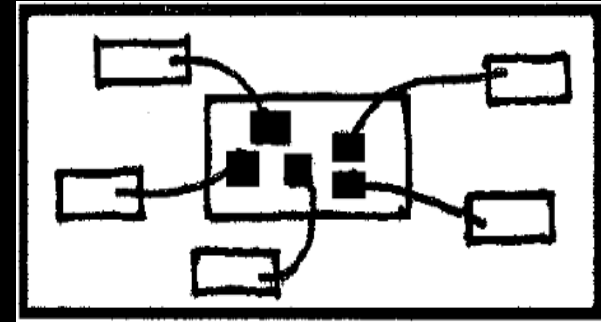
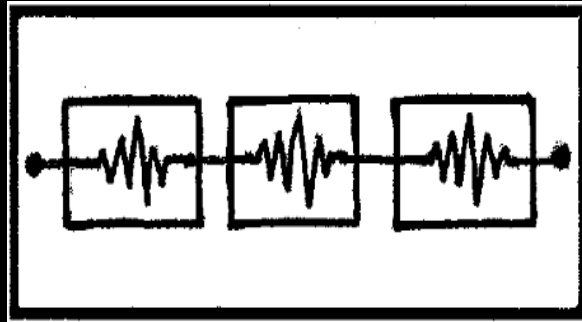
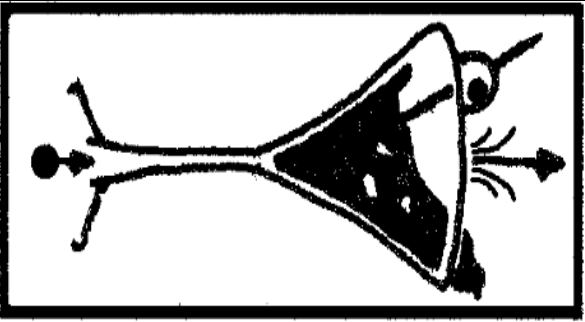


CSE 512 - Data Visualization

# 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:

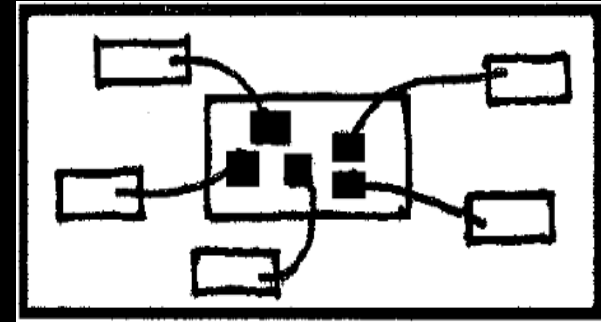
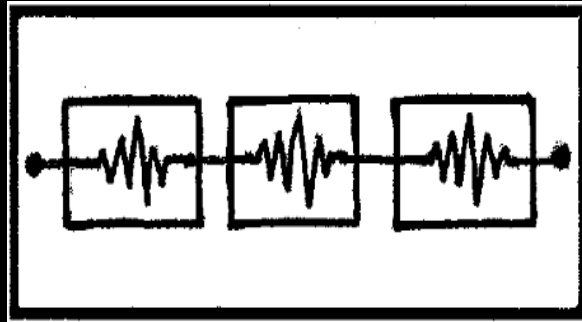
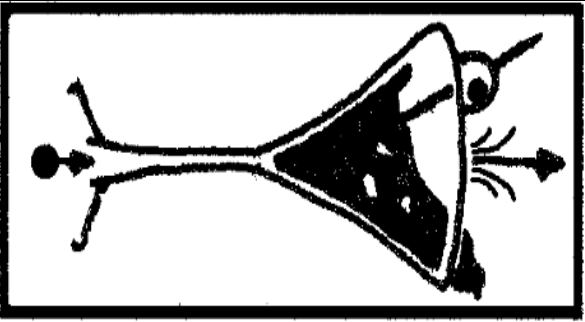
A survey of **related work** (references/URLs)

Your **schedule** for project completion



CSE 512 - Data Visualization

# Narrative Visualization

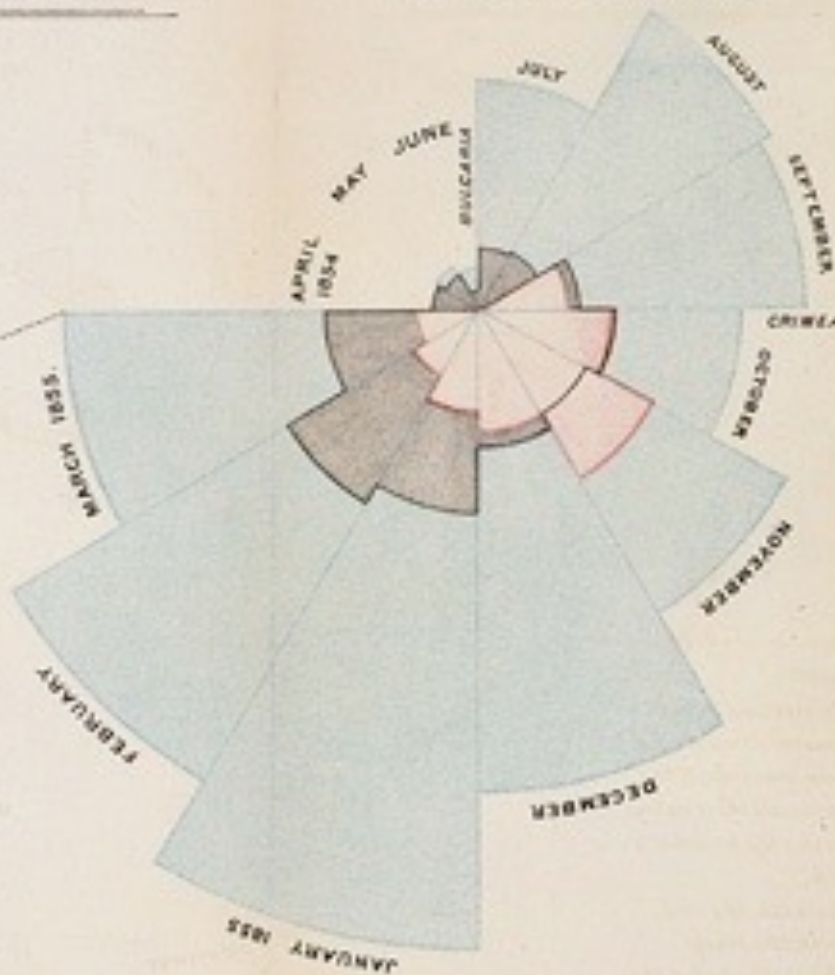


Jeffrey Heer [University of Washington](#)

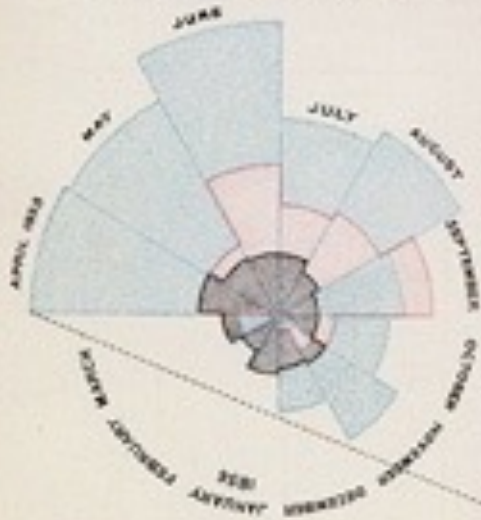
(with significant material from Edward Segel)

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

1.  
APRIL 1854 TO MARCH 1855.

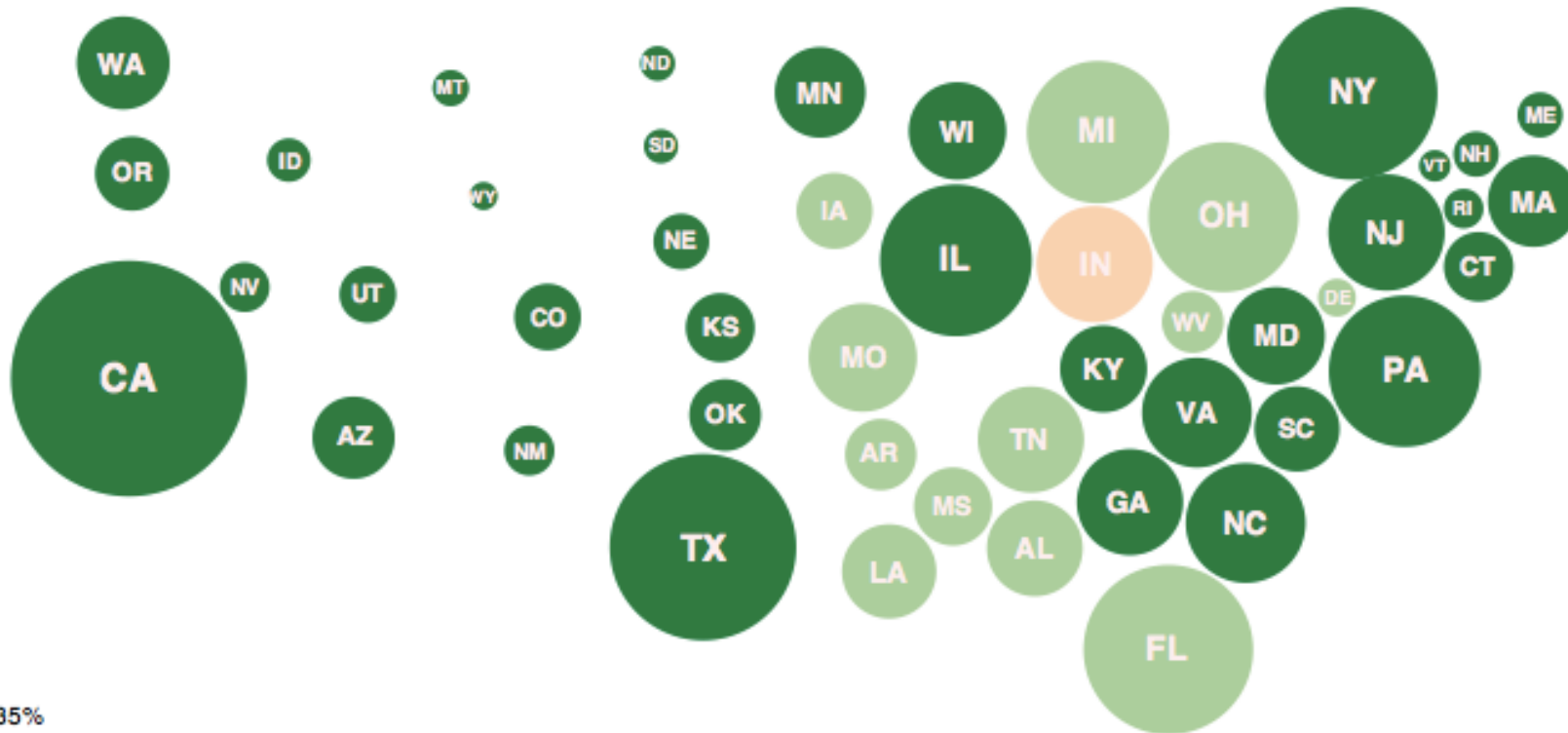


2.  
APRIL 1855 TO MARCH 1856.

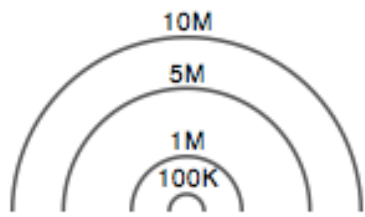


“to affect thro’ the Eyes  
what we fail to convey  
to the public through  
their word-proof ears”

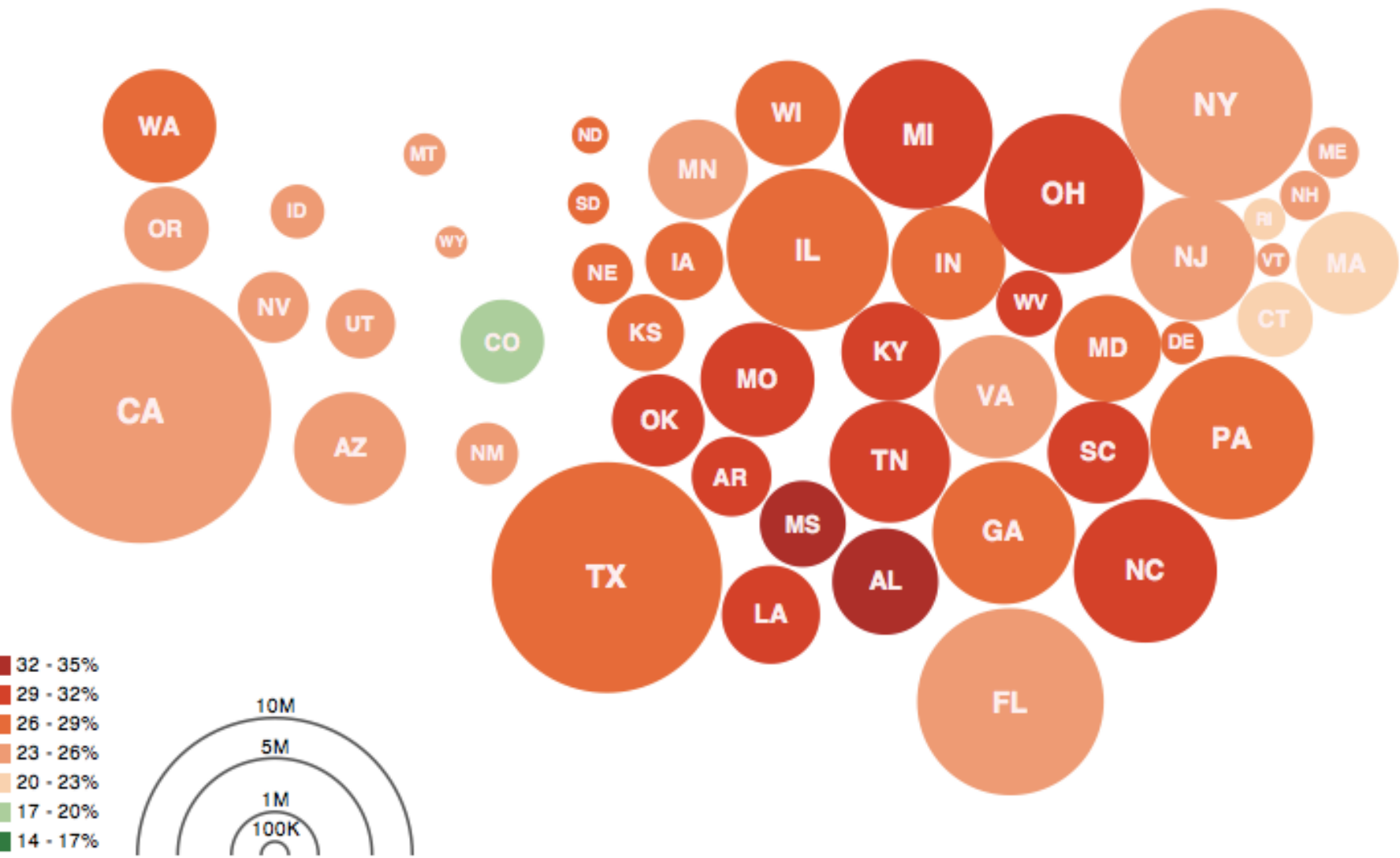
1856 “Coxcomb” of Crimean War Deaths, Florence Nightingale



- 32 - 35%
- 29 - 32%
- 26 - 29%
- 23 - 26%
- 20 - 23%
- 17 - 20%
- 14 - 17%



Obesity Map Vadim Ogievetsky



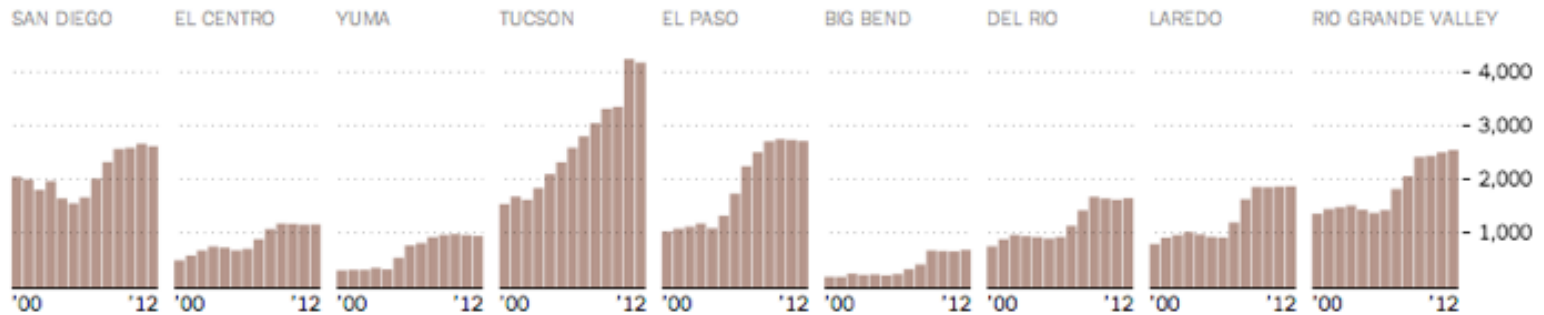
Obesity Map Vadim Ogievetsky

# 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.

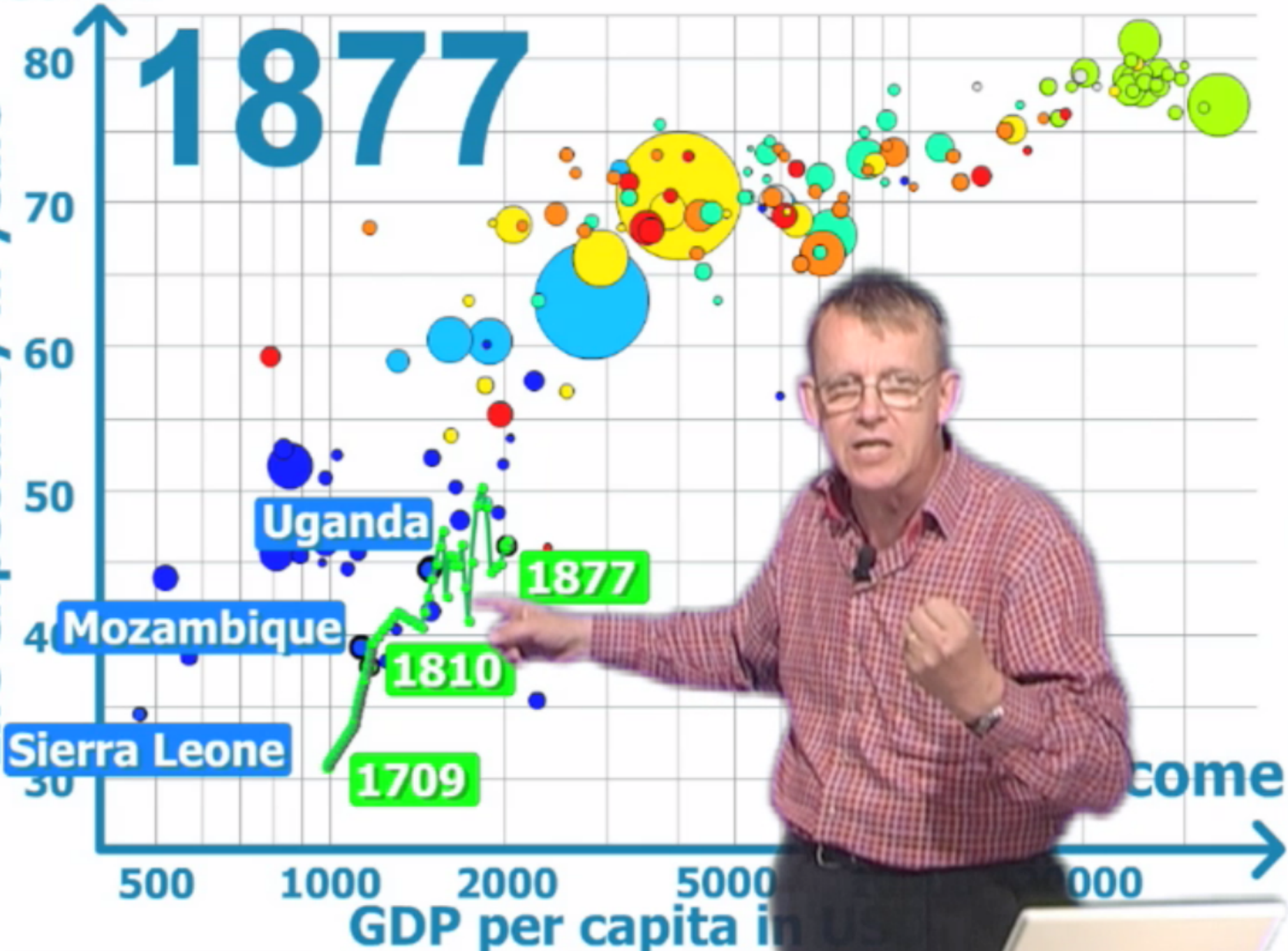




Health

Life expectancy in years

1877



Income

GDP per capita in US\$



Holograms?

Narrator

# **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

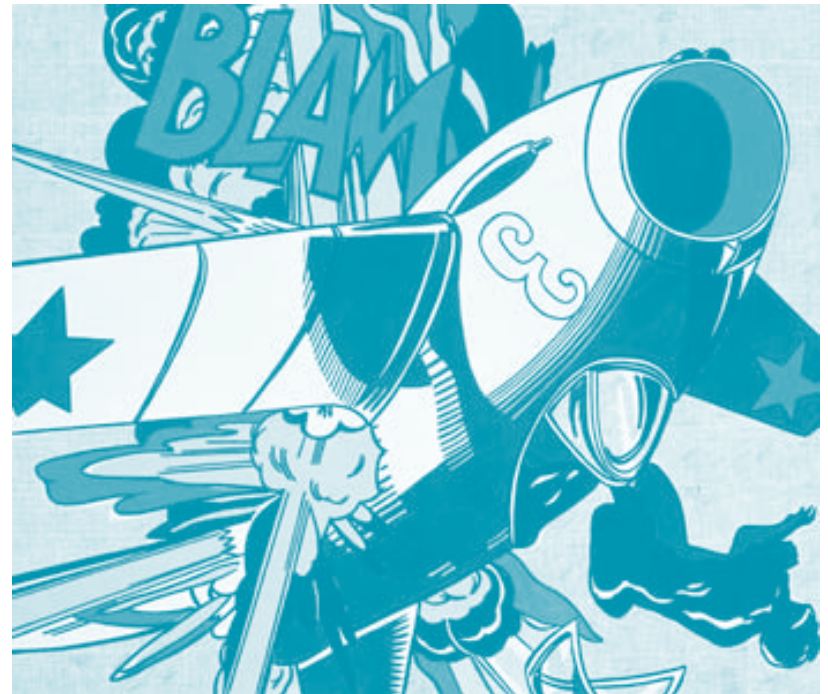
PEOPLE TELL STORIES

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.

August 26, 2010

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## Anecdotal Lead

August 26, 2010

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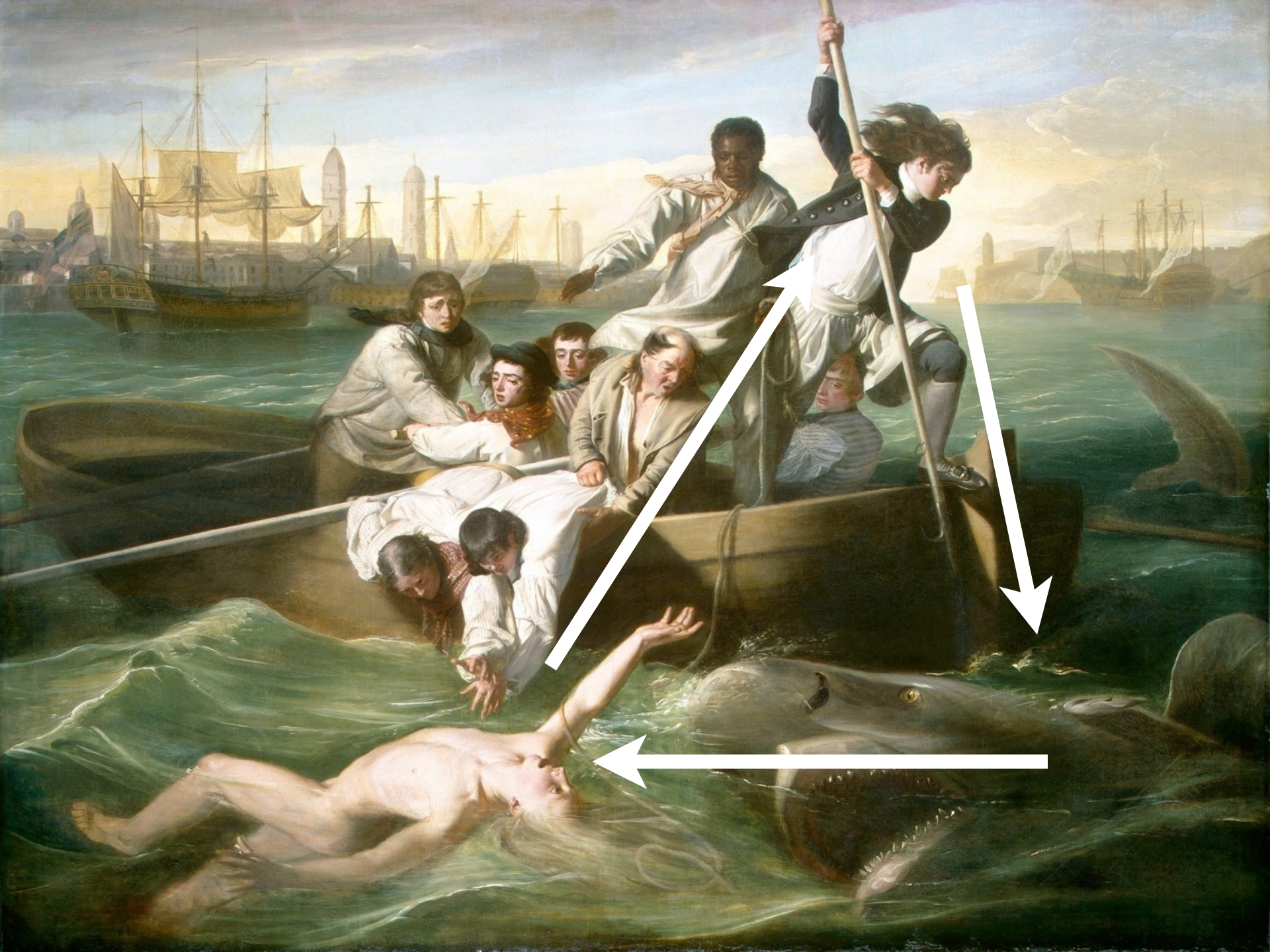
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## Nut Graph

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HOW CAN YOU  
TELL STORIES WITH  
DATA?



Privacy and the internet  
Lives of others

OWNERS OF THE INTERNET  
Techs look and Google face a backlash, from users and regulators alike, over the way they have handled sensitive data

**J**OHNNIE STOCOMIE, Canada's privacy commissioner, is in talks with Facebook in August over the social networking site's track record, agreeing to change its policies within a year to comply with the country's privacy law, says Ms Stodieck, the company appears to be coming up an important part of that deal, which included giving users a clear and easy-to-understand choice over whether to transmit data with third parties. "It doesn't seem to me that Facebook is going to be right to opt out of this issue," she says, fearing that, without a change of course, the firm could soon become the subject of another formal investigation by her organisation.

Facebook is not the only internet giant to provoke the ire of data watchdogs. Google endured scathing criticism this week following news that it had accessed some personal communications sent over unsecured Wi-Fi data networks in homes and offices in some 30 countries. On May 17th Peter Schaar, Germany's federal commissioner for data protection, called for an independent investigation into Google's behaviour, claiming that it had "deeply disrupted normal rules in the development and usage of software."

The cases highlight rising tension between guardians of privacy and internet firms. And they reflect concern among web users about how private data are made public. Several government interven-

ty in such as Cory Doctorow, a science-fiction author, and Iain Stewart, a politician, have abandoned Facebook. Since such as Quora's founder, Douglas, is suing others to force, including May 2nd a mass Facebook "boycott".

This is unlikely to stop the momentum of Facebook, which is poised to claim half a billion members and which drove even more visitors as a whole to its site last year. Firm revenues have been raised at the company's headquarters in Menlo Park, where bosses are reading up on how to respond. Several online folk are now hinting that Facebook will soon roll out stronger privacy controls to make it easier to keep more data hidden. MySpace, a rival, is already making its controls stricter to an extent to woo disaffected Facebookers to its service.

A revolt over Facebook's handling of privacy has been brewing for some time. In December the social network changed the default settings on its privacy controls so that individuals' personal information would be shared with "everyone" rather than selected friends. Facebook argued this reflected a shift in society towards greater openness and noted that users could still adjust privacy settings back again. But frustrated privacy activists lobbied hard to be reversed.

The switch should not have come as a surprise. Early on, many social networks

Also in this section

- 68 Spring companies
- 80 The recovery of General Motors
- 86 Business crime in China
- 70 Italian retail
- 70 Japan's drug firms are the model
- 74 Brazil's tabacaria
- 74 Schumpeter: Duernstetzel

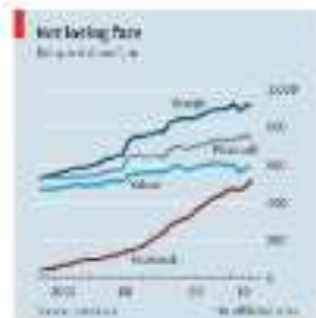
For daily analysis and news on business, visit [economist.com/business-forecast](http://economist.com/business-forecast)

reportedly to tough privacy policies in order to attract and retain users. But as more joint controls are gradually loosened to encourage more sharing. As people share more, Facebook can increase the traffic against which it sells advertising. And the more it learns about users' likes and dislikes, the better it can target ads that generate hundreds of millions of dollars.

Privacy groups have still following a developers' conference last month at which Mark Zuckerberg, Facebook's boss, announced yet another series of policy changes. One that raised irritation was an "instant personalisation" feature that lets remote third-party websites access Facebook data when people visit. Critics say that Facebook has made it risky to disable this feature, which may explain why its similar facilities are rare.

European officials are questioning both Facebook's use. This month a group of data-protection experts who advise the European Commission wrote to the social network, calling its default settings "unacceptable" and asking it to

small support afterthought boring?





Published: February 2, 2010

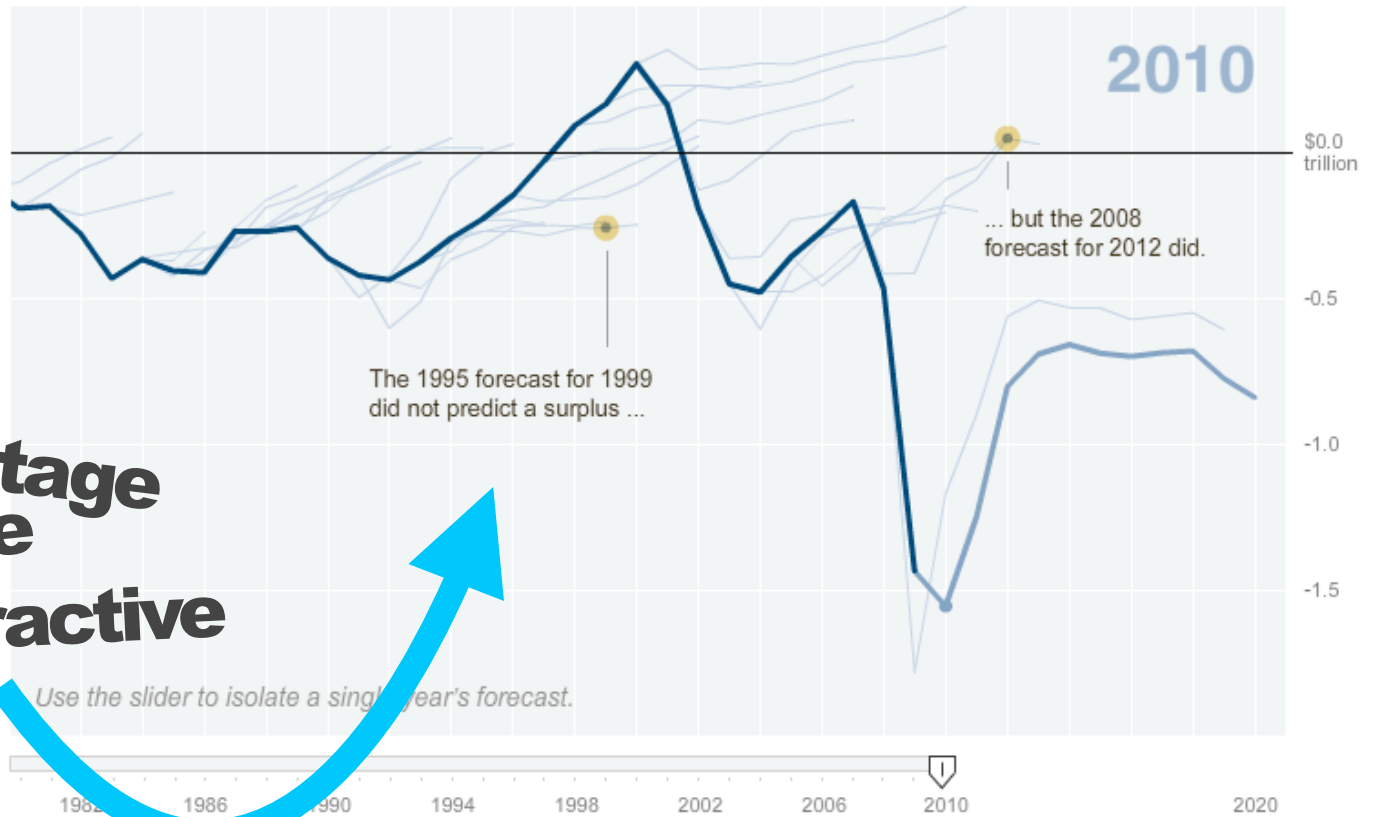
# Budget Forecasts, Compared With Reality

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



- 1 Income
- 2 Regions
- 3 Poverty
- 4 Health
- 5 Countries
- 6 Differences
- 7 Trends
- 8 Gaps
- 9 Deaths

English translation: Claes Johansson, UNDP

Start

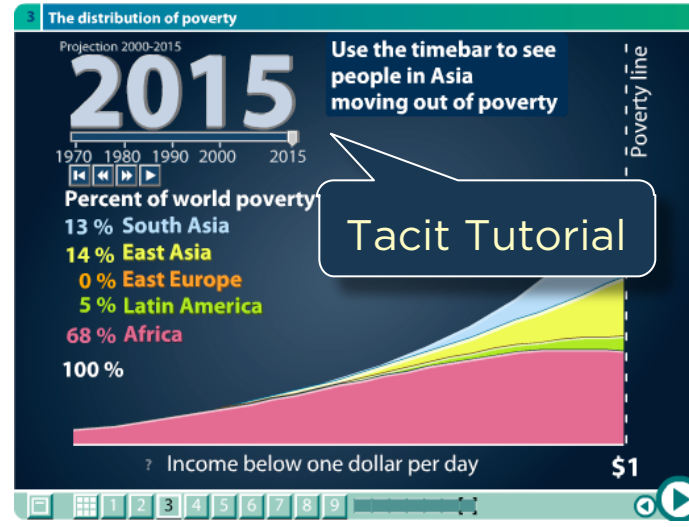
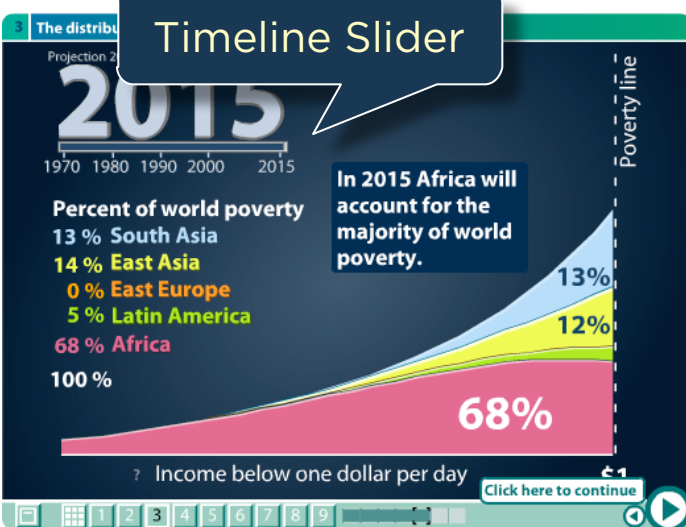
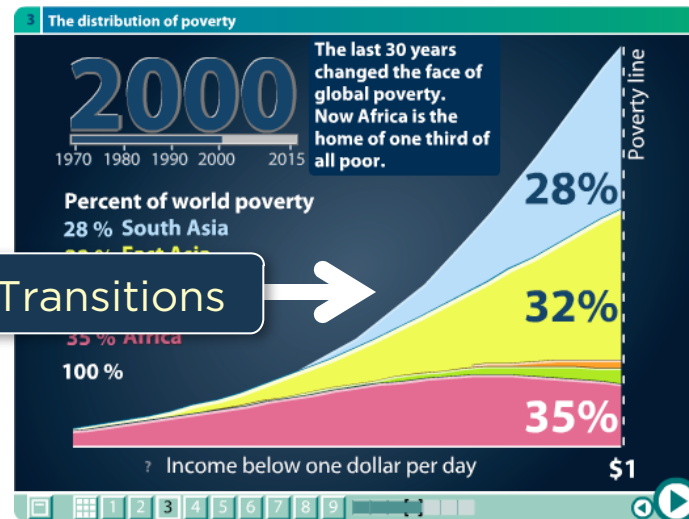
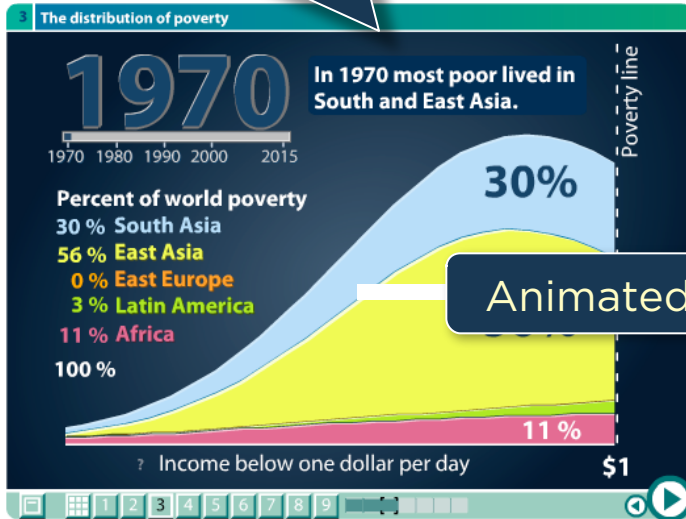


- English
- Dansk
- Portuguese
- Suomi
- Français
- Deutsch

Progress Bar

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

Consistent Visual Platform

Introductory Text

by [Tony Ridley](#) and [Carly Lev](#)  
Wednesday 24 March 2010 15:00 GMT

## Smith and Fulham



**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%

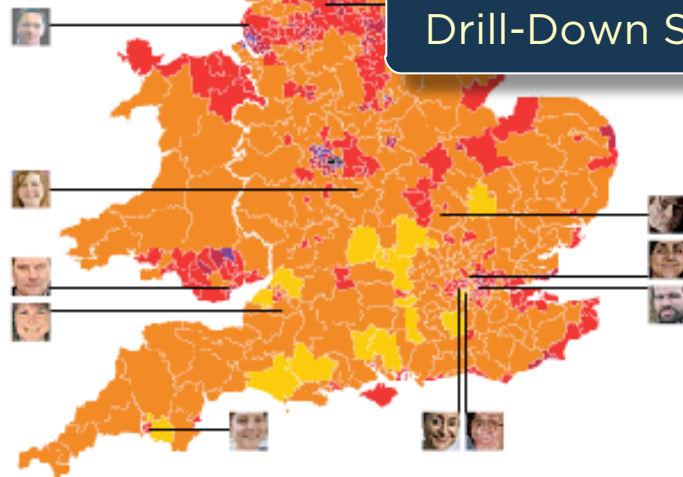
4 - 5.99%

6 - 7.99%

8 - 9.99%

10% and above

Drill-Down Story



**THE**

**NARRATIVE**

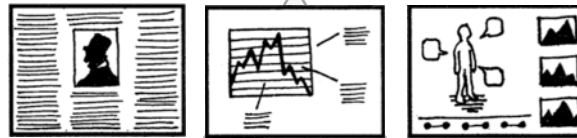
**FRAMEWORK**







# 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

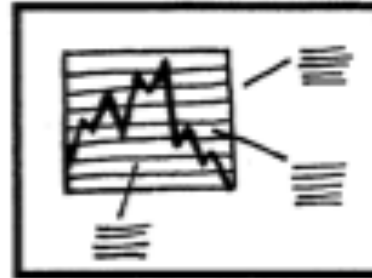
## Interactivity

MORE

## Seven Genres



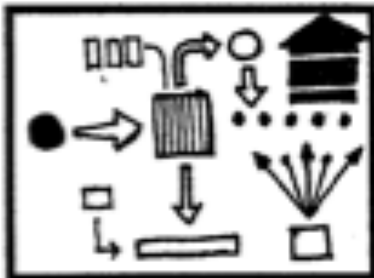
Magazine Style



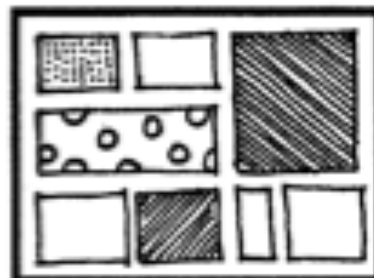
Annotated Chart



Partitioned Poster



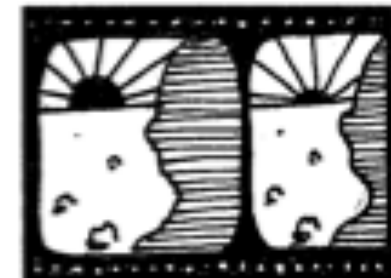
Flow Chart



Comic Strip



Slide Show



Film/Video/Animation

# Genres for Narrative Visualization

# Genres + Interactivity + Messaging =

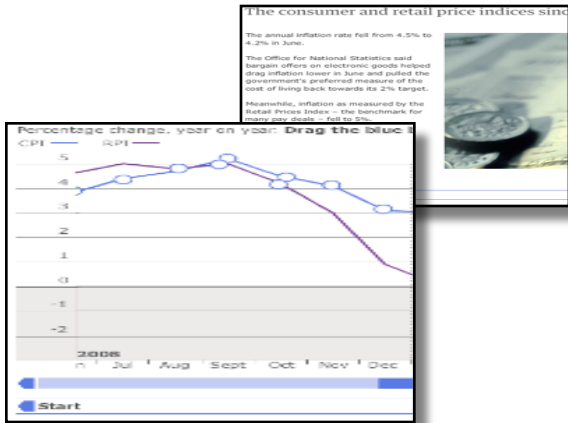
# DESIGN SPACE

STORYTELLING  
CLARITY  
SPEED

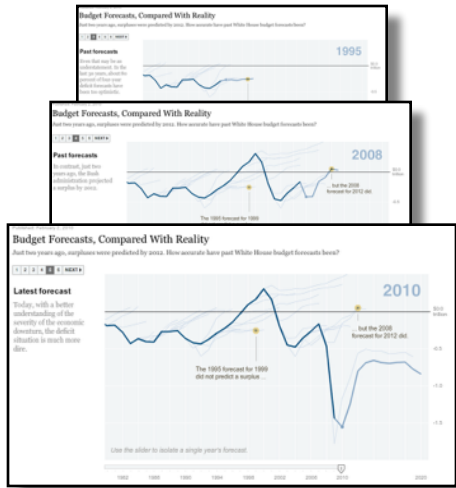
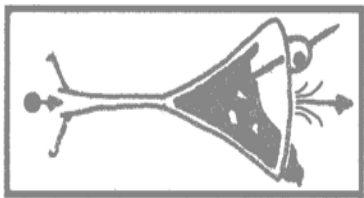
**Author Driven**  
strong ordering  
heavy messaging  
limited interactivity

**Reader Driven**  
weak ordering  
light messaging  
free interactivity

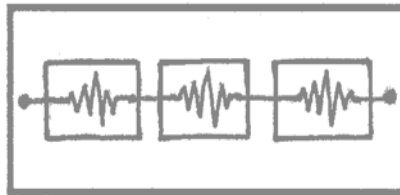
ASK QUESTIONS  
EXPLORE  
FIND



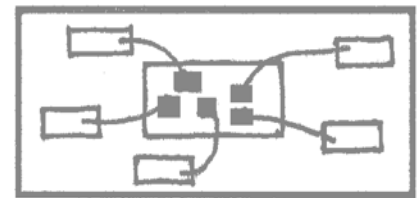
martini glass

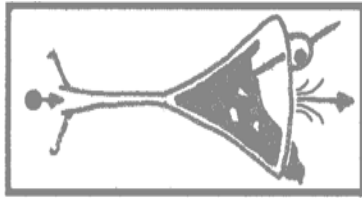


interactive slideshow



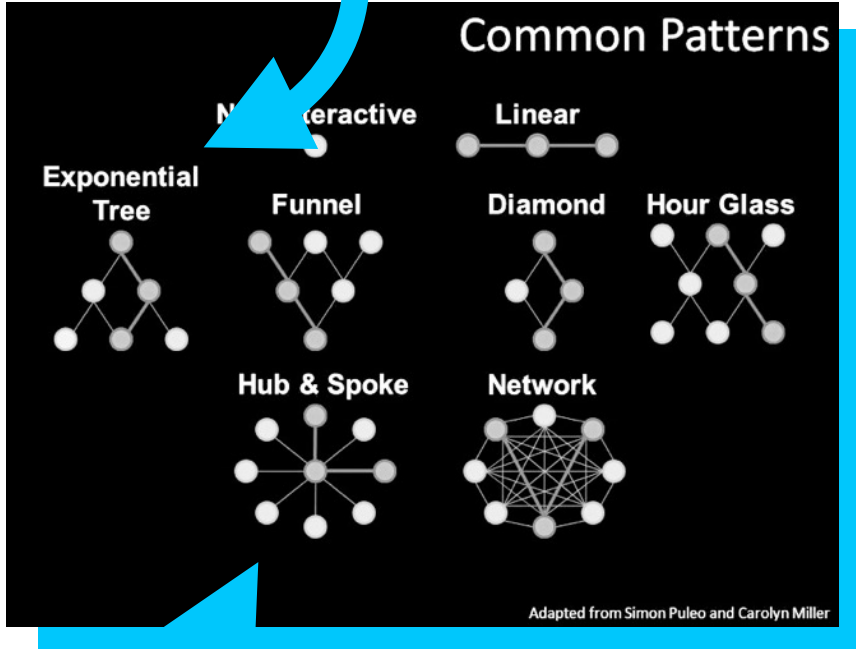
drill-down story



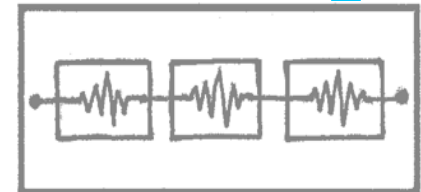
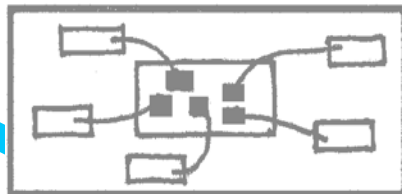
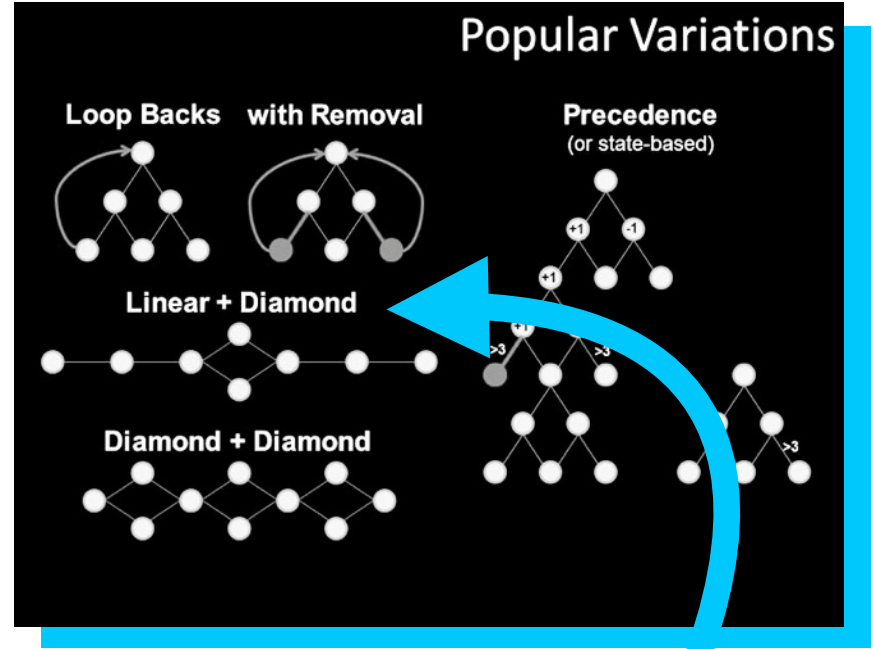


(more patterns)

### Common Patterns



### Popular Variations



**THE**

**DESIGN**

**CATALOGUE**

**Guide.**  
**Highlight.**  
**Interpret.**





**VISUAL DESIGN**  
show

**MESSAGING**  
tell

**INTERACTIVITY**  
engage

**VISUAL DESIGN**  
show

**MESSAGING**  
tell

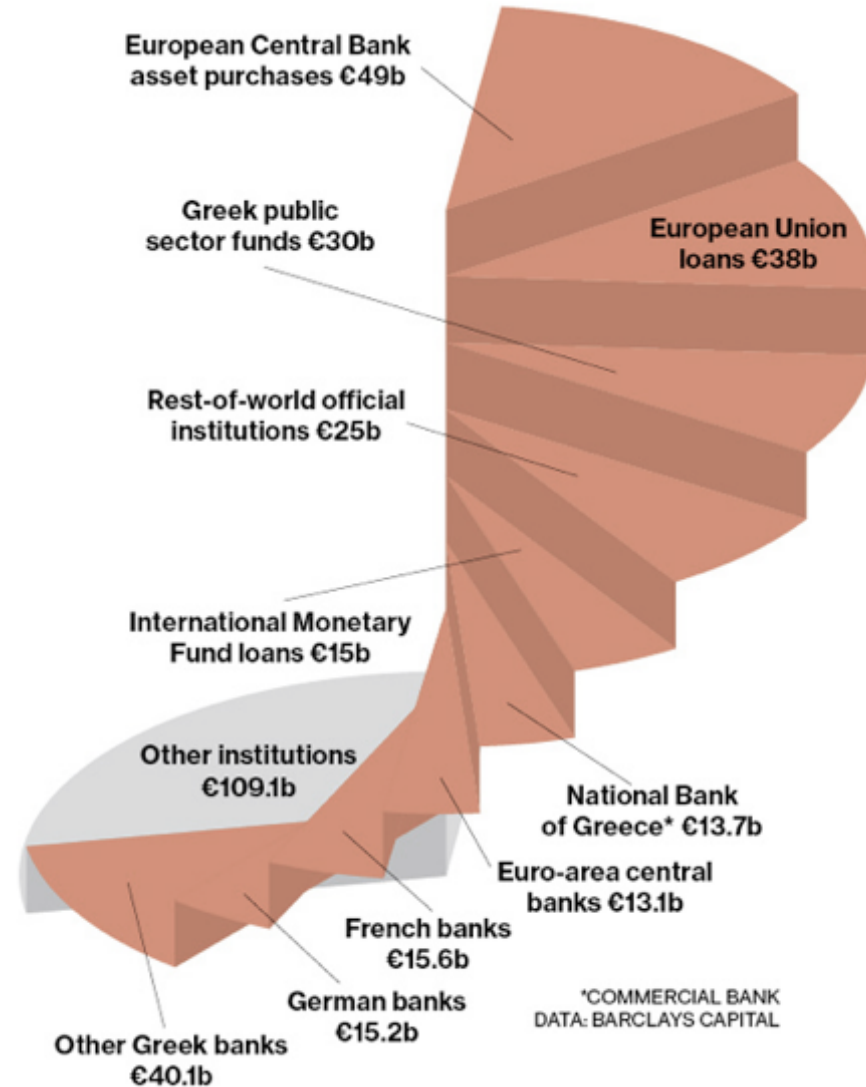
**INTERACTIVITY**  
engage



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

## Who Owns Greece's Debt?

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



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.

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**

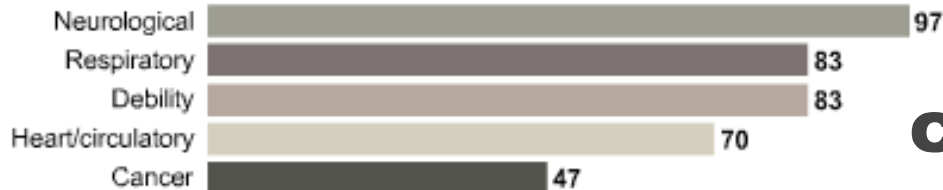


Avoid “chart junk” (Tufte).  
Extra marks  
distract from the  
data.

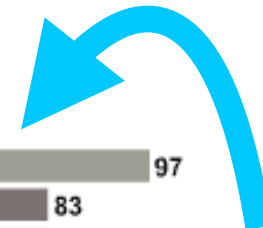
**better**



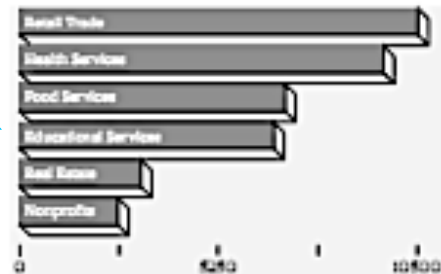
Rank	Country	Alcohol consumption	Total quarts
1	Republic of Moldova	4.5	14.6 19.3'
2	Czech Republic	3.8	13.6 17.4
3	Hungary	3.2	14.0 17.2
4	Russian Federation	7.3	9.4 16.7
5	Ukraine	5.5	11.0 16.5
6	Estonia	9.7	6.7 16.5'
7	Andorra	3.3	13.0 16.4'
8	Romania	4.4	11.8 16.2
9	Slovenia	1.4	14.6 16.1'
10	Belarus	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.

**World Population: 6,853,328,460**  
**Migrants in the world: 215,738,321**

Almost 216 million people, or 3.15% of the world population, live outside their countries.

Click on a country box to know more about migration flow to/from that country.

click a box

where?

## Human Development Trends 2005



Interactive presentation of some of the messages in the Human Development Report 2005

English  
Dansk  
Portuguese  
Suomi  
Français  
Deutsch

Produced in collaboration with: **GAPMINDER**  
www.gapminder.org

English translation: Claes Johansson, UNDP

1 Income  
2 Regions  
3 Poverty  
4 Health  
5 Countries  
6 Differences  
7 Trends  
8 Gaps  
9 Deaths

Start

**POTUS Tracker**  
Analyzing Obama's schedule

ANALYSIS CALENDAR View Event List By: ISSUE TYPE ATTENDEES LOCATION

Every day President Obama meets with key members of his administration, Congress, foreign dignitaries, interest groups and regular citizens. Use our interactive database to track how Obama is spending his time, what issues are getting the most attention and who is influencing the debate. Subscribe to daily schedule via RSS.

2009 2010 2011

J F M A M J J A S O N D J F M A M J J A S O N D J F M A

Matching Events **2131**

FILTERS  Use all filters

**ISSUES DISCUSSED**  
Select: All None

- ✓ 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)

BOXES SIZED TO NUMBER OF EVENTS

2009 Foreign Policy 2010 2009 2009 Defen

### 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.

On Davis's mechanics:

"After you push out to the side, you want to make sure you don't use a lot of effort and energy to bring that foot back underneath you.

"The higher you raise it up off the ice, the more energy you have to expend. So you want to make sure that foot **stays close to the ice without really scraping the ice**, cause scraping the ice will also slow you down."

By Graham Roberts, Bedel Sager and Michael W. Schmidt | Send Feedback

The more linear, the more like a story.

Stories have a beginning, middle, and end.

### 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.

On how Davis's body is built for skating:

"He's got very long legs — his femurs are especially long — so his **morphology** really fits into the sport of skating.

"He stays **very low to the ice**, which means that his frontal resistance ... is very low. And so the wind resistance that he has to overcome is minimized."

### 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 >

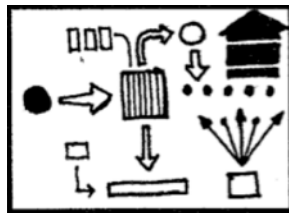


**Eric Heiden**, the American speedskater who captured five golds in 1980 and is now the doctor for the 2010 U.S. team, explains how Shani Davis uses turns to his advantage.

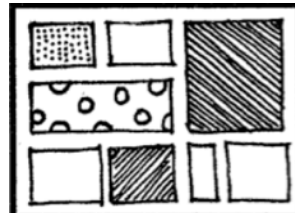
On building speed into the straightaway:

"If you watch Shani when he first enters the turn, his first few strokes the tempo is a little bit slower than when he leaves the turn.

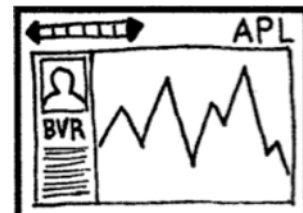
"And by the end of the turn his tempo has increased so that he can **maximize the ability to gain speed out of the turns**. ... As you watch as he enters the straightaway very often ... he continues with his turn strokes long into the straightaway."



FLOWCHART



COMICSTRIP



SLIDESHOW



## 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™

Consistent visual frameworks. Keep things tidy.

# The Social Network



Black Swan



The King's Speech



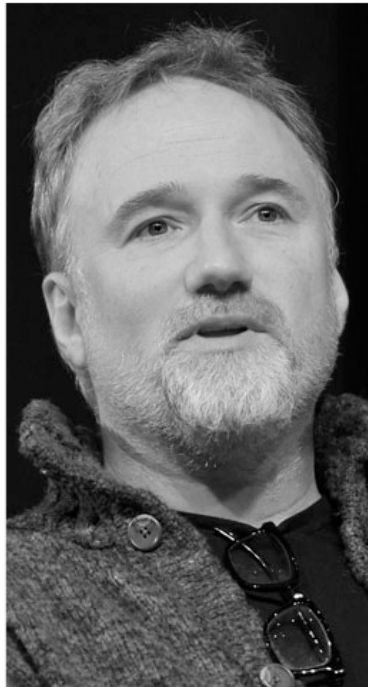
The Fighter



127 Hours



The Kids Are All Right



Guardian Review



Observer Review



Interview



Interview



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



Toy Story 3



The Social Network



True Grit



Inception



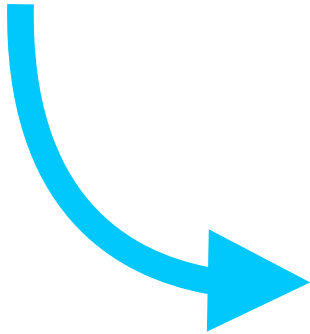
Winter's Bone



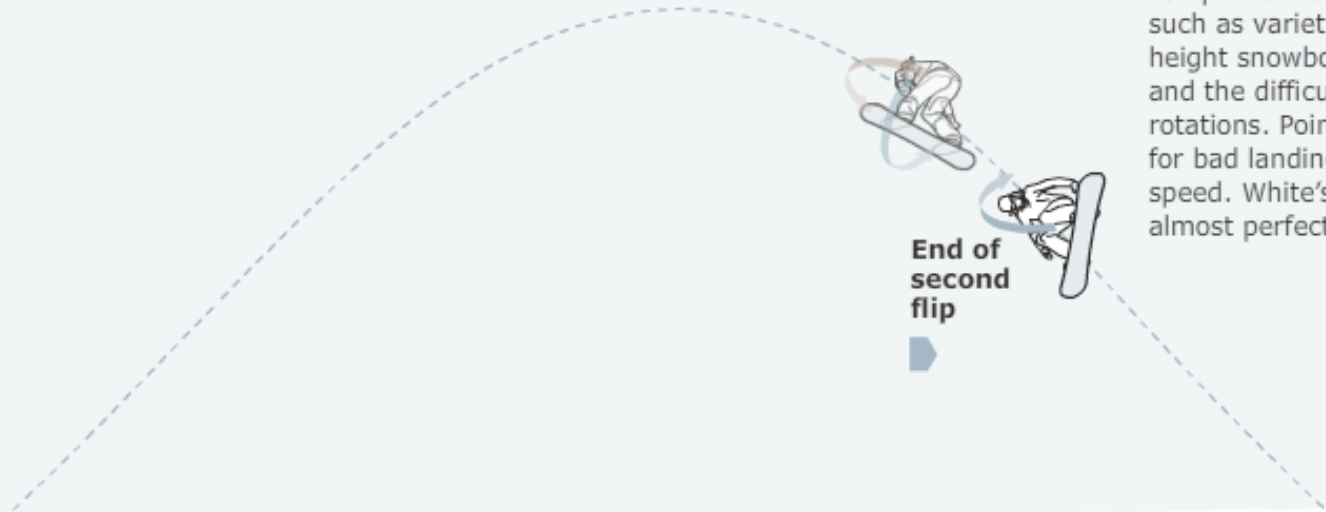
CONTINUED...

Consistent visual frameworks.

Keep things tidy.



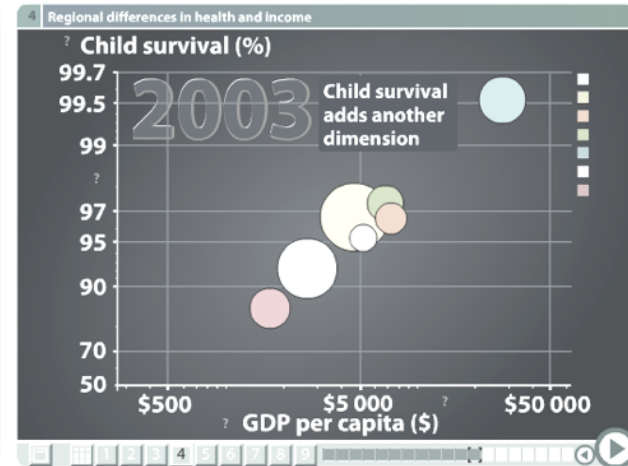
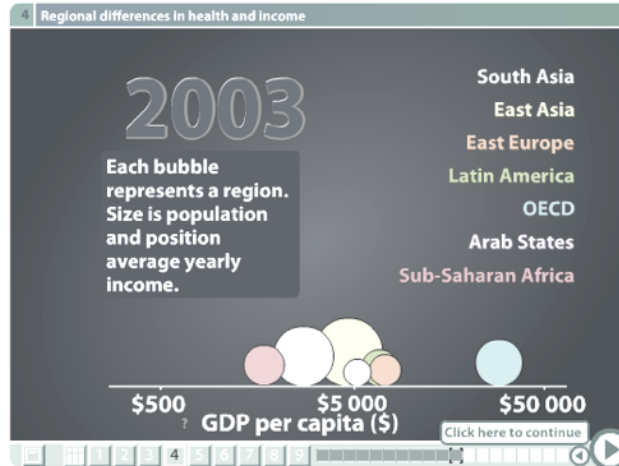
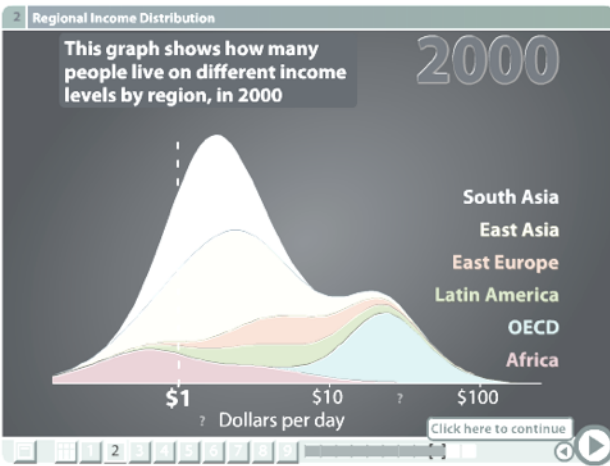
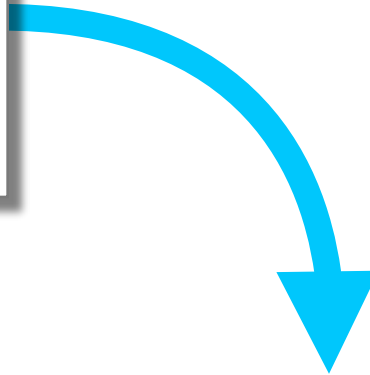
## The jump



End of  
second  
flip

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



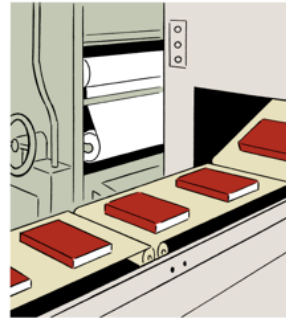
# Transitions Guidance

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

PRICE \$4.50

# THE NEW YORKER

FEB. 25, 2008



Use establishing shots.

Situate the viewer before diving in.

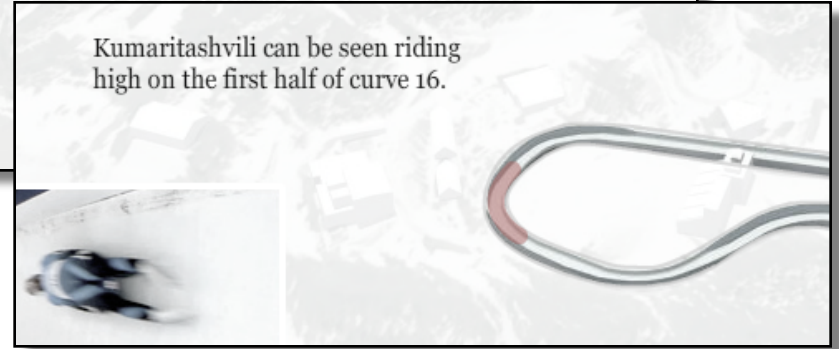
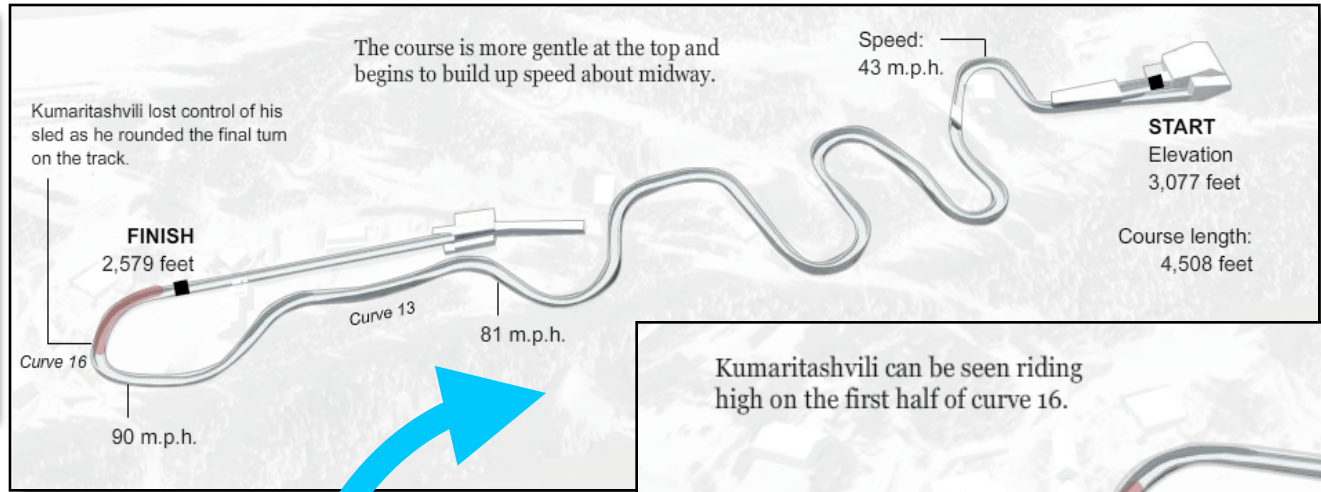




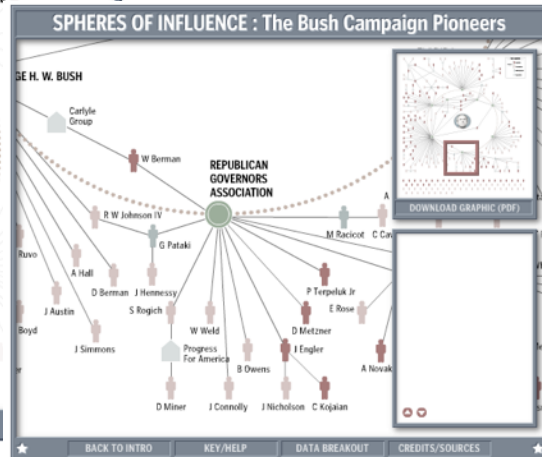
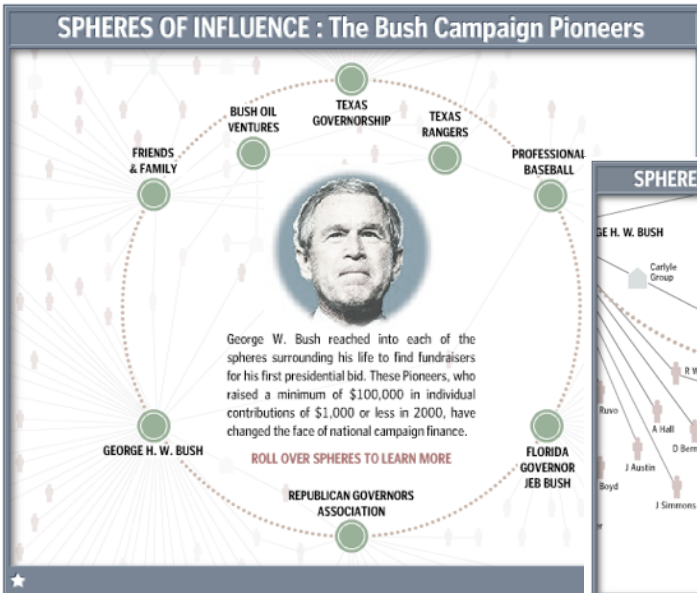
# CONTINUED...

Use establishing shots.

Situate the viewer before diving in.



good



bad

PRICE \$4.99

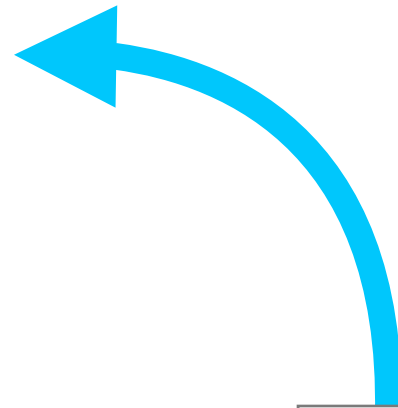
MAR. 20, 2006

# 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



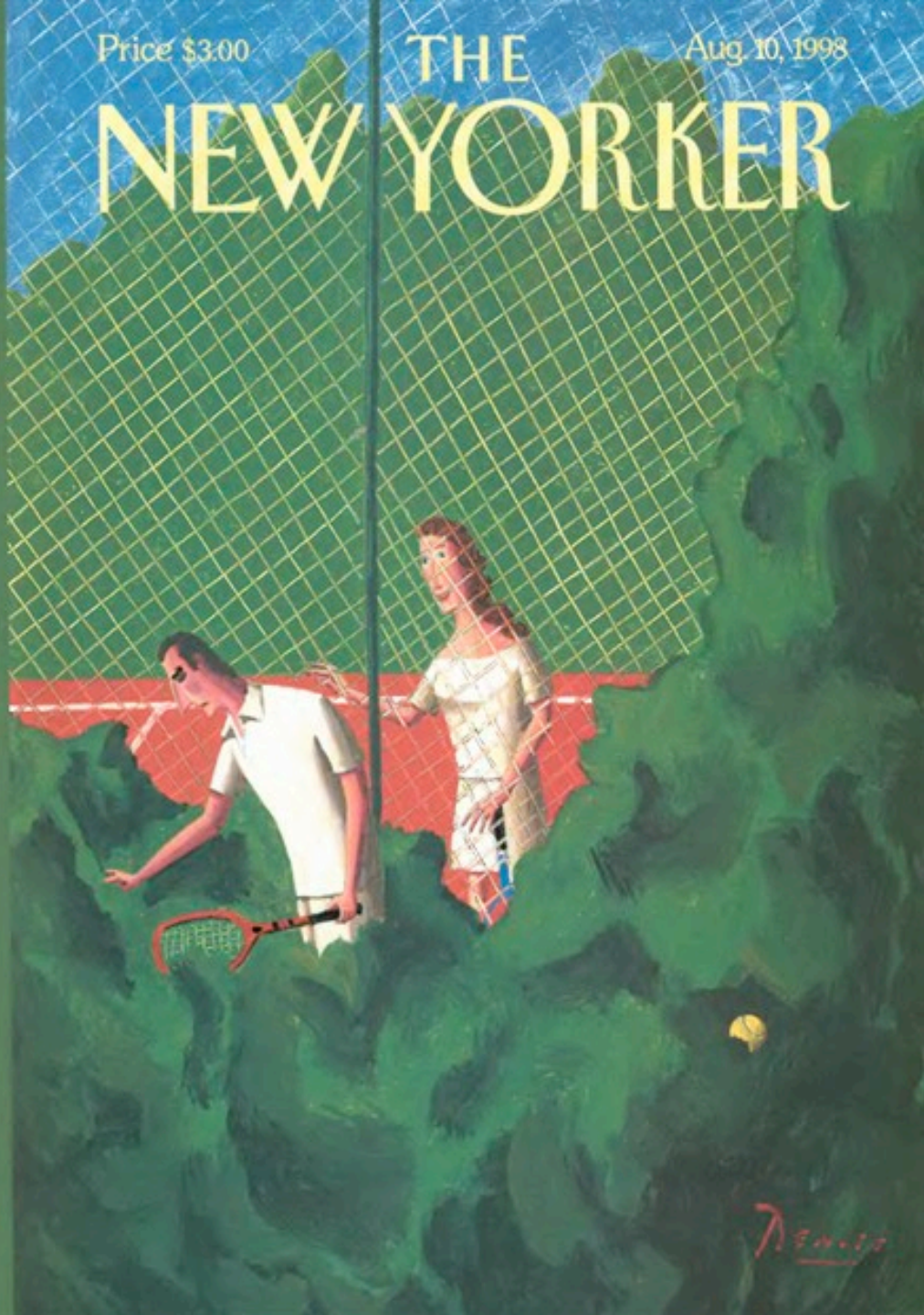
*alvise*



Price \$3.00

Aug. 10, 1998

# THE NEW YORKER



# 755

Grab attention with image and position



Line chart of cumulative home runs.

**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 516

Major on

According to a book, he began using steroids in the 1990s, league-wide later, he runs, su career p

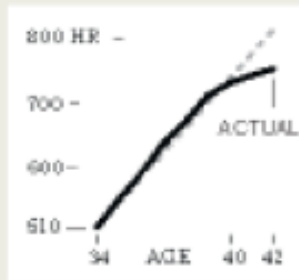
Reduced visual priority

## Homer Pace After Age 34

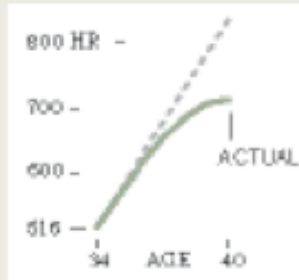
If the accusations are correct, Bonds was 34 in his first season on steroids. Here are projected home run paces for each player after age 34.

----- PROJECTED PACE BASED ON AVERAGE OF PREVIOUS FIVE SEASONS

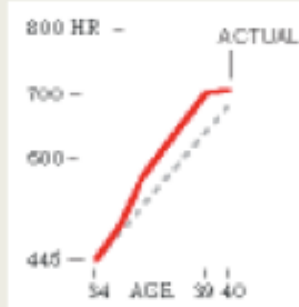
**Aaron**  
Actual homers slightly outpace projected homers for five seasons.



**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.

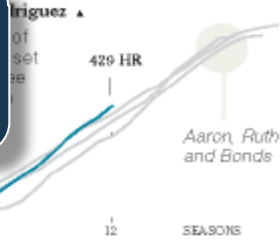


Note: Ages as of July 1 of each season.

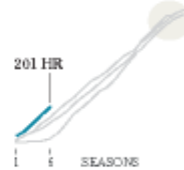
## Others Taking Aim



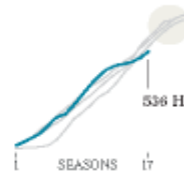
ence



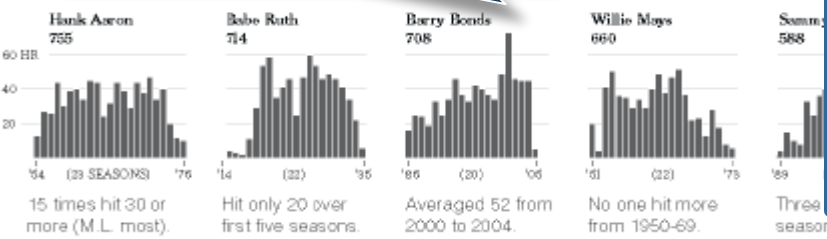
**Albert Pujols**  
Averaging 40 homers a season, he has started stronger than the three leaders did.



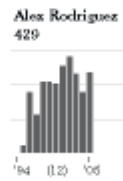
**Ken Griffey Jr.**  
Many thought he would be the first to catch Ruth and Aaron until injuries limited his output.



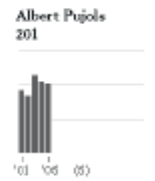
## Differing Paths to the Top of the Charts



(257th).



Youngest to reach 400 homers.



Second most ever in first five seasons.

# 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 Babe Ruth and 47 to equal Hank Aaron.

He needs only six more to tie Babe 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

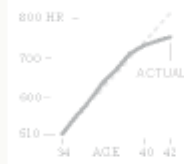
**Bonds takes lead**  
Home runs after 16 seasons  
Bonds 567  
Aaron 554  
Ruth 511

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.

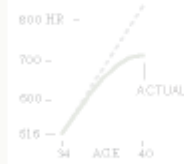
### Homer Pace After Age 34

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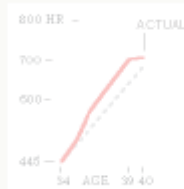
**Aaron**  
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**Ruth**  
Averaged 46.4 homers a season from age 30 to 34. Averaged 42.5 for next four seasons



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



Note: Aaron age of 14 in 1st graph season

### 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.



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

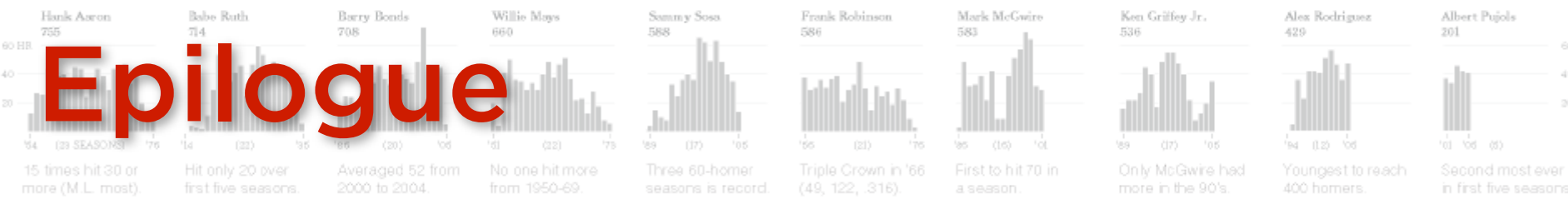


# Middle

# End

### 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

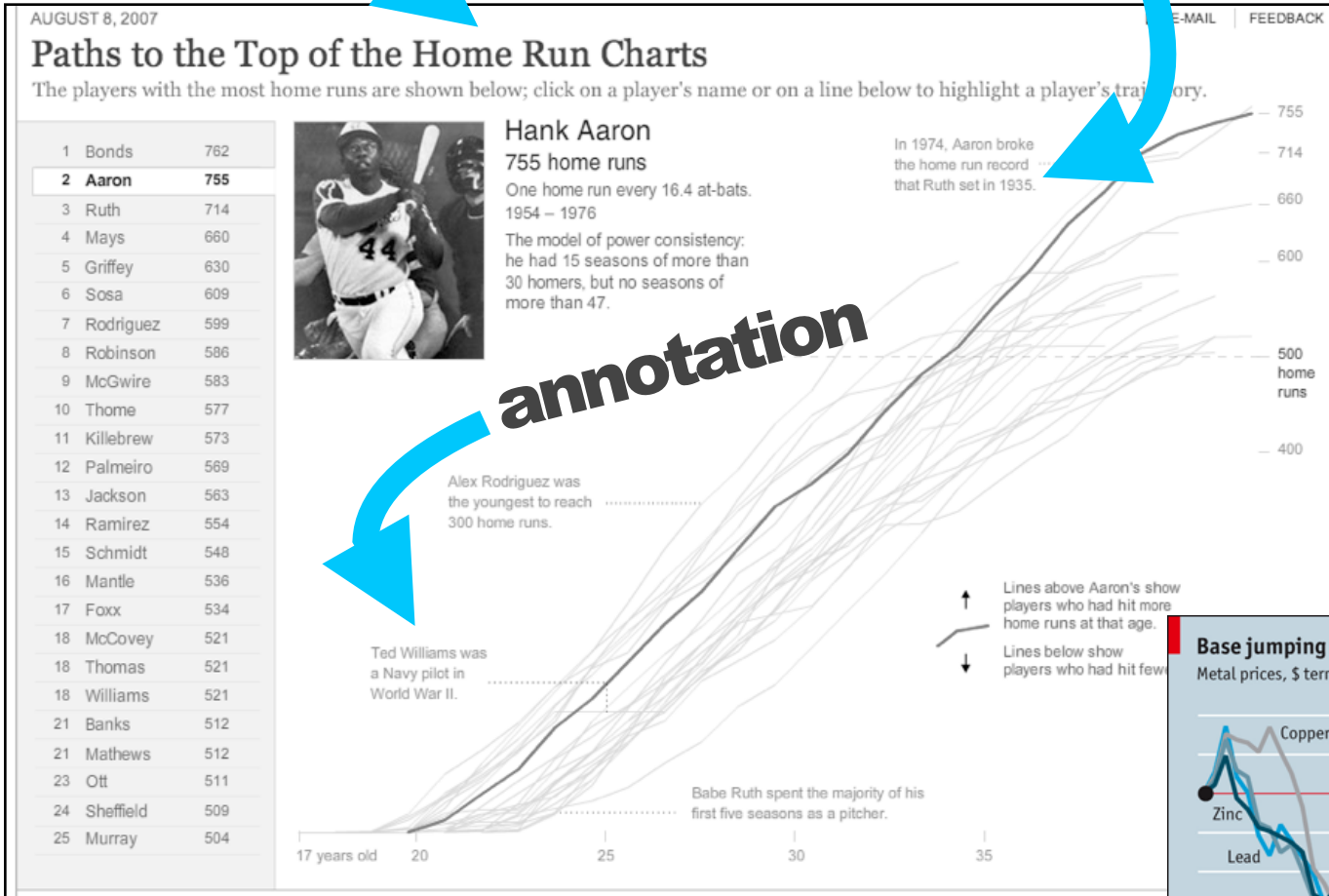
**INTERACTIVITY**  
engage



headline

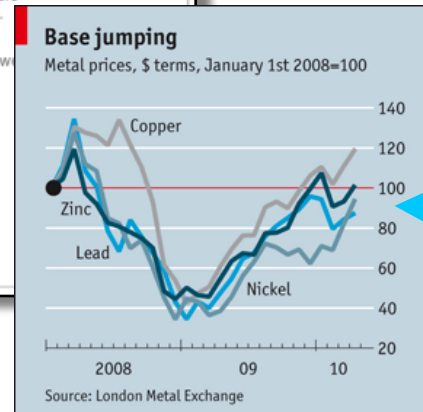
caption

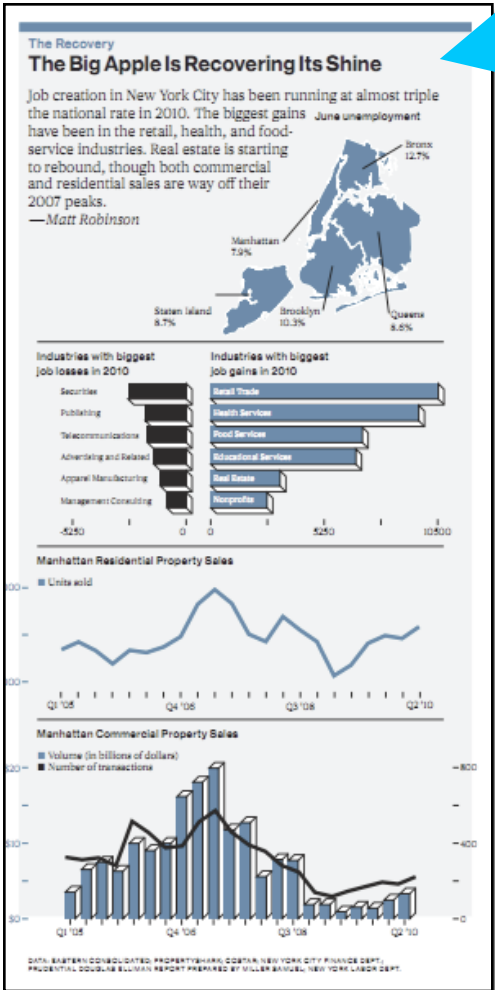
Use headlines, captions, & annotations. Quickly draw attention to what's important.



annotation

???





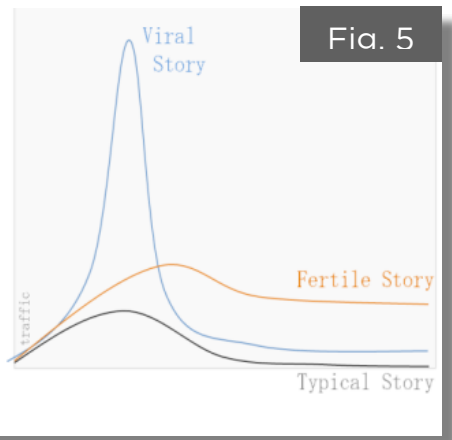
**isolated**

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

June 20, 2011

quire significantly more work than traditional news stories. To make this work economical, visualizations are often woven into stories that are either *persistent* or *viral* in order to generate traffic. **Persistent stories** cover “endemic themes” that maintain relevance over time (e.g., the economy, food economics, the housing market). Visualizations to persistent themes “fatten and elongate” news stories (which are already fatter and longer). During this slow-burn, these visualizations are supported by hundreds of stories over several months and they evolve. **Viral stories** achieve heavy traffic through unanticipated spikes of popularity. These stories tend to be about celebrity, personalities, or sensational news. To get the most bang for the buck, produce visualizations for editorial content that is either *persistent* 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.



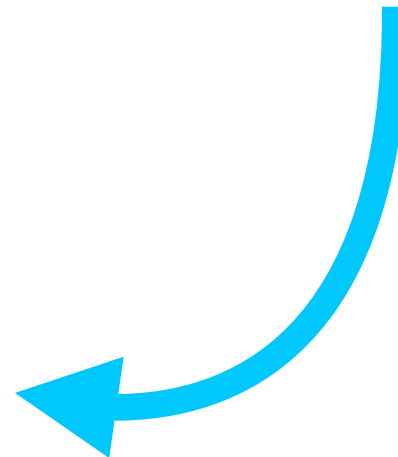
Women were paid less than men in every region, even when they had higher ratings and seniority.

But Wal-Mart's numbers showed their women fared better than elsewhere in the country.



**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

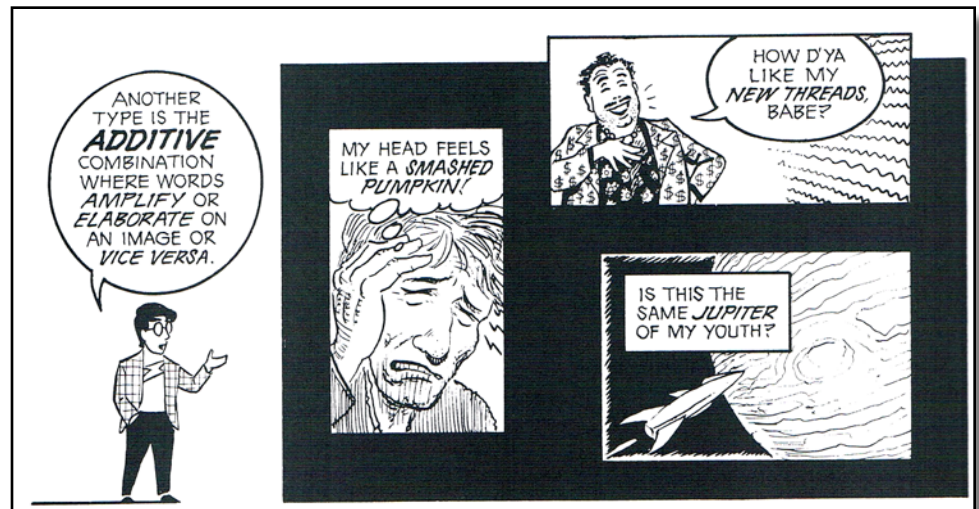
Word and pictures combine to convey an idea neither conveys alone

### Parallel

Words and pictures seem to be independent.

### Montage

Words and pictures combine pictorially.



### 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 \(135\)](#)

100 titles that were frequently rented from Netflix in 2009

Change how movies are sorted

[Previous](#)
[Next](#)
Most rented
Least rented
Most rented
Alphabetical
By metacore

#### Mad Men: Season 1: Disc 1

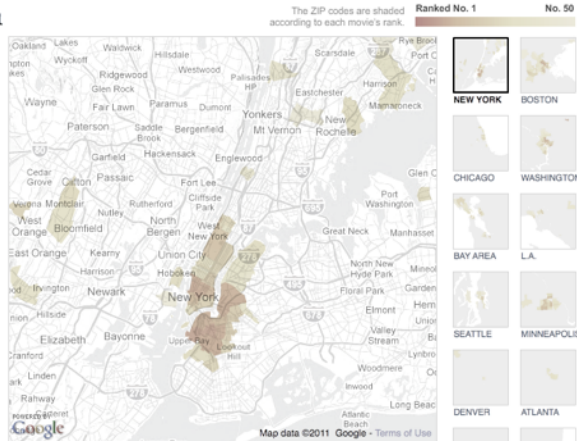


77

Metacritic score  
100 loved by critics, 0 hated

There were seven deadly sins practiced at the dawn of the 1960s: smoking, drinking, adultery, sexism, homophobia, anti-Semitism and racism. The magic of *Mad Men* is that it softly spoofs those cruel, antiquated mores without draining away the romance of that era: the amber-lit bars and indigo nightclubs, soaring skyscrapers, and the brash confidence that comes with winning a war and owning the world.

[Read Rest of NYT Review >](#)



Sources: Netflix provided data on the top 50 rentals in 2009 in each ZIP code. Titles are listed in the approximate order of popularity across selected metropolitan areas. Metacores are from metacritic.com.

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	<b>20,000</b>	acres
Atlantic	<b>110,000</b>	acres

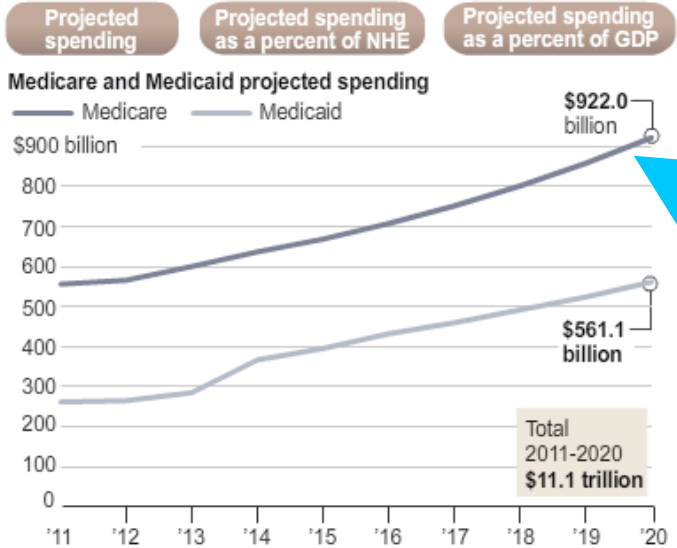
Mind your precision.

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

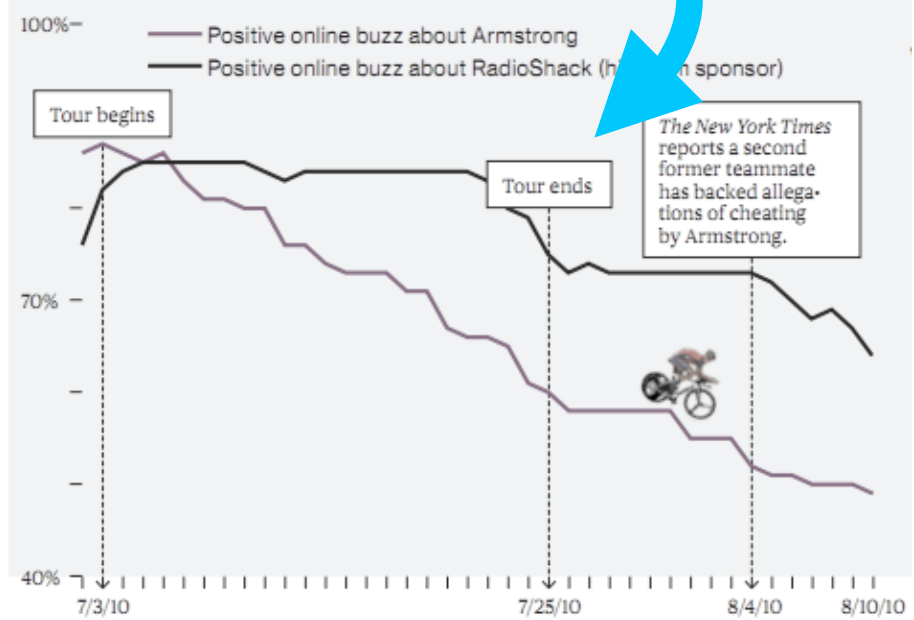
Bloomberg GOVERNMENT

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

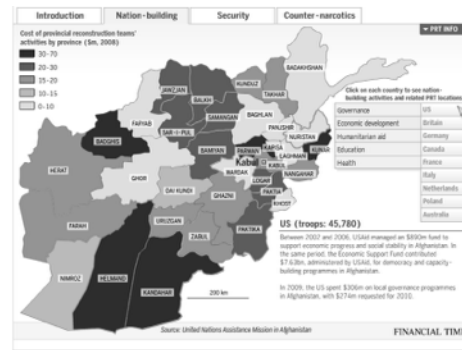
**MESSAGING**  
tell

**INTERACTIVITY**  
engage

Interactive features should scream interactivity. Avoid a click-and-seek experience.

**Be explicit.**

Click here.



live outside their country

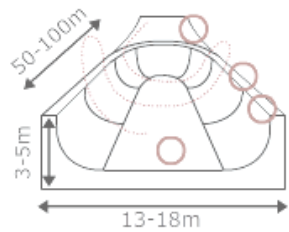
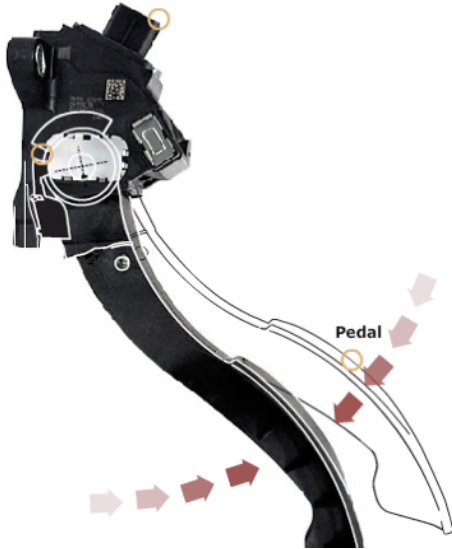
Click on a country box to to/from that country.

click a box

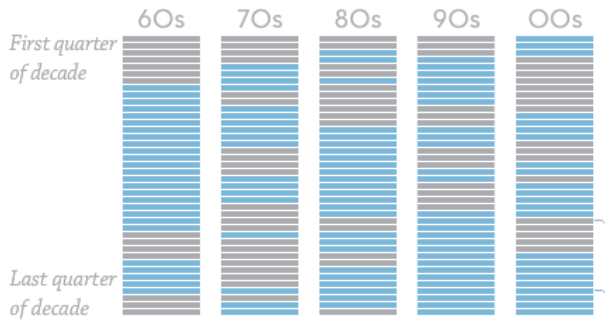
Top migrant de

USA

**suggested actions**



**visual cues**



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

**CONTINUE**

Source: Bloomberg

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	+

The U.S. will take in \$172.4 billion from Aug. 3 to 31

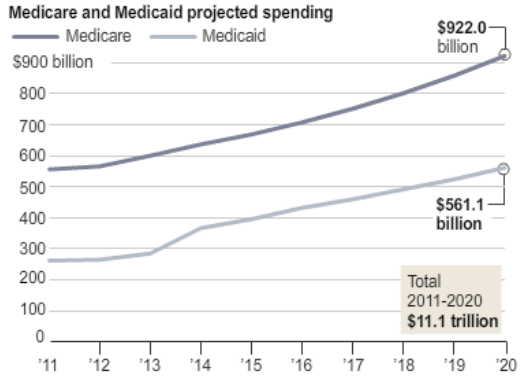
**familiar widgets**



### 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.

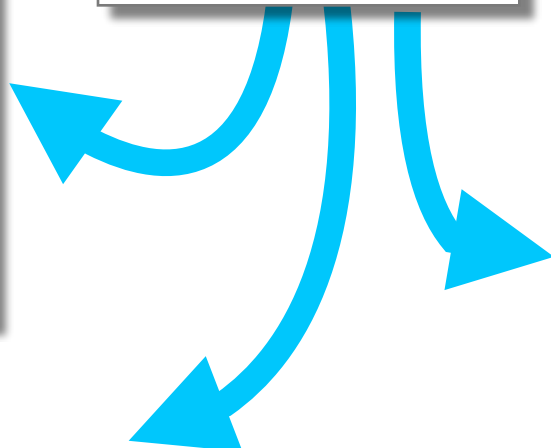
Projected spending      Projected spending as a percent of NHE      Projected spending as a percent of GDP



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

Interactive features should react to the user.

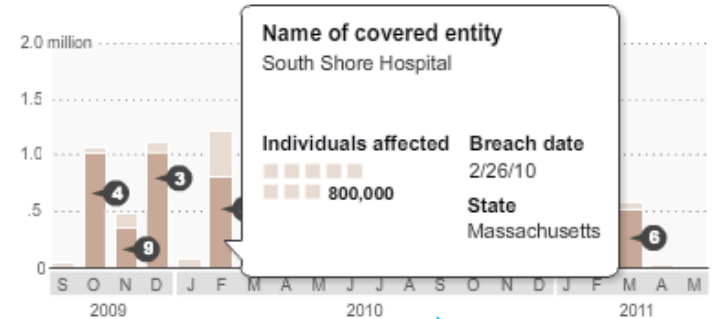
Depress buttons, highlight items, animate widgets.



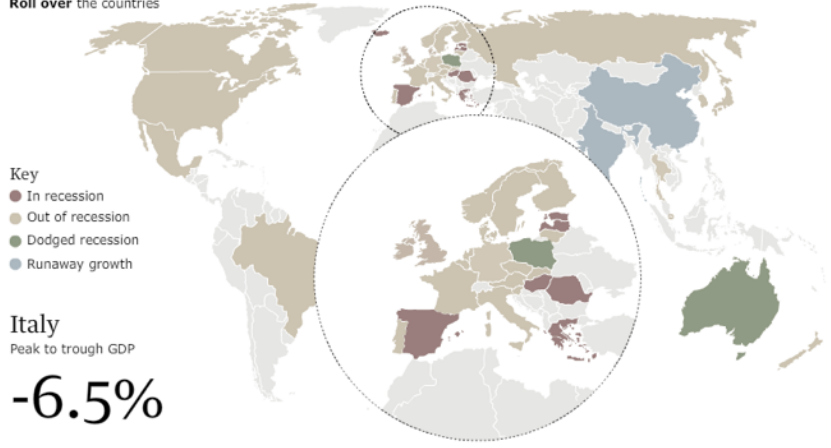
### Health Care's Growing Concern Over Cyber Security

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

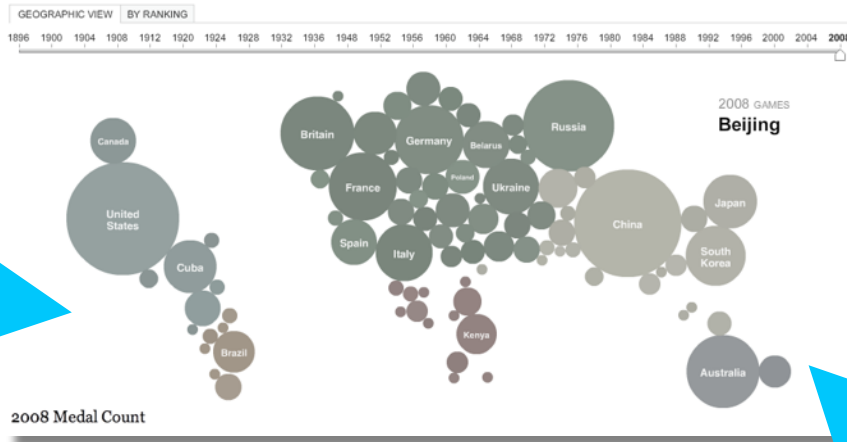
Ten of the largest recent breaches □ = 100,000 individuals  
Type of breach: ■ Unknown ■ Theft ■ Loss ■ Hacking/IT incident ■ Other



Roll over the countries

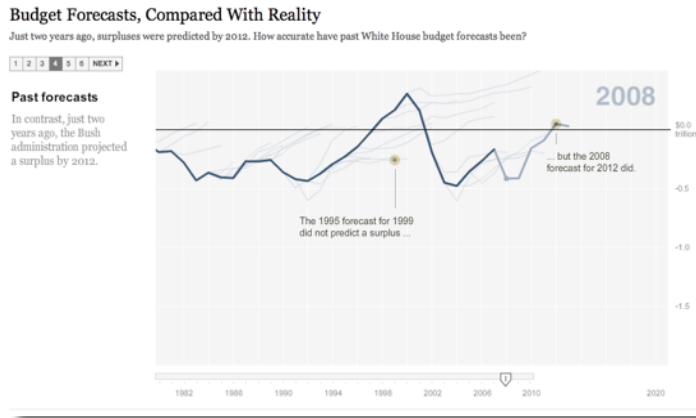
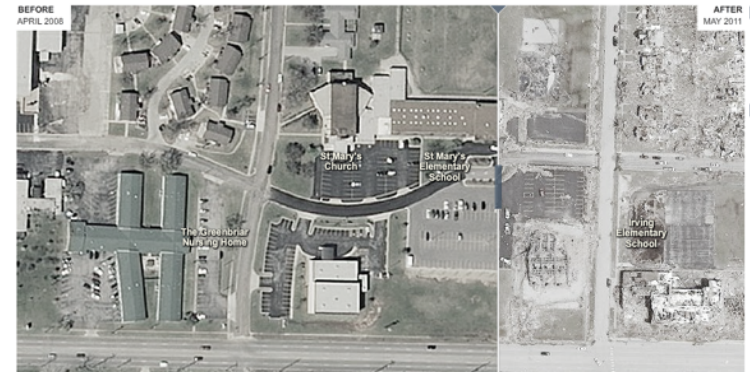


Don't obscure data. Avoid letting pop-ups obscure data.



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

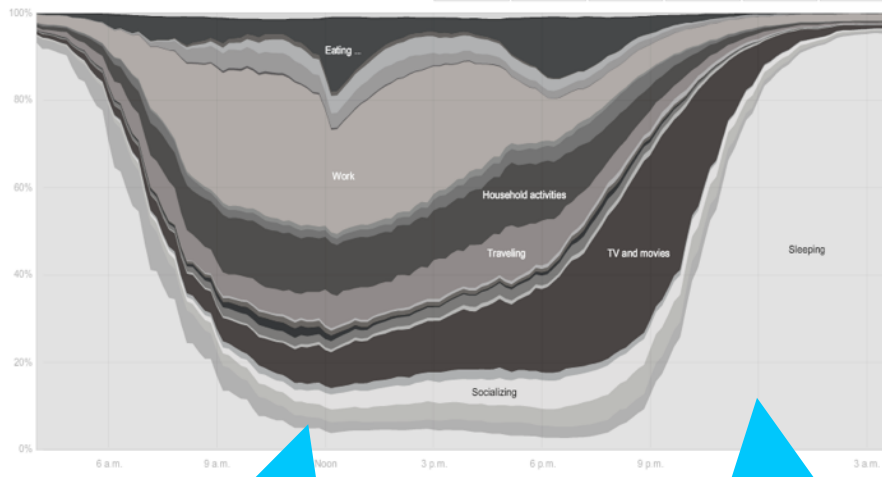
Demonstrate interactivity. Animate interactive widgets for tacit tutorials.



### Everyone

Sleeping, eating, working and watching television take up about two-thirds of the average day.

Everyone	Employed	White	Age 15-24	H.S. grade	No children
Men	Unemployed	Black	Age 25-64	Bachelor's	One child
Women	Not in lab...	Hispanic	Age 65+	Advanced	Two+ children



Include a progress bar and “back” and “reset” buttons  
Linear navigation is important—especially with lots of interactivity.

### POTUS Tracker

Analyzing Obama's schedule

SEARCH [ ] [ Search ]  
Advanced Search »

ANALYSIS CALENDAR View Event List By: ISSUE TYPE ATTENDEES LOCATION

Every day President Obama meets with key members of his administration, Congress, foreign dignitaries, interest groups and regular citizens. Use our interactive database to track how Obama is spending his time, what issues are getting the most attention and who is influencing the debate. Subscribe to daily schedule via RSS.

2009 2010 2011  
J.F. M.A. M.J. J.A.S.O.N.D J.F. M.A. M.J. J.A.S.O.N.D J.F. M.A.

Matching Events **2131**

FILTERS  Use all filters

ISSUES DISCUSSED  
Select: All None

- ✓ 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)

BOXES SIZED TO NUMBER OF EVENTS

2009	Foreign Policy
2010	
2009	2009 Defer

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



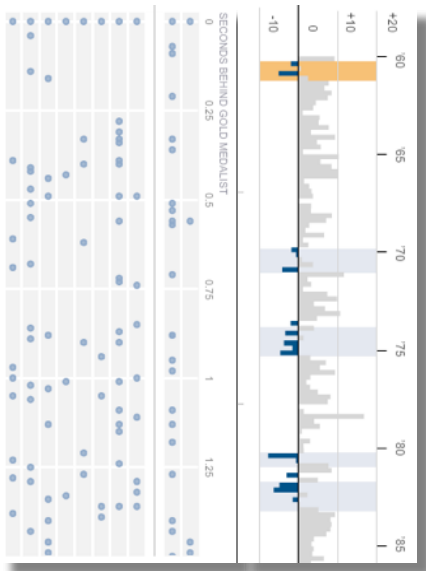


**VISUAL DESIGN**  
show

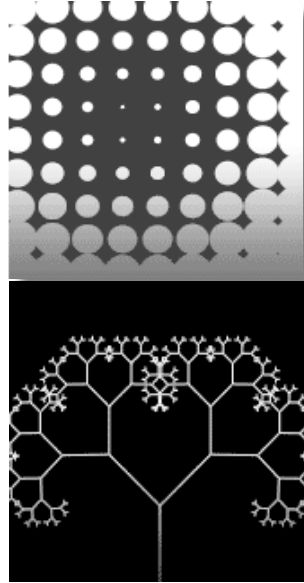
**MESSAGING**  
tell

**INTERACTIVITY**  
engage

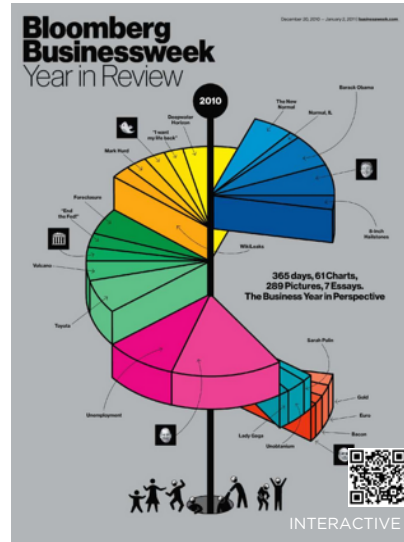
## Sound & Video



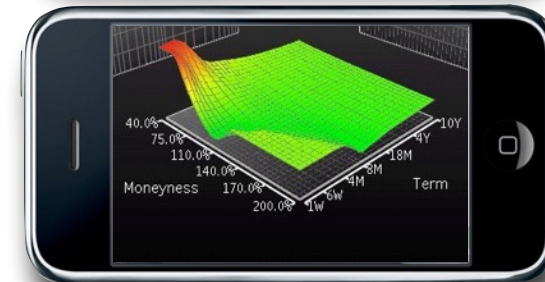
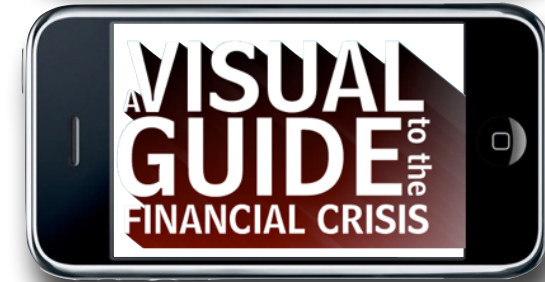
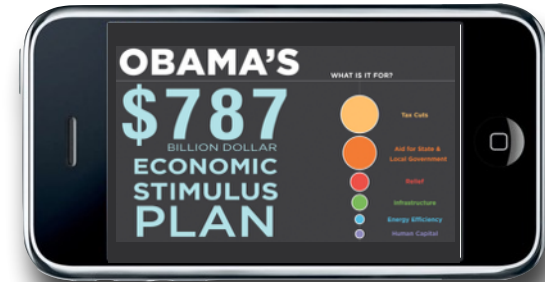
## Fluid



## 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

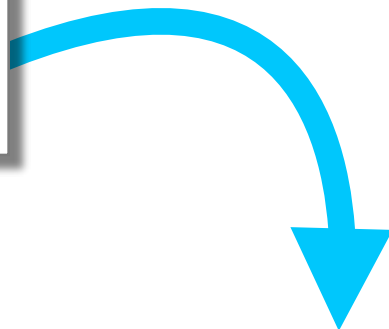
**VISUALIZATION**

**& JOURNALISM**

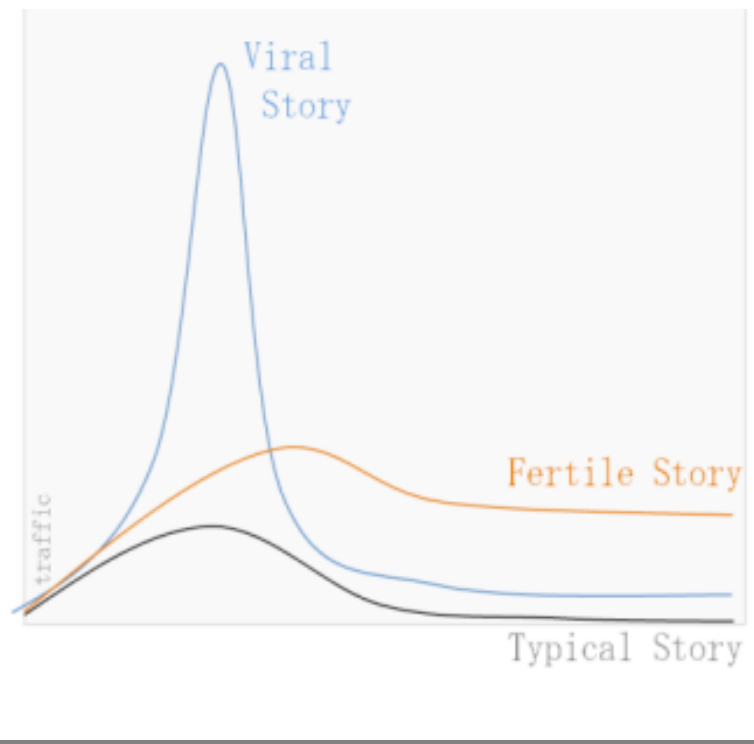


## Interactive Visualizations Drive Traffic

Slow burn vs. Burn out



quite significantly more work than traditional articles. To make this work economical, visualizations need to be attached to stories that are either *persistent* or *viral* in order to generate traffic. **Persistent stories** cover “chronic themes” that maintain relevance over time (e.g., crisis, food economics, the housing market). Visualizations attached to persistent themes “fatten and elongate” stories (which are already fatter and longer). During this slow-burn, these visualizations are supported by hundreds of stories over several months and as they evolve. **Viral stories** achieve heavy traffic in punctuated spikes of popularity. These stories tend to focus on celebrity, 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

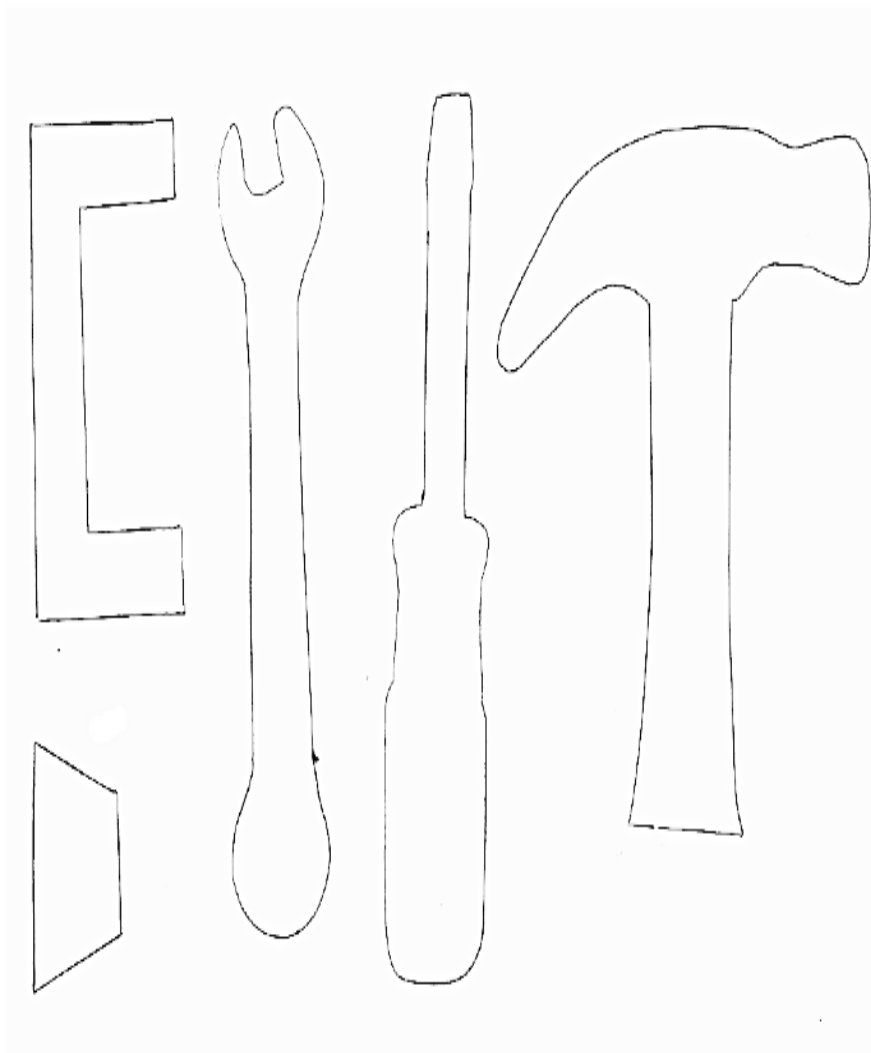
**magazine**

**web**

**iPad**



**Print to Digital**



## Templates & Tools

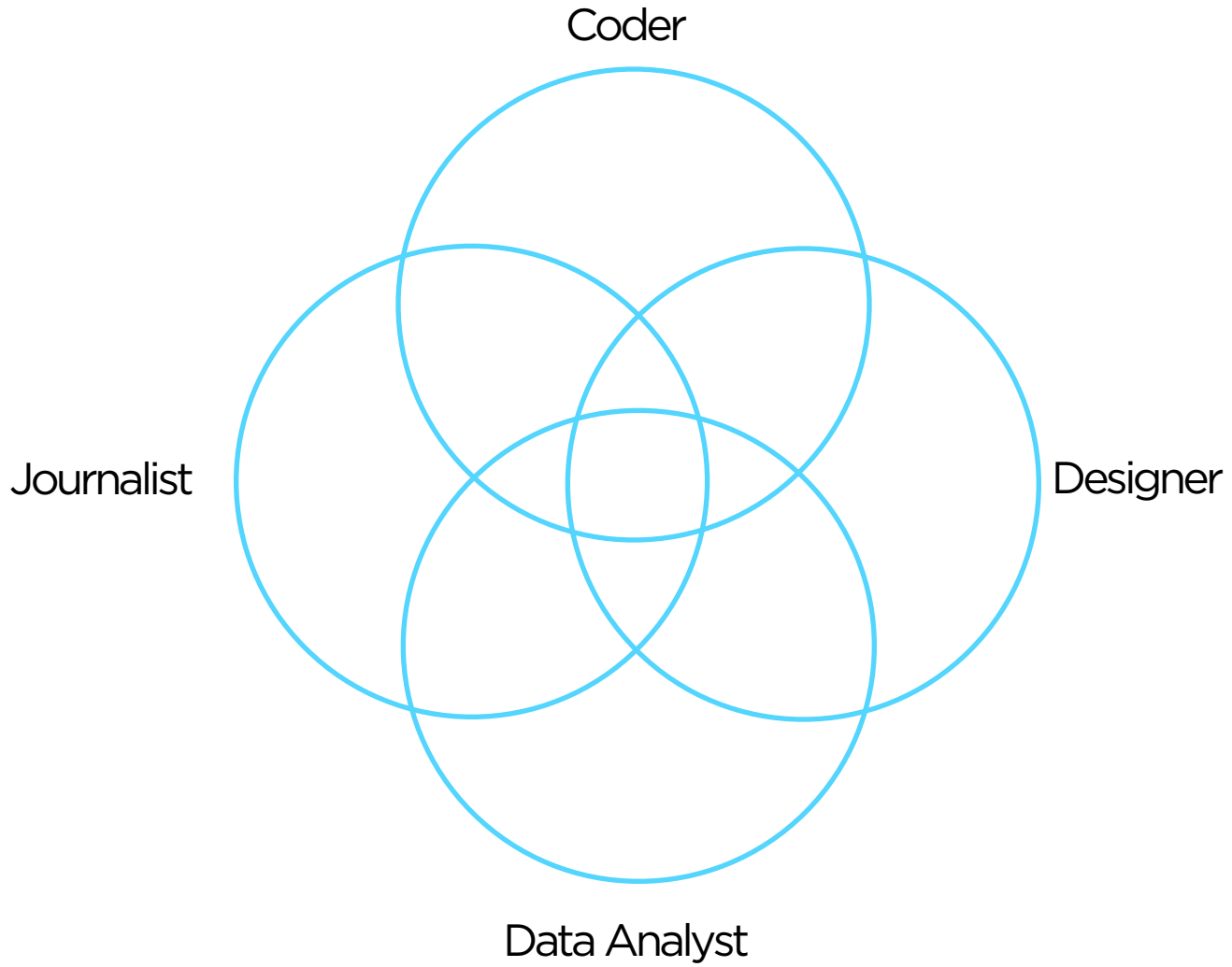
High demand for visualization tools  
for non-technical journalists

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.



## 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>

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<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](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>

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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.

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

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Guardian. Shaun White's Double McTwist.

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

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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>

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[http://www.bgov.com/news\\_item/WMrg8l6JoxhifG-KDDpytg](http://www.bgov.com/news_item/WMrg8l6JoxhifG-KDDpytg)

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Businessweek. Amid doping furer, Lance Armstrong's reputation heads downhill.

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Businessweek. Oil on Troubled Waters.

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



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[http://www.washingtonpost.com/wp-srv/politics/pioneers/pioneers\\_spheres.html](http://www.washingtonpost.com/wp-srv/politics/pioneers/pioneers_spheres.html)

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