

Statistics in the News

Nancy Reid

University of Georgia

April 17, 2009



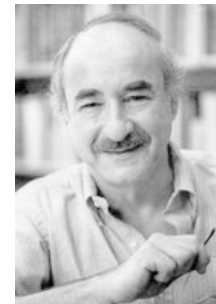
Freshman seminars

- First year students only
- No pre-requisites
- Not part of any program
- Can be used as breadth requirement
- Limited to 24 students
- Emphasis on discussion, writing
- (No exams!)



Inspiration

“A course called Chance”



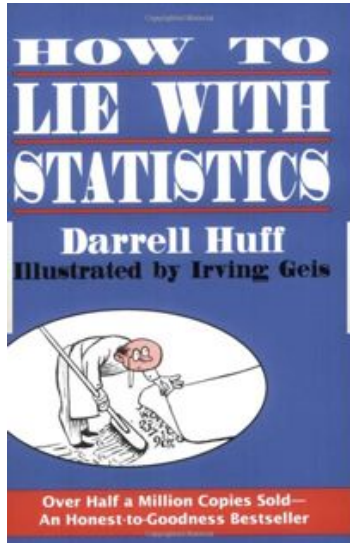
CHANCE

A publication of the American Statistical Association

Volume 22, Number 1, 2009

A screenshot of a web page. On the left is a navigation menu with a colorful grid icon and links for 'Main Page', 'Community portal', and 'Current events'. At the top right are tabs for 'article', 'discussion', 'edit', and 'history'. The main content area is titled 'Main Page' and contains a link for 'Chance News 46: 3/23/09 to ? Under Construction'.

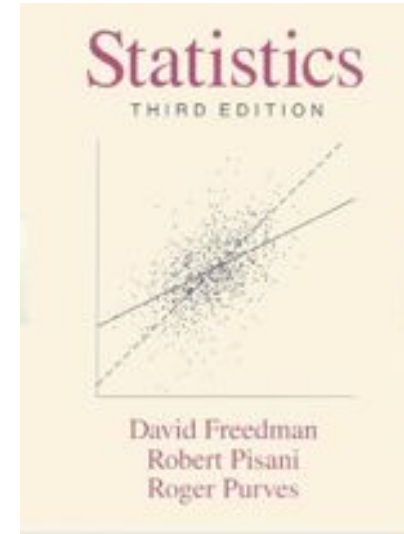
The pioneers



1954



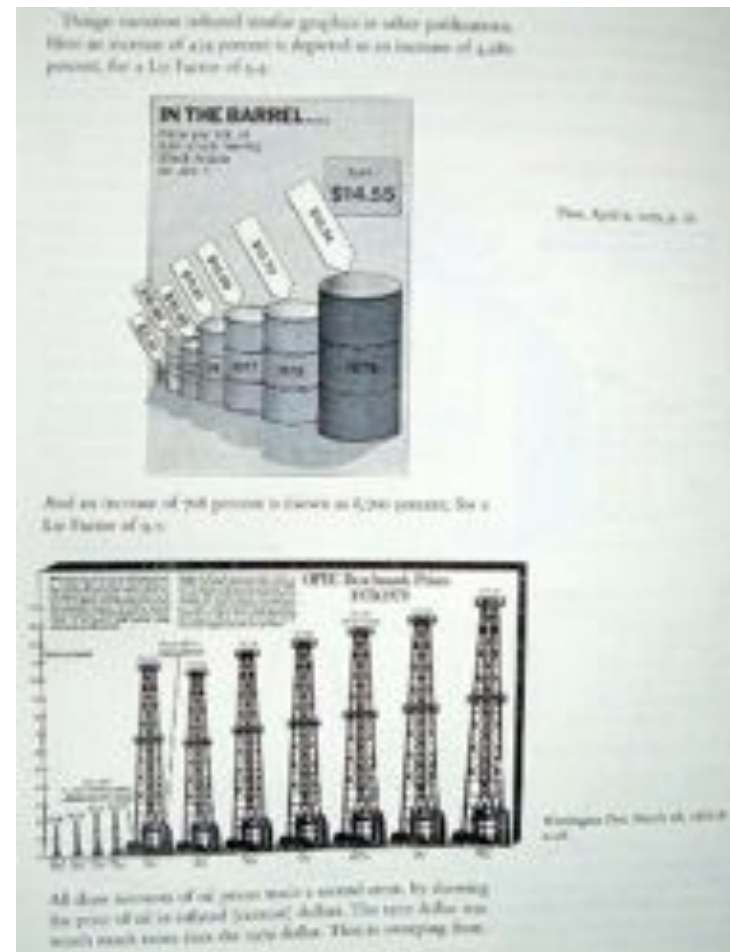
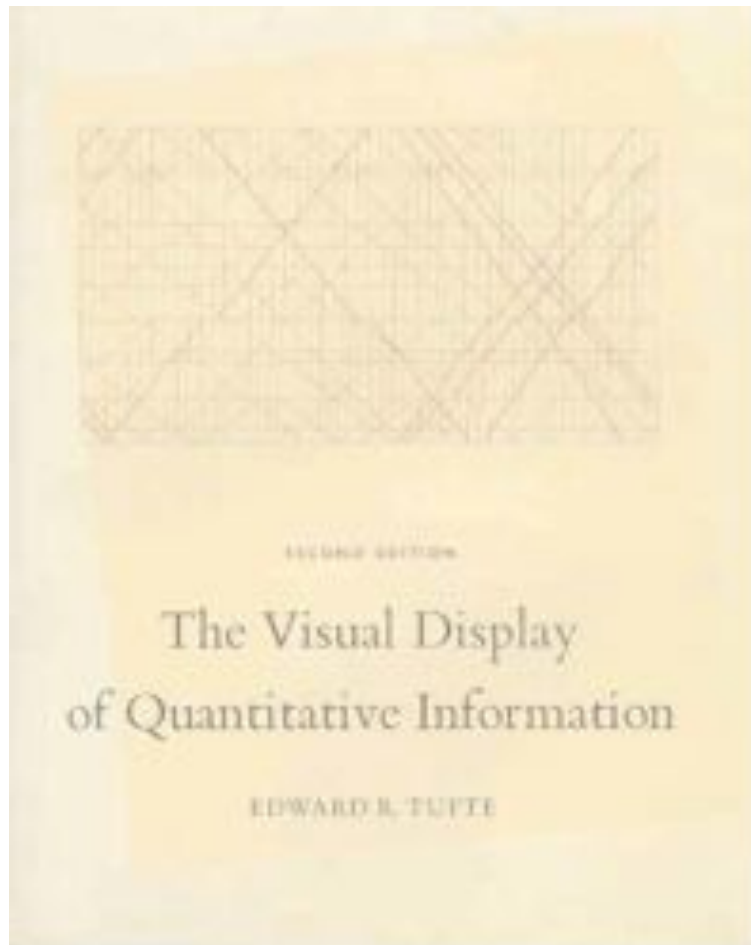
1978



1979



... pioneers



1983

This week in the news



The NEW ENGLAND
JOURNAL of MEDICINE

WIRED

Required for next week

- Read Chapter 16 of *SBL*. Come to class prepared to note the parts you didn't follow, and the parts you found particularly interesting.
- Read the Toronto Star article about the influenza vaccine (attached, and see below), and the Abstract and Summary of the research article on which this was based (also attached).

This week in the news

- “Half of U.S. doctors say they use placebo treatments”, The Globe and Mail and NY Times, Oct. 23.
<http://www.nytimes.com/2008/10/24/health/24placebo.html?ref=health>
- “21-Year Study of Children Set to Begin”, NY Times, Oct. 28.
<http://www.nytimes.com/2008/10/28/health/research/28chil.html?ref=health>
- “Arctic ice thickness *plummets*”, BBC News, Oct. 28.
<http://news.bbc.co.uk/2/hi/science/nature/7692963.stm>
- “Universal flu shot saves lives, resources: study”, Toronto Star, Oct. 27.
<http://www.thestar.com/News/Canada/article/525558>
<http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0050211>
- “Ontario to ban cellphone use while driving” Globe & Mail, Oct. 25. One of the most widely quoted studies of cellphone use and accidents was done at U of T in the mid-nineties, by Redelmeier (of ICES, coincidentally the group that wrote the flu article) and Tibshirani (Dept Statistics, U of T at the time).
- “Accuracy of polls a question in itself”, Washington Post, Oct. 28. A similar story was in the Globe & Mail on Oct. 25, and there is a long article in *Science* (Oct. 10), mainly about the Bradley effect, but also the uncertainty on whether or not the ‘new voters’ (young, black) will actually vote on Tuesday. And today's G & M on the front page: “Last minute surge for McCain or just more polling mumbo-jumbo?”

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Polls

Clinical Trials

Observational Studies

Experiments

Surveys

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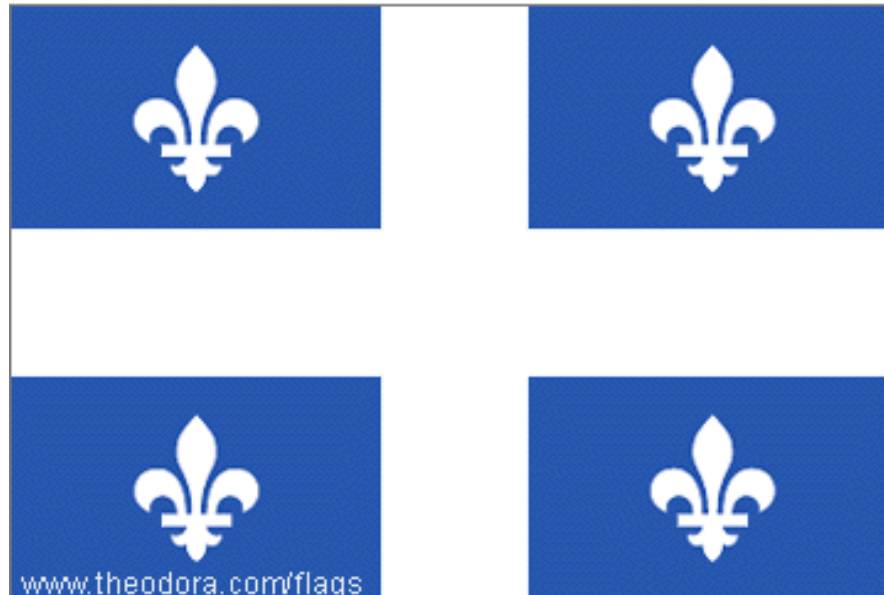
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Polls

- October 30, 1995: [Quebec referendum](#)
- “Do you agree that Québec should become sovereign ... ? “



... Quebec referendum 1995

... Quebec referendum 1995







... Quebec referendum 1995

- “Do you agree that Québec should become sovereign ... ? “

Date	YES	NO	Undecided
Sept 7-8	42.9	43.8	13
Sept 8-12	45.0	37.0	18
Sept 11-14	40.0	36.0	24
Sept 15-19	46.2	38.8	15
Sept 21-25	45.1	43.8	11.1

... Quebec referendum 1995

- Oct. 21: “Dollar plunges on fears of Yes vote”

Polling Company	number polled	date	No	Yes	Undec/ Won't Say
L&L	959	Sept. 7-8	42.9	43.8	13
SOM	1003	8-12	45.0	37.0	18
Compas	959	11-14	40.0	36.0	24
Createc	1004	15-19	46.2	39.8	15
Crop	2020	20-25	47	39	14
SOM	1820	19-25	48	39	13
L&L	1006	25-28	45.1	43.8	11
L&L	1015	Oct. 1-3	44	43	13
Gallup	1013	10-12	43	39	18
L&L	1002	8-12	42	45	13
SOM	981	13-16	43.4	42.9	13.6
L&L	1005	16-20	42.3	45.7	12.1

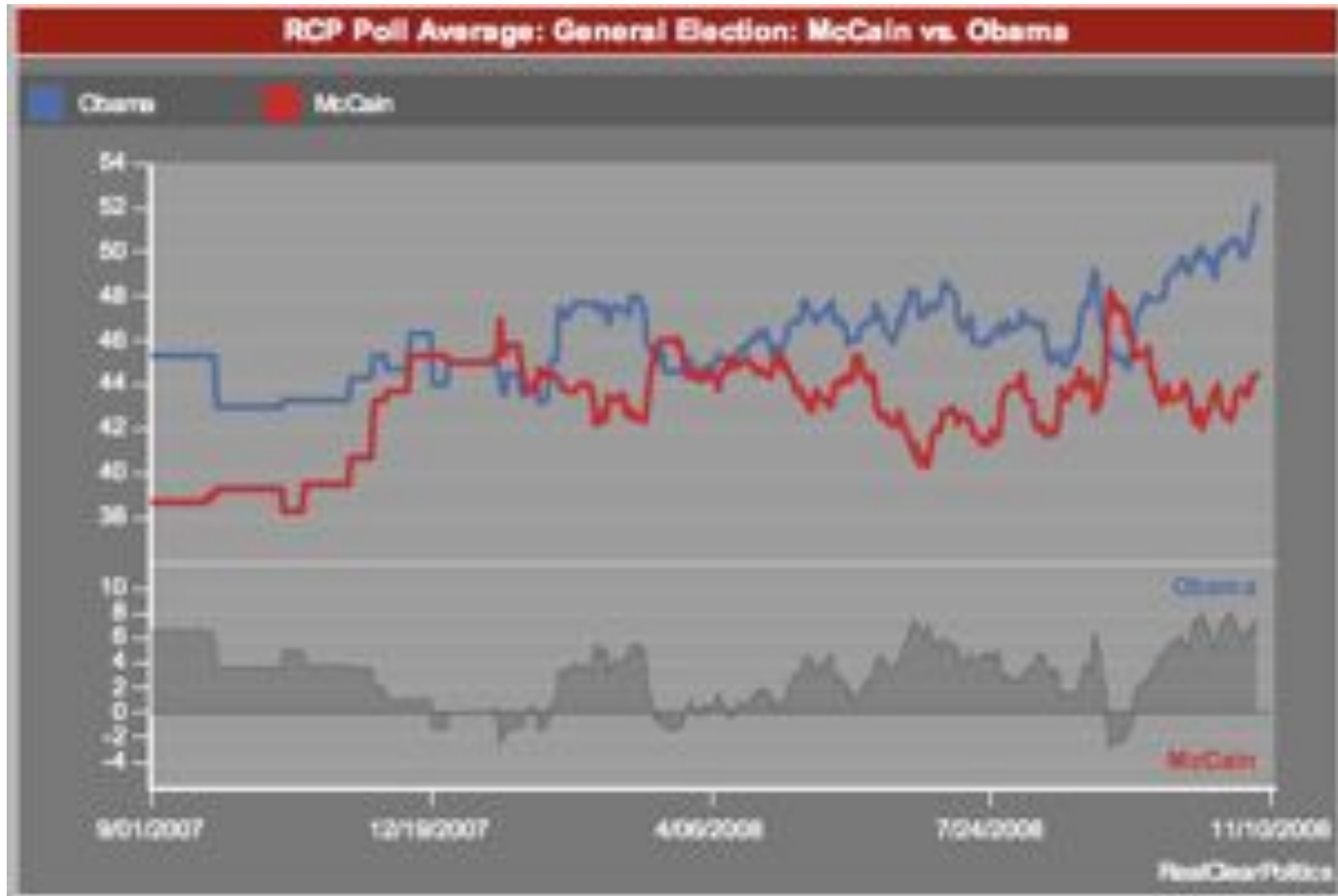
... Quebec referendum 1995



YES: 49.42%

NO 50.58%

... 2008



Surveys

- “New study estimating number of dead in Iraq hotly contested” (Globe & Mail)
- “The human cost of the war in Iraq” (Economist)
- “A statistical study claims that many more Iraqis have died than was thought”
- “Mortality after the 2003 invasion of Iraq: a cross-sectional study” (The Lancet)
- Iraqi death estimates called too high: methods faulted” (Science)

... mortality in Iraq

- Iraq body count: 48,693
- Burnham et al: 601,027 (427,000 – 793,700)
- NEJM, Jan 2008: 151,000 (104,000 – 223,000)
- “Bias in Epidemiological Studies of Conflict Mortality” *J Peace Research* 2008
 - (1) select a random main street, (2) choose a random cross street to this main street, and (3) select a random household on the cross street to start the process.

... biases in sampling

- “Welfare recipients found jobs, study says”
(Globe & Mail, Oct 24 1996)
- Welfare payments cut by 20% when new government took office
- Policy changes made welfare more difficult to obtain
- Number receiving welfare dropped by 180,000
- Government commissioned study to find out why
- Survey of 2100 “randomly chosen people who left the system in May ... more than half had found a job”
- “Considered accurate to within 1.6%, 19 times out of 20”
- “... the research company’s **telephone** survey”

Serendipity

- Capture-recapture sampling
- Assigned reading for March 19
- March 16: *The New York Times*
- March 24:
“Homeless survey
`decoys’ get \$100 each”
- “we have to do this to
make it statistically
valid”

feature

Whale science— and how (not) to use it

Few creatures carry more emotion on their broad backs than whales; and few issues arouse as much passion as whaling. Each year around this time the International Whaling Commission comes under pressure to allow the resumption of commercial catching and killing of whales and the Save the Whale lobbyists protest. But how many whales are there? Can the scientists and statisticians tell us—and how much influence do they wield in the real world of whale-politik? Philip Hammond, a former Chairman of the Scientific Committee of the IWC, explains.

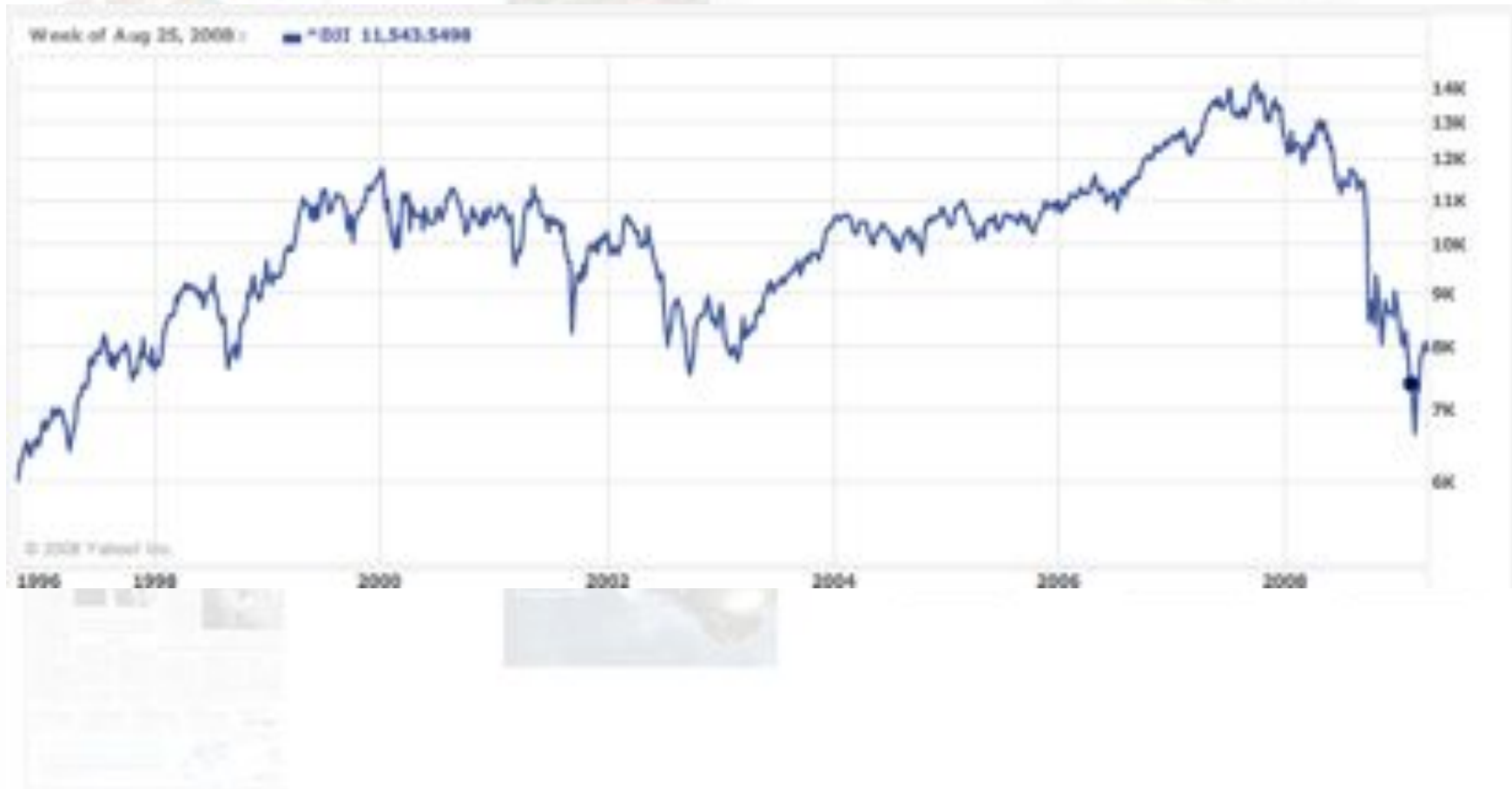


The Fall and Rise of the Right Whale



Over the years

Oct 15, 1996: “Dow Jones breaks 6000” !



... over the years

Oct 22, 1996: meet in computer lab next week

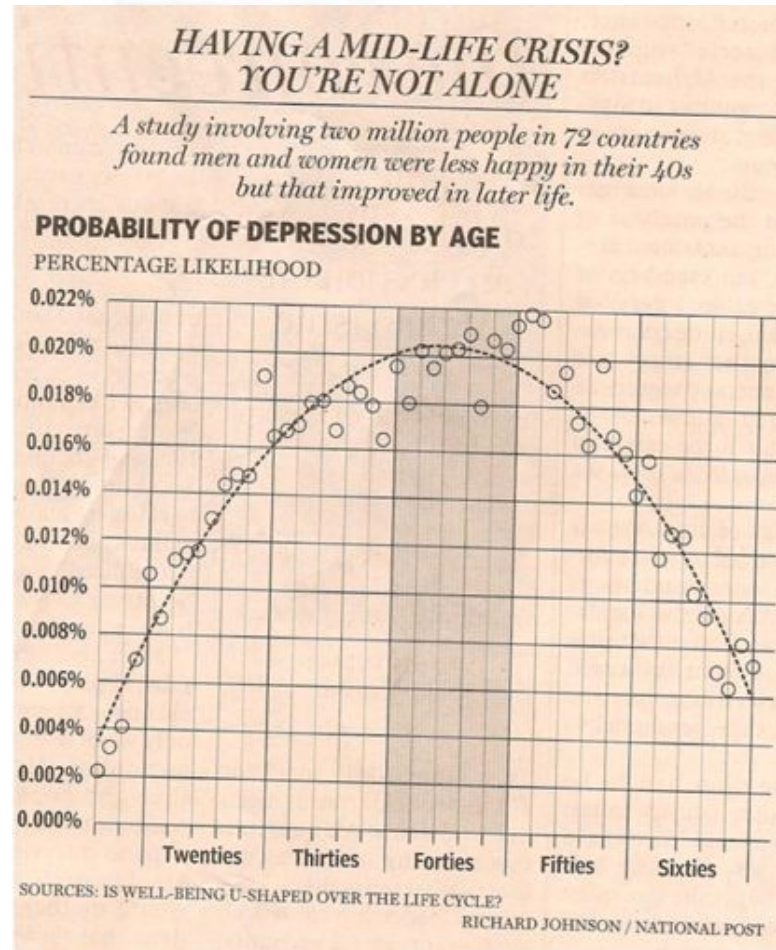
To learn how to use the Internet!!

April 14, 2009: “College students who use Facebook spend less time studying and have lower grade point averages than students who have not signed up for the social networking website”

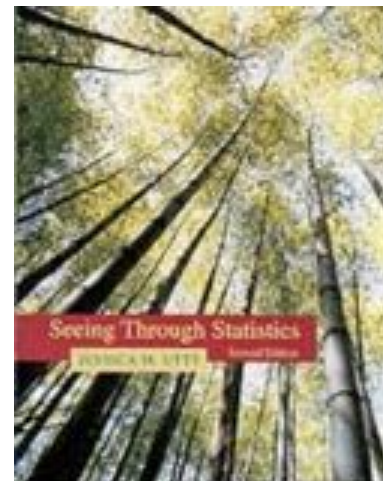
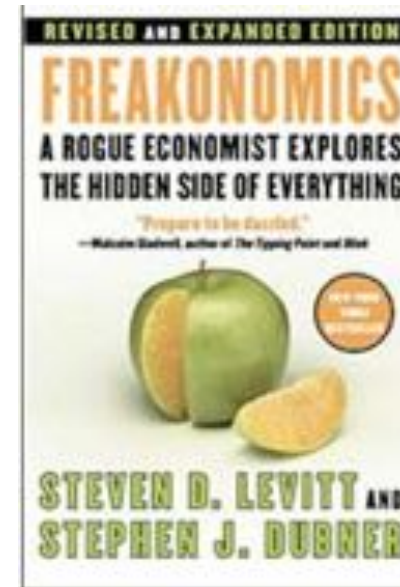
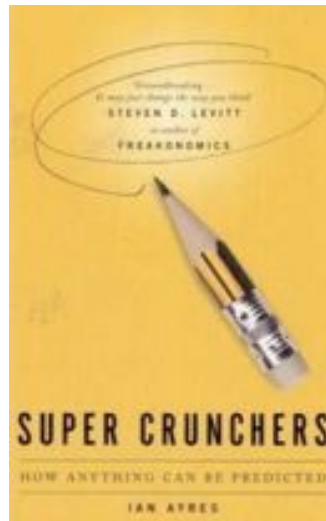
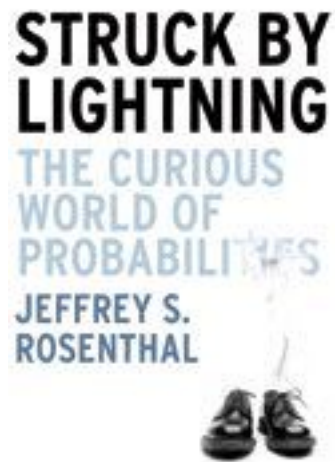
annual meeting of AERA, April 16

Another favorite

“Life begins to suck at 40” (National Post, Jan 30, 2007)

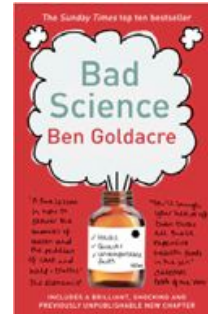


Popular texts



Increased awareness

- www.badsience.net



- <http://tierneylab.blogs.nytimes.com/>



- http://news.bbc.co.uk/2/hi/programmes/more_or_less/

BBC NEWS

LIVE LT BBC NEWS CHANNEL

News services
Your news when you want it

News Front Page

more or less

Page last updated at 13:11 GMT, Monday, 2 February 2009

RADIO 4 IN PARTNERSHIP WITH THE OPEN UNIVERSITY

More or Less is currently off air but

... increased awareness

- <http://understandinguncertainty.org>



**Understanding uncertainty: 2845 ways
of spinning risk**

by Mike Pearson and David Spiegelhalter



-
- <http://www.junkcharts.typepad.com/>

Junk Charts
Recycling chartjunk as junk art

Other statistics courses

- Design of Experiments
 - ERT, alcohol, and blood hormone levels
 - “Randomized, double-blind, cross-over trial”
- Methods of Applied Statistics
 - “Data revised on soot in air and deaths”

06/05/82

Data Revised on Soot in Air and Deaths

Scientists Lower Their Estimate of Risk From Bad-Air Days

By ANDREW C. REVKIN

Revising their own data with new statistics, scientists who conducted influential studies that linked sooty air pollution with higher death rates have lowered their estimate of the risk posed by bad-air days.

The findings do not challenge what is now a well-established link between air pollution and premature death, but the new analysis is highly likely to delay the final review of new regulations on small-particle pollution, officials of the Environmental Protection Agency said yesterday.

The review was projected to end, and the new rules to take effect, by the end of next year.

"This may clearly push it beyond that," a spokesman for the E.P.A., Joe Marryak, said last night.

The fine particles in question come mainly from power plants and diesel engines, and the proposed rules have been at the center of a long legal, political and public-relations battle between private environmental groups and power plant owners and vehicle manufacturers.

The researchers, at the Johns Hopkins University, have been distributing their new analysis to scientists and government officials by fax and e-mail. Yesterday, they set up a Web site, www.biosci.jhu.edu/~/hombin/research.html, that details their new findings.

"This is a very important finding that needs to be probed," said Daniel E. Greenbaum, president of the Health Effects Institute, the organization that paid for the work and that was created by the E.P.A. and industry to conduct unbiased studies on contentious pollution issues.

The studies in question, using data from 1987 to 1994, analyzed day-to-day small-particle pollution in 30 American cities and compared them to the death rates among the 100 million residents of these cities, accounting for other influences on mortality like weather and time of year.

They found a pattern of more deaths, notably deaths from heart and lung problems, in the days after spikes in the concentrations of particles smaller than 10 microns, par-

ticles that can be deeply inhaled into the lungs and stay there. In the original analysis, the rise was 5.4 percent above the typical mortality rate for each jump of 70 micrograms of soot per cubic meter of air. In the new analysis, the increase is half that.

The researchers said the change was small but significant. The average level in the average city is now about 24 micrograms a cubic meter.

The work has been published for several years in a variety of leading journals like The New England Journal of Medicine and The American Journal of Epidemiology. The project, the National Morbidity, Mortality and Air Pollution Study, was given extra weight by policy makers because of the reputation of the Health Effects Institute and the Johns Hopkins group, led by Dr. Jonathan M. Samet, chairman of epidemiology at the public health school there.

New research may delay a review due next year on small-particle pollution.

As part of a continuing effort to check for flaws, those scientists in recent weeks used a new method to look at their figures and obtained different results. They re-assessed the original figures and found that the problem lay with how they used off-the-shelf statistical software to identify initial patterns that are somewhat akin to ripples from a particular rock tossed into a wavy sea. Instead of adjusting the program to the circumstances that they were studying, they used standard default settings for those calculations. That move apparently introduced a bias in the results, the team says in the papers on the Web.

The chairman of the Johns Hop-

kins biostatistics department, Dr. Scott L. Zeger, said other researchers who used the software, 5-PART, should check for similar problems. It is widely used for research in fields like pharmacology, genetics, molecular biology and stock-market forecasting, as well as serving as a mainstay of other environmental studies.

Dr. Zeger and Mr. Greenbaum stressed that the new findings did not overturn the basic link between soot and illness. They also pointed to the recent publication of other studies on the long-term effects of soot that do not use the same analytical tools.

Still, industry officials told the new findings called into question the validity of some research underlying the new federal standards.

"This study is really one of the ones creating the path for the future on air-quality regulation," said Allen Schaeffer, executive director of the Diesel Technology Forum.

The new results, Mr. Schaeffer said, show that "particle science is still evolving, and to are the analytical tools to look at it."

Scientists involved with the new standard said that there was much other evidence that pointed to the dangers of soot but that the errors in the Johns Hopkins work were still significant.

"It certainly brings into question the precision of the data," said Dr. Jane Q. Koenig, a professor of environmental health at the University of Washington and a consultant involved with the soot review. "That's very unfortunate, because this research was supposed to be the re-analysis that was going to give us a lot of confidence."

Senior government officials, including Dr. John D. Graham, President Bush's chief overseer of regulatory effectiveness at the Office of Management and Budget, said they had been told of the problems with the studies. Dr. Graham, who has often questioned the need for more rules, said that the apparent error, although important to assess, did "not call into question any of the key cause-effect relationships between pollution and premature death."

“A default setting that produced erroneous results went unchecked for years, despite significant statistical expertise in all the groups”

... other statistics courses

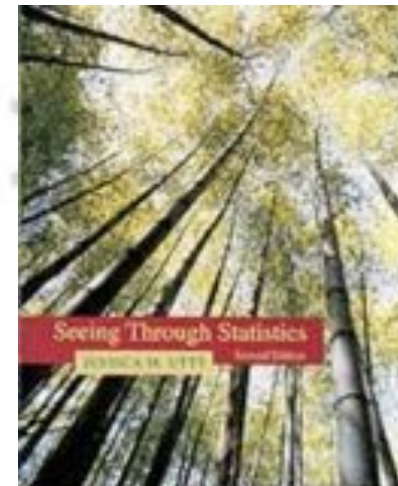
- Data mining and machine learning
 - “Neuropathological findings processed by artificial neural networks (ANNs) can perfectly distinguish Alzheimer's patients from controls in the Nun Study” *BMC Neurol.* 2007
- Statistical inference
 - “Association between cellular telephone calls and motor vehicle collisions” *NEJM* 1996
- Survey sampling, probability, multivariate analysis

Some common topics

- Polls
- Sampling (and other) biases
- Comparison of means
- Types of studies
- Linear regression
- Confounding variables
- Probability (LLN) and distributions (CLT)
- Conditional probability and Bayes theorem

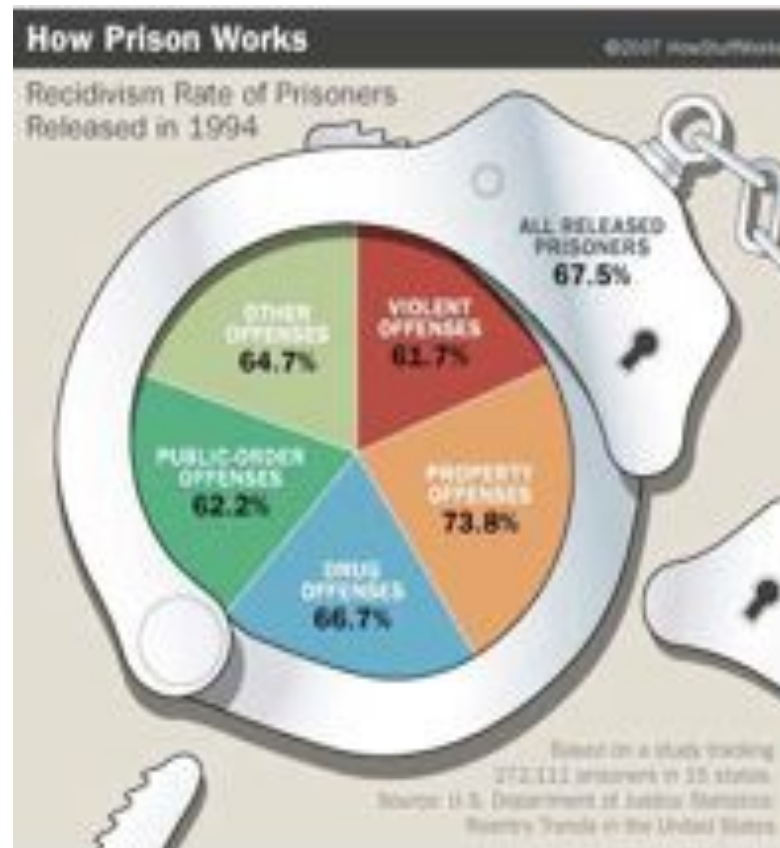
Some less common topics

- Standardized mortality ratios and life tables
- Survival data and censoring, clinical trials
- Meta-analysis
- Relative risk
- Nonlinear regression and logistic regression
- Poisson process
- Time series, price indices
- Ethics in trials and in statistics



And my favorite part

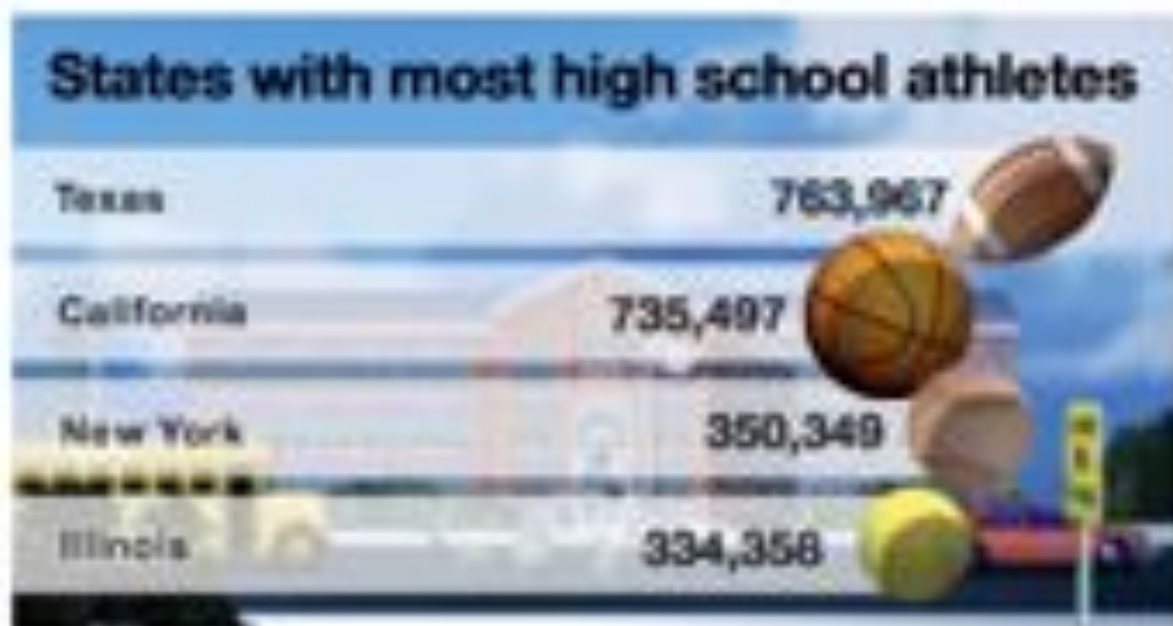
Bad graphs!



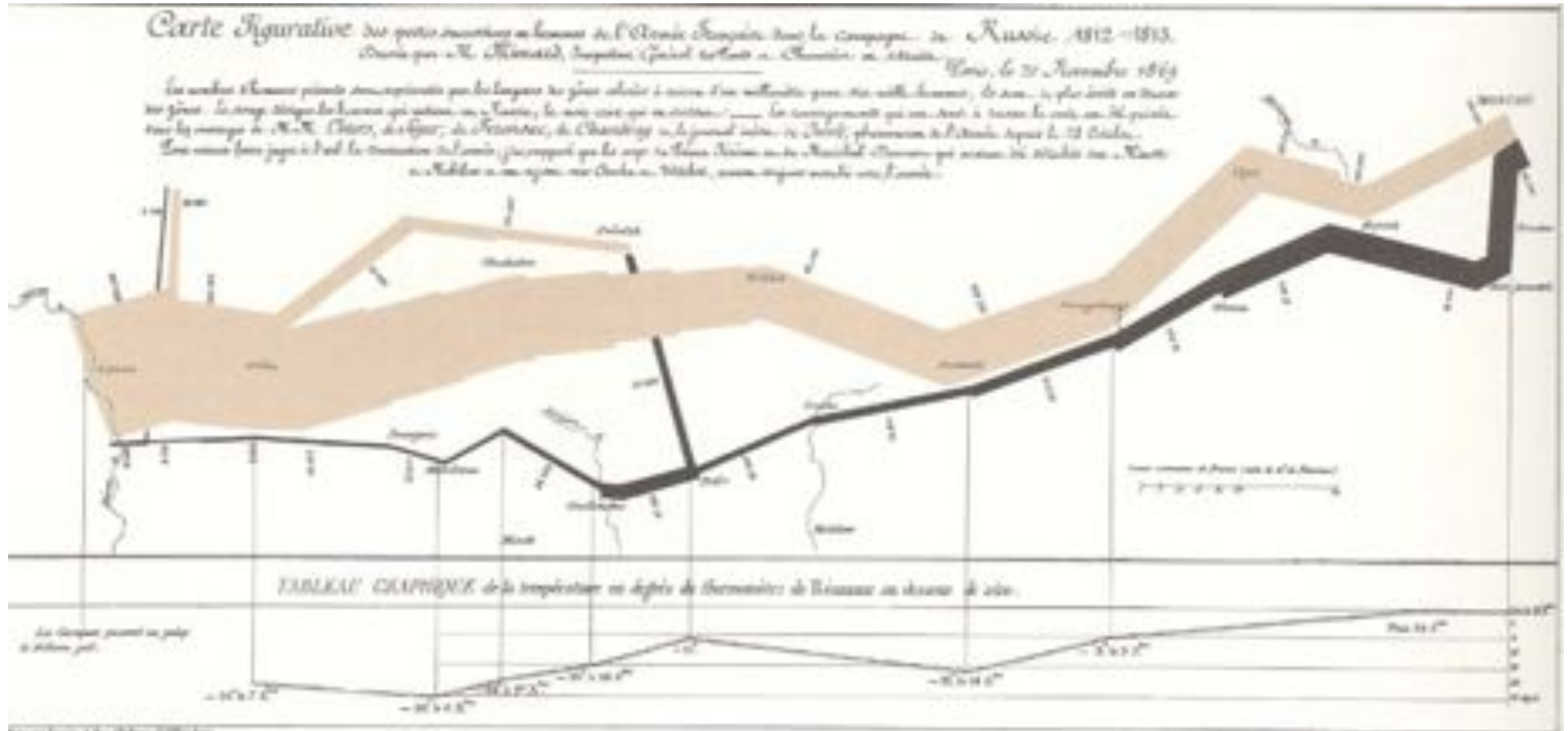
USA TODAY Snapshot

10/11/2007 • Updated 04:36 AM ET

There were more than 7.3 million high school athletes in the 2006-07 school year. Top state in athletes: Texas, with nearly 764,000.



And good



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Gaps within 

Gaps within 

BLOG

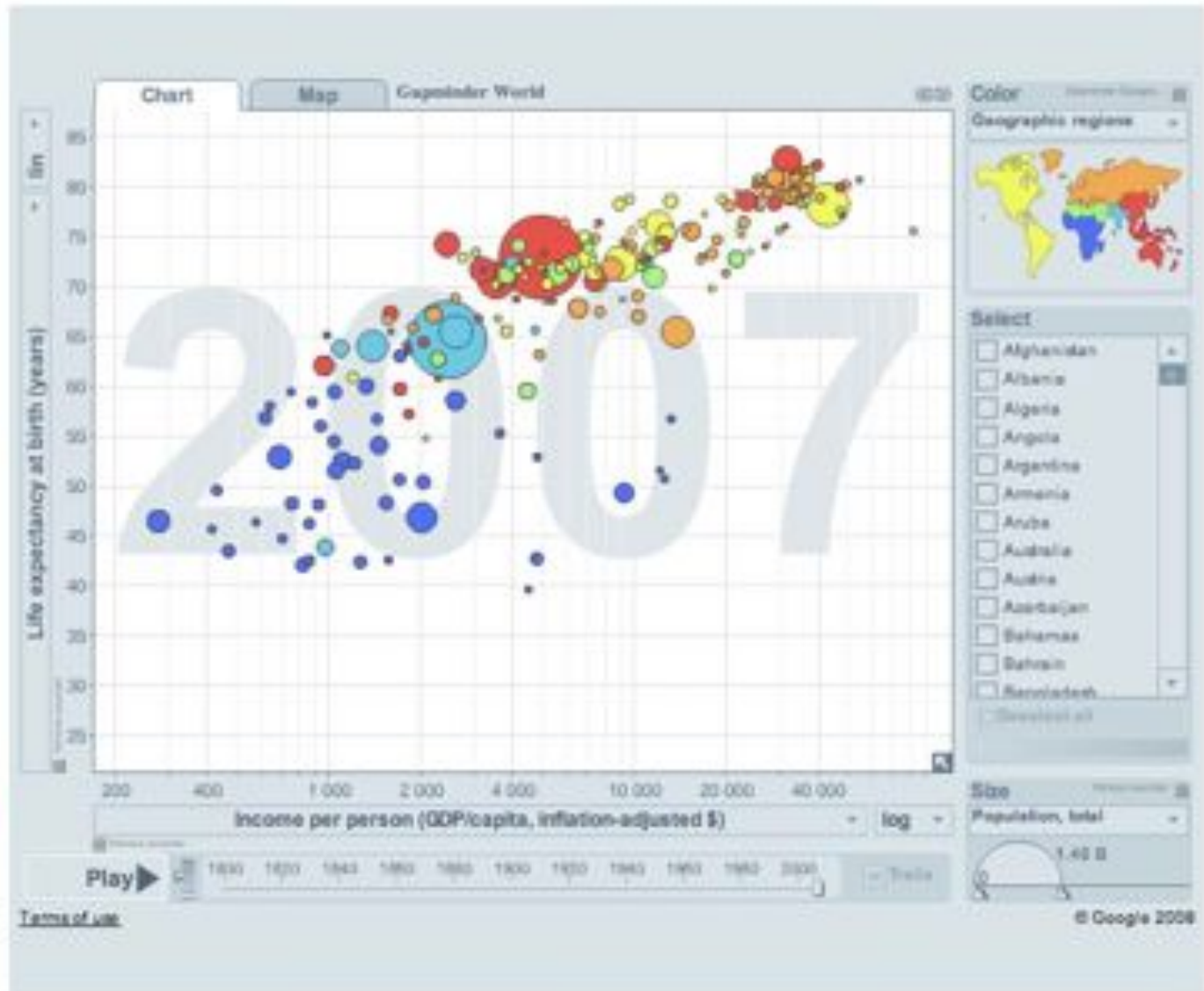
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