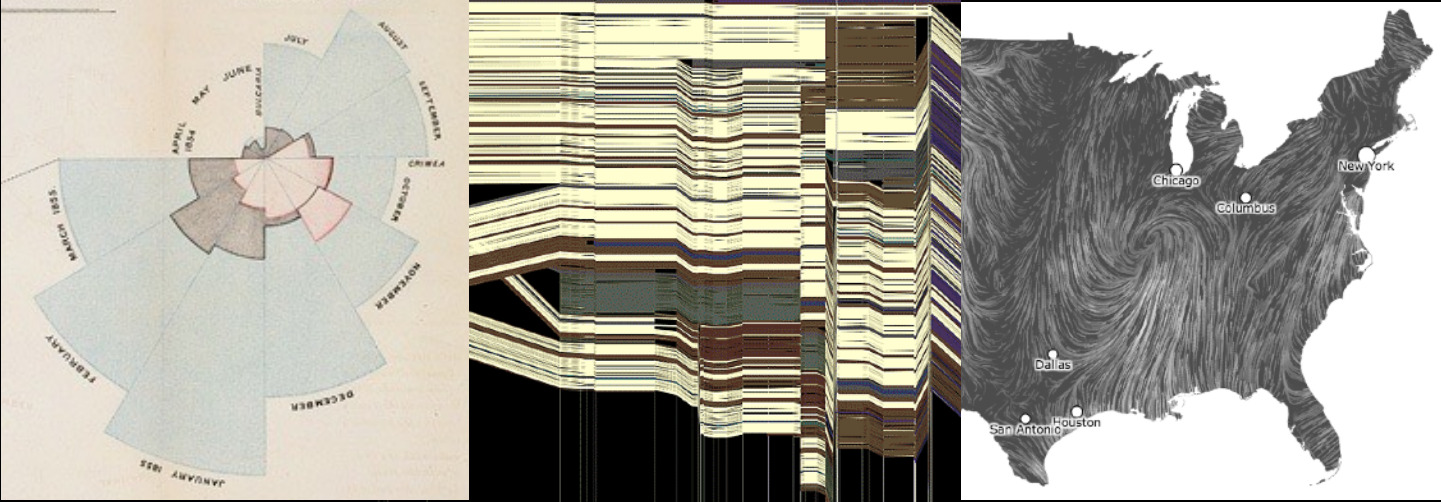


CSE 512 - Data Visualization

# Deceptive Visualization



Jeffrey Heer [U. Washington](#) (slide credits to Michael Correll)

# Deceptive Visualizations

Incorrect Visualizations

Illegible Visualizations

Bullshit Visualizations

Unconventional Visualizations



# Deceptive Visualizations

## Incorrect Visualizations

Illegible Visualizations

Bullshit Visualizations

Unconventional Visualizations



# Incorrect Visualization

## 2010 Georgia Approval Ratings by Region

In a Georgia Newspaper Partnership poll, residents were asked if they approve or disapprove of their government. Select a politician or legislative branch to see how the Georgia residents rated them.

BARACK OBAMA
  U.S. CONGRESS
  G.A. STATE LEGISLATURE
  SONNY PERDUE

### Statewide Results:

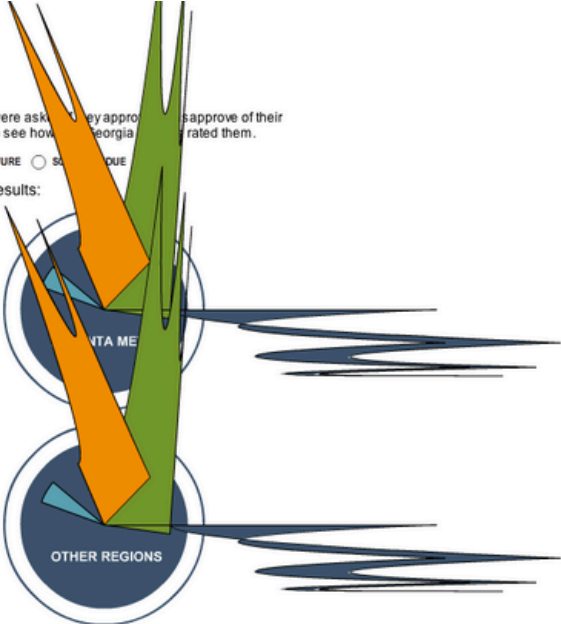
**Barack Obama**  
 Approve: 37 %  
 Disapprove: 52 %  
 Not Sure: 11 %

**U.S. Congress**  
 Approve: 21 %  
 Disapprove: 60 %  
 Not Sure: 19 %

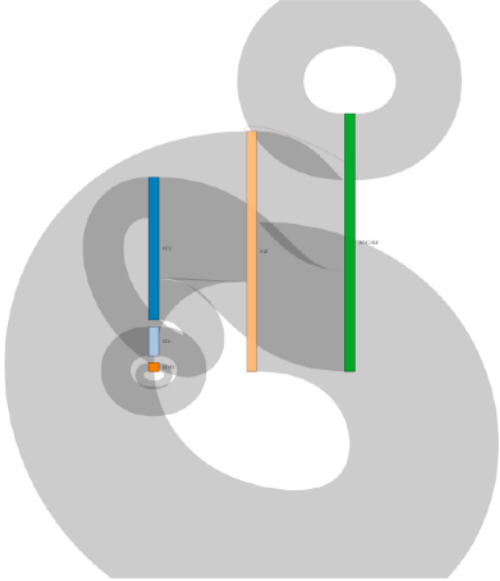
**State Legislature**  
 Approve: 39 %  
 Disapprove: 37 %  
 Not Sure: 24 %

**Sonny Perdue**  
 Approve: 45 %  
 Disapprove: 42 %  
 Not Sure: 13 %

### Regional Results:



Percent of Polled Residents  
 Approve
  Disapprove
  Not Sure






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

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

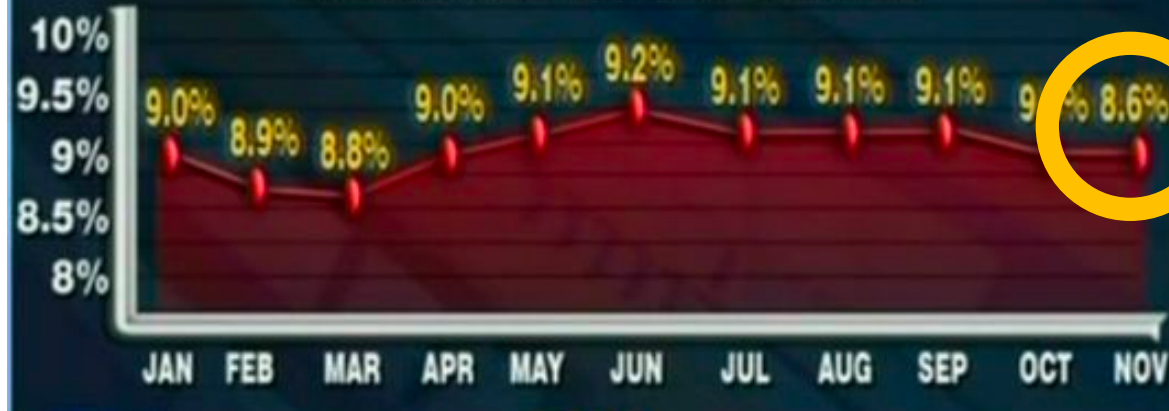


# UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA





# UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



## UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



# UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



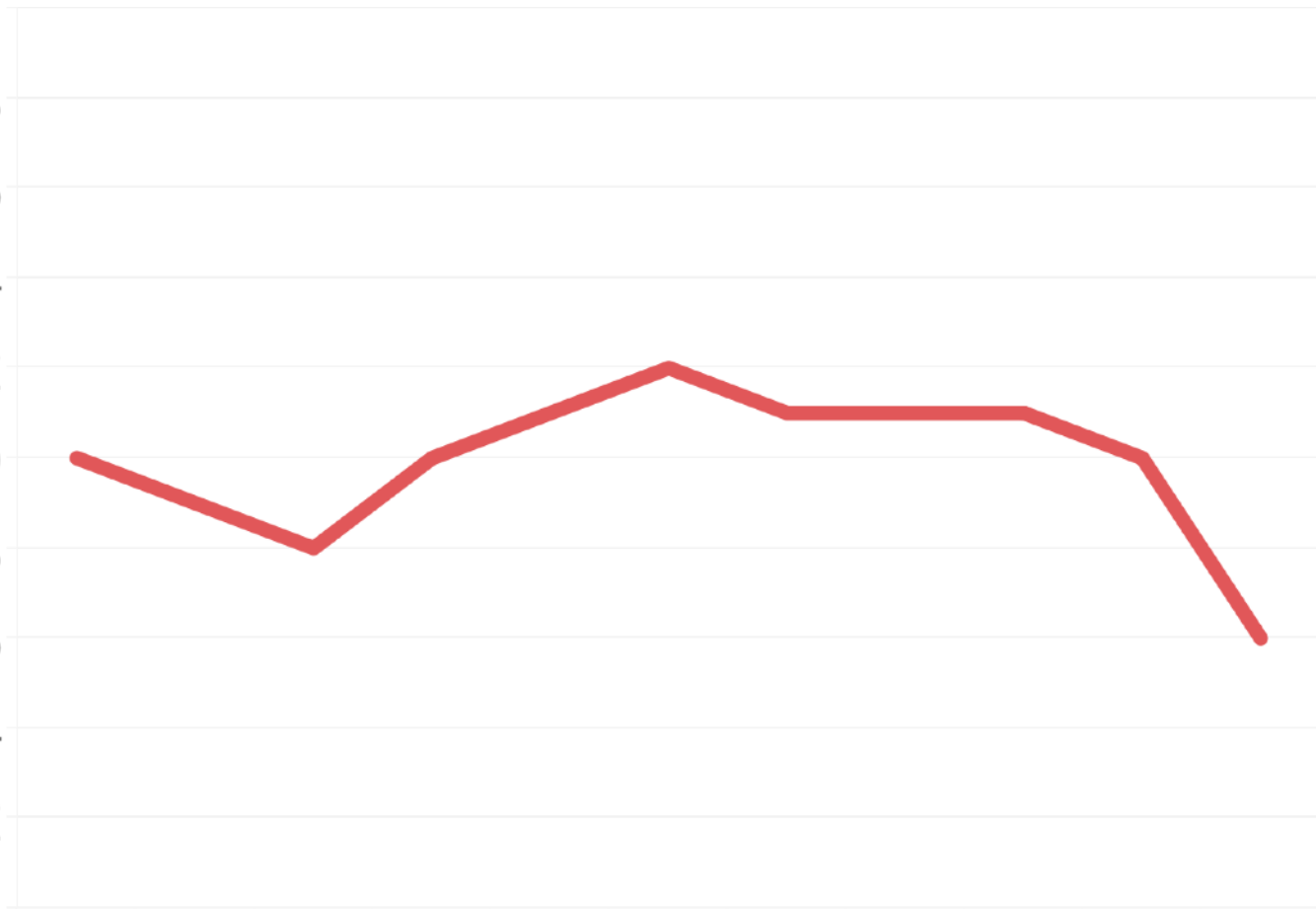
# UNEMPLOYMENT RATE UNDER PRESIDENT OBAMA



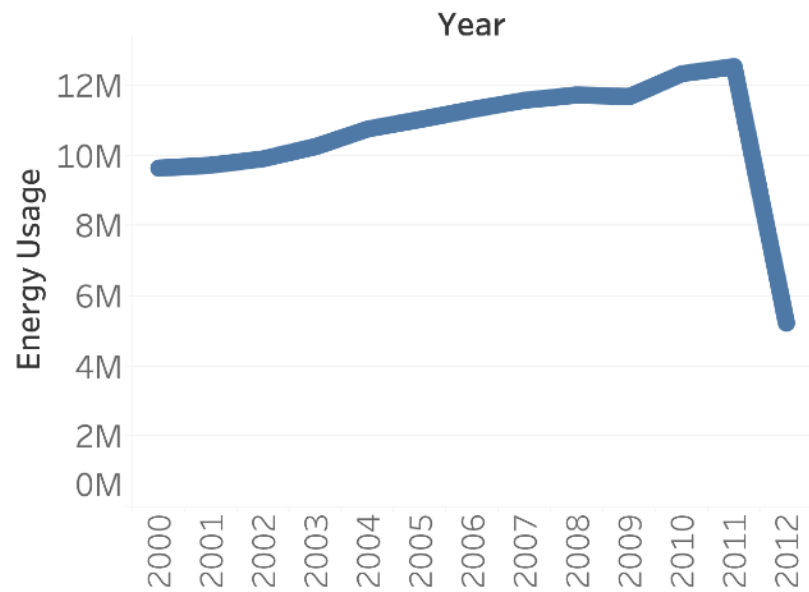
Unemployment

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

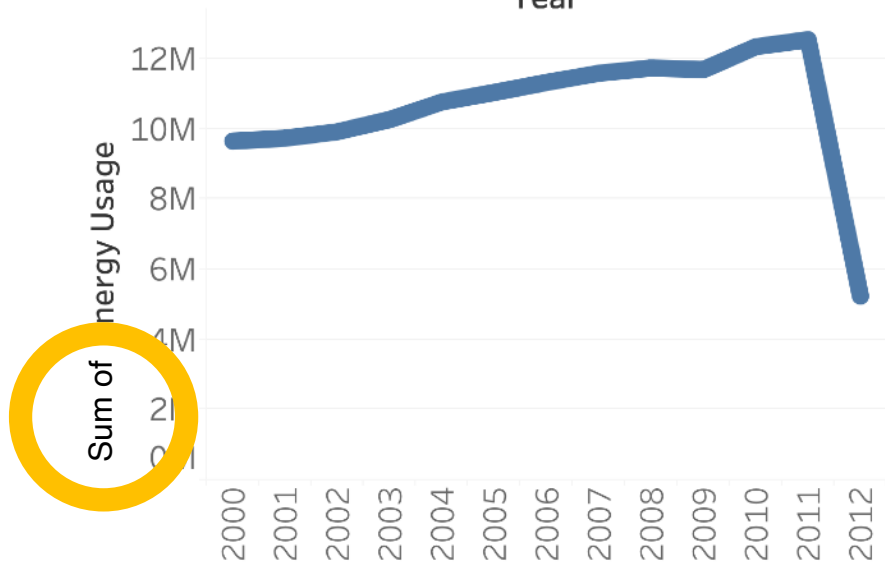


Energy Usage Down?

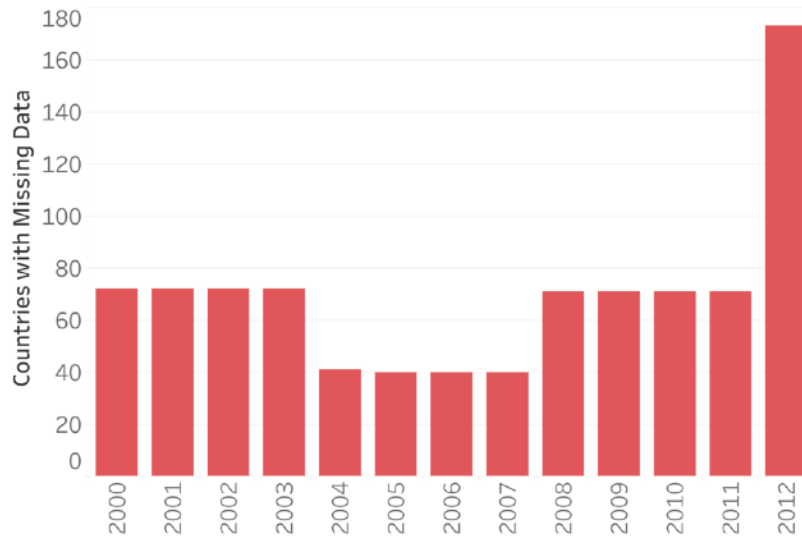
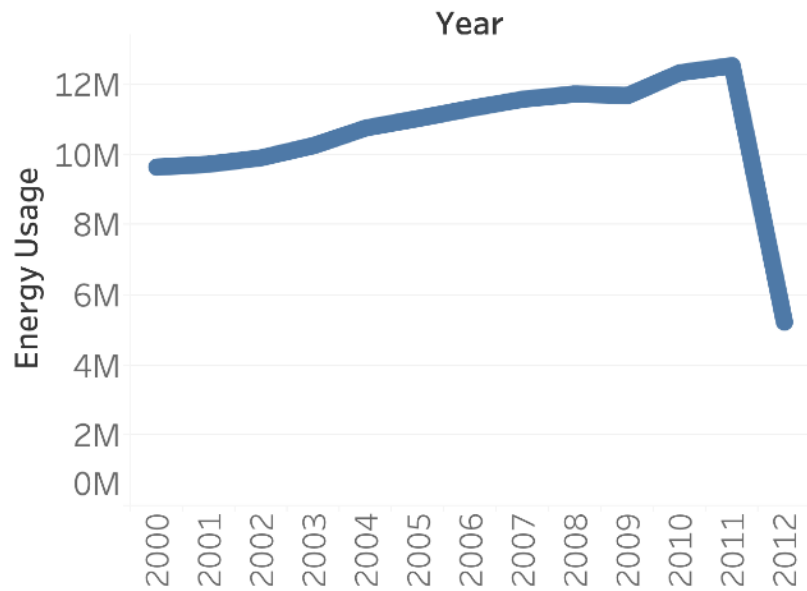


Energy Usage Down?

Year

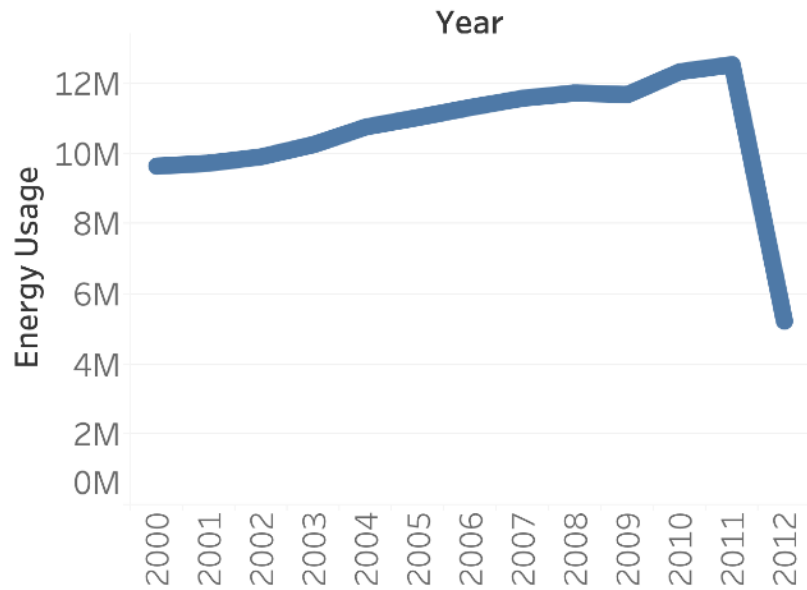


Energy Usage Down?

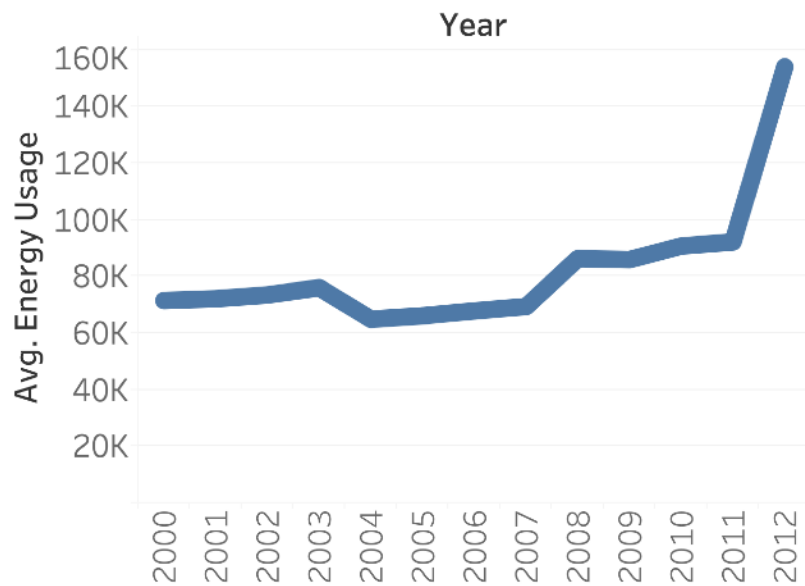




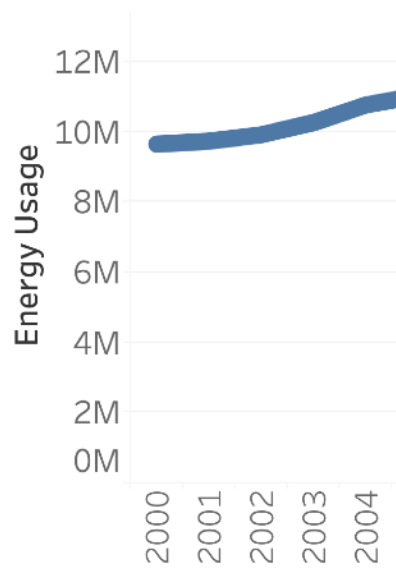
Energy Usage Down?



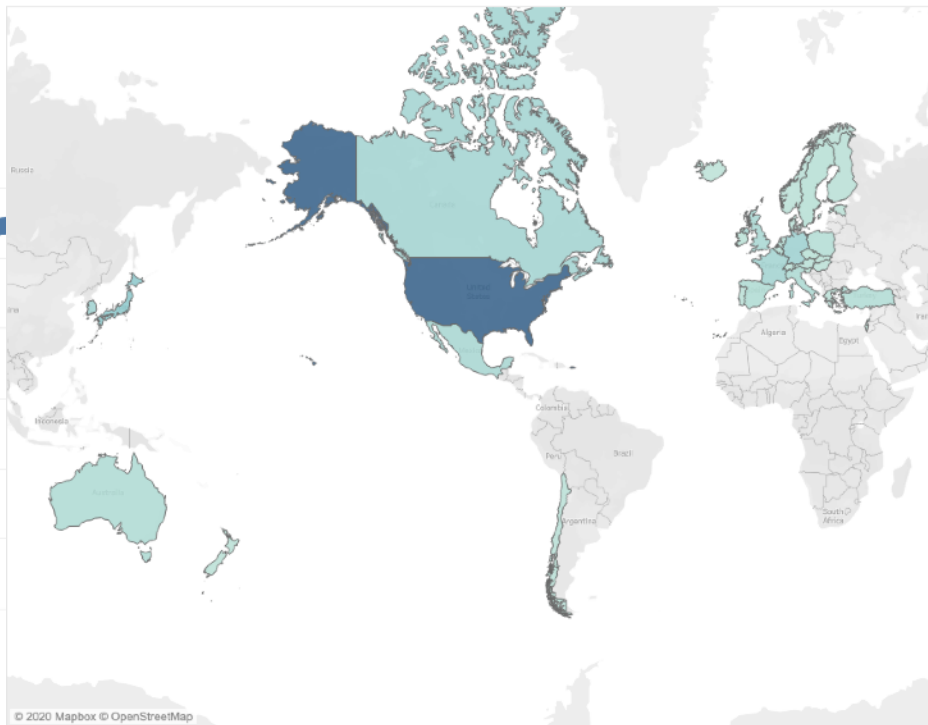
Energy Usage Up?



Energy Usage Down?



2012 Non-Nulls Are OECD Countries



# 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

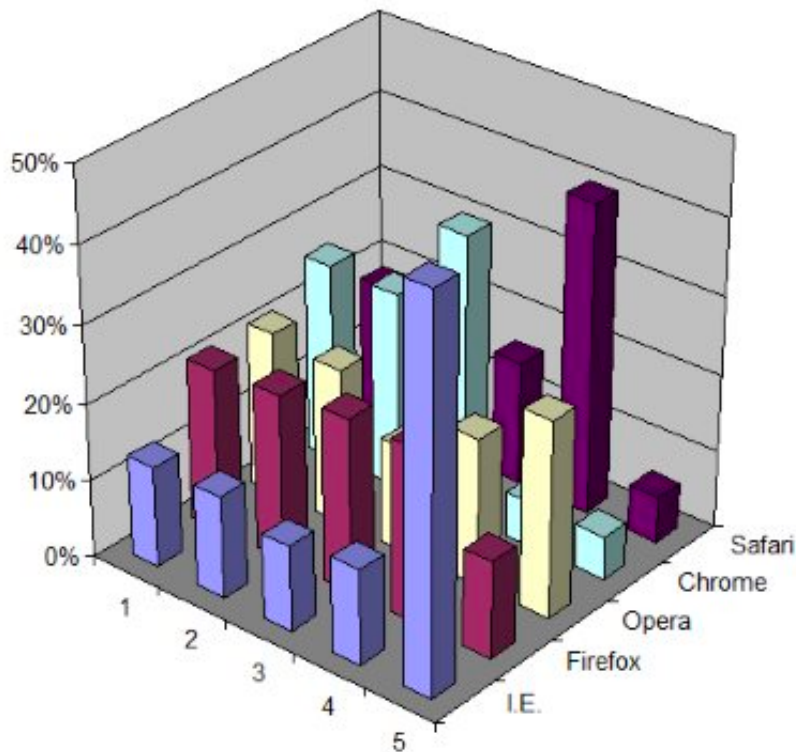
## Illegible Visualizations

Bullshit Visualizations

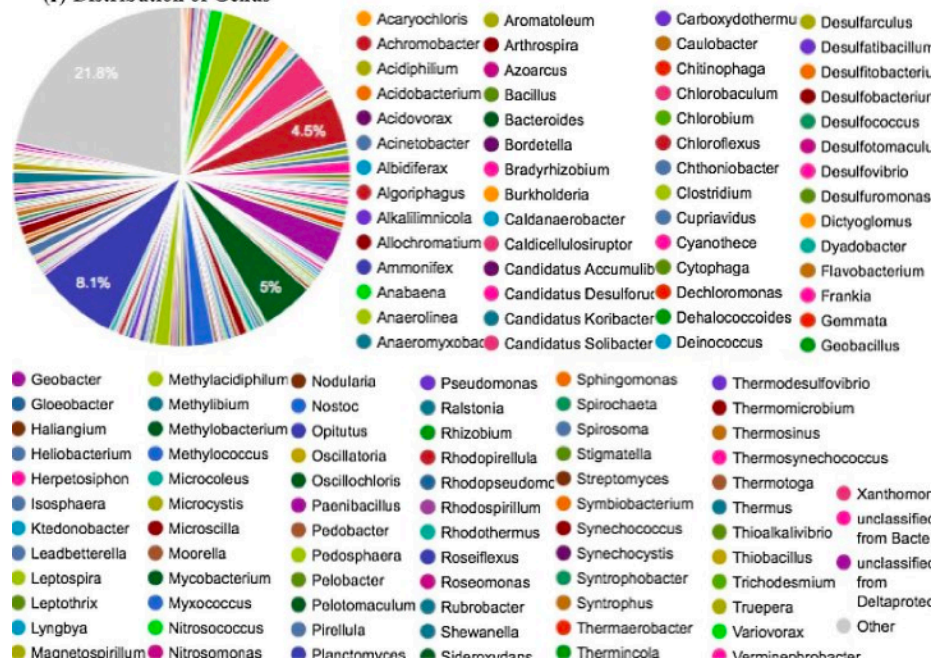
Unconventional Visualizations



# Illegible Visualization



(f) Distribution of Genus





### Interactive Weekly Unemployment Insurance Claims

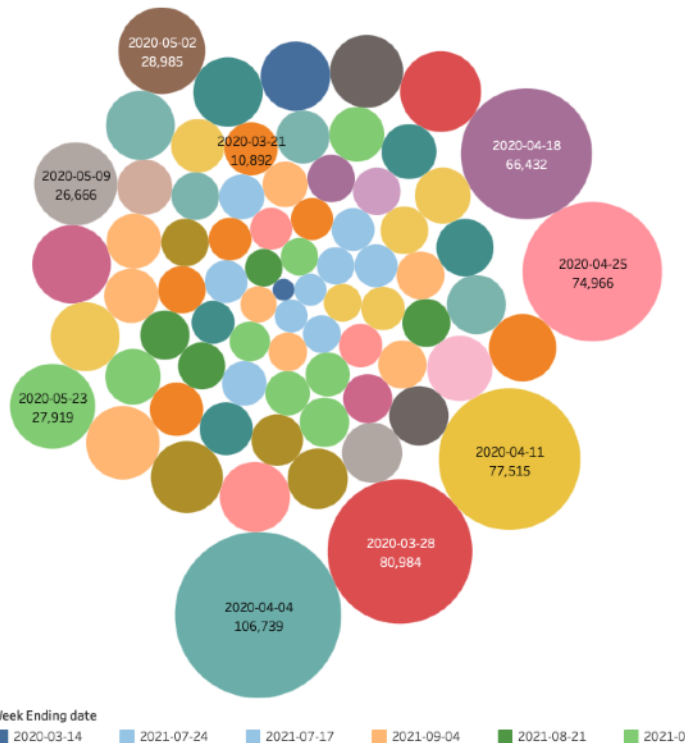
Initial\_Claims\_byCounty **Historical**

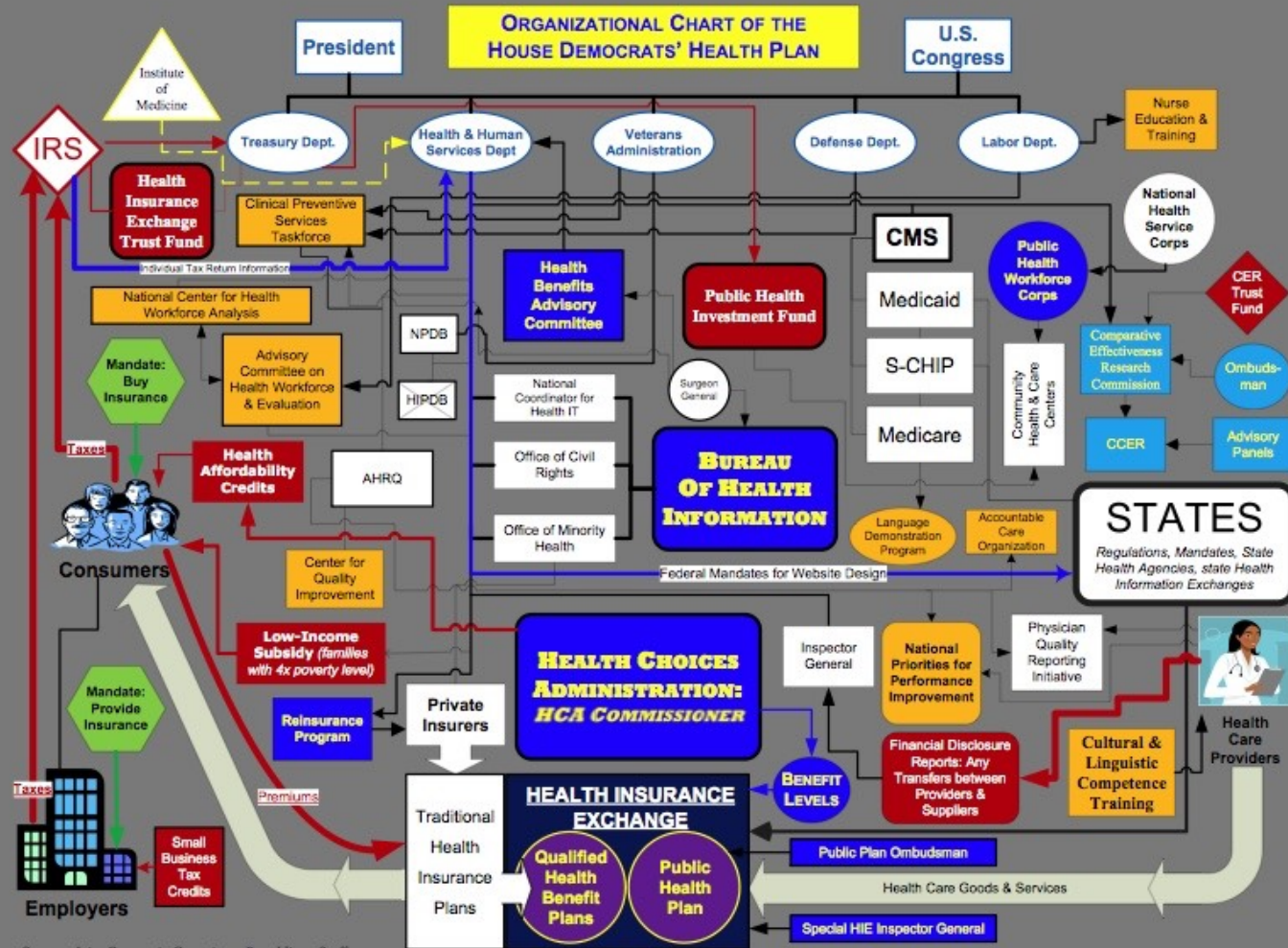
County

Total

#### Historical Initial Claims by Week

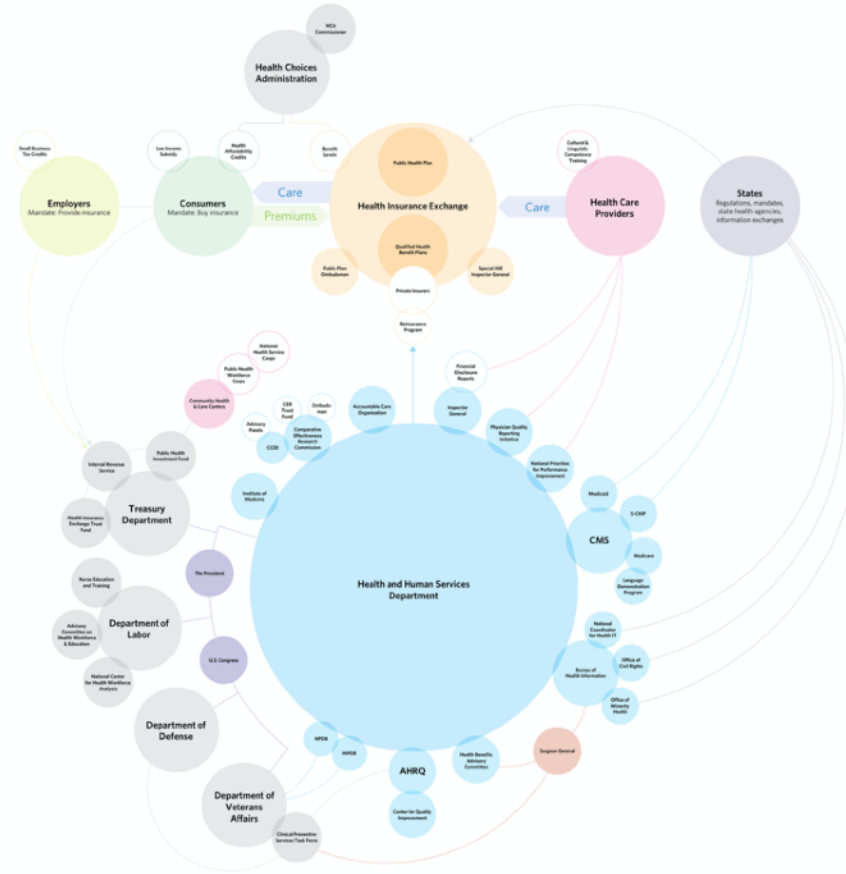
2020-12-26	5,506
2021-01-02	10,996
2021-01-09	14,084
2021-01-16	11,983
2021-01-23	11,615
2021-01-30	12,664
2021-02-06	13,464
2021-02-13	12,087
2021-02-20	11,395
2021-02-27	11,624
2021-03-06	13,592
2021-03-13	16,506
2021-03-20	13,994
2021-03-27	18,710
2021-04-10	10,909
2021-04-17	8,983
2021-04-24	8,704
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





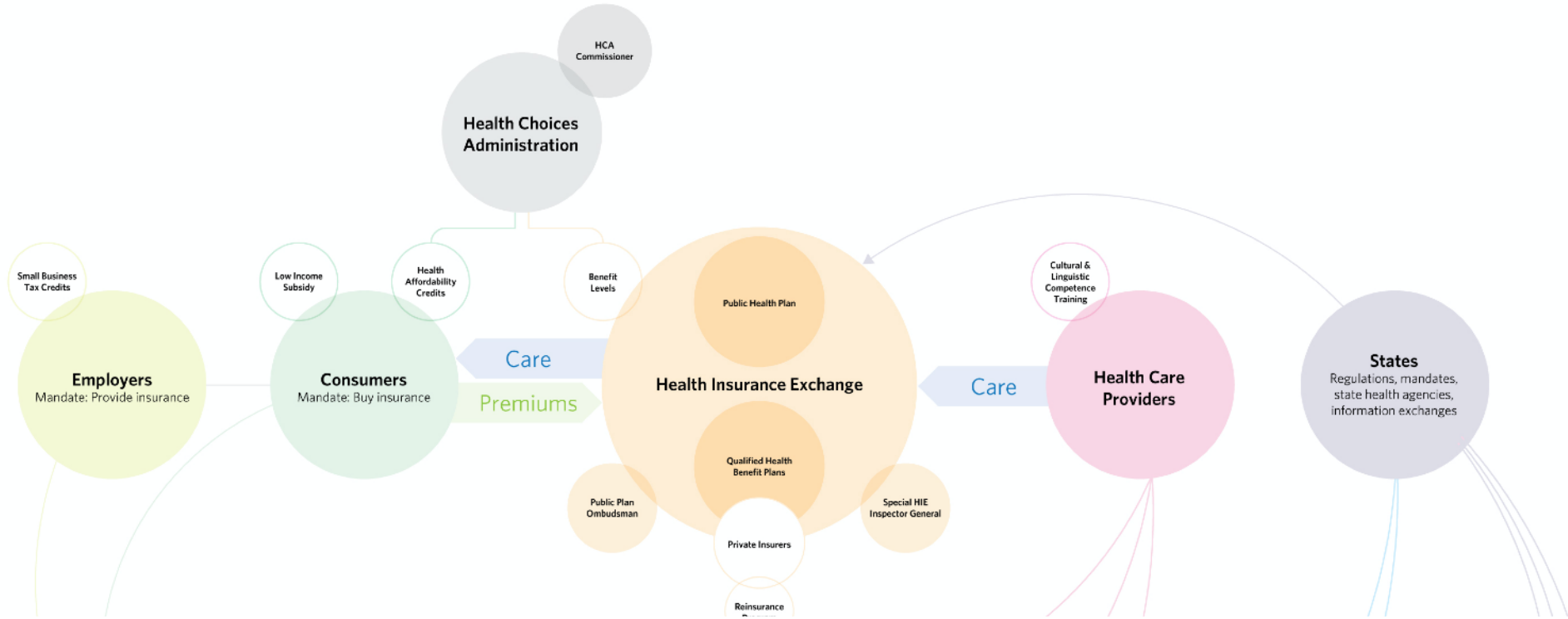
Source: Joint Economic Committee, Republican Staff Congressman Kevin Brady, Ranking House Republican Member

# Organizational Chart of the House Democrats' Health Plan



"Do not f\*ck with graphic designers" – Robert Palmer





“Do not f\*ck 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

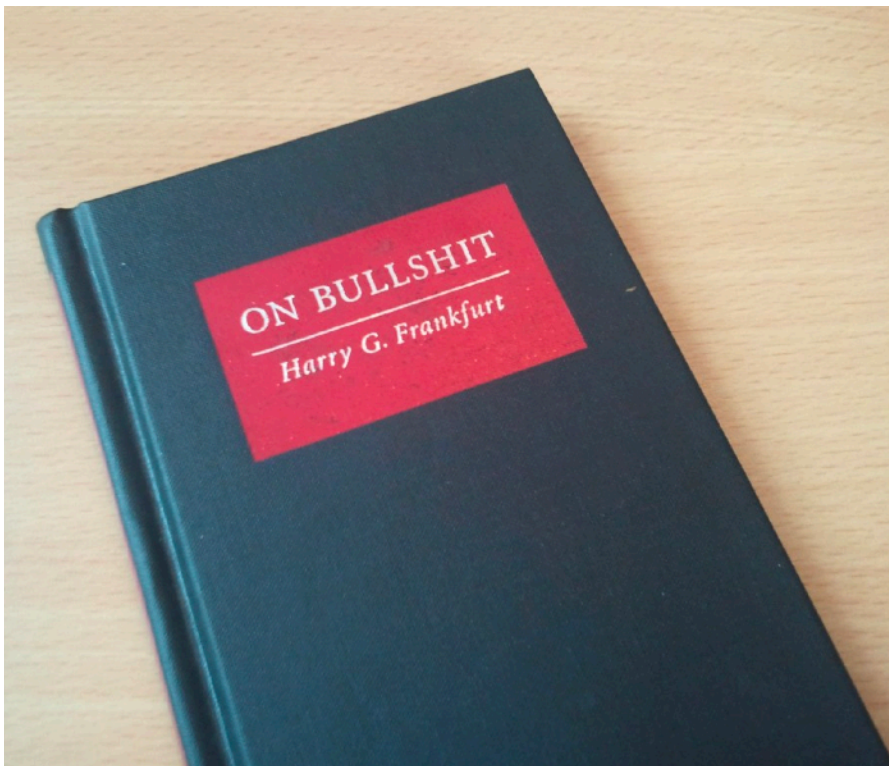
Illegible Visualizations

**Bullshit Visualizations**

Unconventional Visualizations



# Bullshit Visualization



## Lie:

"No, officer, I wasn't speeding"

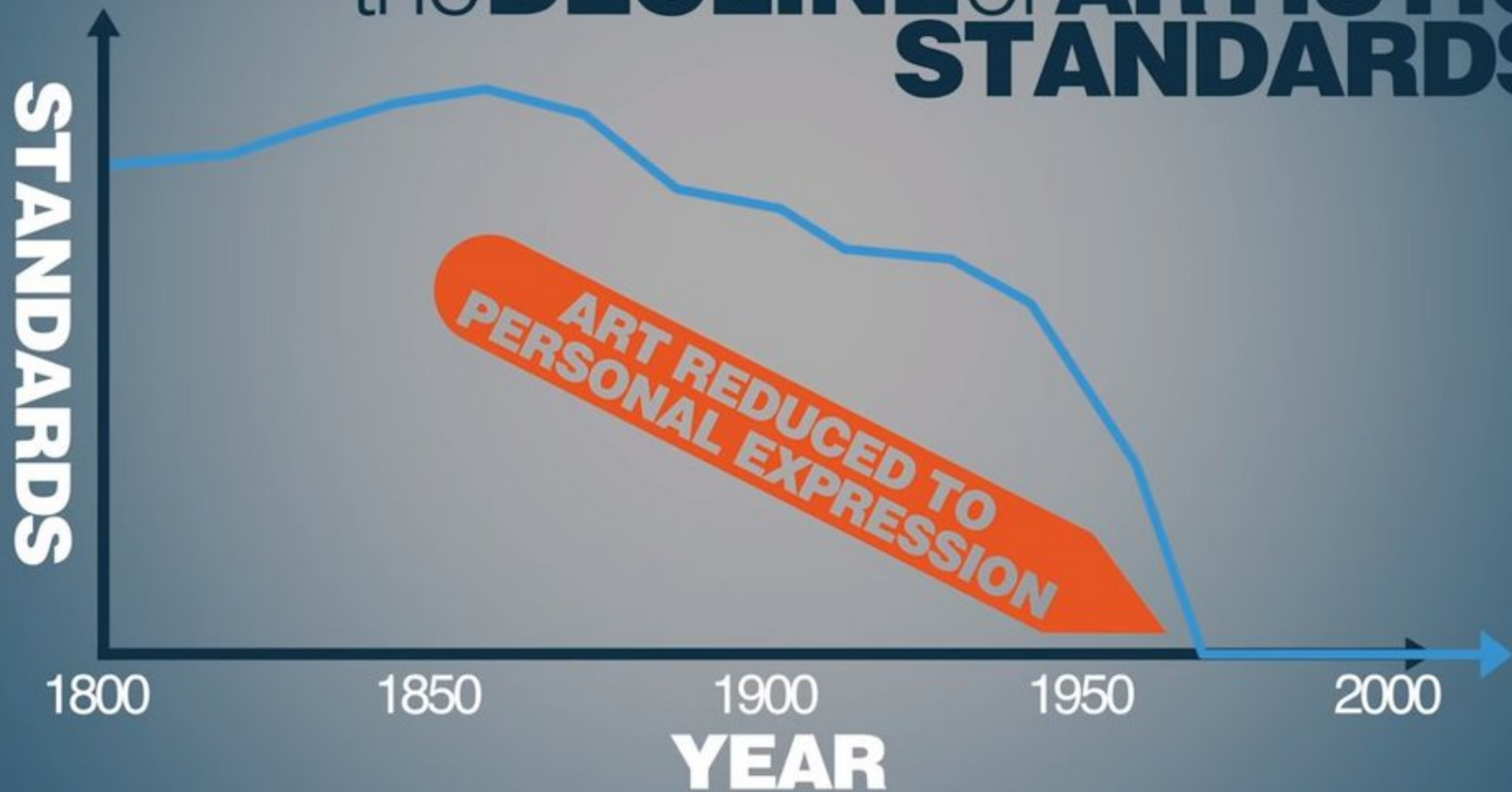
(you know the truth, but intentionally say something you know is untrue)

## Bullshit:

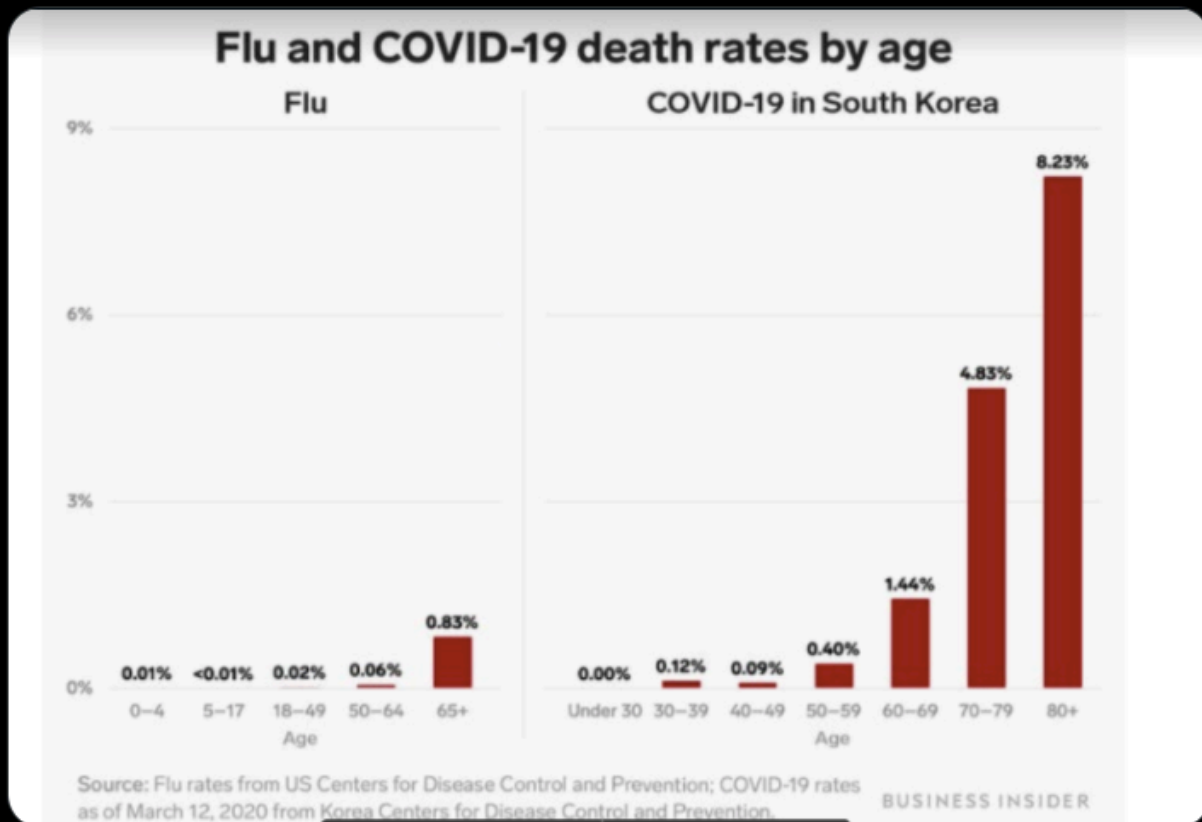
"The party was lame anyways, it's good I wasn't invited"

(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

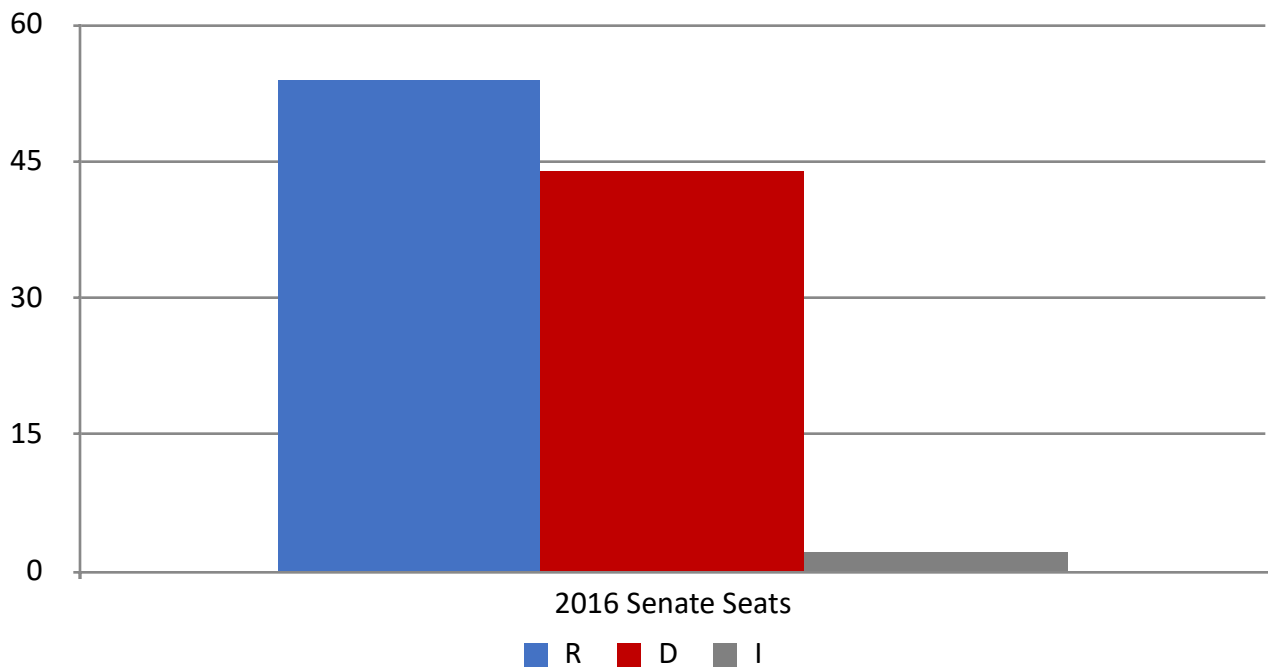
Illegible Visualizations

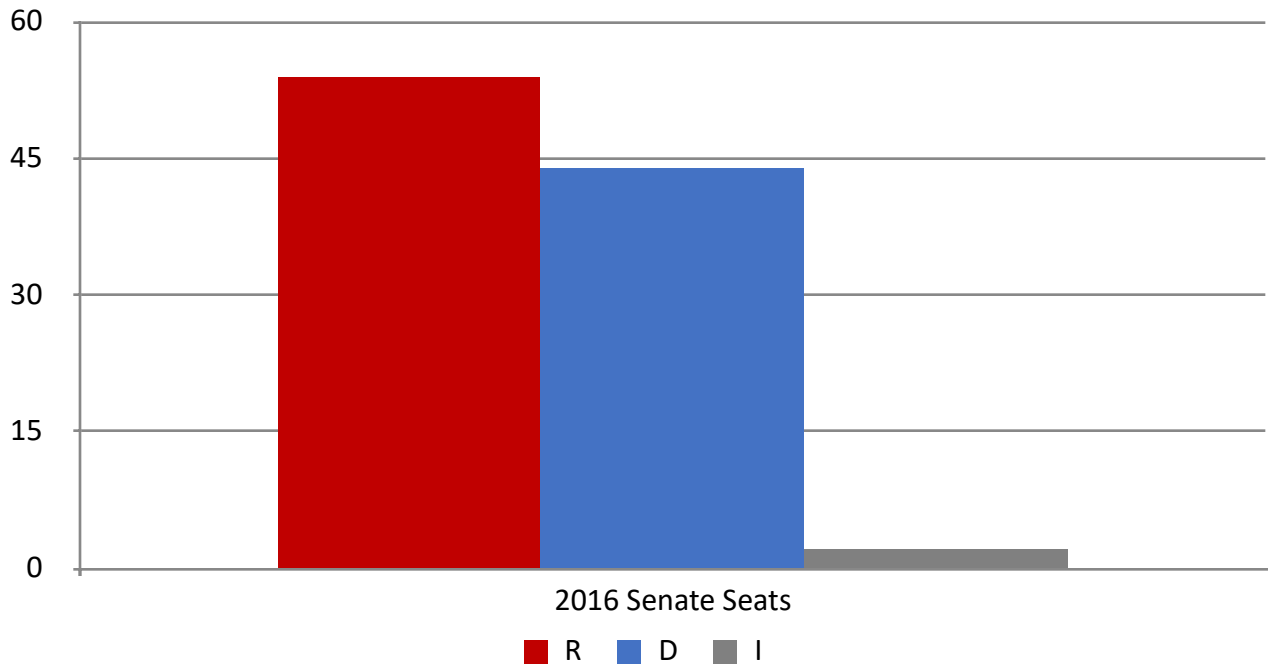
Bullshit Visualizations

**Unconventional Visualizations**

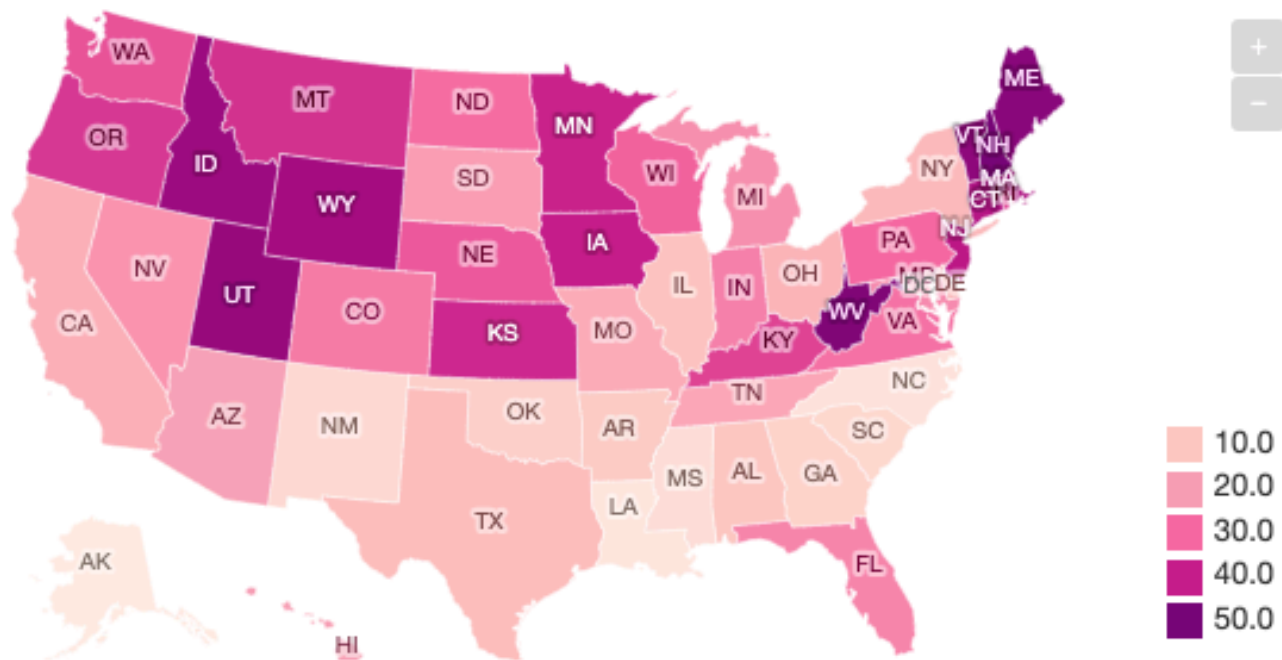




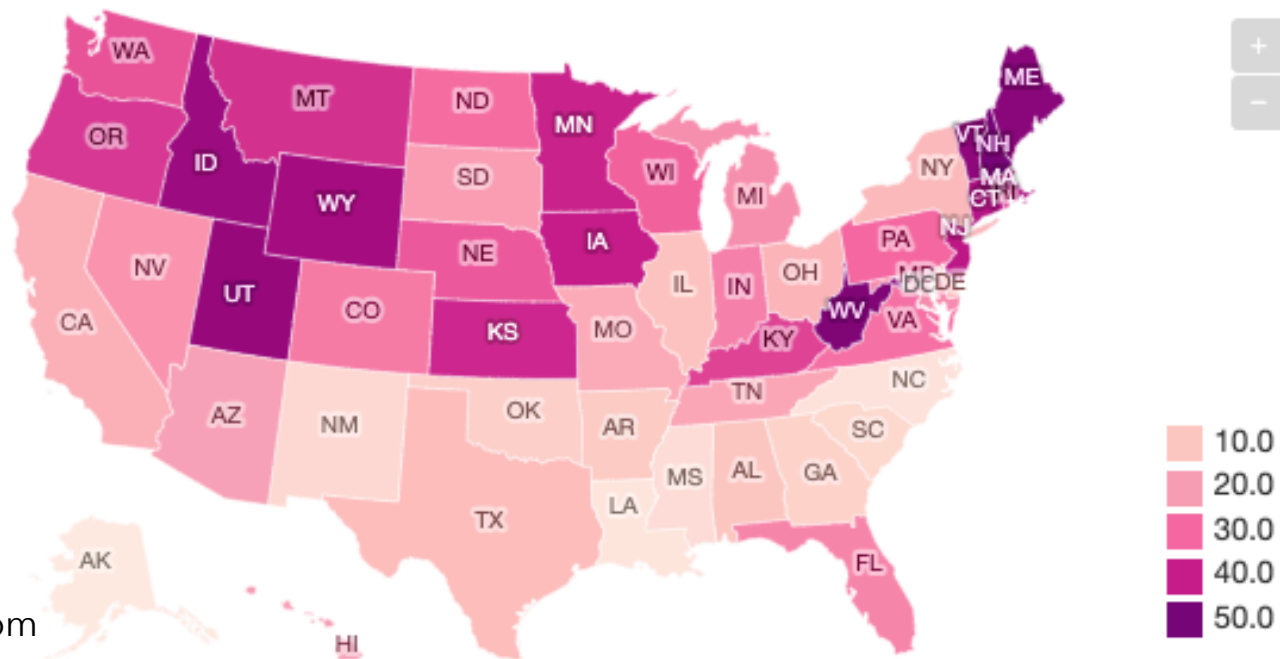




Which states have the most STIs?



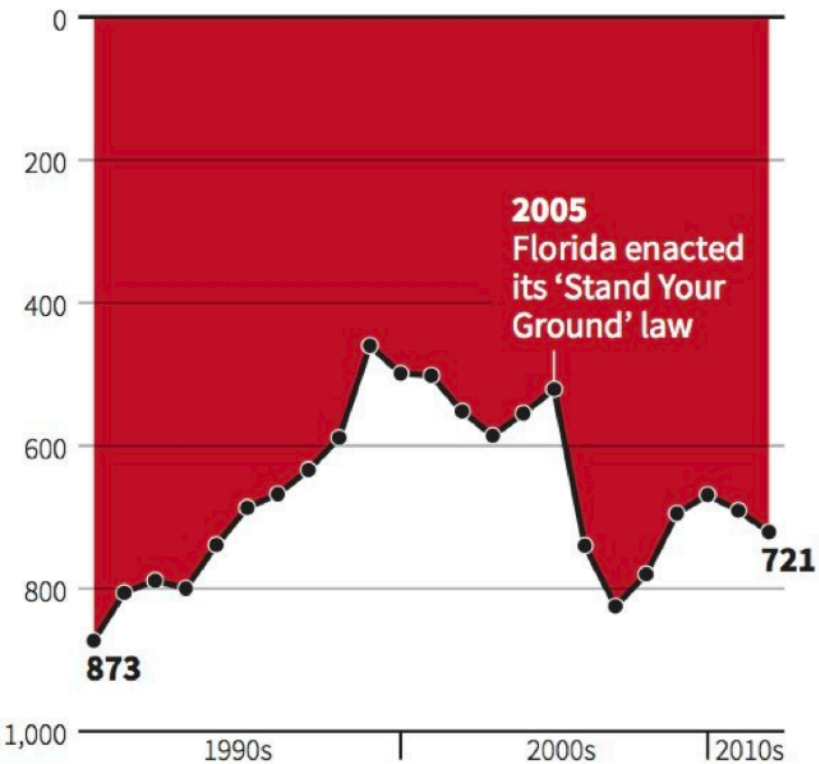
## Which states have the most STIs?



“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

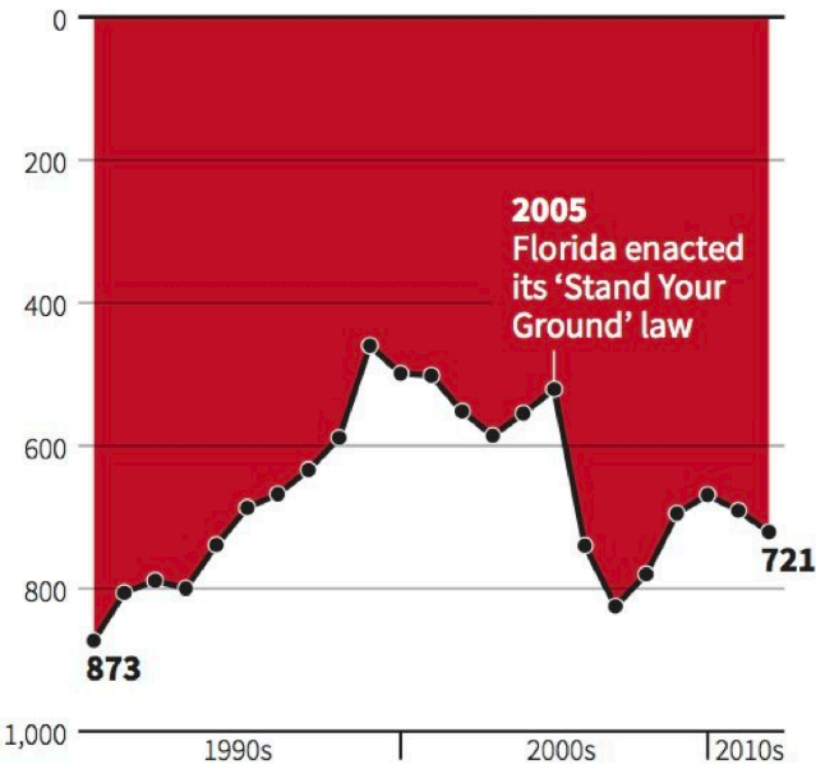
Number of murders committed using firearms



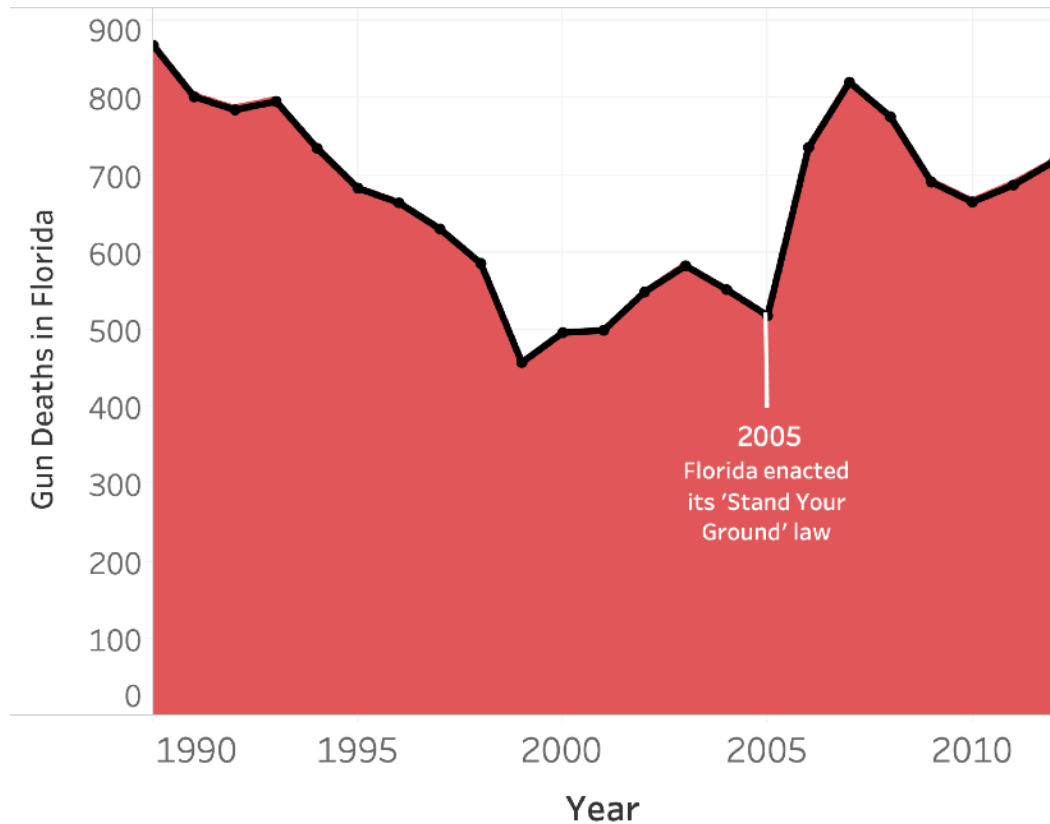
Source: Florida Department of Law Enforcement

# Gun deaths in Florida

Number of murders committed using firearms

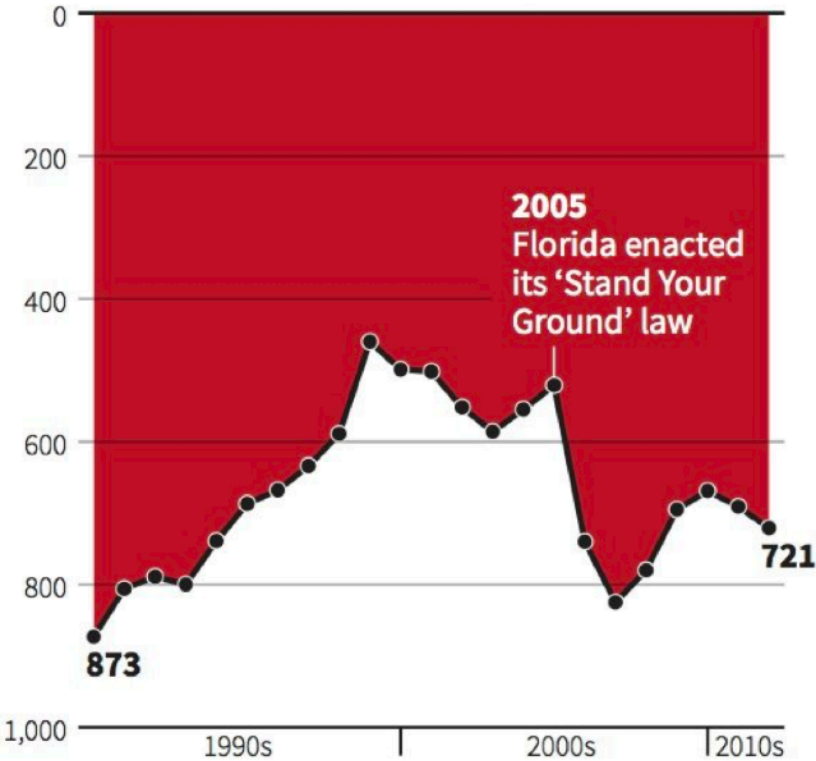


Source: Florida Department of Law Enforcement



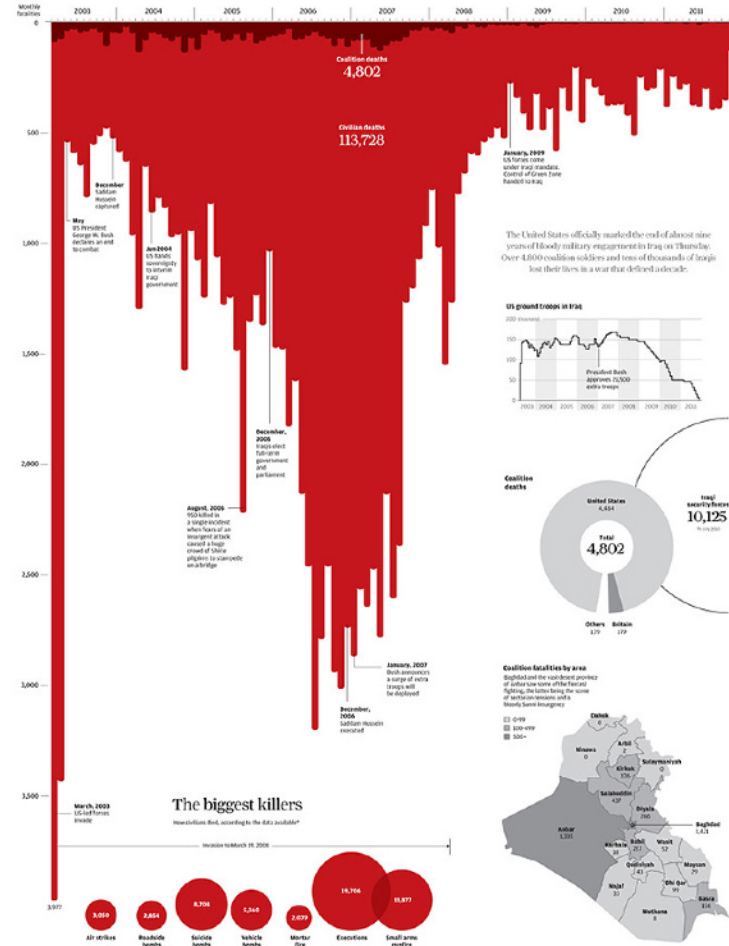
# Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

# Iraq's bloody toll



# ITHACA TIMES

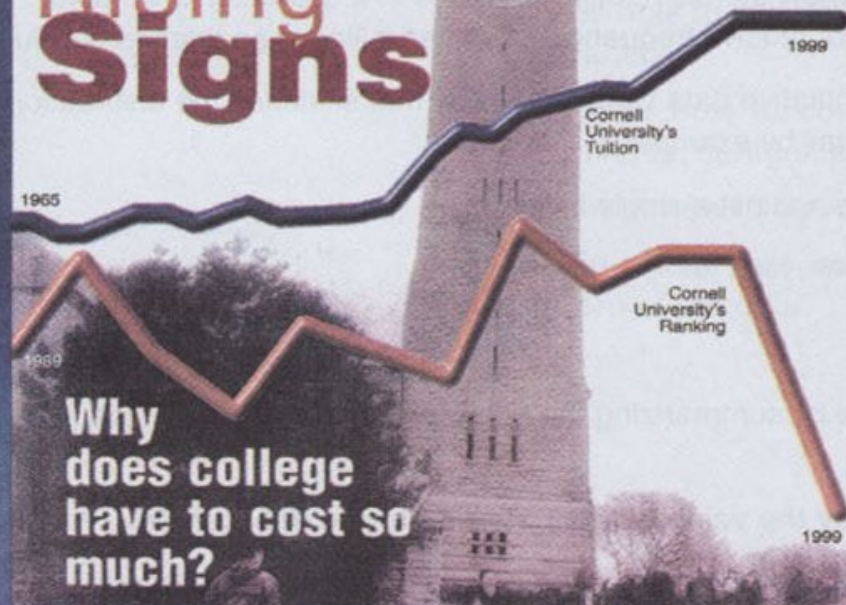
Visit us online at <http://www.ithacatimes.com>

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

Planning Board approves  
Widewaters development

IC students occupy Job Hall

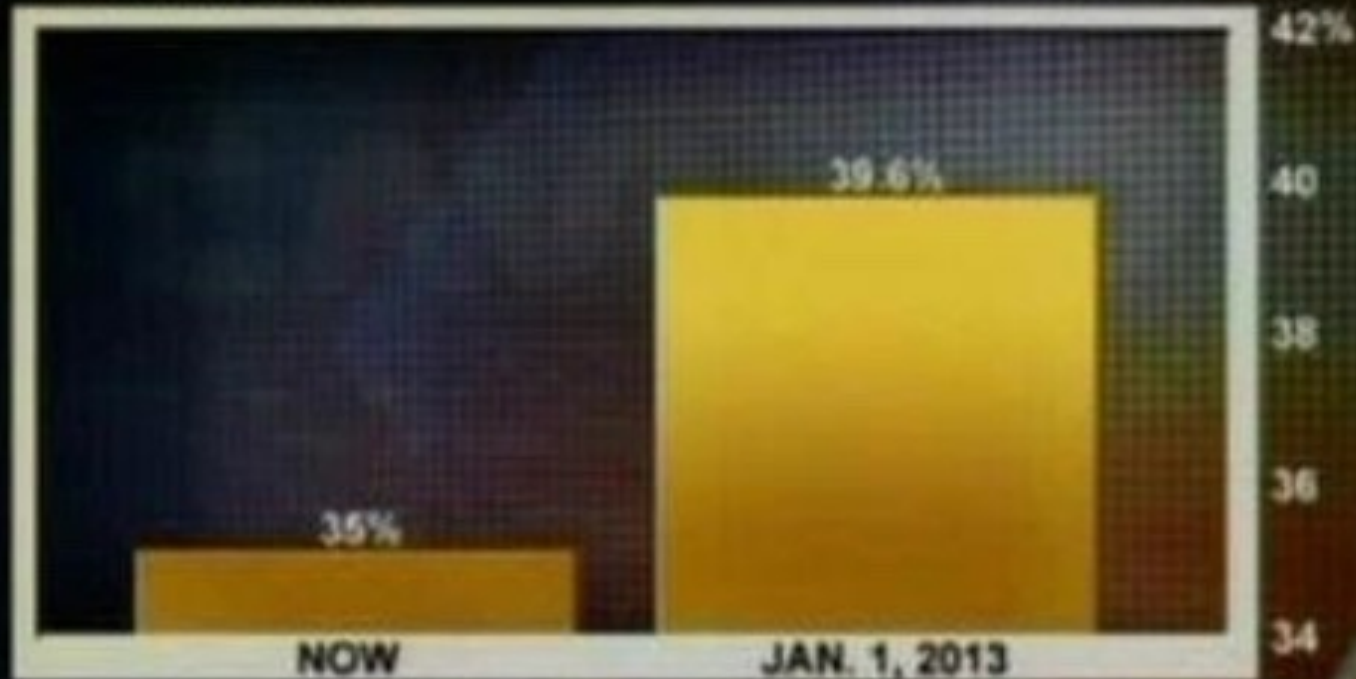
Cayuga Vocal Ensemble  
ushers in the holidays with  
"Judas Maccabaeus"

## Rising Signs



Why  
does college  
have to cost so  
much?

## TOP TAX RATE



8:01 p ET

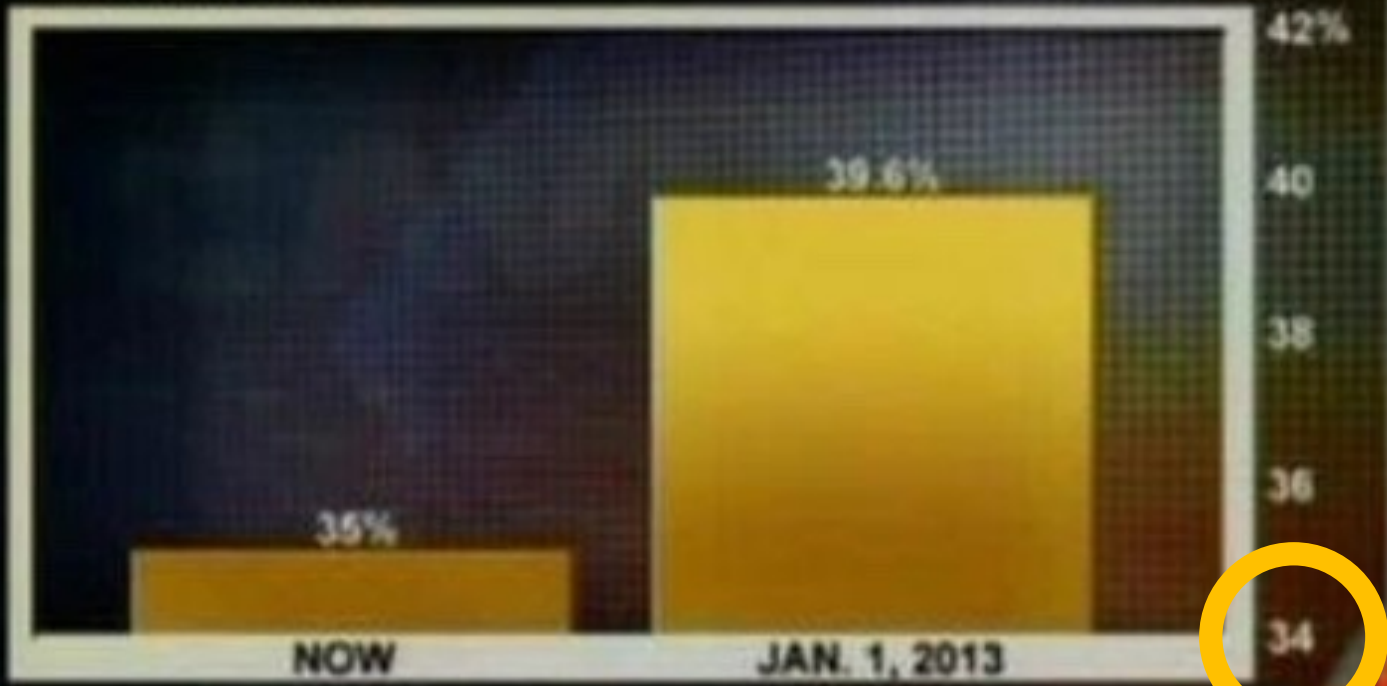
**FOX**

TOP STORIES

TECHNOLOGY

CONSUMER

# TOP TAX RATE



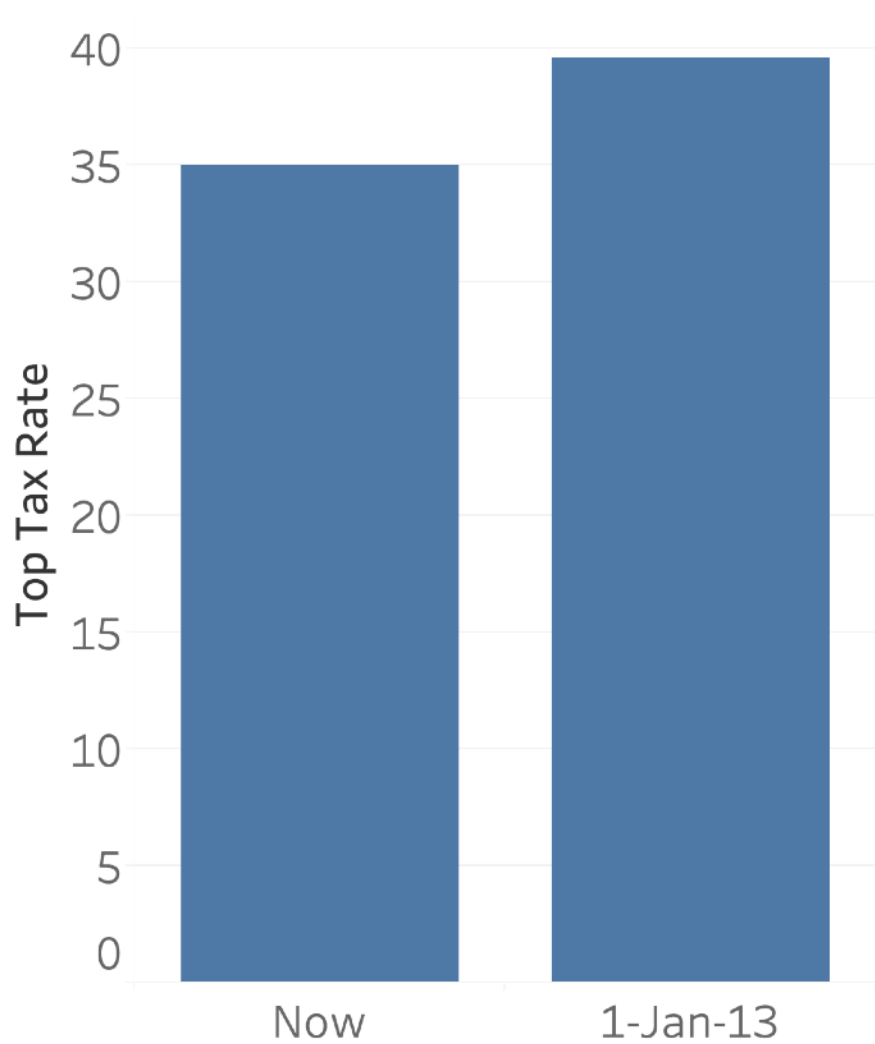
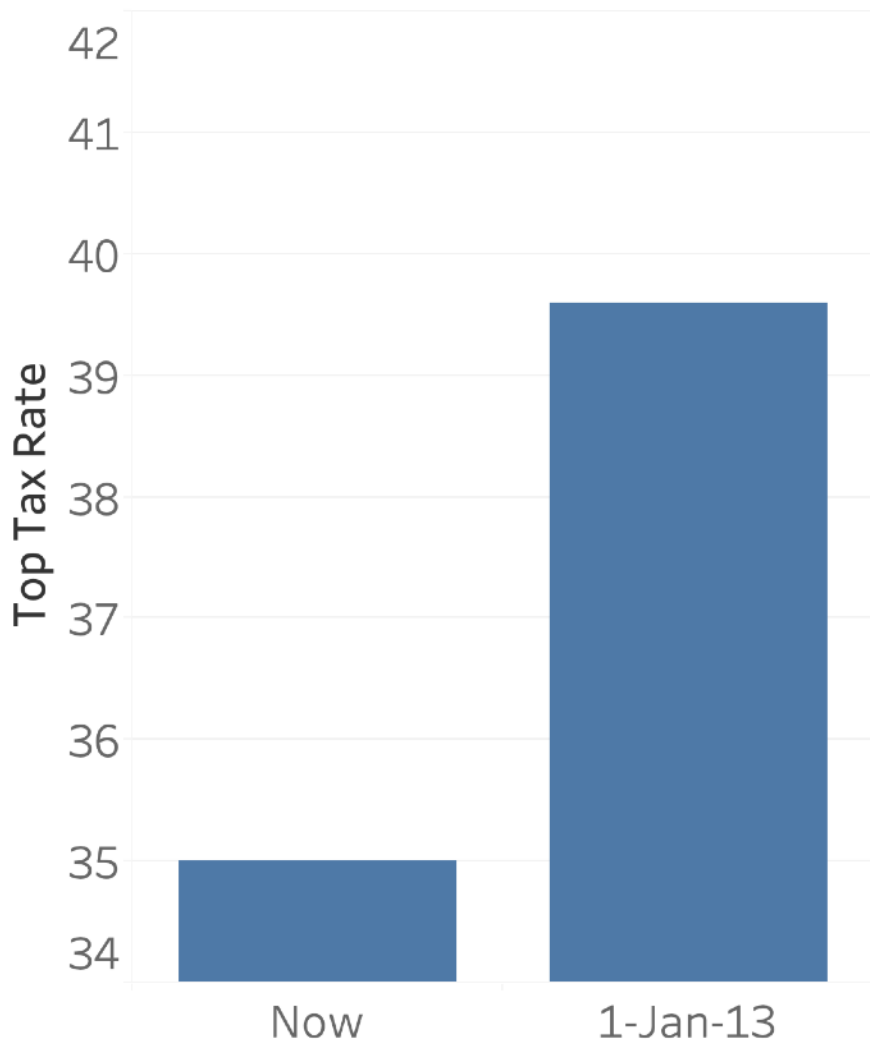
8:01 p ET

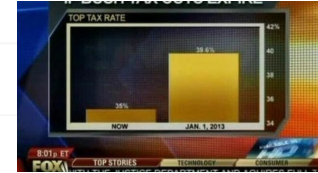
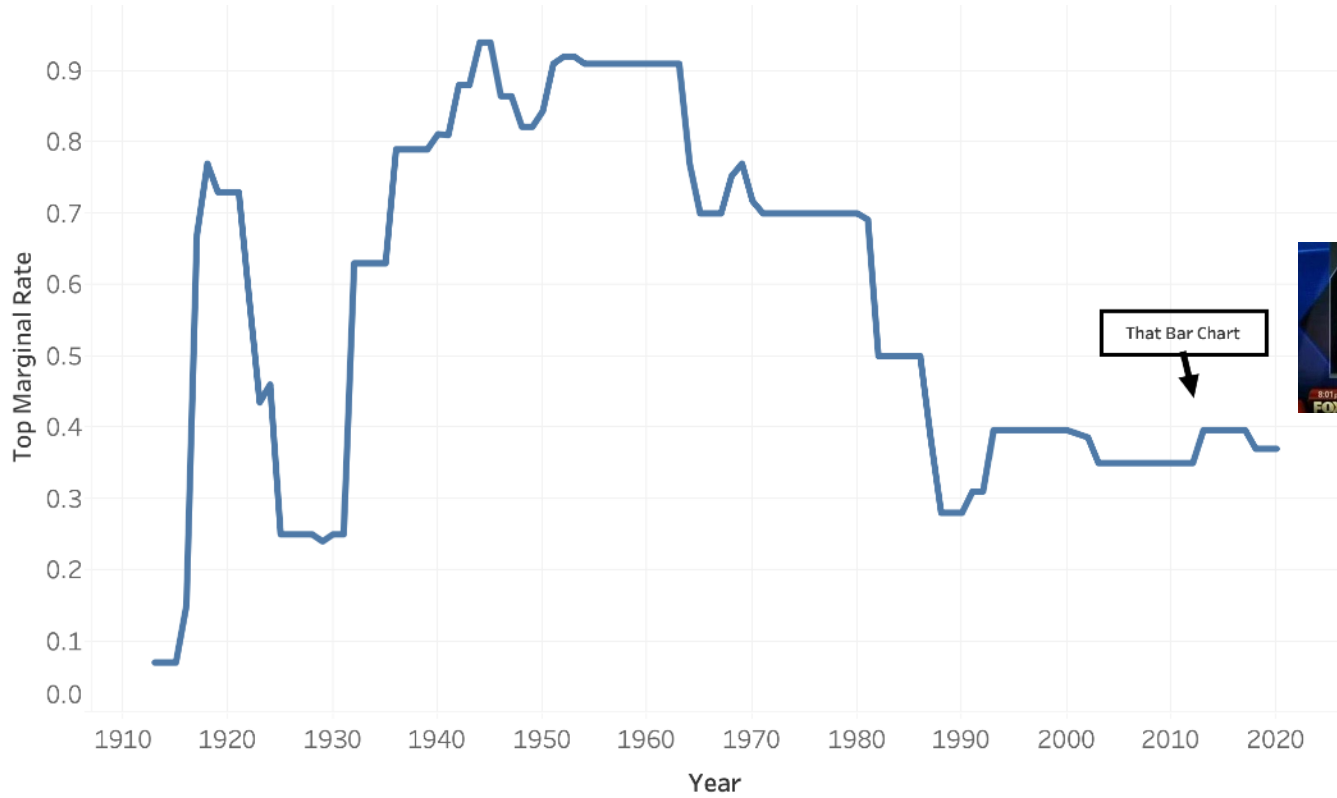


TOP STORIES

TECHNOLOGY

CONSUMER





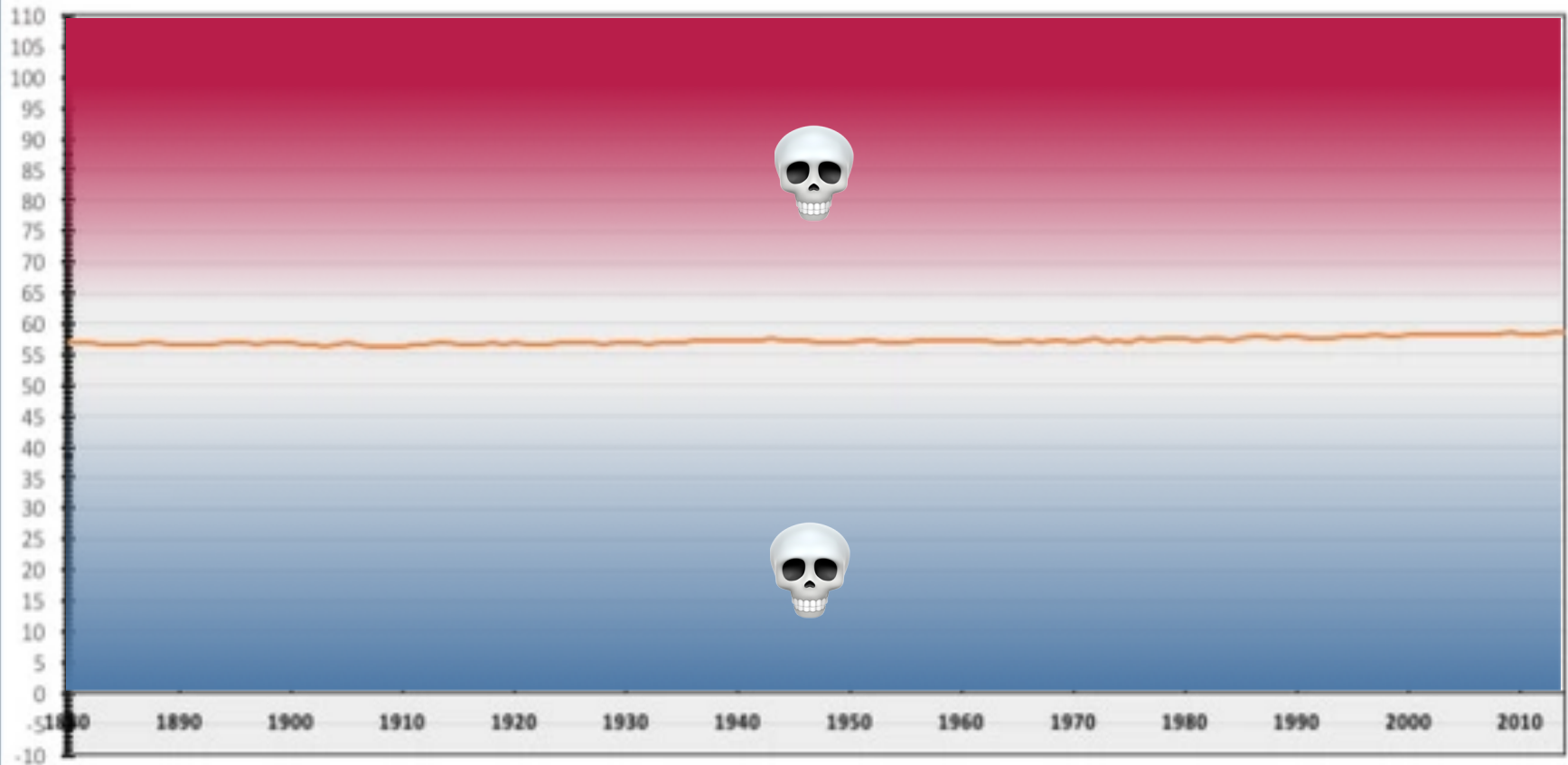
Average Annual Global Temperature in Fahrenheit  
1880-2015



Average Annual Global Temperature in Fahrenheit  
1880-2015



# Average Annual Global Temperature in Fahrenheit 1880-2015





NRO

Average Global Temperature (F)

90  
80  
70  
60  
50  
40  
30  
20  
10

1900

1950

2000

Year

NRO (Truncated)

Average Global Temperature (F)

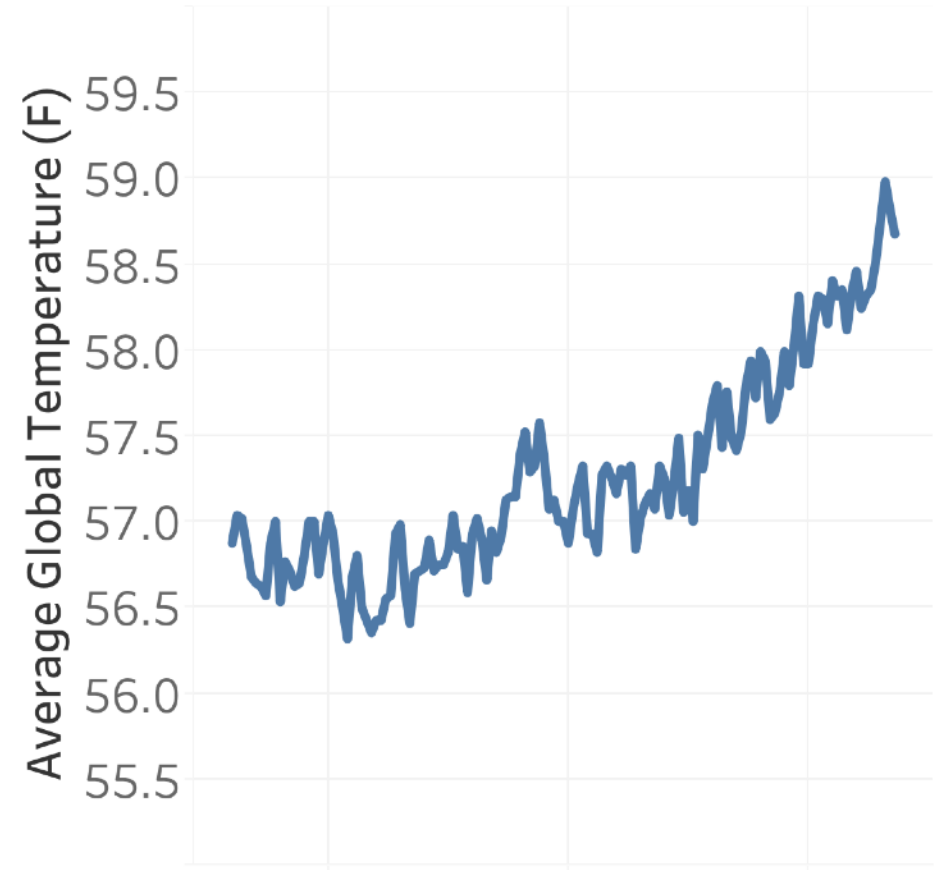
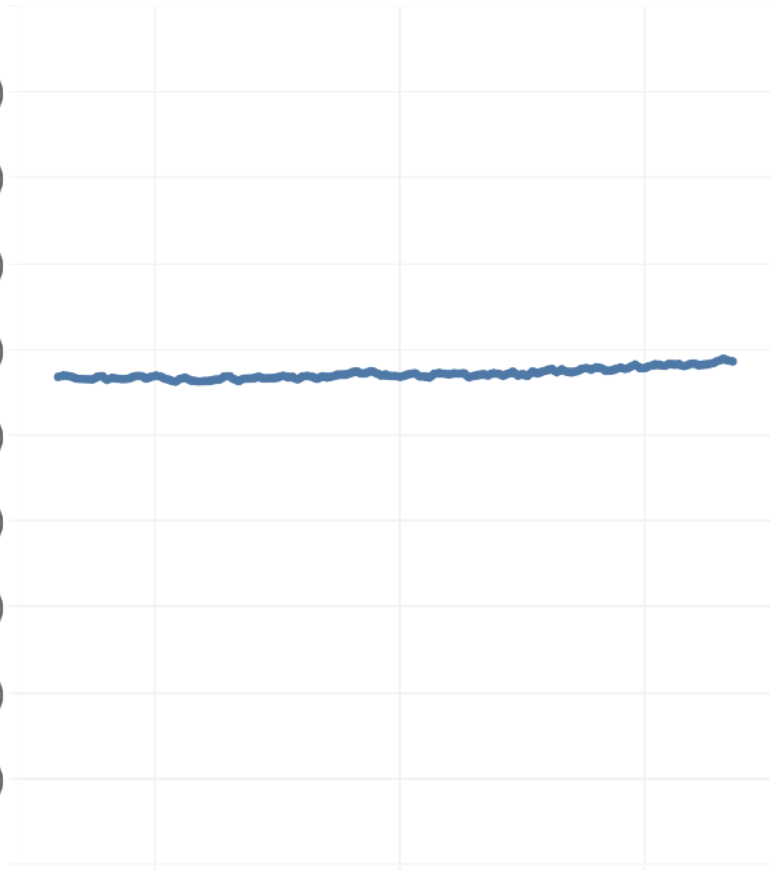
59.5  
59.0  
58.5  
58.0  
57.5  
57.0  
56.5  
56.0  
55.5

1900

1950

2000

Year



# Unconventional Visualizations

People have tacit conventions on how they interpret charts (around colors, axes, shapes, directionality, ...)

...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

# Deceptive Visualizations

Incorrect Visualizations

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# A2: 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 **Mon 4/15 11:59pm.**