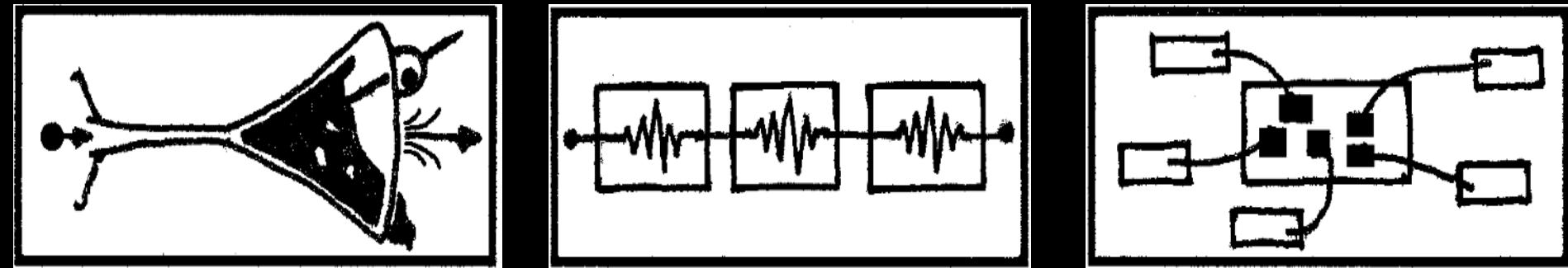


CSE 512 - Data Visualization

Narrative Visualization



Jeffrey Heer University of Washington

(with significant material from Edward Segel)

Administrivia

Project Presentations

In-class Presentations on Thur 5/21

Your presentation should:

Describe the problem (~1 min)

Present progress: sketches, etc (~2 min)

Solicit feedback on final slide with questions

Keep it short, no more than 3-4 minutes

We will split across **MGH 241 & CSE 305**

Room assignments will be posted via Canvas

Project Progress Submission

Submit on Canvas by **5pm** on **Wed 5/20**

Your presentation **slides in PDF format**

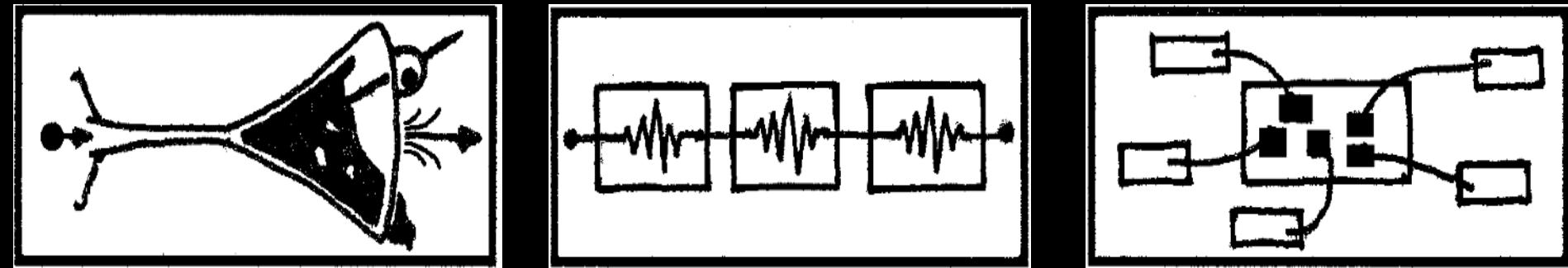
A **PDF progress document** with:

A survey of **related work** (references/URLs)

Your **schedule** for project completion

CSE 512 - Data Visualization

Narrative Visualization

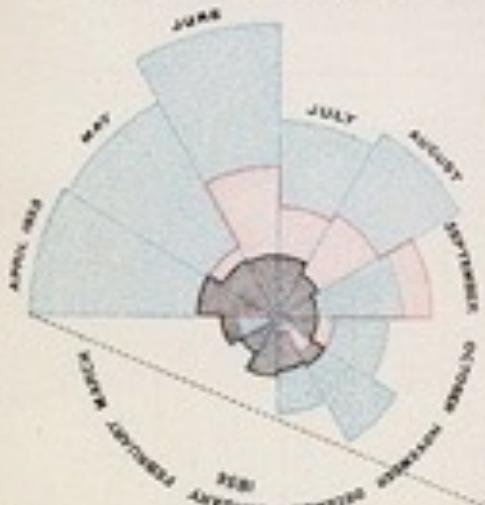


Jeffrey Heer University of Washington

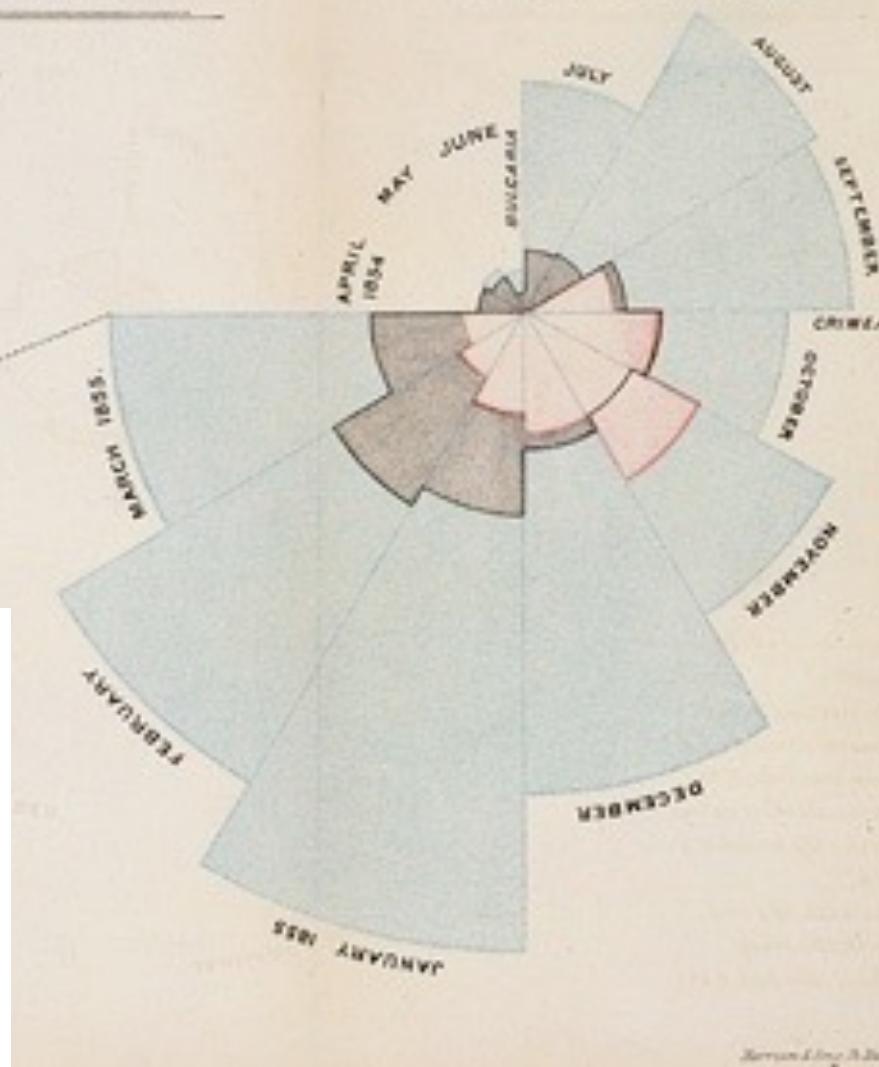
(with significant material from Edward Segel)

2.
APRIL 1855 TO MARCH 1856.

DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.

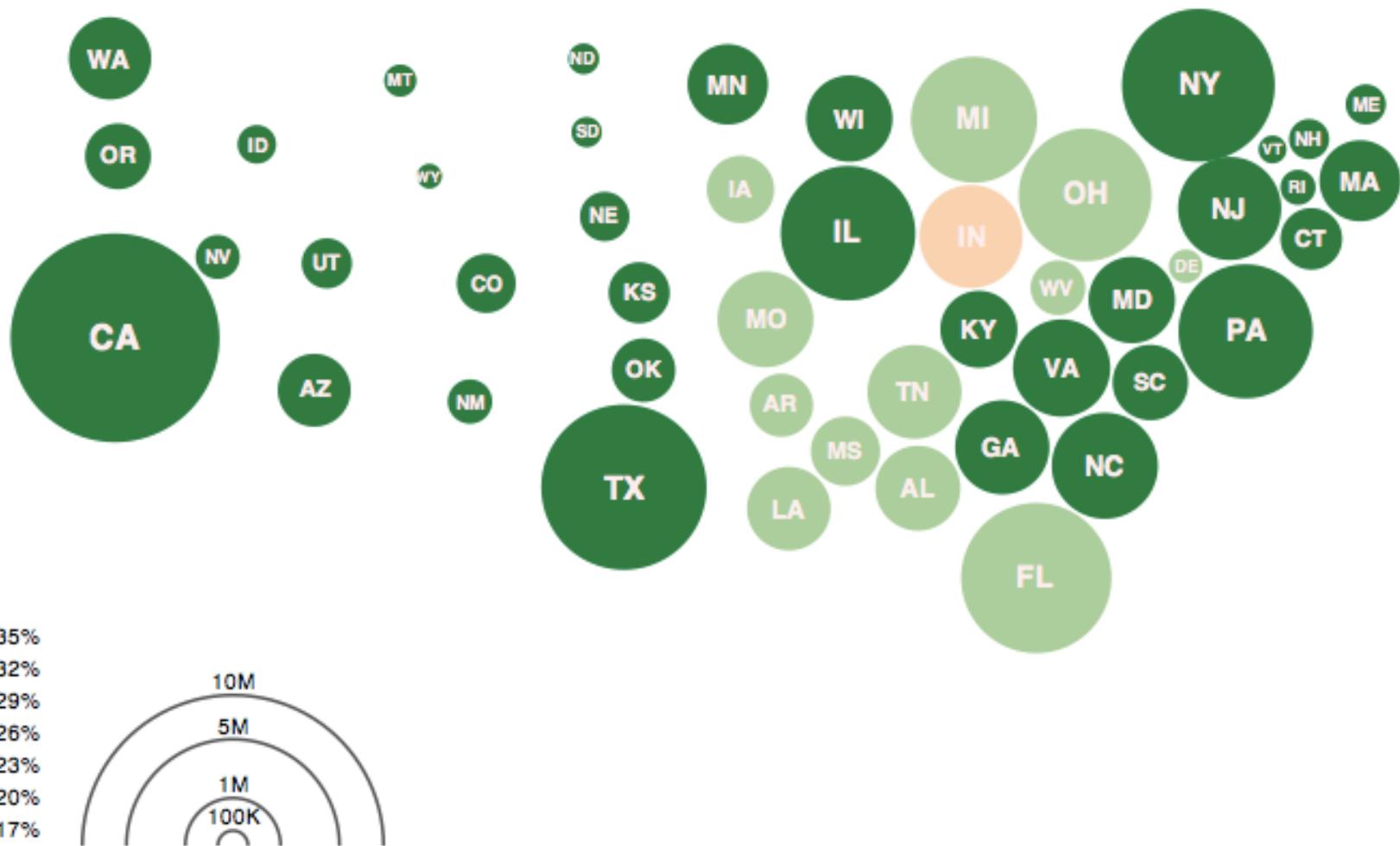


1.
APRIL 1854 TO MARCH 1855.

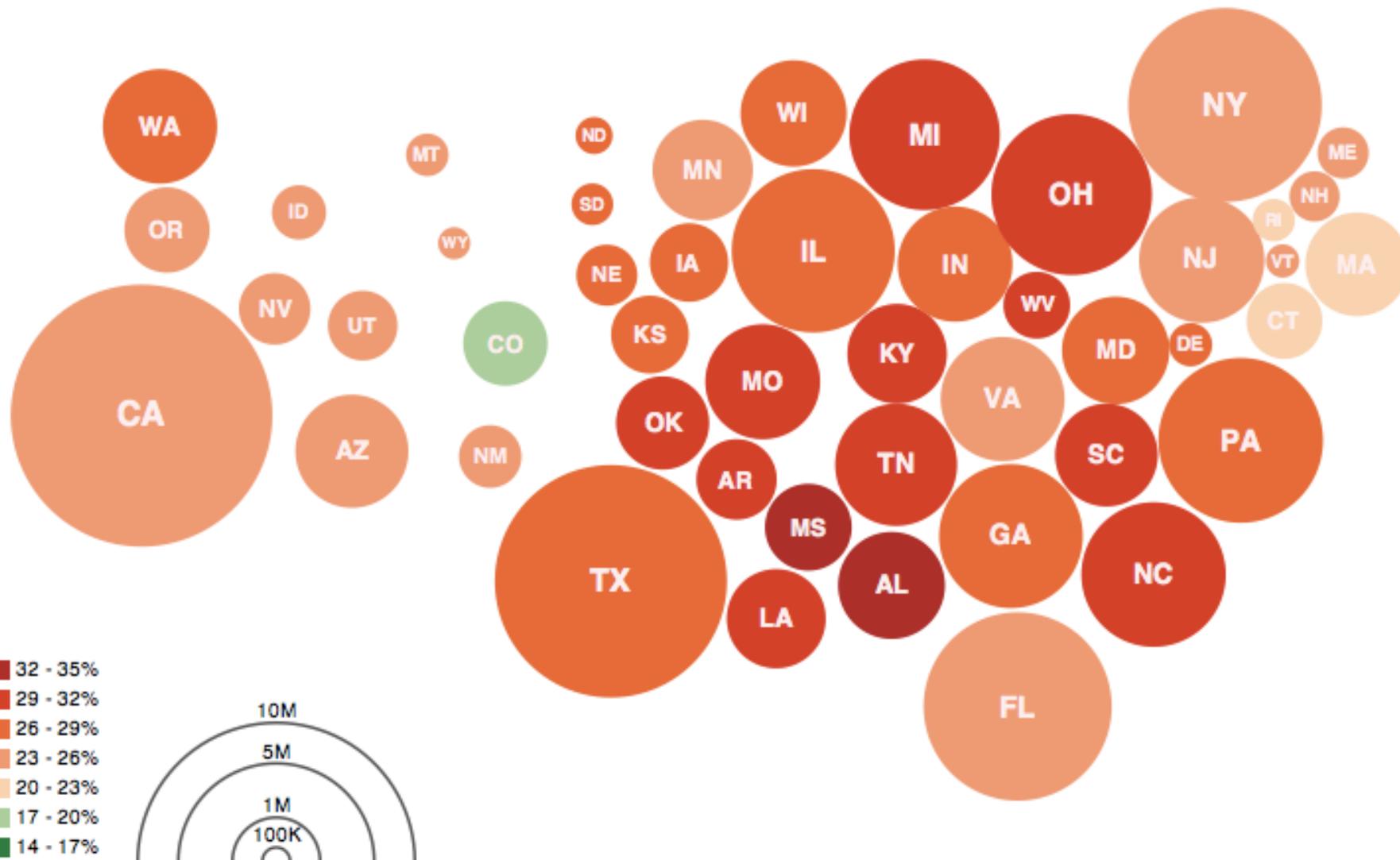


"to affect thro' the Eyes
what we fail to convey
to the public through
their word-proof ears"

1856 "Coxcomb" of Crimean War Deaths, Florence Nightingale



Obesity Map Vadim Ogievetsky



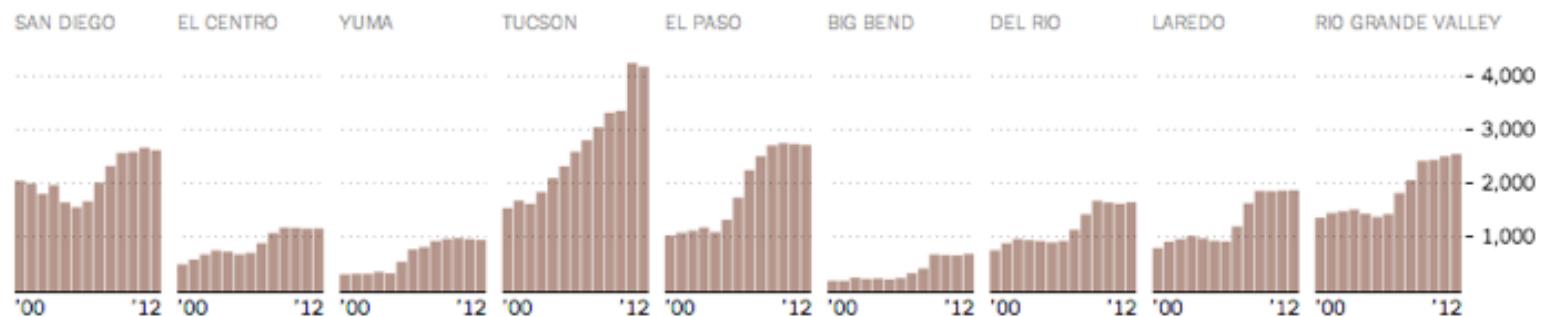
Obesity Map Vadim Ogievetsky

Increased Border Enforcement, With Varying Results



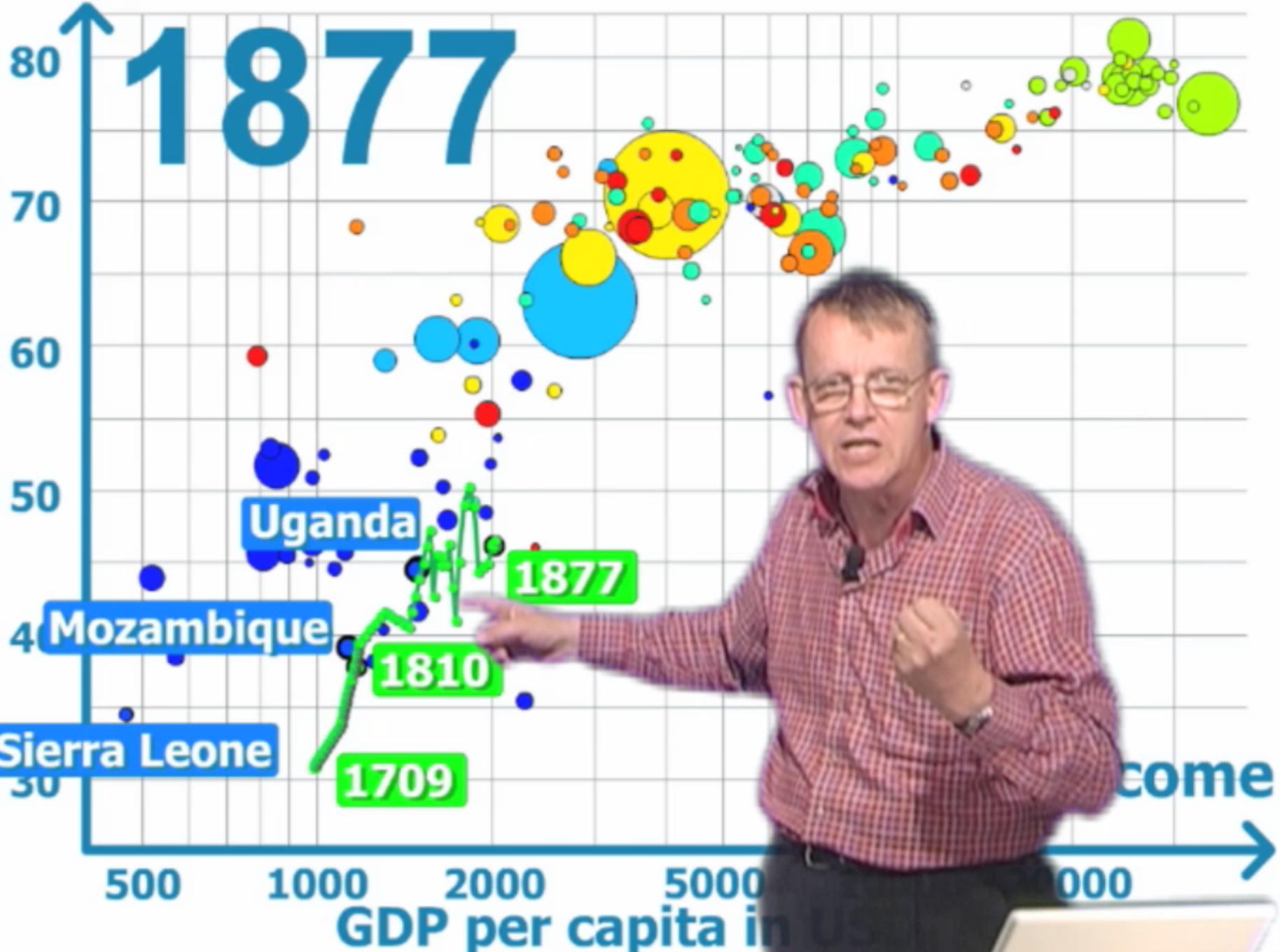
There are now more agents along the 1,954 mile-long border than ever before...

Border agents per sector.



Health

Life expectancy in years



come

500

1000

2000

5000

000

GDP per capita in US\$



Narrative Devices for Storytelling with Data

What devices communicate effectively?

... for which contexts and audiences?

A

BRIEF

HISTORY

STORYTELLING

as ancient as mankind



STORYTELLING

across various media

PEOPLE TELL STORIES
WORDS TELL STORIES
IMAGES TELL STORIES
COMICS TELL STORIES
MOVIES TELL STORIES



August 26, 2010

Generals Wary of Move to Cut Their Ranks

By GINGER THOMPSON and THOM SHANKER

WASHINGTON — Maj. Gen. Paul D. Eaton, a retired Army officer, is familiar with the perks and pitfalls of power, having commanded tens of thousands of troops at Fort Benning, Ga., managed budgets exceeding \$2 billion in Iraq, and overseen layers upon layers of staff members who helped manage both his professional duties and his personal life.

He has experienced the full range of lifestyles that come with military leadership, living at one point in an elegant antebellum mansion, and at another, with eight other officers crowded in a marble bathhouse behind one of Saddam Hussein's old palaces.

When he traveled, he was occasionally able to justify the use of military aircraft, but most times, he said, he flew coach. And today he lives on a pension worth 75 percent of his military salary, with health benefits that cover everything except dental and eye care for himself and his wife.

"We are well compensated, and we live very comfortable lives," General Eaton said, referring to the military's most senior leaders. "But when you look at all the things going on around a general, the nation is getting a very, very high return on its money."

Not everyone at the Pentagon agrees. Two weeks ago, Defense Secretary Robert M. Gates announced a sweeping effort to improve efficiency that, among other things, takes aim at the military's sacrosanct corps of generals and admirals, ordering his staff to cut at least 50 positions, and making clear that he would be happier if they cut more.

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Anecdotal Lead

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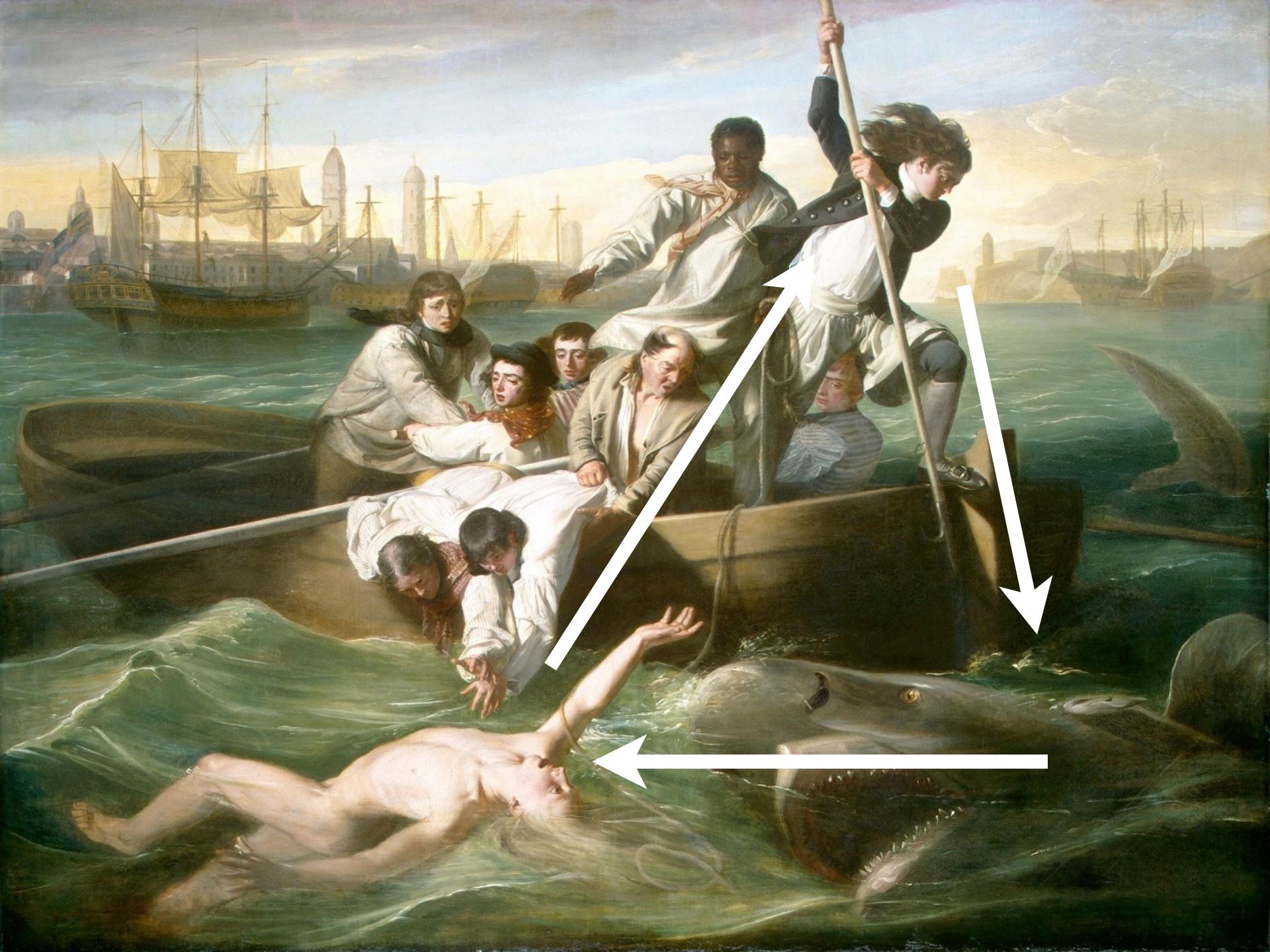
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Nut Graph

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BLAM

HOW CAN YOU
TELL STORIES WITH
DATA?



Privacy and the internet Lives of others

BY JENNIFER STODDART

Facebook and Google face a backlash from users and regulators alike over the way they have handled sensitive data.

JENNIFER STODDART, Canada's privacy commissioner,坐下来与Facebook商讨。在8月达成的协议中，她要求Facebook在一年内修改其隐私政策，使其符合加拿大的隐私法。然而，该协议似乎正在经历一场危机，因为Facebook正计划将其数据共享条款与第三方公司分享，从而在未经用户同意的情况下与第三方共享数据。“它没有理由向我们保证Facebook正在走正确的方向。”她说。然而，如果没有这些条款，Facebook很可能很快会成为另一个被指责侵犯用户隐私权的组织。

Facebook不是唯一一家试图通过提供隐私政策来安抚用户的公司。谷歌最近几周也一直在努力，希望用户知道它如何处理他们的个人信息。然而，谷歌最近几周的举动却令一些人感到不安。在5月11日，德国的数据保护专员Peter Schaar呼吁对谷歌进行调查，称谷歌在开发过程中“严重违反了数据保护原则”。他指出，谷歌在开发过程中“严重违反了数据保护原则”。

这些事件突显了隐私和便利之间的冲突。许多用户希望自己的信息不会被公开。然而，许多领先的互联网

公司，如Facebook、谷歌、Twitter、LinkedIn和Twitter，都面临着同样的问题：如何在保护用户隐私的同时，又能有效地利用他们的数据。Facebook最近宣布，将允许用户将其数据共享给第三方应用，这可能会引起用户的不满。

Facebook最近的举动引起了人们的广泛关注。Facebook最近宣布，将允许用户将其数据共享给第三方应用，这可能会引起用户的不满。Facebook最近宣布，将允许用户将其数据共享给第三方应用，这可能会引起用户的不满。Facebook最近宣布，将允许用户将其数据共享给第三方应用，这可能会引起用户的不满。

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Also in this section

- 68 Hiring competition
- 69 The recovery of General Motors
- 70 Business comes to China
- 70 Indian retail
- 70 Japan's drug firms are the ones
- 71 Brazilian telecoms
- 72 Schumpeter: Diversified

See also [privacy and data protection](#), and [economist.com/technology](#)

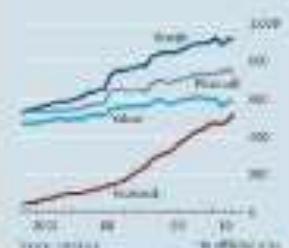
公司努力通过隐私政策来吸引和保留用户。但越来越多的公司开始认识到，鼓励用户共享数据，从而增加广告收入，是实现这一目标的关键。Facebook最近宣布，将允许用户将其数据共享给第三方应用，这可能会引起用户的不满。

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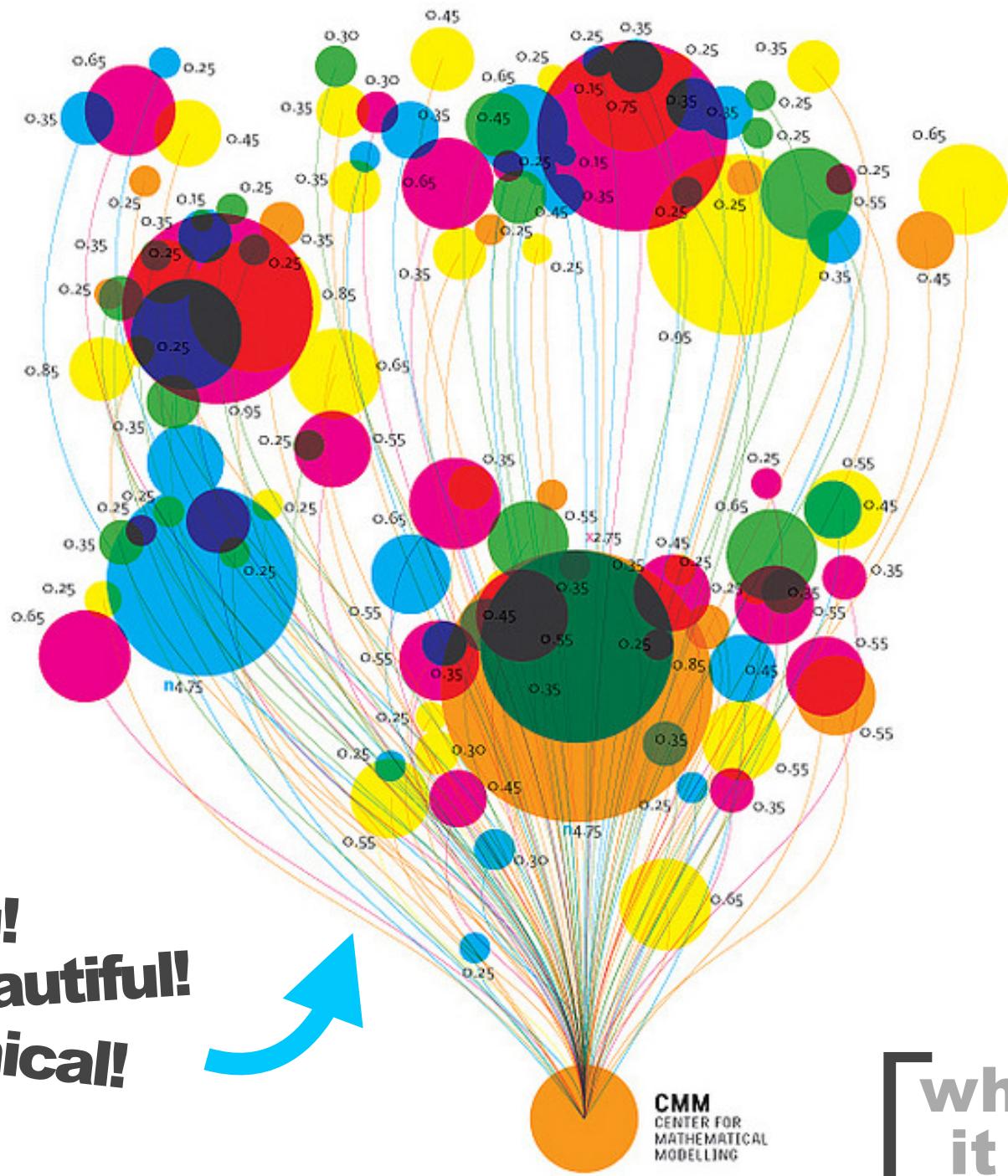
Hiring fare

By Jennifer Stoddart



small support afterthought boring?





exciting!
beautiful!
technical!



BUT
[**what does**
it mean?]

CMM
CENTER FOR
MATHEMATICAL
MODELLING

Published: February 2, 2010

Budget Forecasts, Compared With Reality

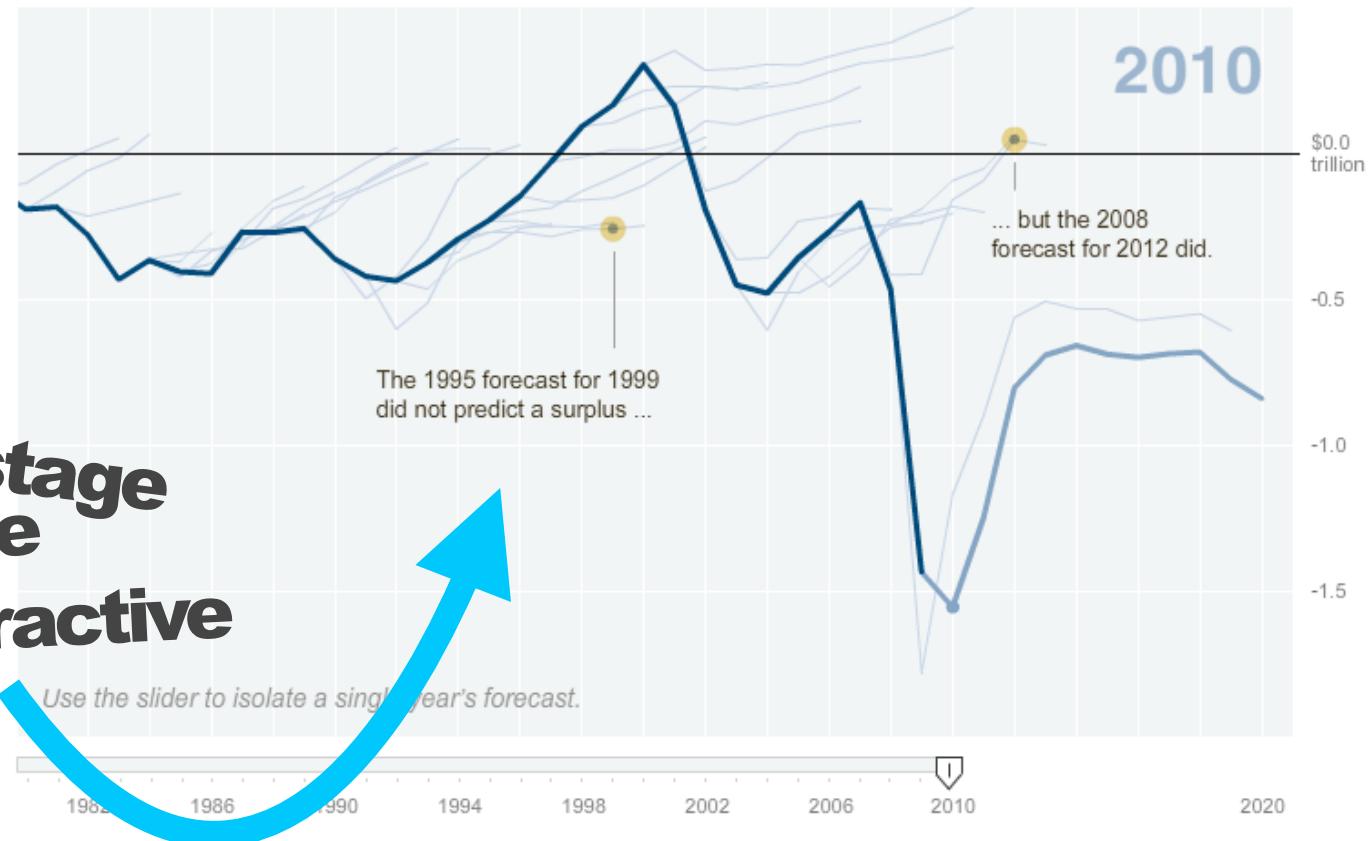
Just two years ago, surpluses were predicted by 2012. How accurate have past White House budget forecasts been?

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.

**center stage
standalone
interactive
guided**



Establishing Shot

Development Trends 2005

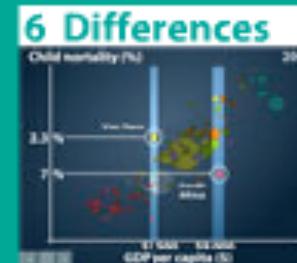
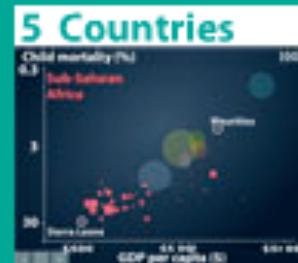
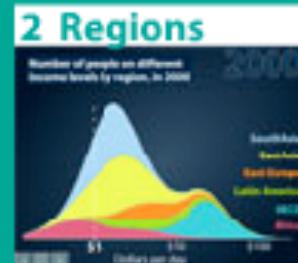


Checklist
Structure

Interactive presentation of some of the messages in the Human Development Report



English
Dansk
Portuguese
Suomi
Français
Deutsch



Produced in collaboration with:

gapminder.org

Progress Bar

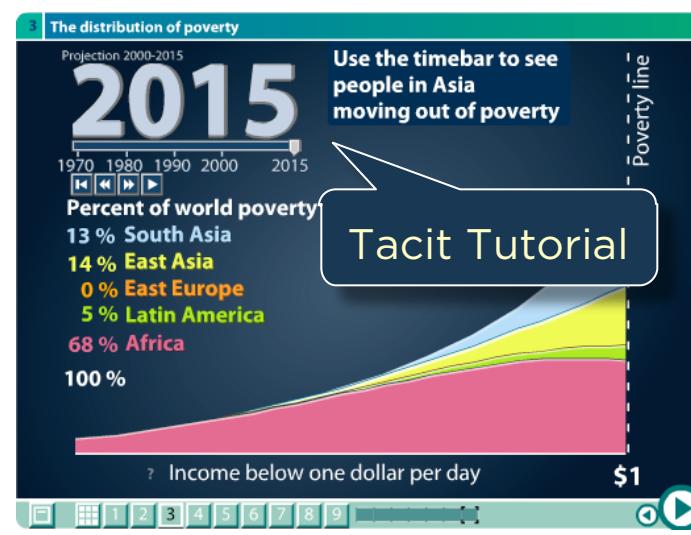
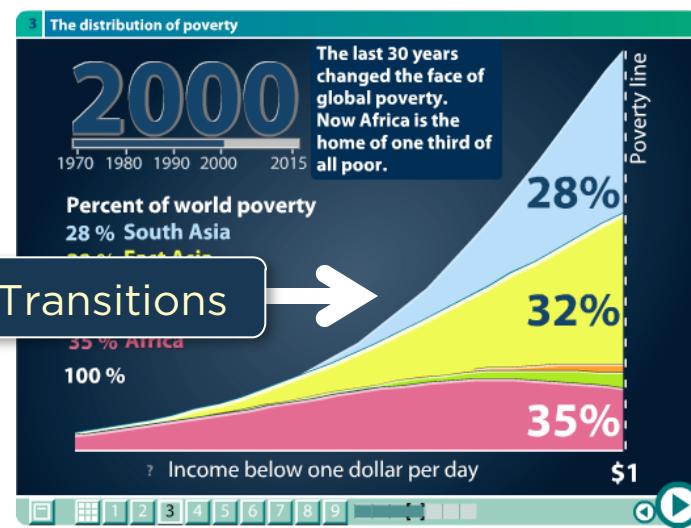
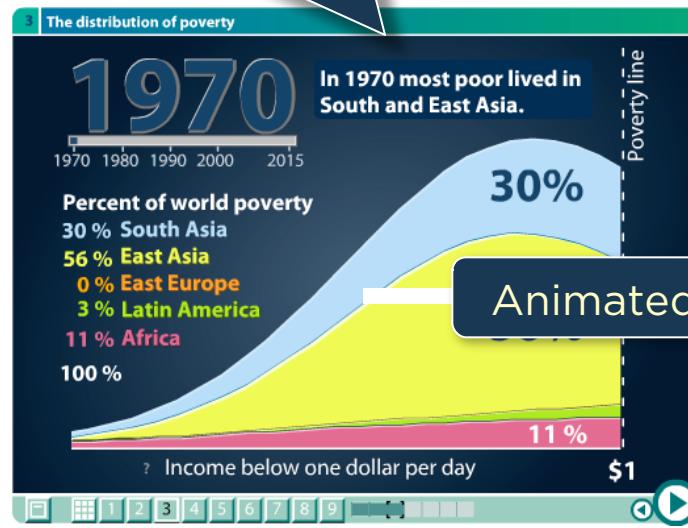
English translation: Claes Johansson, UNDP

1 2 3 4 5 6 7 8 9

Start

Cue to Action

Annotations Tell Story



Interactive Slide Show

Budget 2010: reaction from around the UK

People in key constituencies around the country give their responses to Alistair Darling's budget

Introductory Text

Consistent Visual Platform



Shilpa Wymer, 40, is managing director of two branches of Pitman Training Ltd, a training school specialising in secretarial and PA training

Enquiries from individuals suddenly dropped off a cliff from October 2008 and in January last year we had to lay off a couple of people, though things have picked up since. The budget seems very positive and shows the government are thinking about small and medium sized businesses at last. I think the measures will help businesses be more confident, which will have a knock-on effect on us. It has turned my head and made me think about which way I will vote.

Constituency profile

MP: Greg Hands, Conservative. Majority: 5,029
Unemployment benefit claimants, Feb 2010:
3,281 (up 13% over last year)

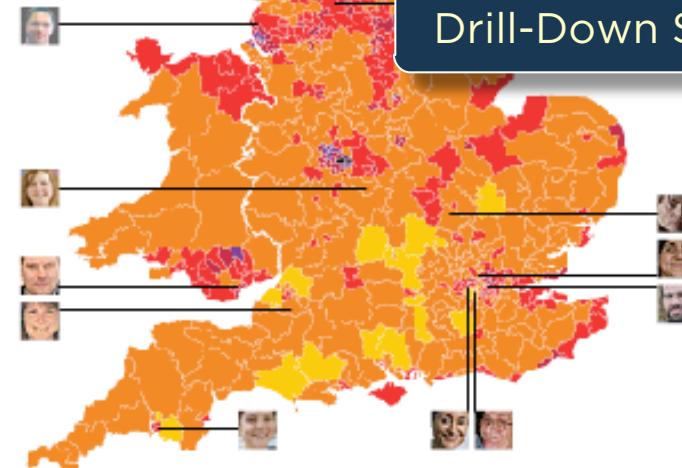
Anecdotal Stories with Data Stories



Key

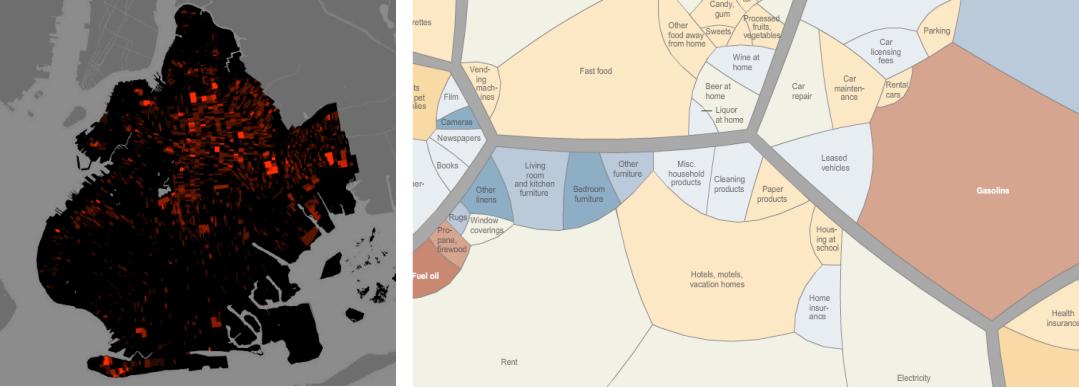
Unemployment benefit claimant count, February 2010

0 - 1.99%
2 - 3.99%
4 - 5.99%
6 - 7.99%
8 - 9.99%
10% and above

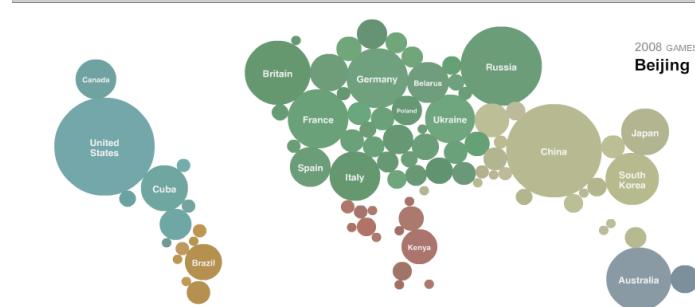


Drill-Down Story

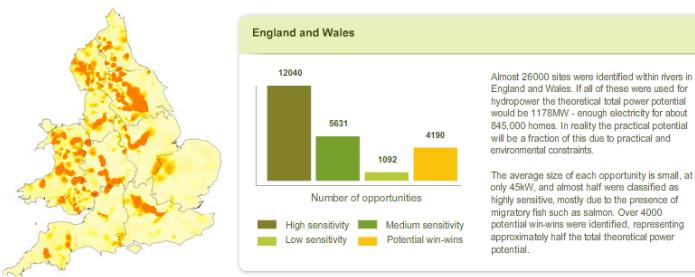
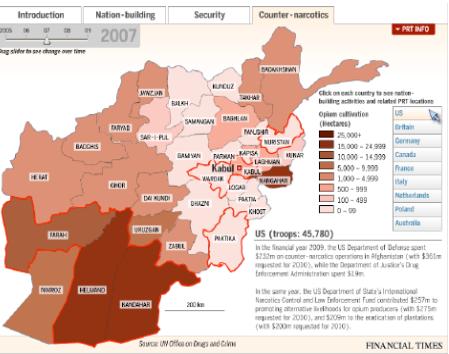
THE
NARRATIVE
FRAMEWORK



GEOGRAPHIC VIEW BY RANKING
1896 1900 1904 1908 1912 1920 1924 1928 1932 1936 1948 1952 1956 1960 1964 1968 1972 1976 1980 1984 1988 1992 1996 2000 2004 2008



2008 Medal Count



58

CASE STUDIES

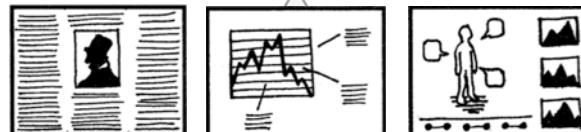
70% Journalism
20% Business
10% Research

Case Studies

Visualization Description
Architecture and Justice (Brooklyn Crime Blocks)
John Polson: Abusing their free-mailing privileges before elections
Football (soccer) drawings
Pedestrians crossing the street
The Climate Agenda
Did Your County's Jobs Disappear?
Metrics House Price Index
Banks' Earnings: How compensation relates to performance
Offensive: Taliban attacks in Pakistan
Debt loves by Sector
Economic data
Budget 2010: Reaction from around the UK
Formula One 2010: driver's rankings
Lighting up Hadrian's wall
Mapping hydropower hotspots across the UK
Most 200+ meter bombs: interactive map
The world economy turns the corner
A Map of Olympic Medals
Inflation's Little Parts
All else equal
Bonds visualization (interactive)
The Job and Flow of Money: Box Office Receipts 1986 – 2008
The Blessing Rate for Applying You
Advertisement: Bus
Advertisement: Helicopter
Analyze Obama's schedule
Oscars 2010: the best picture nominees
The consumer and retail price indices since 2006
UK Intentions
Bonds Visualizaiton (Static Image)
Comparison of Bear Markets
How Americans Spend Their Day
Michelle Obama's Family Tree
Netflix Rentals
Vancouver's Olympic Venue
On the Map: Five Major North Korean Prison Camps
A Visual Guide to the Financial Crisis
Economic Meltdown of 2008-2009
Where Did All the Money Go?
Life cycle of a beetle through a year
McDonald's "Making Comics"
How the Government Dealt with Past Recessions
Afghanistan: Behind the front line
Toys: a timeline: a company history
Gaps under Human Development
Earthquakes: why they happen
Iran's nuclear programme
Shane White's Double McTwist
Toyota's stick accelerator problem
Alpine Skiing: From Technical Turns to Tucks and Speed
Budweiser Forecasts vs. Reality
Macmillan Orientation Video
Delta Airline Safety Video
"The Story of Stuff"
Virgin America Airplane Safety Video

Magazine Style	Visual Structuring	Highlighting	Transition Guidance	Ordering	Interactivity	Messaging
Illustrated Graph / Map	Establishing Shot / Splash Screen	Scene-Ups	Random Access	Over Highlighting / Details	Imitating Default Views	Multi-Messaging
Science Fair Poster	Consistent Visual Platform	Feature Distinction (focus, color, detail, outline)	User Directed Path	Layered Interactivity	Options / Headlines	Comment Repetition
Flow Chart	Progress Bar / Timeline	Character Direction	Linear	Implicit Instruction	Annotations	Introductory Text (more than a sentence)
Comic Strip	Checklist™ Progress Tracker	Zooming	Object Continuity	Exit Tutorial	Companying Article	Synthesis
Slide Show	Similar Objects (but still clearly distinct)	Swing Angle	Animated Transitions	Overriding / Details	+	+
Image / Video / Animation	Orientation	Character Motion	Linear	Layered Interactivity	+	+
	Audio	Continuity Editing	Object Continuity	Implicit Instruction	+	+
		Random Transitions	Animated Transitions	Exit Tutorial	Annotations	+
					Imitating Default Views	Comment Repetition
					Options / Headlines	Introductory Text (more than a sentence)
					Annotations	Synthesis

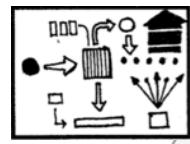
Visual Design



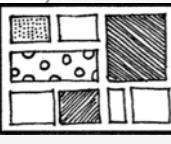
MAGAZINE
STYLE

ANNOTATED
CHART

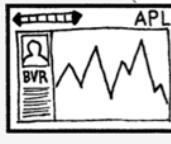
SCIENCE FAIR
POSTER



FLOWCHART



COMICSTRIP



SLIDESHOW



MOVIE

Duo-Specific

Captions

Annotations

Attached Article

Summaries

Interpret

Headlines

Tacit Tutorial

Selection

Navigation

Details on Demand

Timelines

Filtering

Highlighting

Messaging

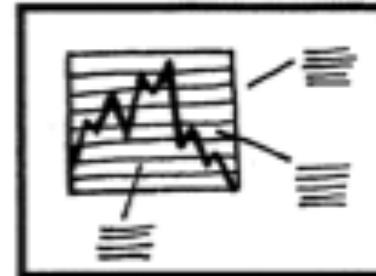
Interactivity

MORE

Seven Genres



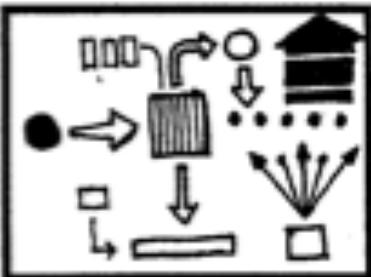
Magazine Style



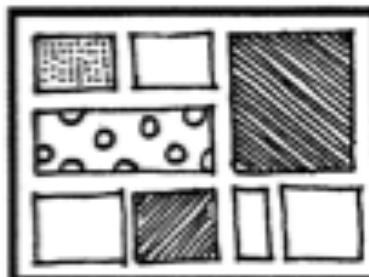
Annotated Chart



Partitioned Poster



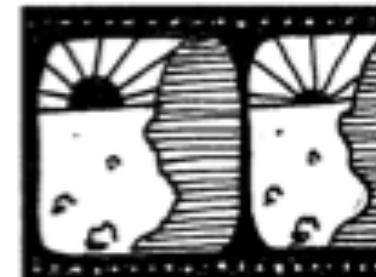
Flow Chart



Comic Strip



Slide Show



Film/Video/Animation

Genres for Narrative Visualization

Genres + Interactivity + Messaging =

DESIGN SPACE

STORYTELLING

CLARITY

SPEED

Author Driven

strong ordering
heavy messaging
limited interactivity

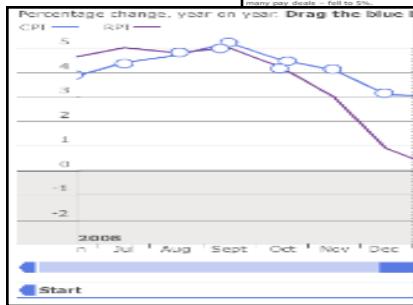
Reader Driven

weak ordering
light messaging
free interactivity

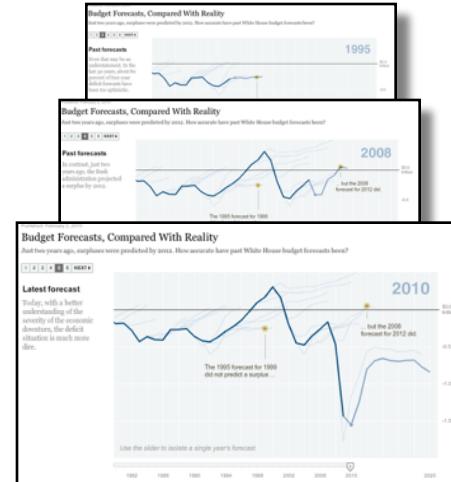
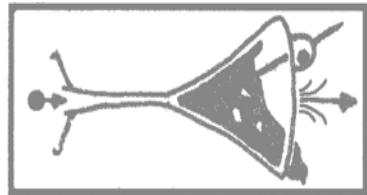
ASK QUESTIONS

EXPLORE

FIND



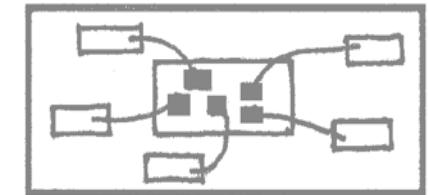
martini
glass

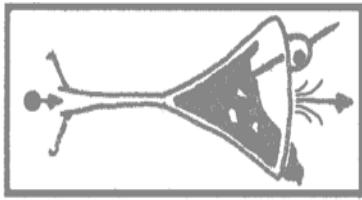


interactive
slideshow

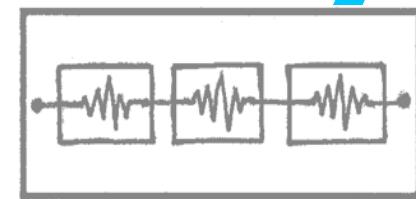
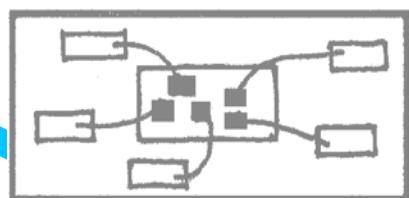
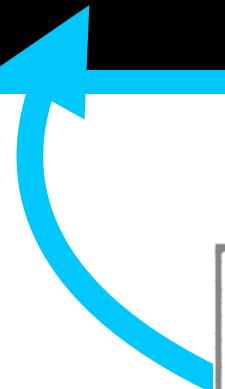
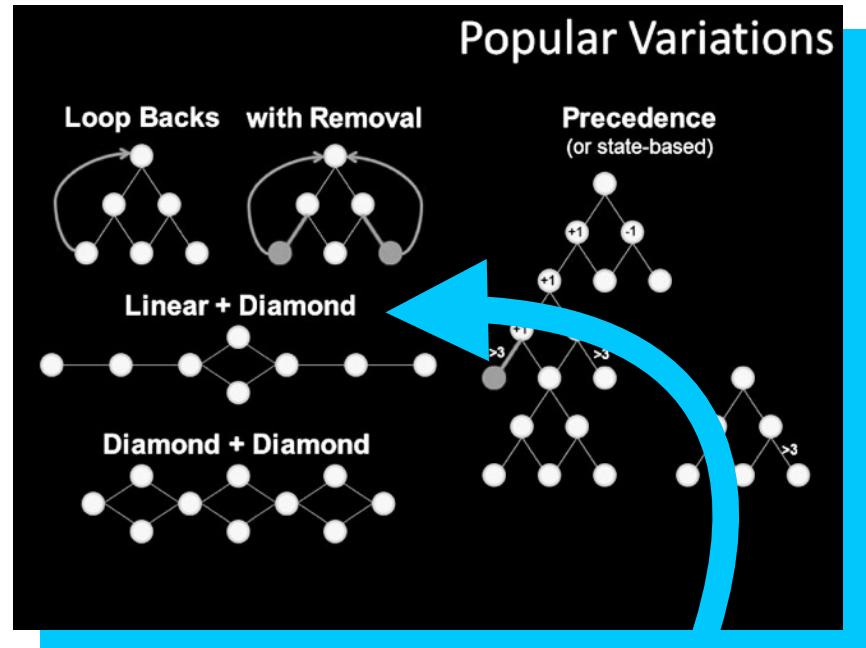
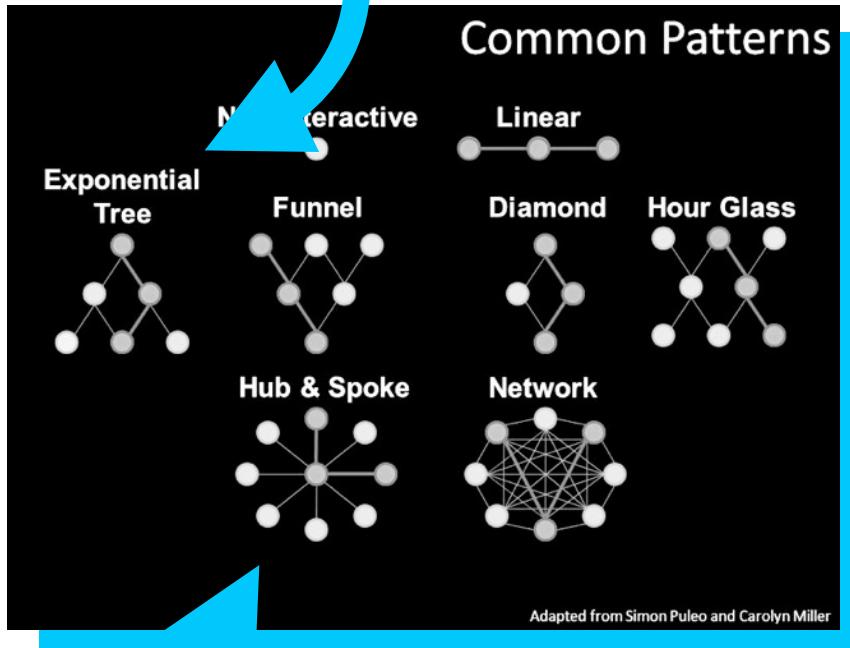


drill-down
story





(more patterns)



THE
DESIGN
CATALOGUE

**Guide.
Highlight.
Interpret.**

VISUAL DESIGN

show

MESSAGING
tell

INTERACTIVITY
engage

VISUAL DESIGN

show

MESSAGING
tell

INTERACTIVITY
engage



Choose your
visualization
type carefully.
Know your
options. Even
obscure ones.





Choose your visualization type carefully. Know your options. Even obscure ones.

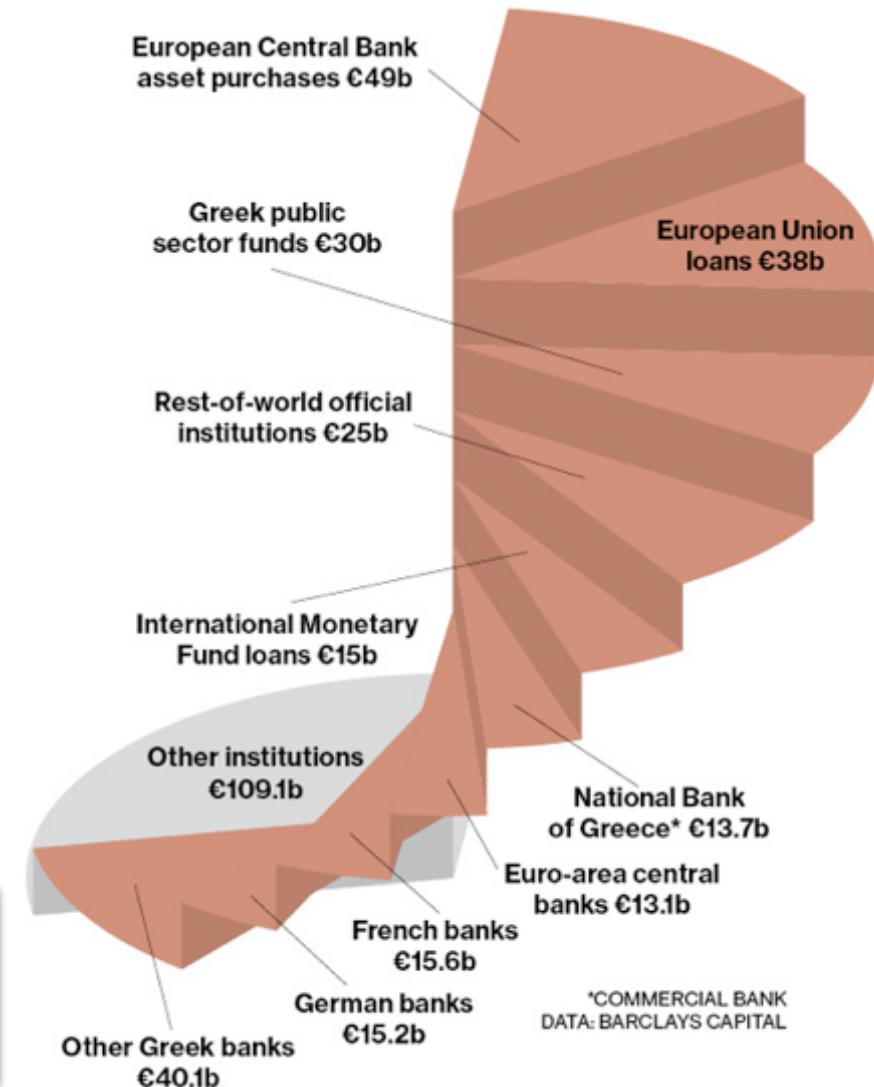


“Cool” and “readability” are often at odds. Recognize the trade-off and choose your audience.



Who Owns Greece's Debt?

Taxpayers would suffer from a Greek default since public institutions are the biggest creditors



Representative	District	Fiscal 2010 contract spending
Mike Coffman	Colo. 6	\$3.26 billion
Doug Lamborn	Colo. 5	2.98 billion
Rob Bishop	Utah 1	2.76 billion
Kenny Marchant	Texas 24	2.58 billion
Jeff Duncan	S.C. 3	2.40 billion
Sandy Adams	Fla. 24	2.36 billion
Lamar Smith	Texas 21	1.65 billion
Steve Scalise	La. 1	1.49 billion
Jeff Landry	La. 3	1.47 billion
Roscoe Bartlett	Md. 6	1.44 billion
John Carter	Texas 31	1.42 billion

dirty

Avoid “chart junk” (Tufte).
Extra marks distract from the data.

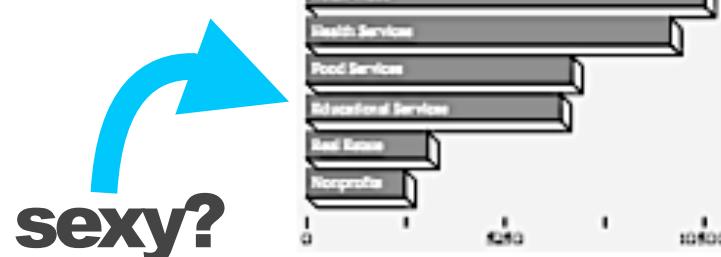
better



Rank	Country	Alcohol consumption	Total quarts
1	Republic of Moldova	4.5	14.6 19.3
2	Czech Republic	3.8	13.6 17.4
3	Hungary	3.2	14.0 17.2
4	Russian Federation	7.3	9.4 16.7
5	Ukraine	5.5	11.0 16.5
6	Estonia	9.7	6.7 16.5
7	Andorra	3.3	13.0 16.4
8	Romania	4.4	11.8 16.2
9	Slovenia	1.4	14.6 16.1
10	Belarus	4.3	11.7 16.0
11	Croatia	2.0	13.9 16.0
12	Lithuania	4.8	11.1 15.9
13	South Korea	10.1	5.5 15.6
17	U.K.	2.5	11.6 14.1
56	U.S.	2.8	7.2 10.0



clean



sexy?

But...

chart junk may reflect cool
design choices

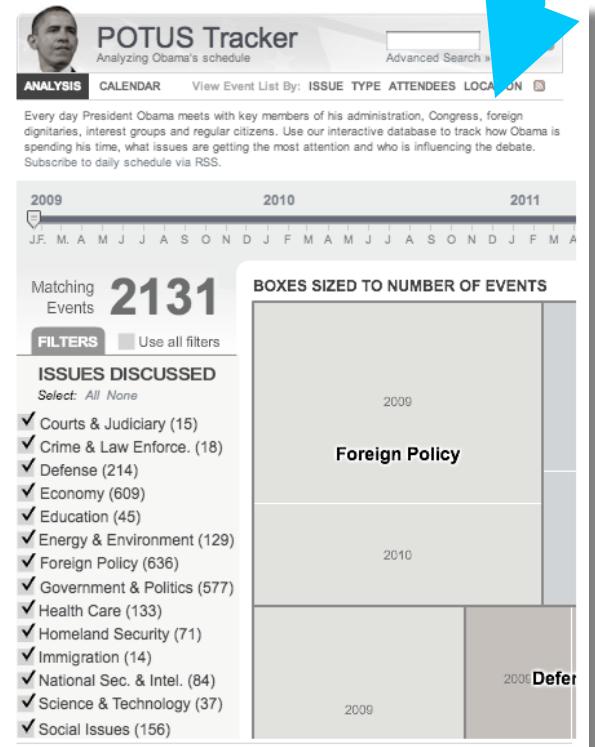
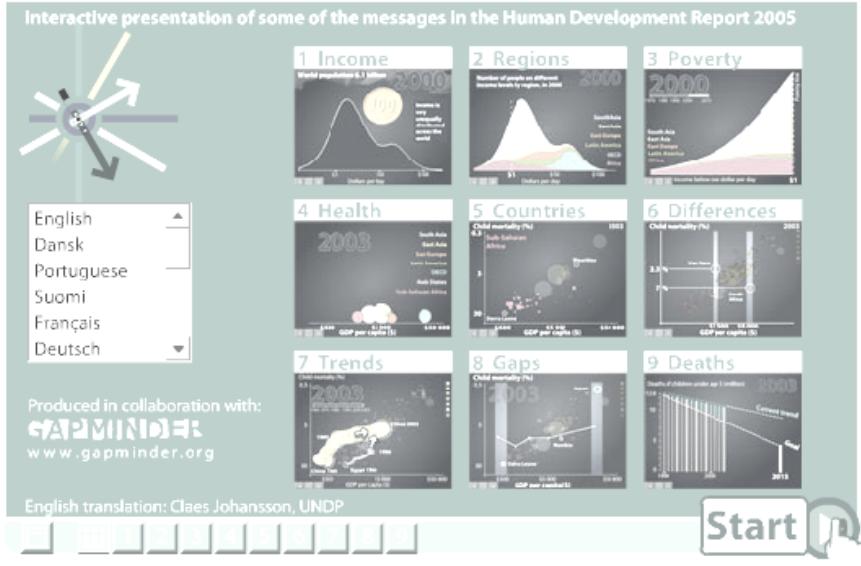
Businessweek...

does great with labeling
only as much as needed

Make it clear where to start.
Don't let readers defect.



Human Development Trends 2005



Taking the Corners

A look at the technique of American speedskater Shani Davis, who won gold in the 1,000 meters and silver in the 1,500.

1 2 3 4 5 6 7 8 NEXT ▶



Eric Heiden, the American speedskater who captured five golds in 1980 and is now the doctor for the 2010 U.S. team, explains how Shani Davis uses turns to his advantage.



By Graham Roberts, Bedel Saget and Michael W. Schmidt | [Send Feedback](#)

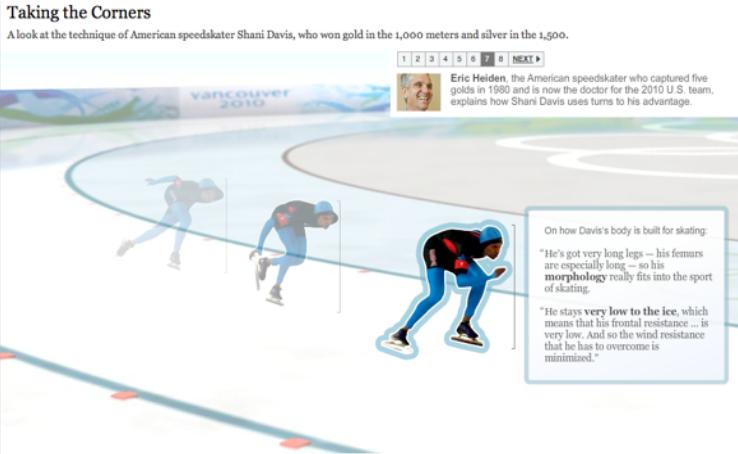
Taking the Corners

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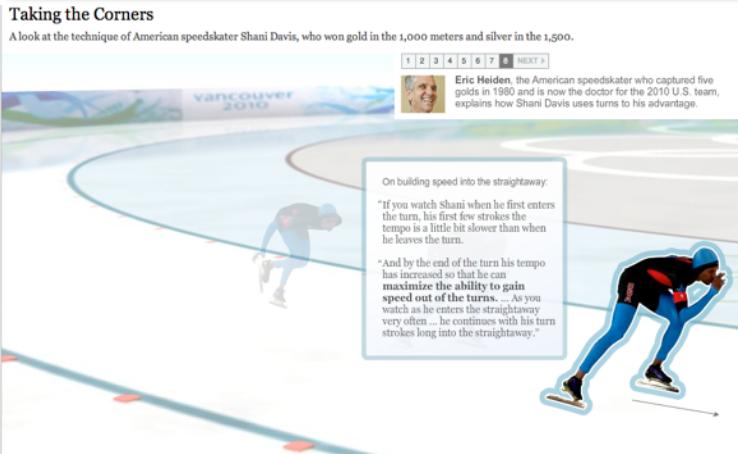
Taking the Corners

A look at the technique of American speedskater Shani Davis, who won gold in the 1,000 meters and silver in the 1,500.

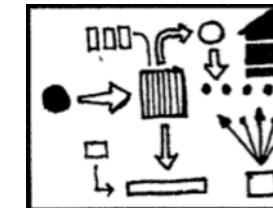
1 2 3 4 5 6 7 8 NEXT ▶



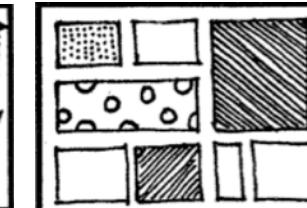
Eric Heiden, the American speedskater who captured five golds in 1980 and is now the doctor for the 2010 U.S. team, explains how Shani Davis uses turns to his advantage.



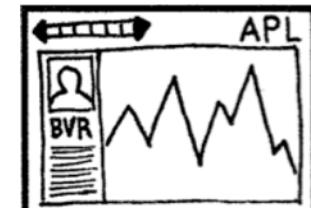
The more linear, the more like a story.
Stories have a beginning, middle, and end.



FLOWCHART



COMICSTRIP



SLIDESHOW

Consistent
visual
frameworks.
Keep things
tidy.

The Social Network



Black Swan



The King's Speech



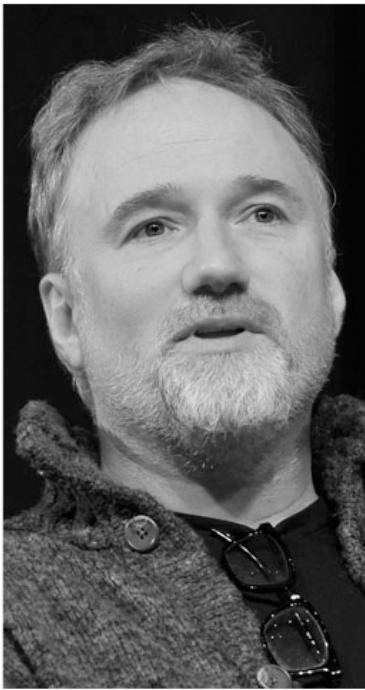
The Fighter



127 Hours



The Kids Are All Right



Guardian Review



Observer Review



Interview Interview



Interview Interview



Trailer



More

8 nominations

Many people have the Golden Globes winner down as the film to rain on the king's parade. Its slick script and well-pitched performances impressed critics and picking a film about the internet may help Academy members feel like they have their fingers on the pulse

IMAGES: GETTY IMAGES, ALLSTAR/COLUMBIA PICTURES

Dodd-Frank One Year Later: The Key Players

When Dodd-Frank was signed into law a year ago, the lobbying in Congress moved to the regulatory agencies. Now financial firms are arguing with regulators and each other over the language of hundreds of rules that will determine how much Dodd-Frank will change the system.

[Explore the key players >](#)



Photos from Bloomberg, U.S. Chamber of Commerce, U.S. Securities and Exchange Commission

Source: Bloomberg reporting

Bloomberg
GOVERNMENT



Toy Story 3



The Social Network



True Grit



Inception

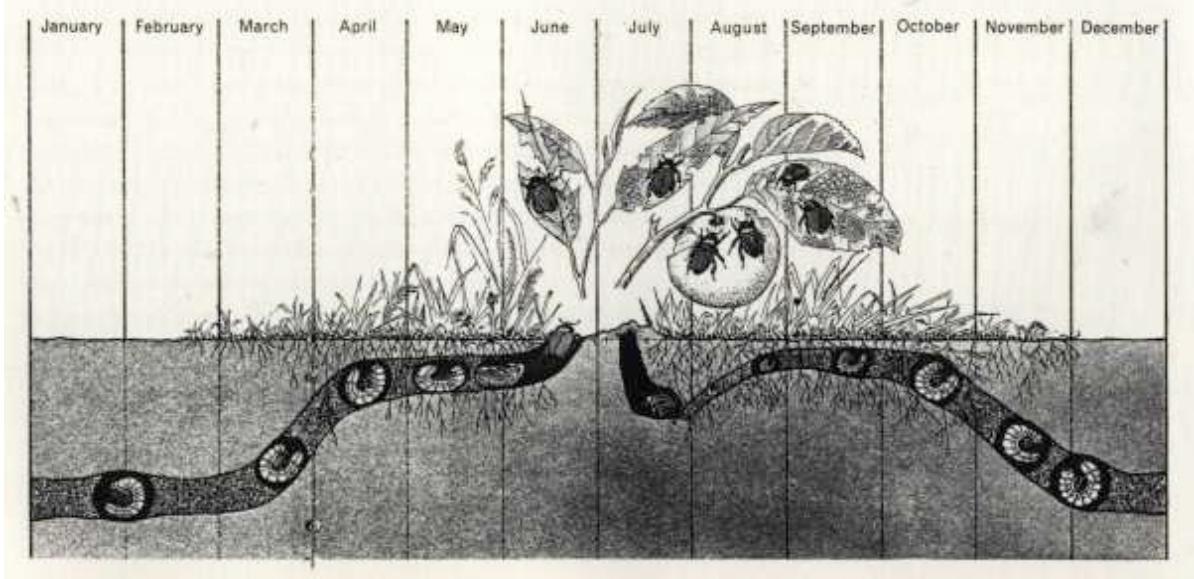
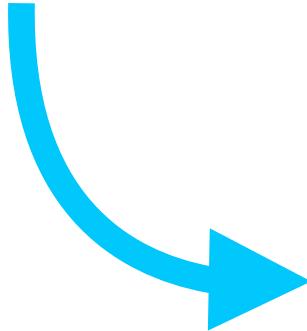


Winter's Bone

CONTINUED...

Consistent visual
frameworks.

Keep things tidy.

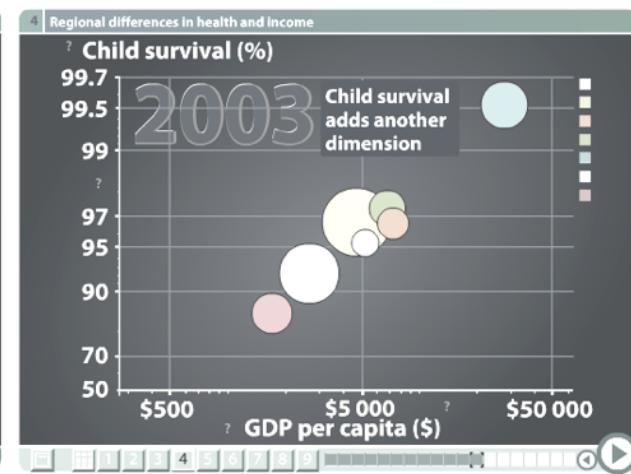
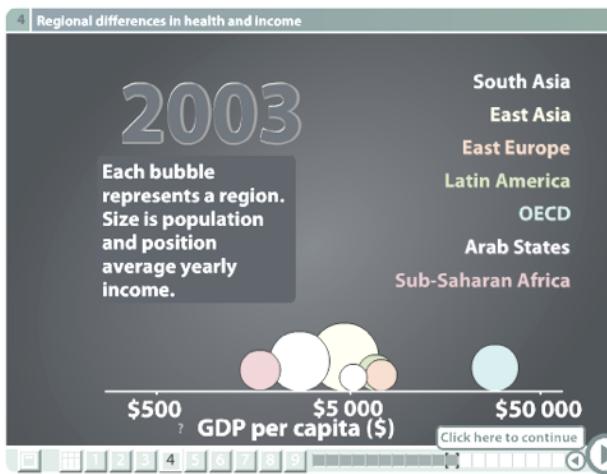
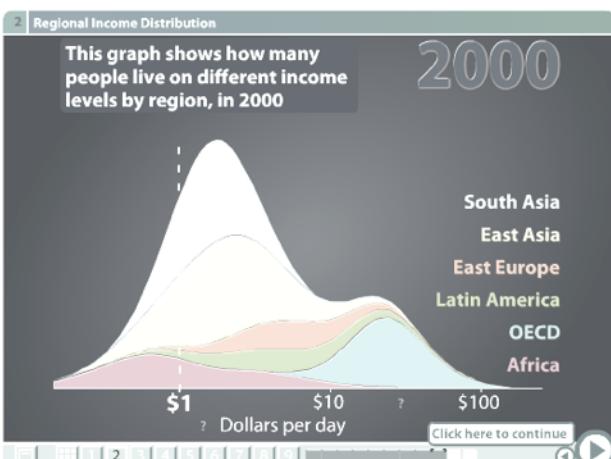
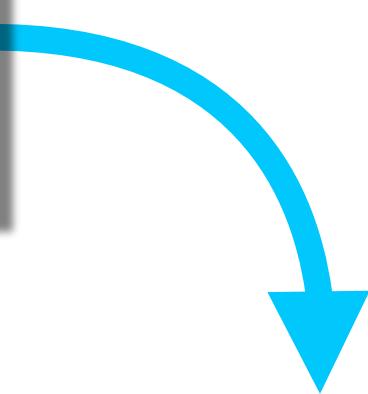


The jump



Five judges award points to competitors based on factors such as variety of tricks, the height snowboarders reach and the difficulty of tricks and rotations. Points are deducted for bad landings and a lack of speed. White's jump was almost perfect

Use staging and animation
for complicated transitions.
Stage big transitions to
avoid confusing readers



Transitions Guidance

Viewing Angle
Viewer (Camera) Motion
Continuity Editing
Object Continuity
Familiar Objects

PRICE \$4.50

FEB. 25, 2008

THE NEW YORKER

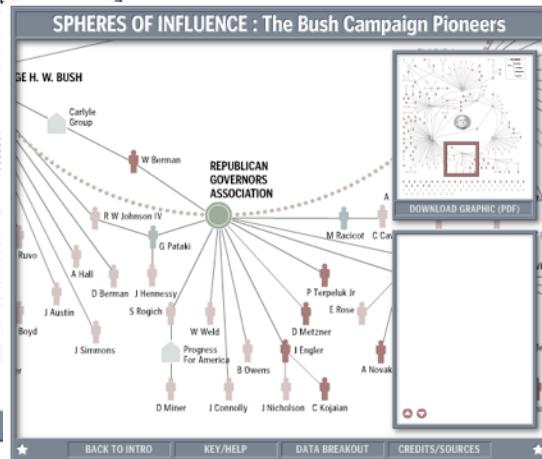
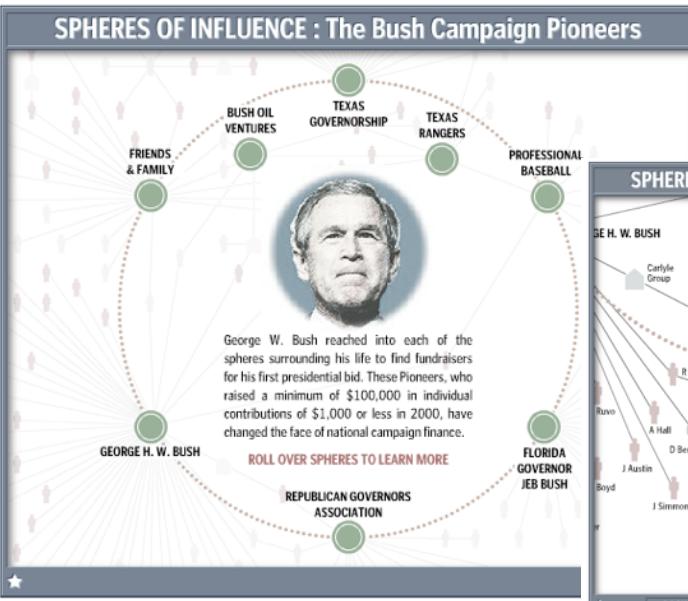
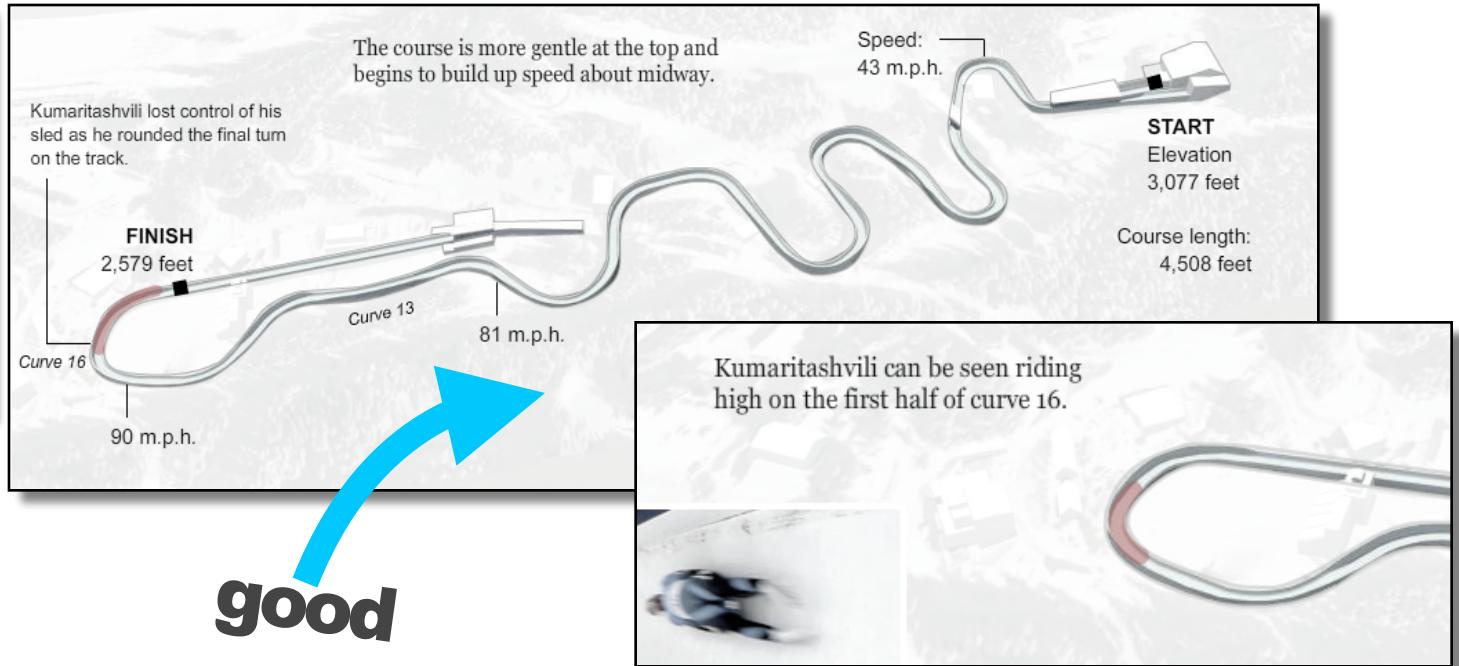


Use establishing shots.

Situate the viewer before diving in.



CONTINUED...
 Use establishing shots.
 Situate the viewer before diving in.



bad

PRICE \$4.99

THE

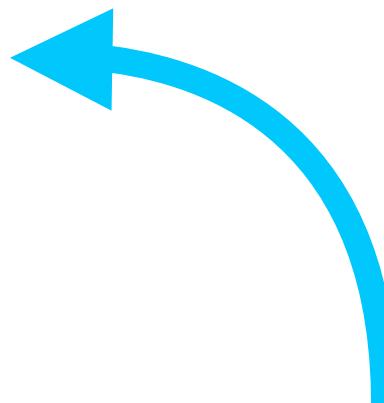
MAR. 20, 2006

THE NEW YORKER



Highlighting Techniques

Character Direction
Feature Distinction
Close-Ups
Zooming
Framing
Motion
Audio



Make it clear what to look at and when.
Guide readers through the story or they'll get lost.

PRICE \$3.50

JULY 30, 2001

THE NEW YORKER

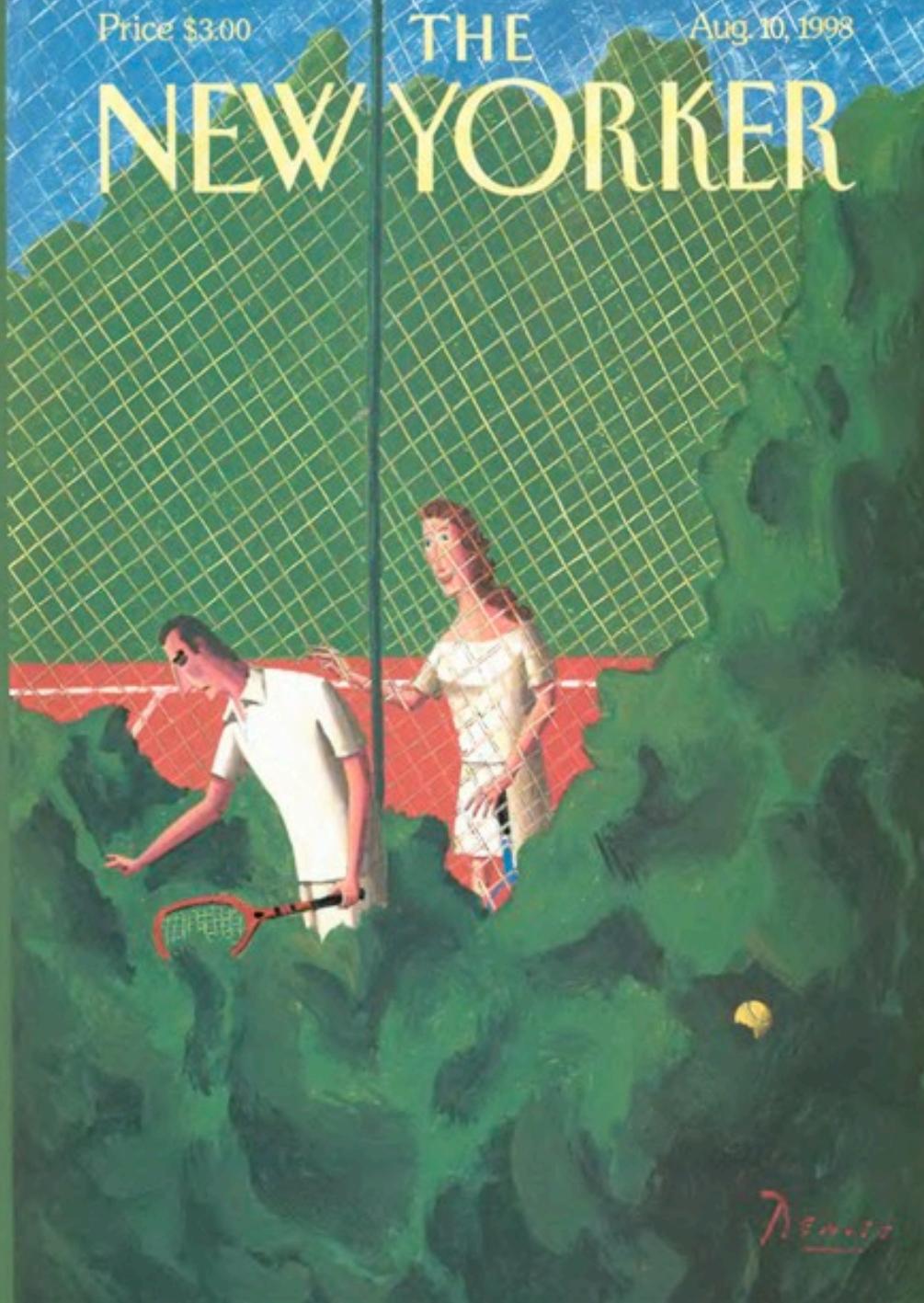


alvarez

Price \$3.00

Aug. 10, 1998

THE NEW YORKER



755

Grab attention with image and position

Line graph: cumulative home runs.

Hank Aaron
755 homers
23 seasons



Babe Ruth
714 homers
22 seasons



Barry Bonds
708 homers
20 seasons

400

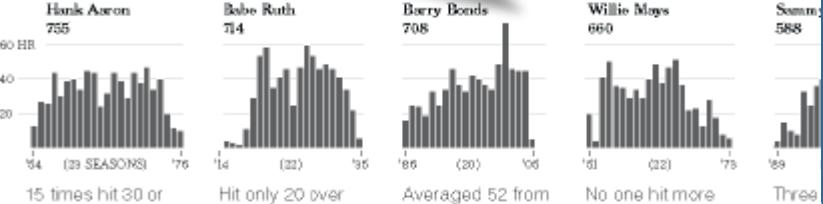
Major
on

According to a book he began steroid use in 1985, league rules later, he hit 14 more runs, surpassing career path.

Reduced visual priority

Differing Paths to the Top of the List

The top seven players on the career home run list



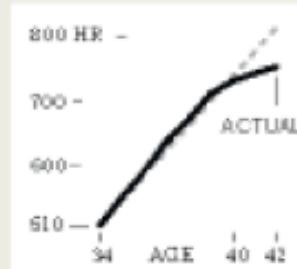
Homer Pace After Age 34

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.

— PROJECTION BASED ON AVERAGE OF PREVIOUS FIVE SEASONS

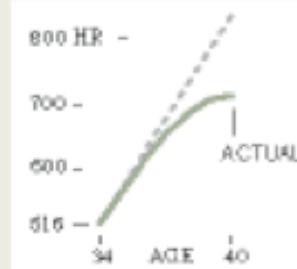
Aaron

Actual homers slightly outpace projected homers for five seasons.



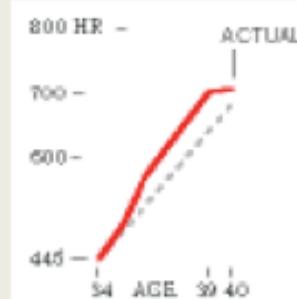
Ruth

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



Bonds

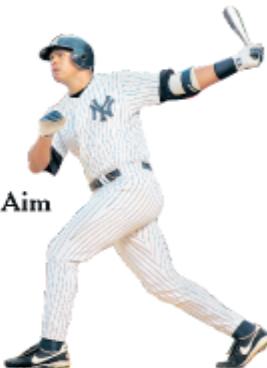
From age 35 to 39, he averaged 14 more homers a season than projected.



Note: Ages as of July 1 of each season.

Others
Taking Aim

ence



Albert Pujols

Averaging 40 homers a season, he has started stronger than the three leaders did.

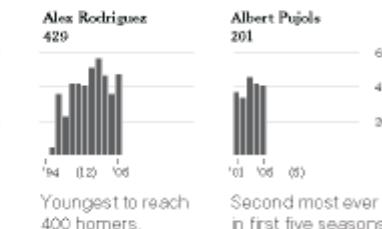
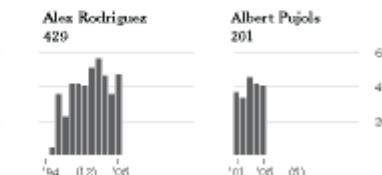
Ken Griffey Jr.

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



Alex Rodriguez

Youngest to reach 400 homers.



Antonio Cox and Joe Ward/The New York Times

755 Beginning

Steroids or Not, the Pursuit Is On

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

Hank Aaron
755 homers
23 seasons



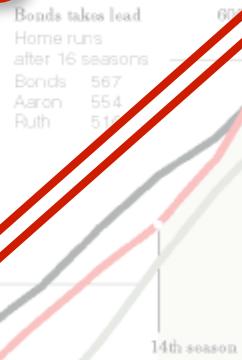
Babe Ruth
714 homers
22 seasons



Barry Bonds
708 homers
20 seasons



Bonds takes lead
Home runs
after 16 seasons
Bonds 567
Aaron 554
Ruth 511



According to allegations in a book about Bonds, he began taking steroids before the 1999 season, his 14th in the league. Two seasons later, he hit 73 home runs, surpassing Aaron's career pace.

714 755 708
23 seasons 22 seasons 20 seasons

Bonds was injured last season. He played 14 games and hit 6 homers.

Middle

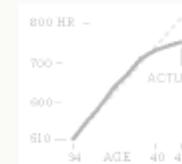
Homer Pace After Age 34

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

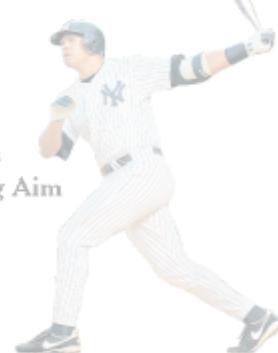


Bonds

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



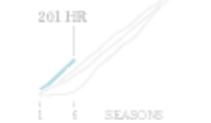
Others Taking Aim



Alex Rodriguez
Is ahead of the pace set by all three home run leaders.



Albert Pujols
Averaging 40 homers a season, he has started stronger than the three leaders did.



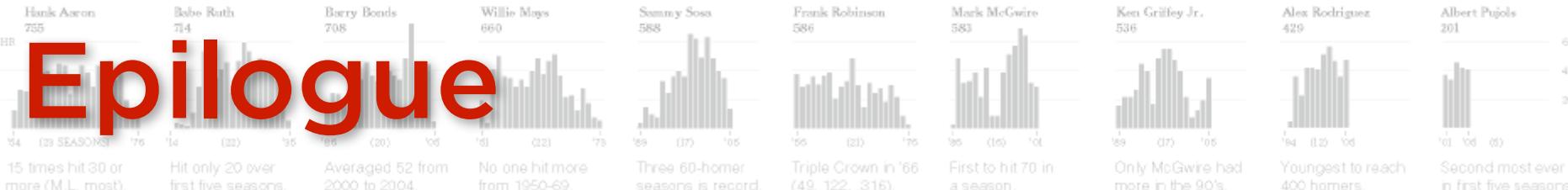
End

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

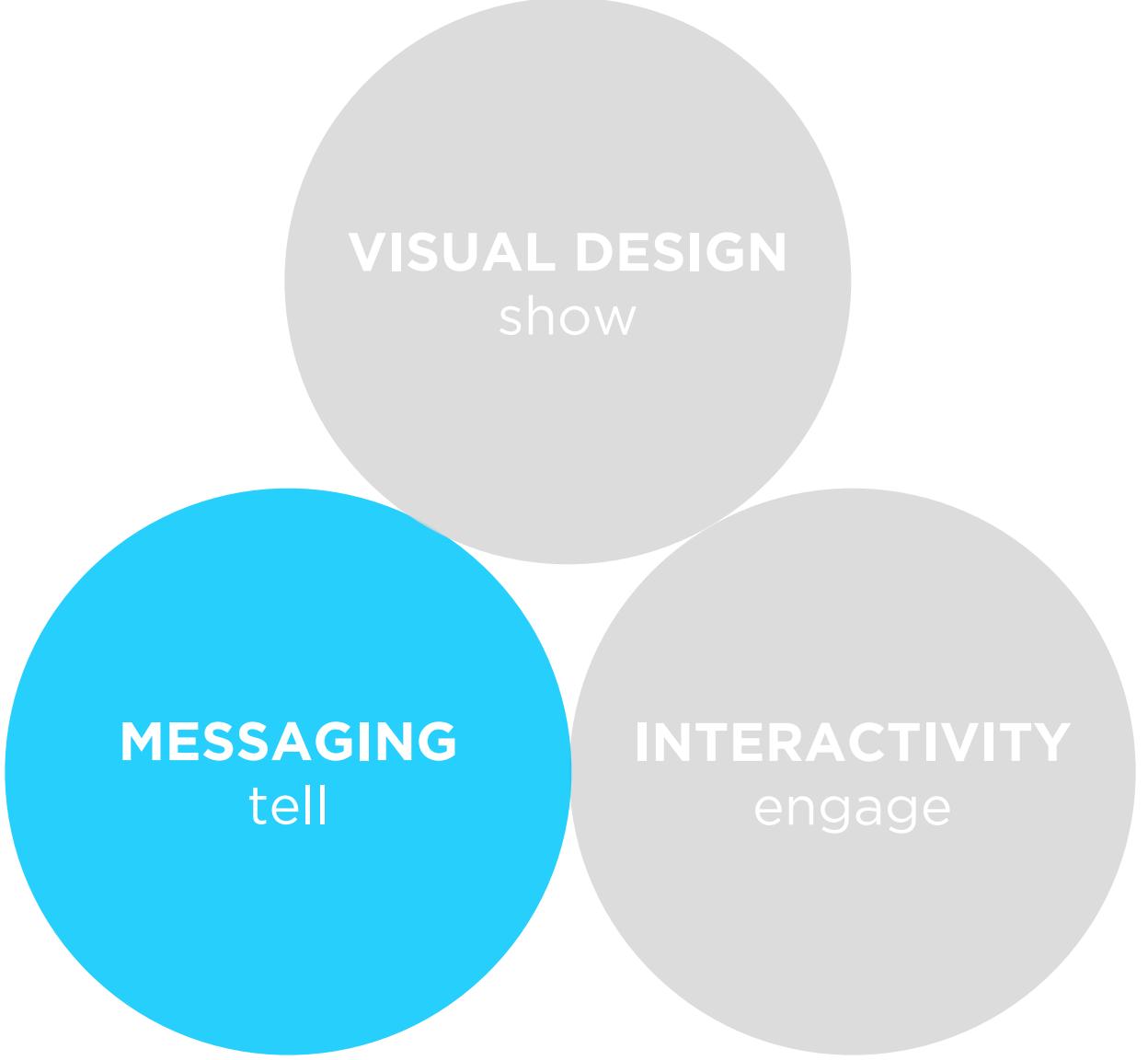


Differing Paths to the Top of the Charts

The top seven players on the career home run list, along with a look at Griffey (12th), Rodriguez (37th) and Pujols (tied 257th)



Epilogue



VISUAL DESIGN
show

MESSAGING
tell

INTERACTIVITY
engage

headline

caption

AUGUST 8, 2007

Paths to the Top of the Home Run Charts

The players with the most home runs are shown below; click on a player's name or on a line below to highlight a player's trajectory.

1	Bonds	762
2	Aaron	755
3	Ruth	714
4	Mays	660
5	Griffey	630
6	Sosa	609
7	Rodriguez	599
8	Robinson	586
9	McGwire	583
10	Thome	577
11	Killebrew	573
12	Palmeiro	569
13	Jackson	563
14	Ramirez	554
15	Schmidt	548
16	Mantle	536
17	Foxx	534
18	McCovey	521
18	Thomas	521
18	Williams	521
21	Banks	512
21	Mathews	512
23	Ott	511
24	Sheffield	509
25	Murray	504



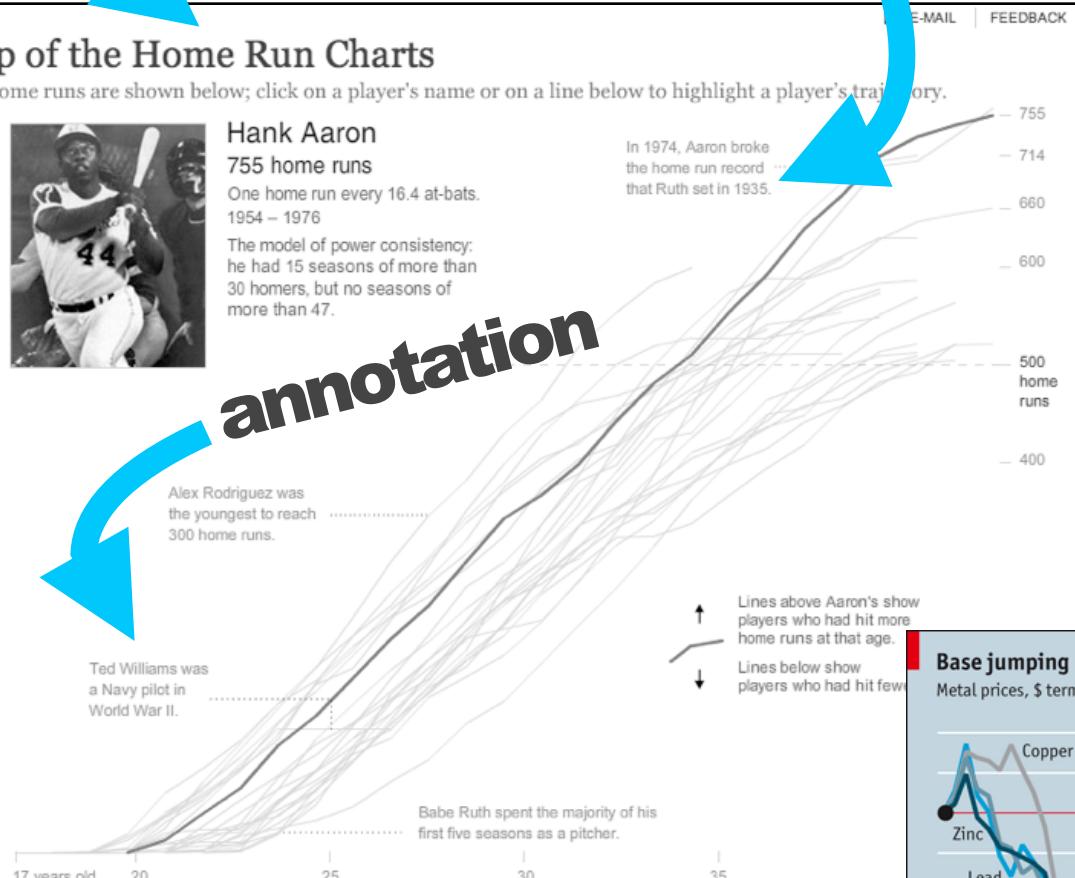
Hank Aaron

755 home runs

One home run every 16.4 at-bats.
1954 – 1976

The model of power consistency:
he had 15 seasons of more than
30 homers, but no seasons of
more than 47.

annotation



???



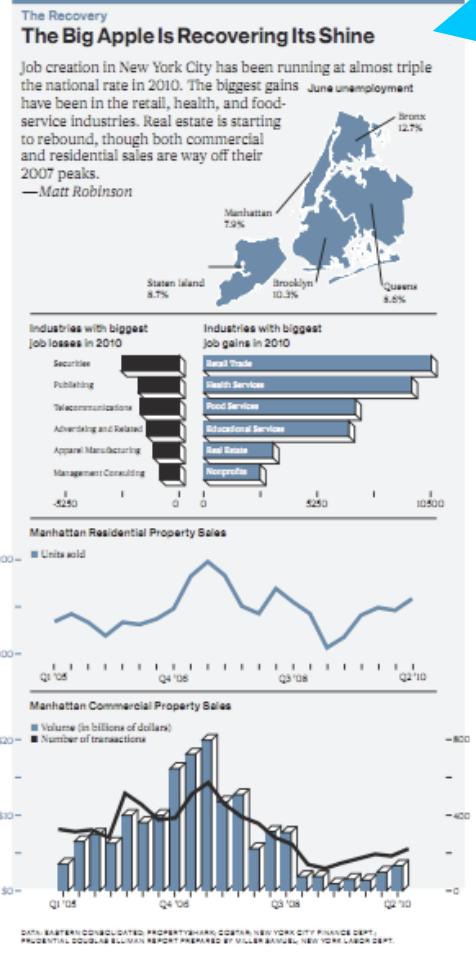
Base jumping

Metal prices, \$ terms, January 1st 2008=100

Source: London Metal Exchange

Use headlines,
captions, &
annotations.
Quickly draw
attention to
what's
important.

isolated

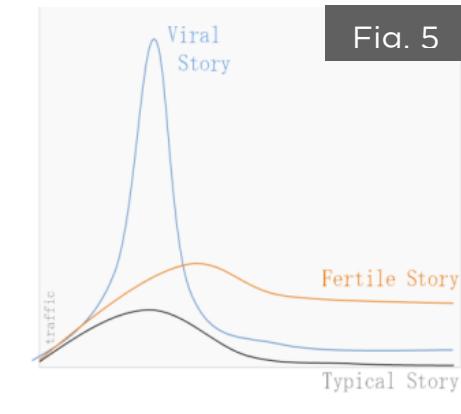


June 20, 2011

Weave text into the graphic—not just at the beginning.
Text and graphics work better together than apart.

Connect the text to the relevant graphics.
See Fig. 5

quire significantly more work than traditionalistics. To make this work economical, visualizations ed to stories that are either *persistent* or *viral* in order due-generating traffic. **Persistent stories** cover amatic themes that maintain relevance over time (climate change, food economics, the housing market). zations to persistent themes “fattens and elongates” r visualizations (which are already fatter and longer tories). During this slow-burn, these visualizations l by hundreds of stories over several months and ss evolve. **Viral stories** achieve heavy traffic unctuated spikes of popularity. These stories tend ology, personalities, or sensational news. To get the buck, produce visualizations for editorial content sistent or viral



The Supreme Court gets the Wal-Mart ruling right.

Everything about Wal-Mart Stores Inc. (WMT) is big. Total sales, at \$422 billion last year, exceeded the gross domestic product of all but 18 countries. Its 4,300 U.S. stores employ more than 1.4 million people, more than any other U.S. company.

So the verdict handed down yesterday by the U.S. Supreme Court in Wal-Mart v. Dukes was suitably outsized; it decided the largest workplace discrimination case in history. The decision, which was unanimous in one part, and split along the familiar 5-4 ideological lines in another, was the correct one.

The lawsuit was brought on behalf of every woman who worked for Wal-Mart since late December 1998, more than 1.5 million in all. The Supreme Court, which hadn't reviewed the standards for class-action suits in 12 years, told the women they didn't have enough in common to sue the company as a monolithic class.

The female plaintiffs claimed that they had been illegally denied pay and promotions despite a company policy against sex discrimination. The suit relied largely on statistics, which seemed damning enough.

Women filled 70 percent of Wal-Mart's hourly jobs, yet made up only 33 percent of management employees. Women were paid less than men in every region, even when they had higher performance ratings and seniority.

The plaintiffs bolstered their case with affidavits detailing the experiences of 120 individuals. One female worker said

she was told to "doll up" if she wanted a promotion.

Wal-Mart devastatingly turned the numbers against the plaintiffs. One brief filed on behalf of the women cited Census Bureau figures showing that U.S. median earnings of women in 2009 were 77 percent of men's earnings. The company pointed out that women at Wal-Mart earned between 85 percent and 95 percent of what male colleagues earned. They actually did better at Wal-Mart than in the country at large.

As for the affidavits, the company said they represented just one-thousandth of one percent of women employed at the retailer since December 1998.

As Justice Antonin Scalia wrote for the majority, "Without some glue holding together the alleged reasons" for Wal-Mart's pay and promotion decisions, it was impossible to say that all of the class members suffered the same injury at different stores run by different managers across the nation. Wal-Mart allows local managers wide latitude in wages and promotions.

The plaintiffs can still bring lawsuits individually, and many certainly will. Some may even band together in smaller classes — if they worked at the same store, for example, and believe they experienced systemic discrimination from the same managers.

In the end, what the women were really trying to prove is that Wal-Mart has a corporate culture that favors men. Some of the briefs filed with the court claimed that promotions were characterized as a "tap on the shoulder," with local managers having great discretion in deciding whose shoulder to tap. Vacancies were not regularly

posted. Employees were discouraged from discussing their compensation, presumably to prevent comparisons.

As Justice Ruth Bader Ginsburg wrote in a partial dissent, such behavior could be a cover for bias against women. It will be up to other courts to make sure Wal-Mart doesn't use its decentralized management to escape legal responsibility. But those cases should be dealt with on their individual merits — and unique facts.

This opinion is likely to make litigation harder for other employment class actions that bind together disparate litigants in a single class. But a class of 1.5 million employees faces an appropriately high hurdle. This class didn't clear it.

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The female plaintiffs claimed that they had been illegally denied pay and promotions despite a company policy against sex discrimination. The suit relied largely on statistics, which seemed damning enough. And this is the end of my first graphic for Bloomberg.

1.5 million women sued Wal-Mart for discriminatory pay & promotion practices, using mostly statistics to make their case.

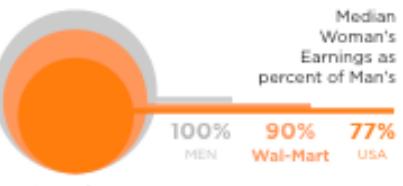
Women filled 70% of hourly jobs...



...but only 33% of management.

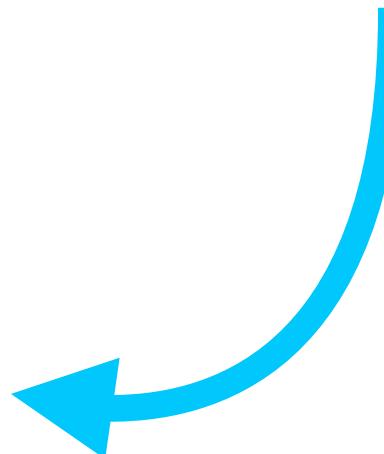


Women were paid less than men in every region, even when they had higher ratings and seniority.



OurView The Supreme Court was right.

integrated



CONTINUED...

Weave text into the graphic—not just at the beginning.
Text and graphics work better together than apart.

Word-Specific

Pictures illustrate the words

Picture-Specific

Words accentuate aspects of the scene

Duo-Specific

Words and pictures send the same message

Intersecting

Words and pictures contribute information independently

Interdependent

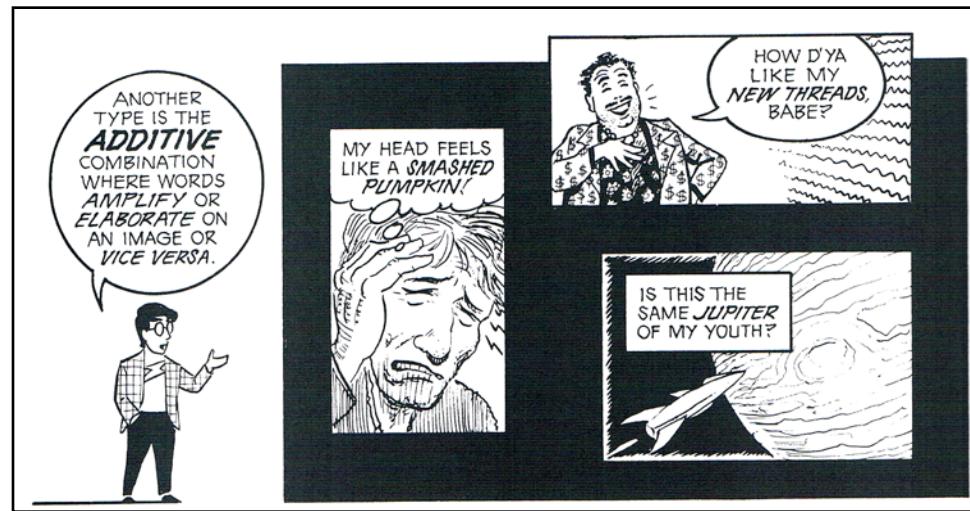
Word and pictures combine to convey an idea neither conveys alone

Parallel

Words and pictures seem to be independent.

Montage

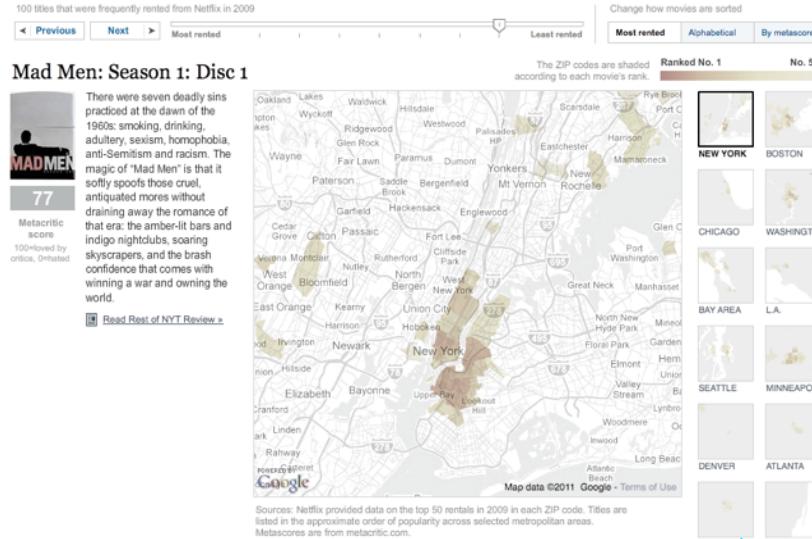
Words and pictures combine pictorially.



Published: January 8, 2010

A Peek Into Netflix Queues

Examine Netflix rental patterns, neighborhood by neighborhood, in a dozen cities. Some titles with distinct patterns are *Mad Men*, *Obsessed* and *Last Chance Harvey*. [Comments \(135\)](#)



Start with an editorially interesting view.

Default views can be boring. Curate the experience from the beginning.

Make data relatable. Put numbers and facts in context.
250 thousand square miles means nothing.
It's the size of Texas!

Wetlands Destruction



Coastal marshes absorb fertilizer runoff from farms and buffer civilization from Gulf storms.
Losses in coastal watersheds, 1998 to 2004

Great Lakes	20,000	acres
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Atlantic	110,000	acres
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Aug 16, 2010

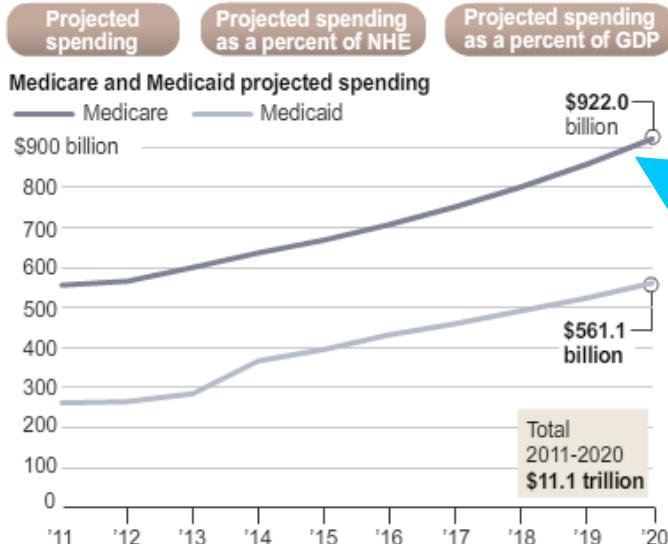
Mind your precision.

Significant digits, tick marks, and labels suggest what deserves attention.

BGOV INTERACTIVE

Medicare and Medicaid Spending Show No Signs of Slowing Down

Centers for Medicare and Medicaid Services projects increases in spending compared to gross domestic product and national health expenditures.



Sources: Centers for Medicare and Medicaid Services, Bloomberg Government
Graphic: Adrienne Lewis
BGOVgraphics@bloomberg.com

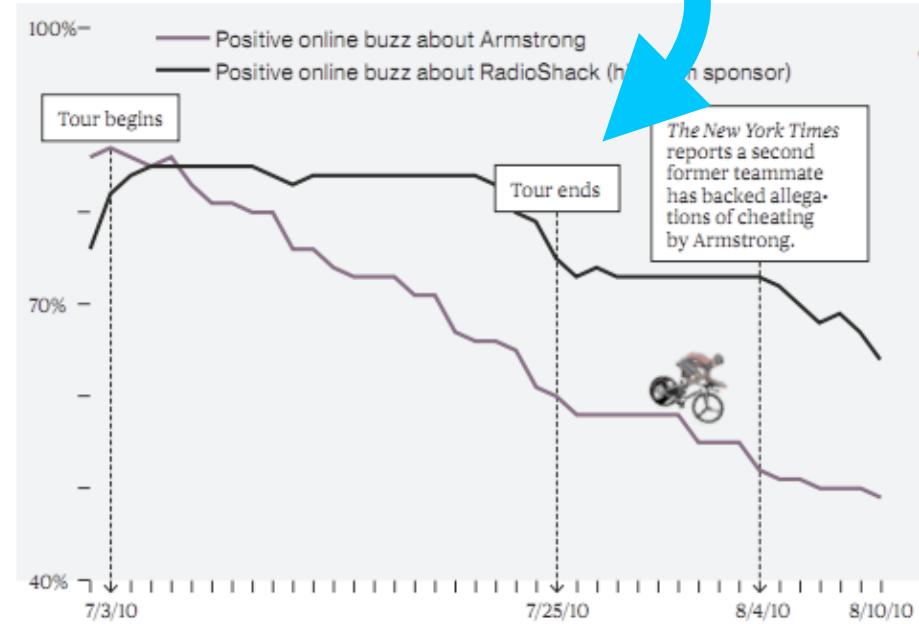
Bloomberg
GOVERNMENT

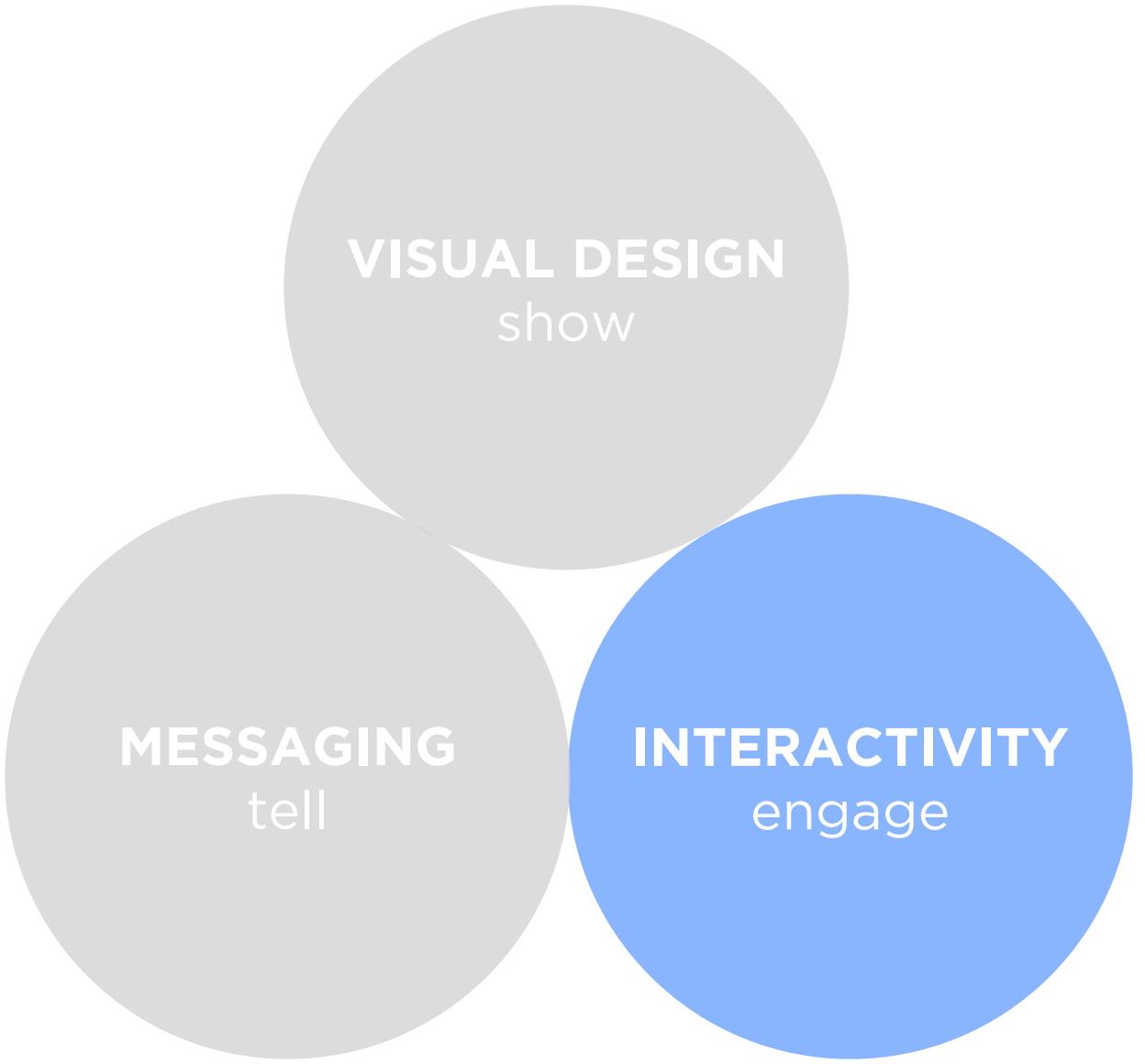
too precise

Representative	District	Fiscal 2010 contract spending
Mike Coffman	Colo. 6	\$3.26 billion
Doug Lamborn	Colo. 5	2.98 billion
Rob Bishop	Utah 1	2.76 billion
Kenny Marchant	Texas 24	2.58 billion
Jeff Duncan	S.C. 3	2.40 billion
Sandy Adams	Fla. 24	2.36 billion
Lamar Smith	Texas 21	1.65 billion
Steve Scalise	La. 1	1.49 billion
Jeff Landry	La. 3	1.47 billion
Roscoe Bartlett	Md. 6	1.44 billion
John Carter	Texas 31	1.42 billion

fine

thoughtful





VISUAL DESIGN
show

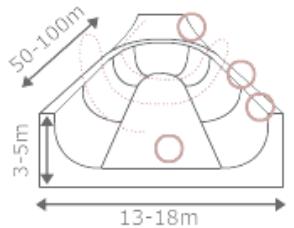
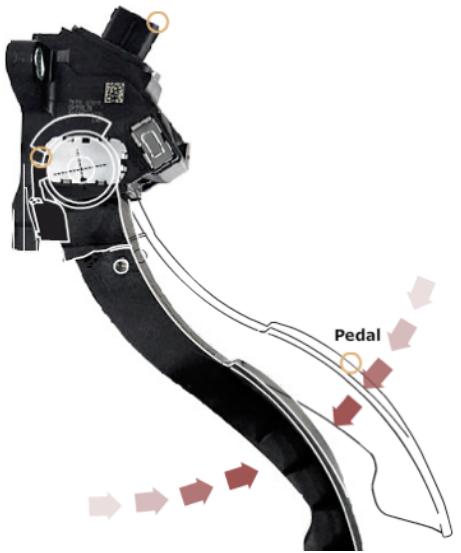
MESSAGING
tell

INTERACTIVITY
engage

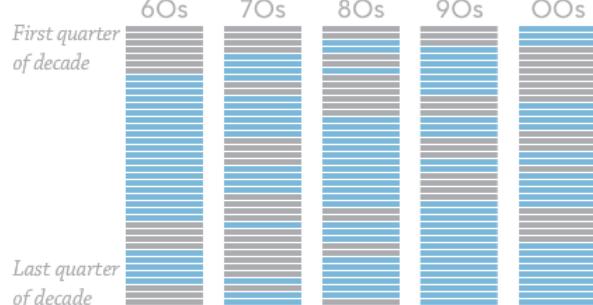
Interactive features
should scream
interactivity.

Be explicit.
Click here.

Avoid a click-and-seek
experience.



visual cues

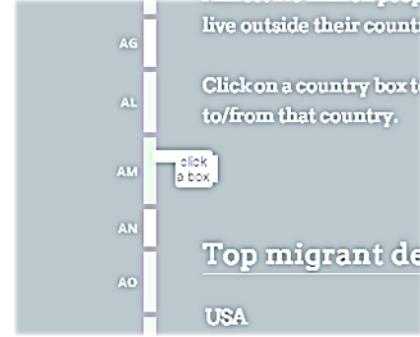
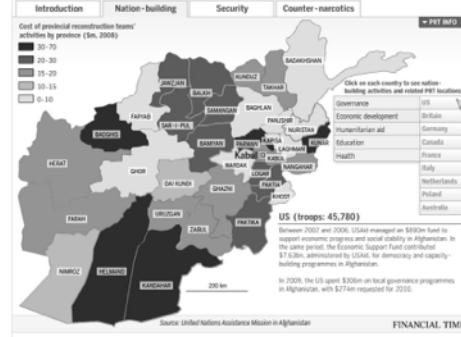


Source: Bloomberg

We first looked at whether
policy was counter-cyclical in
any given quarter.

CONTINUE

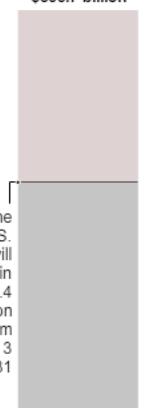
Counter-cyclical policy not used
Counter-cyclical policy used



suggested actions



August bills due:
\$306.7 billion



Click on options below to see the effect on U.S. spending

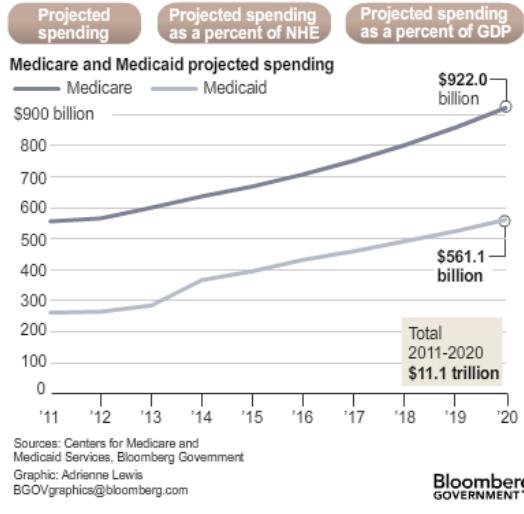
<input type="checkbox"/>	Interest on Treasury securities	\$29.0 billion	[+]
<input type="checkbox"/>	Social Security benefits	49.2	[+]
<input type="checkbox"/>	Medicare	28.6	[+]
<input type="checkbox"/>	Medicaid	21.4	[+]
<input type="checkbox"/>	Defense vendor payments	31.7	[+]
<input type="checkbox"/>	Unemployment Insurance benefits	12.8	[+]

familiar widgets

BGOV INTERACTIVE

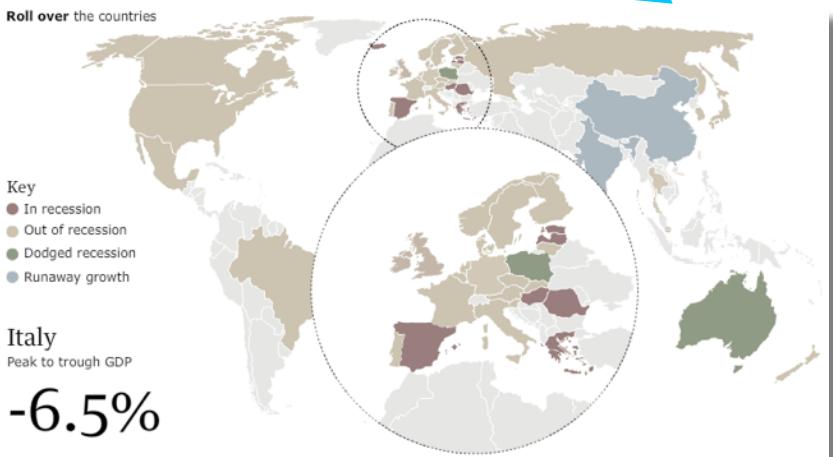
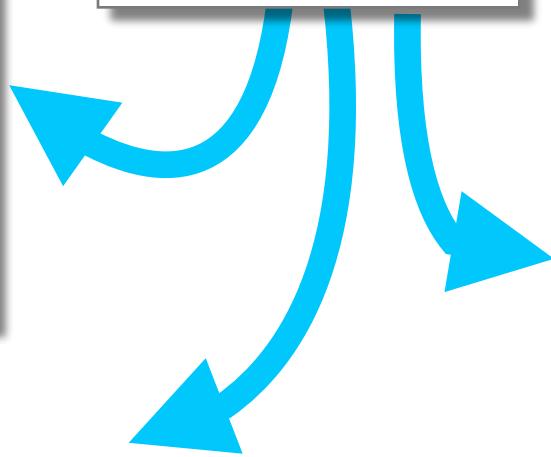
Medicare and Medicaid Spending Show No Signs of Slowing Down

Centers for Medicare and Medicaid Services projects increases in spending compared to gross domestic product and national health expenditures.



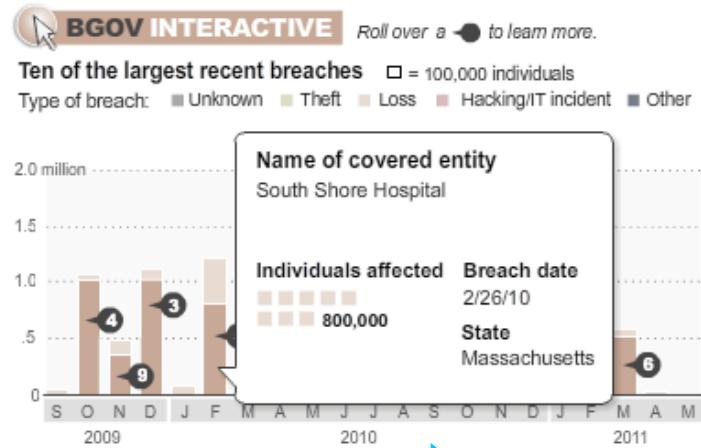
Interactive features should react to the user.

Depress buttons, highlight items, animate widgets.



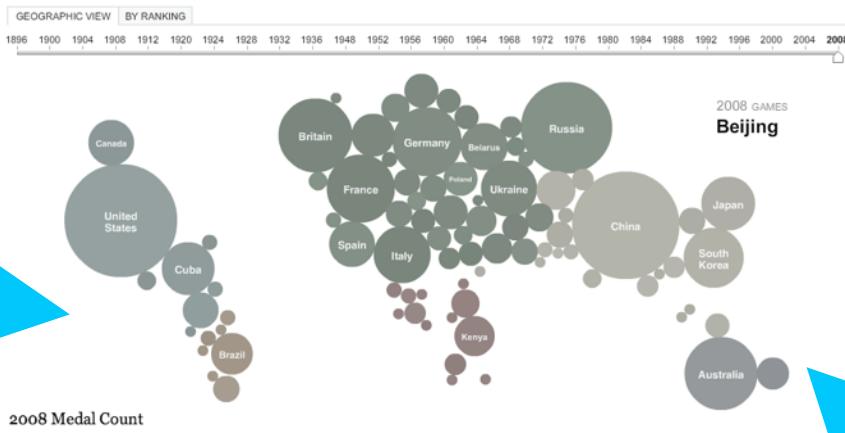
Health Care's Growing Concern Over Cyber Security

As health-care providers increasingly adopt electronic records, they are looking for insurance coverage against possible data breaches.



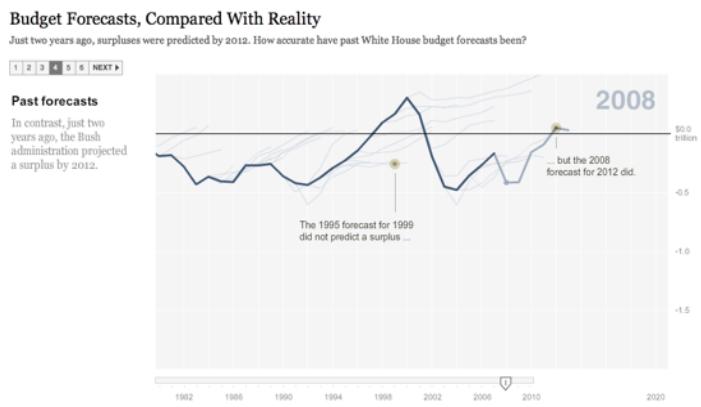
Don't obscure data.
Avoid letting pop-ups obscure data.





Make the visualization “look alive”.
Things move even without the user!

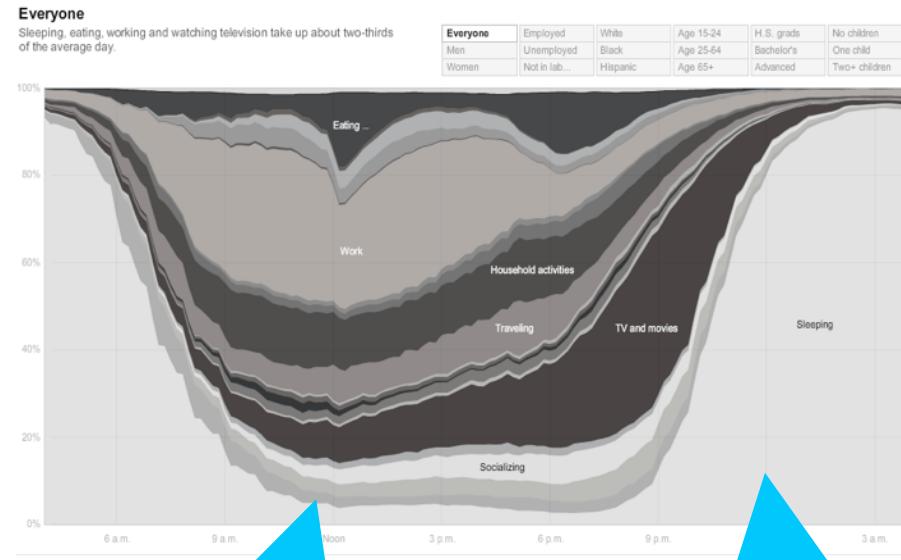
Demonstrate interactivity.
Animate interactive widgets for tacit tutorials.



Include a progress bar and “back” and “reset” buttons

Linear navigation is important—especially with lots of interactivity.

Restrict interactivity to key dimensions.
The more interactivity, the less story.



The POTUS Tracker interface displays a timeline from 2009 to 2011. A large "2131" indicates the total number of events. A sidebar lists "Matching Events" (2131) and "Issues Discussed". The "FILTERS" section includes a "Use all filters" link. The main area shows a grid of boxes for each month, with "Foreign Policy" and "Defense" being prominent categories. A large blue arrow points from the "POTUS Tracker" section towards the central text box.

Issues Discussed	Count
Courts & Judiciary	15
Crime & Law Enforce.	18
Defense	214
Economy	609
Education	45
Energy & Environment	129
Foreign Policy	636
Government & Politics	577
Health Care	133
Homeland Security	71
Immigration	14
National Sec. & Intel.	84
Science & Technology	37
Social Issues	156

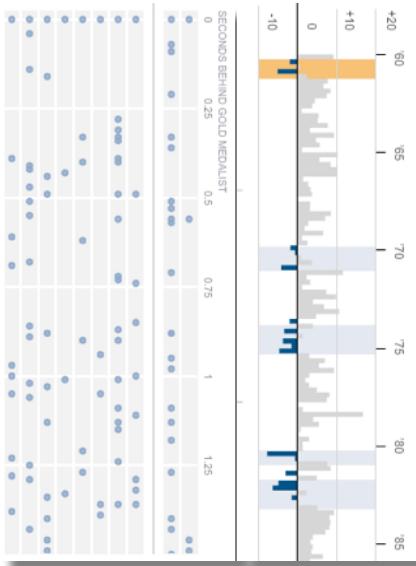
VISUAL DESIGN

show

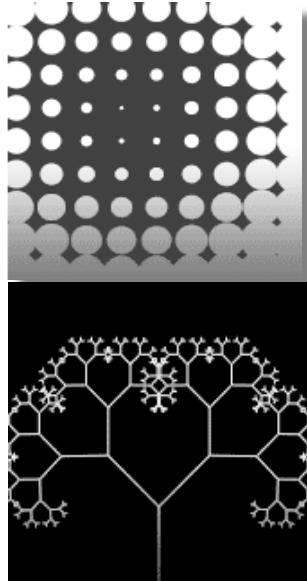
MESSAGING
tell

INTERACTIVITY
engage

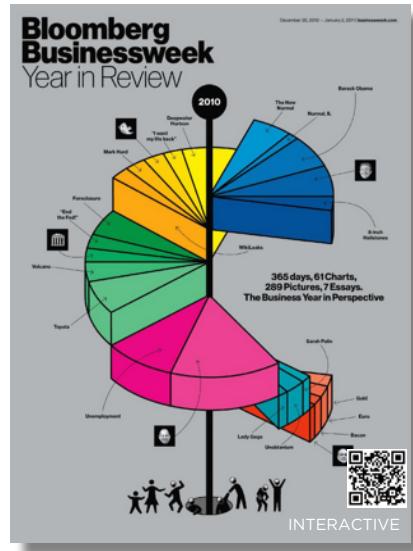
Sound & Video



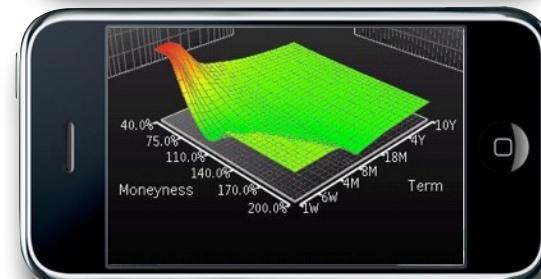
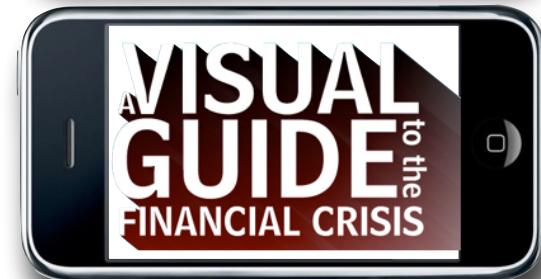
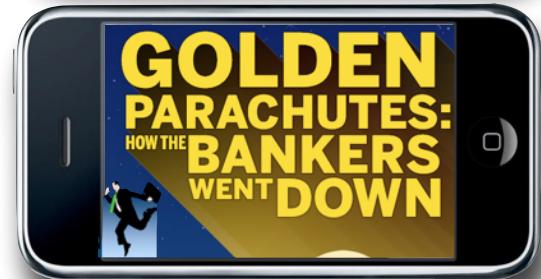
Fluid



Linking



Mobile



WHAT'S

NEXT

Scrollytelling

How the Recession Shaped the Economy

So You Think You Can Scroll?

Scrollytelling

Mobile: Swipe is the New Scroll?

DATA JOURNALISM
IS NOT GRAPHICS AND
VISUALIZATIONS. IT'S ABOUT
TELLING THE STORY IN THE BEST WAY POSSIBLE.

SOMETIMES THAT WILL BE A VISUALIZATION...
BUT SOMETIMES IT'S A NEWS STORY. SOMETIMES, JUST
PUBLISHING THE NUMBER IS ENOUGH.

SIMON ROGERS, THE GUARDIAN // 2011

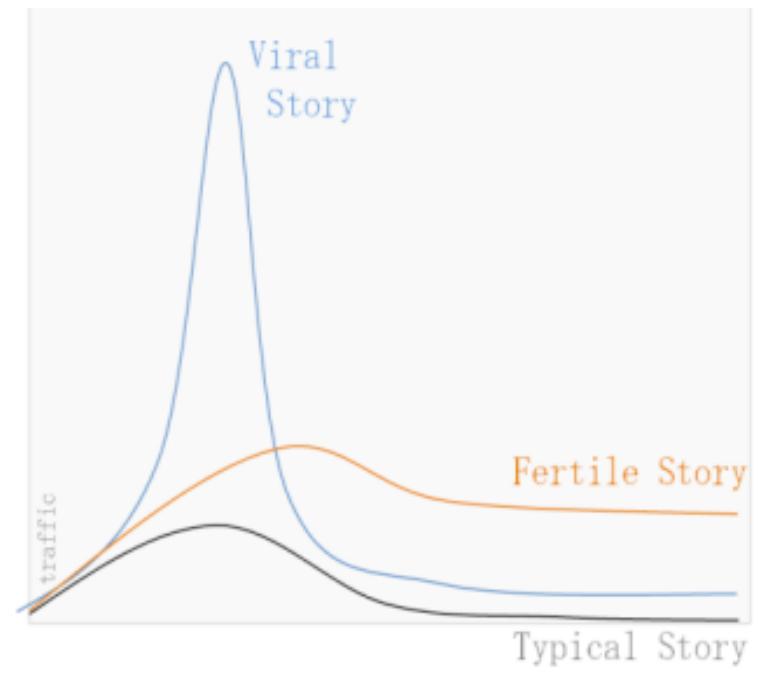
PEOPLE HAVE BEGUN TO FORGET HOW
POWERFUL HUMAN STORIES ARE,
EXCHANGING THEIR SENSE OF EMPATHY FOR
A FETISHISTIC FASCINATION WITH DATA...
THE HUMAN STUFF IS THE MAIN STUFF,
AND THE DATA SHOULD ENRICH IT.

JONATHAN HARRIS // 2008

VISUALIZATION & JOURNALISM

Interactive Visualizations
Drive Traffic
Slow burn vs. Burn out

quire significantly more work than traditional graphics. To make this work economical, visualizations need to stories that are either *persistent* or *viral* in order to generate traffic. **Persistent stories** cover "familiar themes" that maintain relevance over time (politics, food economics, the housing market). Visualizations to persistent themes "fattens and elongates" viral visualizations (which are already fatter and longer stories). During this slow-burn, these visualizations will be updated by hundreds of stories over several months and will evolve. **Viral stories** achieve heavy traffic through punctuated spikes of popularity. These stories tend to be about technology, personalities, or sensational news. To get the most bang for the buck, produce visualizations for editorial content that is either persistent or viral.



Fast Turnaround

What can be done quickly?

FRIDAY

MONDAY

TUESDAY

WEDNESDAY

THURSDAY

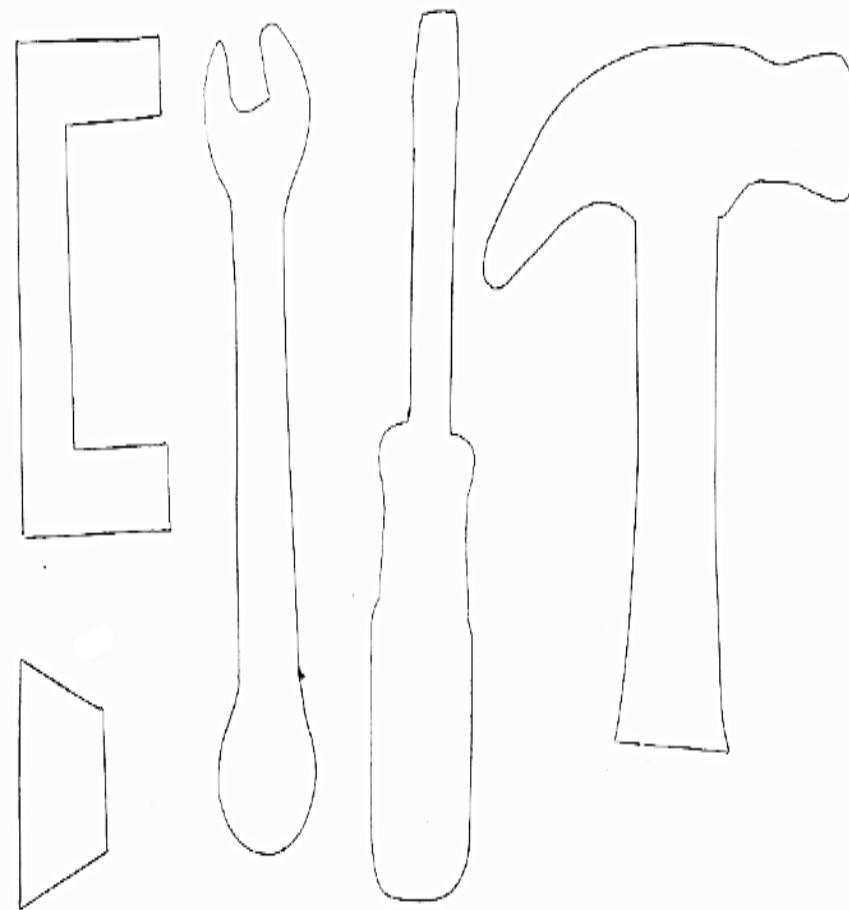
magazine

web

iPad



Print to Digital



Templates & Tools

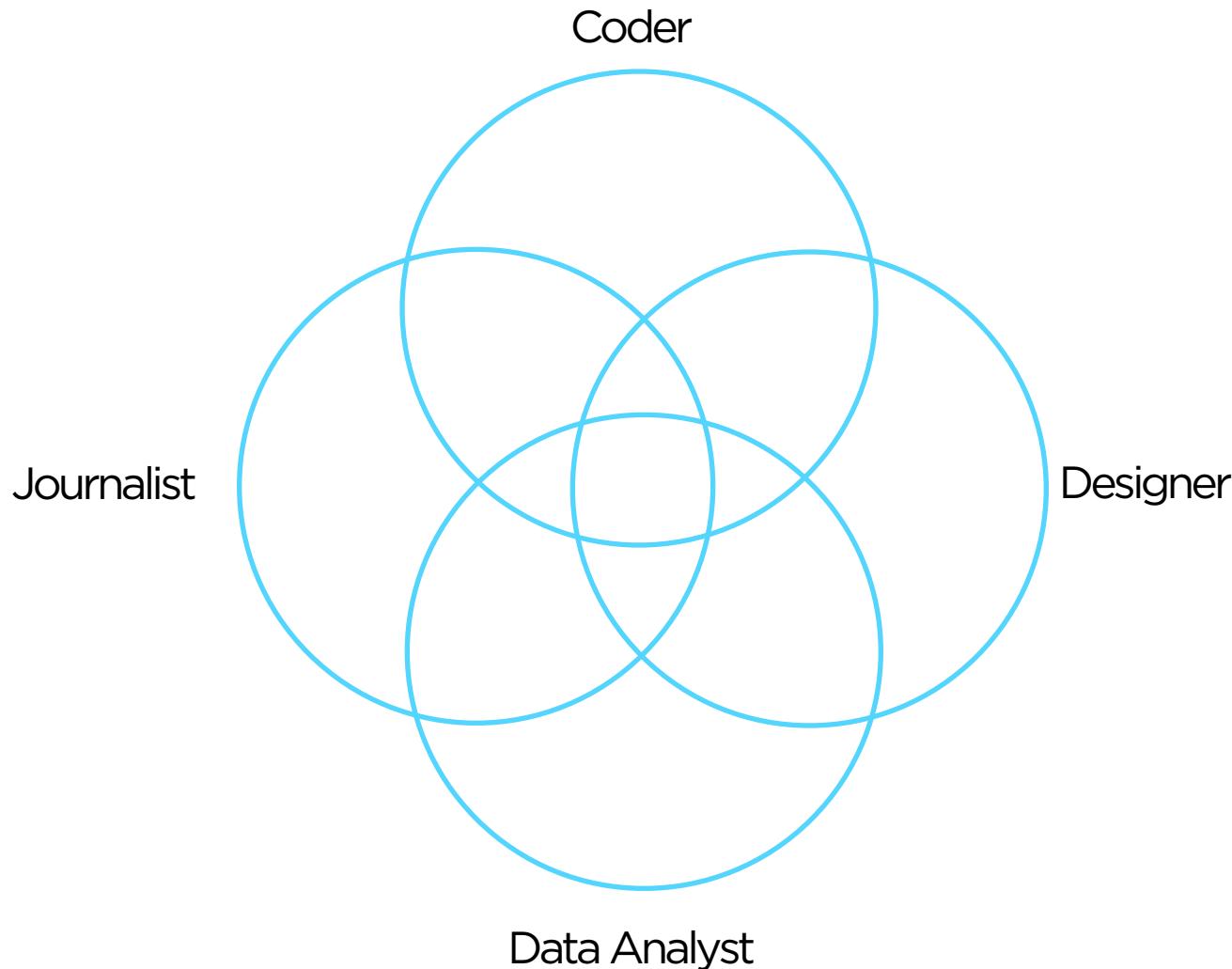
High demand for visualization tools
for non-technical journalists

What are the
big seminal themes
over the next year?

Build visualizations that
update with those themes...

Link to them every
chance you get!

Magical Candidate
Who has all these skills?



VISUAL DESIGN

show the story

(1) Choose your visualization type carefully.

Know your options. Even obscure ones.

(2) The more linear, the more like a story.

Stories have a beginning, middle, and end.

(3) Use establishing shots.

Situate the viewer before diving in.

(4) Make it clear what to look at and when—especially where to start.

Guide readers through the story or they'll get lost.

(5) Limit complexity at first. Reveal as needed.

Don't confuse the reader with extraneous information.

(6) Consistent visual frameworks.

Keep things tidy.

(7) Use staging and animation for complicated transitions.

Stage big transitions to avoid confusing readers

(8) Design Matters.

Duh.

(9) Avoid “chart junk” (Tufte).

Extra marks distract from the data.

(10) “Cool” and “readability” are at odds.

Recognize the trade-off and choose your audience.

MESSAGING

tell the story

(1) The more text, the more storytelling.

Graphs are abstract. Words give concrete interpretations.

(2) Say the point you're making with the graphic.

Don't make the reader figure it out on his own.

(3) Use headlines, captions, & annotations.

Quickly draw attention to what's important.

(4) Weave text into the graphic—not just the beginning.

Text and graphics work better together than apart.

(5) Start with an editorially interesting view.

Default views can be boring. Curate the experience from the beginning.

(6) Make data relatable. Put numbers and facts in context.

250 thousand square miles means nothing. It's the size of Texas!

(7) Connect the text to the relevant graphics.

See Fig. 5

(8) Don't ignore summaries & conclusions.

Answer the “so what?” or the reader leaves empty handed.

(9) Mind your precision.

Significant digits, tickmarks, and labels suggest what deserves attention.

INTERACTIVITY

engage

(1) Demonstrate interactivity.

Animate interactive widgets for tacit tutorials.

(2) Interactive features should scream interactivity.

Avoid a click-and-seek experience.

(3) Interactive features should react to the user.

Depress buttons, highlight items, animate widgets.

(4) Restrict interactivity to key dimensions.

The more interactivity, the less story.

(5) Make the visualization “look alive”.

Things move even without the user!

(6) Don’t obscure data.

Avoid letting pop-ups obscure data.

(7) Include a progress bar and “back” and “reset” buttons

Linear navigation is important—especially with lots of interactivity.

LINKS

1

New York Times

New York Times. The jobless rate for people like you.

<http://www.nytimes.com/interactive/2009/11/06/business/economy/unemployment-lines.html>

New York Times. How many households are like yours?

<http://www.nytimes.com/interactive/2011/06/19/nyregion/how-many-households-are-like-yours.html>

New York Times. The Death of a Terrorist: a Turning Point?

<http://www.nytimes.com/interactive/2011/05/03/us/20110503-osama-response.html>

New York Times. Paths to the Top of the Home Run Charts.

http://www.nytimes.com/ref/sports/20070731_BONDS_GRAPHIC.html

New York Times. A Peek Into Netflix Queues.

<http://www.nytimes.com/interactive/2010/01/10/nyregion/20100110-netflix-map.html>

New York Times. A Map of Olympic Medals.

http://www.nytimes.com/interactive/2008/08/04/sports/olympics/20080804_MEDALCOUNT_MAP.html

New York Times. Aerial Photographs of Joplin Before and After the Tornado

<http://www.nytimes.com/interactive/2011/05/25/us/joplin-aerial.html>

New York TImes. How different groups spend their day.

<http://www.nytimes.com/interactive/2009/07/31/business/20080801-metrics-graphic.html>

New York Times. Taking the Corners.

<http://www.nytimes.com/interactive/2010/02/20/sports/olympics/20100220-davis-graphic.html>

New York Times. Alpine Skiing, From Technical Turns to Tucks and Speed

<http://www.nytimes.com/interactive/2010/02/20/sports/olympics/downhill-overview.html>

New York Times. Luge Crash at the Olympics.

<http://www.nytimes.com/interactive/2010/02/12/sports/olympics/LUGEDEATH.html>

New York Times. Budget forecasts compared to reality.

<http://www.nytimes.com/interactive/2010/02/02/us/politics/20100201-budget-porcupine-graphic.html>

New York Times. Fractions of a Second: An Olympic Musical.

<http://www.nytimes.com/interactive/2010/02/26/sports/olympics/20100226-olysymphony.html>

New York Times. How the Government Dealt with Past Recessions.

<http://www.nytimes.com/interactive/2009/01/26/business/economy/20090126-recessions-graphic.html>

The Guardian

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<http://www.guardian.co.uk/business/interactive/2010/feb/04/toyota-automotive-industry>

Guardian. Shaun White's Double McTwist.

<http://www.guardian.co.uk/sport/interactive/2010/feb/19/winterolympics2010-vancouver>

Guardian. Earthquakes: Why they happen.

<http://www.guardian.co.uk/world/interactive/2008/jan/23/earthquakes>

Guardian. Oscars 2011: an interactive guide to this year's best picture nominees

<http://www.guardian.co.uk/film/interactive/2011/feb/21/oscars-2011-best-picture-nominations-interactive-guide>

Guardian. Inflation in the UK.

<http://www.guardian.co.uk/business/interactive/2009/mar/24/rpi-inflation?intcmp=239>

Guardian. The World's Economy Turns the Corner.

<http://www.guardian.co.uk/business/interactive/2010/jan/26/recession-gdp>

Miscellaneous

Aaron Koblin. Personal website with work.

<http://www.aaronkoblin.com/work.html>

Jeff Heer. Seneus.

<http://vis.stanford.edu/papers/senseus>

Stamen. MTV Video Music Awards.

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Simon Rogers. Data journalism at the Guardian: what is it and how do we do it?

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GapMinder

<http://www.gapminder.org>

Gapminder. Human Development Trends 2005.

<http://www.gapminder.org/downloads/human-development-trends-2005/>

People Movin

<http://peoplemov.in/>

Visual Complexity. Football Drawings.

http://www.visualcomplexity.com/vc/project_details.cfm?id=452&index=452&domain

Dan Archer. Nisoor square shootings of 2007

<http://www.cartoonmovement.com/icomic/11>

LINKS 3

BGOV

BGOV. Federal Programs on Debt-Limit Bubble

<http://about.bgov.com/2011/07/12/august-invoices-show-u-s-treasury%20%99s-limited-choices/>

BGOV. Hospitals Wary of Data Breaches Seek Cyber Insurance From AIG

http://www.bgov.com/news_item/4D53U6teO2rko9nUq8XDoQ

BGOV. Medicare-Medicaid Costs \$1.5 Trillion by 2020: Chart of the Day.

http://www.bgov.com/news_item/XwqMzluxD58Dh0n6lp8WA

BGOV. Kentucky Bourbon's Seoul Appeal May Rise With Trade Agreement.

http://www.bgov.com/news_item/PtRA9_pVGxAHjVVsjZev_g

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http://www.bgov.com/news_item/On7zzjnP-22zll6mQUEigw

BGOV. Tea Party Debt Deal Opponents Gain From U.S. Awards.

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BGOV. August Invoices show Treasury's Limited Choices.

<http://about.bgov.com/2011/07/12/august-invoices-show-u-s-treasury%20%99s-limited-choices/>

BGOV. Dodd-Frank One Year Later: The Key Players

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Businessweek. The Credit Boom's Best and Worst Deals.

http://images.businessweek.com/mz/10/34/1034mergers47.pdf?chan=magazine+channel_news++markets+%2B+finance

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http://images.businessweek.com/mz/10/34/1034endorsements22.pdf?chan=magazine+channel_news++companies+%2B+industries

Bloomberg Interactive Insights. America tied up by debt record.

<http://www.bloomberg.com/insight/america-tied-up-by-record-debt.html>

Businessweek. How to save Greece.

http://www.businessweek.com/magazine/content/11_27/b4235000567802.htm

Businessweek. The Big Apple is Recovering its Shine.

[http://images.businessweek.com/mz/10/34/1034therecover11.pdf?chan=magazine+channel_news++global+economics](http://images.businessweek.com/mz/10/34/1034thereccovery11.pdf?chan=magazine+channel_news++global+economics)

Businessweek. Problem? What Problem?

http://www.businessweek.com/magazine/content/11_26/b4234013596135.htm

Businessweek. Oil on Troubled Waters.

<http://images.businessweek.com/mz/10/34/1034oilbp53.pdf>



LINKS 4

The Washington Post

Washington Post. Obama's Calendar.

<http://projects.washingtonpost.com/potus-tracker/>

Washington Post. Spheres of Influence: The Bush Campaign Pioneers.

http://www.washingtonpost.com/wp-srv/politics/pioneers/pioneers_spheres.html

Washington Post. On the Map: On the Map: Five Major North Korean Prison Camps

<http://www.washingtonpost.com/wp-srv/special/world/north-korean-prison-camps-2009/>