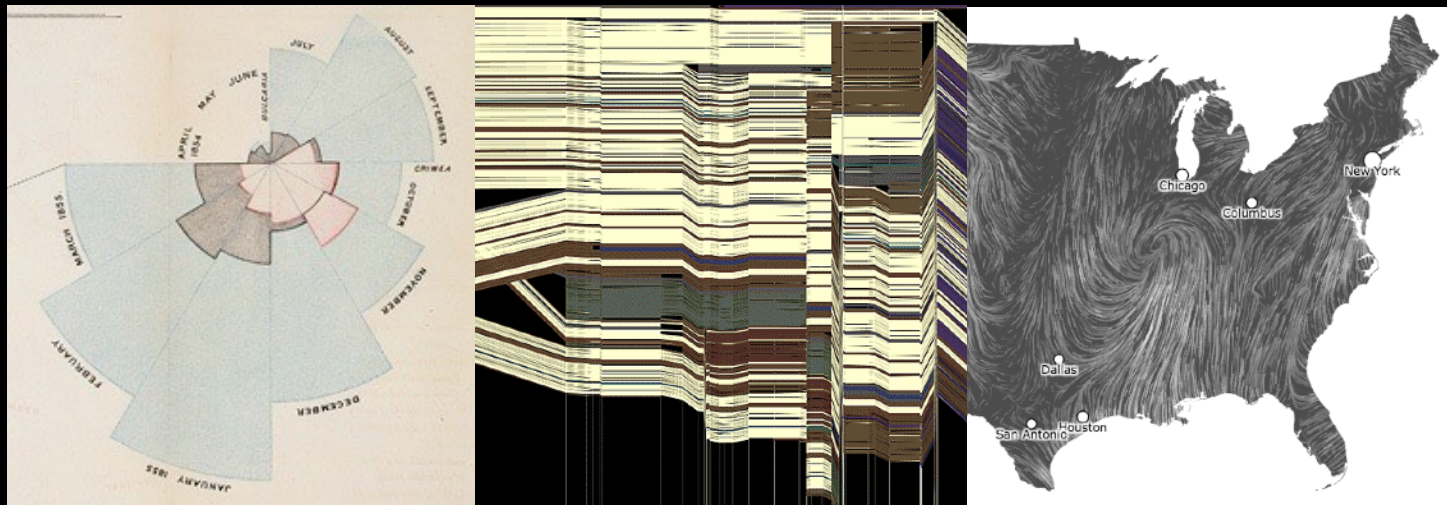


CSE 442 - Data Visualization

Deceptive Visualization



Jeffrey Heer University of Washington

Deceptive Visualization

Slides by Michael Correll

Deceptive Visualizations

Incorrect Visualizations

Illegible Visualizations

Bullshit Visualizations

Unconventional Visualizations



Deceptive Visualizations

Incorrect Visualizations

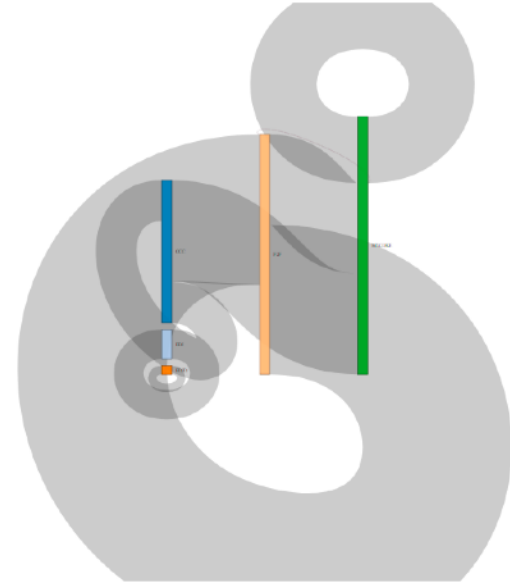
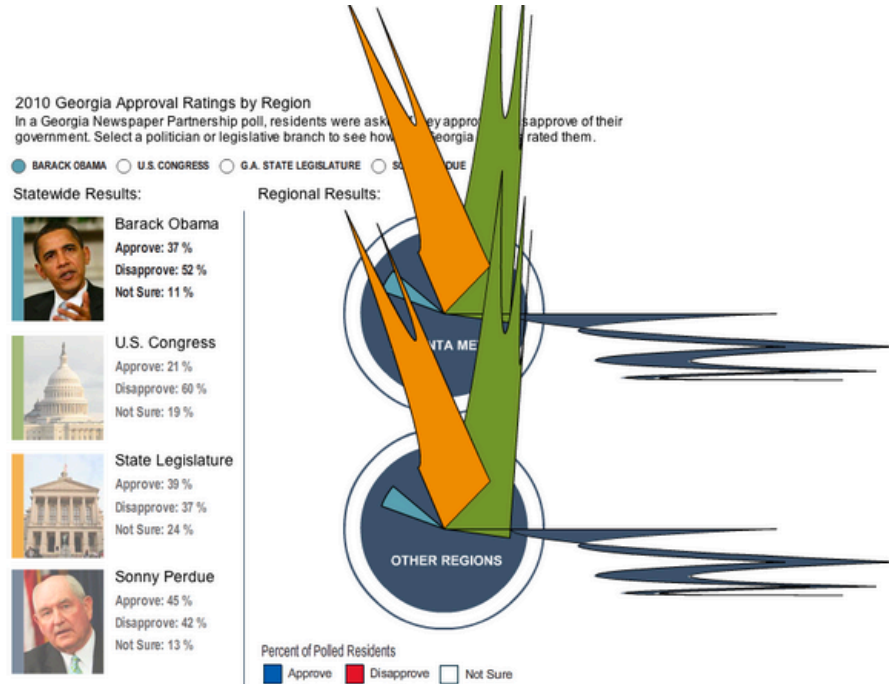
Illegible Visualizations

Bullshit Visualizations

Unconventional Visualizations



Incorrect Visualization





NEW DAY SATURDAY

NEW DAY SATURDAY

NEW DAY SATURDAY

AROUND
THE
WORLD

GIANT HORNETS KILL 42 PEOPLE IN CHINA

LIVE
CNN

RIGHT NOW

CHICAGO  71°

DETROIT  66°

HOUSTON  77°

HEALTH EVALUATION IN MIRIAM CAREY'S HOME AFTER DC C

CNN.com

RIGHT NOW

FOX 10
AccuWeather

TEMPERATURES

Wickenburg
2385

Cave Creek
2960

Surprise
1350

Deer Valley
65

Fountain Hills
1665

Glendale
66

Scottsdale
64

Buckeye
66

Goodyear
64

Sky Harbor
64

Mesa
63

Apache Junction
64

Ahwatukee
1270

Chandler
63

Gateway
63

Queen Creek

Maricopa
63

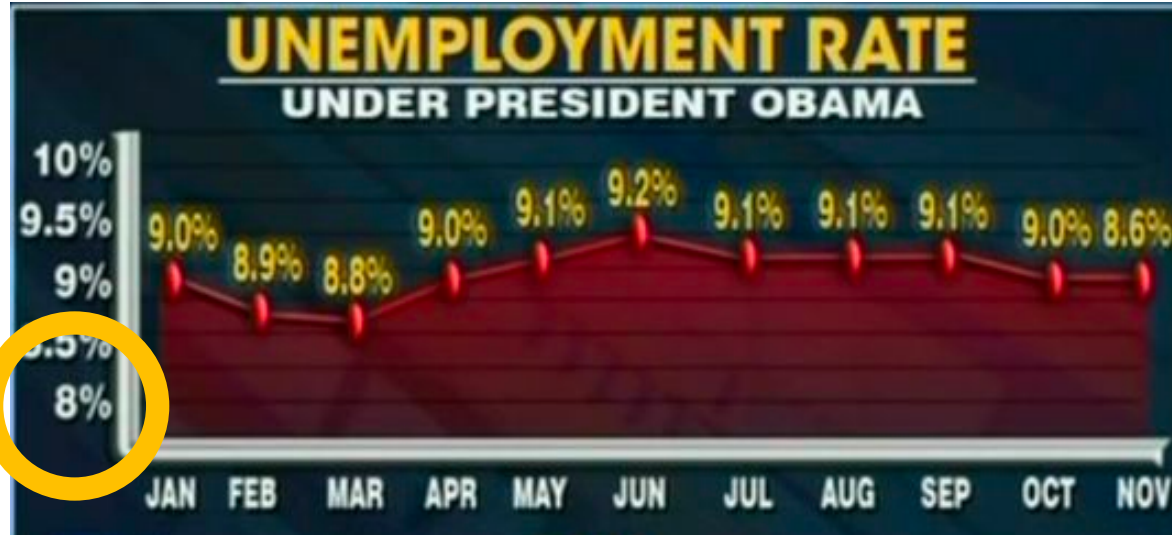
Florence
1625

FOX 10

12:20 64°

UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA





UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA

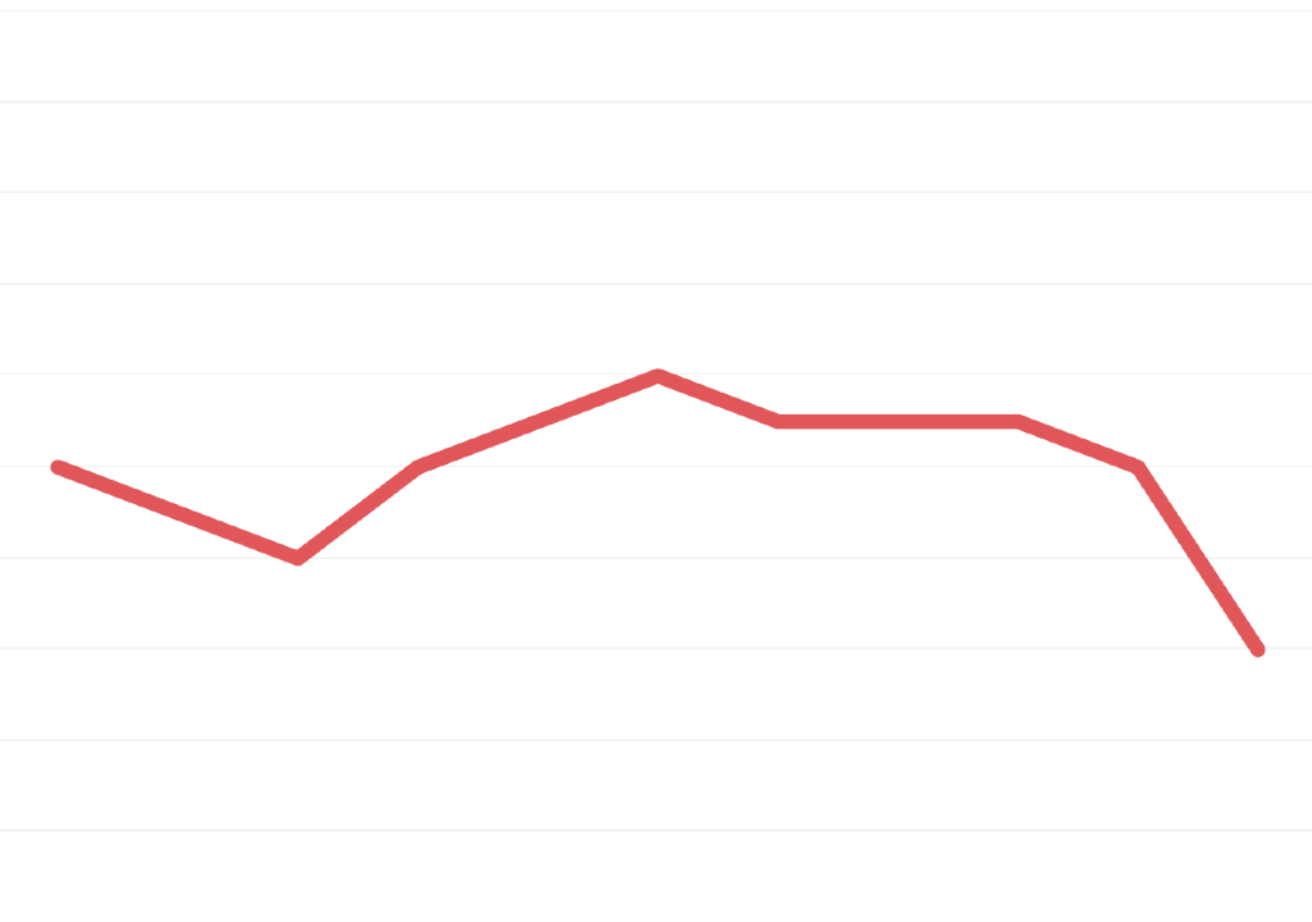


UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



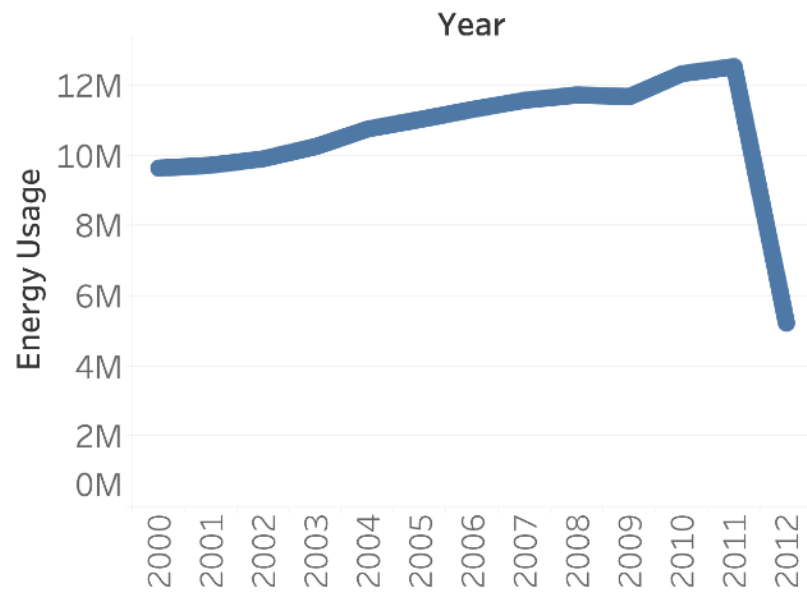
Unemployment

9.8
9.6
9.4
9.2
9.0
8.8
8.6
8.4
8.2



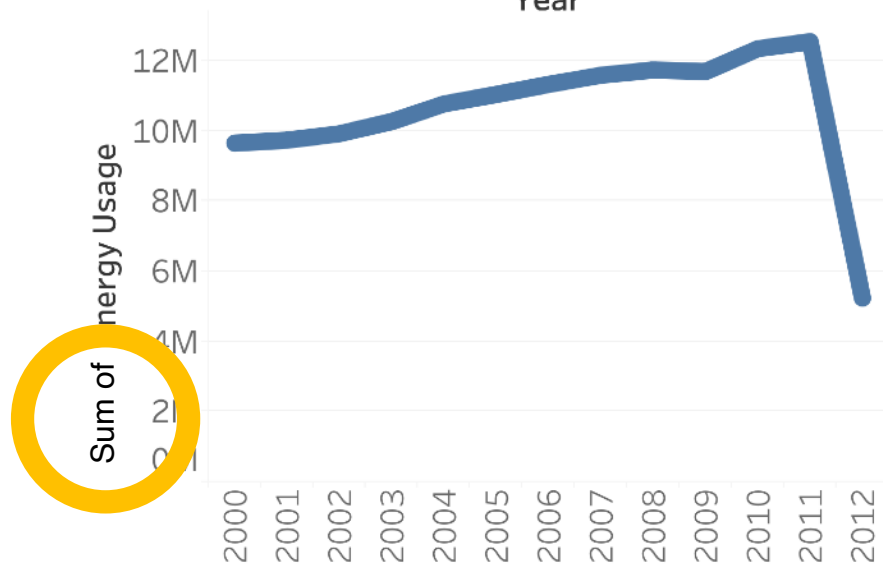
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov

Energy Usage Down?

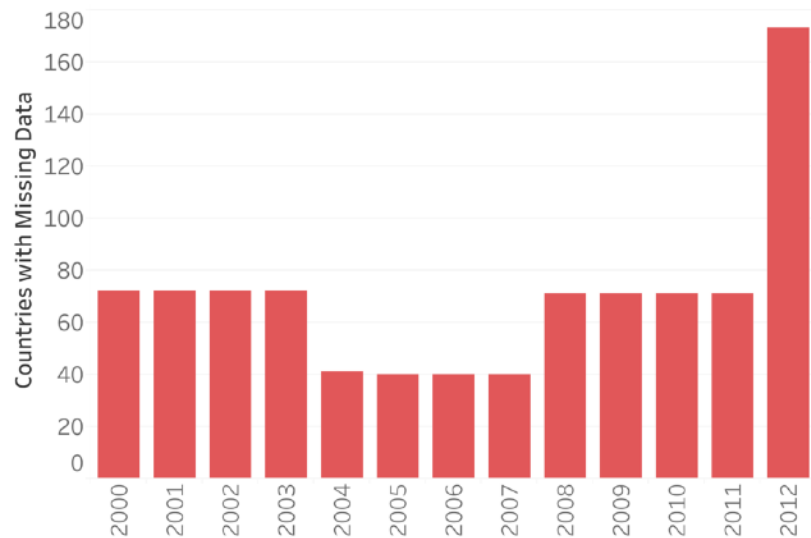
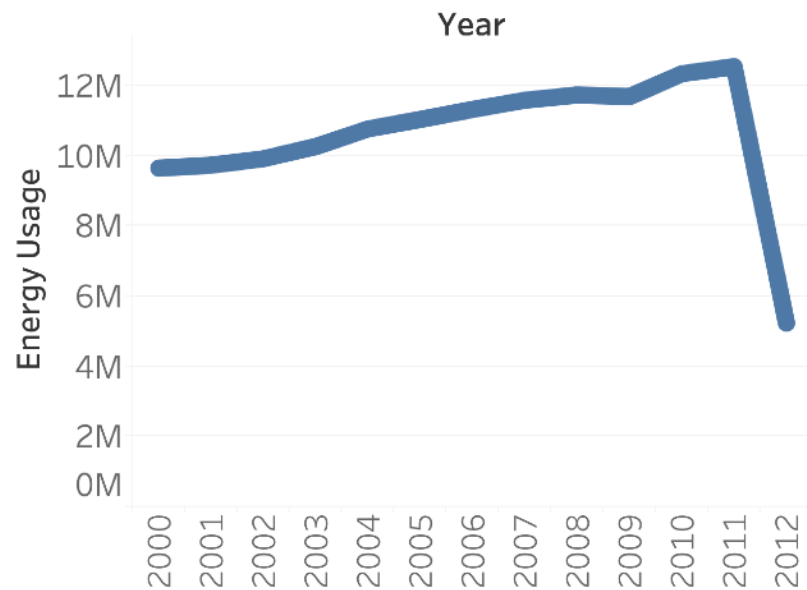


Energy Usage Down?

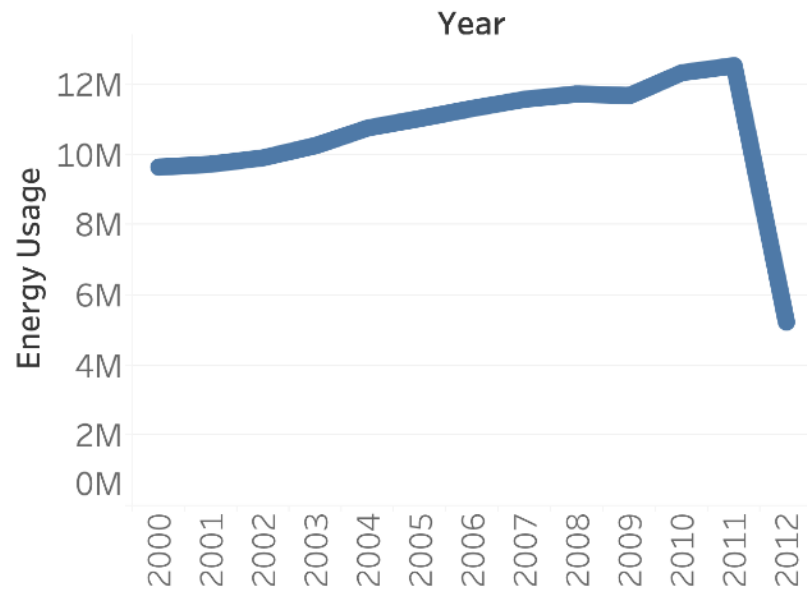
Year



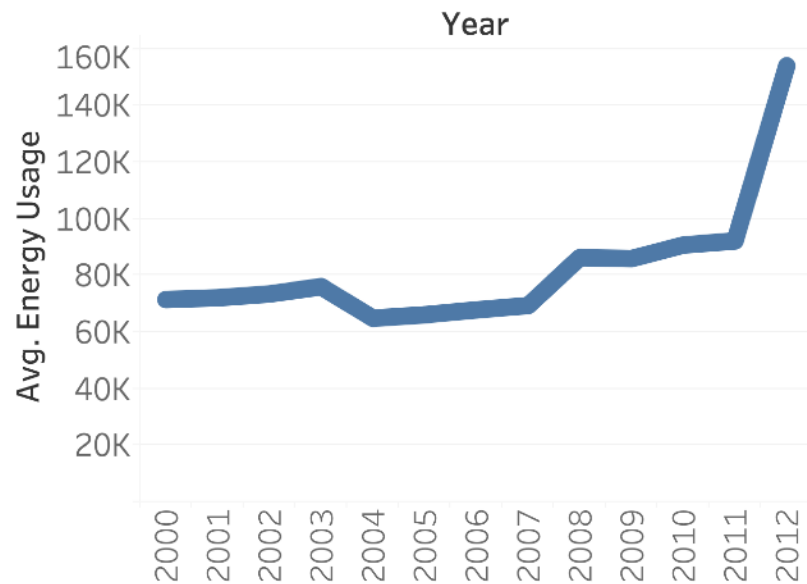
Energy Usage Down?



Energy Usage Down?

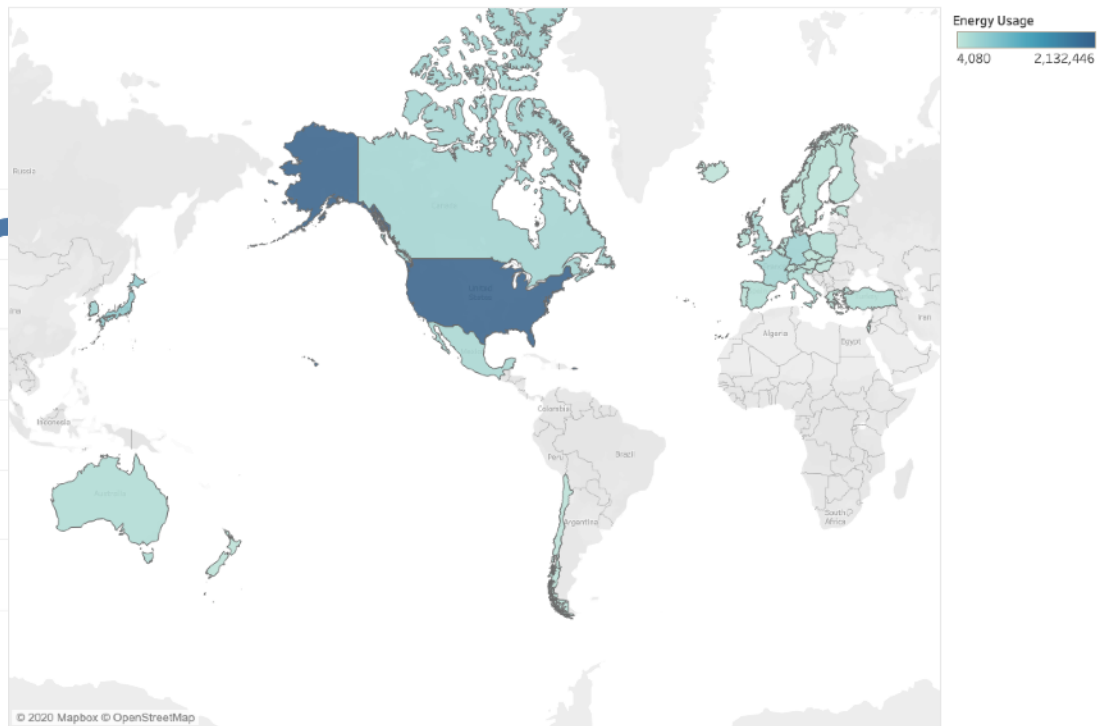
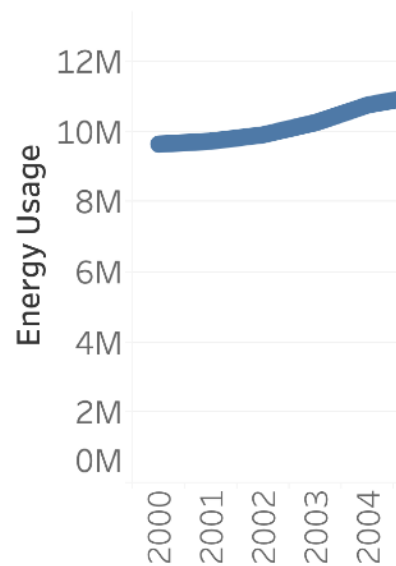


Energy Usage Up?



2012 Non-Nulls Are OECD Countries

Energy Usage Down?



Incorrect Visualizations

People assume that visualizations properly encode their data

...if we violate that assumption, we can do anything we want.

Deceptive Visualizations

Incorrect Visualizations

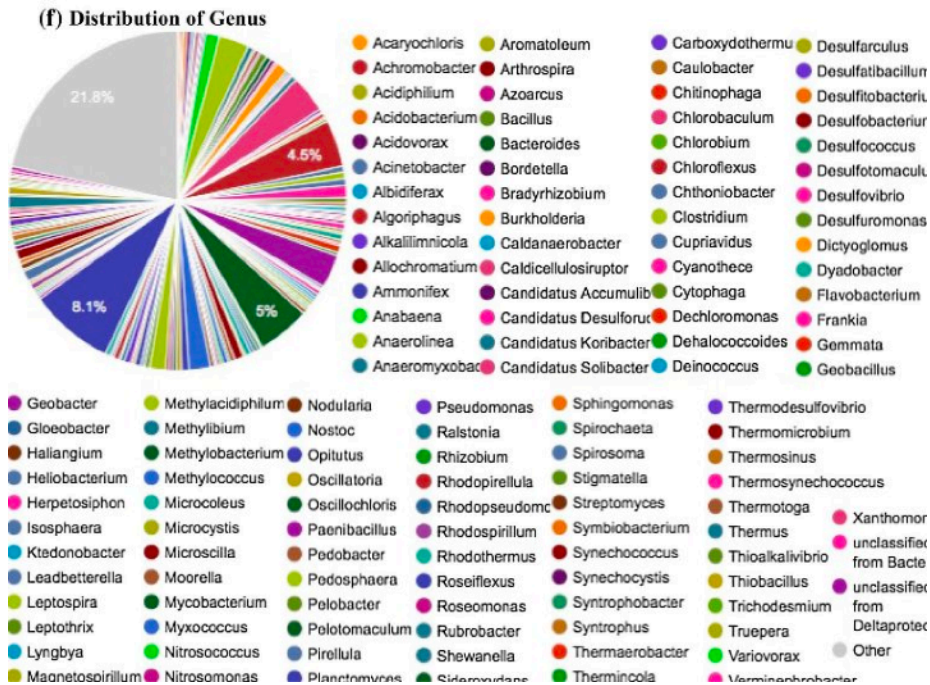
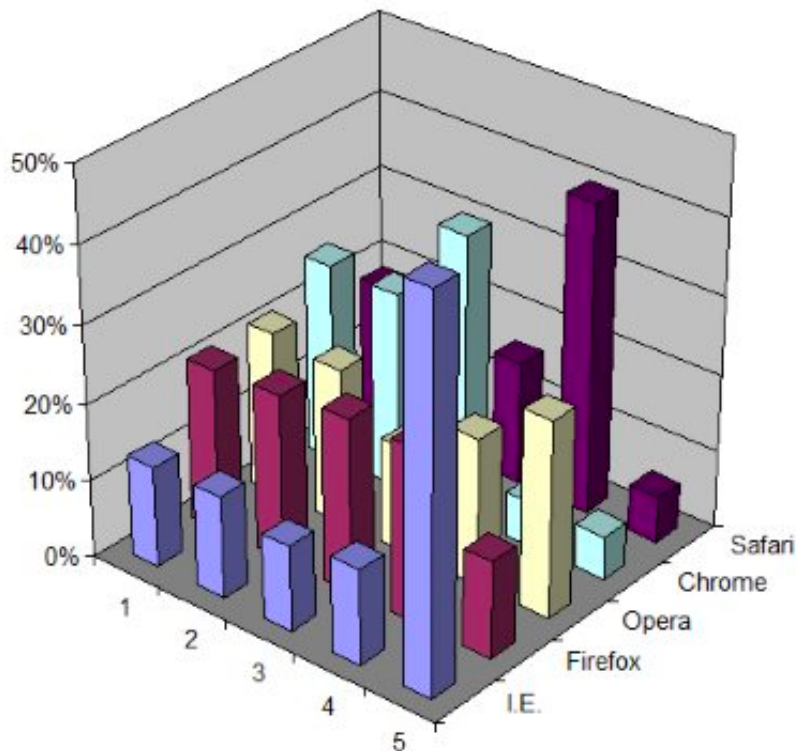
Illegible Visualizations

Bullshit Visualizations

Unconventional Visualizations



Illegible Visualization





ALABAMA DEPARTMENT OF LABOR LABOR MARKET INFORMATION DIVISION

LMI Home | CES | OES | QCEW | LAUS | Workforce Development | OSHS

Interactive Weekly Unemployment Insurance Claims



Initial_Claims_byCounty Historical

County

Total

Historical Initial Claims by Week

2020-12-26	5,506
2021-01-02	10,996
2021-01-09	14,084
2021-01-16	11,983
2021-01-23	11,615
2021-01-30	12,664
2021-02-06	13,464
2021-02-13	12,087
2021-02-20	11,395
2021-02-27	11,624
2021-03-06	13,592
2021-03-13	16,506
2021-03-20	13,994
2021-03-27	18,710
2021-04-10	10,909
2021-04-17	8,983
2021-04-24	8,704
2021-05-01	10,325
2021-05-08	10,841
2021-05-15	9,377
2021-05-22	8,698
2021-06-05	7,290
2021-06-12	6,847
2021-06-19	7,108
2021-06-26	5,816
2021-07-03	7,295
2021-07-10	5,435
2021-07-17	4,254
2021-07-24	3,977
2021-07-31	6,793
2021-08-07	6,196
2021-08-14	5,469
2021-08-21	5,407
2021-08-28	5,431
2021-09-04	5,095



Week Ending date

2020-03-14

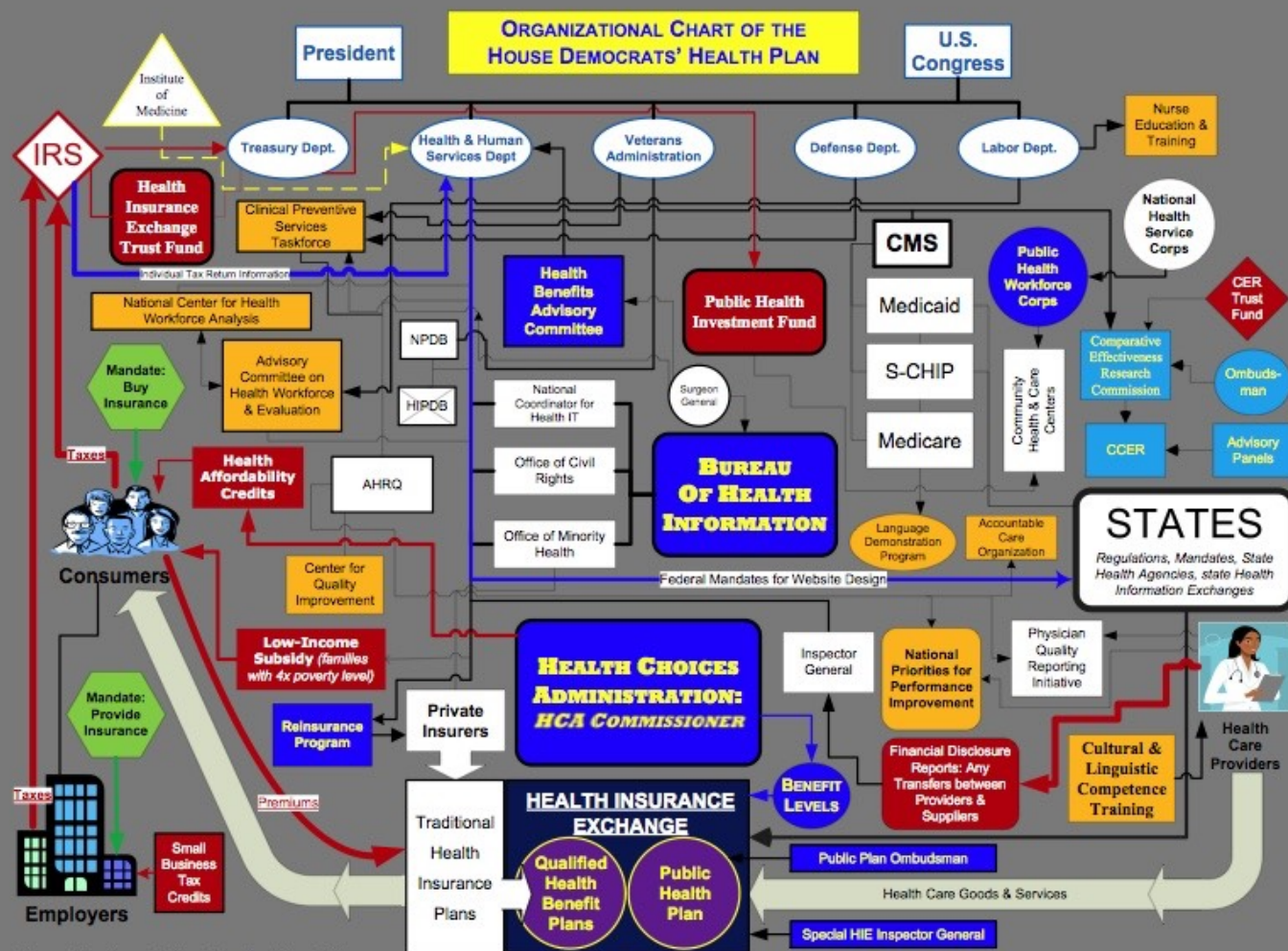
2021-07-24

2021-07-17

2021-09-04

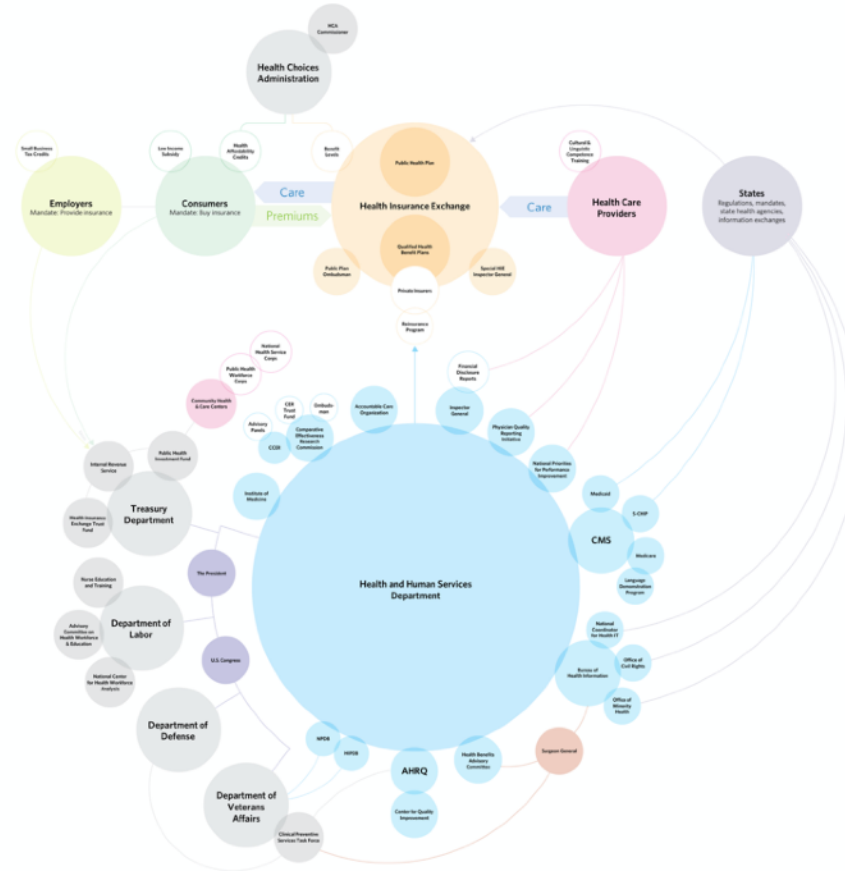
2021-08-21

2021-08-14

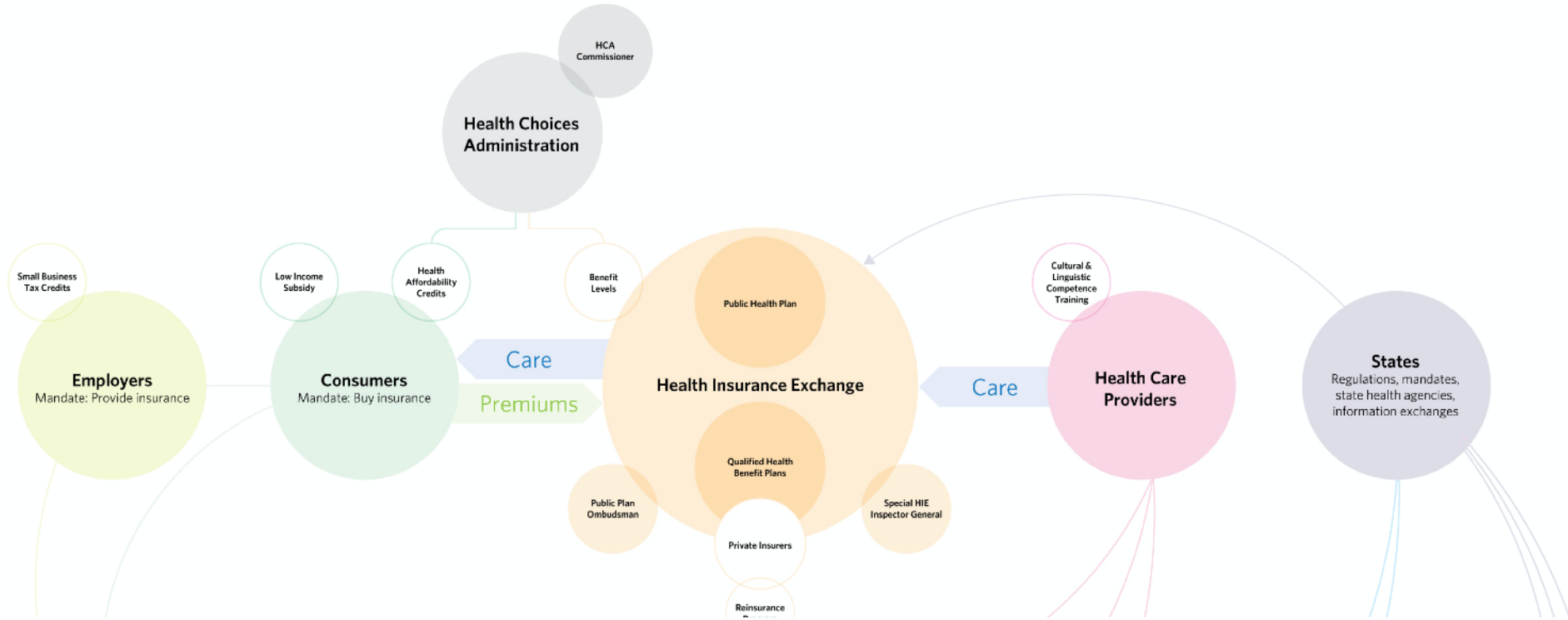


Source: Joint Economic Committee, Republican Staff
Congressman Kevin Brady, Ranking House Republican Member

Organizational Chart of the House Democrats' Health Plan



“Do not fuck with graphic designers” – Robert Palmer



“Do not fuck with graphic designers” – Robert Palmer

Illegible Visualizations

People will get lost in the details or overwhelmed by complexity

...if we make things intentionally complex people then people may just assume we know what we're talking about or will be too dazed to check too closely.

Deceptive Visualizations

Incorrect Visualizations

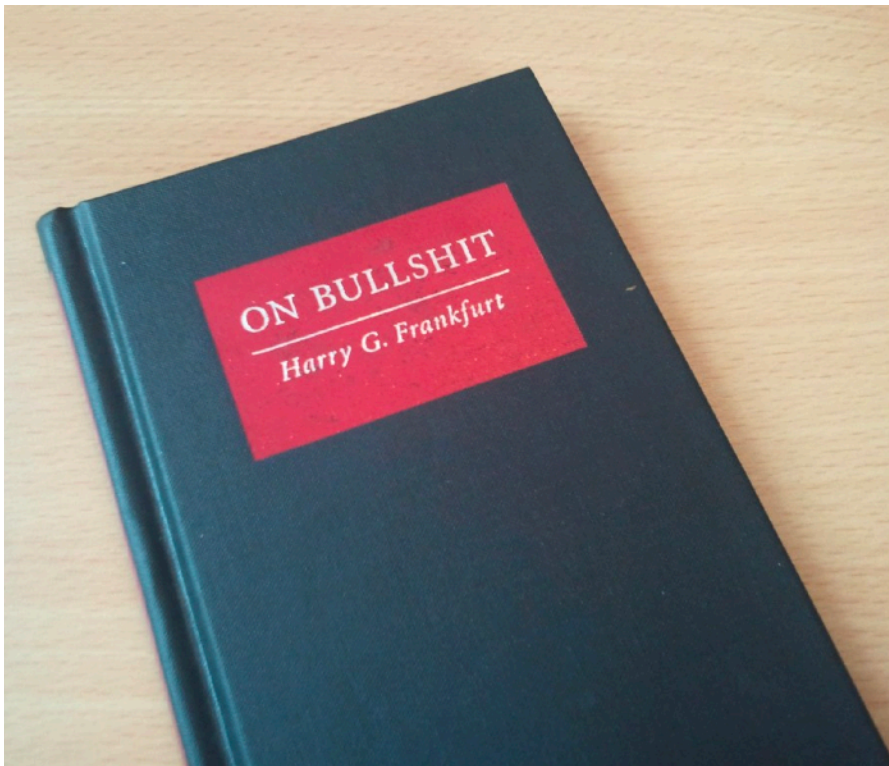
Illegible Visualizations

Bullshit Visualizations

Unconventional Visualizations



Bullshit Visualization



Lie:

"No, officer, I wasn't speeding"

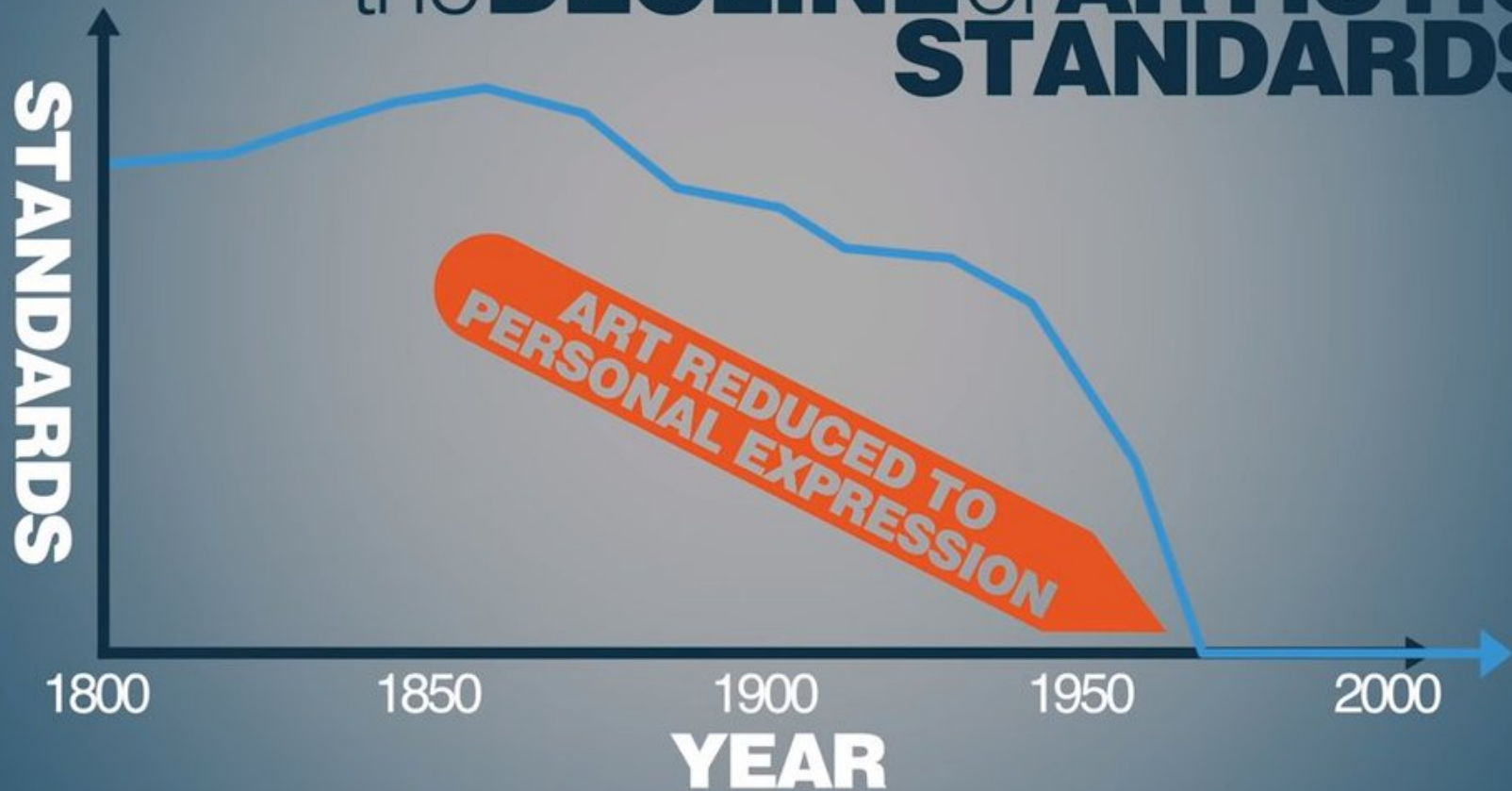
(you know the truth, but intentionally say something you know is untrue)

Bullshit:

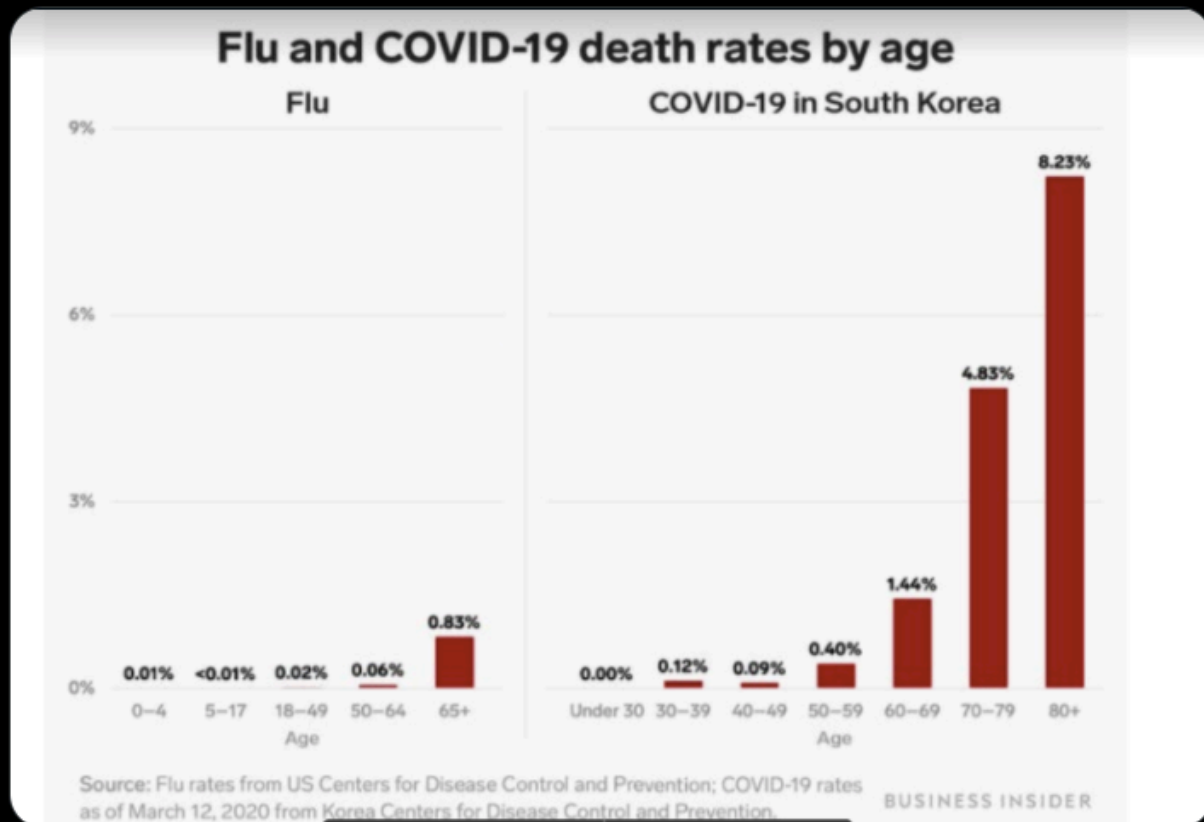
"The party was lame anyways, it's good I wasn't invited"

(you don't know or don't care about the truth, but intentionally say something you hope is persuasive)

the **DECLINE** of **ARTISTIC** **STANDARDS**



For people under 60, coronavirus is LESS dangerous than the seasonal flu:



Bullshit Visualizations

You can just make stuff up with no connection to reality

...show stuff that looks like data but isn't

...assume a conclusion and pretend it's true

...or give people data they can't do anything with

Deceptive Visualizations

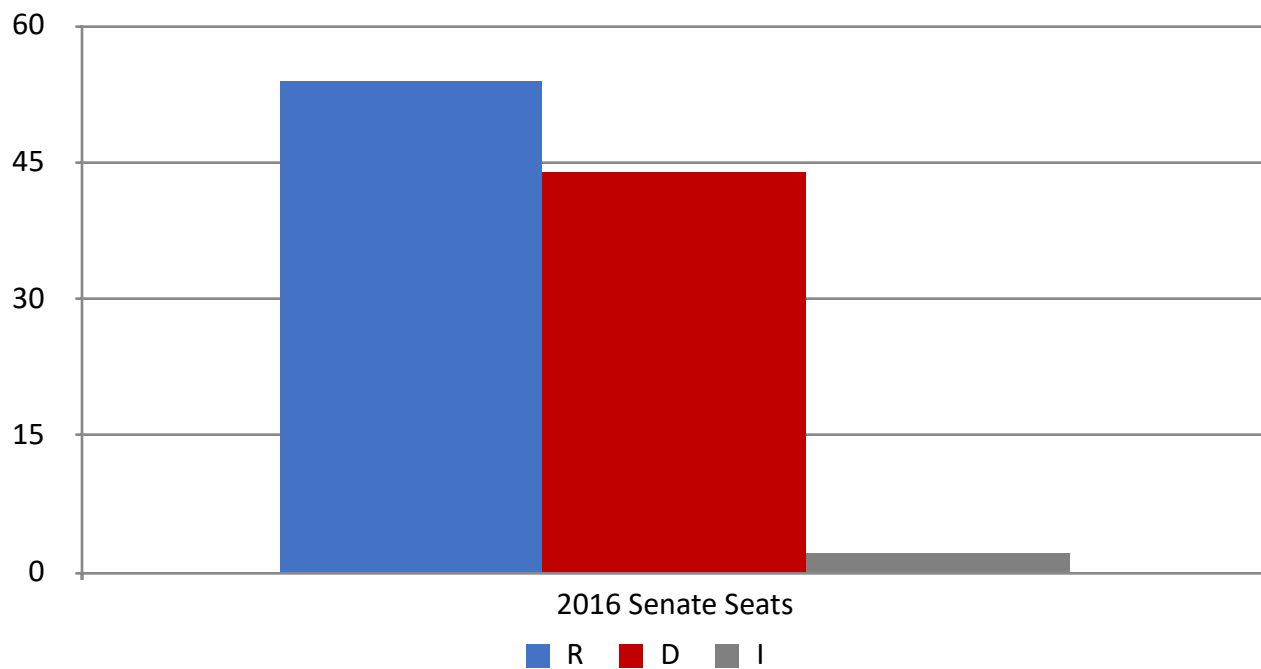
Incorrect Visualizations

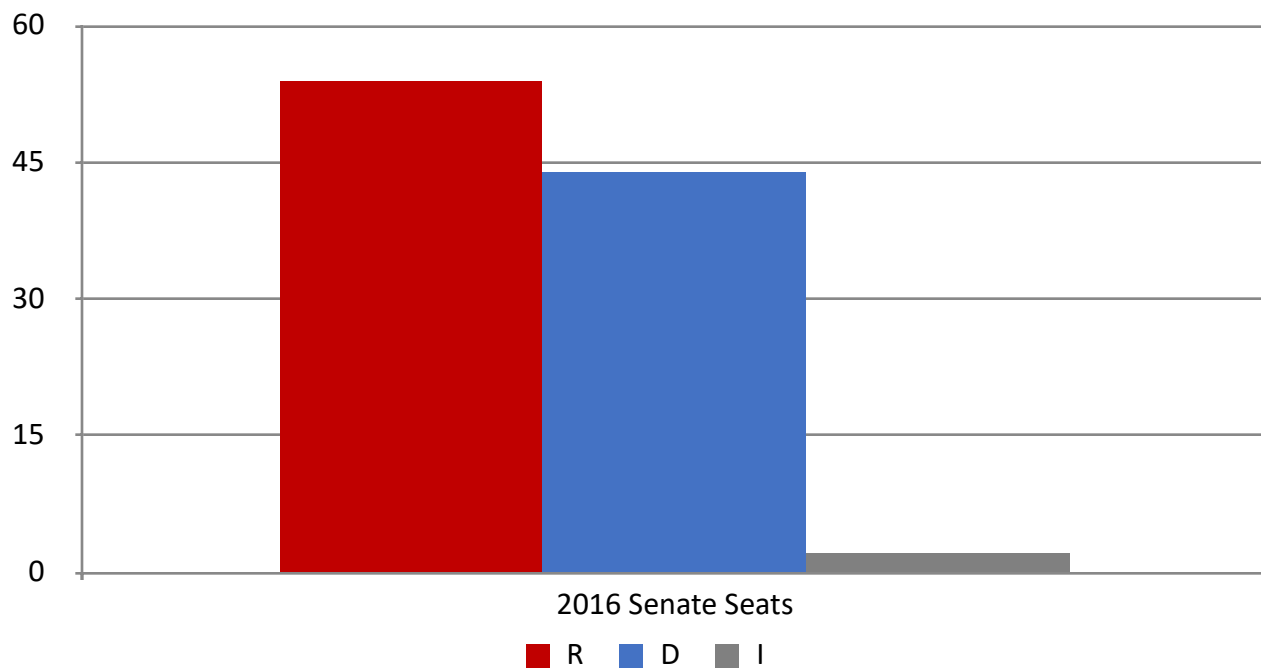
Illegible Visualizations

Bullshit Visualizations

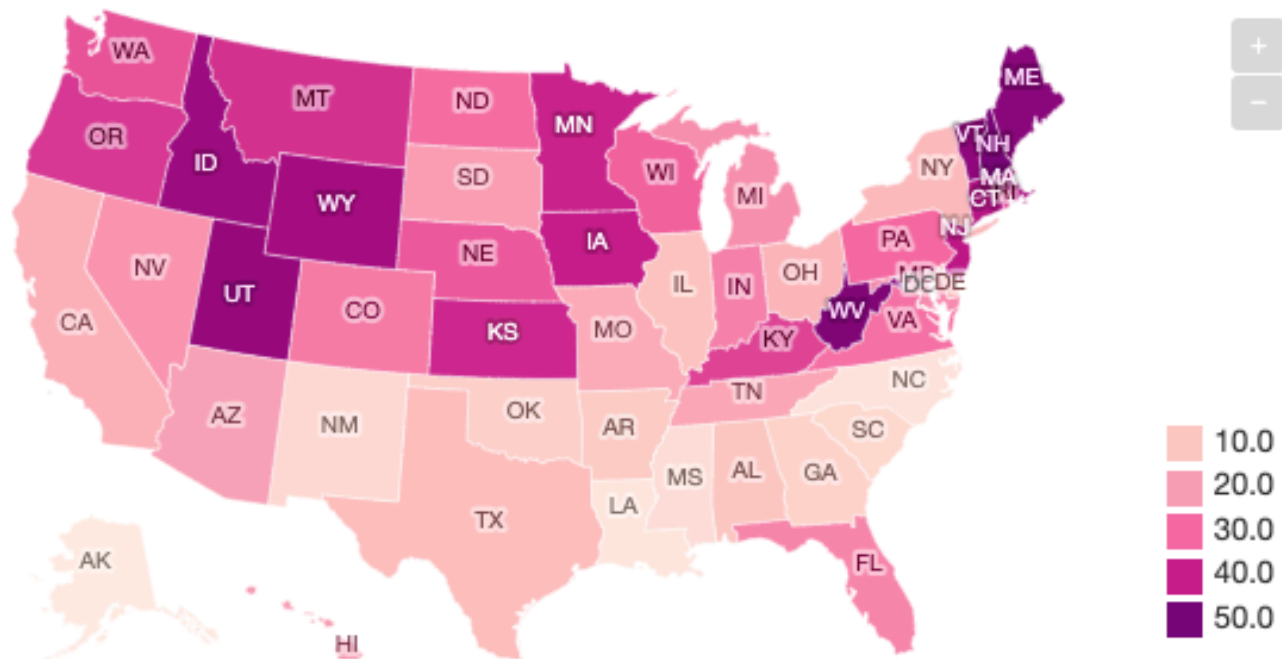
Unconventional Visualizations



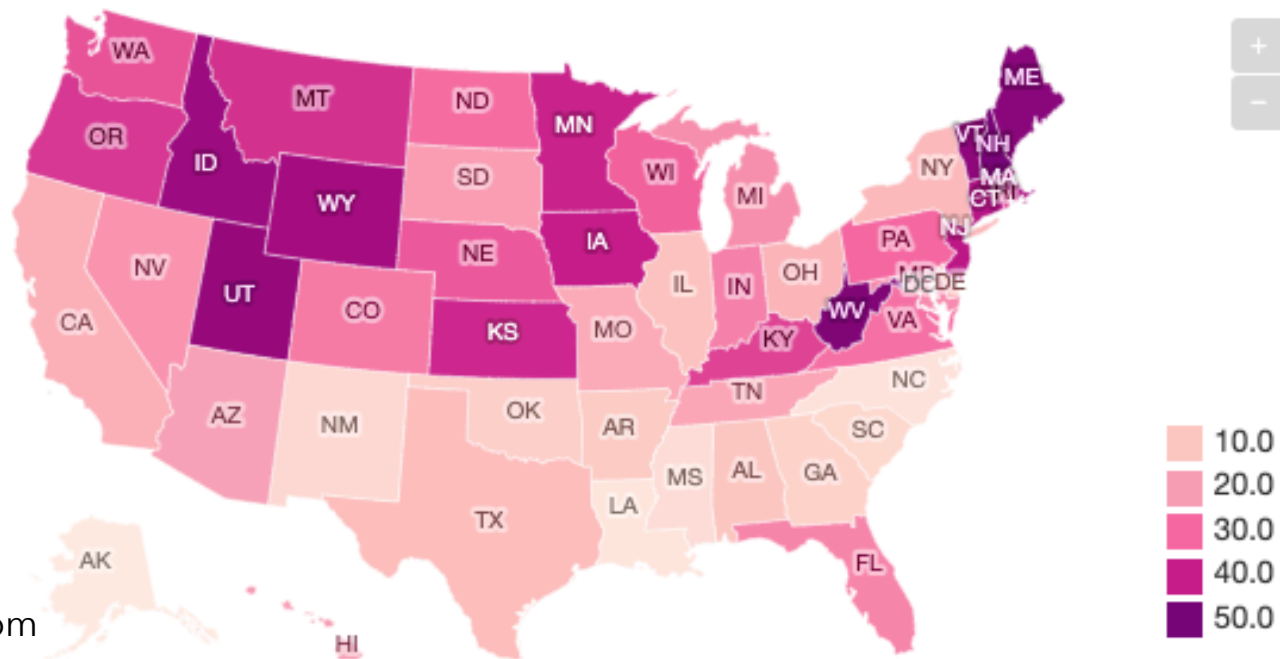




Which states have the most STIs?



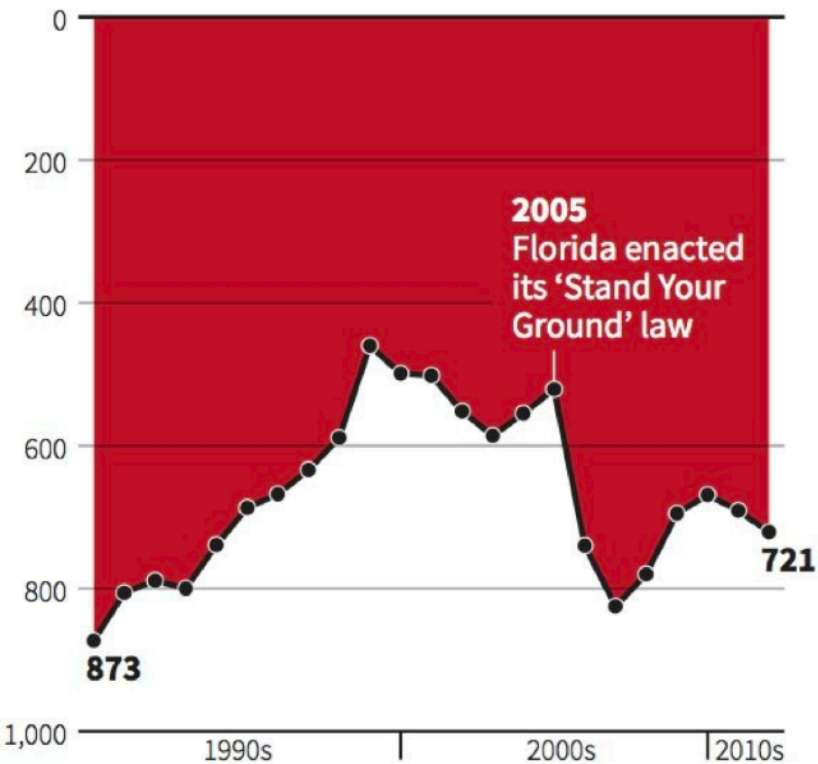
Which states have the most STIs?



"Each state has been rated from one to 50: the higher the score, the smaller the proportion of STIs. So on the map - the darker the color, the smaller the rate of STIs."

Gun deaths in Florida

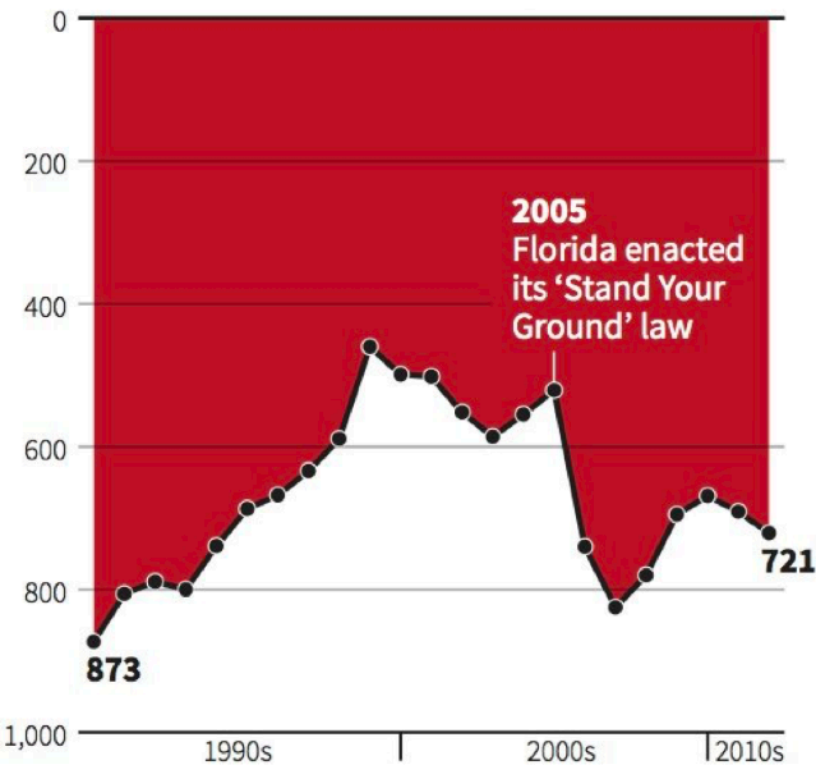
Number of murders committed using firearms



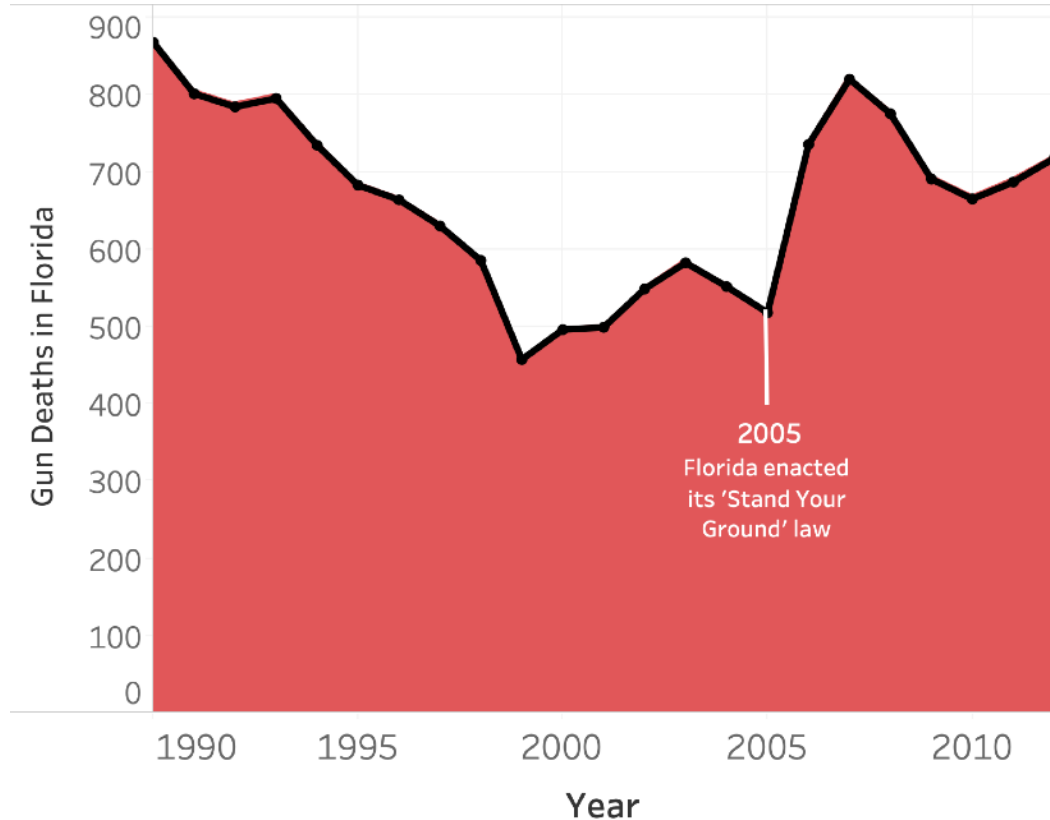
Source: Florida Department of Law Enforcement

Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement



Number of murders committed using firearms

 **REUTERS**

The biggest killers
How coalition died, according to the data available*

Timeline: March 2003 (US attacks Iraq), November 2003 (US troops in Iraq), January 2004 (US troops surge), August 2006 (US troops surge), January 2007 (US troops surge), December 2007 (US troops surge), January 2009 (US troops surge), March 2009 (US attacks Iraq), November 2009 (US troops surge), January 2011 (US troops surge).

Coalition deaths
4,802
113,726

US ground troops in Iraq
200 thousand
100 thousand
50 thousand
0
2003 2004 2005 2006 2007 2008 2009 2010 2011

Coalition deaths by country
United States: 4,654
Iraq: 10,125
Others: 175
Britain: 179

Coalition fatalities by area
Afghanistan and the east-end province of southern Iraq were the most dangerous areas, with the most deaths. In the case of Afghanistan, the most deaths were in the south, with the most deaths in the south.

Coalition fatalities by province
Kabul: 1,331
Herat: 1,331
Nangarhar: 1,331
Paktia: 1,331
Paktika: 1,331
Parag: 1,331
Sardar: 1,331
Shah Wali Kot: 1,331
Surrend: 1,331
Tari: 1,331
Zabul: 1,331

Coalition deaths by weapon type
Air strikes: 1,069
Roadside bombs: 2,654
Sniper bombs: 6,708
Vehicle bombs: 5,244
Mortar fire: 2,609
Explosions: 15,704
Small arms gunfire: 11,877

ITHACA TIMES

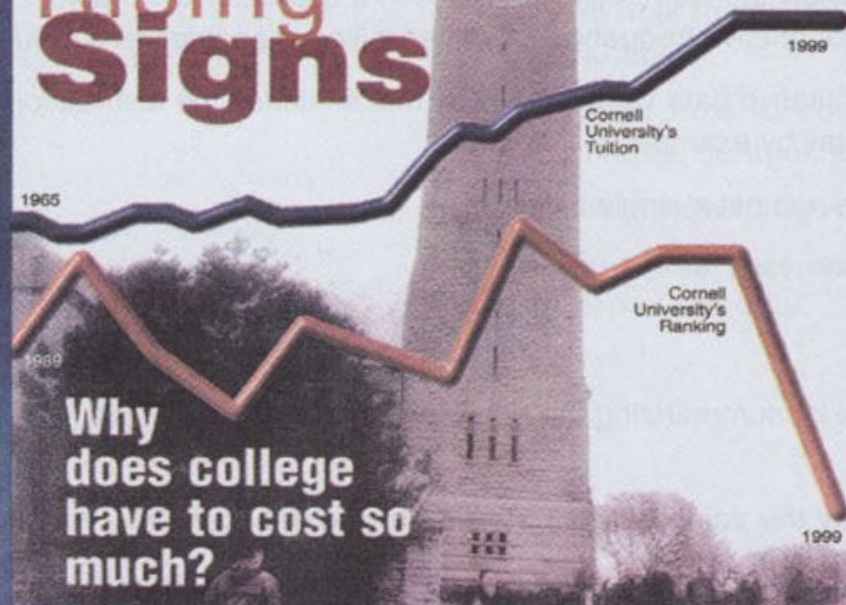
Visit us online at <http://www.ithacatimes.com>

Planning Board approves
Widewaters development

IC students occupy Job Hall

Cayuga Vocal Ensemble
ushers in the holidays with
"Judas Maccabaeus"

Rising Signs



Why
does college
have to cost so
much?

ITHACA TIMES

Visit us online at <http://www.ithacatimes.com>

Planning Board approves
Widewaters development

IC students occupy Job Hall

Cayuga Vocal Ensemble
ushers in the holidays with
"Judas Maccabaeus"

Rising Signs

1965

1989

1999

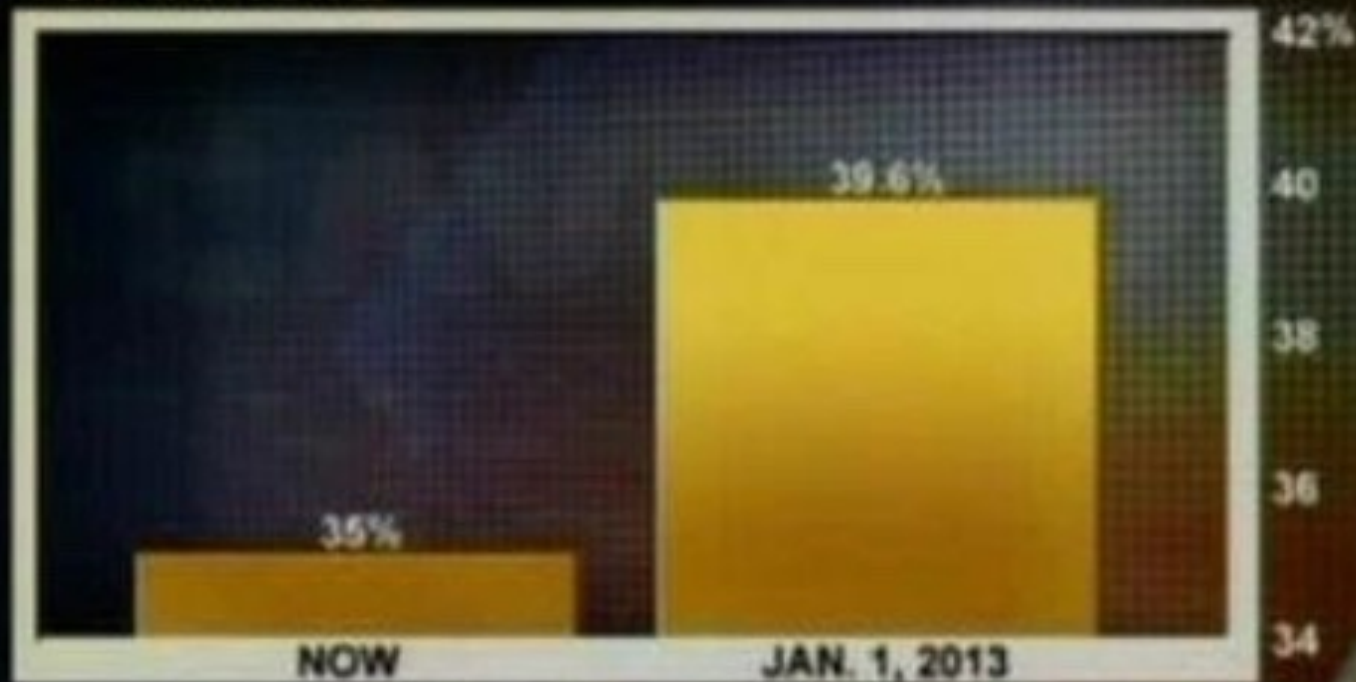
1999

Cornell
University's
Tuition

Cornell
University's
Ranking

Why
does college
have to cost so
much?

TOP TAX RATE



8:01p ET

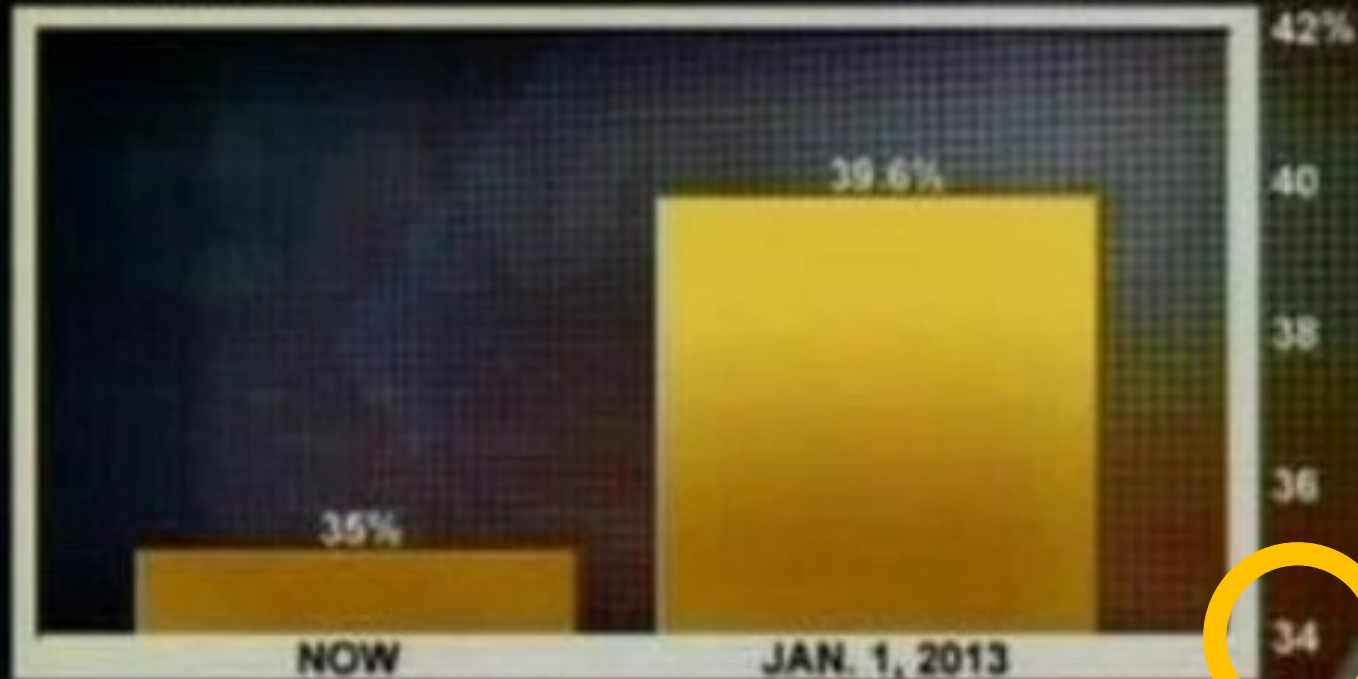
FOX

TOP STORIES

TECHNOLOGY

CONSUMER

TOP TAX RATE



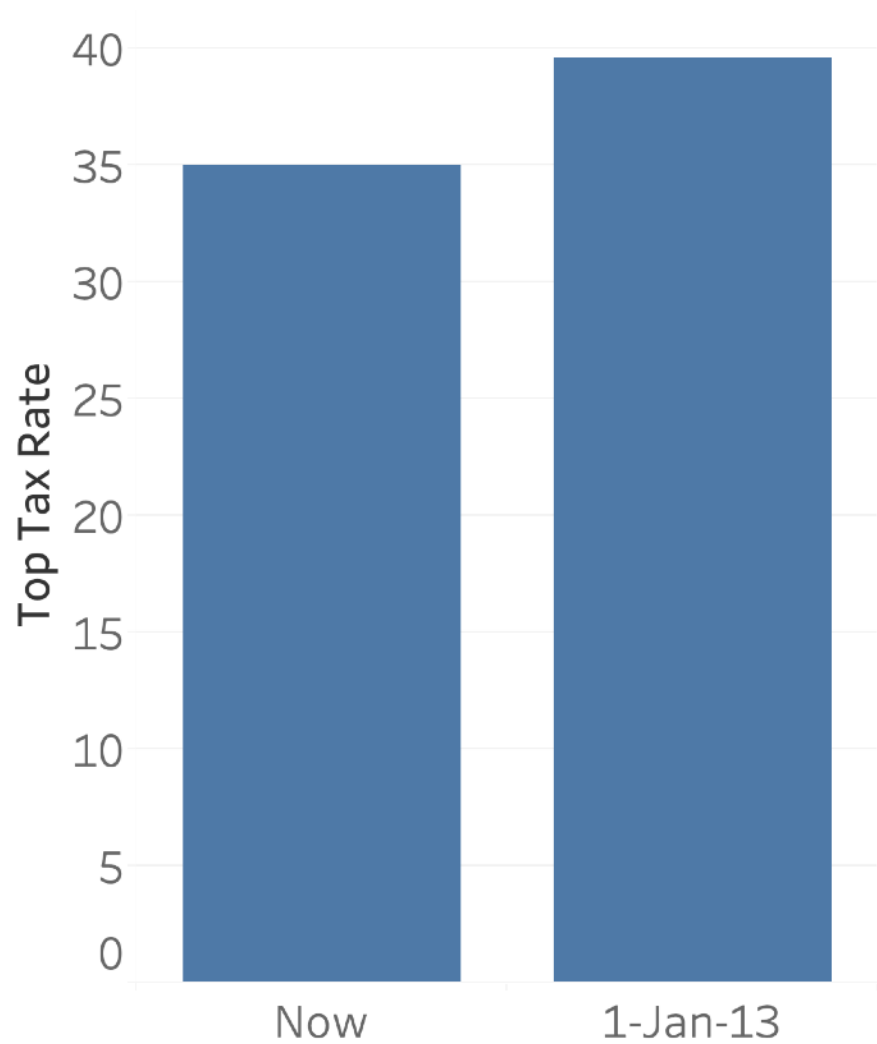
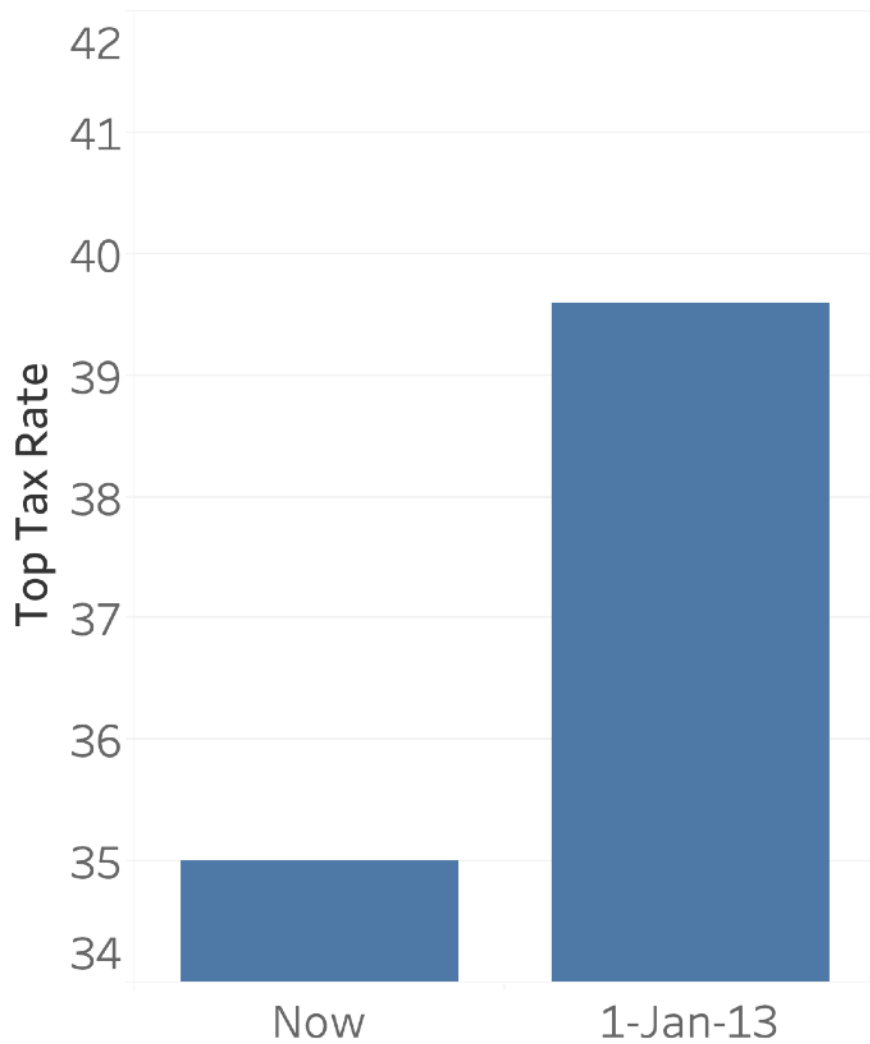
8:01 p ET

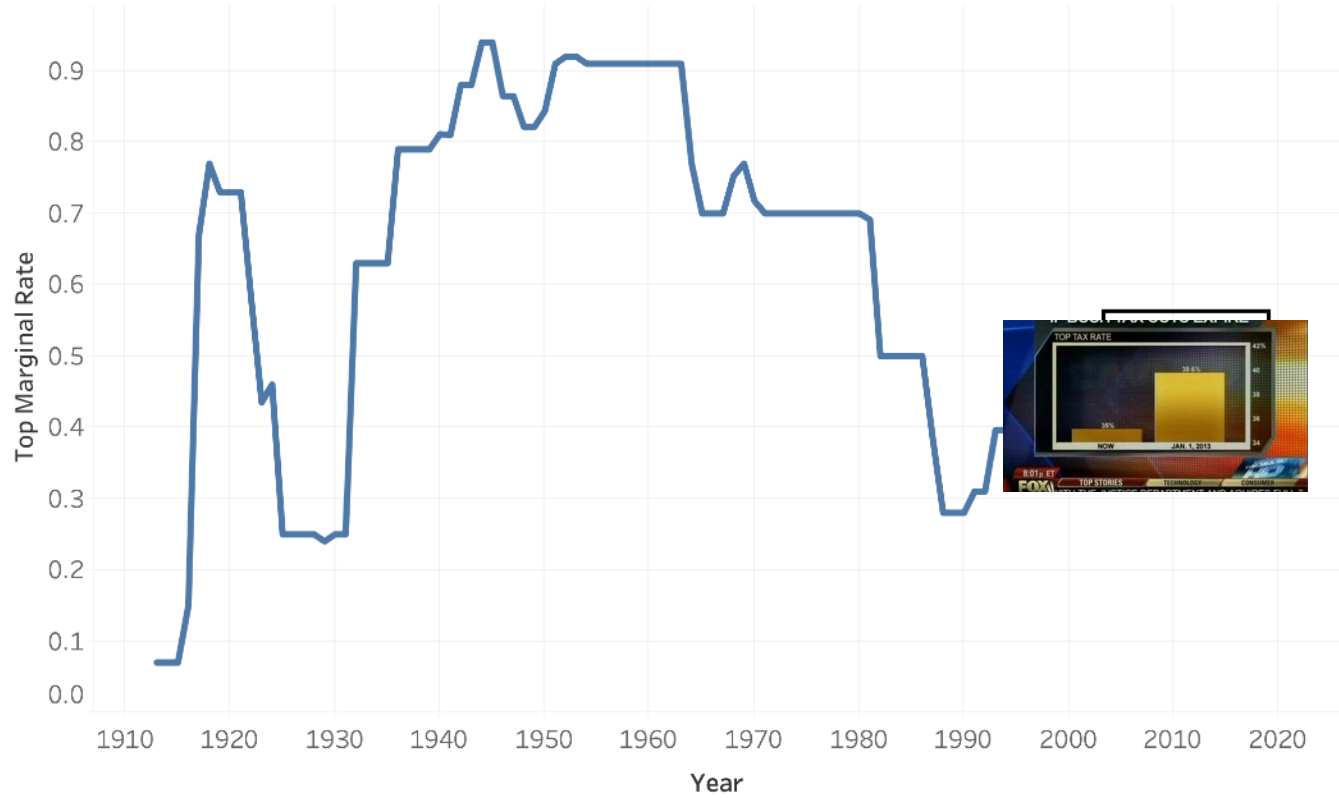
FOX

TOP STORIES

TECHNOLOGY

CONSUMER

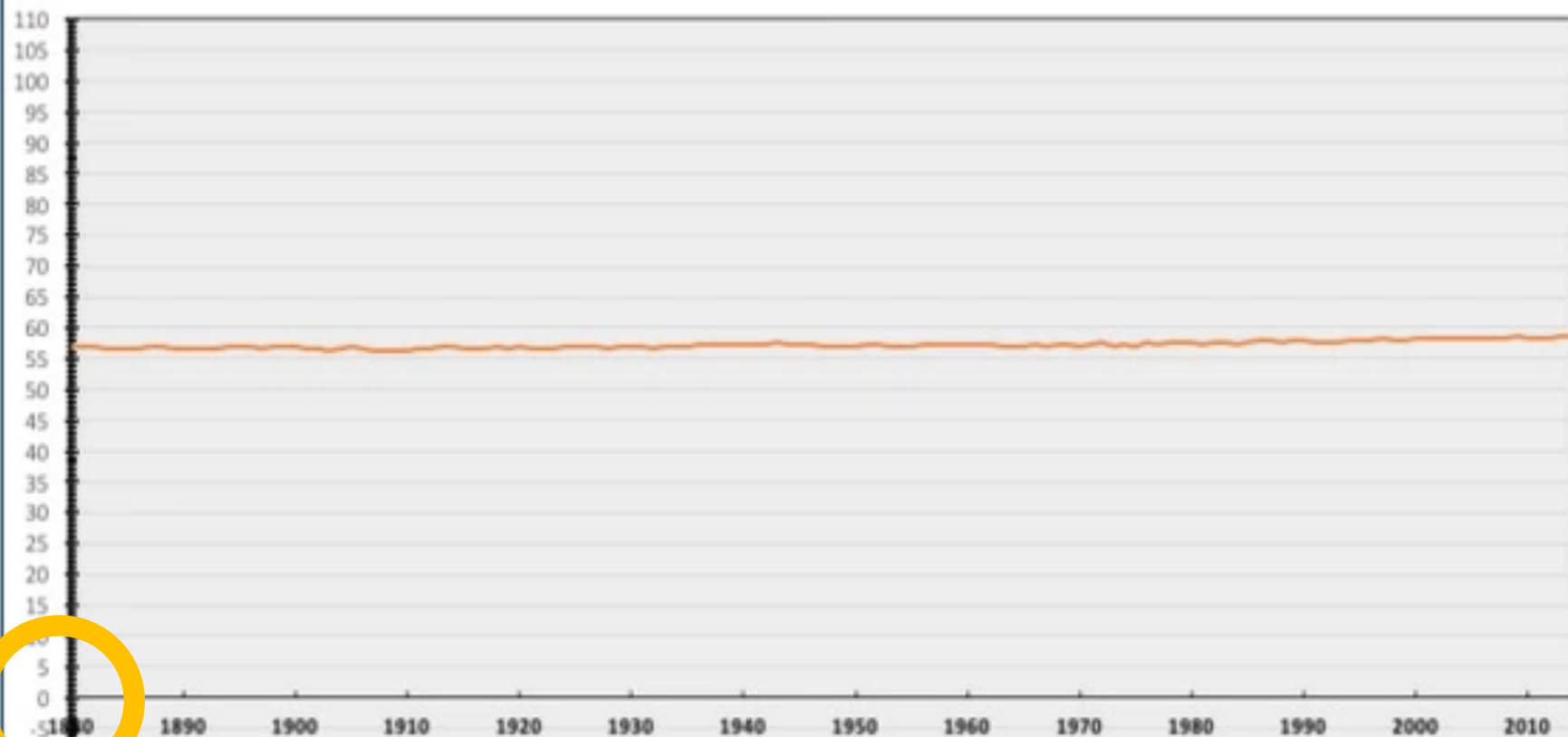




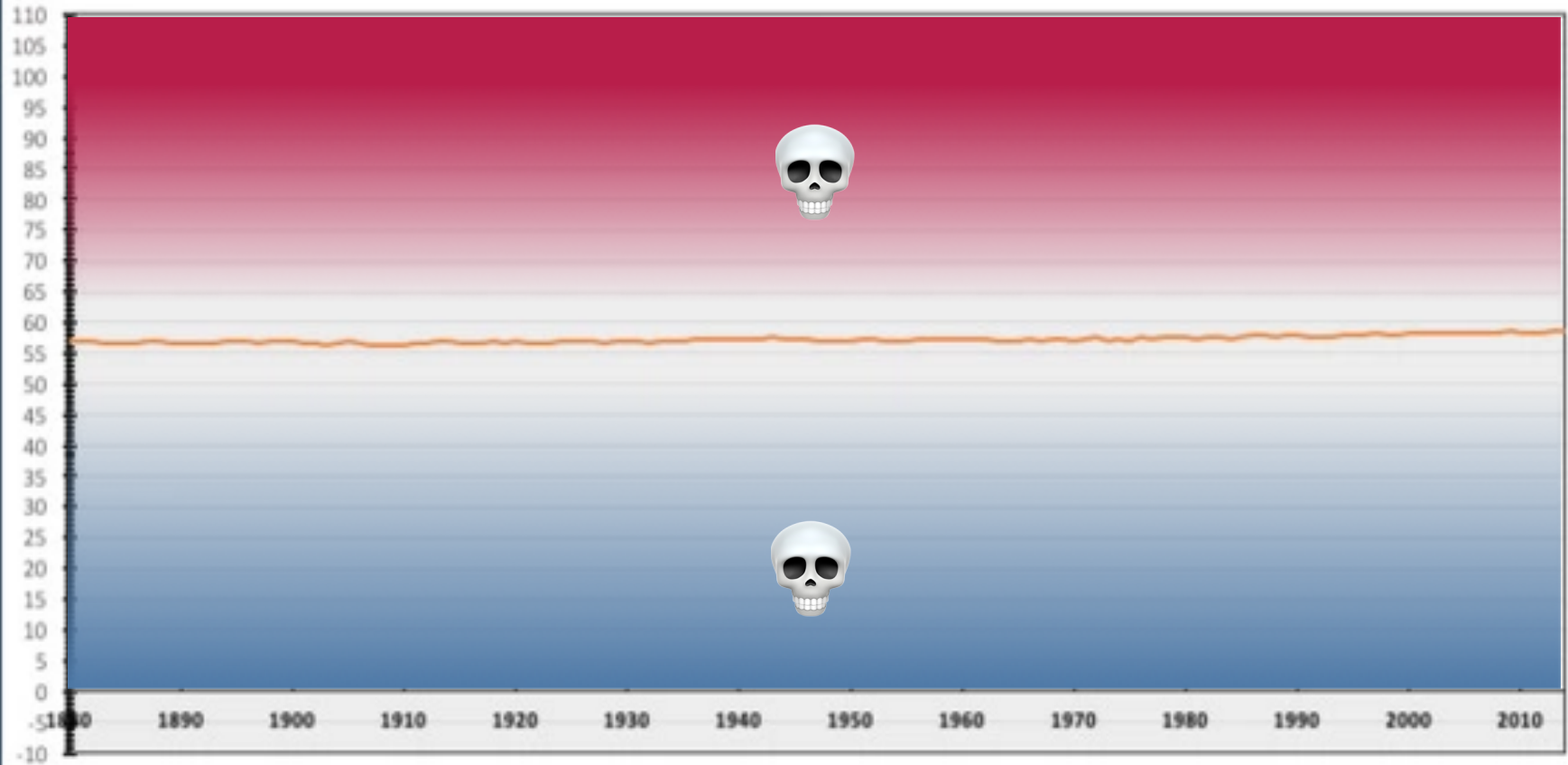
Average Annual Global Temperature in Fahrenheit
1880-2015



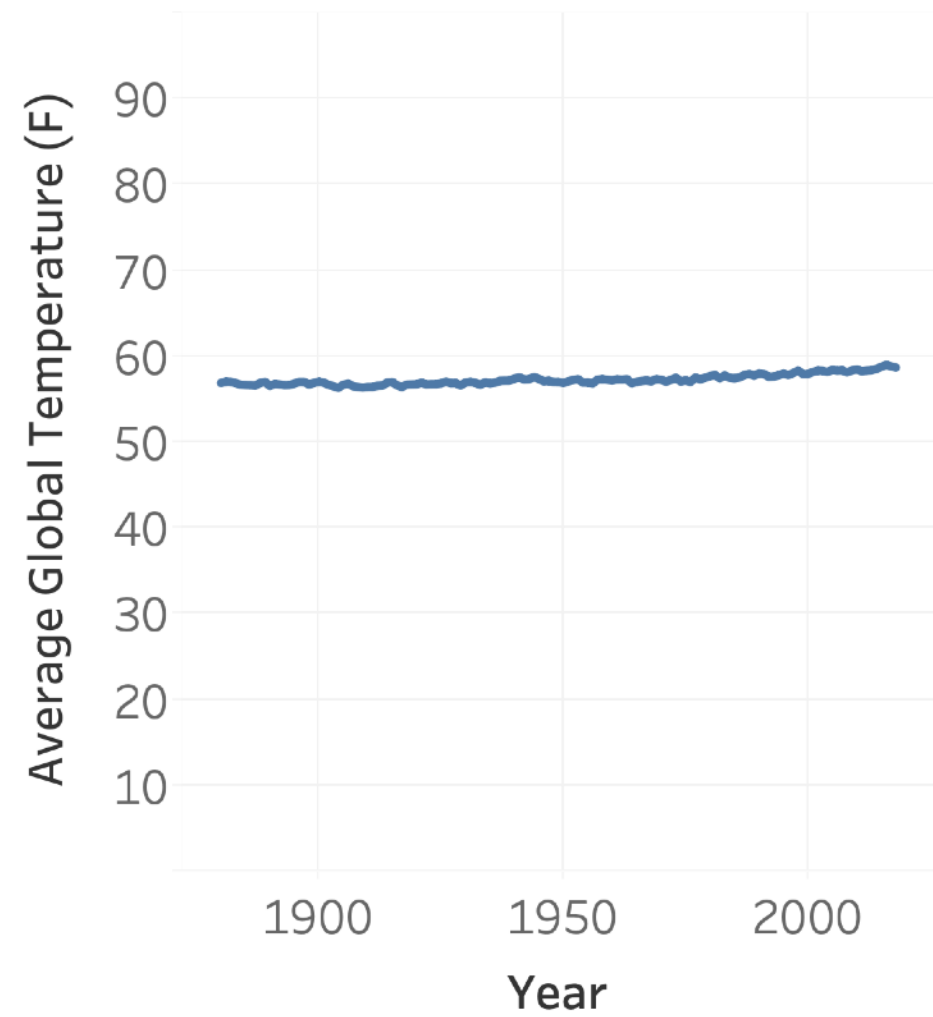
Average Annual Global Temperature in Fahrenheit
1880-2015



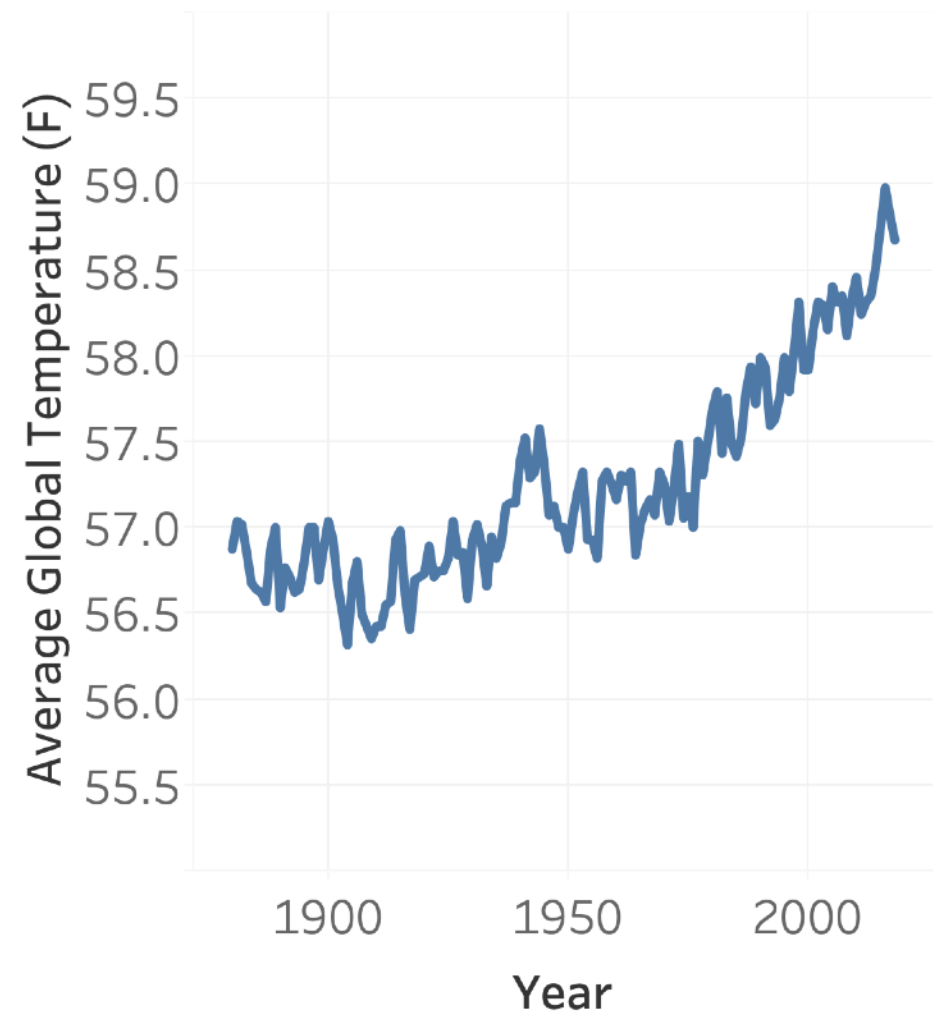
Average Annual Global Temperature in Fahrenheit 1880-2015



NRO



NRO (Truncated)



Unconventional Visualizations

People have tacit conventions on how they interpret charts (around colors, axes, slopes)

...if you violate those conventions, you can catch people off guard.

Deceptive Visualization Wrap-Up

Ways to mislead:

Breaking assumptions, expectations, conventions, drowning people in details... or just making stuff up.

Context matters:

Not every chart that breaks a design “rule” is misleading

Not every chart that follows the design “rules” is truthful

Exercise & Assignment

Deceptive Visualization

Design **two** static visualizations for a dataset:

1. An *earnest* visualization that faithfully conveys the data
2. A *deceptive* visualization that tries to mislead viewers

Your two visualizations may address different questions.

Try to design a deceptive visualization that appears to be earnest: *can you trick your classmates and course staff?*

You are free to choose your own dataset, but we have also provided some preselected datasets for you.

Submit two images and a brief write-up on Gradescope.

Due by **Wed 10/15 EOD**.

Deceptive Visualization Exercise

This week you will get more practice rapidly creating visualizations, and think through how these visualizations may (mis)communicate.

Given a dataset of demographics and earnings, create both earnest and deceptive charts.

Hone your deception skills in advance of the A2 assignment!

We're here to help! If you complete the exercise with time to spare, start the A2 assignment.