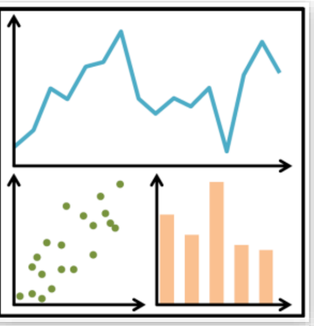
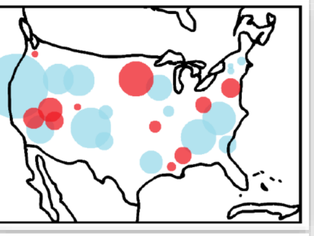
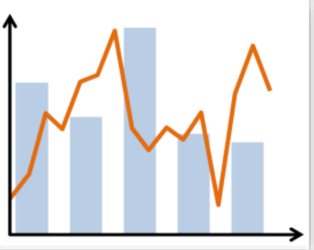
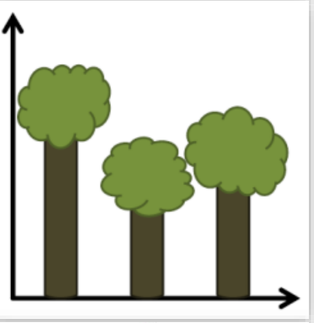
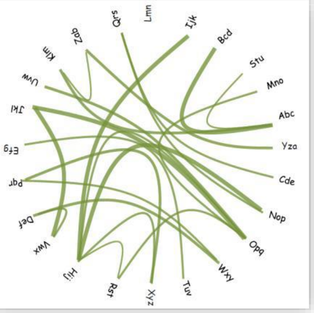






Lecture 19: Storytelling

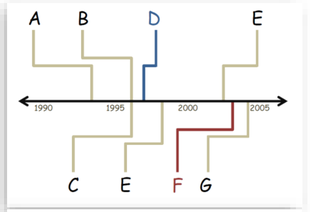
CS 7250

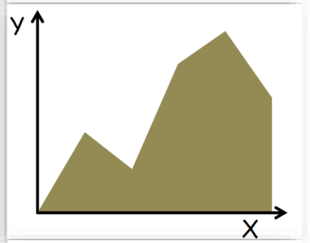
SPRING 2021

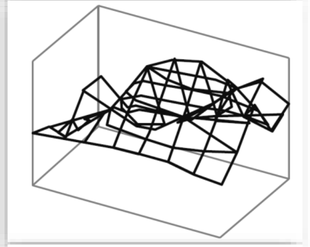
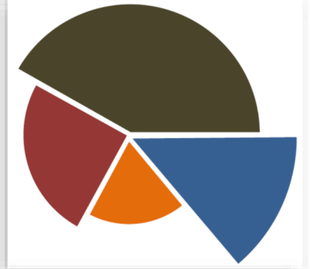
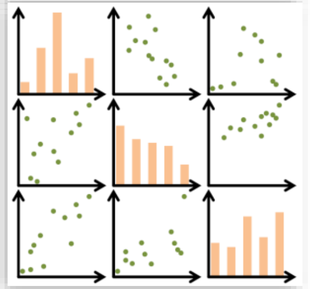
Prof. Cody Dunne

NORTHEASTERN UNIVERSITY

Slides and inspiration from Michelle Borkin, Krzysztof Gajos, Hanspeter Pfister, Miriah Meyer, Jonathan Schwabish, and David Sprague





Checking In

READING QUIZ

Quiz — Storytelling

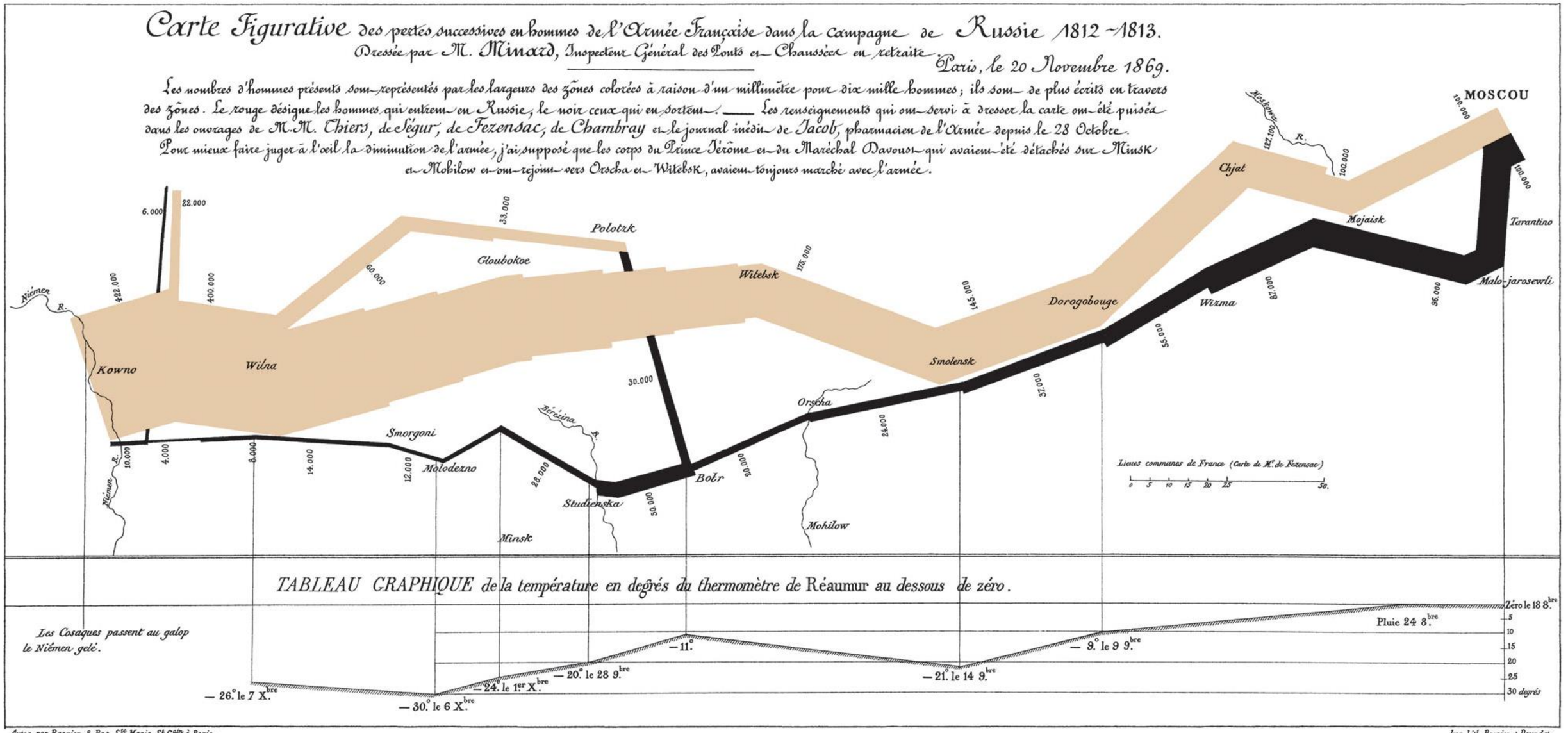
Password: XXXXXX

STORYTELLING

Goals for Today

- Learn about the basic narrative elements of a story arc.
- Learn about the three basic storytelling scenarios, and how that informs your visualization.
- Learn the 7 genres of visual storytelling, and what the advantages of each one are.

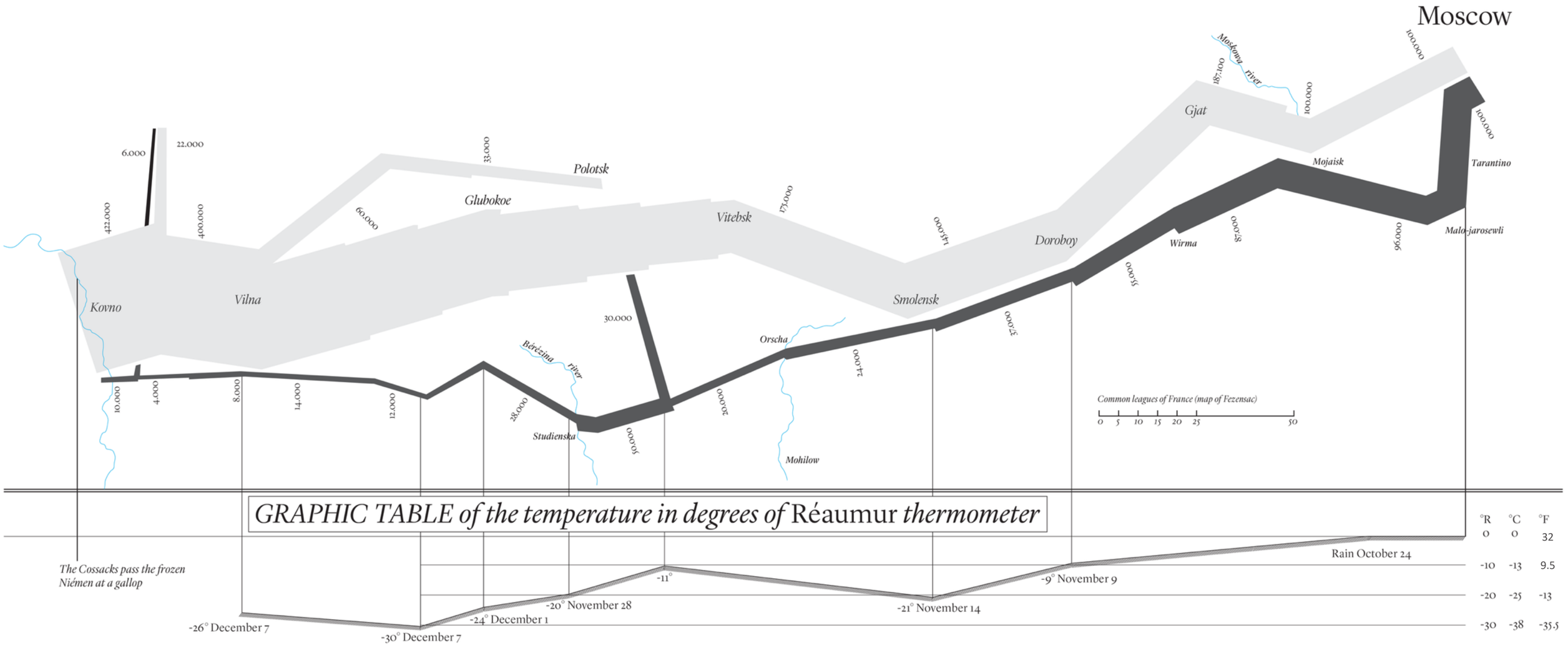
Hall of Fame or Hall of Shame



[Charles Joseph Minard, 1869](#)

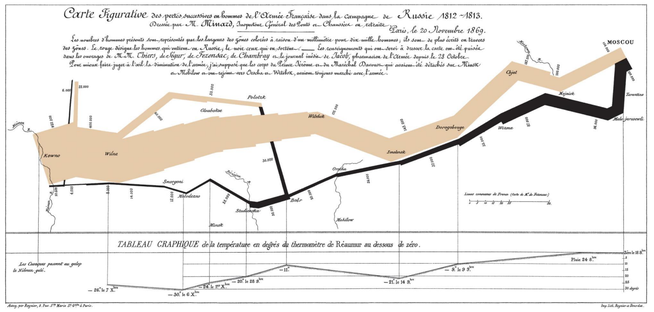
FIGURATIVE MAP of the successive losses in men of the French Army in the RUSSIAN CAMPAIGN OF 1812-1813

Drawn by Mr. Minard, Inspector General of Bridges and Roads in retirement. Paris, 20 November 1869. The numbers of men present are represented by the widths of the colored zones in a rate of one millimeter for ten thousand men; these are also written beside the zones. Red designates men moving into Russia, black those on retreat. — The informations used for drawing the map were taken from the works of Messrs. Chiers, de Ségur, de Fezensac, de Chambray and the unpublished diary of Jacob, pharmacist of the Army since 28 October. In order to facilitate the judgement of the eye regarding the diminution of the army, I supposed that the troops under Prince Jèrôme and under Marshal Davoust, who were sent to Minsk and Mobilow and who rejoined near Orscha and Witebsk, had always marched with the army.



Iñigo Lopez, 2015 (note the °R temp. scale is wrong)

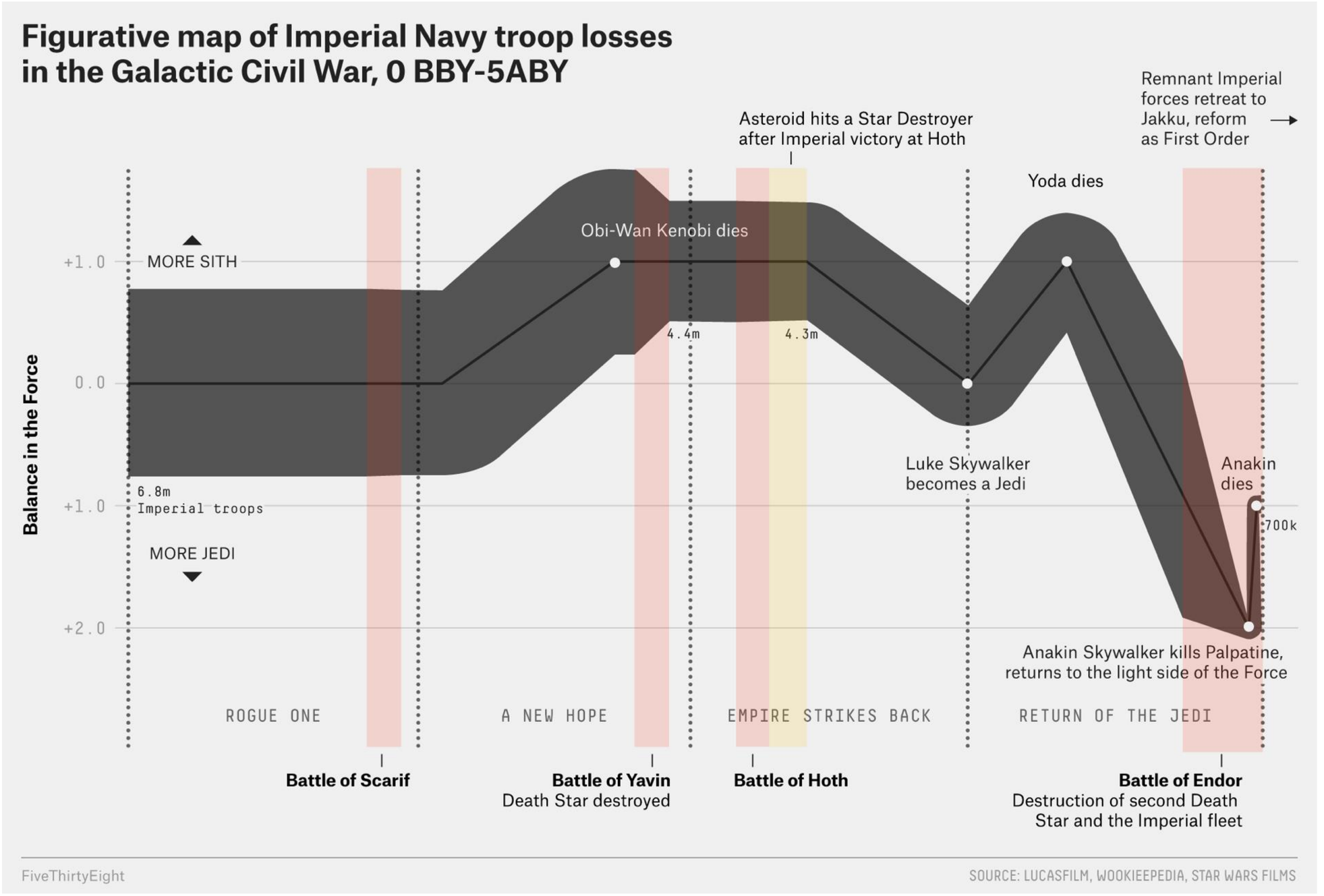
March to Moscow



Charles Joseph Minard

- French civil engineer (1781-1870)
- Pioneer in using graphics in engineering and statistics
- “March to Moscow” graph most famous work; considered by many including Tufte to be one of the best graphics ever

Charles Joseph Minard, 1869



http://fivethirtyeight.com/features/star-wars-in-one-chart/

STORYTELLING

Forbes LOG IN

YOUR READING LIST

Data Storytelling: The Essential Data Science Skill Everyone Needs

Active on LinkedIn

Beyond Kimchi And Kale: How Millennial 'Foodies' Are Challenging The Supply Chain From Farm To Table

Active on Twitter

The Future Is Now: Five Awesome Uses Of Virtual Reality In Marketing

Active on Twitter

GreenWave's Startup Program For Ocean Farmers Can Change The Planet (And The Typical Seafood Menu)

MAR 31, 2016 @ 11:26 AM 81,779 VIEWS

The Little Black Book of Billionaire Secrets

Data Storytelling: The Essential Data Science Skill Everyone Needs

Brent Dykes, CONTRIBUTOR

FULL BIO

Opinions expressed by Forbes Contributors are their own.

TWEET THIS

People hear statistics, but they feel stories

Once your business has started collecting and combining all kinds of data, the next elusive step is to extract value from it. Your data may hold tremendous amounts of *potential value*, but not an ounce of value can be created unless insights are uncovered and translated into actions or business outcomes. During a 2009 interview, Google's Chief Economist Dr. Hal R.Varian stated, "The ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it—that's going to be a hugely important skill in the next decades." Fast forward to 2016 and many businesses would agree with Varian's astute assessment.

As data becomes increasingly ubiquitous, companies are

Brent Dykes, 2016

Primary Sources for Today's Lecture

Storytelling: The Next Step for Visualization

Robert Kosara, Jock Mackinlay
Tableau Software
rkosara@tableausoftware.com, jmackinlay@tableausoftware.com

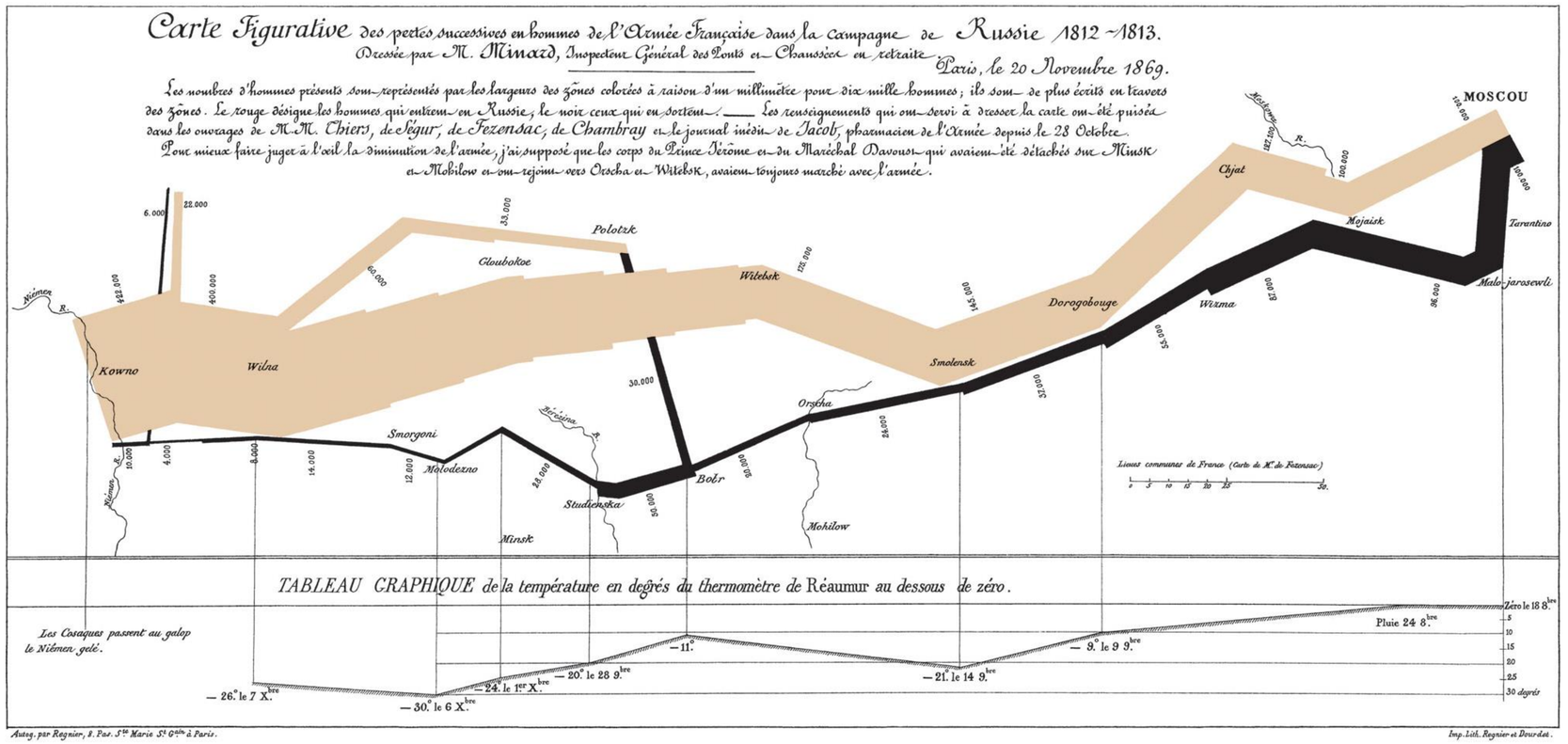
Narrative Visualization: Telling Stories with Data

Edward Segel and Jeffrey Heer

Kosara & Mackinlay, 2013; Segel & Heer, 2010

What is a story?

- Story - an ordered sequence of steps with a clearly defined path through it.
- Common components:
  - Characters
  - Setting
  - Plot
  - Conflict
  - Resolution



What is a story in visualization?

- Story - an ordered sequence of steps with a clearly defined path through it.
- Steps can contain text, images, visualizations, or video, or combinations.
- Order is a key element of stories (usually linear in time).

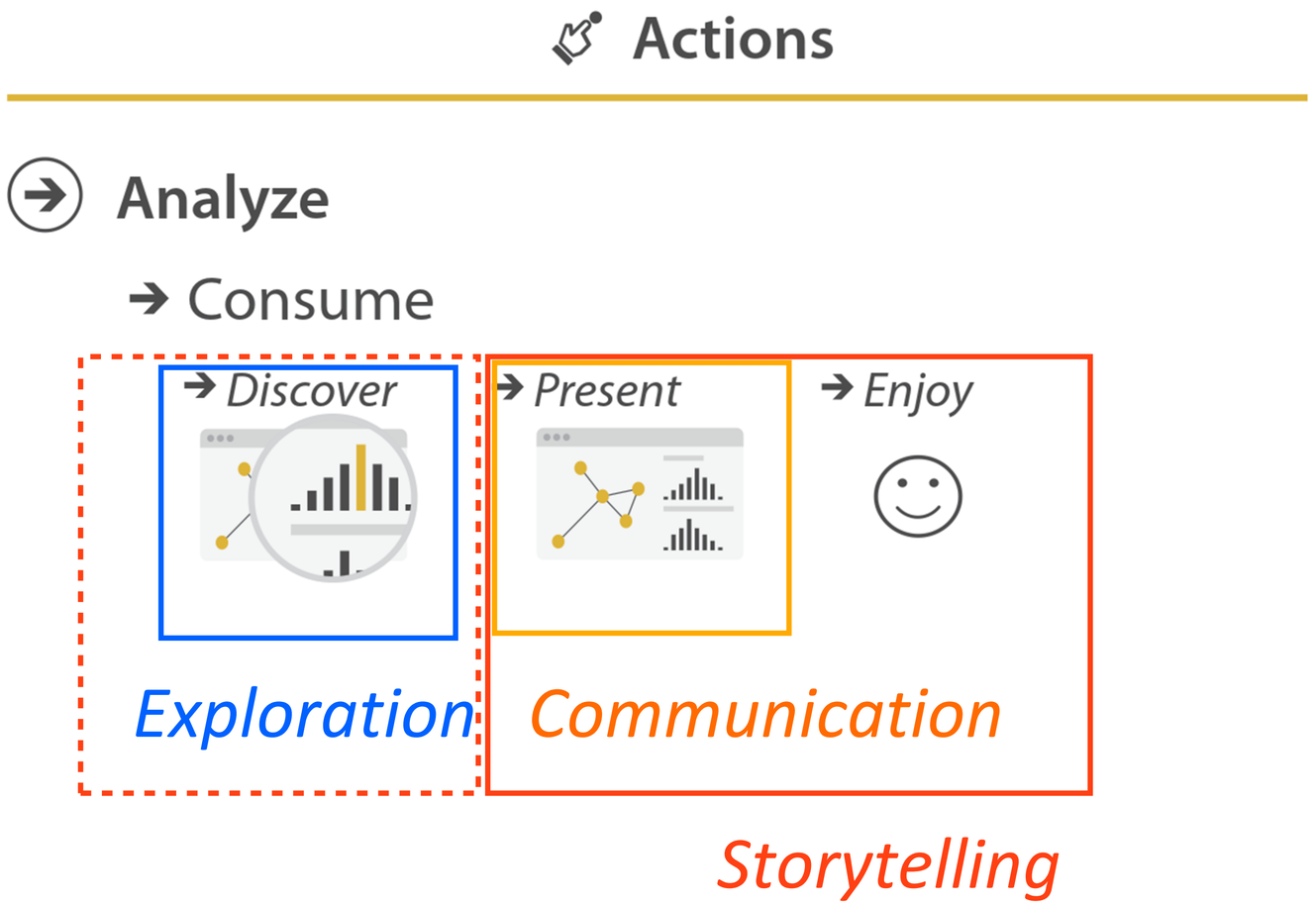
What is a story in visualization?

Actions

- **Analyze**
  - Consume
    - *Discover*
    - *Present*
    - *Enjoy*

  - Produce
    - *Annotate*
    - *Record*
    - *Derive*

What is a story in visualization?

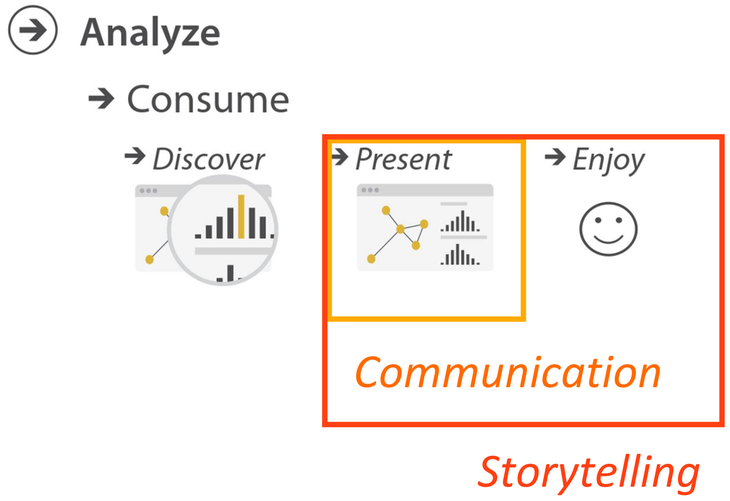


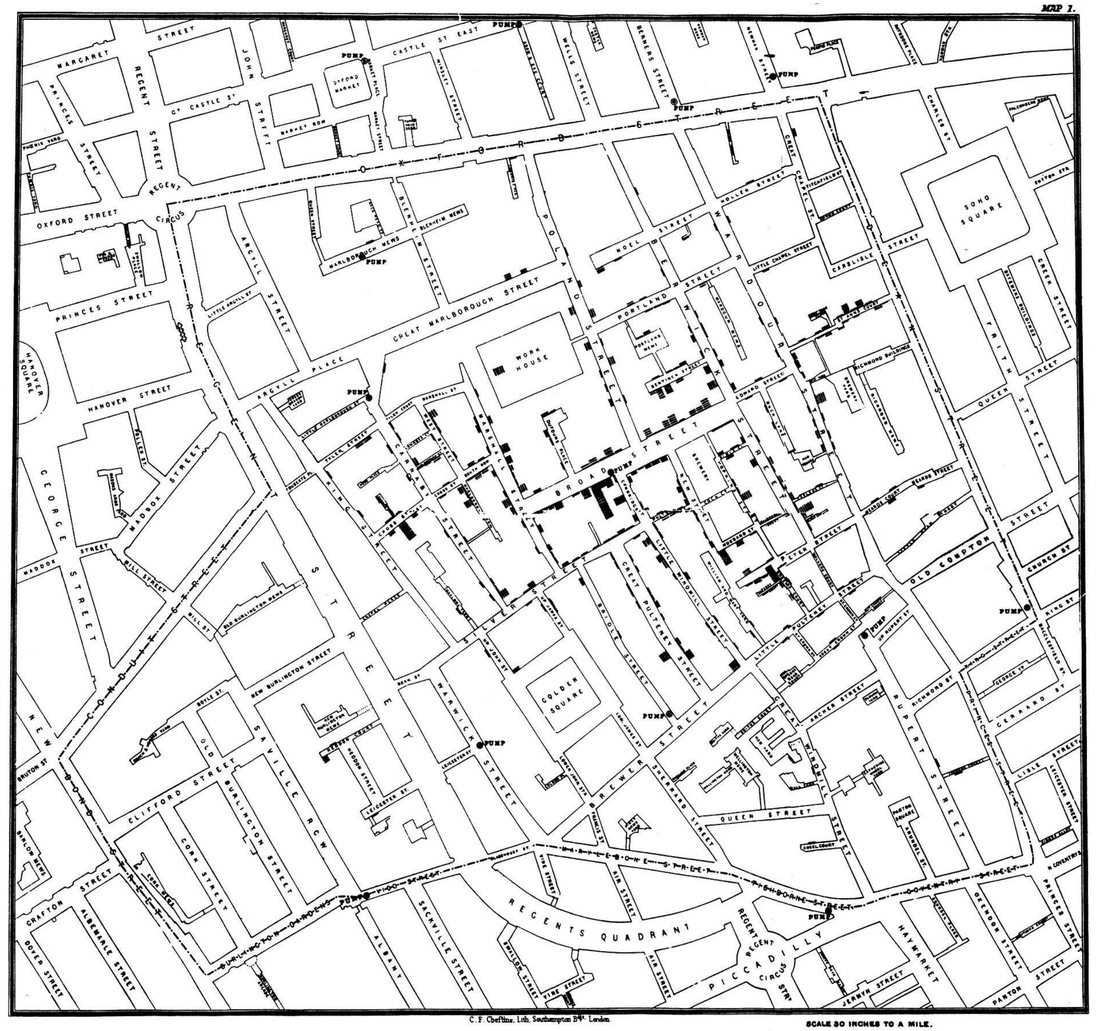
Cholera Epidemic of 1854

Map by John Snow (physician)

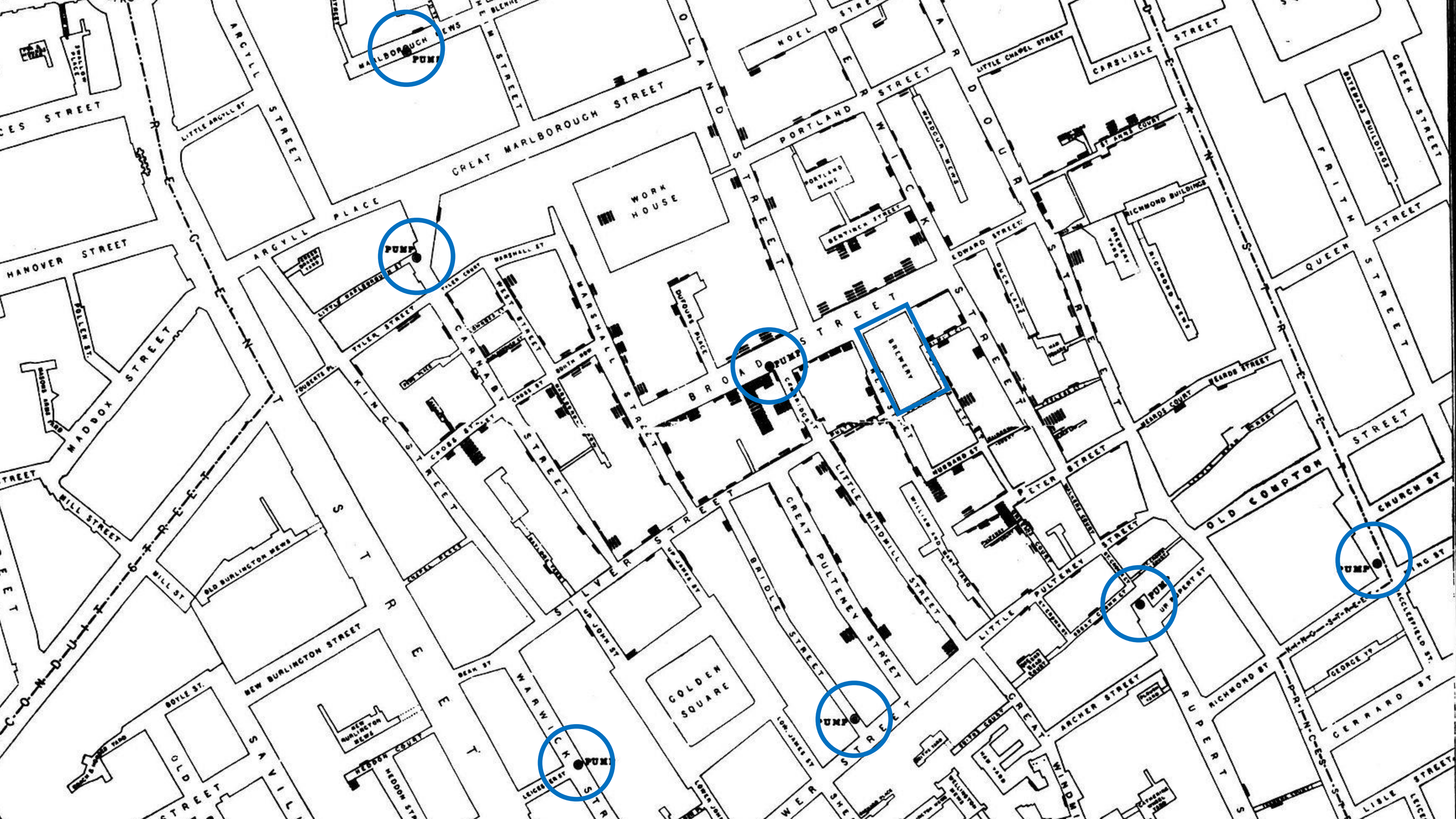
First to demonstrate cholera is a water-born illness

616 people died





John Snow, 1854



PUMP
PUMP
PUMP
PUMP
PUMP
PUMP
PUMP
GREAT MARLBOROUGH STREET
ARGYLL STREET
ARGYLL PLACE
LITTLE ARGYLL ST
HANOVER STREET
MADDOX STREET
MILL STREET
MILL ST
OLD BURLINGTON MEWS
NEW BURLINGTON STREET
BOYLE ST.
OLD
SAVIL
WORK HOUSE
MARSHALL ST
TYLER STREET
CARNABY STREET
KING STREET
WEST STREET
MARSHALL STREET
DUFOURS PLACE
BROAD STREET
BREWERY
NEW STREET
SILVER STREET
GOLDEN SQUARE
WARWICK STREET
BRIDLE STREET
GREAT PULTENEY STREET
LITTLE WINDMILL STREET
PORTLAND STREET
PORTLAND MEWS
BERTINCK STREET
NOEL STREET
LITTLE CHAPEL STREET
CARSLISLE STREET
ST ANNS COURT
RICHMOND BUILDINGS
RICHMOND MEWS
EDWARD STREET
DUCK LANE
HUBBARD ST
PETER STREET
LITTLE PULTENEY STREET
ARCHER STREET
RUPERT ST
RICHMOND ST
GREAT WINDMILL
OLD COMPTON STREET
QUEEN STREET
FRITH STREET
GREEK STREET
BATEMANS BUILDINGS
CHURCH ST
GERRARD ST
LISLE STREET
HEARDS STREET
HEARDS COURT

Storytelling Scenarios

- Self-running presentation to a large audience: Self-explanatory; limited interaction; similar to a written story.
- Live presentation by a speaker in front of audience: Speaker can respond to audience, answer questions, pause story and interact. Additional layers/annotations, interactivity.
- Individual/small-group presentation of results: More interaction with audience; presentation leads to new questions; collect and consolidate information.

Slidedeck online

Gapminder

Business meeting

Kosara & Mackinlay, 2013

“Narrative Storytelling”

58 examples

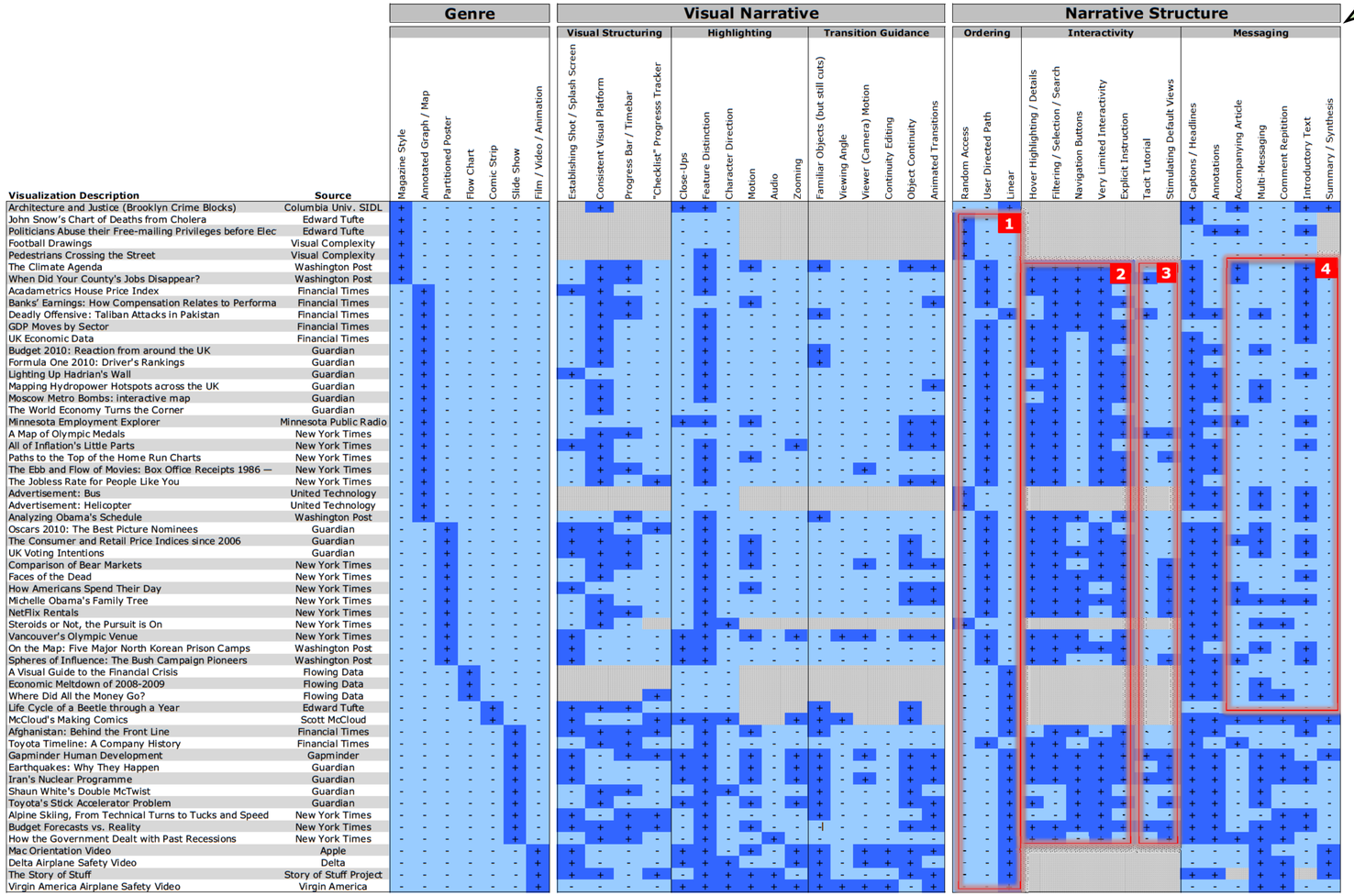


Fig. 7. Design space analysis of narrative visualization. Columns indicate recurring design elements and selected regions highlight patterns in the data. Region (1) shows clusters of ordering strategies that correspond to distinct genres of visual narration. Region (2) highlights the consistency of interactive designs used by visualizations. Region (3) shows the under-utilization of strategies to engage the user in the interactive functionality. Region (4) shows the under-utilization of common storytelling techniques across narrative visualizations.

Segel & Heer, 2010

“Narrative Storytelling”

- Visual Narrative techniques:
  - Visual Structure
  - Highlighting
  - Transition Guidance
- Narrative structures:
  - Ordering
  - Interactivity
  - Messaging

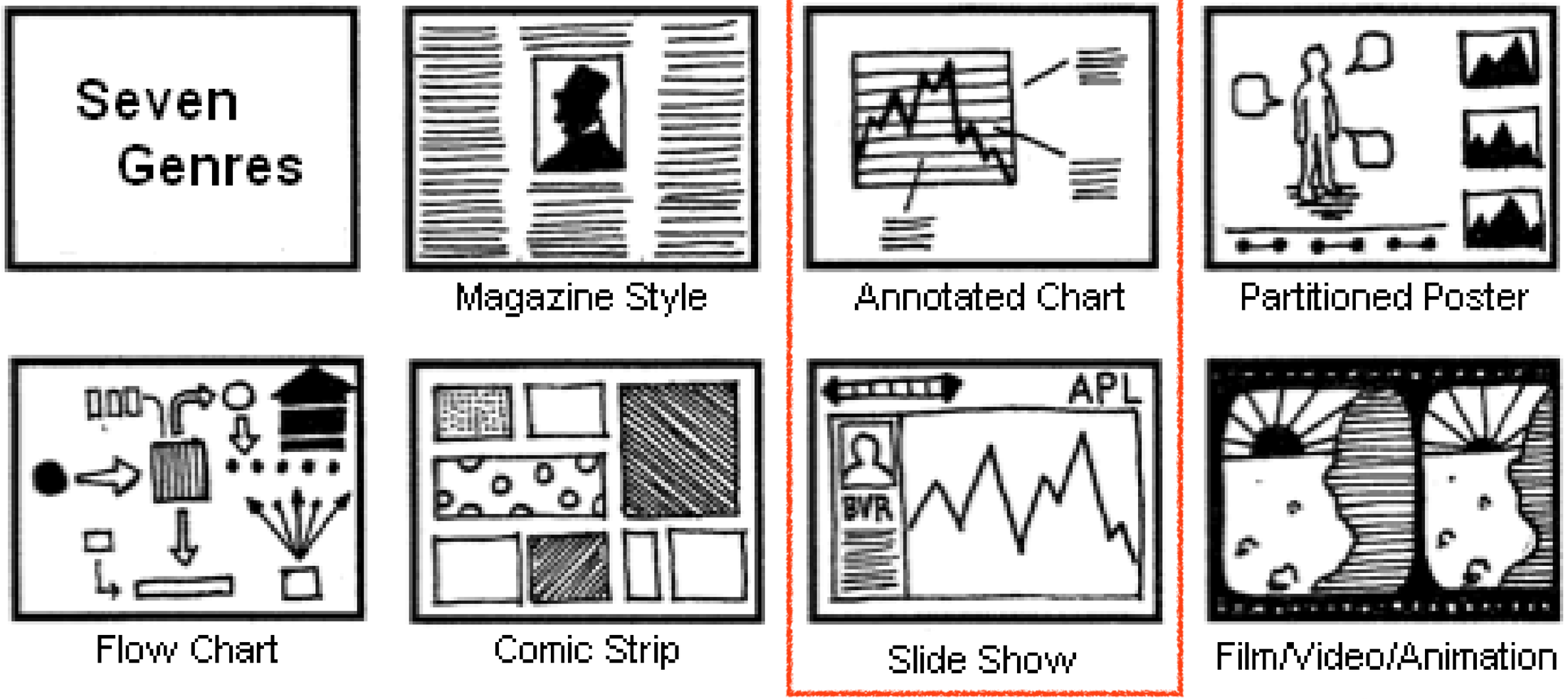
Segel & Heer, 2010

Genres of “Narrative Data Storytelling”

Note: not mutually exclusive!

Segel & Heer, 2010

Genres of “Narrative Data Storytelling”



Gapminder

Note: not mutually exclusive!

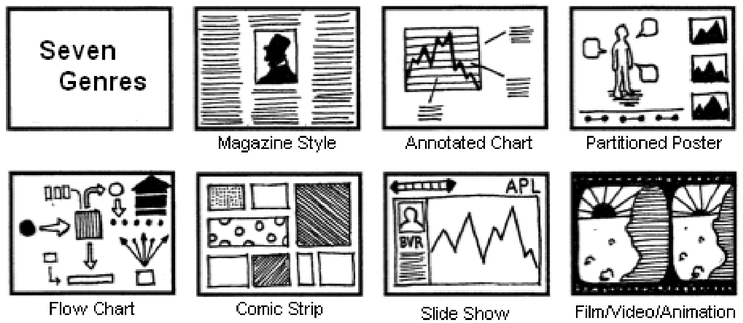
Segel & Heer, 2010

Narrative Structure

Visual Narrative

Genre

- Magazine Style
- Annotated Graph / Map
- Partitioned Poster
- Flow Chart
- Comic Strip
- Slide Show
- Film / Video / Animation



Visual Structuring

- Establishing Shot / Splash Screen
- Consistent Visual Platform
- Progress Bar / Timebar
- "Checklist" Progresss Tracker

Highlighting

- Close-Ups
- Feature Distinction
- Character Direction
- Motion
- Audio
- Zooming

Transition Guidance

- Familiar Objects (but still cuts)
- Viewing Angle
- Viewer (Camera) Motion
- Continuity Editing
- Object Continuity
- Animated Transitions

Ordering

- Random Access
- User Directed Path
- Linear

Interactivity

- Hover Highlighting / Details
- Filtering / Selection / Search
- Navigation Buttons
- Very Limited Interactivity
- Explicit Instruction
- Tacit Tutorial
- Stimulating Default Views

Messaging

- Captions / Headlines
- Annotations
- Accompanying Article
- Multi-Messaging
- Comment Repitition
- Introductory Text
- Summary / Synthesis

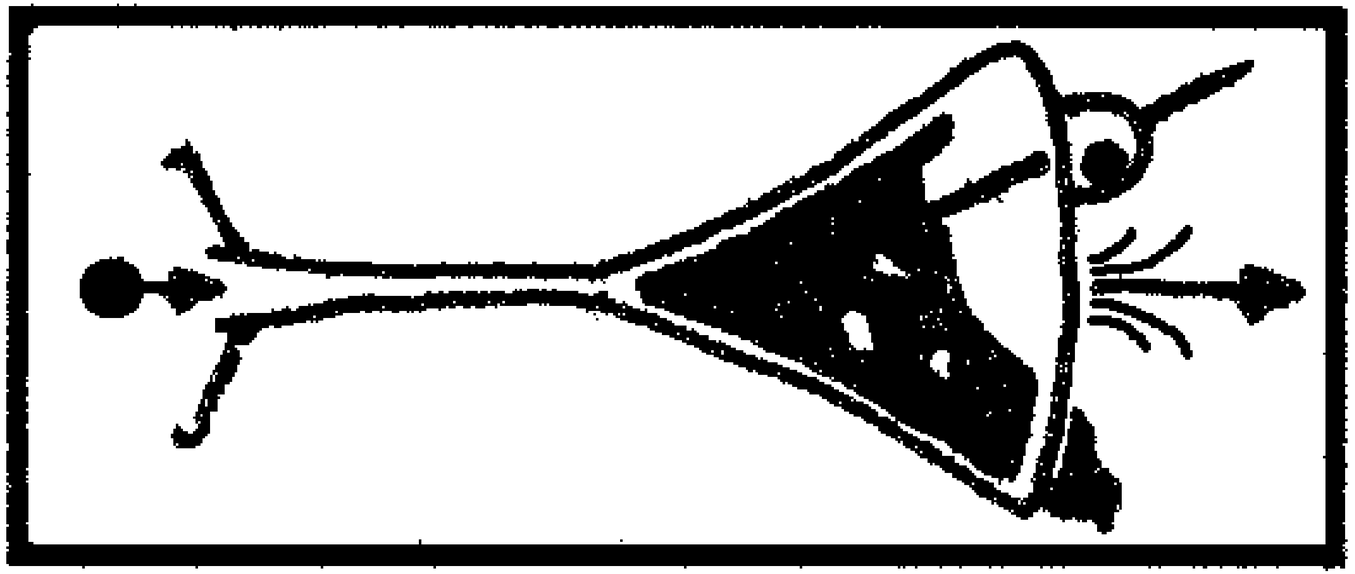
Author versus Reader-Driven

Author-Driven	Reader-Driven
Linear ordering of scenes	No prescribed ordering
Heavy messaging	No messaging
No interactivity	Free interactivity

Segel & Heer, 2010

Author versus Reader-Driven

"Martini Glass Structure"



Starts as Author-driven

Leads to Reader-driven exploration

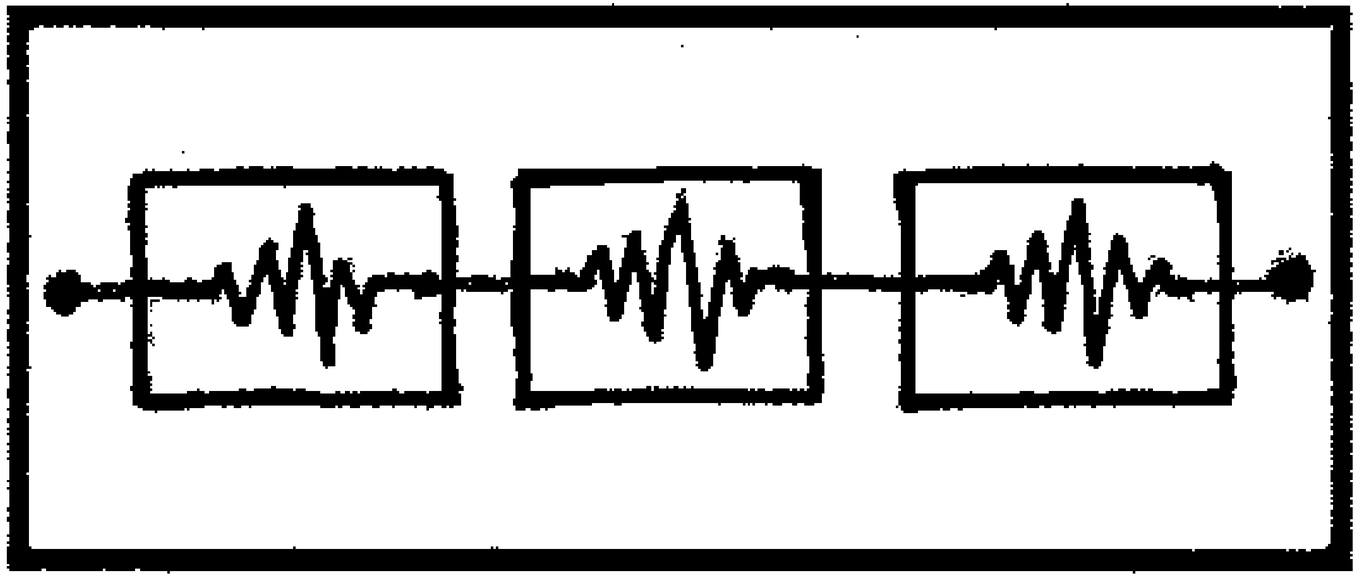
Segel & Heer, 2010

Author versus Reader-Driven

Interactive Slideshow

Overall Author-driven

e.g., Gapminder



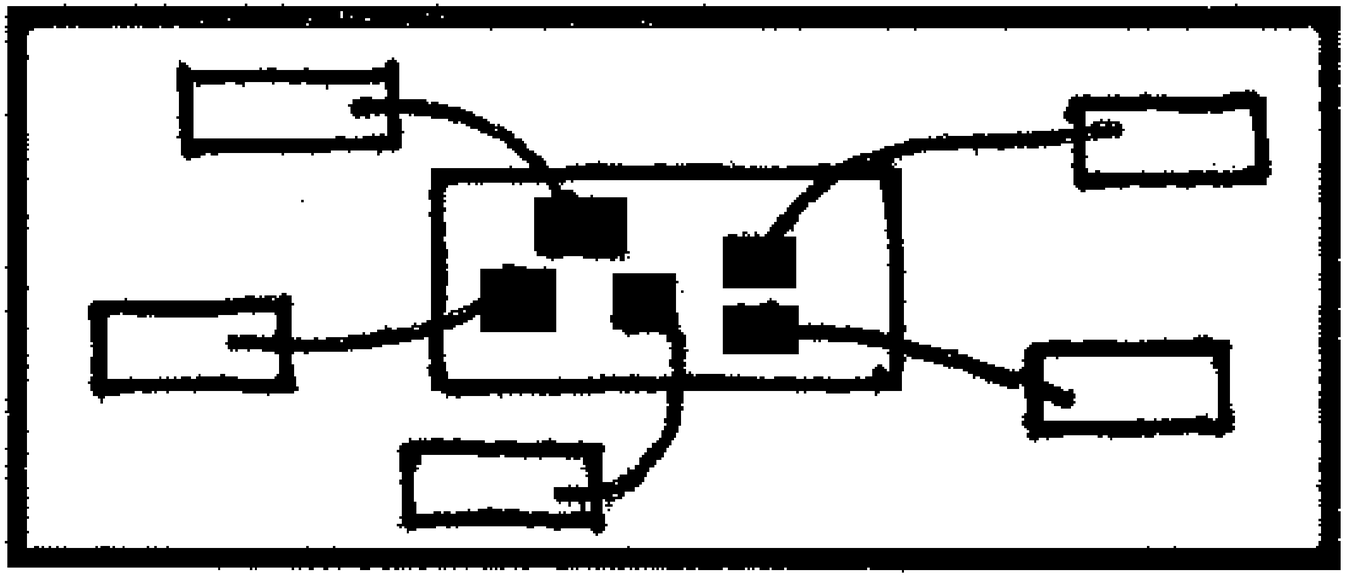
Allows for Reader-driven exploration on each slide

Segel & Heer, 2010

Author versus Reader-Driven

Drill-down Story

Overall Reader-driven



Requires lots of advanced Authoring to create narrative paths

Segel & Heer, 2010

Bear market: prolonged price declines

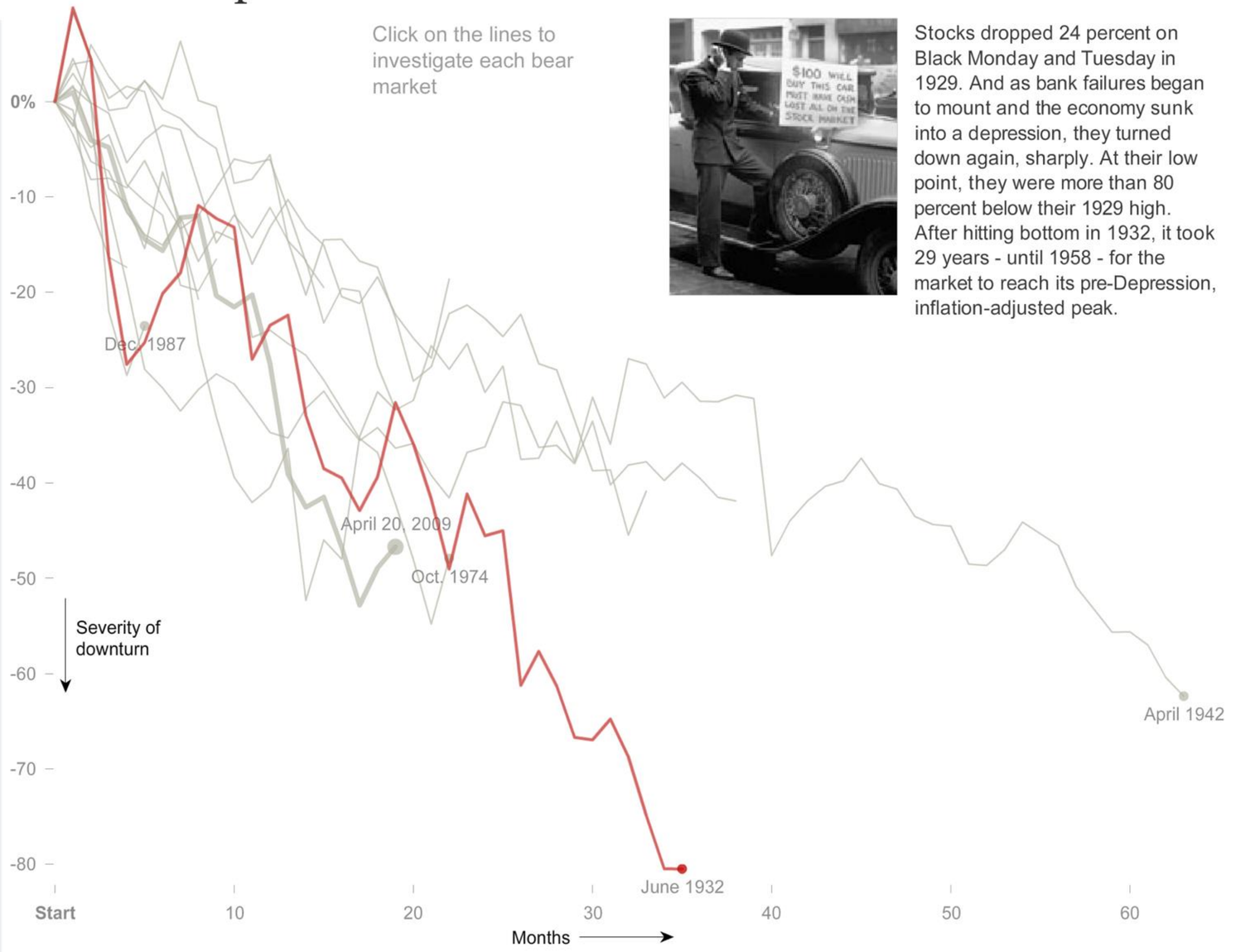
October 11, 2008

How This Bear Market Compares

SIGN IN TO E-MAIL OR SAVE THIS | FEEDBACK

The current bear market is already among the worst in history. Here is how it lines up – in losses and length – with those of the last 80 years.

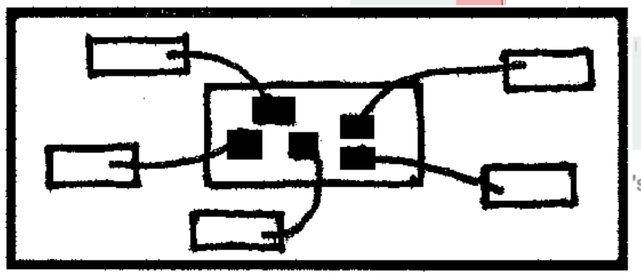
The S.& P. 500, adjusted for inflation, shown monthly **during bear markets.**



Stocks dropped 24 percent on Black Monday and Tuesday in 1929. And as bank failures began to mount and the economy sunk into a depression, they turned down again, sharply. At their low point, they were more than 80 percent below their 1929 high. After hitting bottom in 1932, it took 29 years - until 1958 - for the market to reach its pre-Depression, inflation-adjusted peak.

's; Robert J. Shiller

Amanda Cox, Xaquín G.V. and David Leonhardt

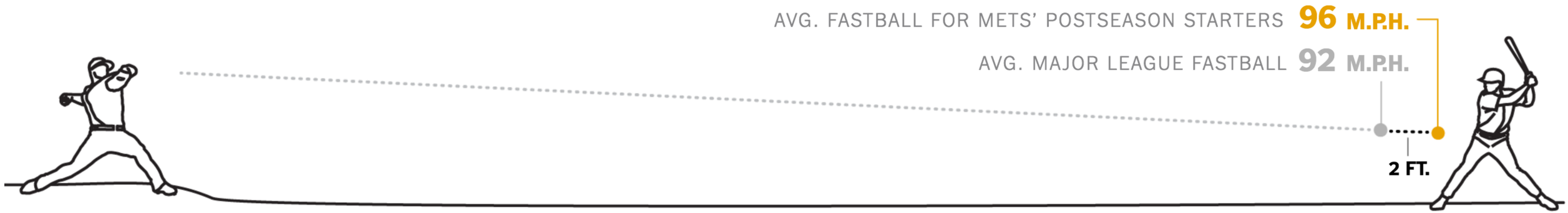


[NY Times, 2008]

Hall of Fame or Hall of Shame

The Fastest Pitchers in Baseball

By JOE WARD and AMANDA COX OCT. 27, 2015 | RELATED ARTICLE



Two feet.

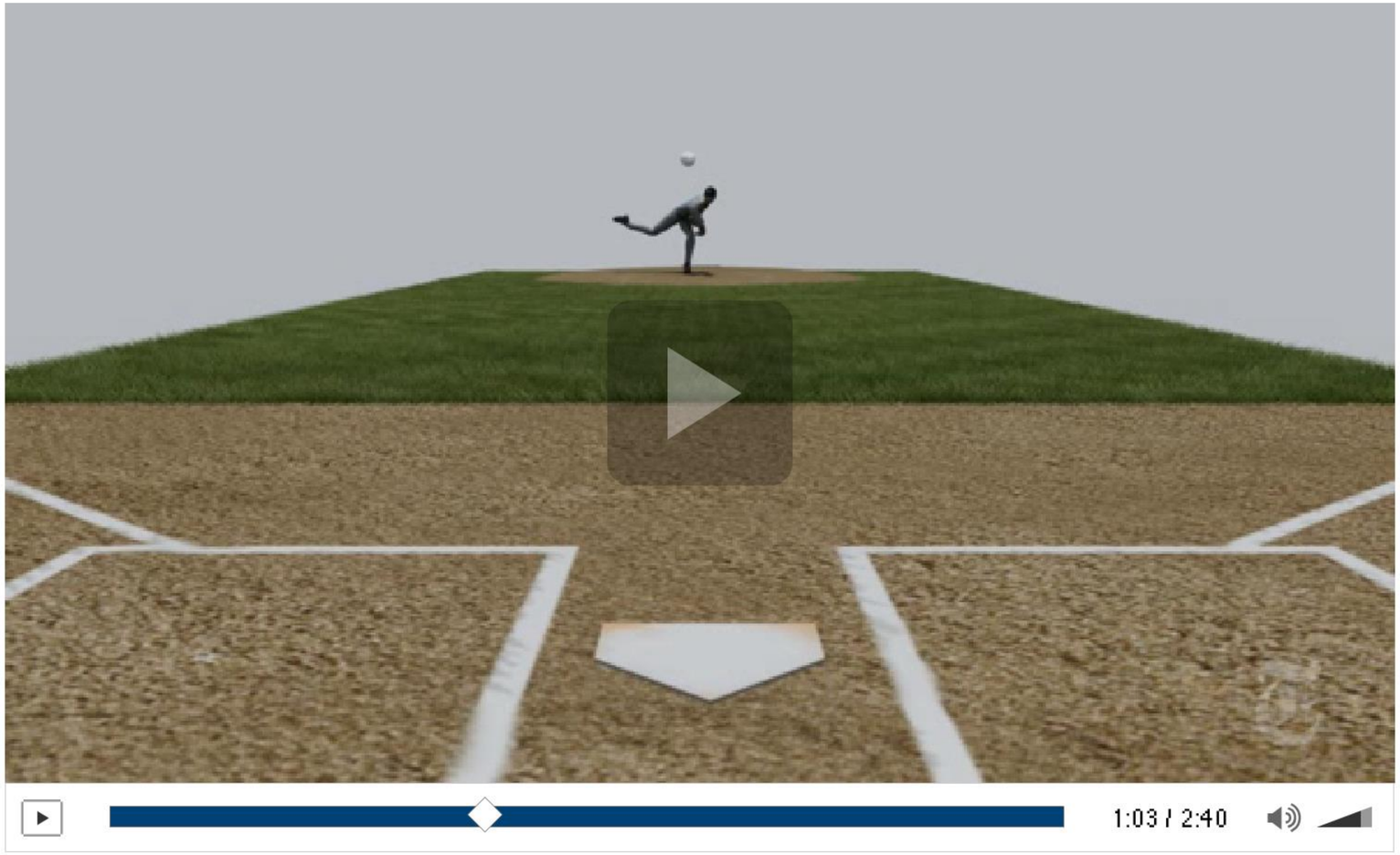
That is the difference between the average major league fastball and the fastballs thrown by the Mets' postseason starters. For every mile an hour faster, the ball is about six inches farther on its path when it crosses the plate.

NY Times, 2015

Published: June 29, 2010

How Mariano Rivera Dominates Hitters

The closer confounded hitters with mostly one pitch: his signature cutter. Related Article »



By GRAHAM ROBERTS, SHAN CARTER and JOE WARD

Sources: Major League Baseball; New York University Movement Lab; Complete Game Consulting

NY Times (Video)

NY Times (Flash)

Published: November 6, 2009

The Jobless Rate for People Like You

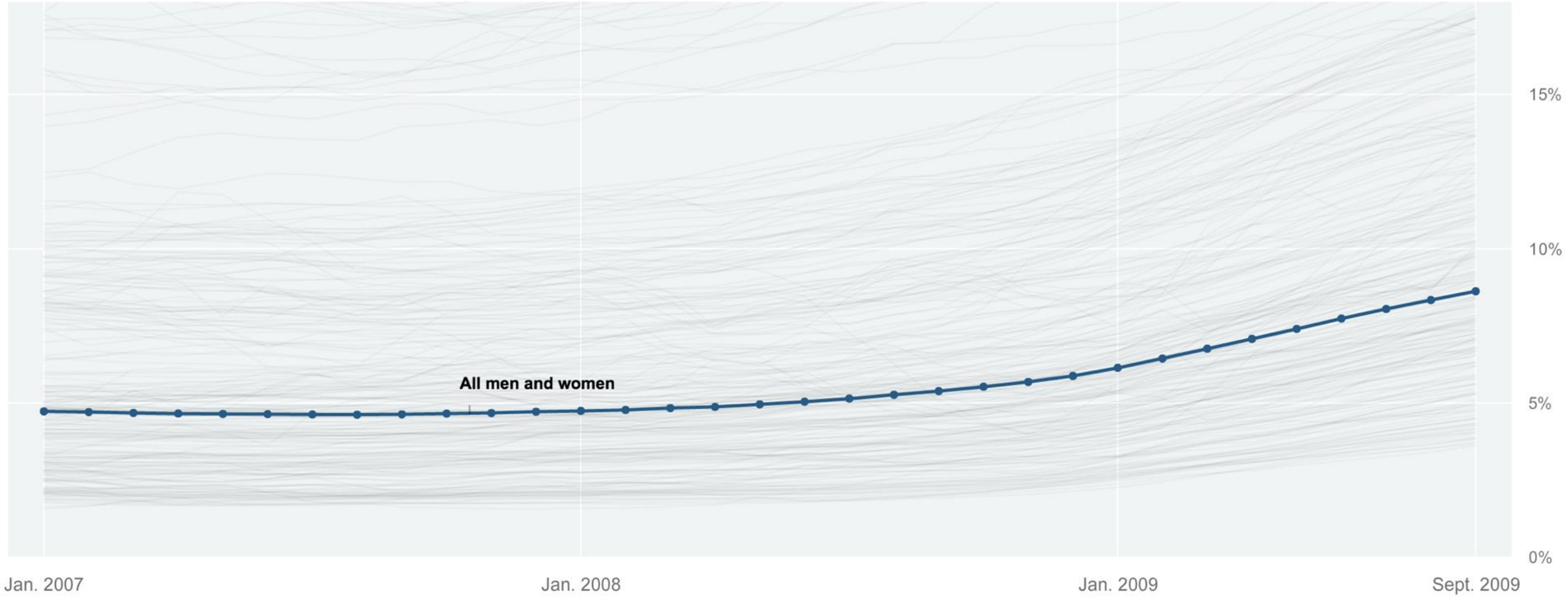
Not all groups have felt the recession equally.

All races	Men and Women	All ages	All education levels
White	Men	Ages 15 to 24	Not a high school grad...
Black	Women	Ages 25 to 44	High school graduate
Hispanic		Age 45 and older	College graduate
All other races			

UNEMPLOYMENT RATE,
12 MONTH AVG. ENDING SEPT. '09

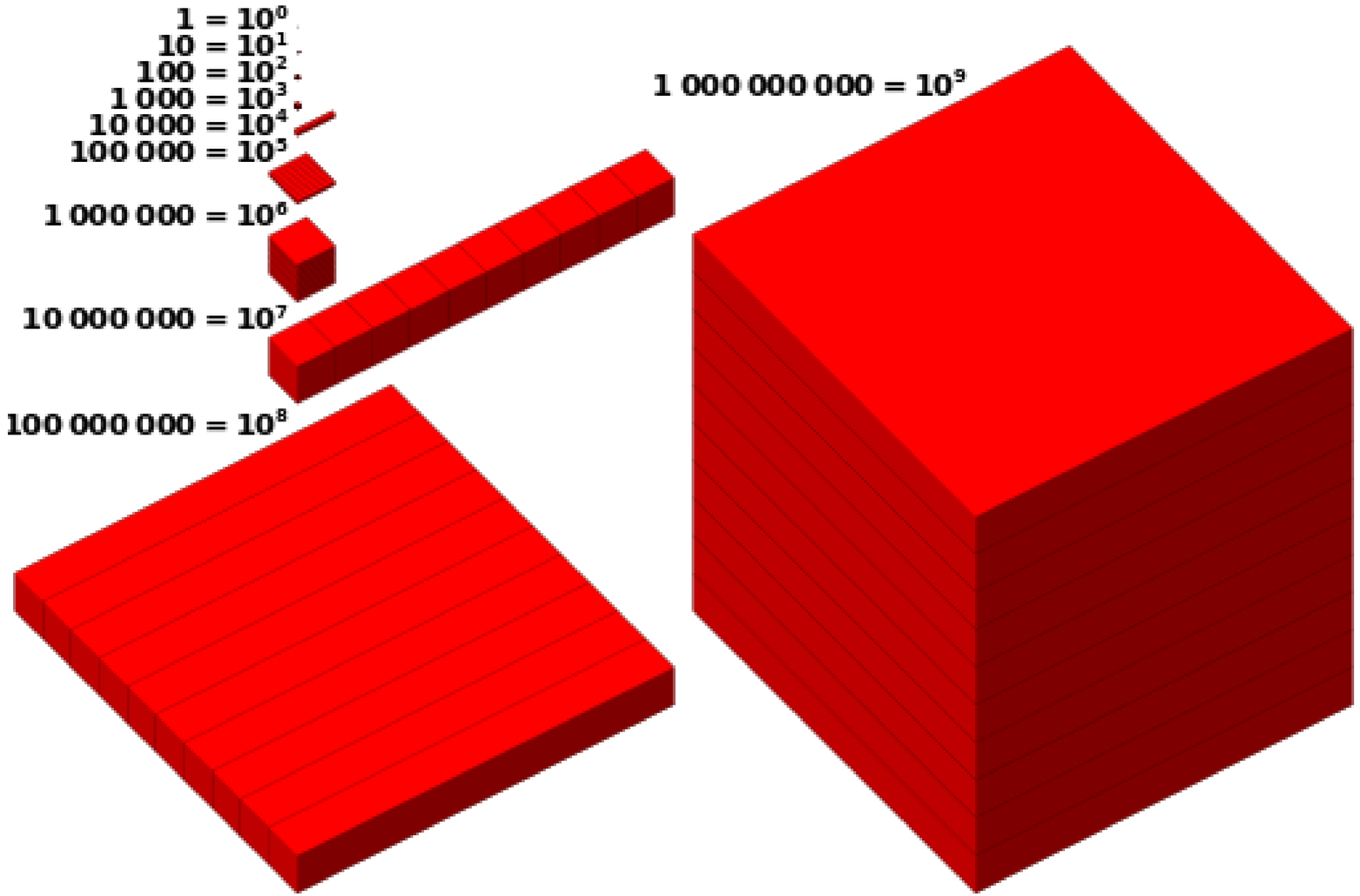
8.6%

For all men and women



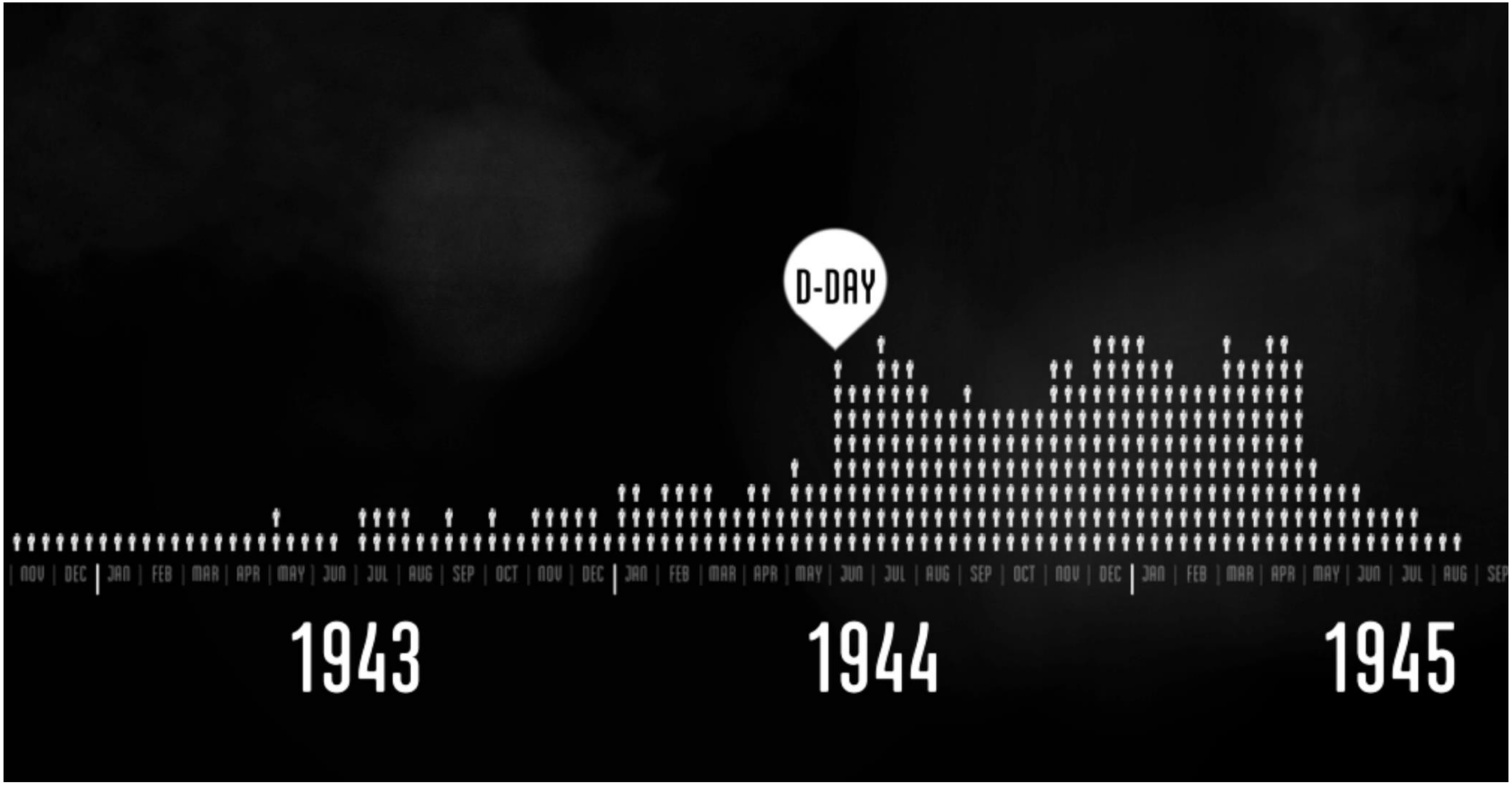
NY Times (Flash)

Powers of Ten



https://en.wikipedia.org/wiki/Power_of_10

The Fallen of World War II



Neil Halloran, 2015

GOLD
SXSW
WINNER
VIMEO
BEST OF 2015
2016
BEST AMERICAN
INFOGRAPHICS

Upcoming Assignments & Communication

Look at the upcoming assignments and deadlines regularly!

- Textbook, Readings, & Reading Quizzes — Variable days
- In-Class Activities — 11:59pm same day as class
- Assignments & Projects— Generally due R 11:59pm

R (2 days):	Project 8 — Sprint 3 & Prep for Usability Testing
F (3 days):	In-Class Usability Testing
Next R (9 days):	Project 9 — Presentation and Video
Next F (10 days):	In-Class Project Presentations

Use Canvas Discussions for general questions, email the TAs/S-LTA/instructor for questions specific to you: codydunne-and-tas@ccs.neu.edu. Include links!

If you're emailing about a particular assignment, please **include the URL of the Submission Details page**. (Canvas documentation.)

If you have a project question, **give us your group number**. E.g., include: `Group ## — Topic` with '##' replaced by your group number and 'Topic' replaced by your topic.