

Animation & Narratives





Heider & Simmel, 1944 youtu.be/sx7IBzHH7c8



Animations can...

but...

Direct attention

Track changes/movement

Imply cause/effect

Create depth

Anthropomorphize

Improve engagement

?



Change Blindness



Credit:

Christopher Healey, <https://www.csc2.ncsu.edu/faculty/healey/PP/>

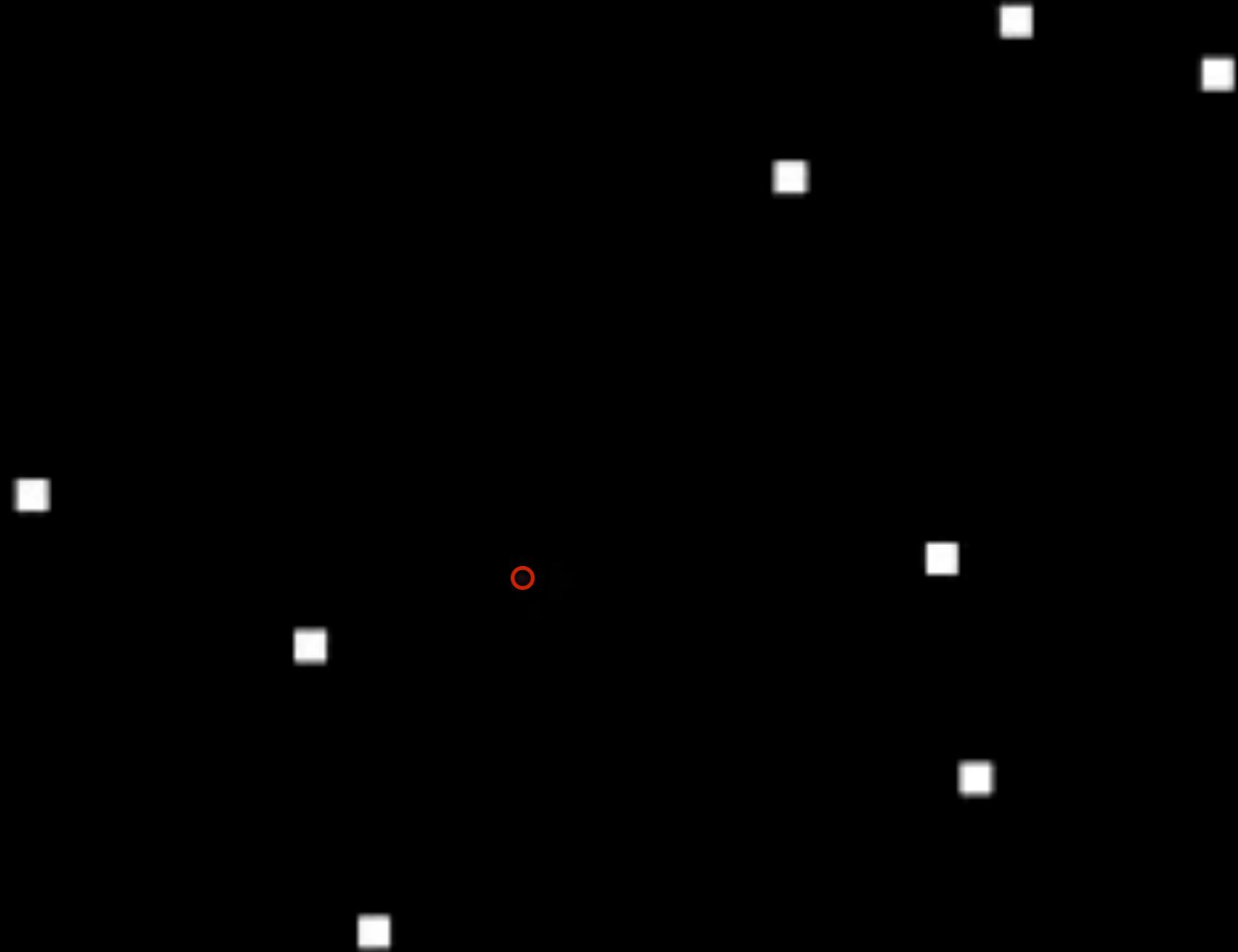


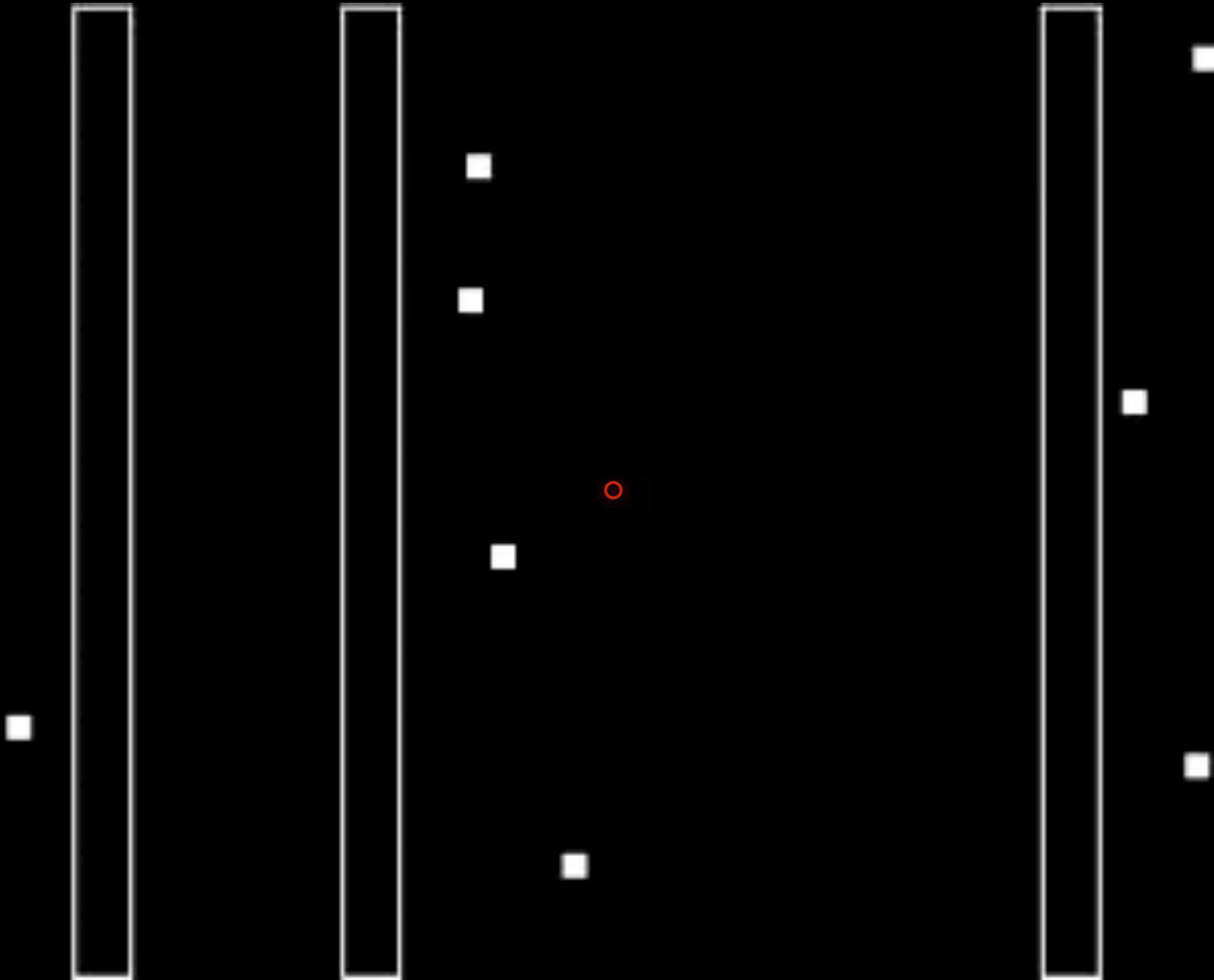
Properties of Motion

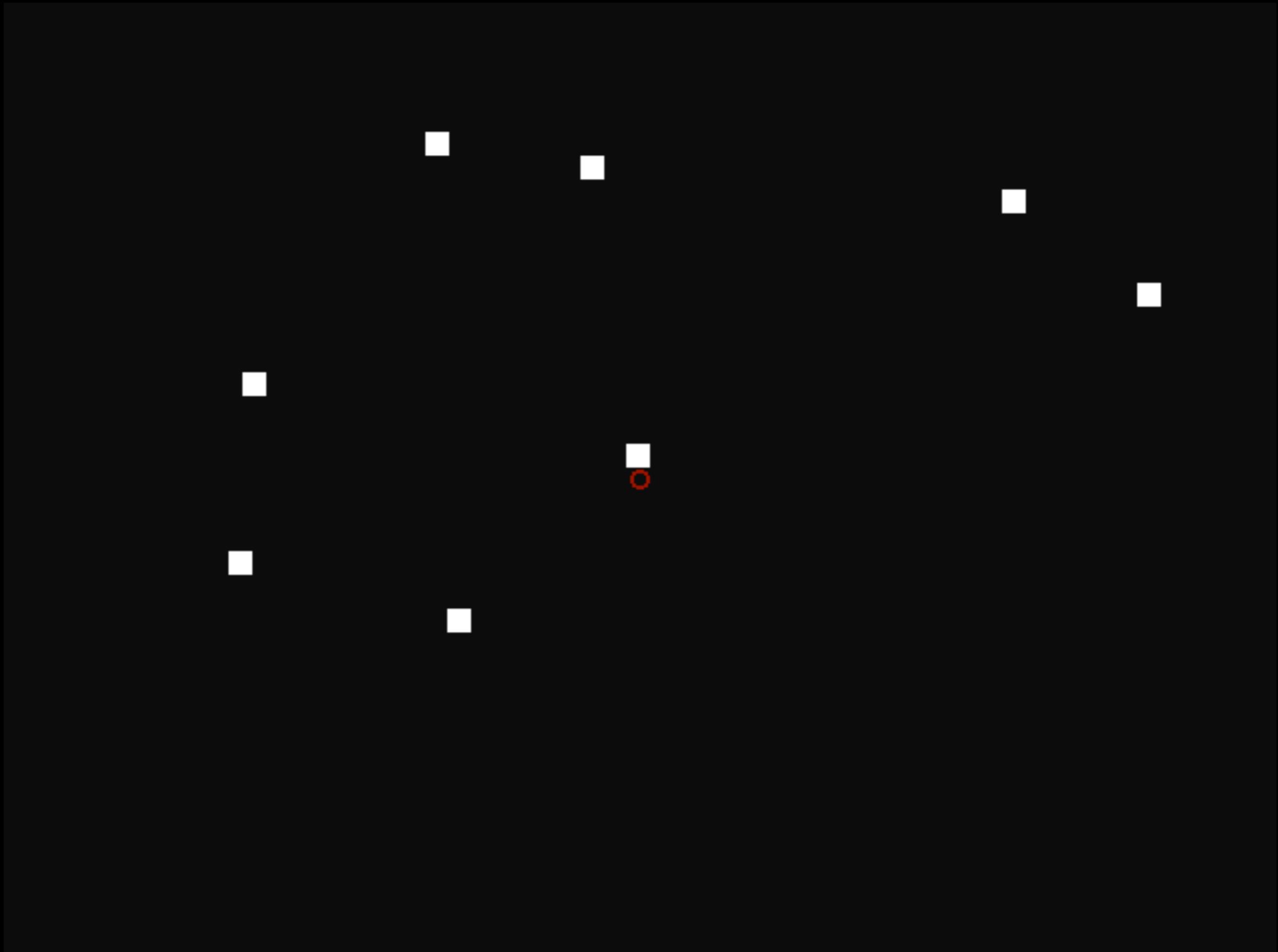
How many entities can we track?

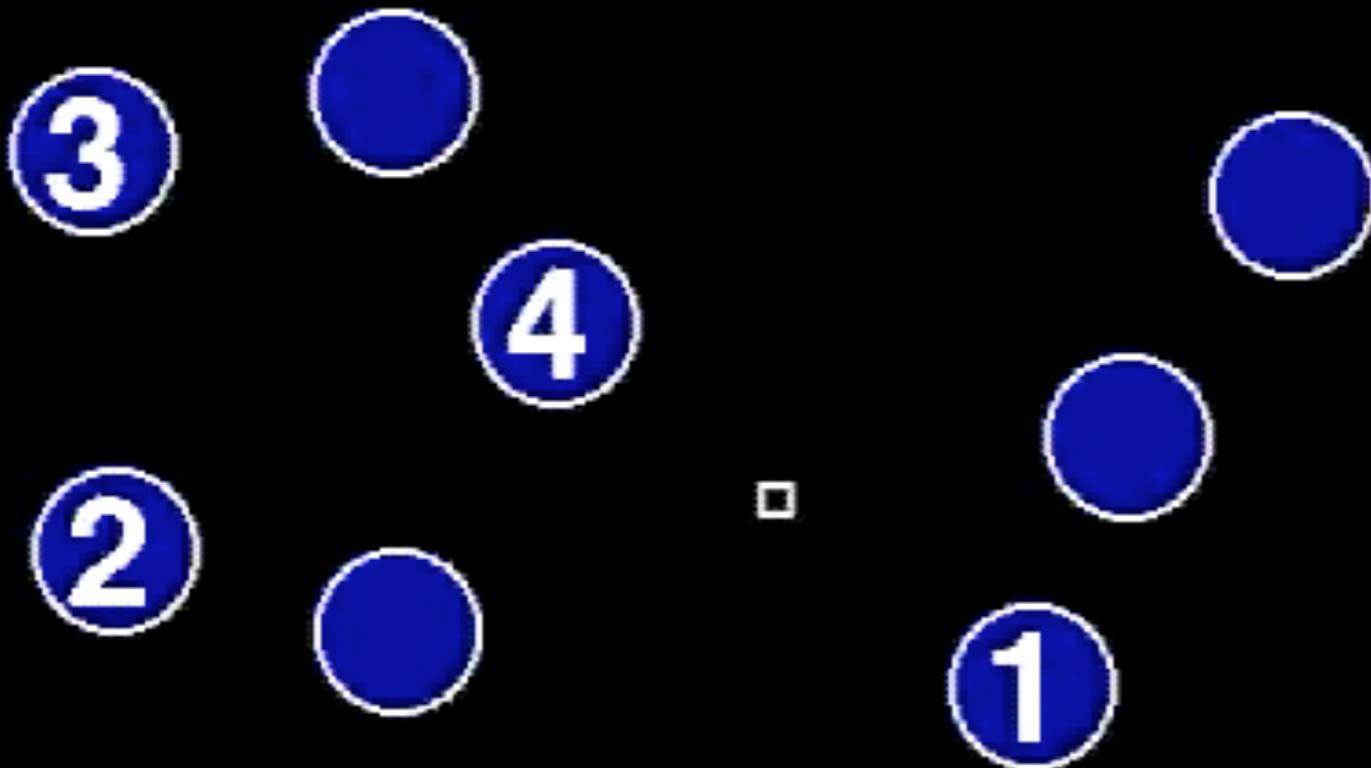
How many changes can we track at
the same time?











Properties of Motion

How many entities can we track?

4-6 entities

(occlusion matters)

How many changes can we track at
the same time?

few at best*



Common Fate

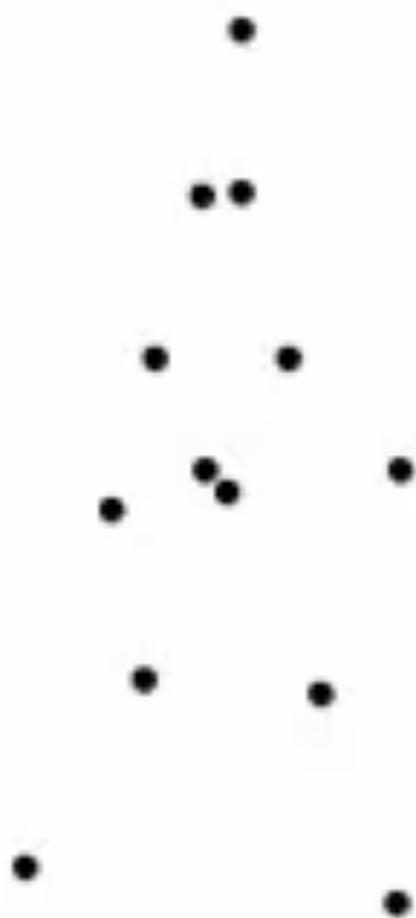
Items that move together
are grouped together

youtu.be/6zOarcL1BSc



Common Fate

We can maintain groups
against noise and even
anthropomorphize!



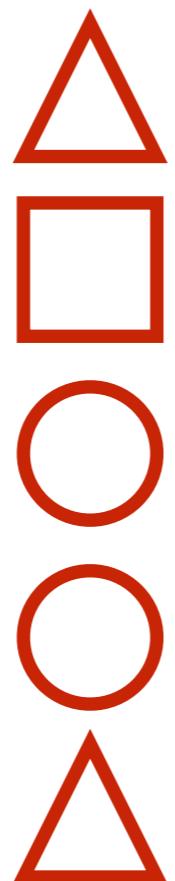
GM

<http://www.georgemather.com/MotionMP4.html>



Tracking State Changes

Subject to overload and change blindness



Tracking State Changes

Subject to overload and change blindness



Use **staging**

Monocular Motion Cues

Parallax

Depth from motion



<http://www.georgemather.com/MotionMP4.html>





Check out <https://youtu.be/z9tBce8eFqE>



Animations can...

but...

- | | | |
|------------------------|-------|-------------------------------------------------------------------------|
| Direct attention | | distractions |
| Track changes/movement | | false conclusions |
| Imply cause/effect | | false relationships |
| Create depth | | illusions of primacy |
| Anthropomorphize | | anthropomorphization |
| Improve engagement | | serve no greater purpose
require good design &
<i>calibration</i> |

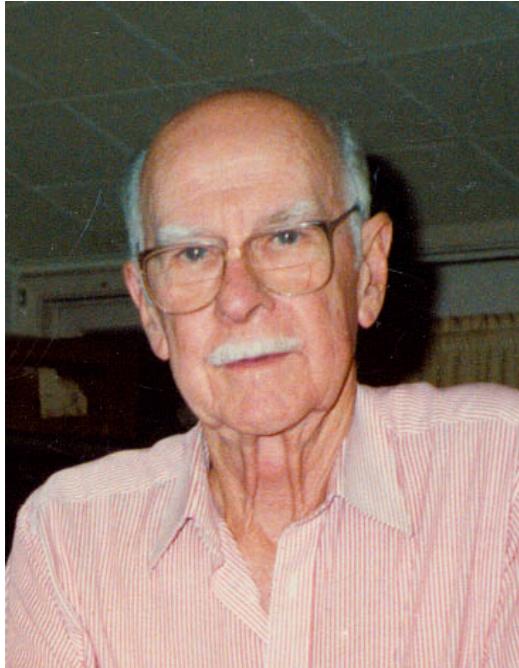




Warner Bros., 1943,



12 Principles of Animation



Ollie Johnston

Frank Thomas

Disney's "Nine Old Men"

Check out: youtu.be/haa7n3UGyDc

ISBN: 978-0-7868-6070-8.



1. Squash and Stretch

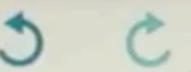
youtu.be/haa7n3UGyDc



5. Follow Through & Overlapping Action

youtu.be/4OxphYV8W3E

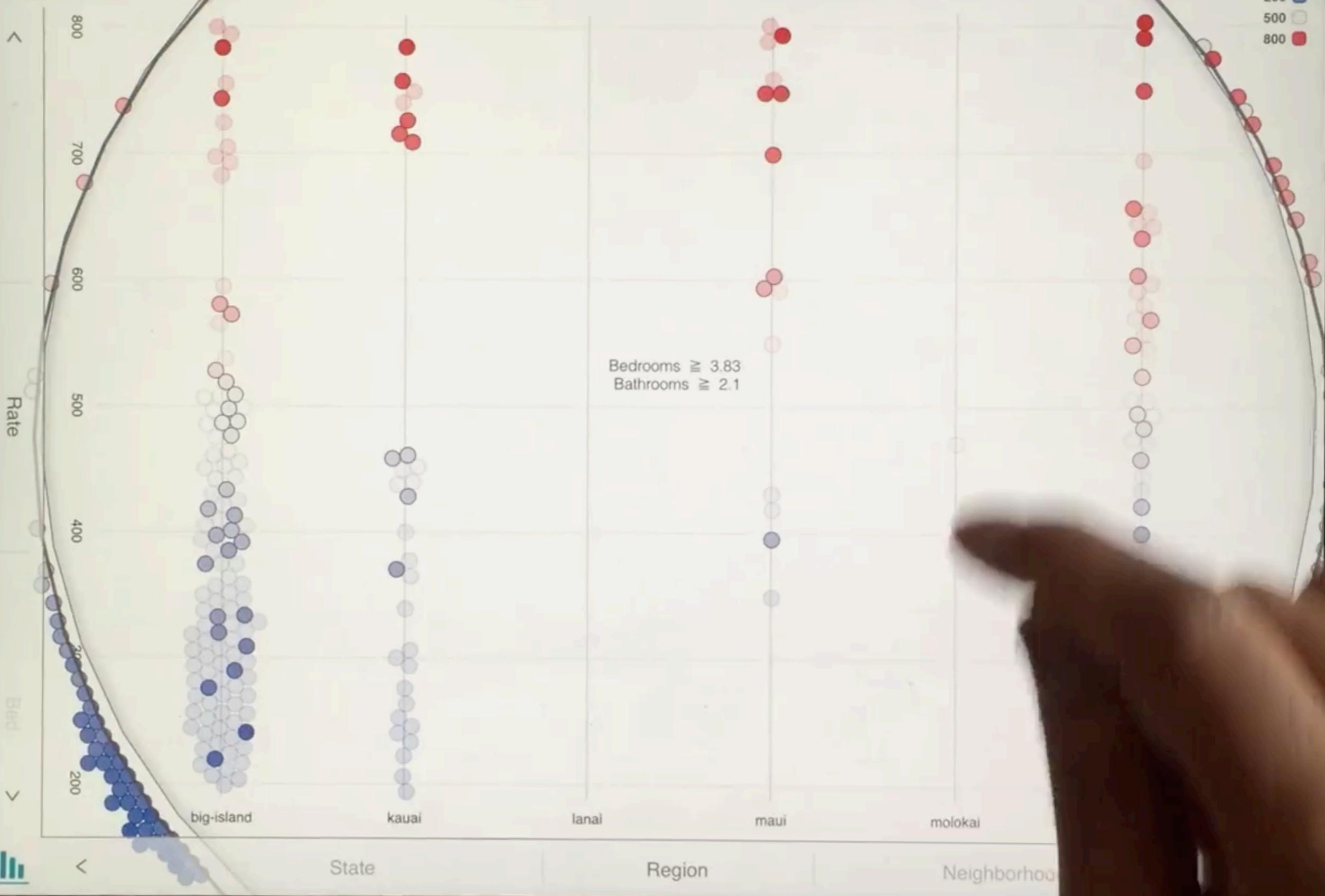


[Home](#)

Vacation Rentals Hawaii



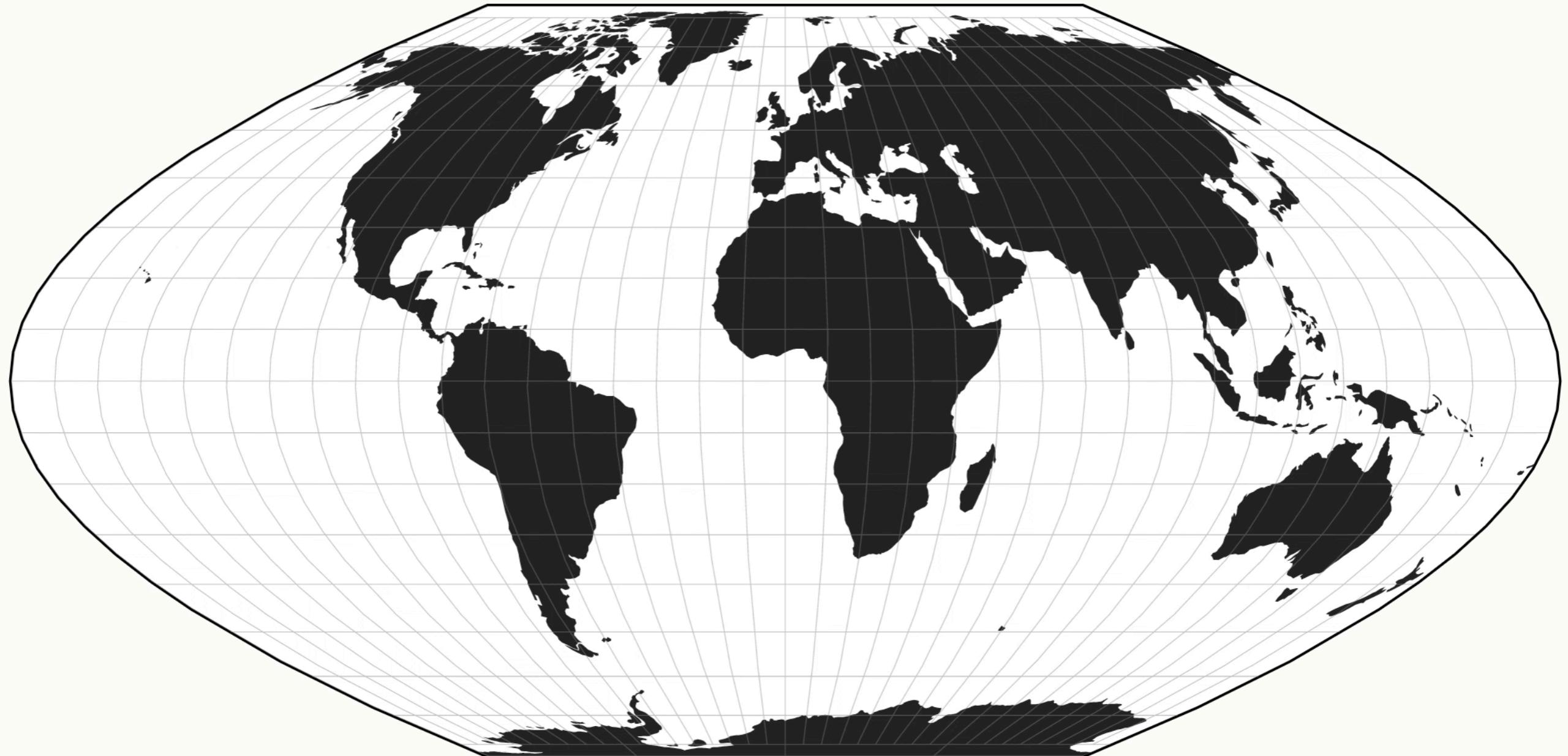
Rate
200
500
800



Animating Visualizations

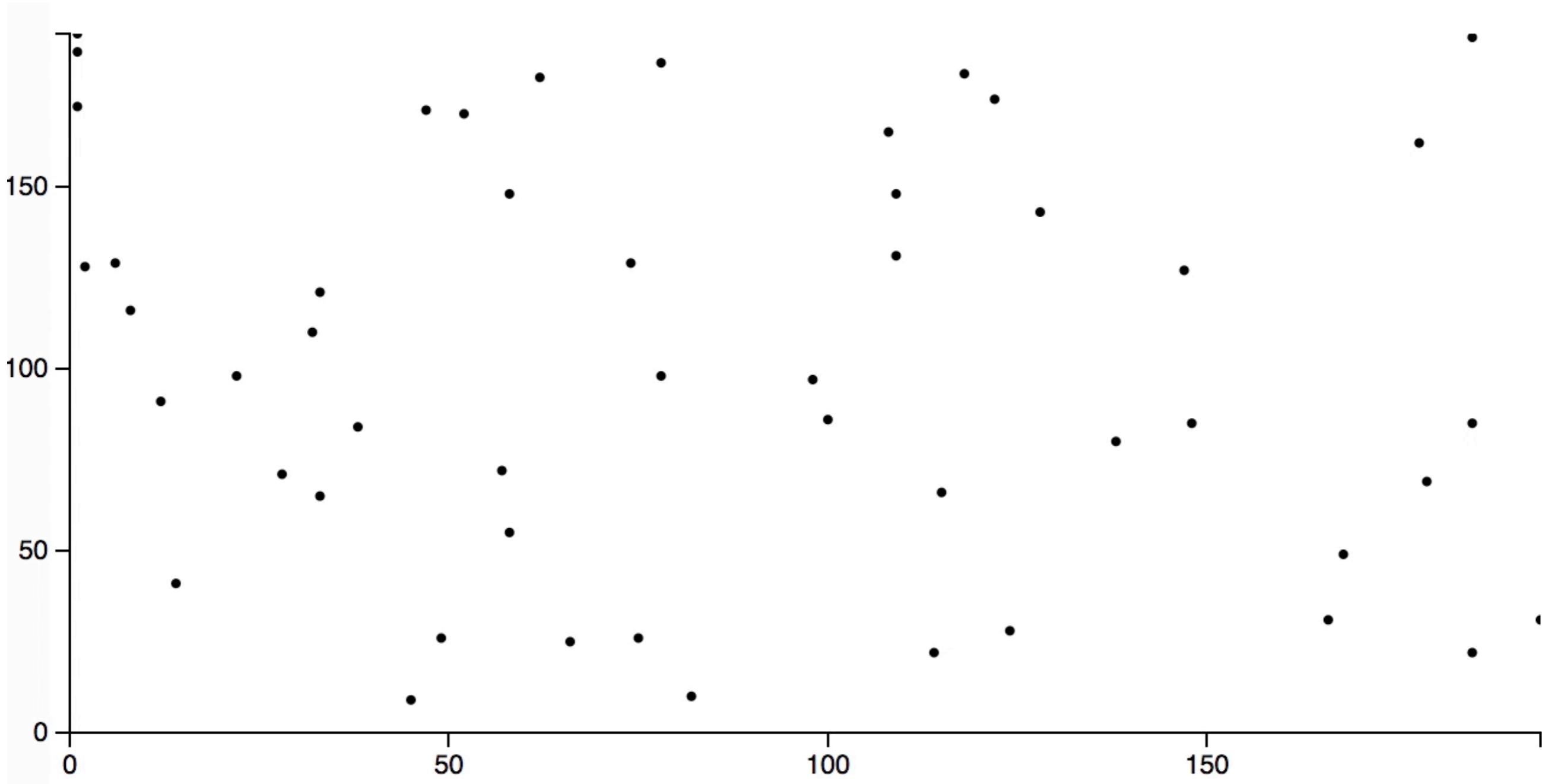


Eckert VI



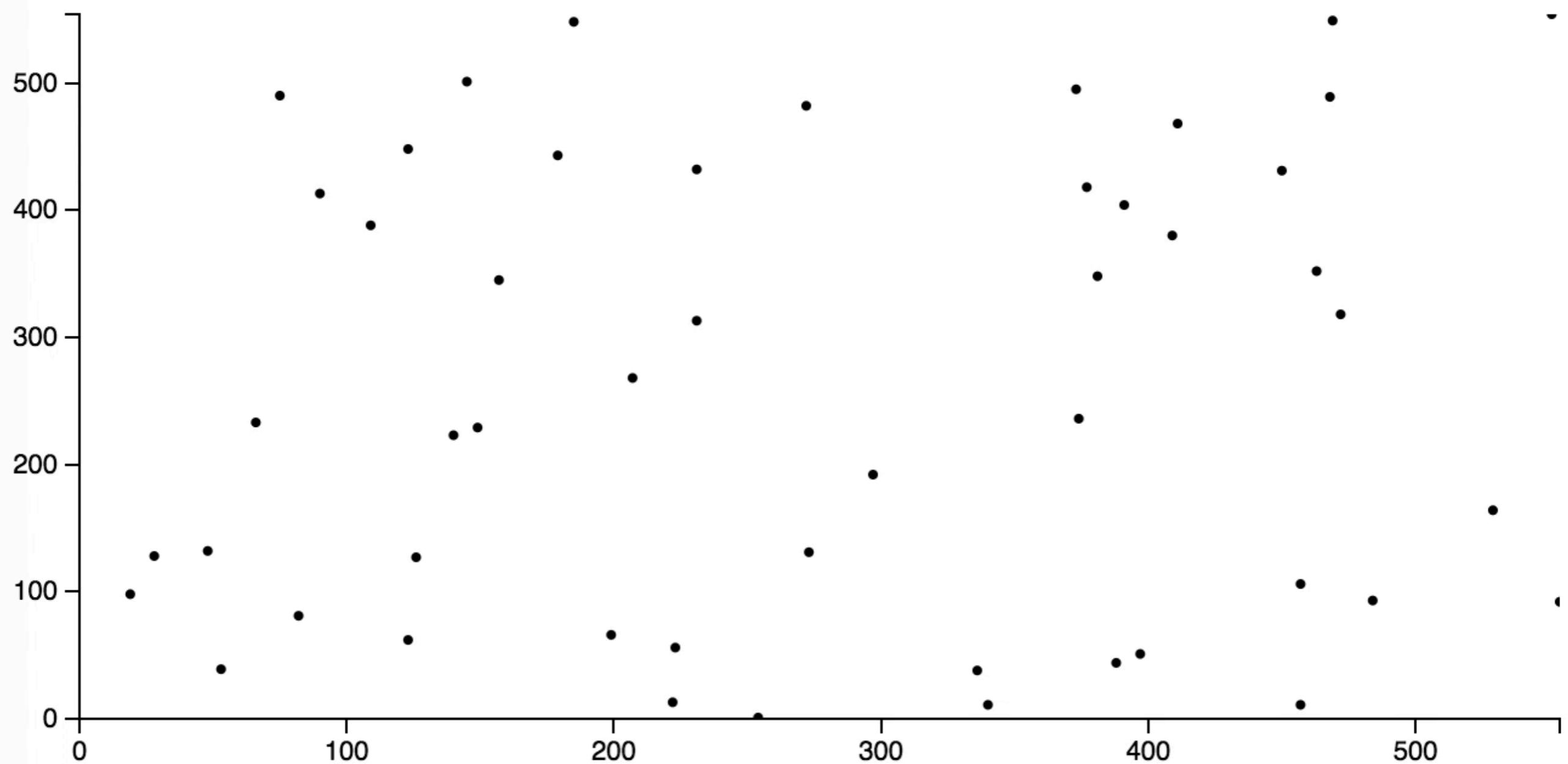
<https://bl.ocks.org/mbostock/3711652>





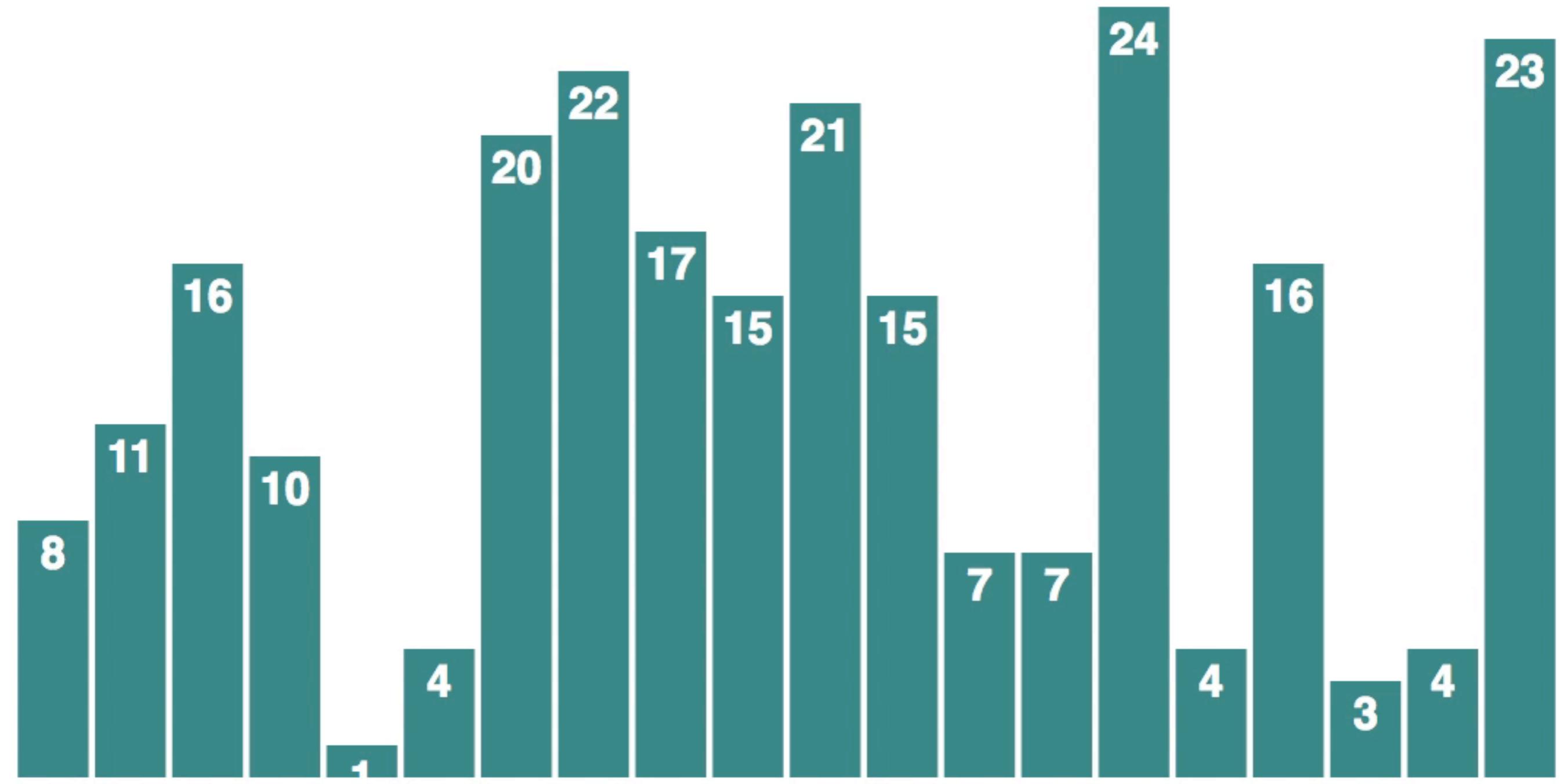
<https://codepen.io/tranzfuse/pen/PwqoZK>

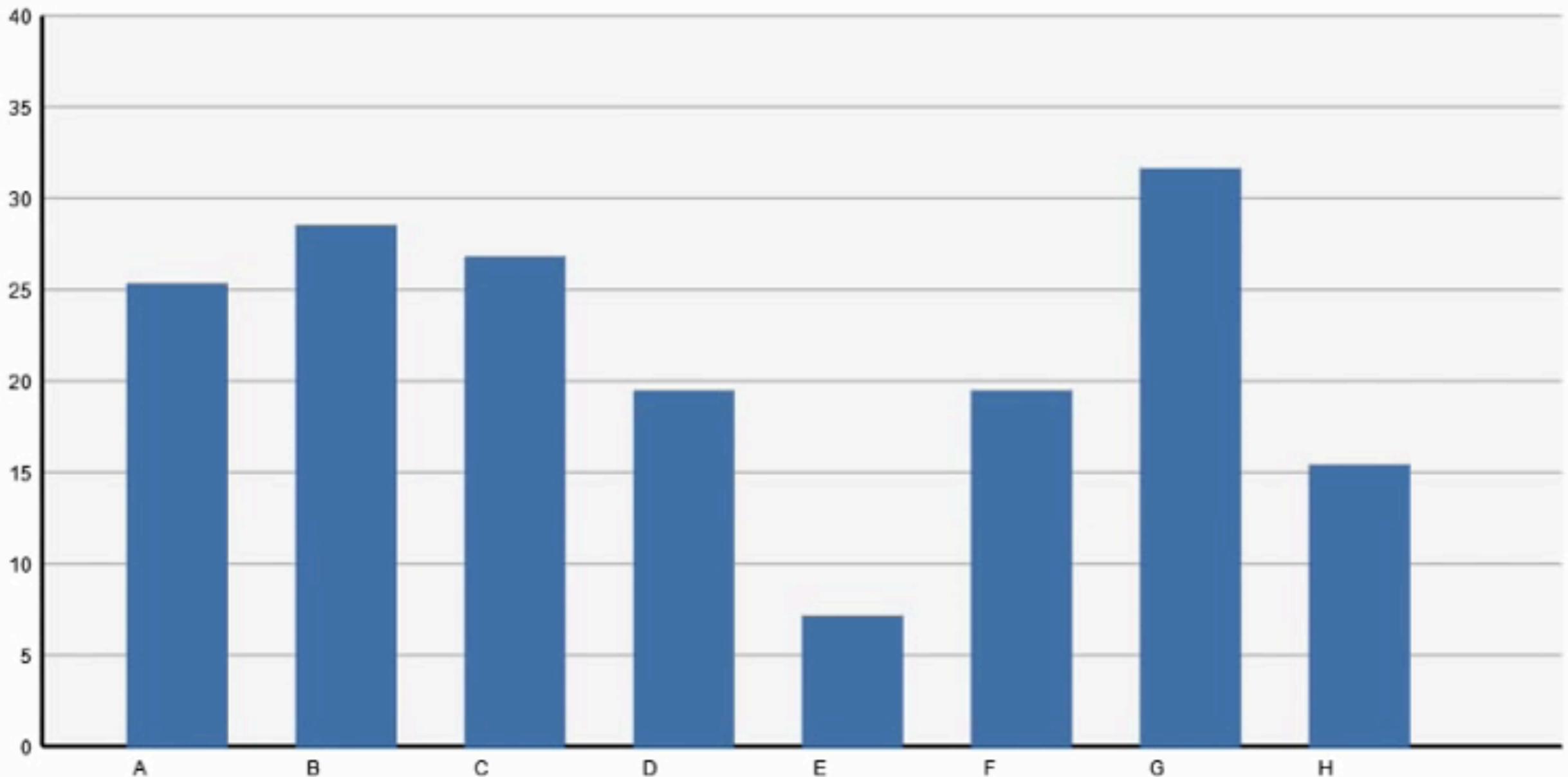


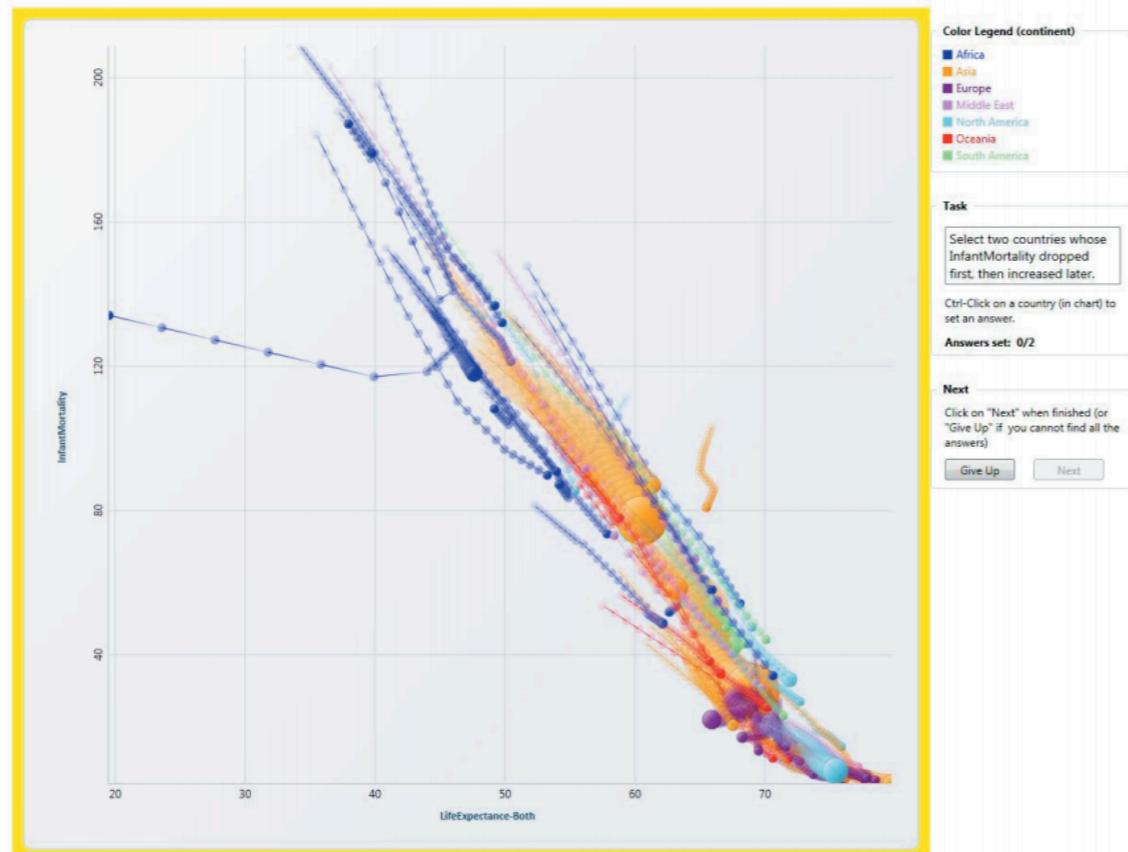


<https://codepen.io/tranzfuse/pen/PwqoZK>









User preference

10% more accurate

Presentation: Animation 60% faster
Analysis: Animation 82% slower

Robertson, G., Fernandez, R., Fisher, D., Lee, B. and Stasko, J., 2008. Effectiveness of animation in trend visualization.



Animations can...

Direct attention

Track changes/movement

Imply cause/effect

Create depth

Anthropomorphize

Improve engagement

but...

use good design practice

axes should be consistent

staging & timing are hard

consider your task

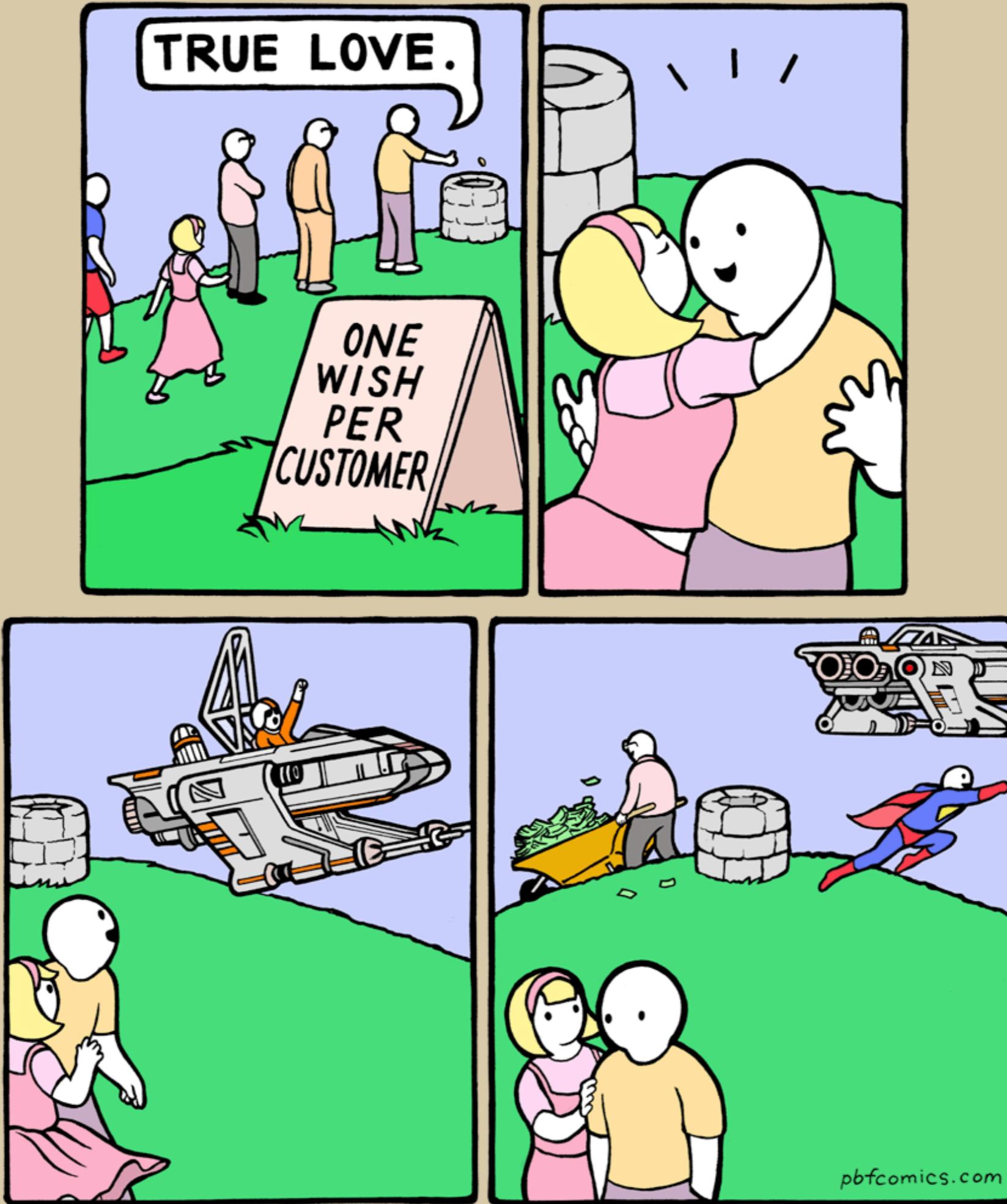
static images might still be better



Narrative

“an account of connected events”





Wishing Well, Nicholas Gurewitz



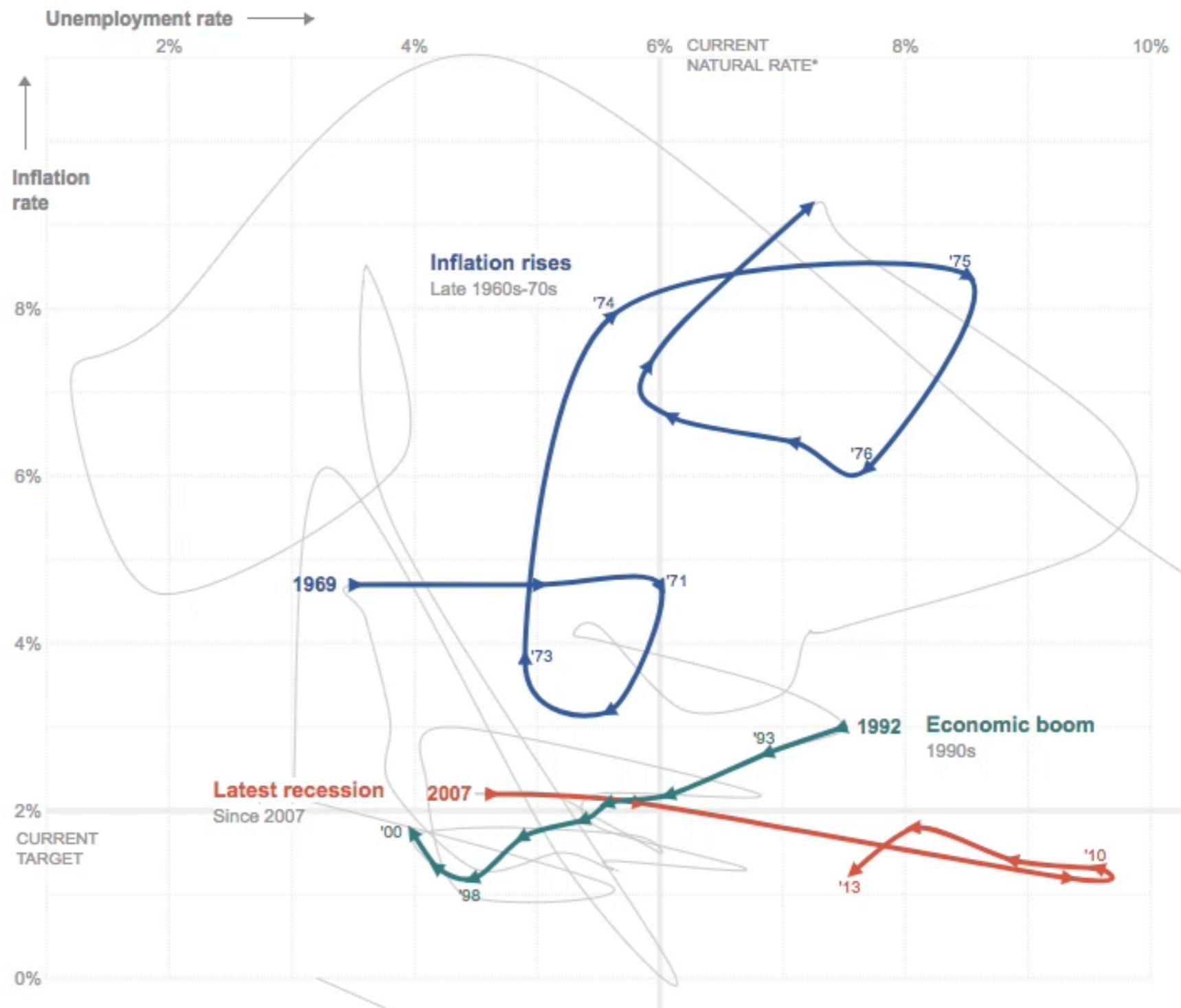
Janet L. Yellen, on the Economy's Twists and Turns

1 2 3 4 5 6 7 NEXT >

Inflation and unemployment

The Federal Reserve is said to have a “dual mandate”: keeping inflation in check and the unemployment rate low. These measures, which tend to change cyclically and in concert with each other, are charted for every year since the Great Depression.

In speeches and in meetings, Ms. Yellen, the nominee for the next Fed leader, has commented on the Fed's actions during significant periods, providing a window into her views and priorities.

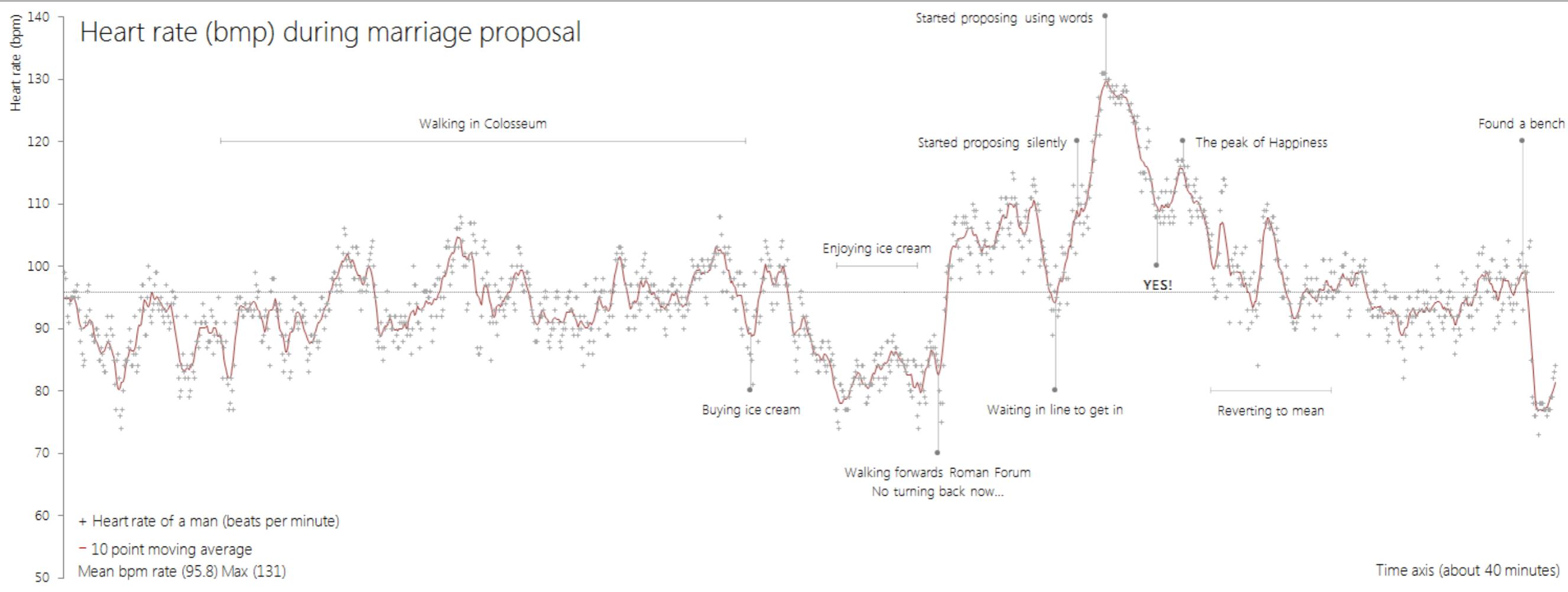


*The natural rate of unemployment is defined as the lowest sustainable level of unemployment over the long term. If the rate is pushed any lower than the natural level, wages and prices would rise.

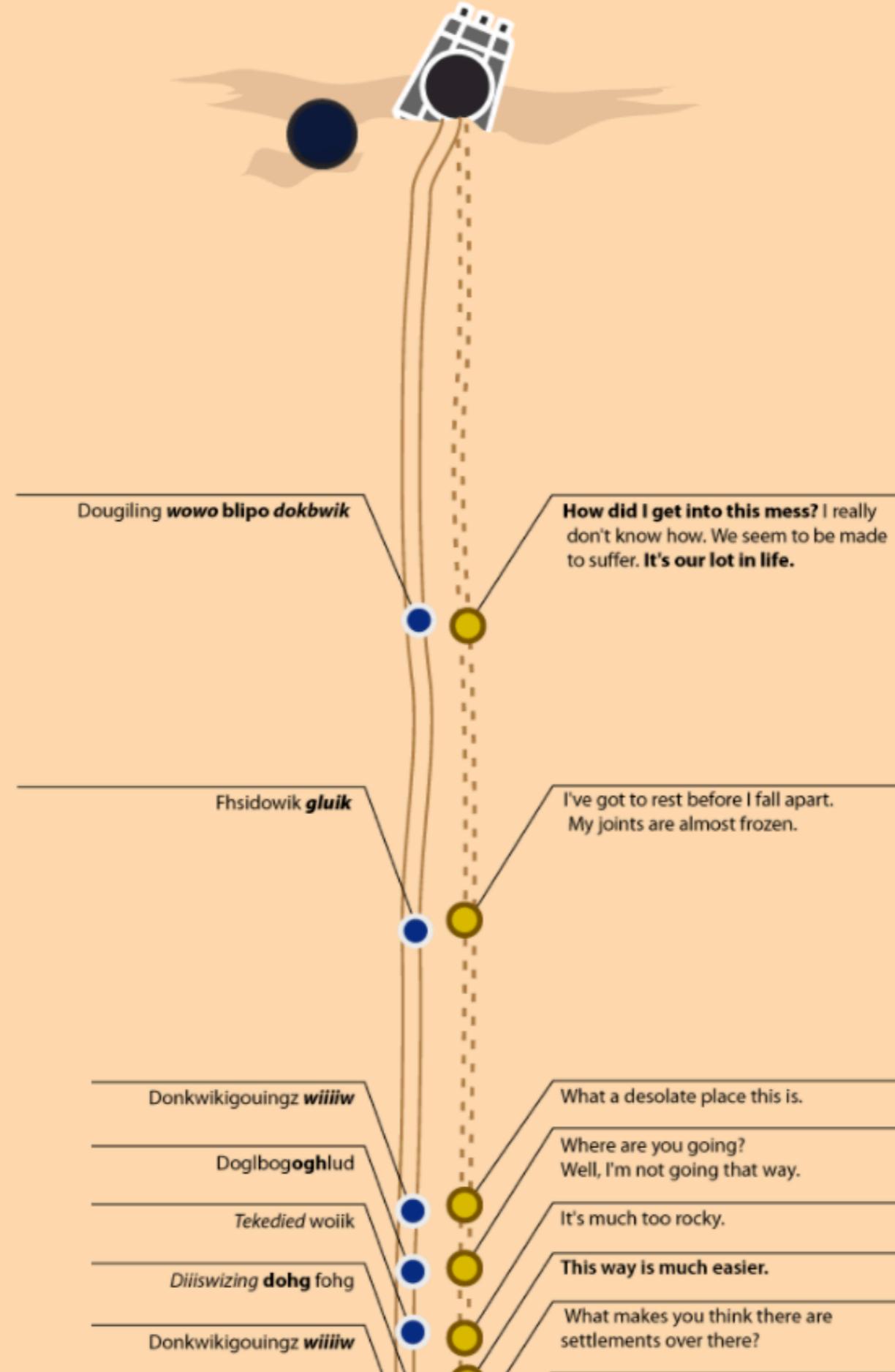
By TOM GIRATIKANON and ALICIA PARLAPIANO

Sources: Federal Reserve Bank of St. Louis (inflation, measured by annual change in core personal consumption expenditures); Bureau of Labor Statistics (unemployment rate, annual average); National Bureau of Economic Research (unemployment rate before 1947)







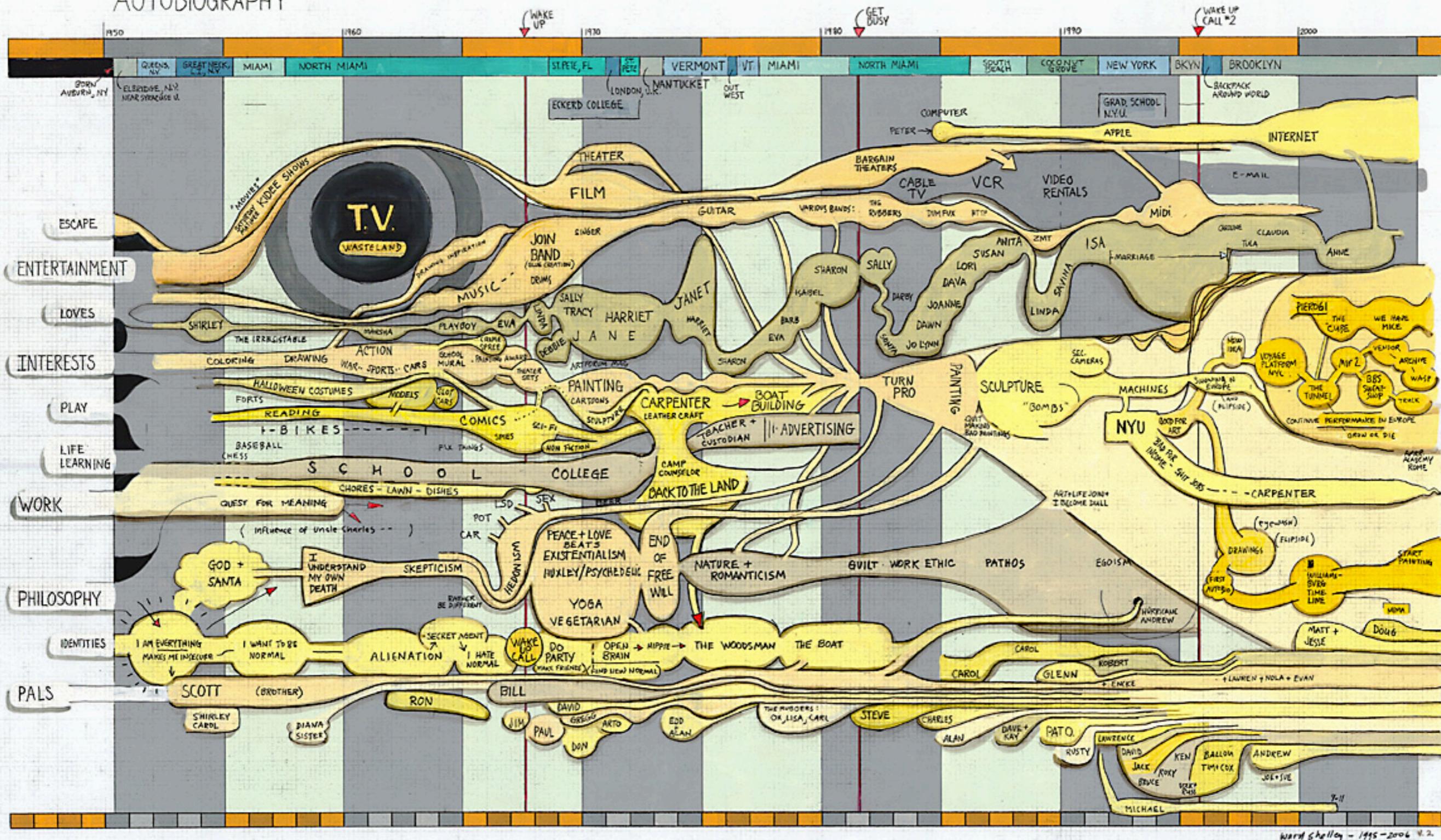




Julia Lines Wilson, The Grasses of America



AUTOBIOGRAPHY



Autobiography, ver. 2 by Shelley



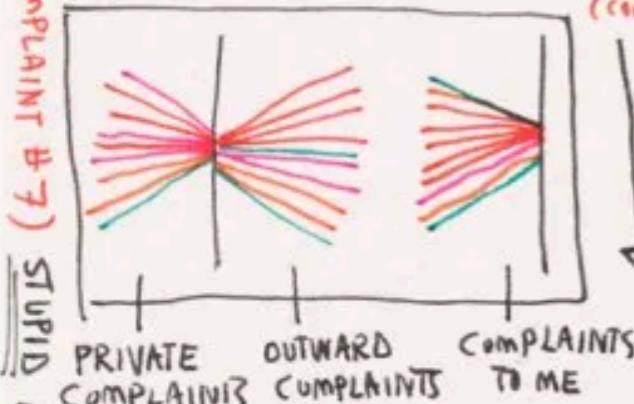
DEAR DATA - WEEK 07

A WEEK OF COMPLAINTS*

→ AND GENERAL GRUMPINESS

HOW TO READ IT: (I ~~THREW DOWN MY~~

4 PENS WHEN I FINISHED)
(COMPLAINT #7)



ALL COMPLAINTS IN CHRONOLOGICAL ORDER EXCEPT 'COMPLAINTS TO ME'
BECAUSE (COMPLAINT #1) I MESSED UP THE ORDER + BY THAT TIME I HAD ALREADY SPENT 1.5 HOURS ON THIS... AARGH! AND (COMPLAINT #2) THIS PART OF THE DRAWING IS NOT SYMMETRICAL WHICH BOTHERS ME!

TYPE OF COMPLAINT:

WEATHER	HEALTH
HUSBAND	HUNGER
ANIMALS	MYSELF
FAMILY	TECHNOLOGY/MEDIA
SOCIETY / THE WORLD TODAY	MONEY
ACQUAINTANCES/ STRANGERS	INANIMATE OBJECTS
MY APPEARANCE	TRANSPORT
FRIENDS	
WORK	* THIS PEN (COMPLAINT #3) LEAKED + SMUDGED MY DRAWING + GOT ALL OVER MY HANDS! * AND A WEEK OF COMPLAINTS ABOUT HOW I F***ED UP THIS DRAWING! (COMPLAINT #5)

(COMPLAINT #4)
MY STUPID HAND!

MAIN STATS

PRIVATE COMPLAINTS:	67
OUTWARD COMPLAINTS:	100
COMPLAINTS TO ME :	43
# OF PEOPLE WHO COMPLAINED TO ME:	5
# OF PEOPLE I COMPLAINED TO:	6
TOP COMPLAINER:	MY DAD
I COMPLAINED MOST ABOUT MY FAMILY	(SORRY MOM + DAD) I ❤ U YOKOBO!
+ SECOND MOST COMPLAINING ABOUT	
MY HUSBAND	(SORRY STEVE I ❤ U YOKOBO)

FROM:
S POSAVEC
~~LONDON~~
UK



TO:

GIORGIA LUPI

BROOKLYN, NY

USA

DELIVERED BY
HAND (SPECIAL NYC
DELIVERY!)



Walking through dimensions – animated comparison

At Top Colleges, an Admissions Gap for Minorities

BLACKS

as a percentage of
2011–12 freshmen

20% —

15% —

10% —

5% —

0% —

University of Maryland

Few black students at elite colleges

Roughly 15 percent of public high school graduates are black. But despite the widespread use of affirmative action at elite colleges, only one college with a graduation rate of more than 70 percent has that many black students in its freshman class.

1

2

3

4

NEXT →

GRADUATION RATE

Note: For-profit colleges and colleges with fewer than 5,000 undergraduates are omitted from the chart.

By JOSH KELLER

Source: National Center for Education Statistics, 2011

What visual properties amplify the narrative?



Highlighting Techniques

755



Steroids or Not, the Pursuit Is On

Bonds is taking aim at the career home run record. He needs only six more to tie Babe Ruth and 47 to equal Hank Aaron.

Lines are cumulative home runs.

Hank Aaron
755 home runs
23 seasons



Babe Ruth
714 home runs
22 seasons



Barry Bonds
708 home runs
20 seasons

Bonds takes lead
Home runs
after 15 seasons
Bonds 567
Aaron 554
Ruth 516

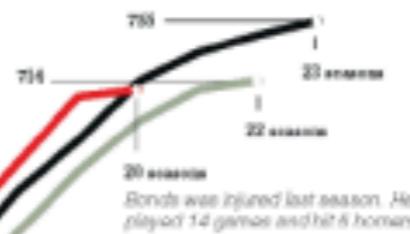


400
300 seasons

100 seasons

0 seasons

According to allegations in a book about Bonds, he began taking steroids before the 1999 season; hit 140 in the League Two seasons later, he hit 73 home runs, surpassing Aaron's career pace.



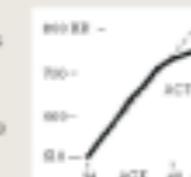
Homer Pace After Age 34

If the accusations are correct, Bonds was 34 in his first season on steroids. Here are projected home run paces for each player after age 34.

PROJECTED PACE BASED ON AVERAGE OF PREVIOUS FIVE SEASONS

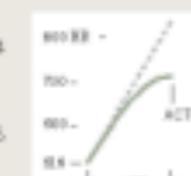
Aaron

Actual homers slightly outpace projected homers for five seasons.



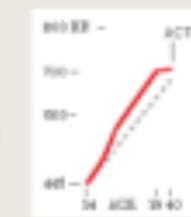
Ruth

Averaged 46.4 homers a season from age 30 to 34. Averaged 42.5 for next four seasons.



Bonds

From age 35 to 39, he averaged 14 more homers a season than projected.

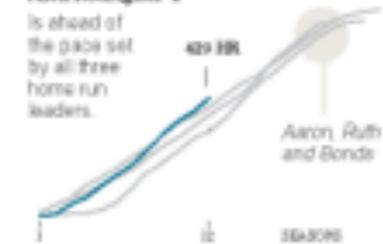


Note: Ages as of July 1 of each season.

Others Taking Aim

Alex Rodriguez

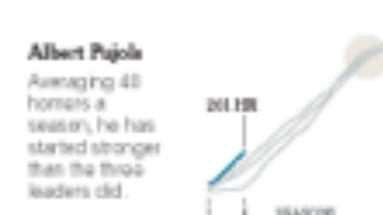
is ahead of the pace set by all three home run leaders.



Aaron, Ruth and Bonds

Albert Pujols

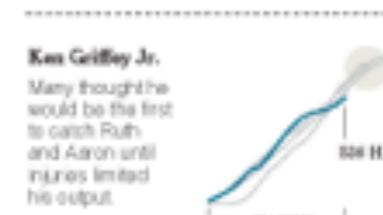
Averaging 48 homers a season, he has started stronger than the three leaders did.



SEASONS

Ken Griffey Jr.

Many thought he would be the first to catch Ruth and Aaron until injuries limited his output.



SEASONS

Differing Paths to the Top of the Charts

The top seven players on the career home run list, along with a look at Griffey (12th), Rodriguez (27th) and Pujols (led 257th).

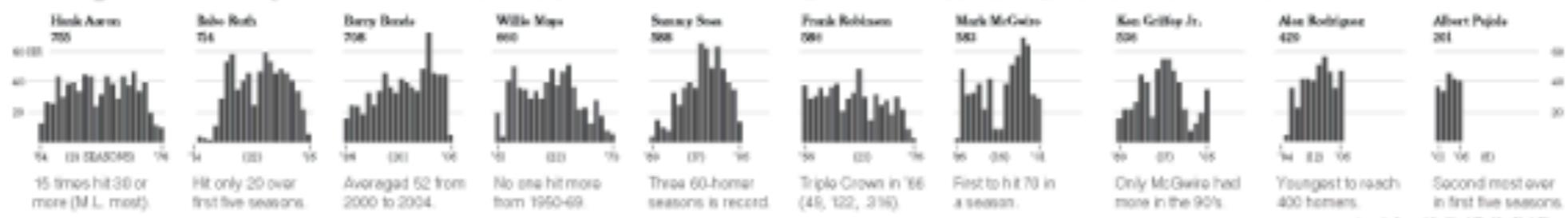
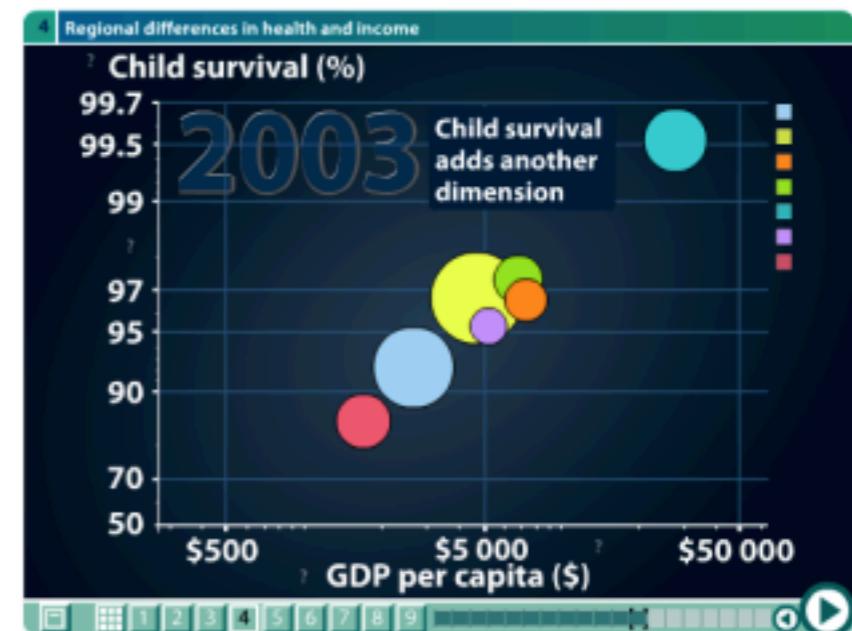
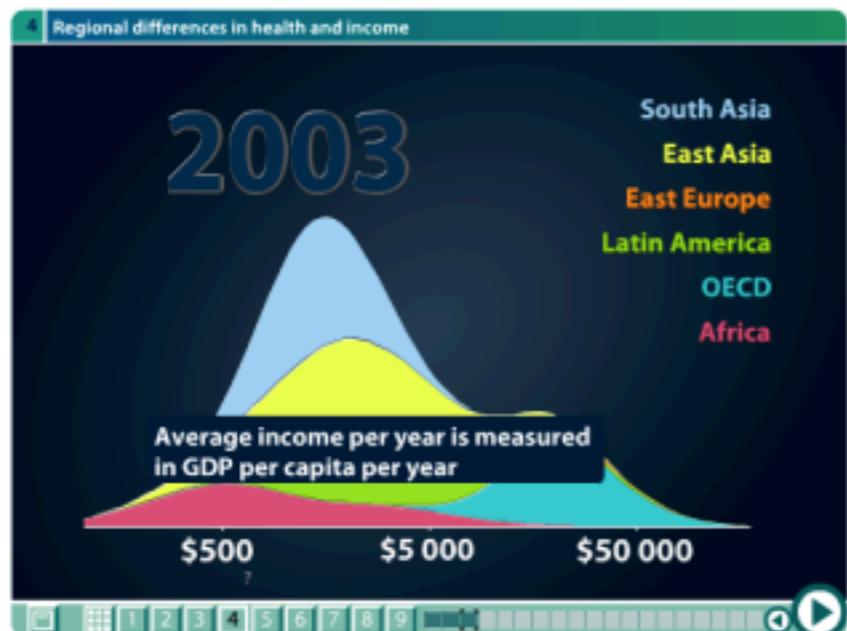


Fig. 1. Steroids Or Not, the Pursuit is On. New York Times.

Segel, E. and Heer, J., 2010. Narrative visualization: Telling stories with data. IEEE transactions on visualization and computer graphics



Guiding Through Transitions



Directing User Activity / Attention

Published: February 2, 2010

Budget Forecasts, Compared With Reality

Just two years ago, surpluses were predicted by 2012. How accurate have past White House budget forecasts been?

1 2 3 4 5 6 NEXT ▶

Latest forecast

Today, with a better understanding of the severity of the economic downturn, the deficit situation is much more dire.



Fig. 2. Budget Forecasts, Compared With Reality. New York Times.



Interactivity

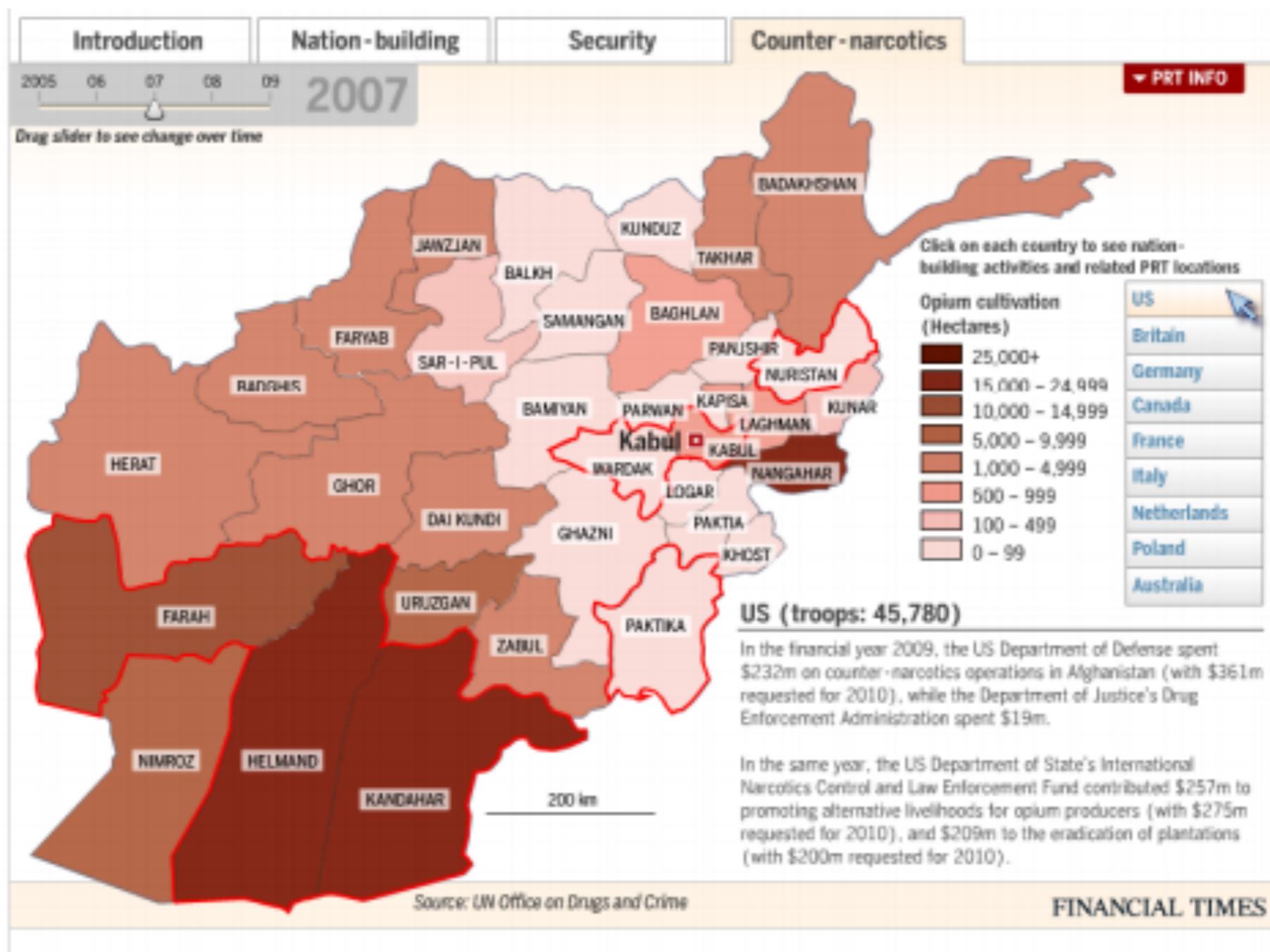


Fig. 3. Afghanistan: Behind the Front Line. Financial Times.



Author Driven

Prescribed order
Strong message
Limited interactivity



Reader Driven

Many orders
Weaker message
High interactivity



Persuasive Visualizations

Persuade or motivate, not just inform

Rhetorical techniques – some viz-specific



Rhetoric

Information Access
Provenance
Mappings
Procedures
Linguistics

Channels

Choice of data
Visual metaphor
Annotations / text
Interactivity

Hullman and Diakopoulos surveyed 51 visualizations
Identified ties to traditional study of rhetoric

Based on a slide by Jessica Hullman

Hullman, J. and Diakopoulos, N., 2011. Visualization rhetoric: Framing effects in narrative visualization.



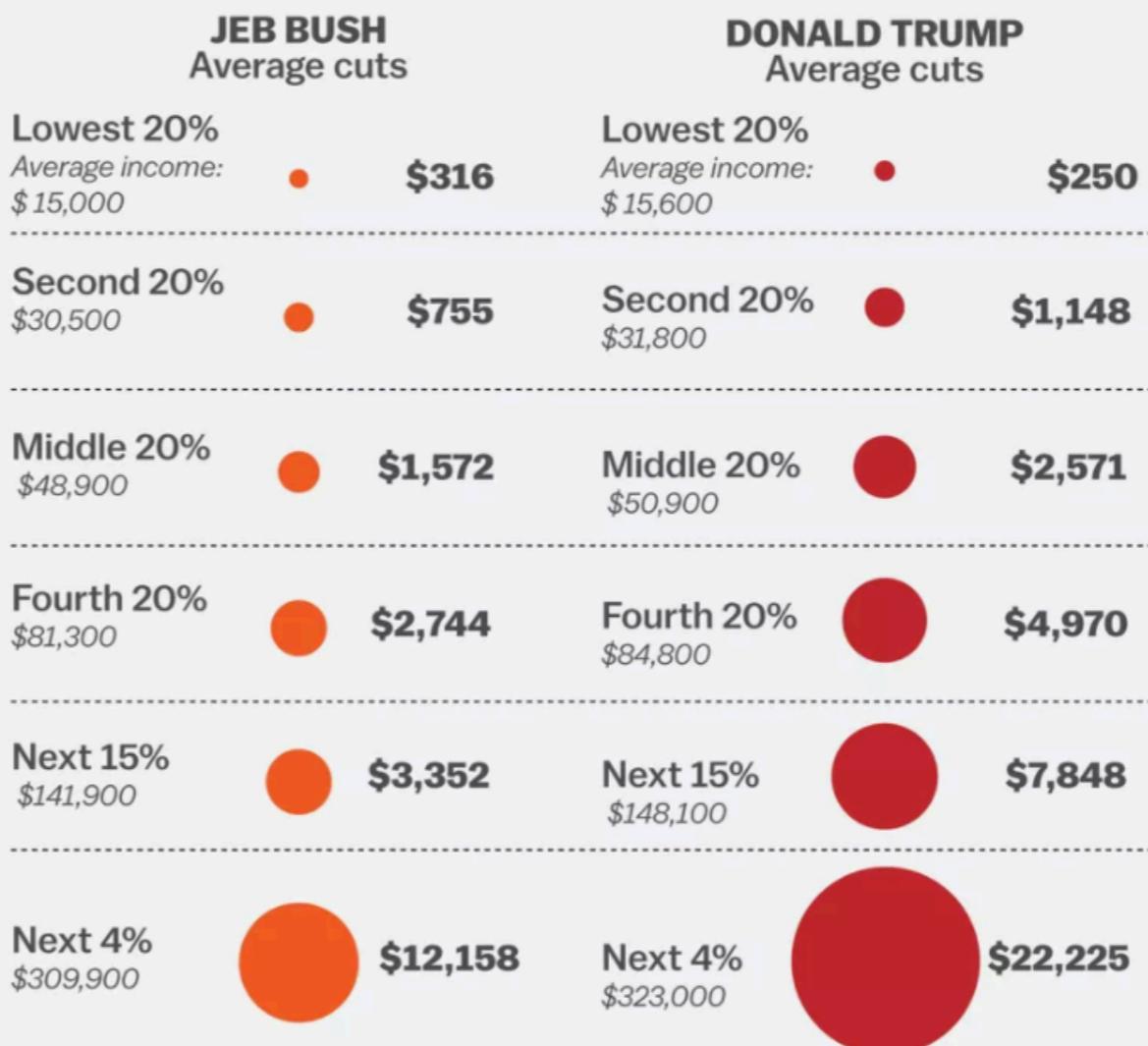
Rhetoric

Information Access

- Provenance
- Mappings
- Linguistics
- Procedures

Bush and Trump's tax cuts would mostly benefit the top 1%

Impact of individual income tax changes proposed by Jeb Bush and Donald Trump



Metonymy



Based on a slide by Jessica Hullman

Hullman, J. and Diakopoulos, N., 2011. Visualization rhetoric: Framing effects in narrative visualization.



Rhetoric

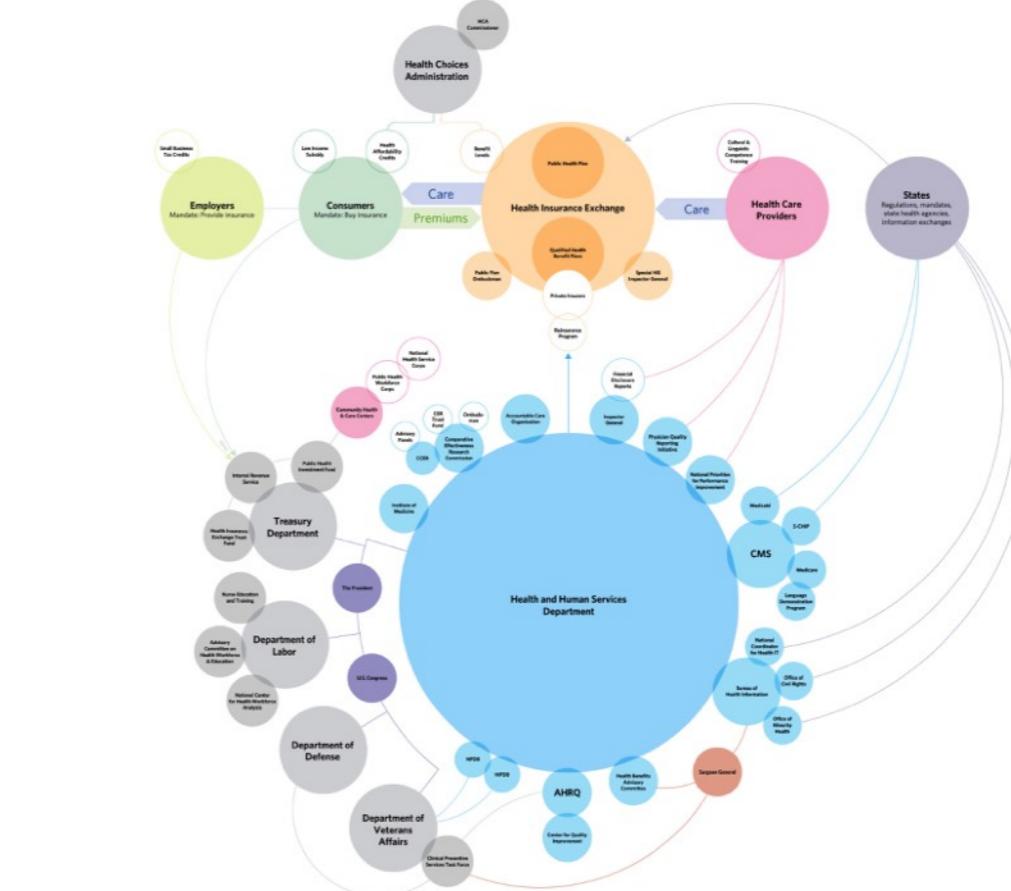
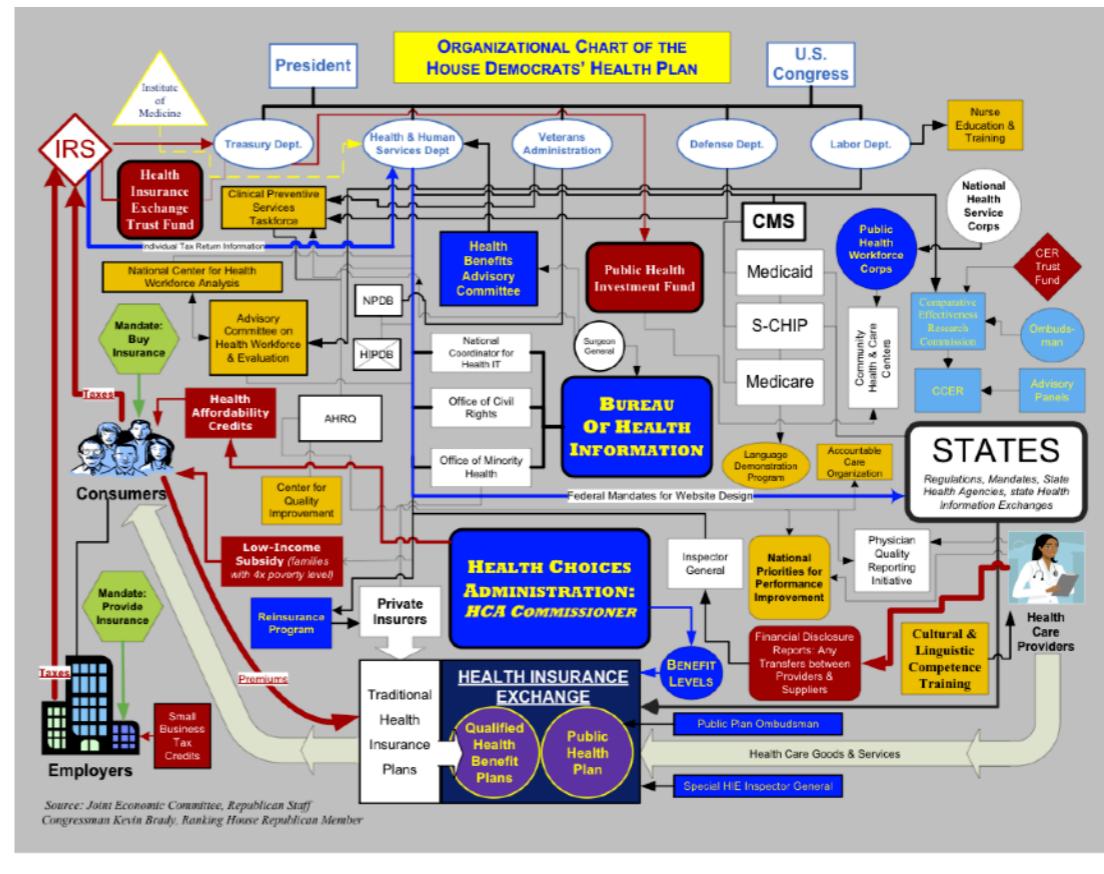
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1 2 3 4 5 6 7 NEXT >

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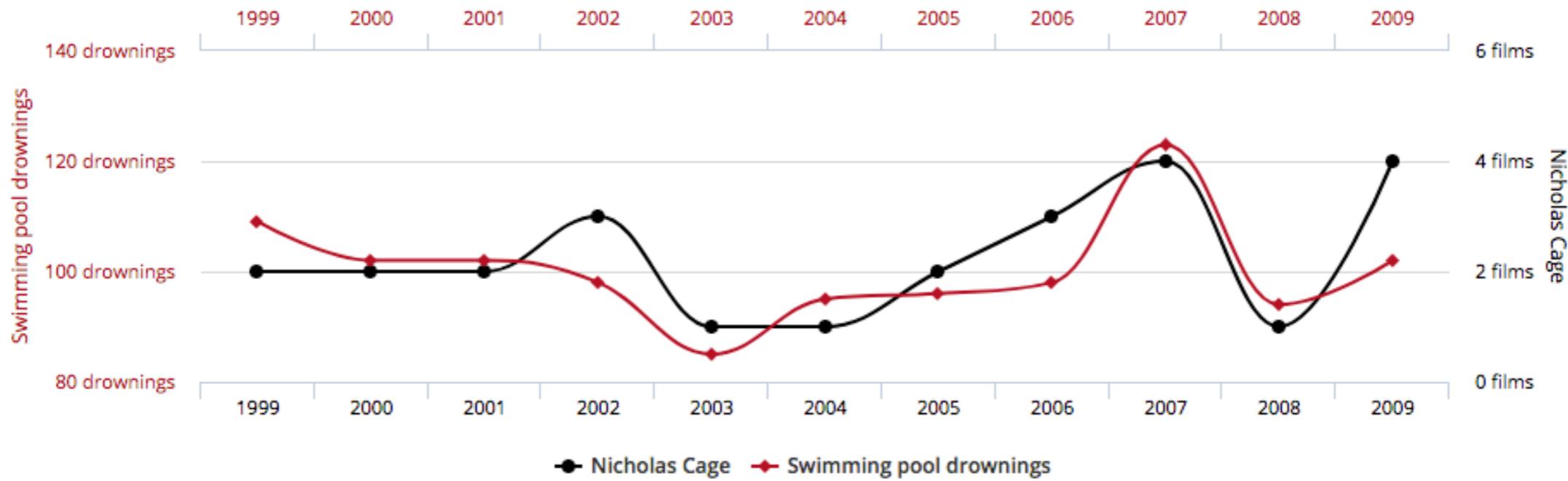
Hullman, J. and Diakopoulos, N., 2011. Visualization rhetoric: Framing effects in narrative visualization.



Number of people who drowned by falling into a pool correlates with Films Nicolas Cage appeared in



Correlation: 66.6% ($r=0.666004$)



tylervigen.com

Rhetoric

Information Access
Provenance
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