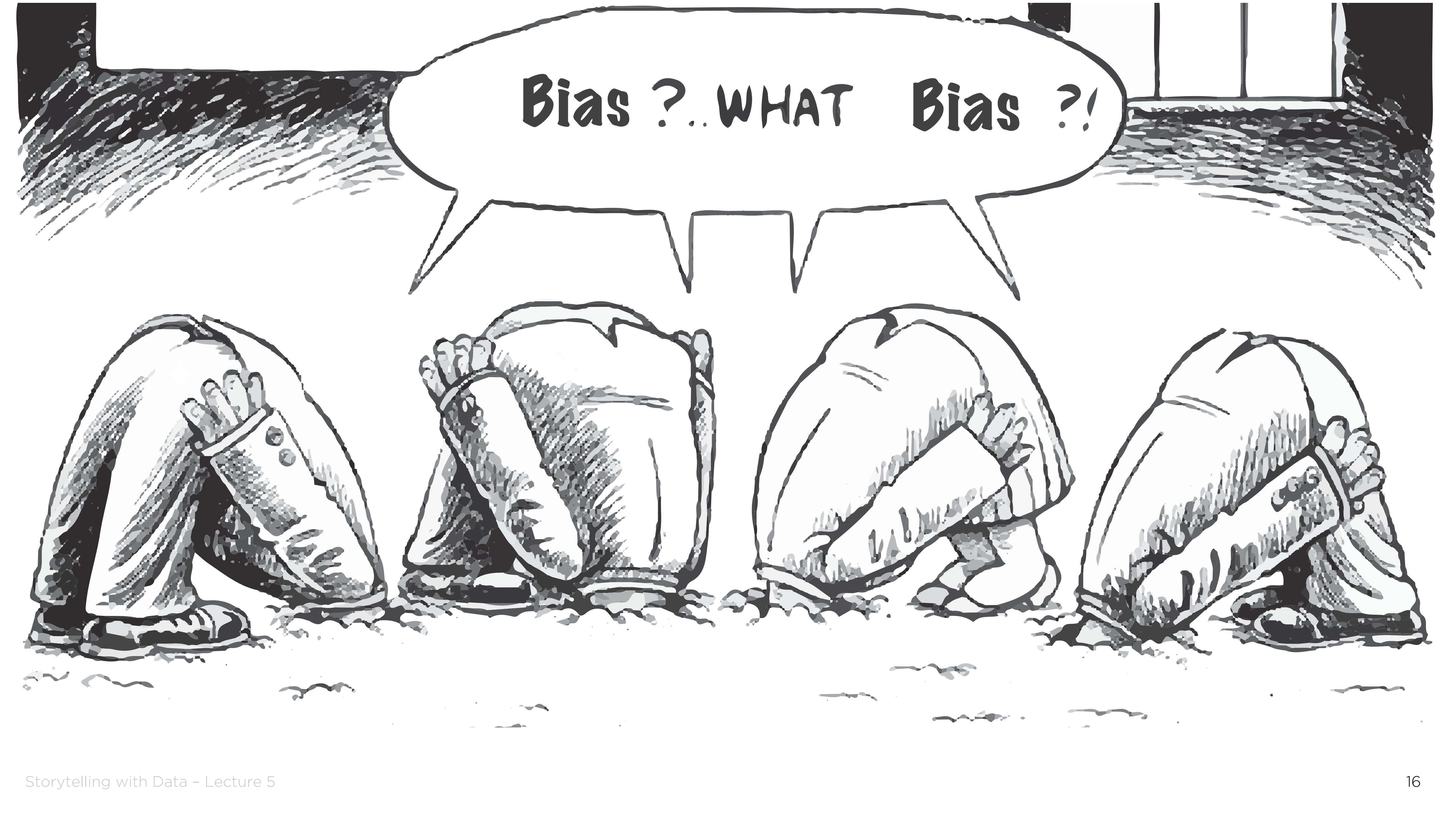
### Two modes of thinking

**Intuitive (system one)** thinking, impressions, associations, feelings, intentions, and preparations for actions flow effortlessly. This system mostly determines our thoughts. System one uses **heuristics**, has **biases**.

**Reflective (system two)** thinking is slow, effortful, and deliberate.

Both are continuous, but system two typically monitors things, and only steps in when stakes are high, we detect an obvious error, or rule-based reasoning is required.

It's very **hard to remain aware of our own biases**, so we need to develop processes that **identify them** and, most importantly, get feedback from others to **help protect against them**.



**Bias ?..WHAT Bias ?!**

# 1

## Check for self-interested biases

Is there any reason to suspect the team making the recommendation of errors motivated by self-interest?

Review the proposal with extra care, especially for over optimism.

# 2

## Check for the affect heuristic

Has the team fallen in love with its proposal?

Rigorously apply all the quality controls on the checklist.

# 3

## Check for groupthink

Were there dissenting opinions within the team? Were they explored adequately?

Solicit dissenting views, discreetly if necessary.

# 4

## Check for saliency bias

Could the diagnosis be overly influenced by an analogy to a memorable success?

Ask for more analogies, and rigorously analyze their similarity to the current situation.



## Check for confirmation bias

Are credible alternatives included along with the recommendation?

Request additional options.



## Check for availability bias

If you had to make this decision in a year's time, what information would you want, and can you get more of it now?

Use checklists of the data needed for each kind of decision.



## Check for anchoring bias

Where are the numbers from? Can there be ... unsubstantiated numbers? ... extrapolation from history? ... a motivation to use a certain anchor?

Re-anchor with data generated by other models or benchmarks, and request a new analysis.



## Check for halo effect

Is the team assuming that a person, organization, or approach that is successful in one area will be just as successful in another?

Eliminate false inferences, and ask the team to seek additional comparable examples.

# 9

## Check for sunk-cost fallacy, endowment effect

Are the recommenders overly attached to past decisions?

Consider the issue as if you are a new executive.

# 10

## Check for overconfidence, optimistic biases, competitor neglect

Is the base case overly optimistic?

Have a team build a case taking an outside view: use war games.

# 11

## Check for disaster neglect

Is the worst case bad enough?

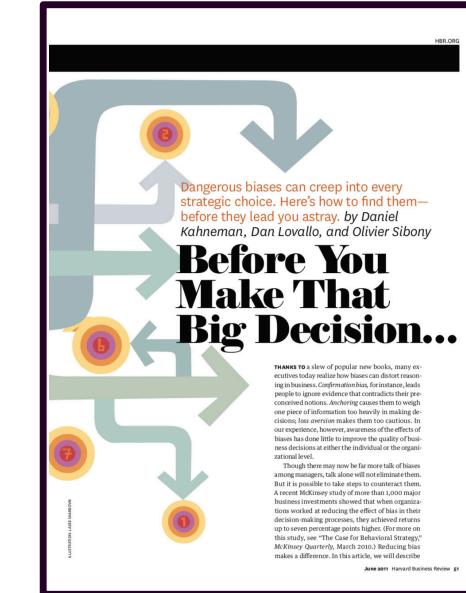
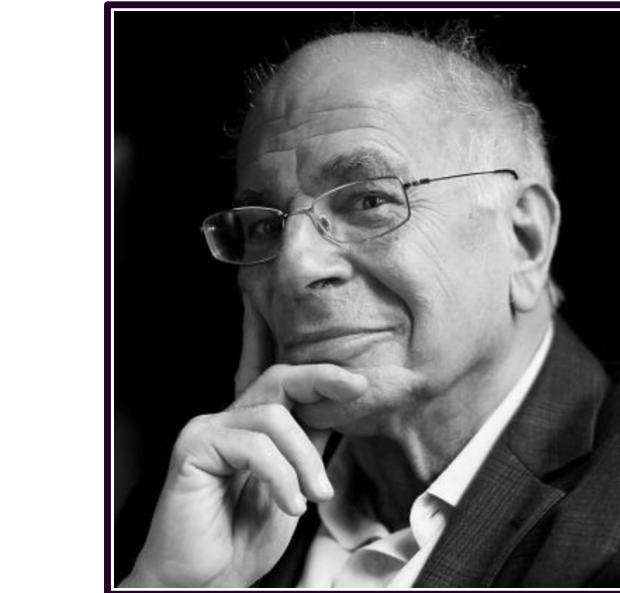
Have the team conduct a premortem: imaging that the worst has happened, and develop a story about the causes.

# 12

## Check for loss aversion

Is the recommending team overly cautious?

Align incentives to share responsibility for the risk or to remove risk.



# Before you make that big decision...

*Kahneman, co-authors*

Awarded the Nobel-Prize in economics and senior scholar at Princeton, Kahneman introduced the idea of cognitive biases, and their impact on decision making.

## Keeping out the appearance of bias

Present ideas from a **neutral perspective**. Becoming too emotional suggests bias.

Make **analogies and examples comparable** to the proposal.

Genuinely **admit uncertainty** in the proposal, and **recognize multiple options**.

Identify **additional data** that may provide new insight.

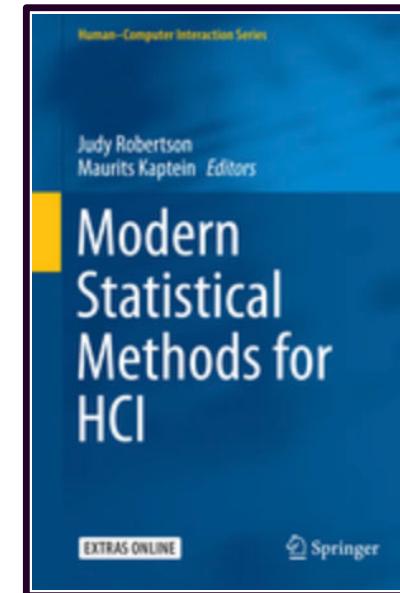
Consider **multiple anchors** in the proposal.

# **Comparing, and admitting uncertainty, with visuals and words**

# Ch. 13, Fair statistical communication in HCI

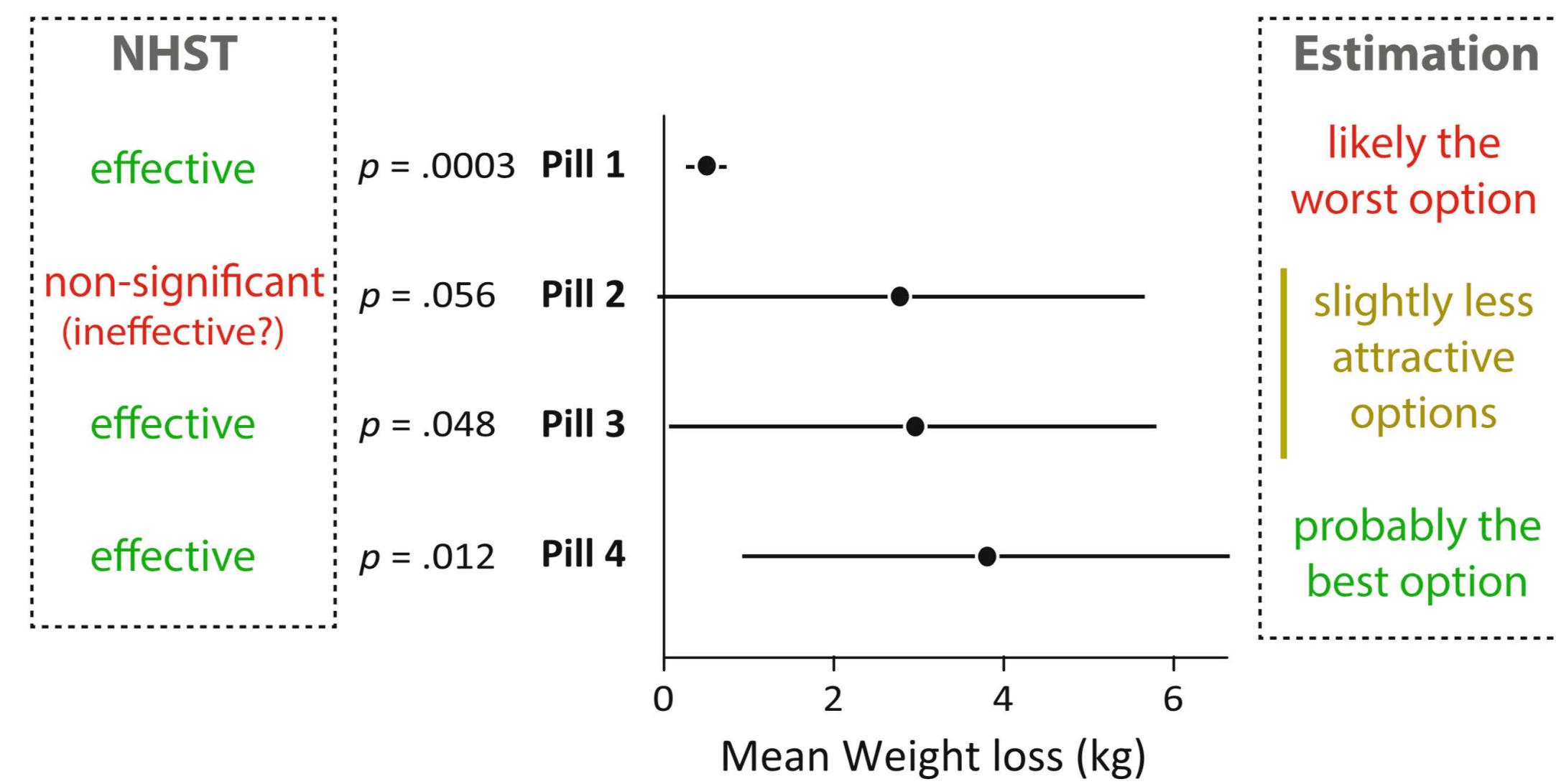
Dragicevic

He is a researcher, focusing on psychology of data visualization for judgment and decision making, and on transparent statistical communication.



He agrees with Abelson\*, decisions are better informed by effect sizes and intervals

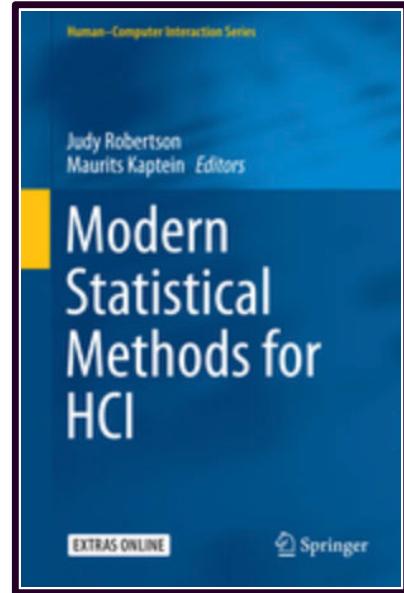
Whether exploring or confirming analyses, show results using an *estimation* approach — use graphs to show **effect sizes** and **interval estimates**, and offer **nuanced interpretations** of results. **Avoid the pitfalls of dichotomous tests and p-values.**



“ The notion of binary significance testing is a terrible idea for those who want to achieve fair statistical communication. ”

## Honestly convey uncertainty

The use of vague language is necessary for **acknowledging and honestly conveying the uncertainty present in effect size estimates**. Vague language — which is not the same as ambiguous language — plays a key role in reasoning.

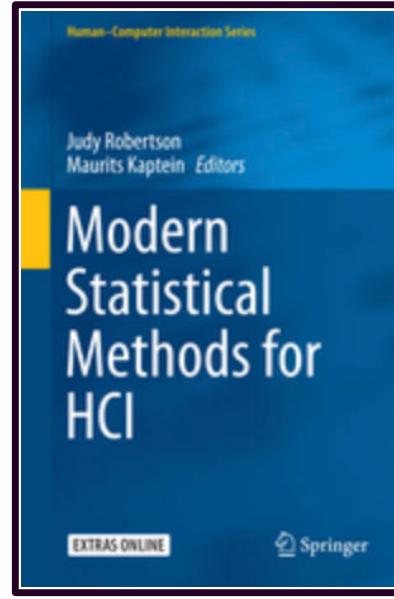


# Ch. 13, Fair statistical communication in HCI

*Dragicevic*

He is a researcher, focusing on psychology of data visualization for judgment and decision making, and on transparent statistical communication.

TODO: Pull his examples of using appropriate vague language.



## Ch. 13, Fair statistical communication in HCI

*Dragicevic*

He is a researcher, focusing on psychology of data visualization for judgment and decision making, and on transparent statistical communication.

### General principle

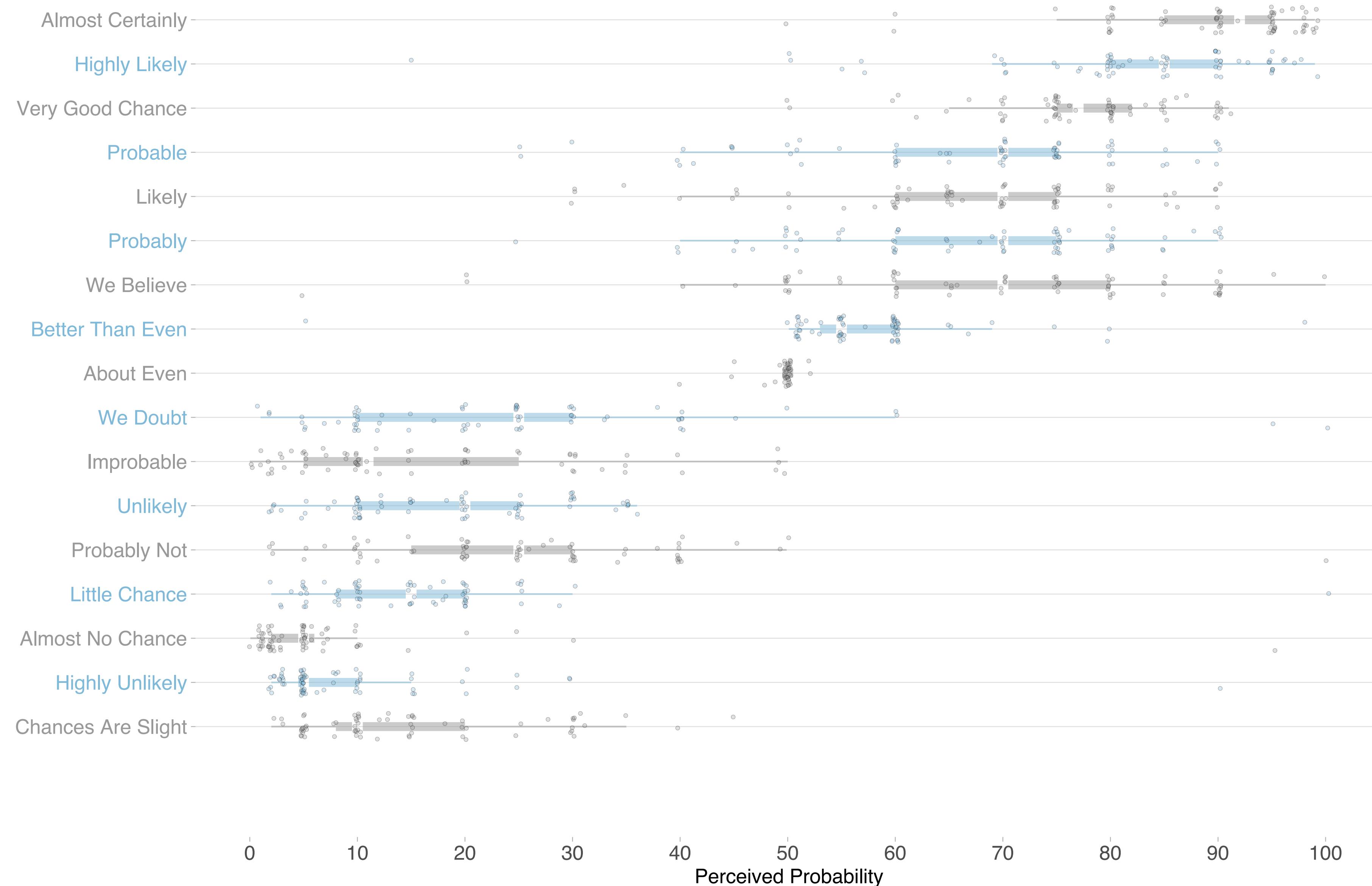
We have the duty of [...] communicating our conclusions in intelligible form, in recognition of the right of other free minds to utilize them in making their own decisions. — Fisher

**Clarity  
Transparency  
Simplicity  
Robustness  
Noncontingency  
Precision**

Details.

**TODO: develop this.**

# Language describing probability are imprecise, depend upon audience and context

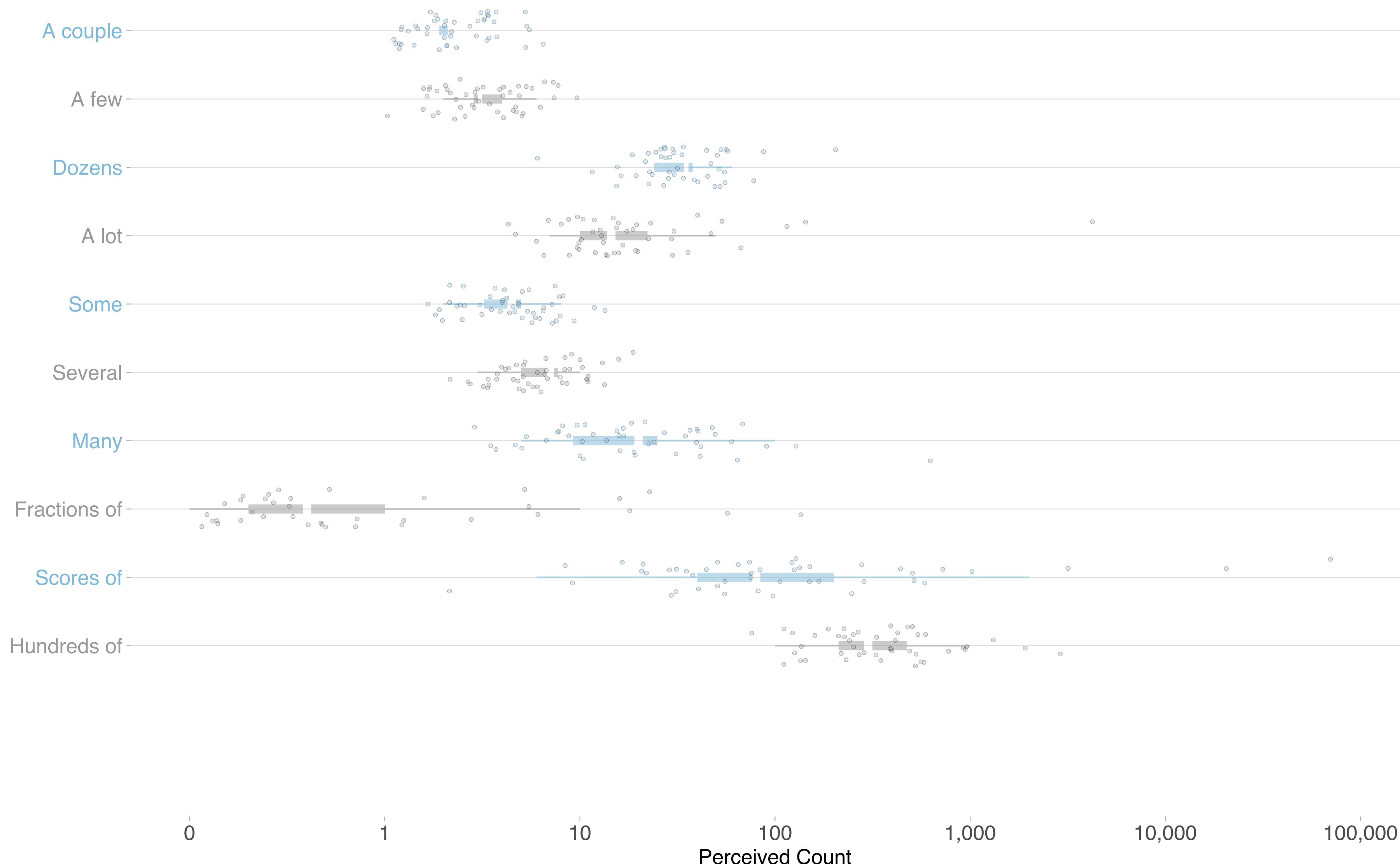


Spencer, Scott. *Quantitative persuasion amid uncertainty*. Forthcoming. Print.

Barclay, Scott et al. *Handbook for Decision Analysis*. Decisions and Designs, Inc., 1977. Print.

zonination. "Perceptions of Probability and Numbers." [github.com/18 Aug. 2015](https://github.com/18 Aug. 2015). Web. 26 Dec. 2018.

# Language describing quantities are imprecise, depend upon audience and context

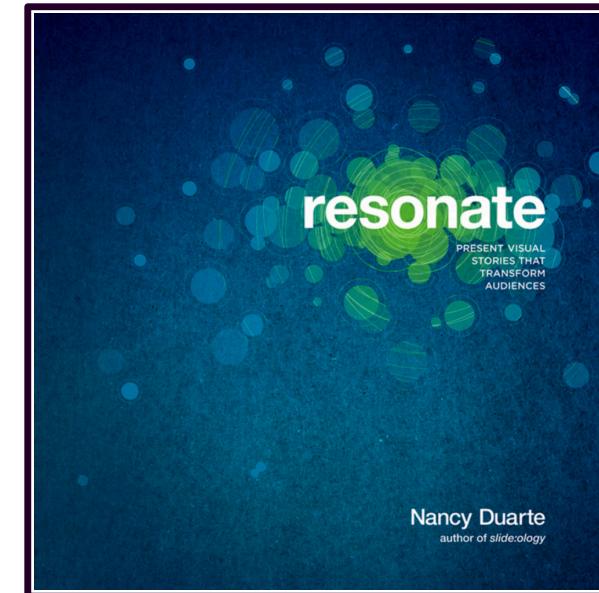


Spencer, Scott. *Quantitative persuasion amid uncertainty*. Forthcoming. Print.

Barclay, Scott et al. *Handbook for Decision Analysis*. Decisions and Designs, Inc., 1977. Print.

zonination. "Perceptions of Probability and Numbers." [github.github.com](https://github.com/github/github.com), 18 Aug. 2015. Web. 26 Dec. 2018.

# Comparison as narrative structure



# The Contour of Communication

*Duarte*

Duarte is known for her work with Vice President Al Gore on the award-winning documentary slide show known as An Inconvenient Truth.

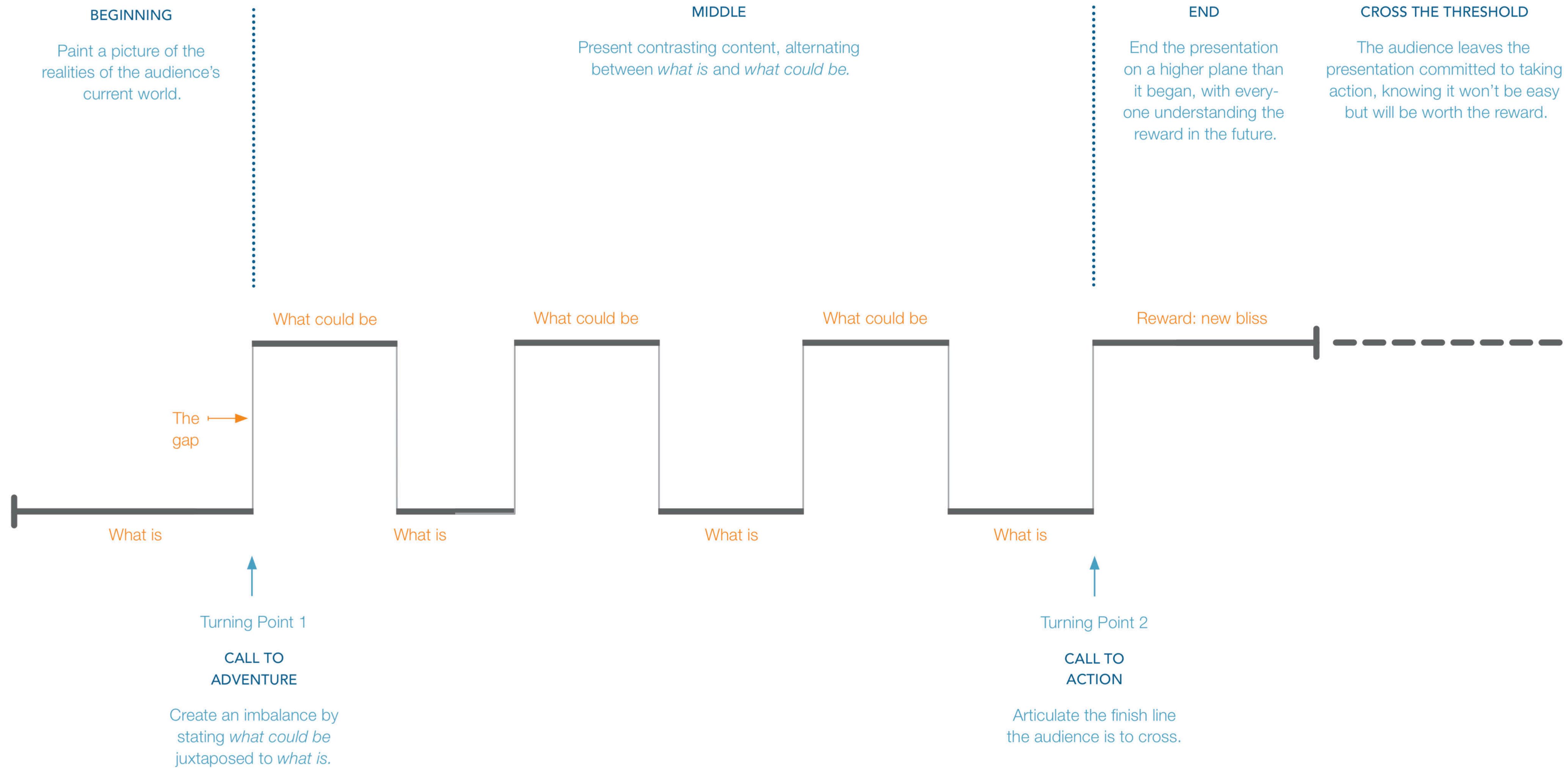
The  
gap



What is

What  
could be

Dramatic tension is created by contrasting the commonplace with the lofty.



# *Analyzing comparison as narrative structure*

---

Recall some of our examples so far,

The Next Rembrandt (to general audience)

Jakarta analytics blog post and paper (to other data scientists)

Dodgers analytics project memo and proposal (to Director of Quantitative Analytics)

Citi Bike infographic (to general audience)

In each of these, can we identify a “**what is**”, a “**what could be**”, creating a “**gap**”?

# Think, pair, and share

# *Applying comparison as narrative structure*

---

Pair up.

In each of your analytics projects, identify a “what is”,  
a “what could be”, creating a “gap” that you are bridging with your analytics project.

Get feedback from your peer for ideas on how you can make these stronger!

Consider how your projects are relevant to a marketing executive, and  
how your narrative to the CAO needs to be changed for the CMO.

# **Sneak peek: storyboards, a tool for testing narrative**

# Oxford English Dictionary

## Storyboard, *n.*

[View as: Outline](#) | [Full entry](#)

**Pronunciation:** Brit. /'stɔːrɪbɔ:d/, U.S. /'stɔri,bɔ(e)rd/

**Frequency (in current use):** ●●●●●

**Origin:** Formed within English, by compounding. **Etymons:** STORY *n.*, BOARD *n.*

**Etymology:** < STORY *n.* + BOARD *n.*

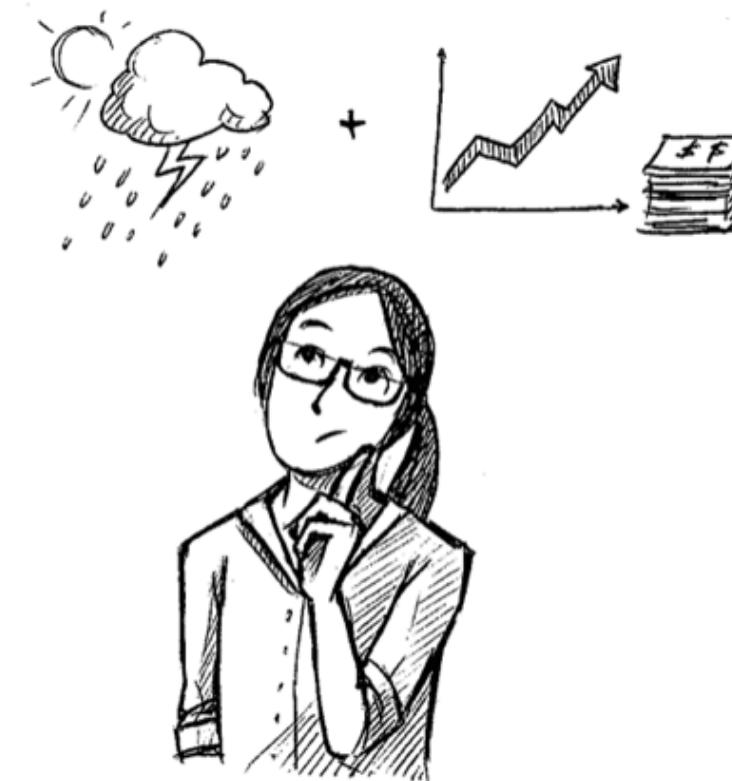
### Film and Television.

A sequence of drawings or other images, typically with some directions and dialogue, representing the shots planned for a film, television programme, or advertisement. Also: a board on which such images are displayed.

- 1941 *Pop. Sci.* Mar. 109/2 Reese thinks nothing of sitting down in the morning prepared to fit sounds to 80 photographs of scenes laid out before him on a *story board*.
- 1965 *N.Y. Times Mag.* Apr. 21/3 They send out *story boards*..to their three or four favorite commercial producers, for bids.
- 1975 R. HILL *April Shroud* xii. 154 A huge sheet of card pinned to the wall. On it were pasted a series of drawings... ‘Yeah, that’s my *story board*.’
- 1999 *8 Days* 4 Dec. 34/4 (caption) A hand-drawn *storyboard* panel captures a moment with *Toy Story 2* characters.
- 2003 *Dreamwatch* Aug. 25/1 Not all the special effects were in, so at some points they would go to the *storyboards* to illustrate where the effects would be.

TODO: EXPLAIN  
TRADITIONAL USE (E.G.,  
MOVIES) AND HOW WE  
CAN BORROW THE IDEA  
FOR ANALYTICS  
COMMUNICATIONS?

# A very simple example. Storyboard for IBM as part of making an end-to-end experience for data scientists to research, create, and collaborate.



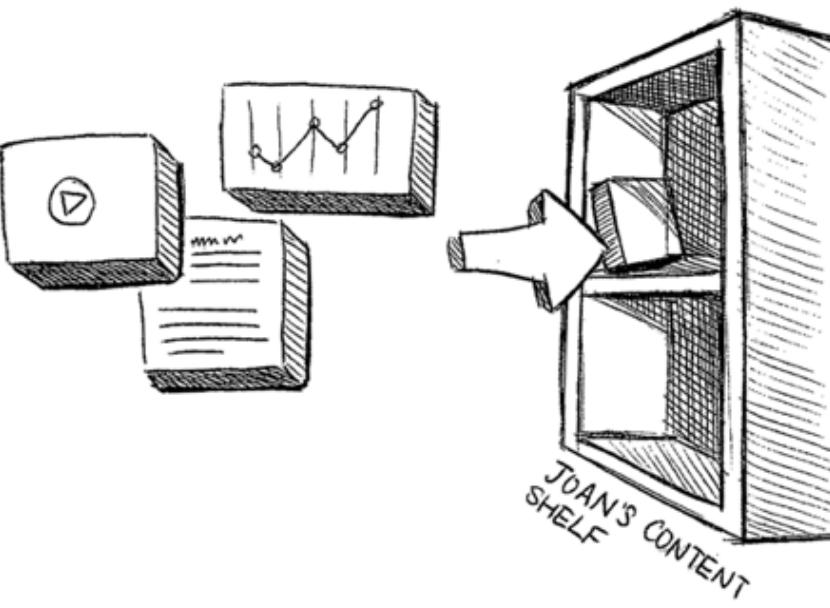
Joan, a Data Scientist at an enterprise company, is looking for resources to help her figure out how weather affects customer sales.



She turns to Google for help. The top search result shows a preview of an interesting paper from Project Miles.



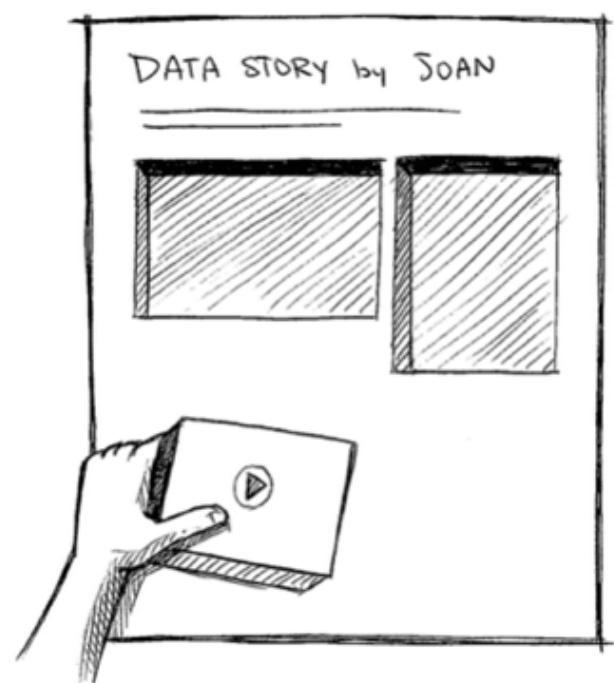
The paper presents a weather algorithm that Joan can use for her own project. She bookmarks the paper for later use.



Joan continues reading Paula's Data Story because she sees a wealth of relevant resources, e.g. videos, papers, talks, that she could use for her project.



Joan clicks on the search result where she sees the paper in context of a workflow, called a "Data Story." It was created by another user named Paula.



Once she has added a handful of resources to her bookmark list, Joan creates her own Data Story. She uses her bookmark content as a reference point.

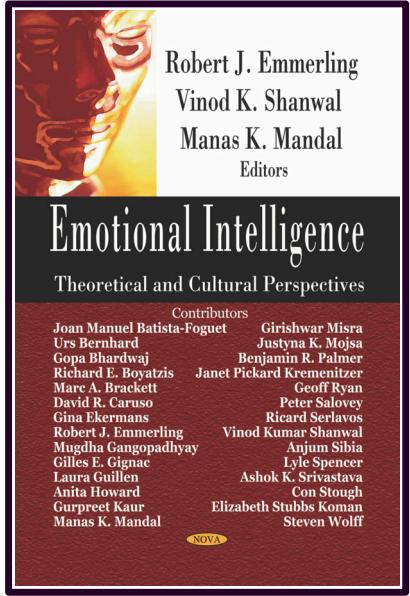
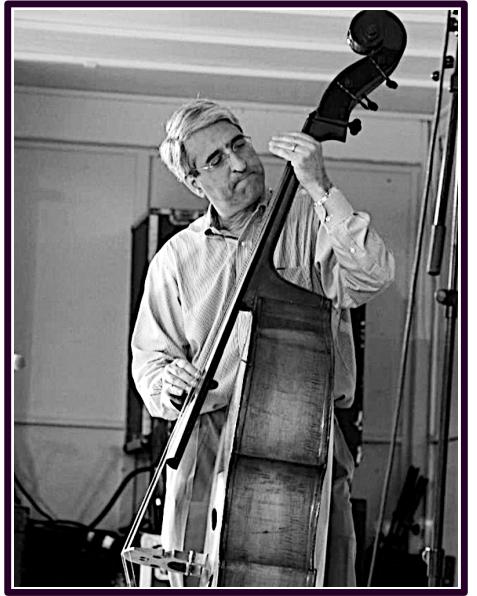


# **Emotional tone of, and context for, communication**

# Emotional intelligence theoretical and cultural perspectives

## Salovey, co-authors

Yale president (and double bassist), Salovey introduced the idea of emotional intelligence. This book collects numerous authors' perspectives, examining the **cross-cultural similarity of the concept of emotional intelligence**.



**Emotions are universal,  
but expression  
depends on culture**

**Emotional Intelligence  
guides communication**

**Higher and lower  
context cultures**

Basic emotions are **perceived similarly** across the world, but display rules for emotional **expression vary** from culture to culture. That is, the norms pertaining to how—and to what intensity—certain emotions should be expressed within social contexts.

“Emotional intelligence involves the ability to monitor one’s own and **others’ feelings and emotions**, to discriminate among them, and to use this information to **guide one’s thinking and actions**” including “our **ability to communicate effectively**.”

*Caveat: much of the research in this field has originated from Western cultures. This reference includes other perspectives.*

In **high context cultures**, unlike the US, the internal meaning of a message is usually embedded deeper in the information; **not everything is explicitly written**.

# Going forward

# For Next Week, Module 6:

## Agenda next week

As you review the material, think about how you might storyboard *The Next Rembrandt*.

### The minimum

**Riche, Nathalie Henry et al.** Ch. 5 and 9. *Data-Driven Storytelling*. CRC Press, 2018. Print.

Read for more perspective on the process of data-driven, visual stories.

**Lee, Bongshin et al.** “*More Than Telling a Story: Transforming Data Into Visually Shared Stories*.” IEEE Computer Graphics and Applications 35.5 (2015): 84–90. Web.

Read for more perspective on the process of data-driven, visual stories.

**McCloud, Scott.** Ch. 6. *Show and Tell. Understanding Comics: the Invisible Art*. Kitchen Sink Press, 1993. Print.

Read for ideas about how words and pictures combine to tell stories.

**Holtz, Yan, and Conor Healy.** *From Data to Viz*. [www.data-to-viz.com](http://www.data-to-viz.com) 2018: web.

Become familiar with common chart typologies, the types of data structures used for them, and how charts share common underlying attributes.

# **Q's in threes,**

**Q1**

Question

**Q2**

Question

**Q3**

Question

**See you  
next week!**

