

Voyagers and Voyeurs

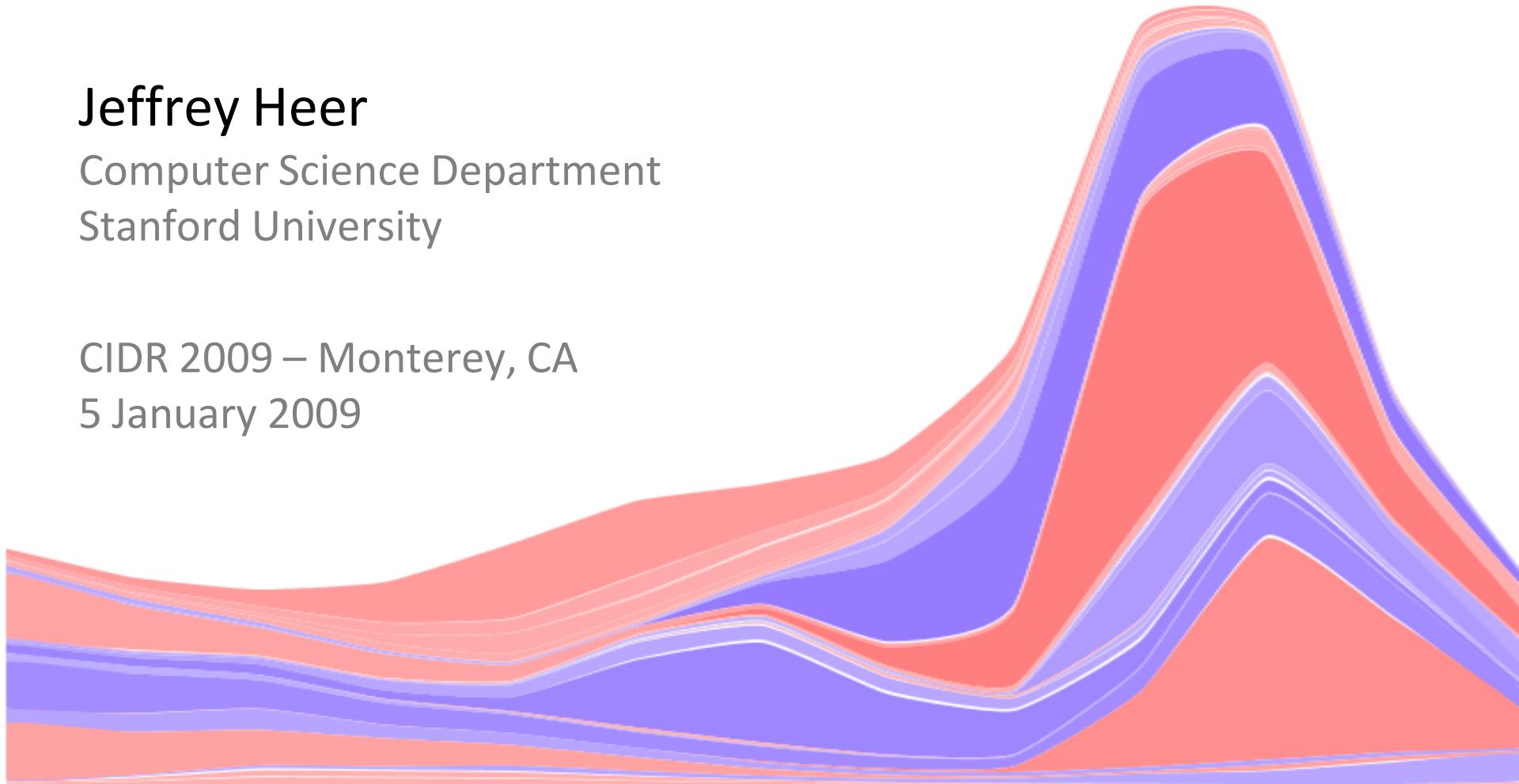
Supporting Social Data Analysis

Jeffrey Heer

Computer Science Department
Stanford University

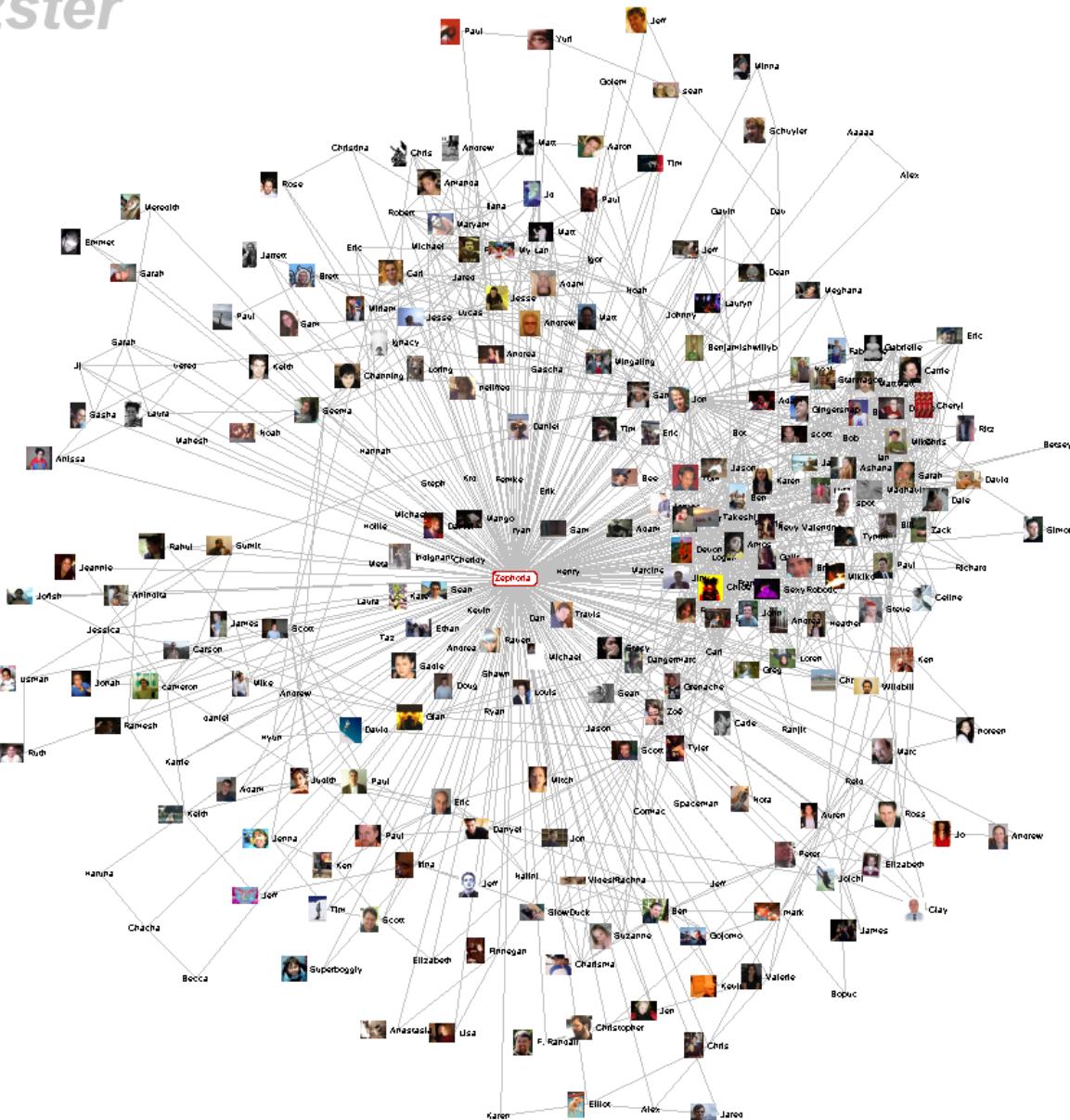
CIDR 2009 – Monterey, CA

5 January 2009



A Tale of Two Visualizations

vizster



600

•

Enabl

search

5

Zephoria

User ID 21721

Friends 266

Age ??

Gender Female

Status Single

Location San Francisco

ometown Lancaster, PA
ccupation researcher: social networks,
identity, context

Interests	apophenia, observing people, culture, questioning power, reading, buddhism, ipseity, computer-mediated communication, social
------------------	--

Music psytrance/goa/trance [Infected Mushroom, San Kito]

Mushroom, Son Rite...
Iboga/Digital Structures], Ani
Difranco, downtempo,
Thievery Corporation, Beth
Orton, Morcheeba, Ween,
White Stripes

Books	Authors: Erving Goffman, Stanley Milgram, Jeanette Winterson, Eric Schlosser, Leslie Feinberg, Dorothy Allison, Italo Calvino, Hermann Hesse
--------------	---

TV Shows

Movies

Waking Life, Tank Girl, The Matrix, Clockwork Orange, American Beauty, Fight Club, Boys Don't Cry

Member Since

Last Login

Last Updated

About [Some know me as danah...]

I'm a geek, an activist and an academic, fascinated by people and society. I see life as a very large playground and enjoy exploring its intricacies. I revel in life's chaos, while simultaneously providing my own insane element.

My musings:
<http://www.zephoria.org/thoughts/>

Want to Meet

Someone who makes life's complexities seem simply elegant.

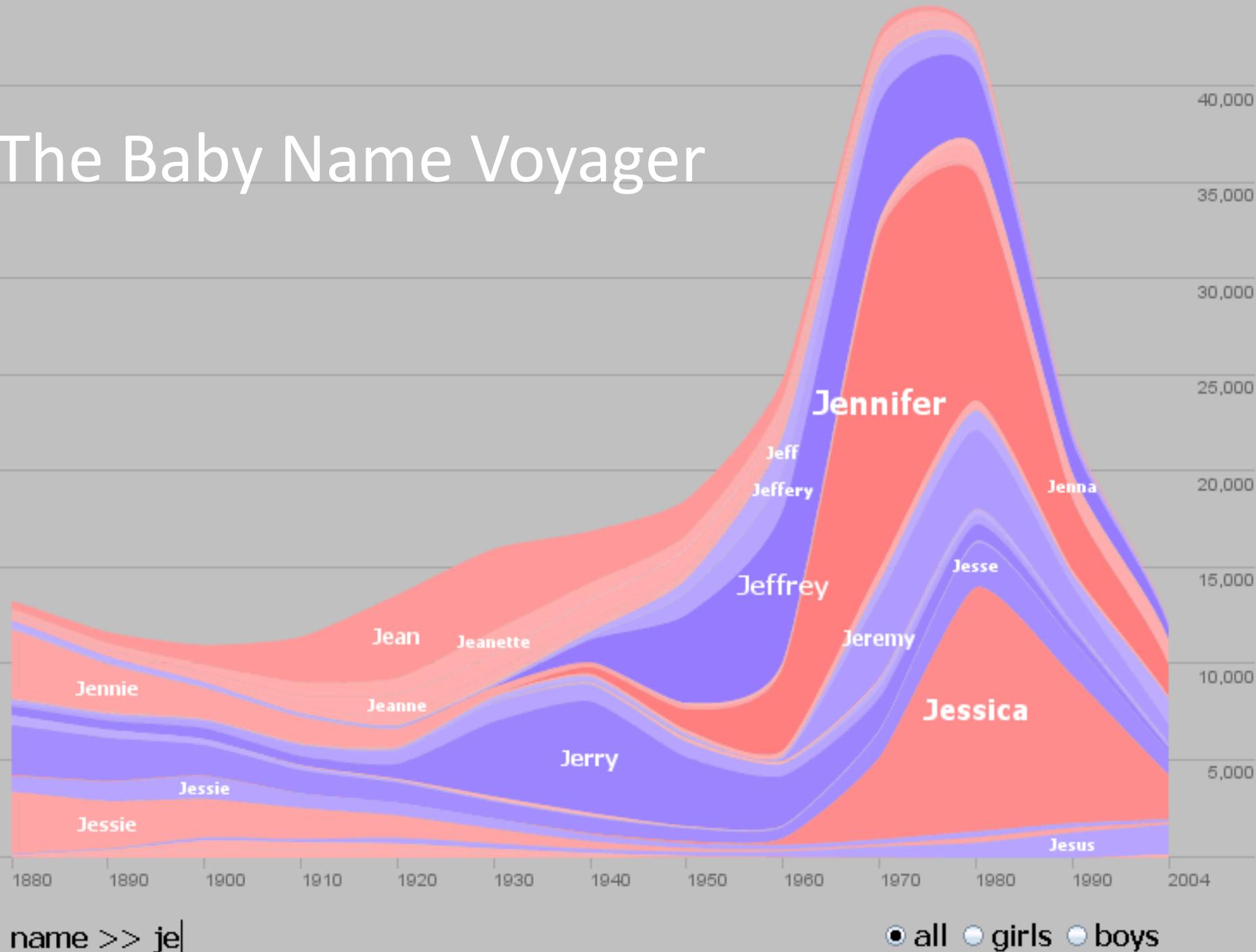
Observations

Groups spent more time in front of the visualization than individuals.

Friends encouraged each other to unearth relationships, probe community boundaries, and challenge reported information.

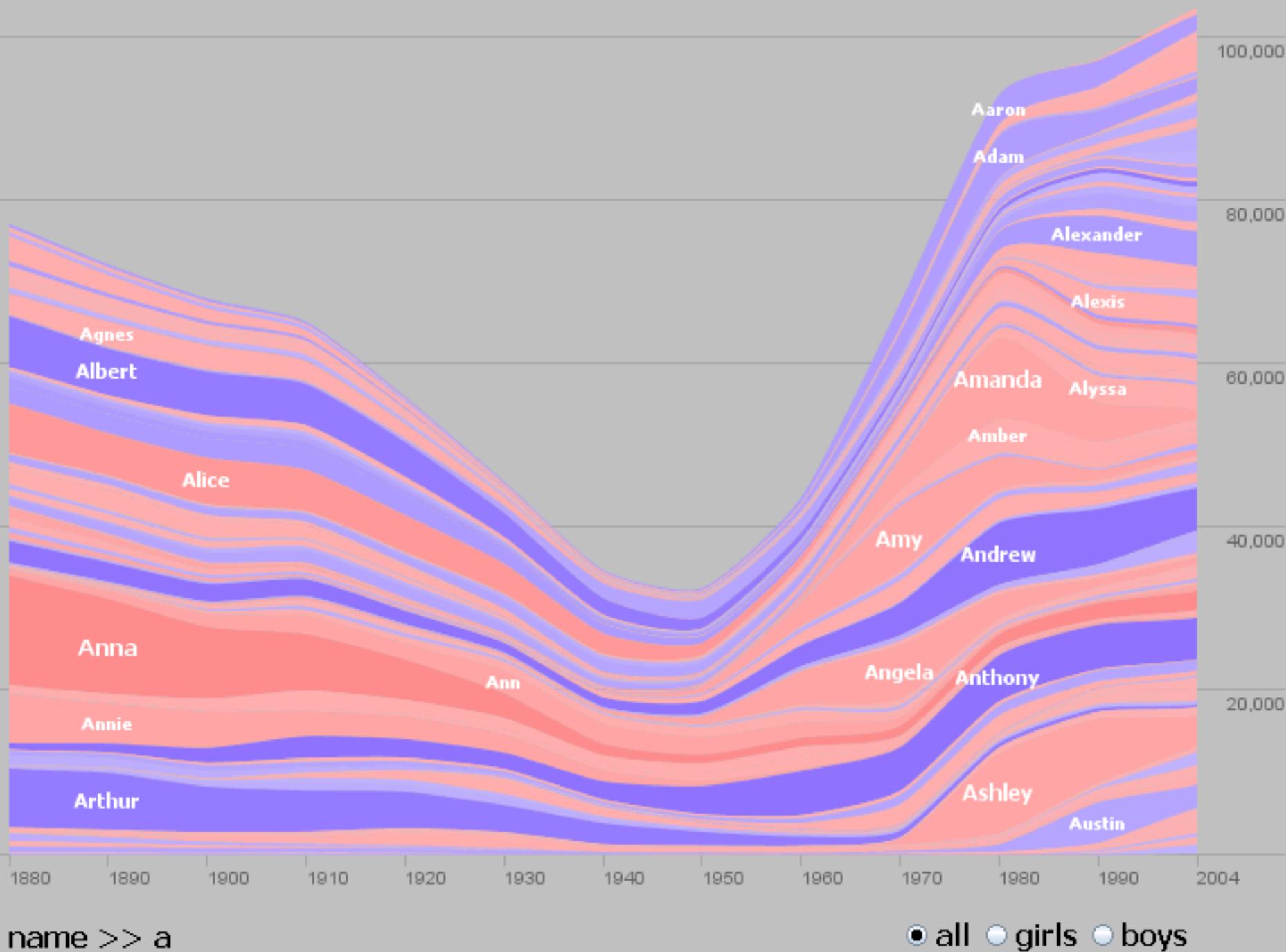
Social play resulted in informal analysis, often driven by story-telling of group histories.

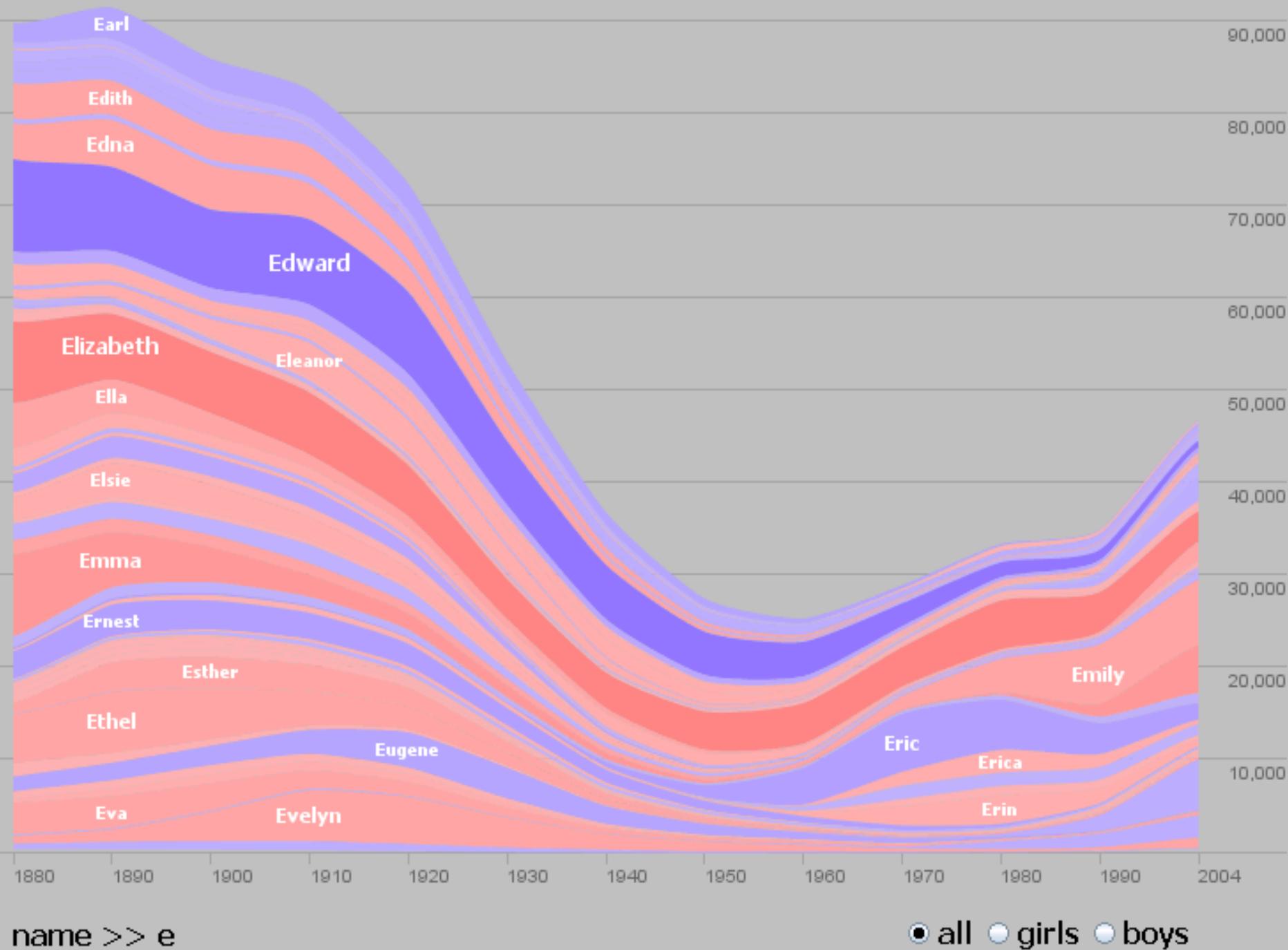
The Baby Name Voyager

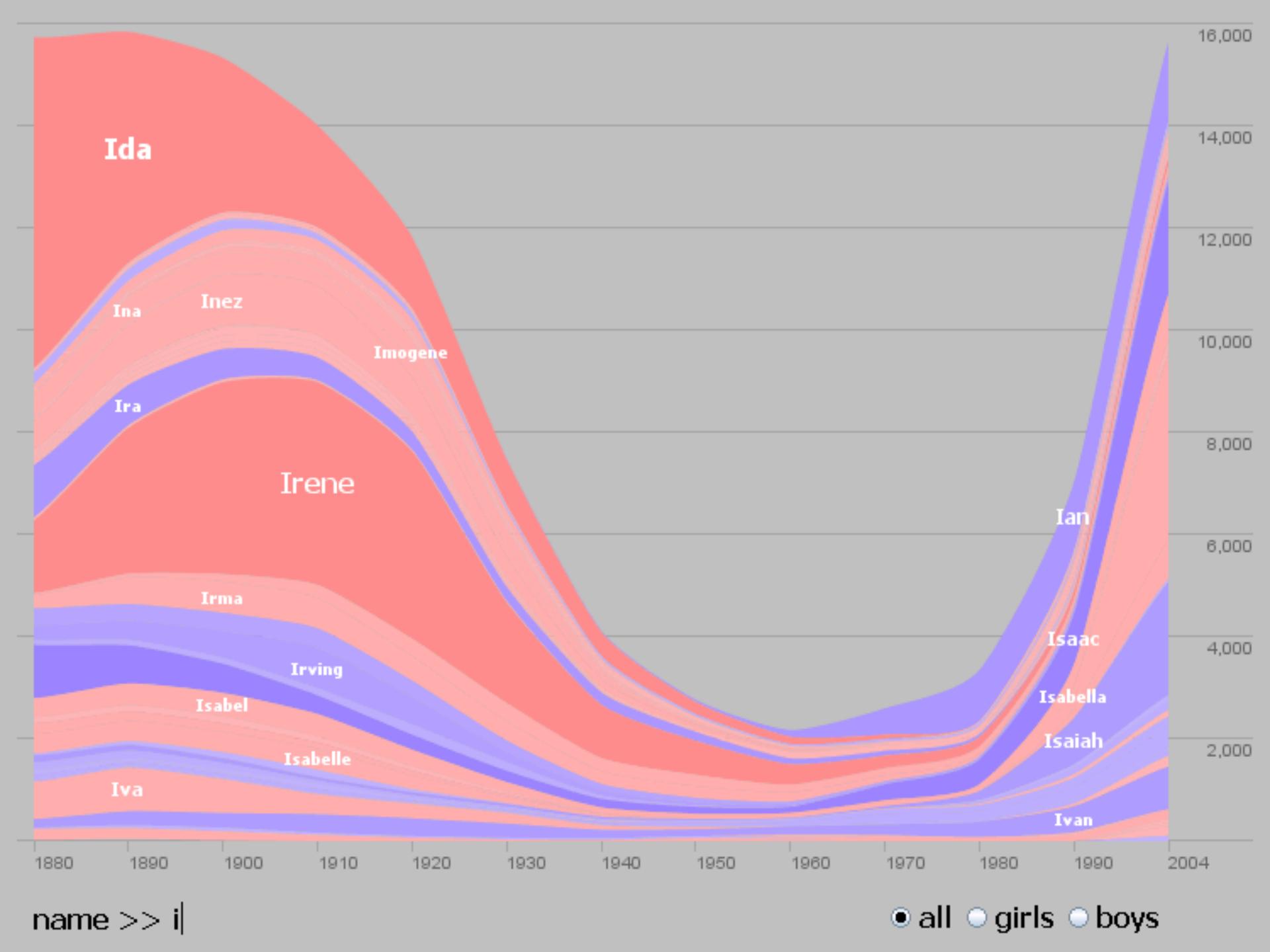


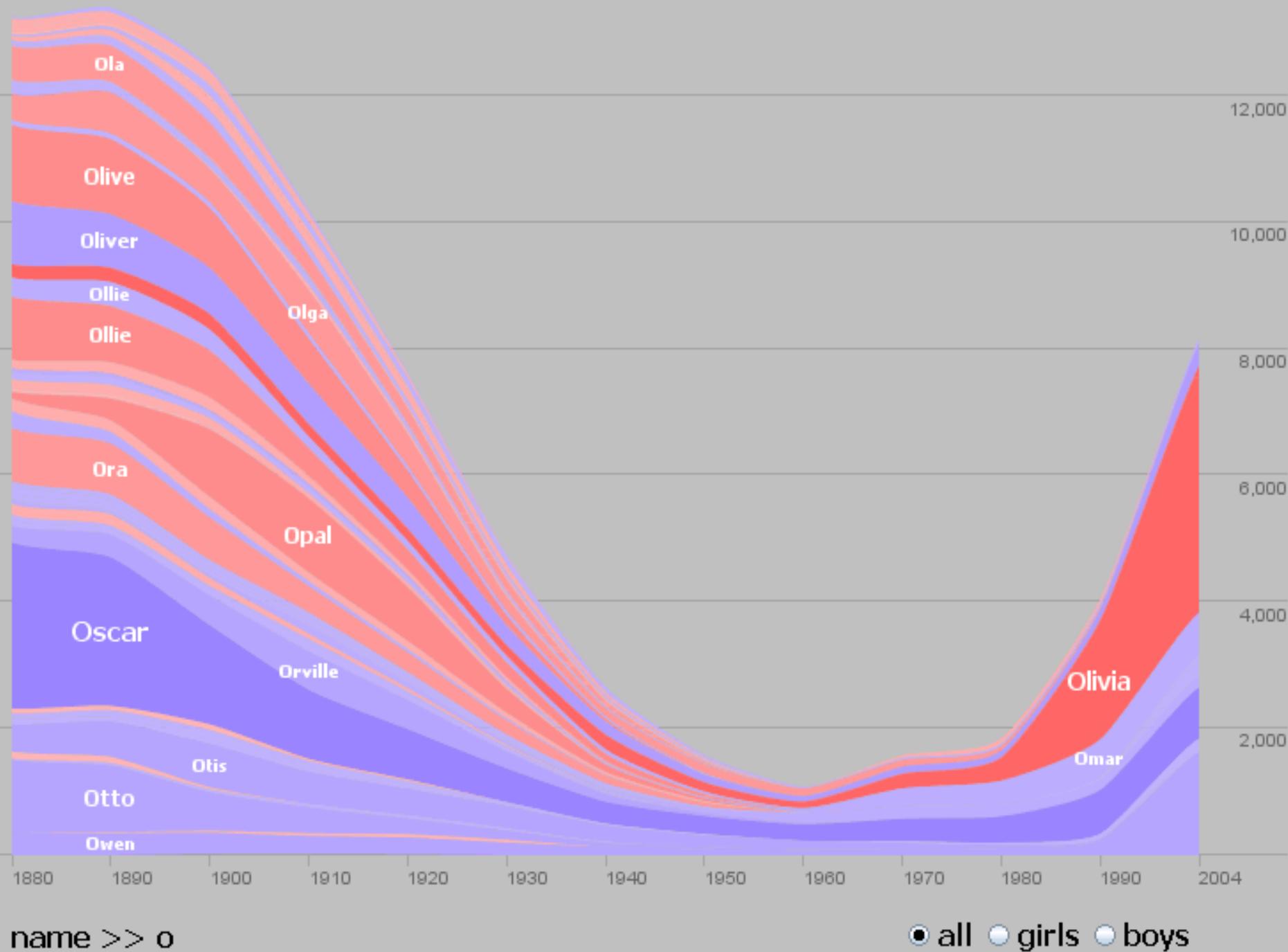
name >> je|

● all ● girls ● boys









Social Data Analysis

Visual sensemaking can be **social** as well as cognitive.

Analysis of data coupled with **social interpretation and deliberation**.

How can user interfaces catalyze and support **collaborative visual analysis**?

sense.US

A Web Application for Collaborative
Visualization of Demographic Data

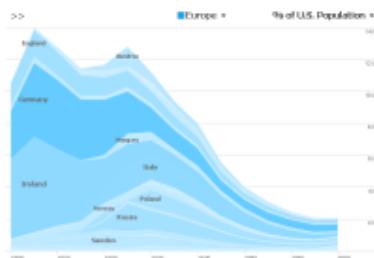
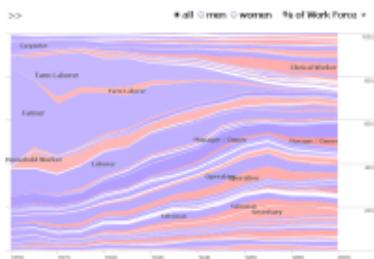
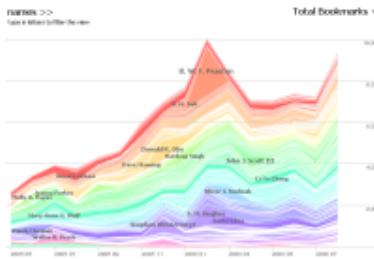
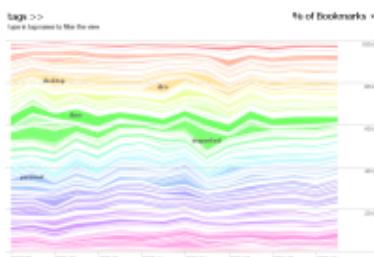


sense.us

Log in to add comments! ibm e-mail

pass

login help



sense.us - social data visualization

sense.us is a prototype system for collaborative visualization.

- See the data. See what people have to say about it.
- Dive into the data and share your explorations.

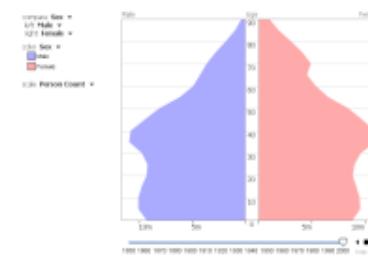
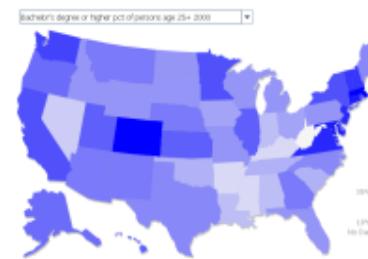
The site requires **Java 1.5+** and either **Firefox** or **Internet Explorer**.

Use your **IBM W3/BluePages e-mail** and **password** to login.

Use at least **1024x768** resolution for the best experience.

Check out the **user's guide** and **privacy policy** before getting started.

Having problems using Firefox with Java 1.4? Some users using Firefox and Java 1.4 have found that comments aren't loading properly. If you run into this problem, consider upgrading to Java 1.5 (**Windows**, **Linux**) or using Internet Explorer (on Windows systems). Sorry for any inconvenience!



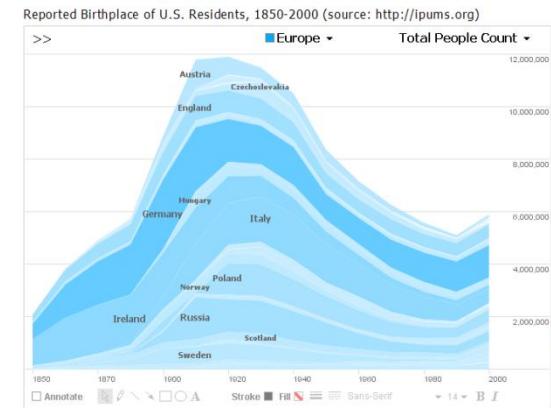
Voyagers and Voyeurs

Complementary faces of analysis

Voyager – focus on visualized data

Active engagement with the data

Serendipitous comment discovery



Voyeur – focus on comment listings

Investigate others' explorations

Find people and topics of interest

Catalyze new explorations

sense.us > jobs > comments - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

Big shift after 1950
The biggest movement of women into the labor force happened between 1950 and 1960. From this view, it appears that clerical and secretary workers underwent significant growth.
by Michael Rogers on Thu Jul 20, 2006 1:55 PM

Big shift after 1950
If you look at household worker, you'll see the opposite trend.
by Julia Hernandez on Fri Jul 21, 2006 10:52 AM

Big shift after 1950
Also has to do with a shift from blue collar to white collar work.
by Fred Klein on Wed Aug 2, 2006 10:29 AM

The bad time
Around 1959, a bad economic time. Many companies were closed. That's why almost no auditors at that moment.
by Li Zhang on Wed Aug 2, 2006 8:56 AM

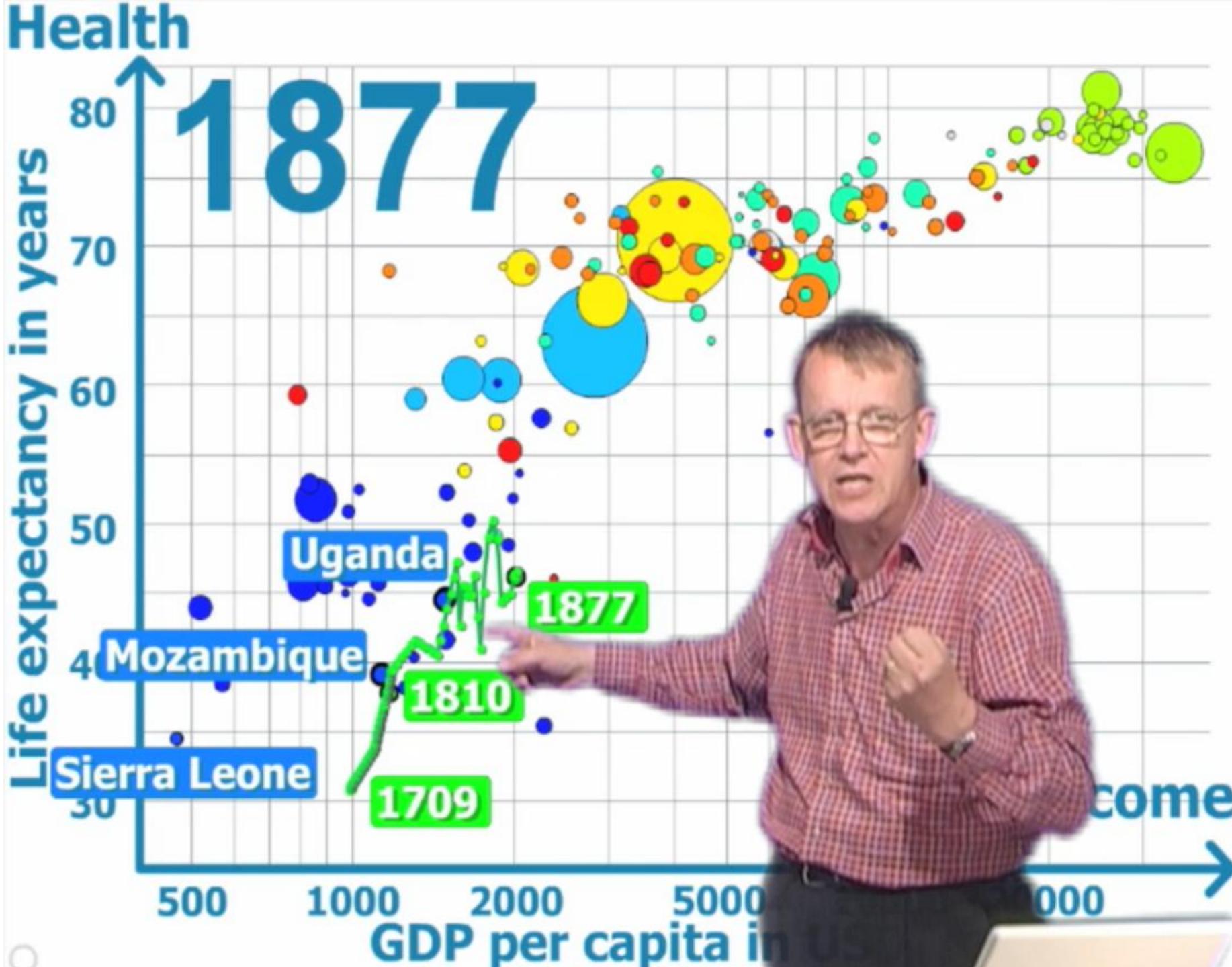
The bad time
I would agree with that.
by Fred Klein on Wed Aug 2, 2006 10:28 AM

Is this military info right?
I would have expected a different pattern for the military, but then again maybe this is just the military industrial complex growing and growing.
by Martin Sherry on Fri Jul 21, 2006 10:15 AM

Is this military info right?
here are labels where I would have expected big jumps.
by Martin Sherry on Fri Jul 21, 2006 10:16 AM

Done

Out of the Lab,
Into the Wild







Wikimapia View Add place

288 / 524 places



Spotfire DecisionSite Posters - Microsoft Internet Explorer

Address <http://preview.spotfire.com/spotfire/library?guid=b92745b0-5c2e-11d9-b49e-0010c0a80214>

Google Search Web 0 blocked AutoFill Options

Spotfire DecisionSite Posters

Menu Help

Sales overview- December

larsb@spotfire.com 2004-12-29

Sales result overview for December. Positive change in WE, while poor performance in the other regions.

Decision Status: Open

[Open in DecisionSite Client](#)

Annotations

larsb@spotfire.com 2004-12-29 View >

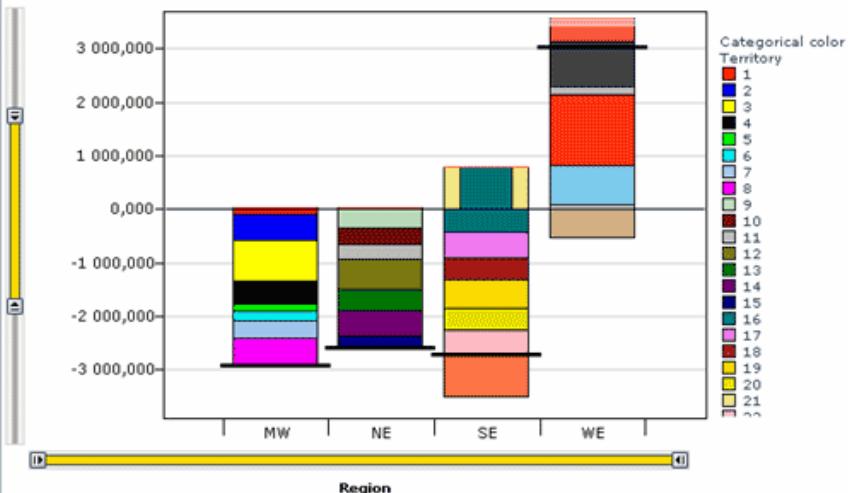
Original bookmark

larsb@spotfire.com 2004-12-29 View >

The only territory outside of the WE with any real gain is territory 21.

[Add Annotation...](#)

Share change over regions and territories



Query Devices

4999/4999 selected

Sales quadrant

- 1
- 2
- 3
- 4
- Include empty values

New DecisionSite Poster 'Sales overview- December' added - Message (HTML)

File Edit View Insert Format Tools Actions Help

[Reply](#) [Reply to All](#) [Forward](#) [Print](#) [Save](#) [New](#) [Help](#)

From: larsb@spotfire.com

Sent: Wed 12/29/2004 3:54 PM

To: Lars Bauerle

Cc:

Subject: New DecisionSite Poster 'Sales overview- December' added

A new DecisionSite Poster, Sales overview- December, has been published to the DecisionSite Library.

(Click [here](#) to login to the full Spotfire DecisionSite Poster)

[Login Information](#)

Spotfire DecisionSite Poster

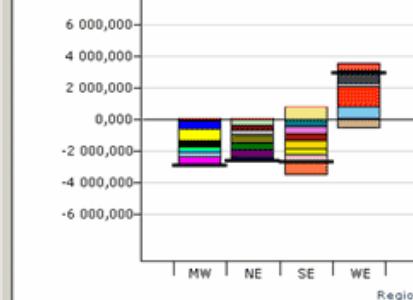
Sales overview- December

larsb@spotfire.com, 2004-12-29

Sales result overview for December. Positive change in WE, while poor performance in the other regions.

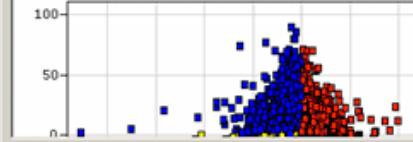
Clippings

Share change over regions and territories



Class change vs share change

MyShare change from Q3 to Q4



Spotfire Decision Site Posters

Views: Analytic Dashboard - Windows Internet Explorer

http://localhost/views/Wow/AnalyticDashboard

File Edit View Favorites Tools Help

Views: Analytic Dashboard

Analytics + tableau Return to Views Help | Log Out Search

Sort (Asc) Sort (Desc) Keep Only Exclude View Data Export Data Export Image Restore

Analytic Dashboard

Discounting by Product

LABELS PAPER PENS & ART SUPPLIES

Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1

Delivery Date [2004]

Region

- CENTRAL
- EAST
- WEST

Product Category..

- FURNITURE
- OFFICE SUP..
- TECHNOLOGY

Top Products by Profitability

Canon PC940 Copier	57,611
Polycom VoiceStation 100	37,254
Hon Olson Stacker Chairs	30,359
Phone 918	25,421
Ericsson 6360	23,349
Siemens 5185I	14,903

Sum of Gross Profit

Annual Trends

2005 2006 2007

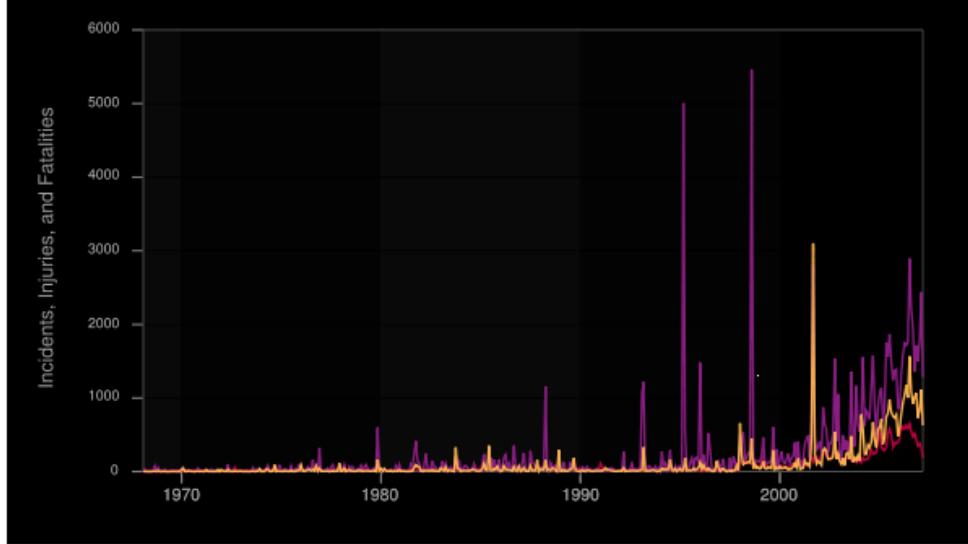
Total Profit

Average Discount

Comments

Done Local intranet 100%

The Status of George Bush's War on Terrorism

[Graph](#) [Table](#) [Cloud](#) [Map](#)
[Absolute](#) [Relative](#) [All](#) [31y](#) [21y](#) [4y](#)

[Bling](#)
[More Options](#)

Legend

 [Global Terrorist Incidents, 1968-2007](#)

- [Incidents](#)
- [Injuries](#)
- [Fatalities](#)

[More >](#)

Tags

no tags yet

Community Tags

[Add tags](#)

no tags yet

Correlations

[See all](#)
 89% [Injuries](#) and [Fatalities](#)

Related Graphs



Sources: MIPT Terrorism Knowledge Base (<http://www.terrorismknowledgebase.com>)

Incidents, injuries, and deaths from terrorism have increased during the new millennium. This may be because of the broader definition of what characterizes a terrorist act, or it may actually be a constant increase in such acts. — [seema](#)

Comments (12)


Anonymous says

Go BuSH!

posted 11 months ago


Tyler says

What a completely disingenuous graph, and comments to follow. You have absolutely no reason to think the line would stay flat without Bush.

You probably thought graphs like these (and your site more widely) would help people overcome preconceived notions by showing hard data.

Instead, you're just amplifying people's preconceived notions -- adding legitimacy

Share this Graph

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[Post to Blog](#)

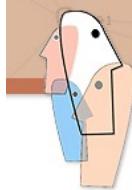
11 diggs [diggit](#)

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[Feature It](#)

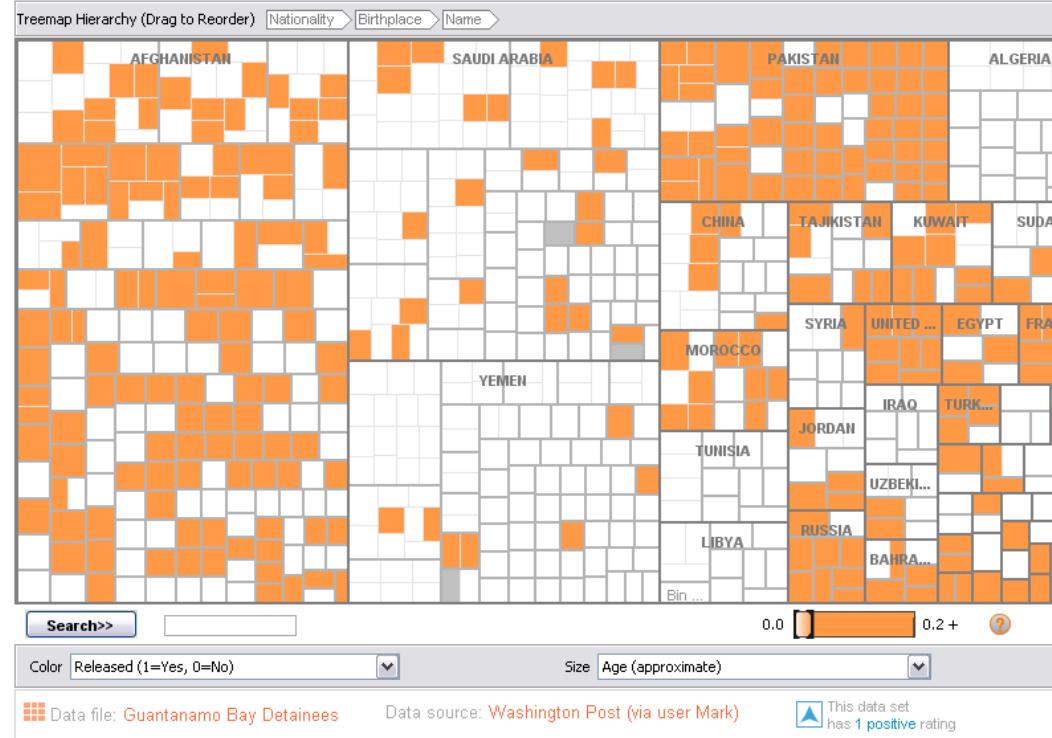
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Visualizations : Guantanamo Bay Detainees, release status & age

Can't see the visualization? Download the latest Java plugin [here](#). On Macs: best viewed in Safari.

Created by: Martin Wattenberg

Created on: Saturday February 24, 12:06 PM

share
thiswatch
thisadd to
topic hubrate
this

Comments (4)



Martin Wattenberg says:

In this view, orange means released, white means not released. Gray means committed suicide.

Posted Saturday February 24, 12:07 PM

[see view for this comment](#)

This visualization has 1 positive rating



You can add this visualization to a topic hub! Learn more.



Want to keep track of this visualization? Add it to your watchlist!

Learn more:

[About the Treemap](#)

Martin Wattenberg says:

I'd be curious to hear ideas on why various countries have the release proportions that they do.

Posted Saturday February 24, 12:13 PM

[see view for this comment](#)

Mark says:

...

Many-Eyes

Social Data Analysis In Action

1. Discussion and Debate
2. Text is Data, Too
3. Data Integrity and Cleaning
4. Integrating Data in Context
5. Pointing and Naming

For each, some thoughts on future directions.

I asked my colleagues: if you could give database researchers a wish list, **what would it be?**

Discussion and Debate

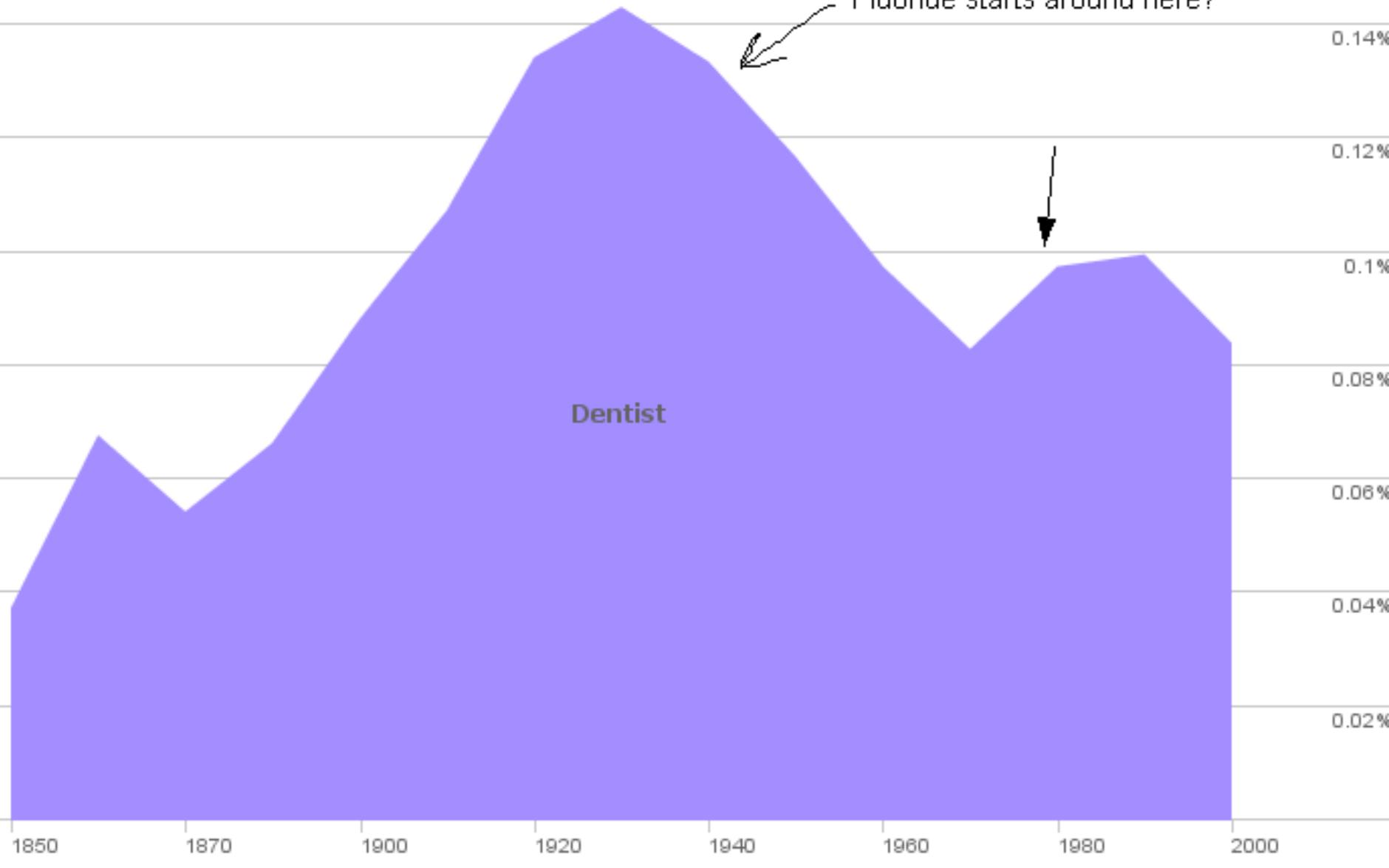
>> dentist

all men women % of Work Force ▾

Fluoride starts around here?

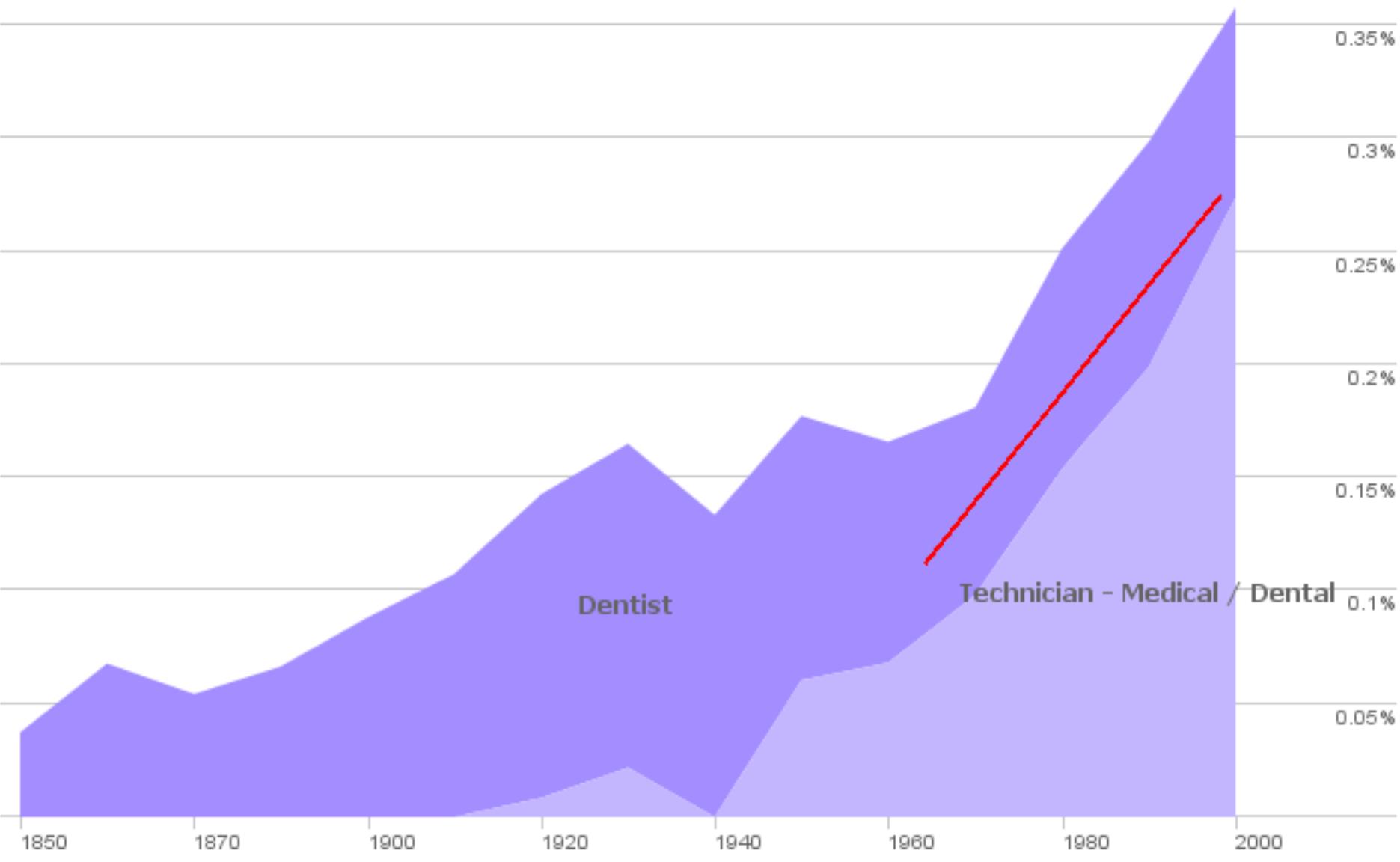


Dentist



>> dent

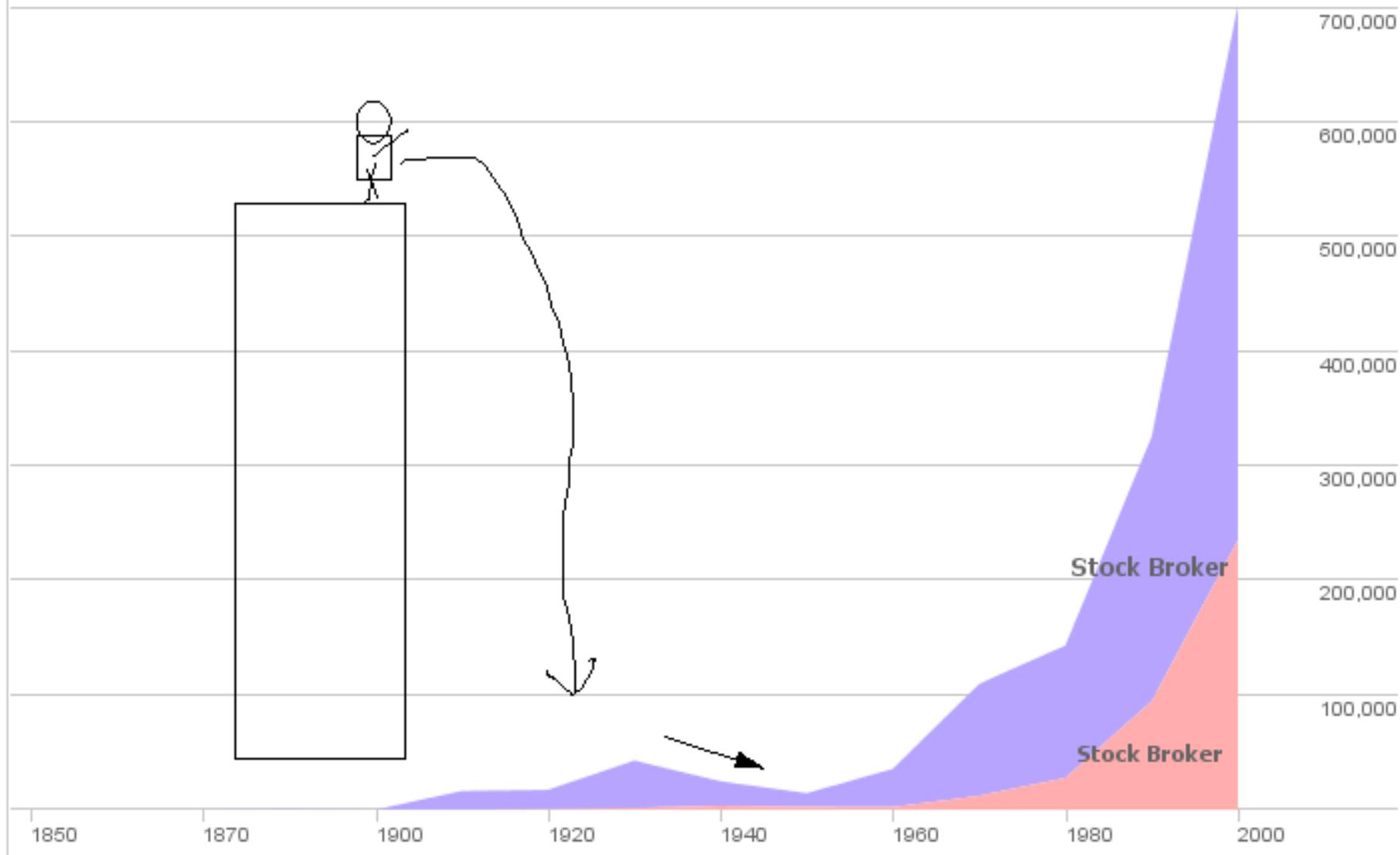
all men women % of Work Force ▾

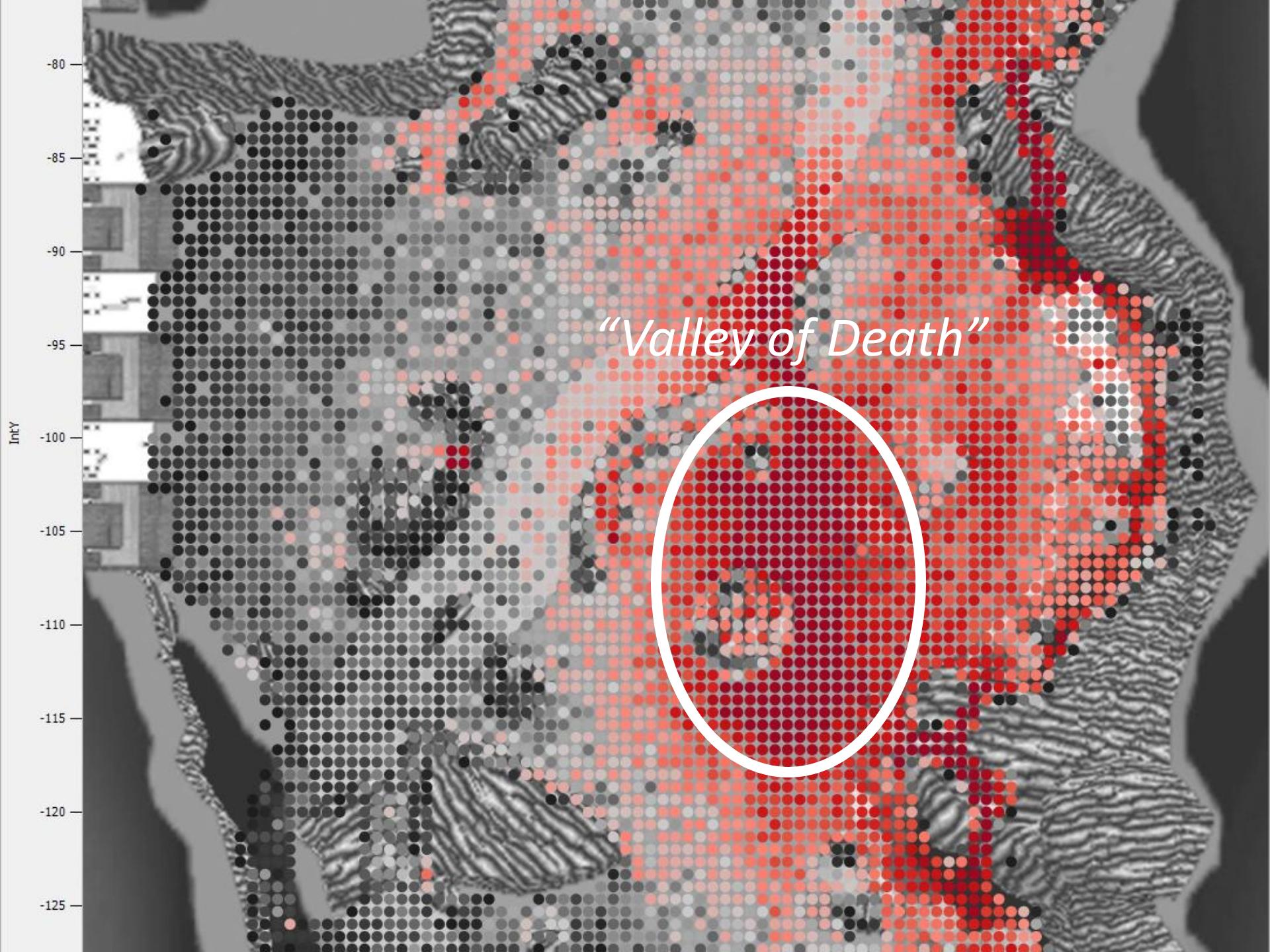


Great depression "killed" a lot of brokers

>> Stock Broker

● all ● men ● women Total People Count ▾







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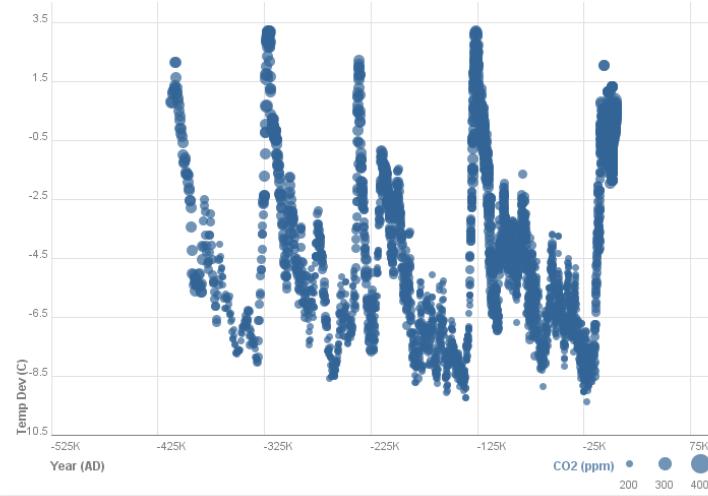
survey text US web world

See More >

Visualizations : Flawed Data - Temp Over Time and CO2 Levels

Creator: Bruce

Tags:



Comments (28)

currently showing



Bruce says:

Don't forget to read the comments on this one!

Posted Friday January 26 2007, 12:25 PM

[see view for this comment](#)

Frank van Ham says:

Hey! Apparently there is a correlation between Co2 level and temperature... :/

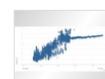
Posted Friday January 26 2007, 08:01 PM

[see view for this comment](#)

Anonymous says:

This view shows the correlation between CO2 and temp. That tendril at the right, is that the world spinning out of control in recent years?

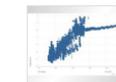
Posted Friday January 26 2007, 08:34 PM

[see view for this comment](#)

Bruce says:

Interesting indeed, the collaborative manipulation of data like this is really something! I hadn't tried those arrangements, and now it shows something else quite interesting. Adding the year as the size makes it a little messy, but if you then scroll over that tendril, you'll see that all the points are within the last 2K years cluster. What does this mean though that such high CO2 levels are preceding significant changes in temperature? Something, much worse is yet to come?

Posted Monday January 29 2007, 09:32 AM

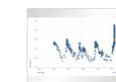
[see view for this comment](#)

Anonymous says:

It seems to me that the tendril on the right, composed of recent anthropogenic CO2 points, says that the coefficient of temperature versus CO2 for anthropogenic CO2 is roughly 1 degree C per 100 ppm of CO2, and this applies to CO2 levels above 300 ppm. In contrast, for the older non-anthropogenic CO2 levels below 300 ppm the coefficient of temperature versus CO2 is an order of magnitude higher, being roughly 10 degrees C per 100 ppm of CO2.

This is very surprising to me. Has this difference been discussed in the climate modelling community? IN the latest UN IPCC report on global warming?

Posted Monday January 29 2007, 02:51 PM
[see view for this comment](#)

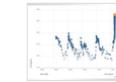


Anonymous says:

If you look here you'll notice something interesting... As CO2 level go up there doesn't seem to be an immediately apparent shift in temperature. Of course, if you look at the data more closely you come to understand that the lack of increase is probably due to a presentation error which is, unfortunately, difficult to overcome. While we have many data points for the 2K year slice we have significantly fewer as we move back in time. I believe that this changes the perception of the graph significantly.

I'm not saying that global warming doesn't exist and that CO2 rises aren't a problem. Only that this data set might not be the right way to go about illustrating it.

Posted Monday January 29 2007, 03:37 PM
[see view for this comment](#)



Anonymous says:

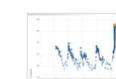
Frank, Correlation does not mean causation. There are far more processes at work during warmer periods than cold periods which would release more CO2. It should be greater during warmer periods and lower in cold periods. That doesn't mean that the CO2 caused the warming.

Posted Tuesday February 06 2007, 10:00 AM

Frank van Ham says:

I know, I never said there was a causation between the two (see original post). There most certainly is a correlation though.

Posted Friday February 09 2007, 01:10 PM



Anonymous says:

The problem is, the data just doesn't go back far enough. We need the same data over a 500-1000 million year period. The fossil records of climate in the 60 – 250 million BCE period indicate a global tropical or semi-tropical climate. What we seem to be entering into in terms of global climate may have been experienced numerous times in the 4+ billion year history of the planet.

Posted Friday February 09 2007, 03:45 PM
[see view for this comment](#)



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X Axis CO2 (ppm)

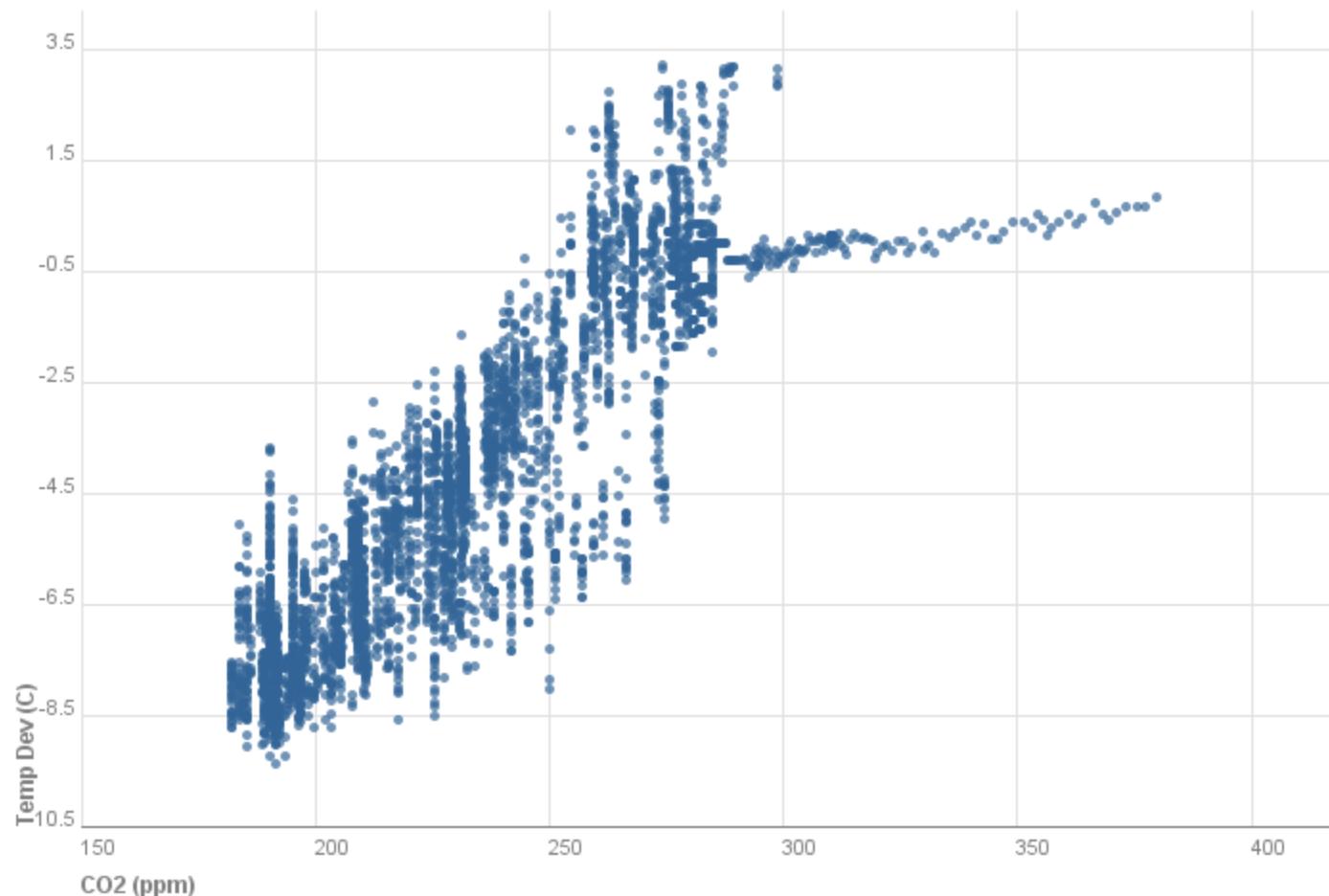
Y Axis Temp Dev (C)

Dot Size No selection

Visualizations : Flawed Data - Temp Over Time and CO2 Levels : This view shows the correlation between...

Creator: Bruce

Tags:



years cluster. What does this mean though that such high CO2 levels are preceding significant changes in temperature? Something, much worse is yet to come?

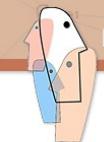
Posted Monday January 29 2007, 09:32 AM

[see view for this comment](#)

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Posted Friday February 09 2007, 03:45 PM

[see view for this comment](#)



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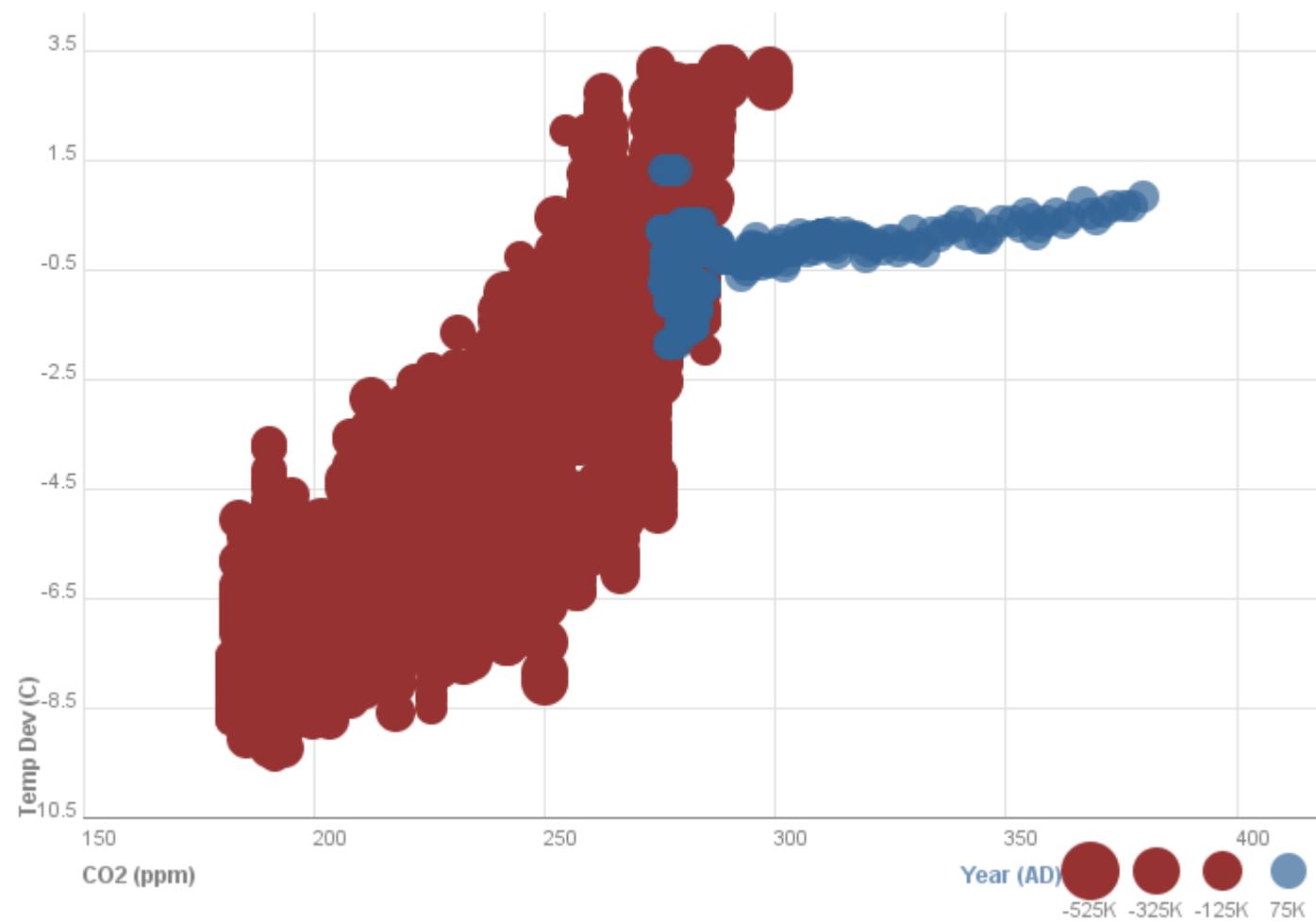
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Visualizations: Flawed Data - Temp Over Time and CO2 Levels : This view shows the correlation between...

Creator: Bruce

Tags:



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Posted Monday January 29 2007, 09:32 AM

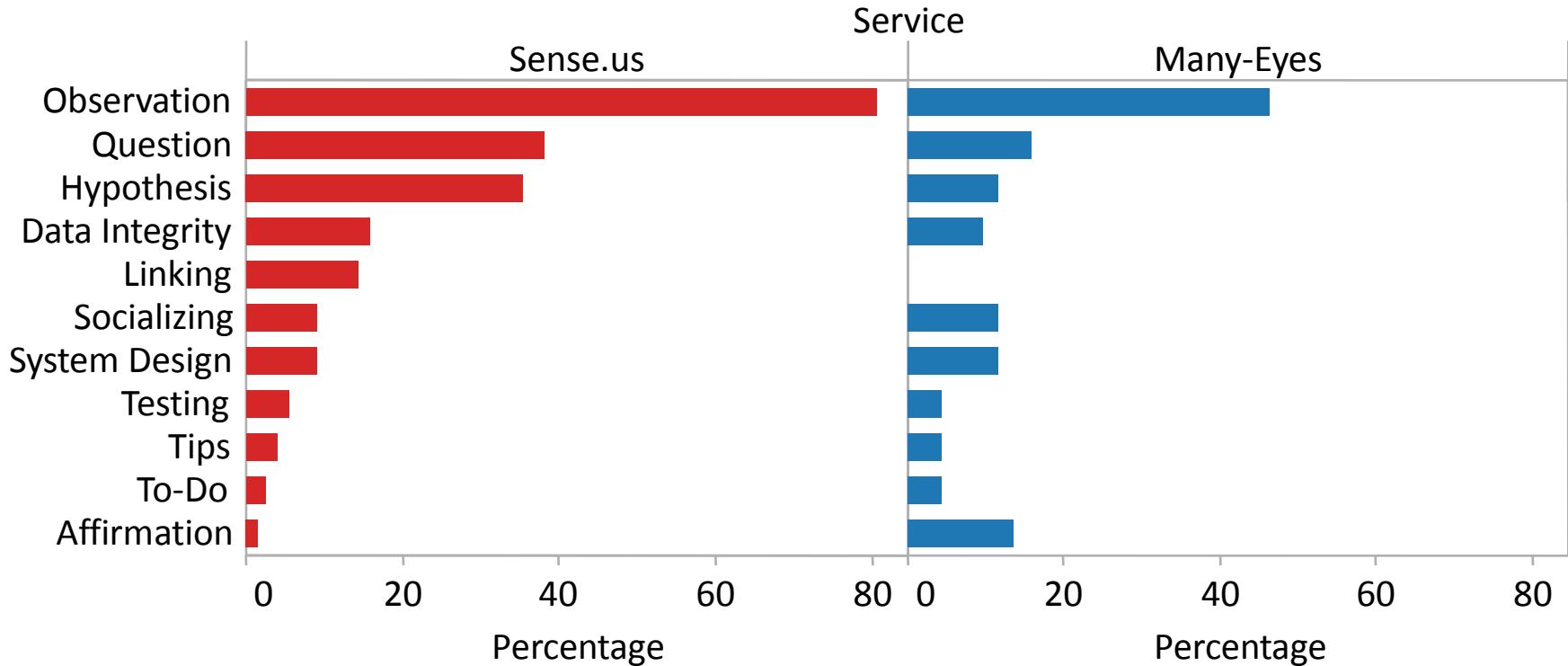
[see view for this comment](#)

experienced numerous times in the 4+ billion year history of the planet.

Posted Friday February 09 2007, 03:45 PM

[see view for this comment](#)

Content Analysis of Comments



Feature prevalence from content analysis (min Cohen's $\kappa = .74$)
High co-occurrence of Observations, Questions, and Hypotheses

WANTED: Structured Conversation

Reduce the cost of **synthesizing contributions**

The screenshot shows the Wikipedia editing interface for a page titled "Editing Interactive visualization". The page content discusses the definition of interactive visualization and its relationship to other concepts like unsourced images and soft real-time. The interface includes standard Wikipedia editing tools like bold, italic, and link buttons, and a preview window showing a grayscale image of a crater with various colored circles overlaid.

Help us provide free content to the world by [donating today!](#)

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Editing Interactive visualization

From Wikipedia, the free encyclopedia

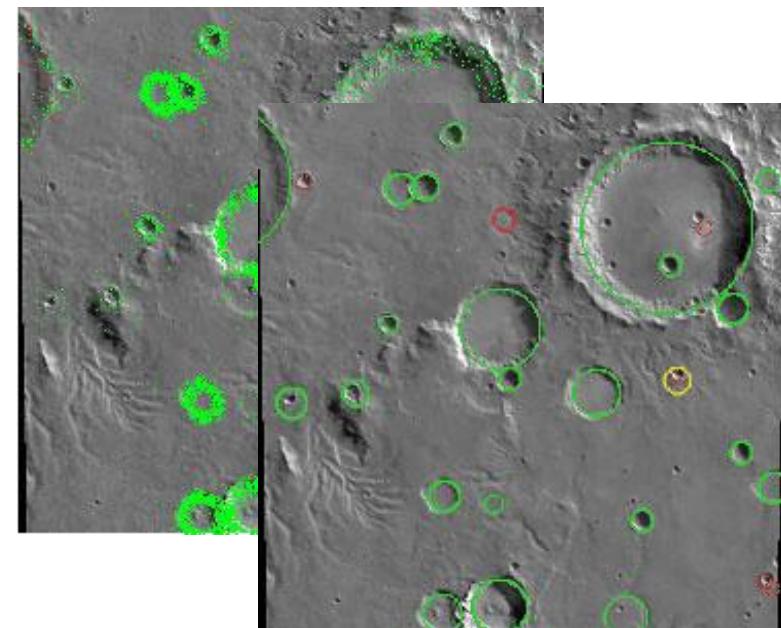
You are not currently [logged in](#). While you are free to edit time and date, in [this page's edit history](#). It is sometimes Messages sent to your IP can be viewed on [your talk page](#).

Please do not save test edits. If you want to experiment, use a different page or namespace.

B | Z | Ab | G | A | | | \sqrt{n} | | — #R | str | ← |

```
<!-- Unsourced image removed: [[image:NetInteractive visualization]] is a brain interact with computers to create graphic [[visualization]] to be considered interactive. Human Input: control of some aspects represented, must be available to a human. Response Time: changes made by the visualization is considered a [[soft real-time]]. -->
```

Wikipedia: Shared Revisions



NASA ClickWorkers: Statistics

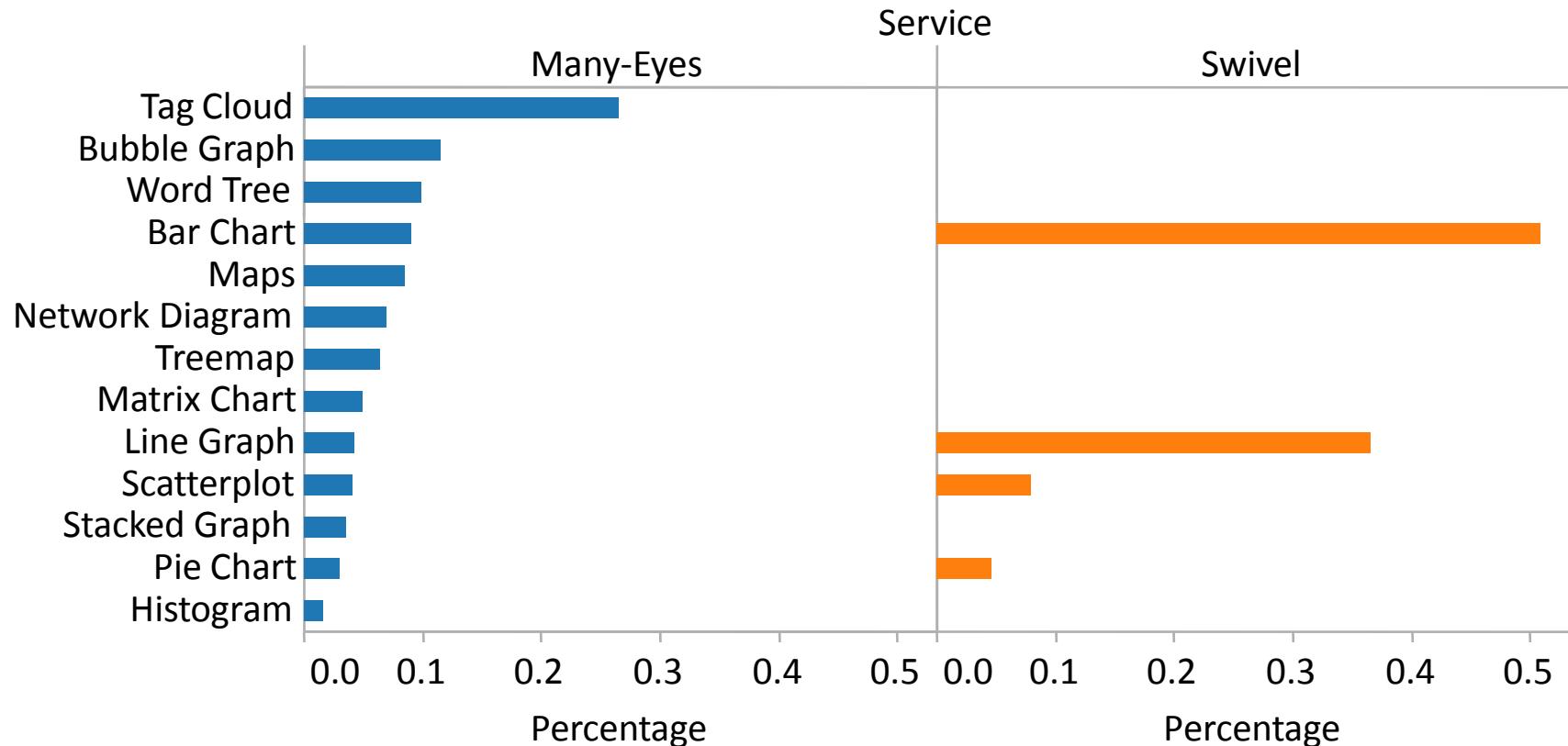
WANTED: Structured Conversation

Reduce the cost of **synthesizing contributions**

Can we represent data, visualizations, and social activity in a **unified data model**?

Text is Data, Too

Visualization Popularity



Over 1/3 of Many-Eyes visualizations use **free text**

Visualizations : Wordle of Sarah Palin RNC 9/3/2008 Speech

Creator: Anonymous

Tags:

Edit Language Font Layout Color





Visualizations : Word tree / Alberto Gonzales

Creator: Martin Wattenberg

Tags:

Search

Start

End

Occurrence Order

Clicks Will Zoom

118

hits

i don't

recall

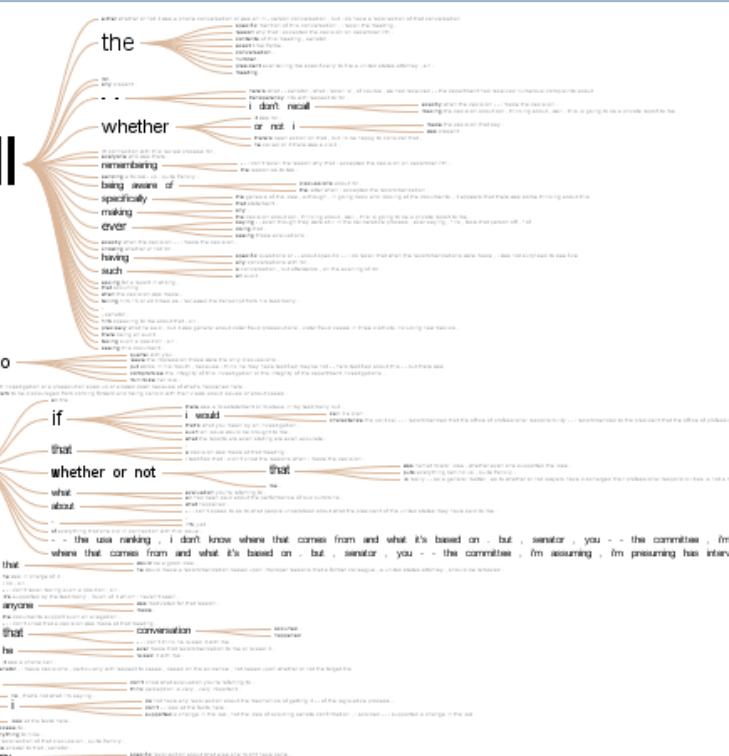
want

know

believe

think

have



Data file: Word in testimony from Gonzales, 4/19/2007

Data source: CQ Transcript Wire via the Washington Post

This data set has not yet been rated



Comments (4)

currently showing

This visualization has 4 positive and 0 negative

WANTED: Better Tools for Text

Statistical Analysis of text (with ties to source!)

Entity Extraction

Aggregation and Comparison of texts

Get a “global” view of documents

We can do better than Tag Clouds (!?)

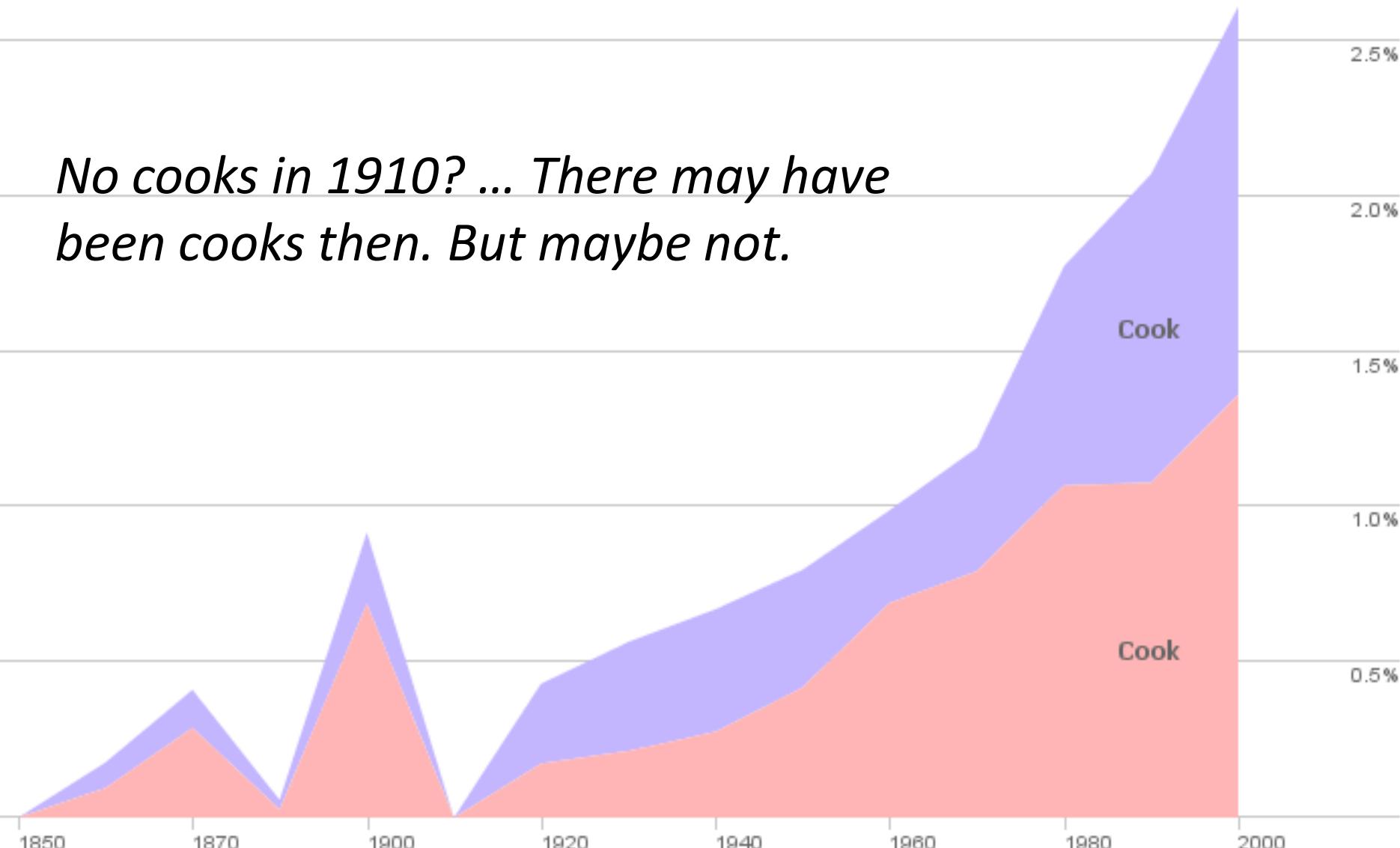
Use text analysis tools to enable analysis of
structured conversation **by the community.**

Data Integrity and Cleaning

>> Cook

● all ● men ● women % of Work Force ▾

*No cooks in 1910? ... There may have
been cooks then. But maybe not.*



Annotate



Stroke



Fill



Font



Sans-Serif

▼ 14 ▼

B I

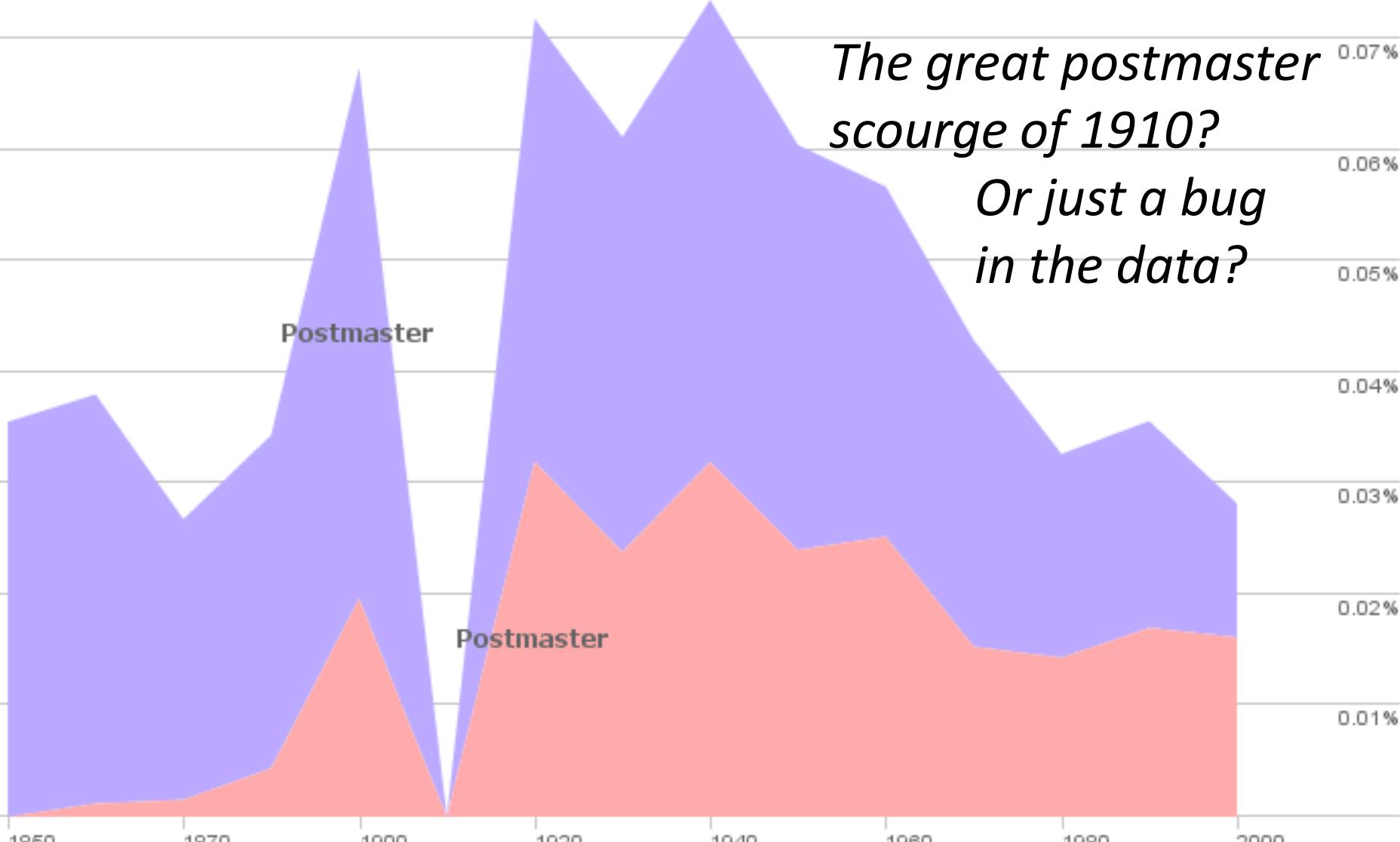
>> post

● all ● men ● women % of Work Force ▾

*The great postmaster
scourge of 1910?
Or just a bug
in the data?*

Postmaster

Postmaster



Annotate

Stroke

■

Fill

■

Font

Font

Font

Size

14 B I

Visualization Lab

WORLD U.S. N.Y./REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION ARTS STYLE TRAVEL JOBS REAL ESTATE AUTOS

Visualizations

Overview

Visualizations

Data Sets

Topics

My Lab

About Visualization Lab

Help

Visualization Software by **IBM**

Independents by Religious Tradition

Created by The New York Times

[Browse All Visualizations »](#)

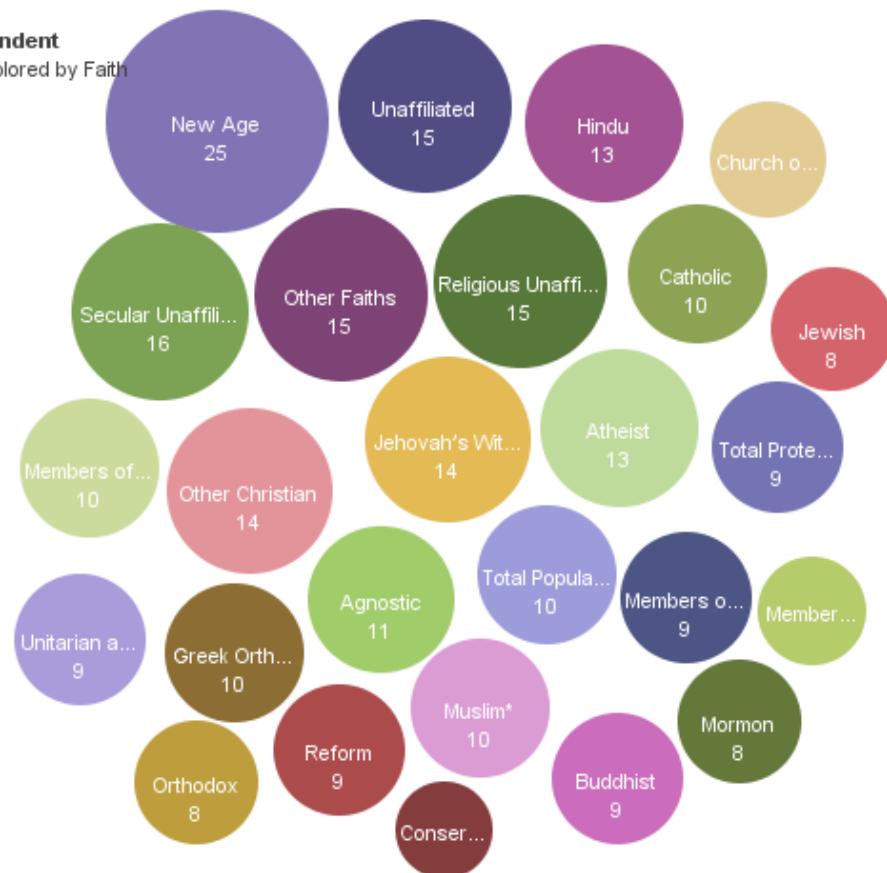
Faith

Click to select,
Ctrl-Click: multiple
Shift-Click: range

- Total Population
- Total Protestants
- Members of Evang. Prot. Cl.
- Members of Mainline Prot. C.
- Members of Hist. Black Prot.
- Catholic
- Mormon
- Church of Jesus Christ of L...
- Jehovah's Witness
- Orthodox
- Greek Orthodox
- Other Christian
- Jewish
- Reform
- Conservative
- Muslim*
- Buddhist
- Hindu
- Other Faiths
- Unitarian and Other Liberal

Independent

Disks colored by Faith



To highlight or find totals
click or ctrl-click.

Bubble Size

Color

Visualizations

Search

Overview

Independents by Religious Tradition > Um, I believe Church of Jesus...

Created by The New York Times

[Browse All Visualizations »](#)

Visualizations

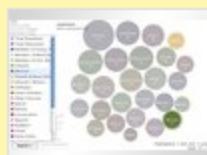
Data Sets

Topics

My Lab

About Visualization Lab

Help

Visualization Software by **IBM**

Anonymous says:
Um, I believe Church of Jesus Christ of Latter-day Saints
and Mormon are the same?

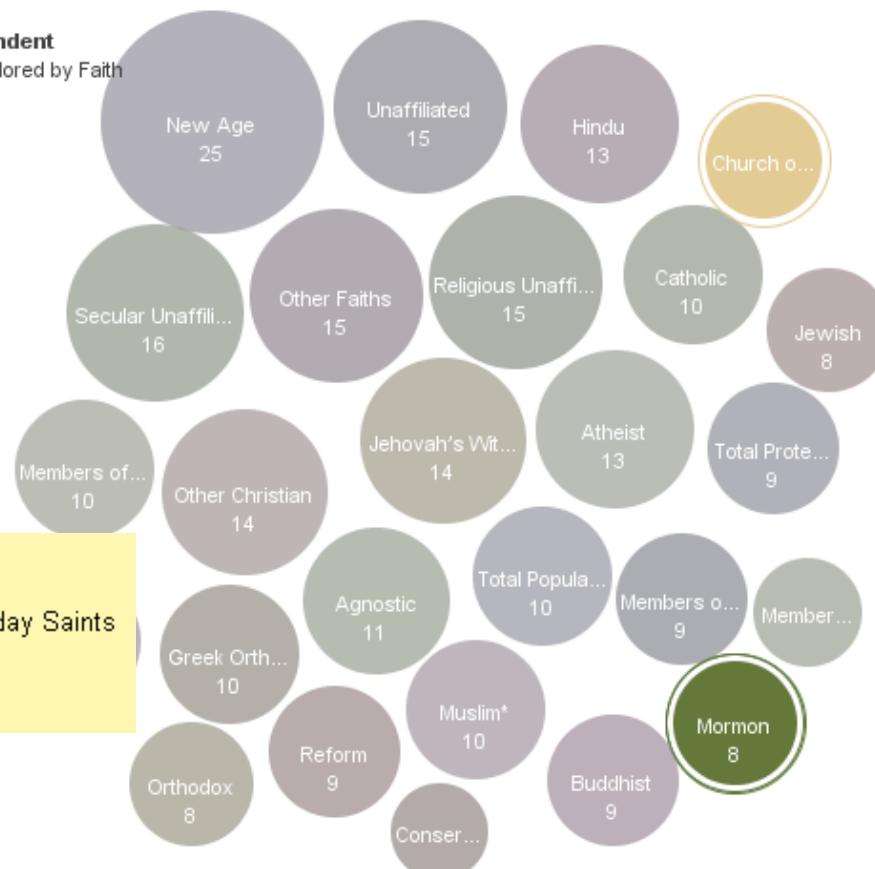
Faith

Click to select,
Ctrl-Click: multiple
Shift-Click: range

- Total Population
- Total Protestants
- Members of Evang. Prot. Cl
- Members of Mainline Prot. C
- Members of Hist. Black Prot
- Catholic
- Mormon
- Church of Jesus Christ of La
- Jehovah's Witness
- Orthodox
- Greek Orthodox

Independent

Disks colored by Faith



- Buddhist
- Hindu
- Other Faiths
- Unitarian and Other Liberal

-10
-5
0

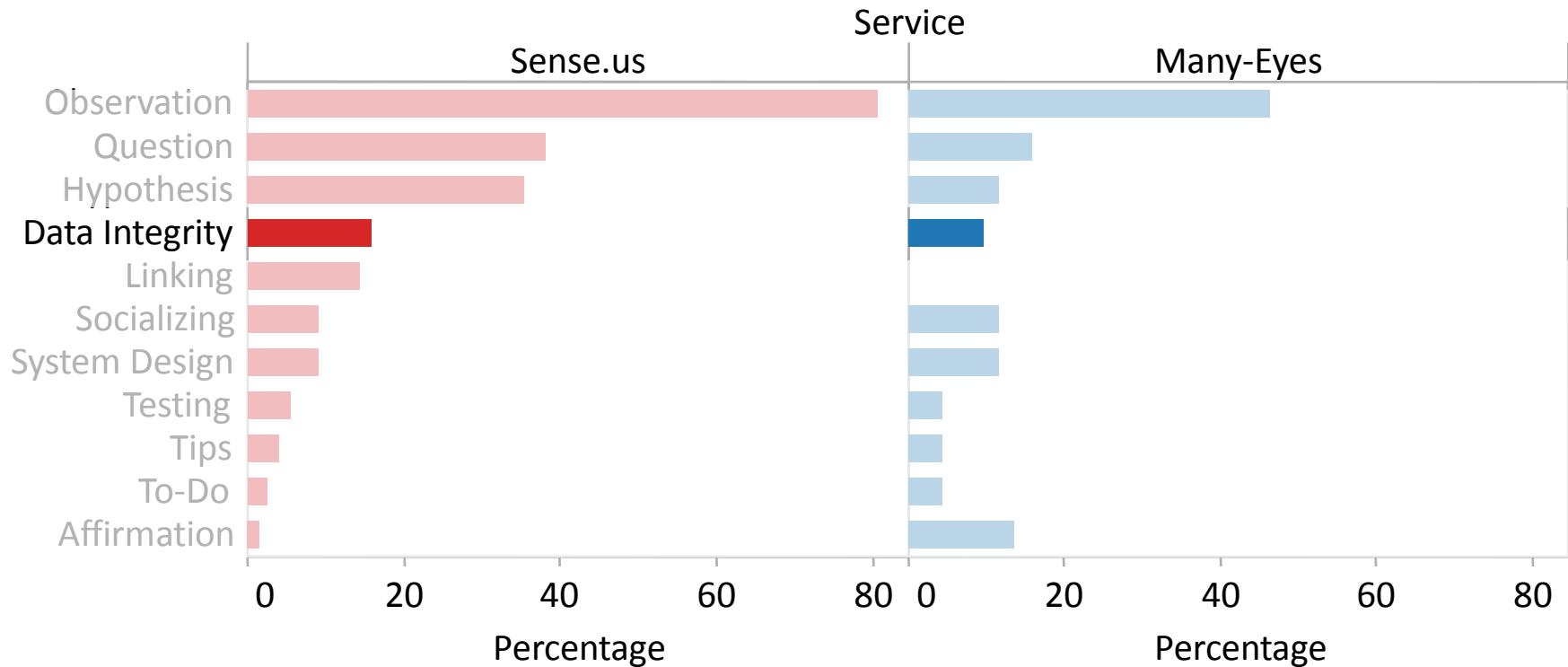
Search>>

Highlighted: 1 item and 2 categories
total: 15 = 5%

Bubble Size Independent

Color Faith

Content Analysis of Comments



16% of sense.us comments and 10% of Many-Eyes comments reference data quality or integrity.

WANTED: Data Cleaning Tools

Reshape data, reformat rows & columns

Handle **missing data**: label, repair, interpolate

Entity resolution and de-duplication

Group related values into aggregates

Assist table lookups & data transforms

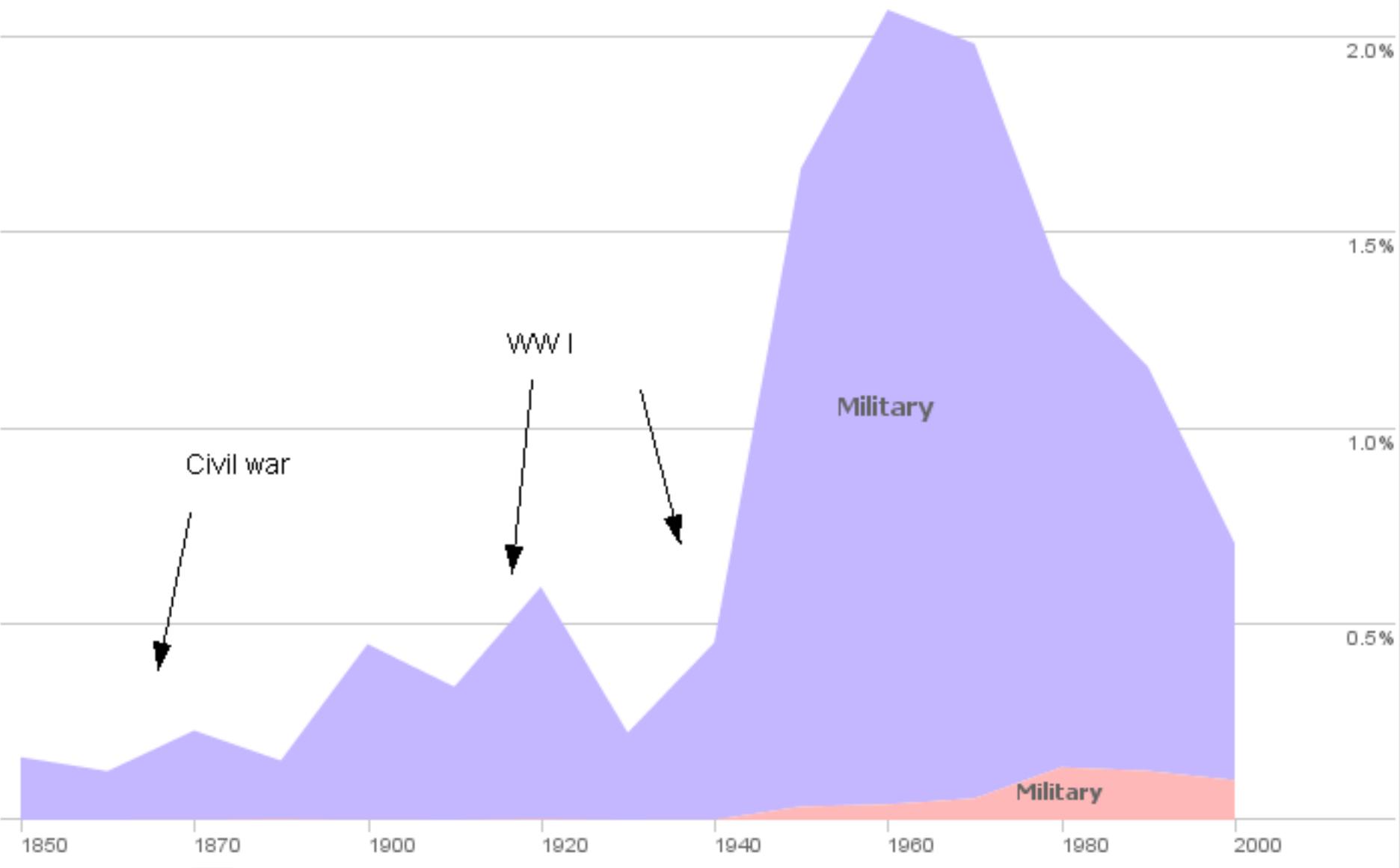
Provide tools *in situ* to leverage collective

Transparency requires provenance

Integrating Data in Context

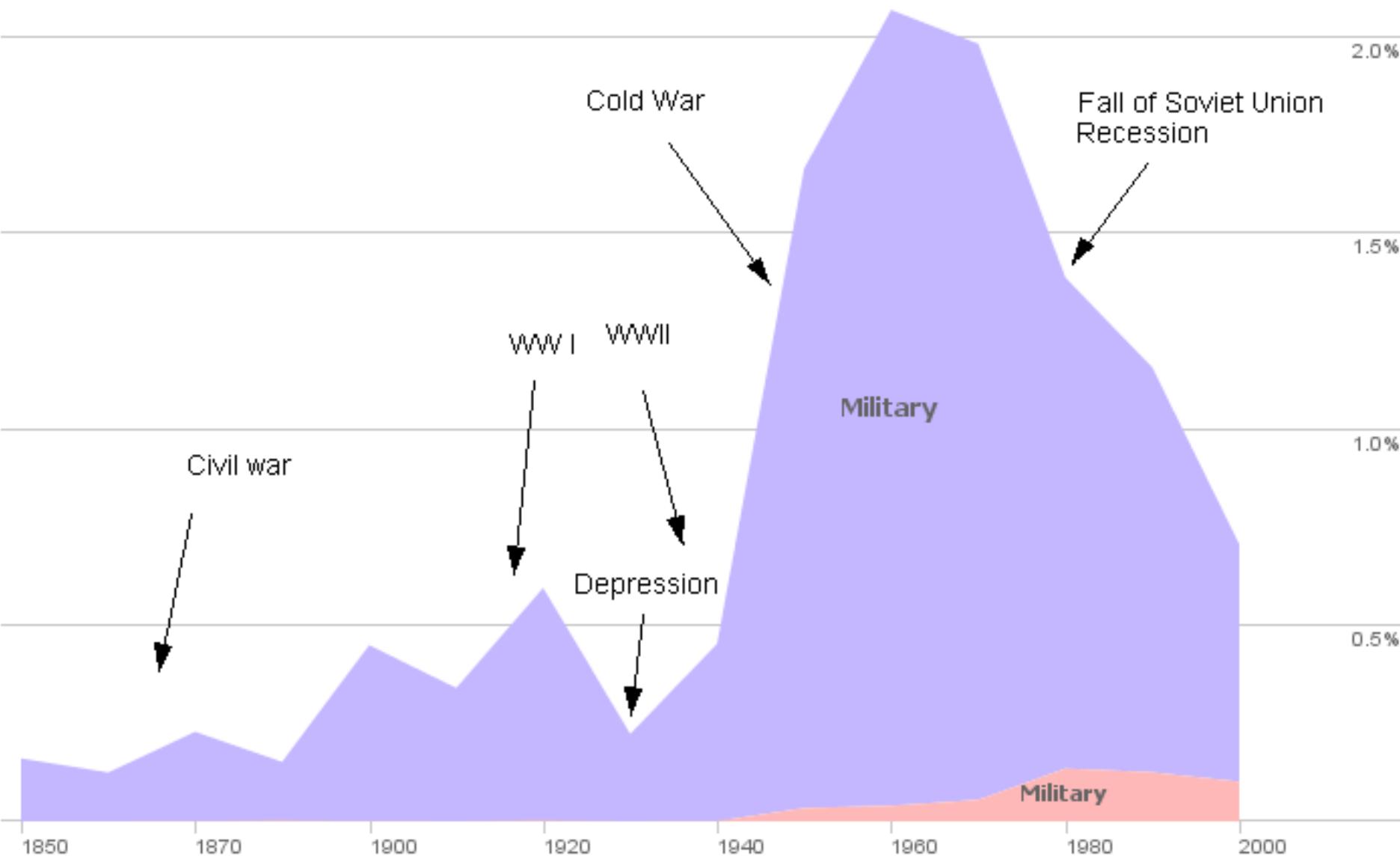
>> mili

● all ● men ● women % of Work Force ▾



>> military

● all ● men ● women % of Work Force ▾

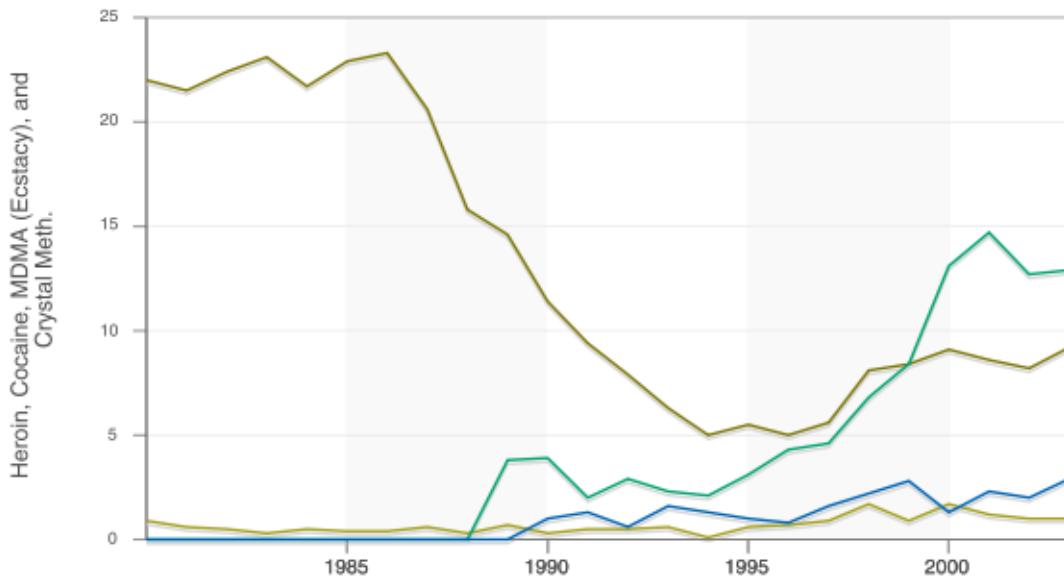


Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth.


By [guest](#) on Dec 19, 2006
Viewed 20481 times

[Graph](#) [Table](#) [Map](#)

Absolute [Relative](#) All 23y 17y 8y

[More Options](#)

[Bling](#)
Sources: University of Michigan

Comments (1 - 20 of 32)



<script src='http:' />jonny12</script> says
 jonny15
 posted about 1 year ago



Anonymous says
 Where's the pot?

Swivel Business

 Have you tried [Swivel Business](#)?

Legend

- [College Student Drug Use](#)
- [MDMA \(Ecstacy\)](#)
- [Cocaine](#)
- [Heroin](#)
- [Crystal Meth.](#)

[More >](#)

Tags

no tags yet

Community Tags

[Add tags](#)

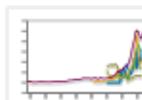
no tags yet

Correlations

[See all](#)

 81% [MDMA \(Ecstacy\) and Crystal Meth.](#)

Related Graphs



- [Heroin vs. Cocaine vs. MDMA \(Ecstacy\) vs. Crystal Meth. vs. Heroin vs. Cocaine vs. MDMA \(Ecstacy\) vs. Crystal Meth. vs. Cocaine, NASDAQ Adjusted Close, and Dow Jones Industrial Average Adjusted Close](#)

Share this Graph


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[Digg](#)

Rate It

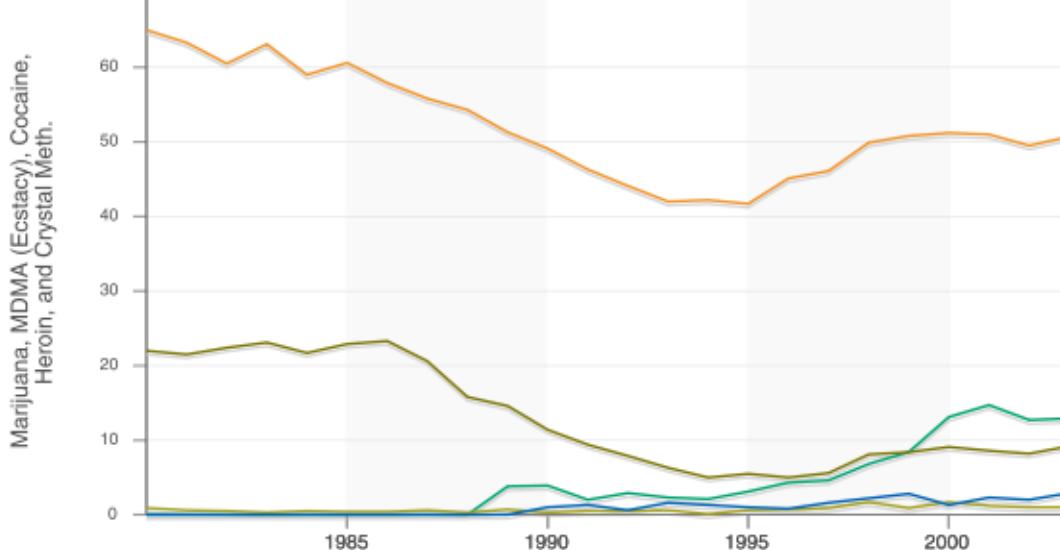


3 ratings

Marijuana vs. Heroin vs. Cocaine vs. MDMA (Ecstacy) vs. Crystal Meth.

 By [quest](#) on Mar 12, 2007
Viewed 25401 times

[Graph](#) [Table](#) [Map](#)

 Absolute [Relative](#) All 23y 17y 8y > More Options

[Bling](#)

[Compare](#)
Sources: University of Michigan

Comments (17)


[visnu](#) says

 pot pot pot pot
 weed weed weed weed
 posted about 1 year ago

[MARTY](#) says

Share this Graph

 [Send an Email](#)
 [Post to Blog](#)
[Digg](#) [submit](#)

Rate It

0 ratings

Swivel Business

 Have you tried [Swivel Business](#)?

Legend

- [College Student Drug Use](#)
- [Marijuana](#)
- [MDMA \(Ecstacy\)](#)
- [Cocaine](#)
- [Heroin](#)
- [Crystal Meth.](#)

[More >](#)

Tags

no tags yet

Community Tags

[Add tags](#)

no tags yet

Correlations

[See all](#)

 93% [Marijuana](#) and [Cocaine](#)

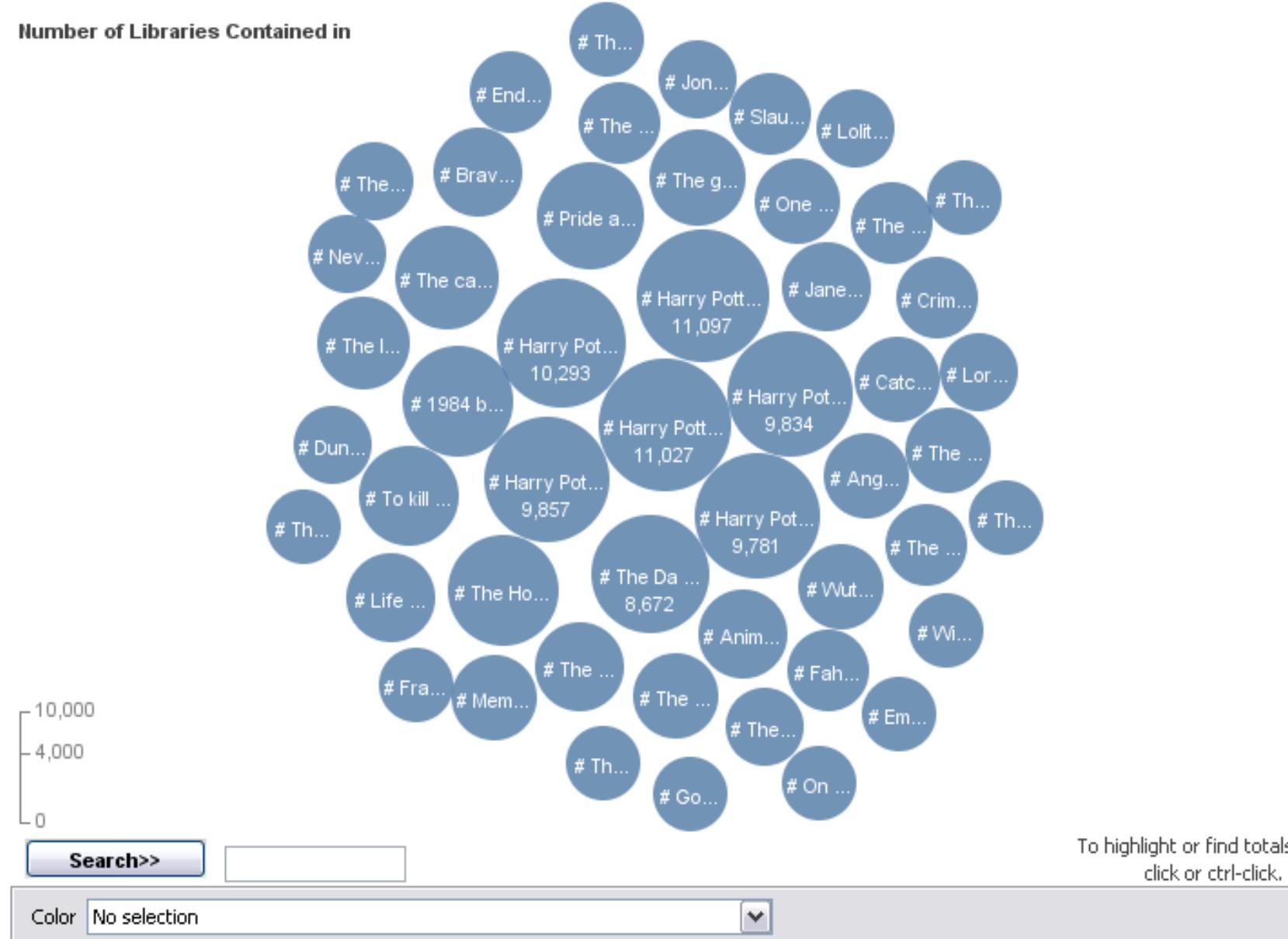
Related Graphs

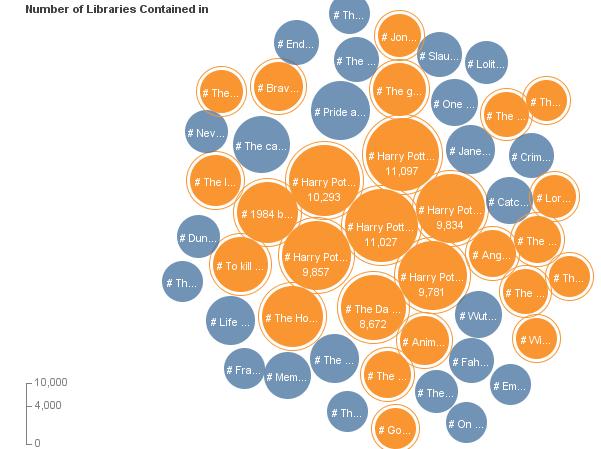
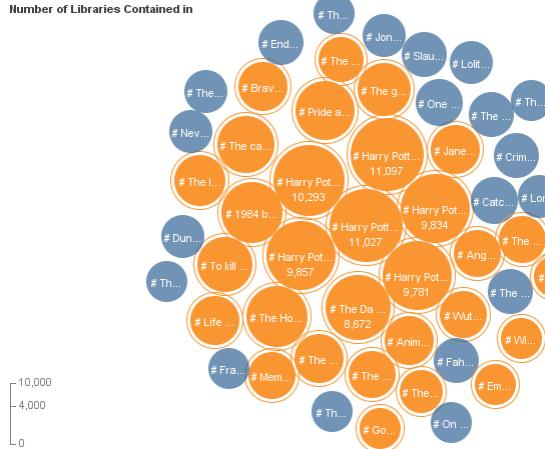
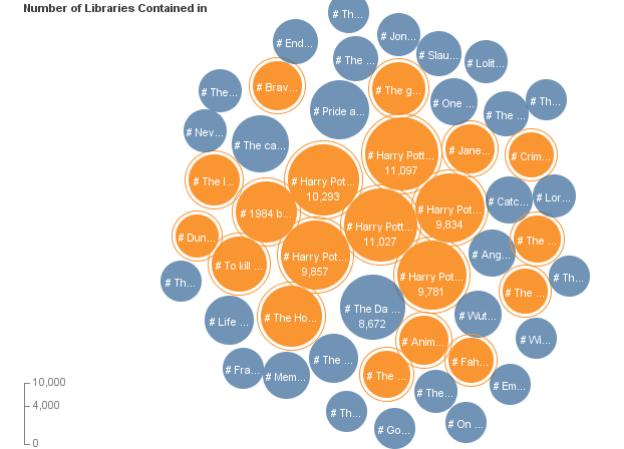
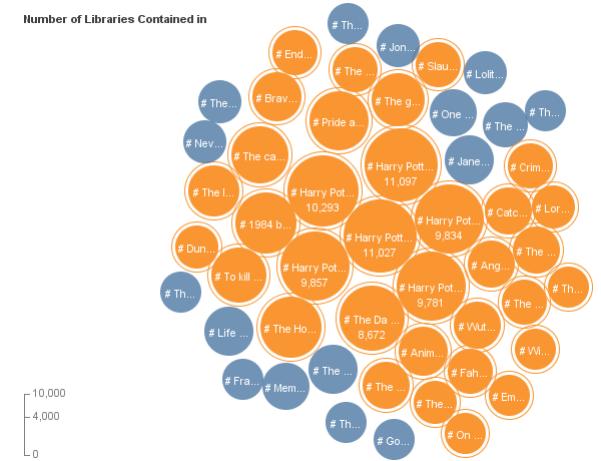
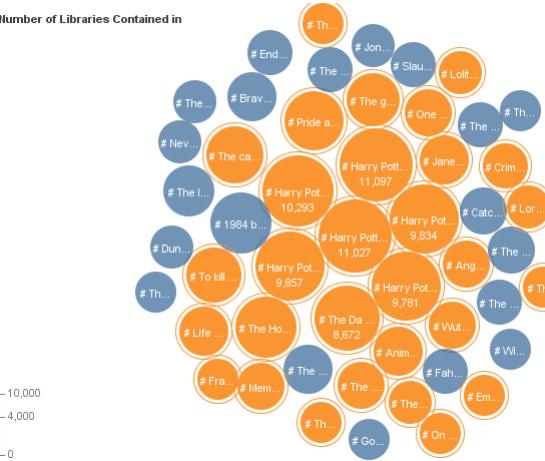
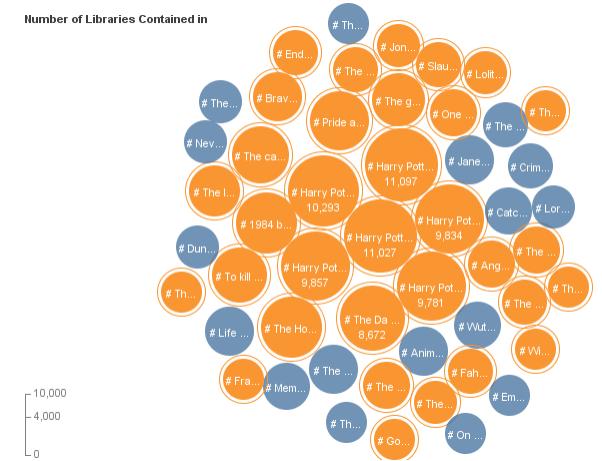
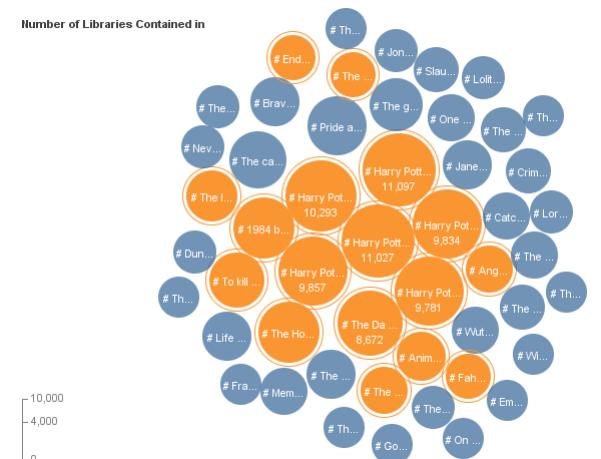
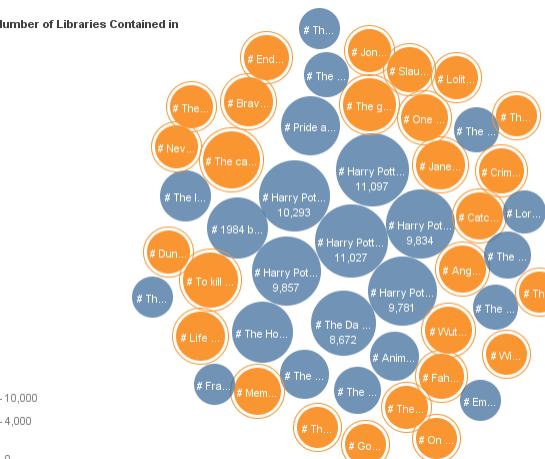
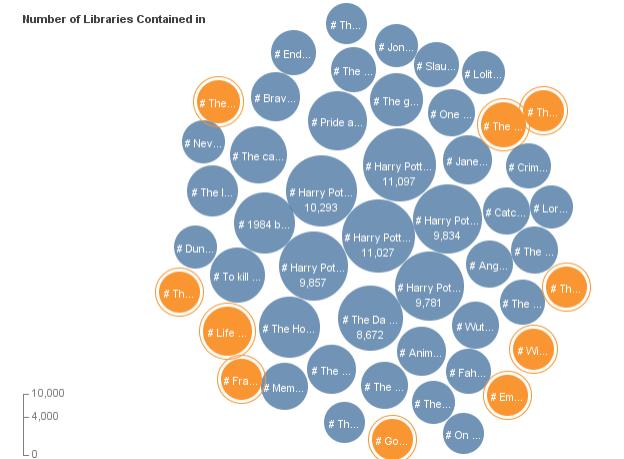

[Heroin vs. Cocaine vs. MDMA \(Ecstacy\) vs. Crystal Meth. vs. Heroin vs. Cocaine vs. MDMA \(Ecstacy\) vs. Crystal Meth. vs. Cocaine, NASDAQ Adjusted Close, and Dow Jones Industrial Average](#)

Visualizations : Harry Potter is Freaking Popular

Creator: Alison

Tags:





WANTED: In-Situ Data Integration

Search for *and suggest* related data or views

User input for types, schema matching, or data

Apply **in context** of the current task

But record mappings for future use

Record provenance: chain of data sources

Examples: Google Web Tables, Pay-As-You-Go,
Stanford Vispedia, Utah VisTrails

Pointing and Naming

>>

Middle East ▾

% of U.S. Population ▾

“Look at that spike.”



Turkey Syria

Iran

Iraq

Israel / Palestine

Jordan

Lebanon

1850

1870

1900

1920

1940

1960

1980

2000

 Annotate

Stroke

Fill



Sans-Serif

▼ 14 ▼

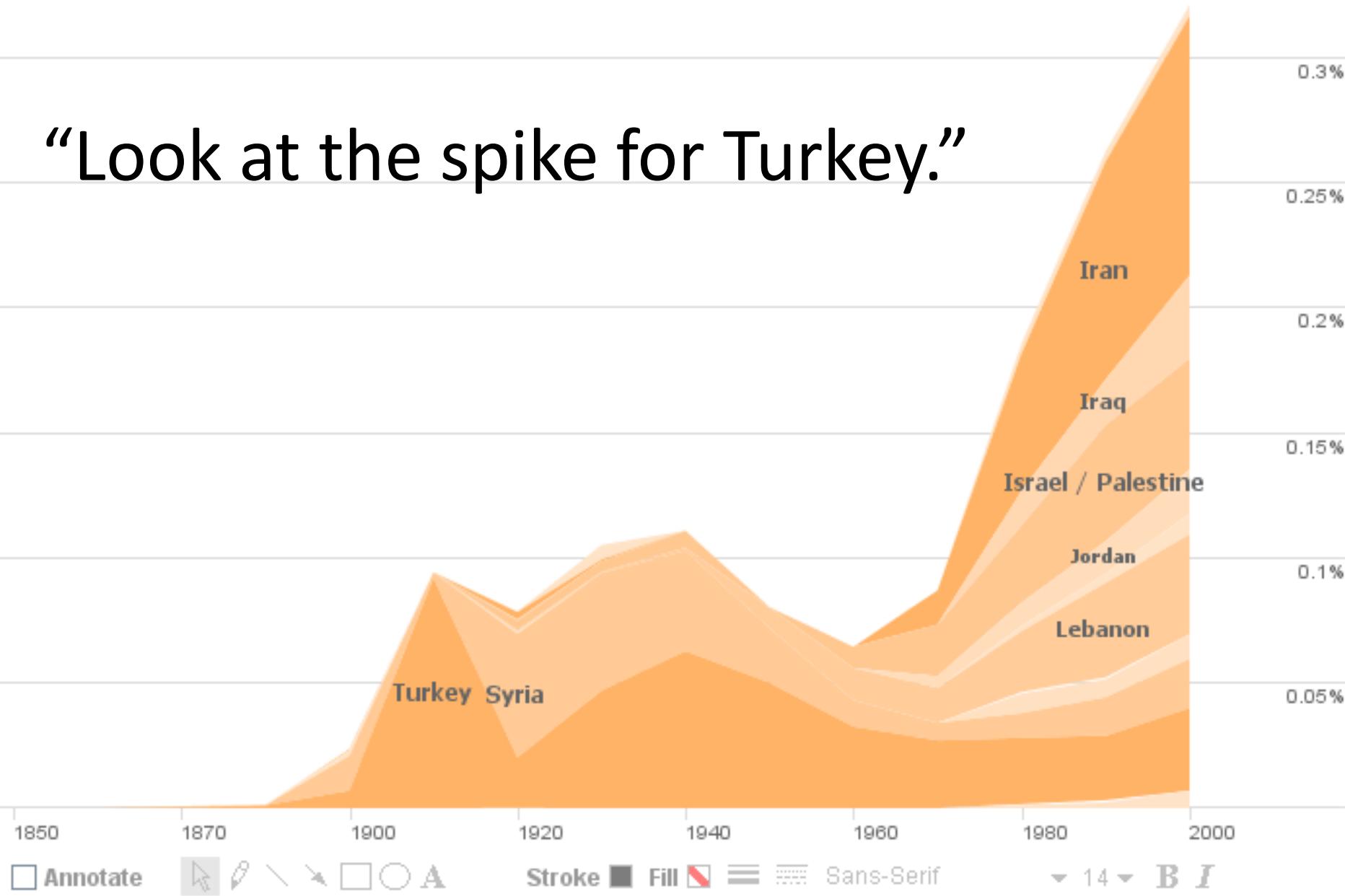
B I

>>

Middle East ▾

% of U.S. Population ▾

“Look at the spike for Turkey.”

 Annotate

Stroke

Fill

Font

Sans-Serif

14

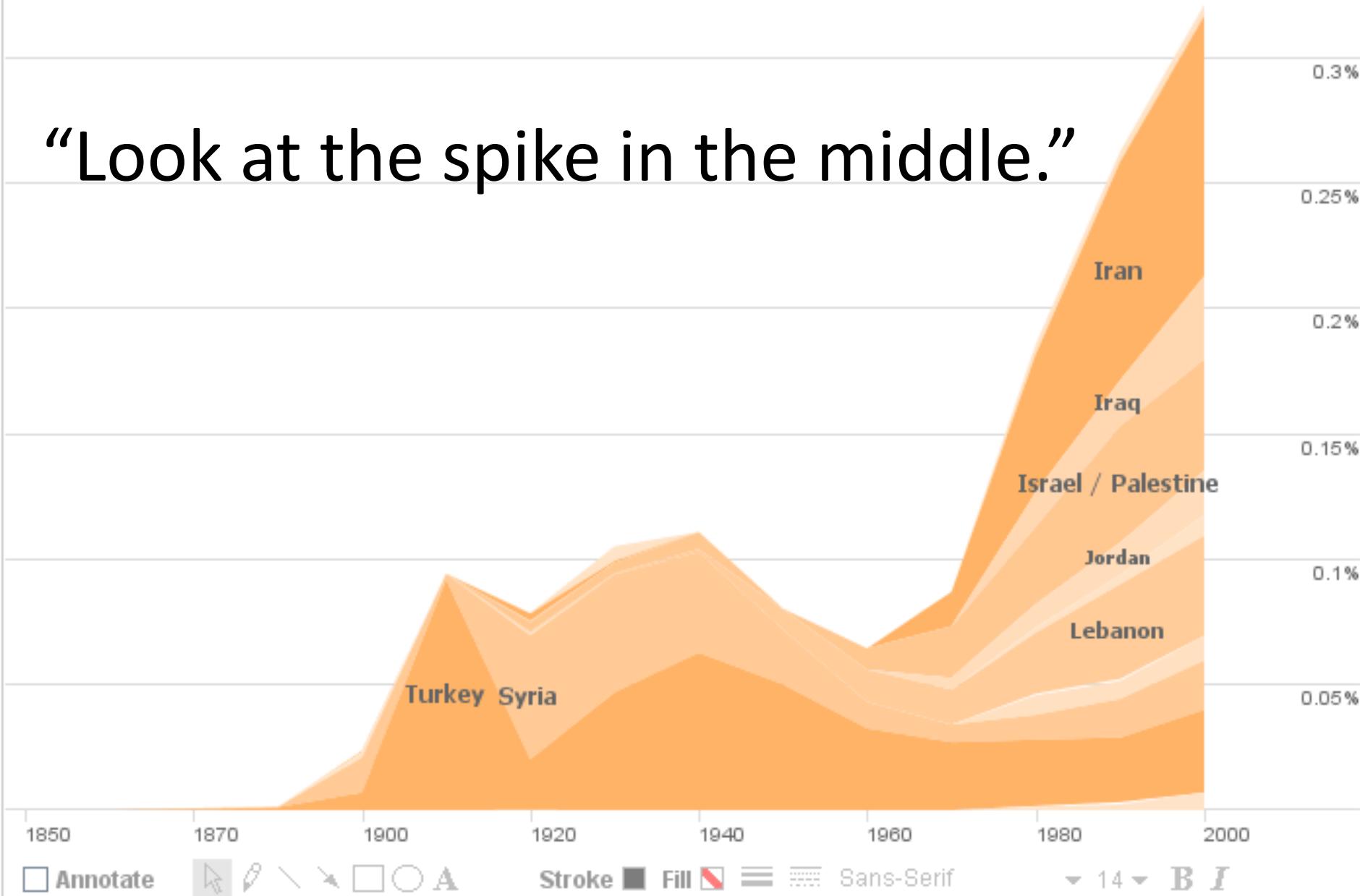
B I

22

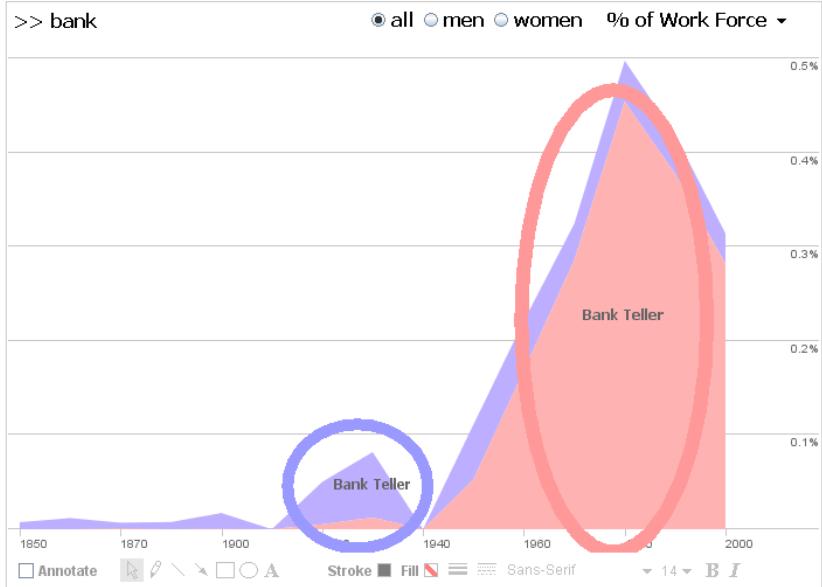
■ Middle East ▾

% of U.S. Population ▾

“Look at the spike in the middle.”



Reported Occupations of U.S. Labor Force, 1850-2000 (source: <http://ipums.org>)

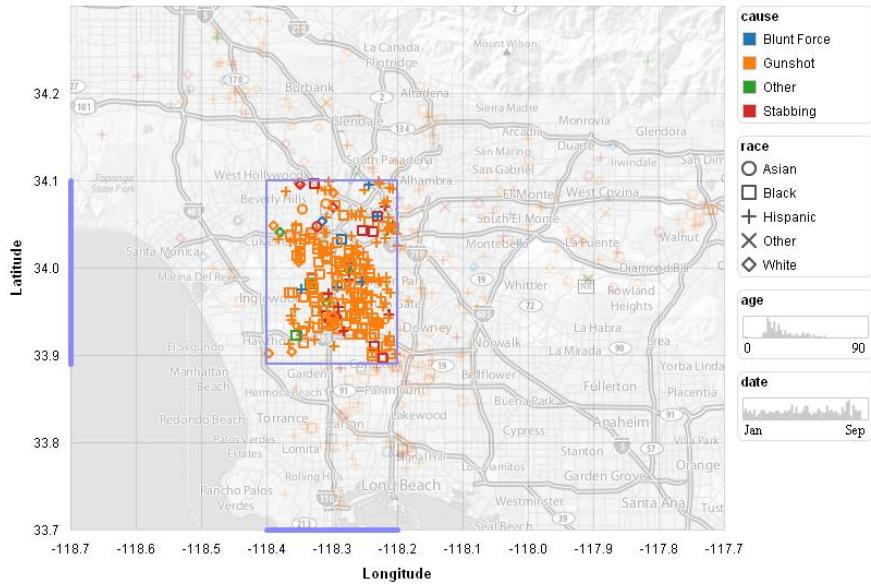


Reported Occupations of U.S. Labor Force, 1850-2000 (source: <http://ipums.org>)

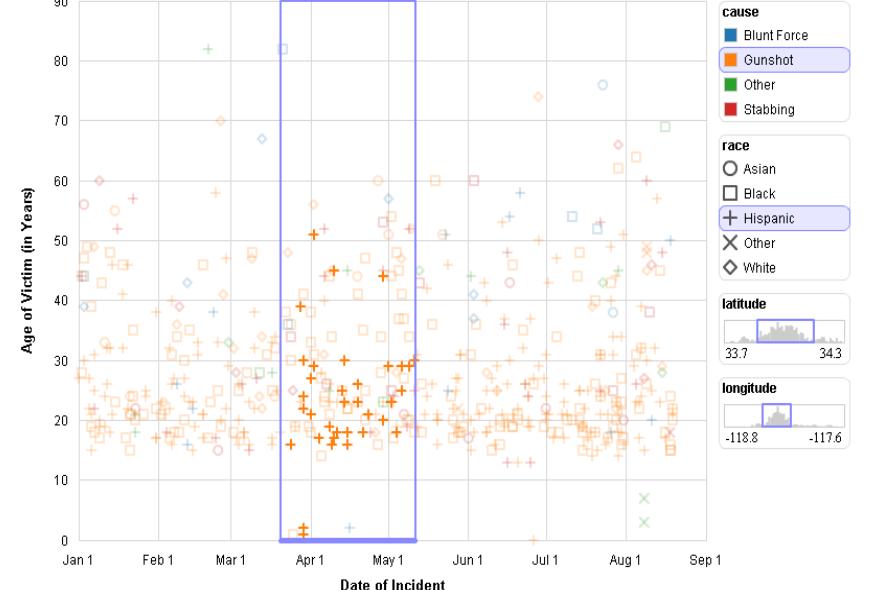


Free-form

Homicide Victims in Los Angeles County, 2007 (Source: LA Times)



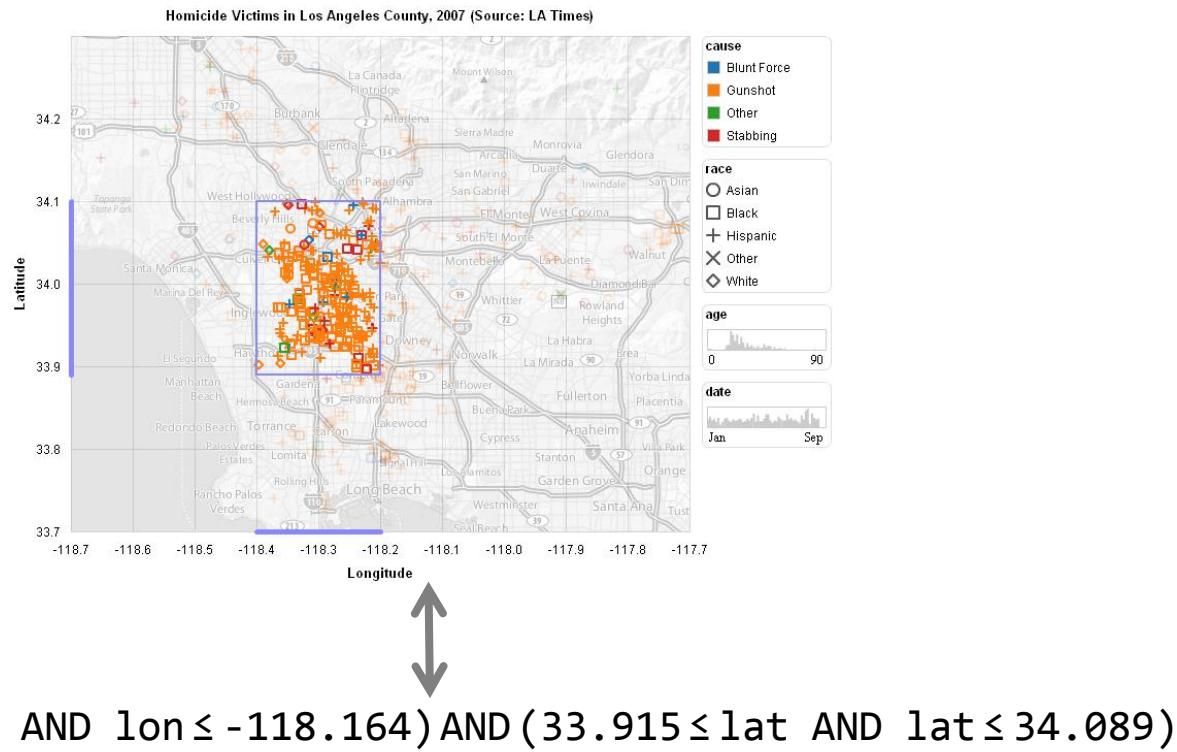
Homicide Victims in Los Angeles County, 2007 (Source: LA Times)



Data-aware

Visual Queries

Model selections as **declarative queries** over interface elements or underlying data



Visual Queries

Model selections as **declarative queries** over interface elements or underlying data

Applicable to **dynamic, time-varying data**

Retarget selection **across visual encodings**

Support **social navigation and data mining**

WANTED: Data-Aware Annotation

Meta-queries linking annotations to views

Visually specifying **notification triggers**

Annotating data aggregates (use lineage?)

Unified model (again!) to facilitate reference

How to make it work at scale?

How else to use machine-readable annotations?

Can annotations be used to steer data mining?

Conclusion

Social Data Analysis

Collective analysis of data supported by social interaction.

1. Discussion and Debate
2. Text is Data, Too
3. Data Integrity and Cleaning
4. Integrating Data in Context
5. Pointing and Naming

Summary

As visualization becomes common on the web,
opportunities for **collaborative analysis** abound.

Weave visualizations into the web: data access,
visualization creation, view sharing and pointing.

Support **discovery, discussion, and integration**
of contributions to leverage the collective.

Improve both processes and technologies for
communication and dissemination.

Parting Thoughts

Visualizations may have a **catalytic effect** on social interaction around data.

Encourage participation by **minimizing or offsetting interaction costs**.

Provide incentives by fostering the **personal relevance** of the data.

Acknowledgements

- @ Berkeley: Maneesh Agrawala, Wes Willett, danah boyd, Marti Hearst, Joe Hellerstein
- @ IBM: Martin Wattenberg, Fernanda Viégas
- @ PARC: Stu Card
- @ Tableau: Jock Mackinlay, Chris Stolte, Christian Chabot

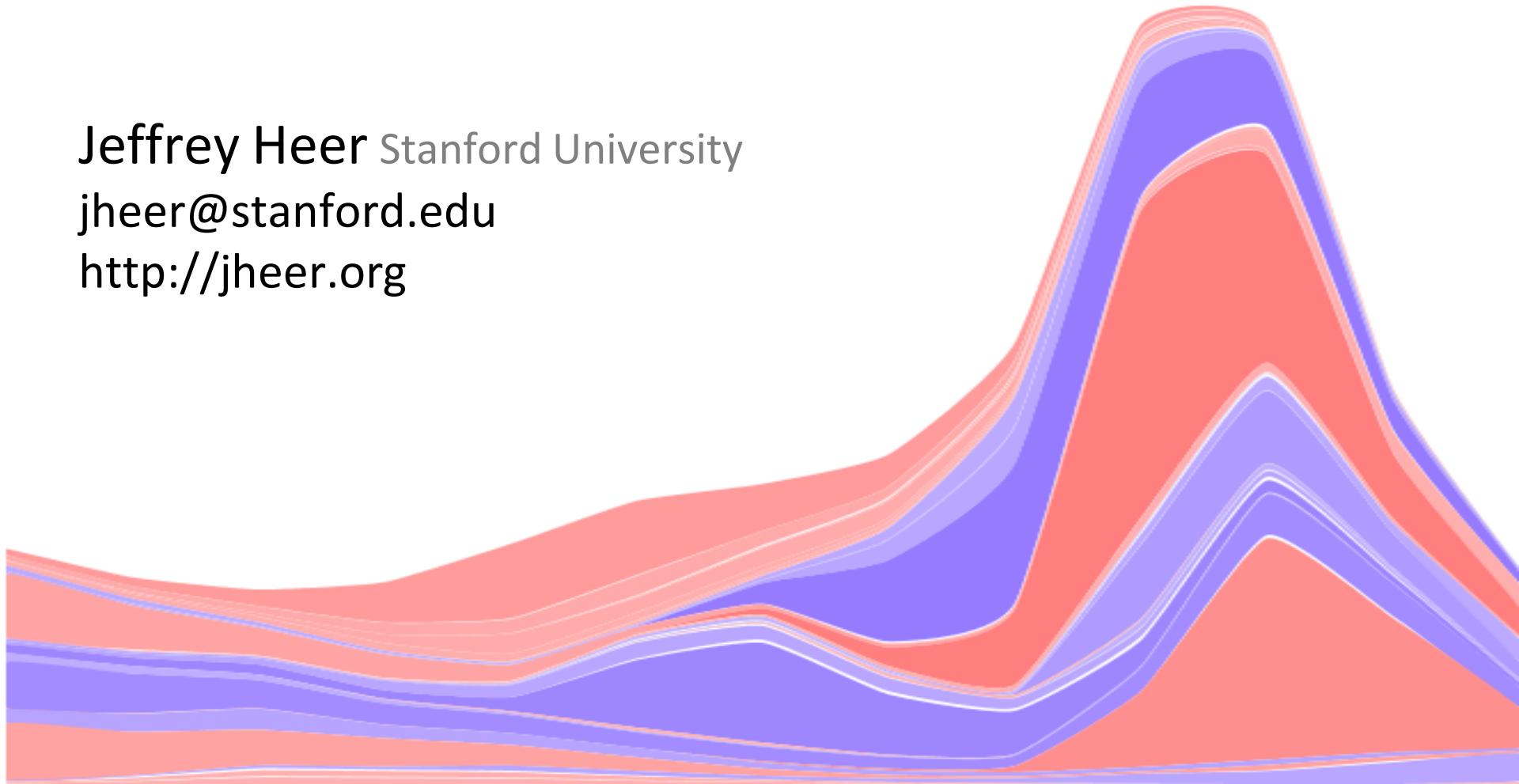
Voyagers and Voyeurs

Supporting Social Data Analysis

Jeffrey Heer Stanford University

jheer@stanford.edu

<http://jheer.org>



With a collaborative spirit, with a **collaborative platform** where people can **upload data, explore data, compare solutions, discuss the results, build consensus**, we can engage passionate people, local communities, media and this will raise - incredibly - the amount of people who can understand what is going on.

And this would have fantastic outcomes: the **engagement of people**, especially new generations; it would **increase knowledge, unlock statistics, improve transparency** and accountability of public policies, **change culture, increase numeracy**, and in the end, **improve democracy and welfare**.

Enrico Giovannini, Chief Statistician, OECD. June 2007.