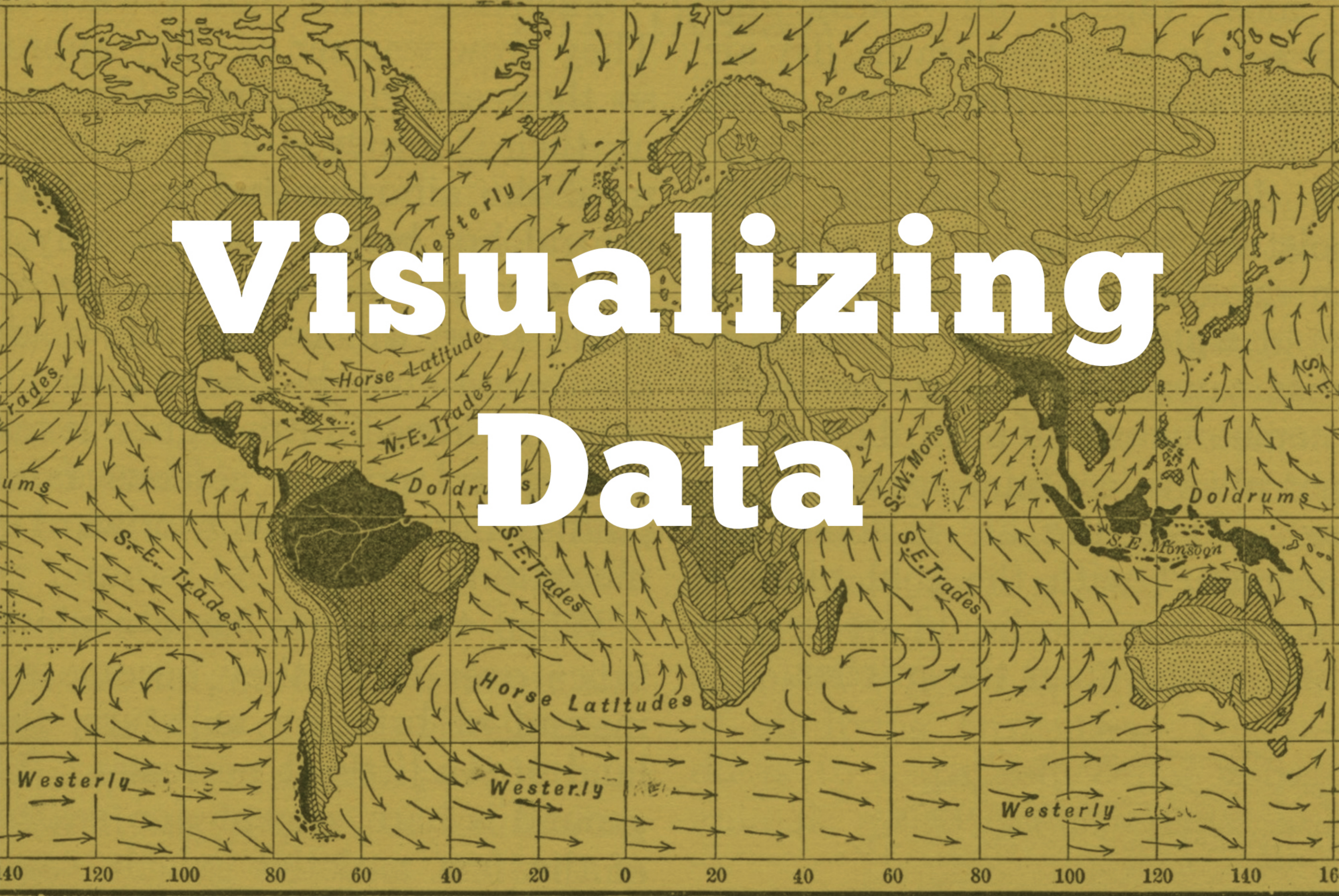
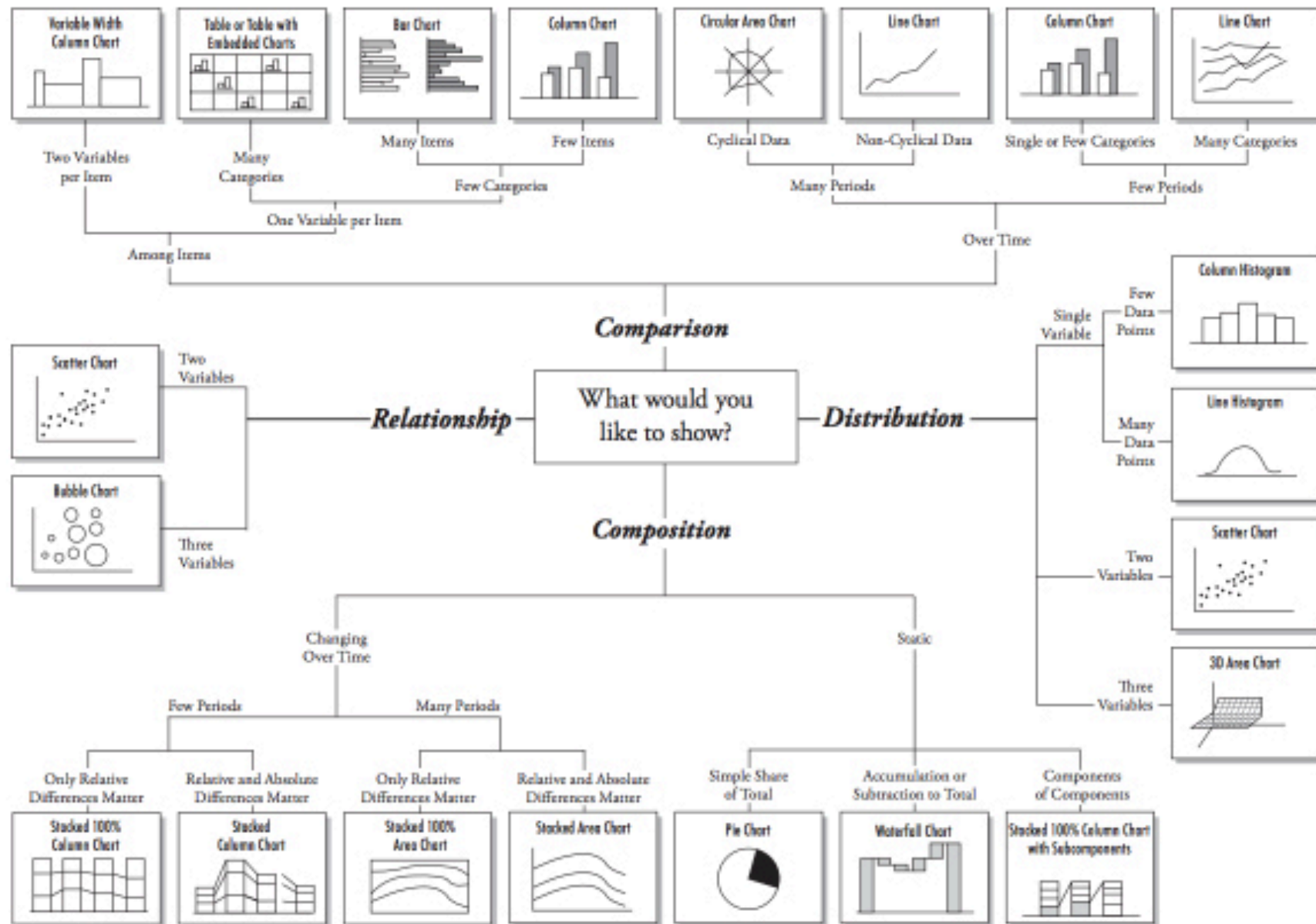


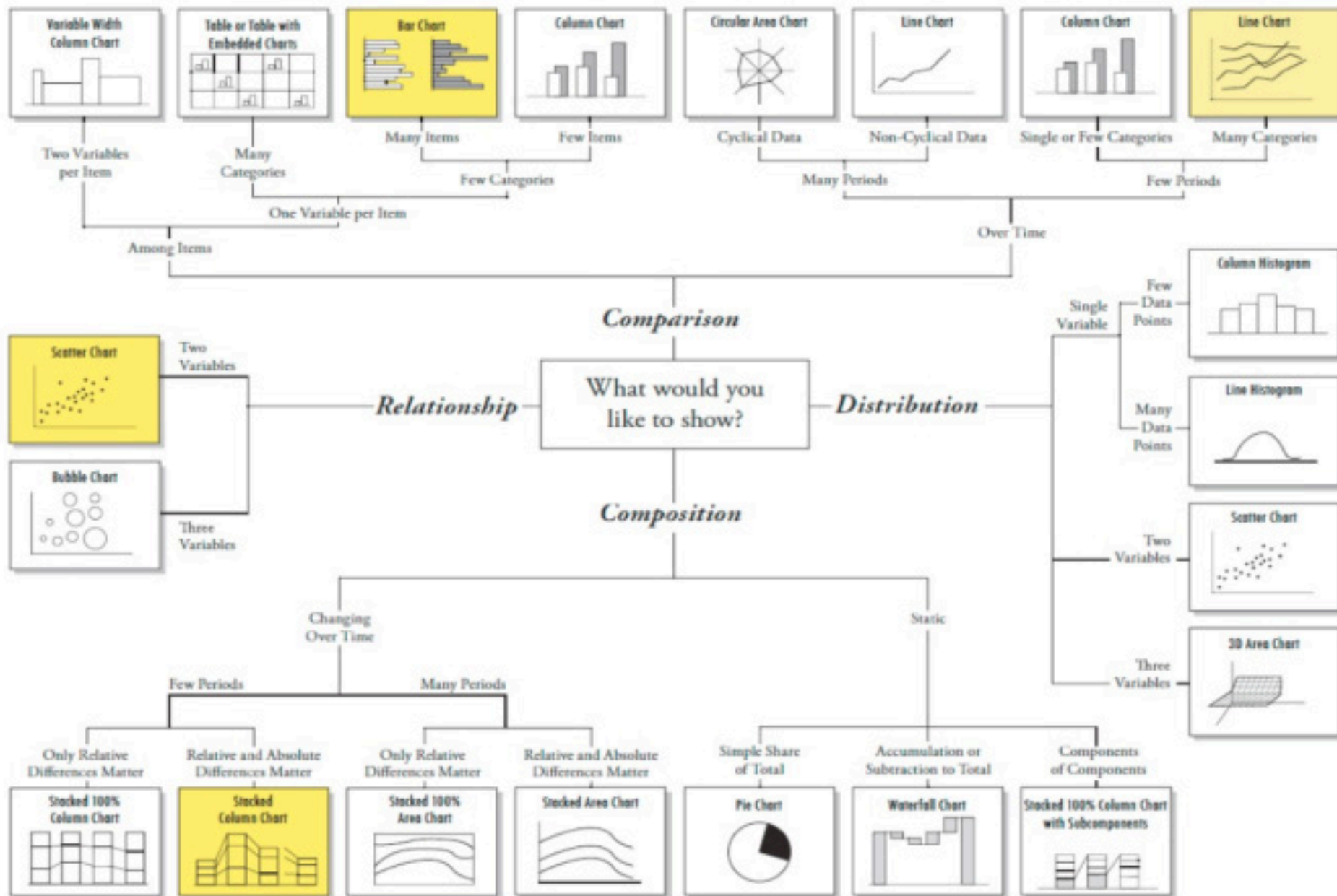
# Visualizing Data

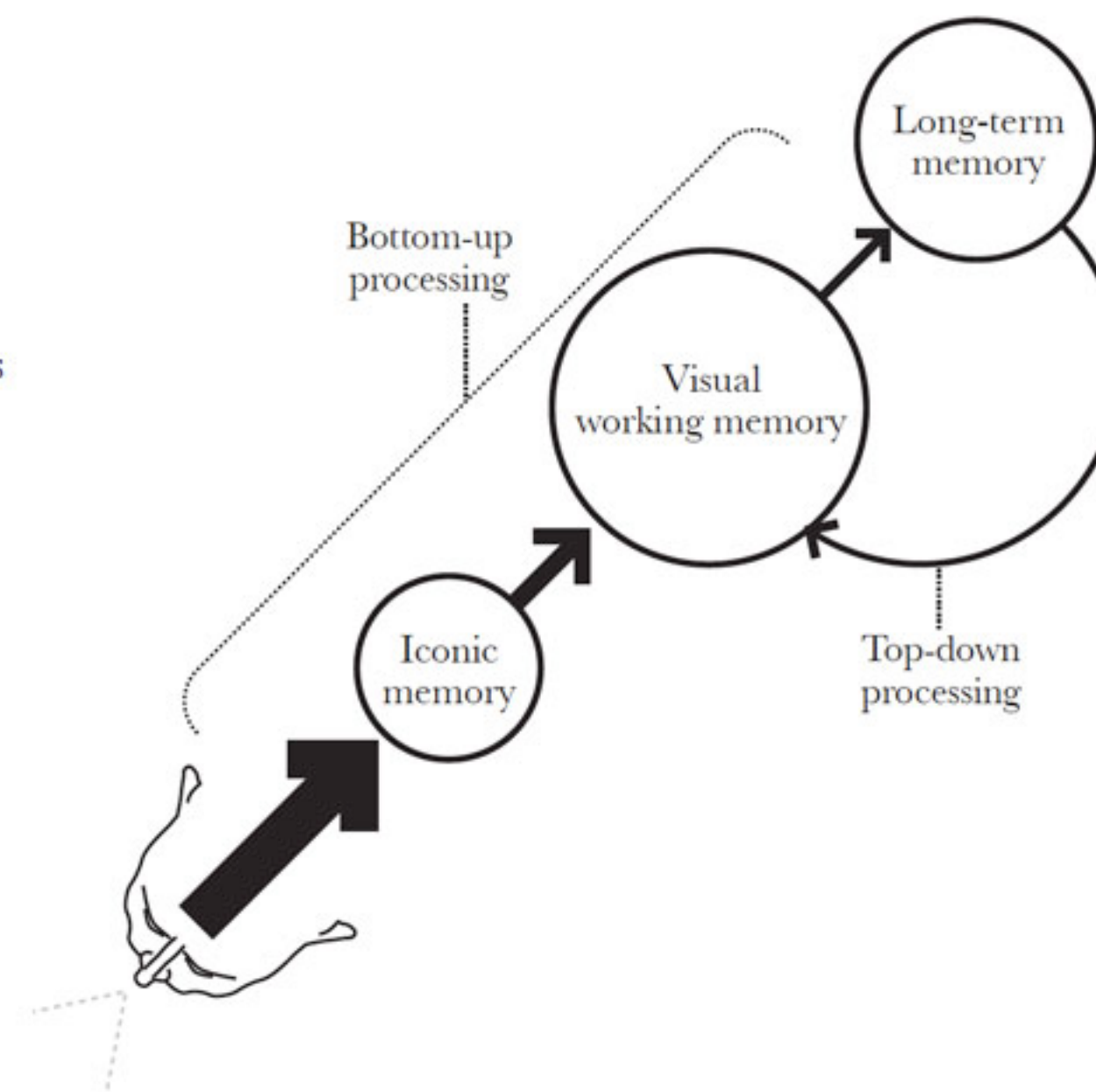
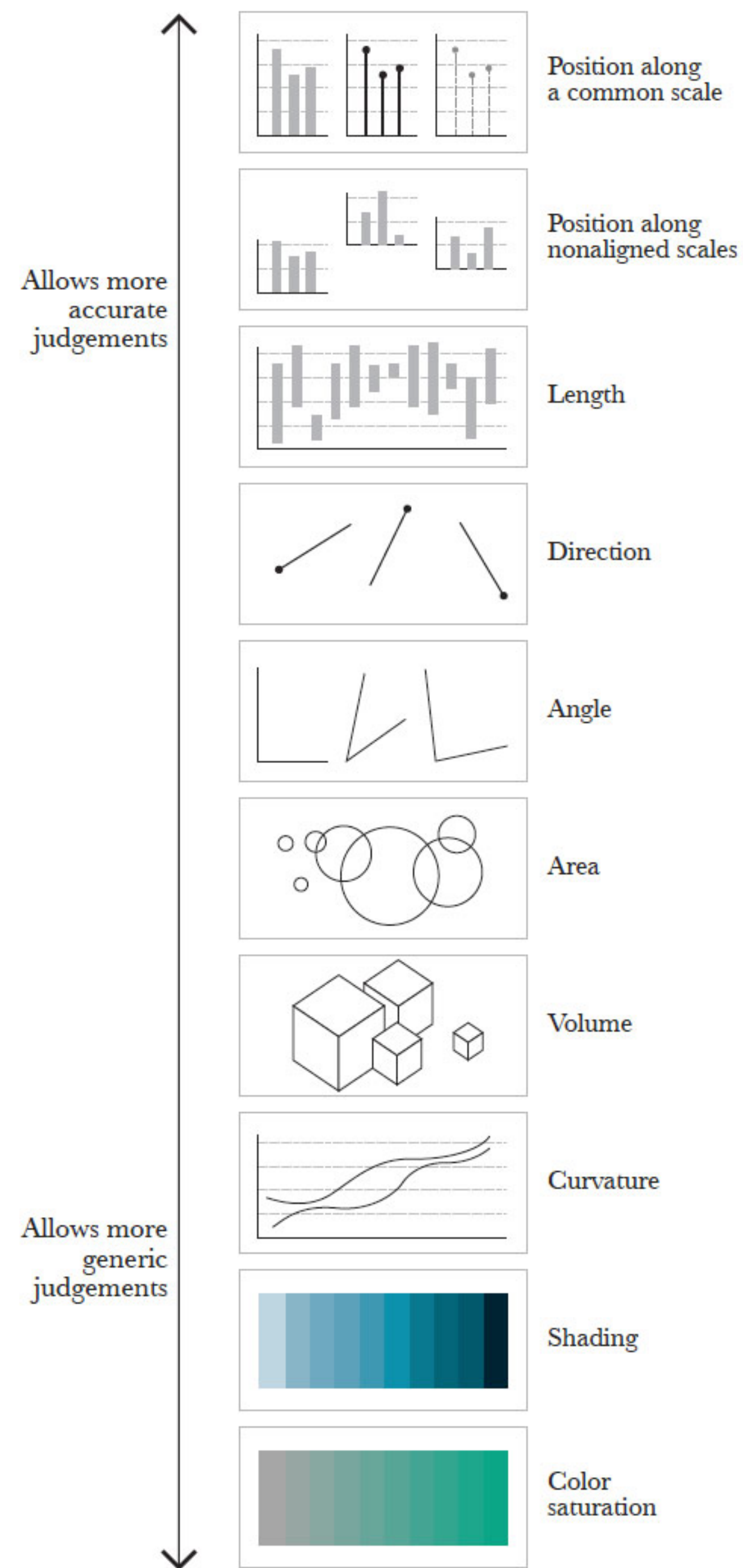




# Chart Suggestions—A Thought-Starter







Pictures from  
The Functional Art,  
pages 120 and 138



# **LINES**

**Classic form**

**Show trends**

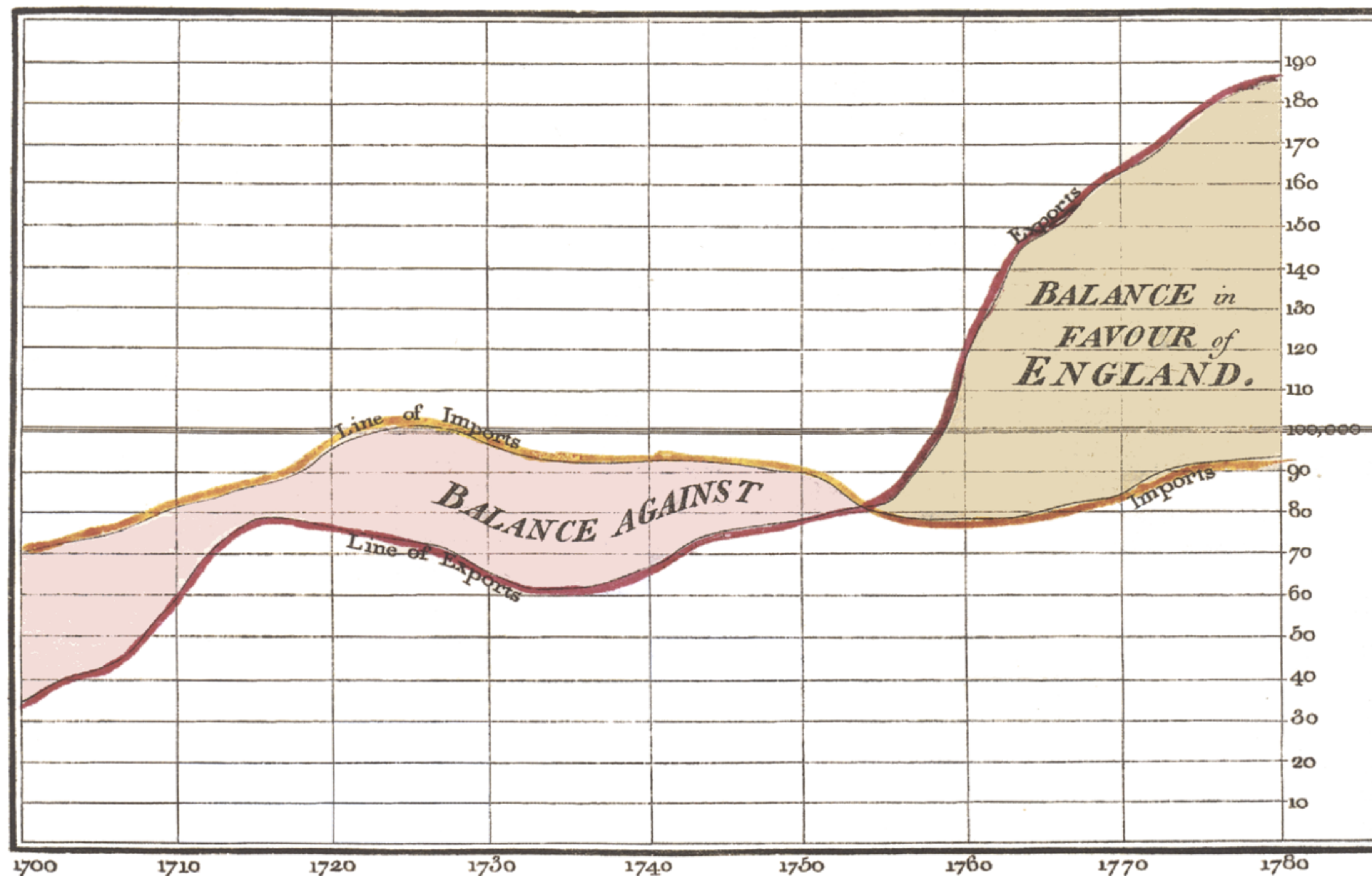
**Good for comparing over time**

**Continuous data**

Common mistakes: Unnecessary legends, 3D, correlations not causation



# Exports and Imports to and from DENMARK & NORWAY from 1700 to 1780.

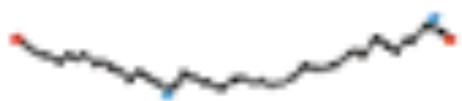



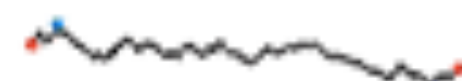


*The Bottom line is divided into Years, the Right hand line into £10,000 each.*

*Published as the Act directs, 14<sup>th</sup> May 1786, by W<sup>m</sup> Playfair*

*Neele sculpt 352, Strand, London.*



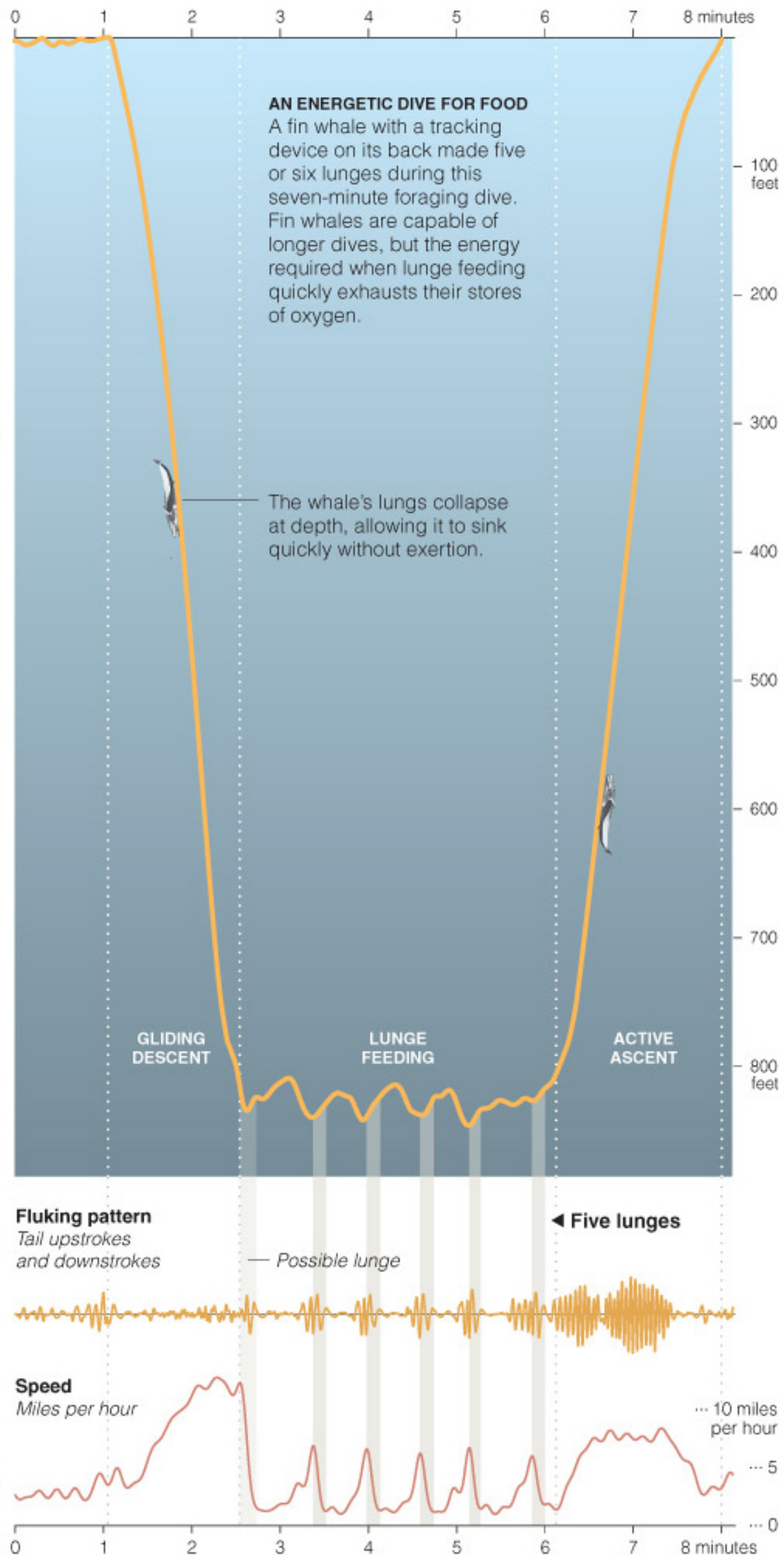
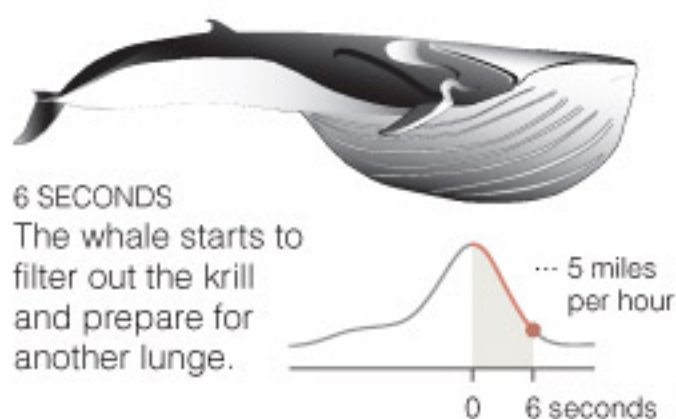
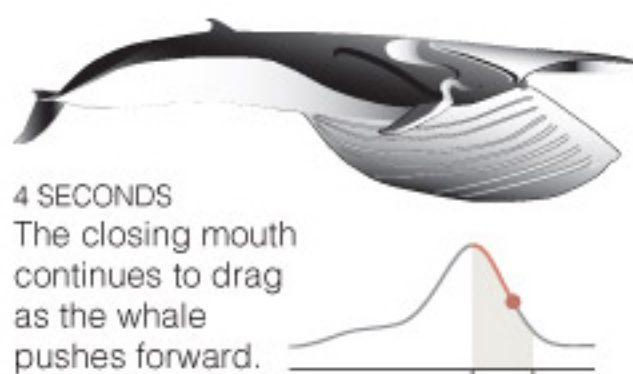
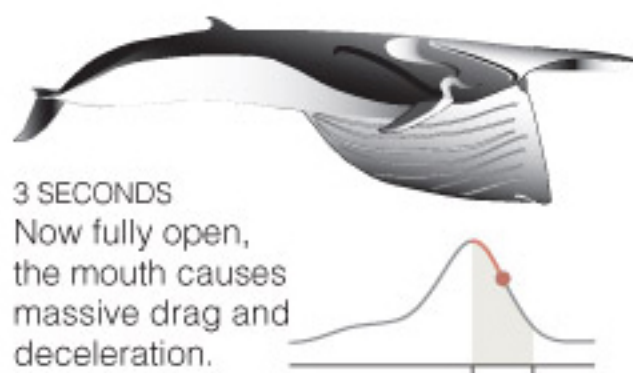
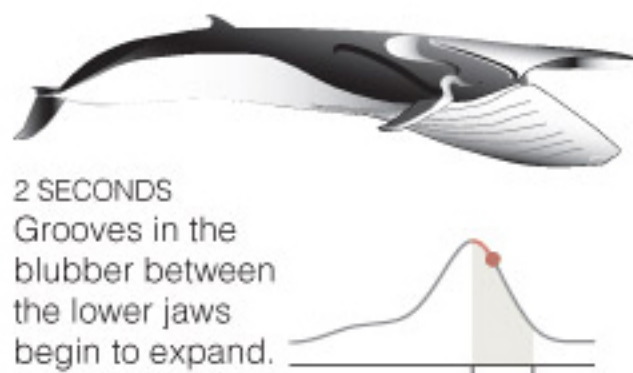
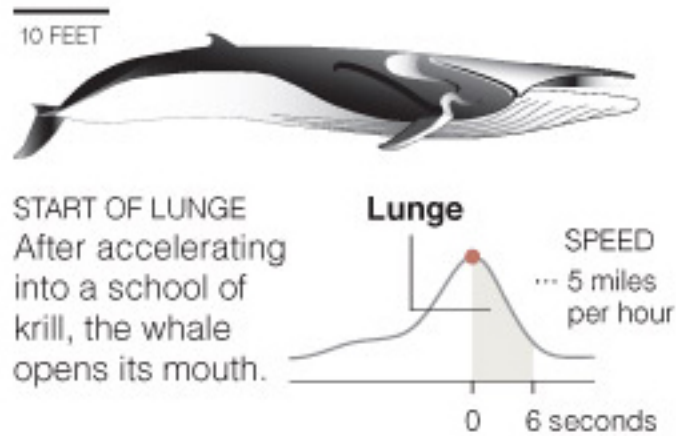
	1999.1.1	65 months	2004.4.28	low	high		2003.4.28	12 months	2004.4.28	low	high
Euro foreign exchange \$	1.1608		1.1907	.8252	1.2858	\$	1.1025		1.1907	1.0783	1.2858
Euro foreign exchange ¥	121.32		130.17	89.30	140.31	¥	132.54		130.17	124.80	140.31
Euro foreign exchange £	0.7111		0.6665	.5711	0.7235	£	0.6914		0.6665	0.6556	0.7235

	\$64,368	Vanguard 500 Index	-2.0%	+12.2%	-11.7%	-0.8%
	62,510	Fidelity Magellan	-2.1	+11.3	-12.9	-0.2
	50,329	Amer A Invest Co Am	-1.2	+09.4	-03.9	+4.0
	47,355	Amer A WA Mutual Inv	-1.5	+09.9	+00.8	+3.0
	40,500	PIMCO Instl Tot Return	-2.3	+02.4	+09.4	+7.6
	37,641	Amer A Grow Fd Amer	-2.9	+14.1	-11.0	+7.4
	31,161	Fidelity Contrafund	-1.0	+10.7	-06.5	+3.0
	28,296	Fidelity Growth & Inc	-1.8	+08.2	-08.7	-0.1
	25,314	Amer A Inc Fund Amer	-0.5	+09.9	+05.5	+5.4
	24,155	Vanguard Instl Index	-2.0	+12.3	-11.6	-0.7



# Lunge Feeding

Scientists tracking fin whales have created the first detailed model of how they feed. After gliding to depths of more than 600 feet in search of krill, a fin whale will repeatedly accelerate and open its mouth wide, engulfing about 20 pounds of krill and more than its own weight in water as it grinds to a halt.





Published: November 6, 2009

# The Jobless Rate for People Like You

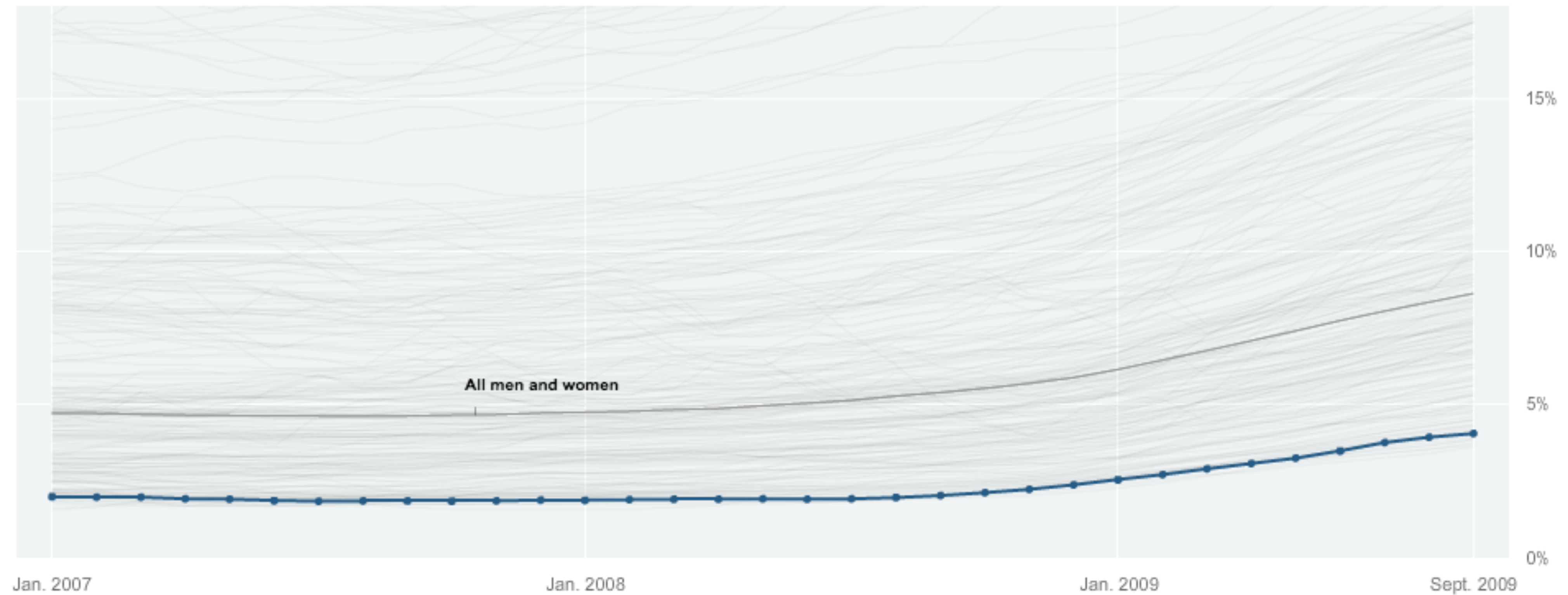
Not all groups have felt the recession equally.

All races	Men and Women	All ages	All education levels
<b>White</b> >	<b>Men</b> >	Ages 15 to 24	Not a high school graduate
Black	Women	Ages 25 to 44	High school graduate
Hispanic		<b>Age 45 and older</b> >	<b>College graduate</b> >
All other races			

UNEMPLOYMENT RATE,  
12 MONTH AVG. ENDING SEPT. '09

## 4.1%

For white men age 45 and older with  
a college degree





# **BARS**

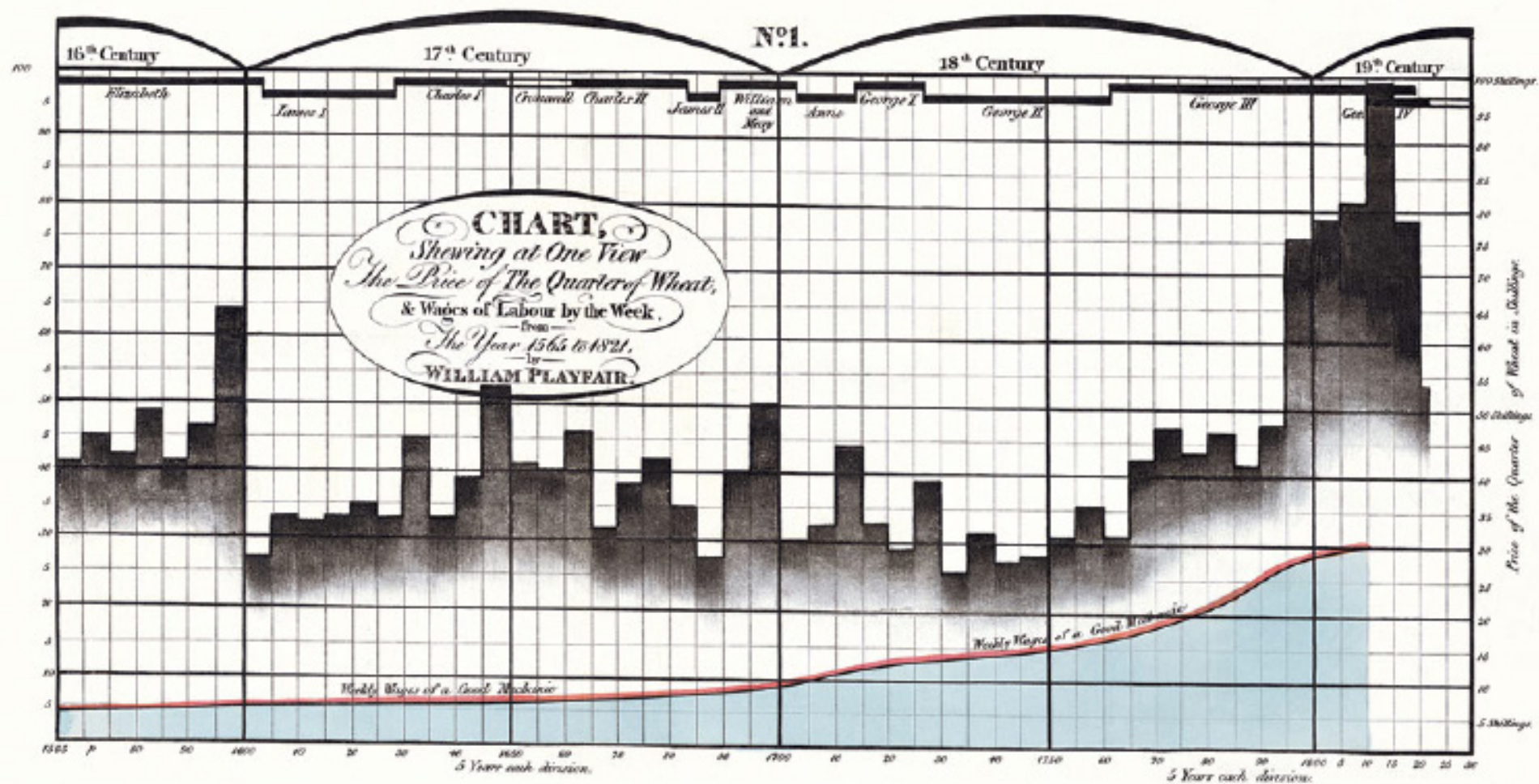
**Classic form**

**Precise comparisons**

**Distinct data**

Common mistakes: Non zero baselines, random ordering of items

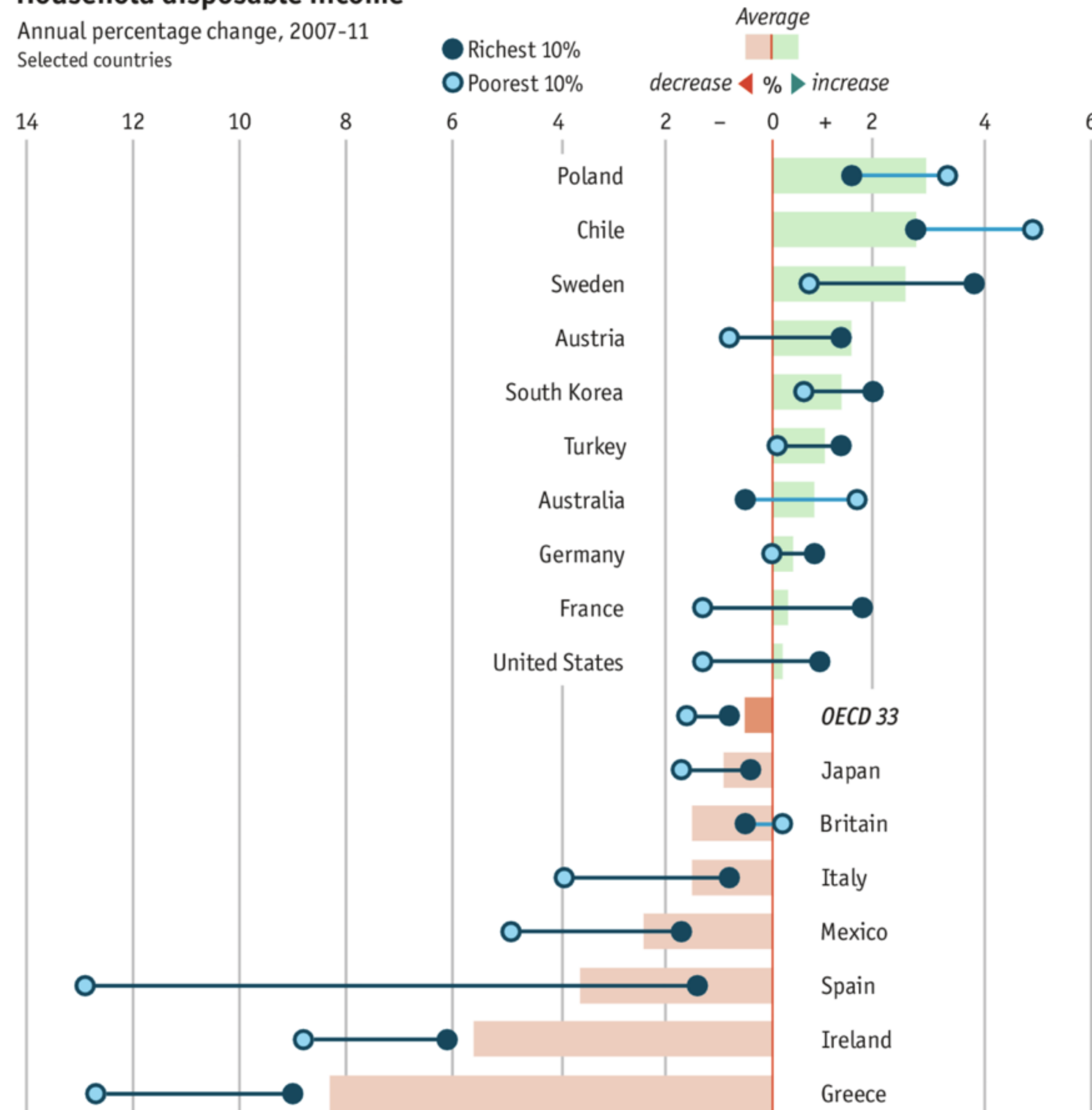






## Household disposable income

Annual percentage change, 2007-11  
Selected countries



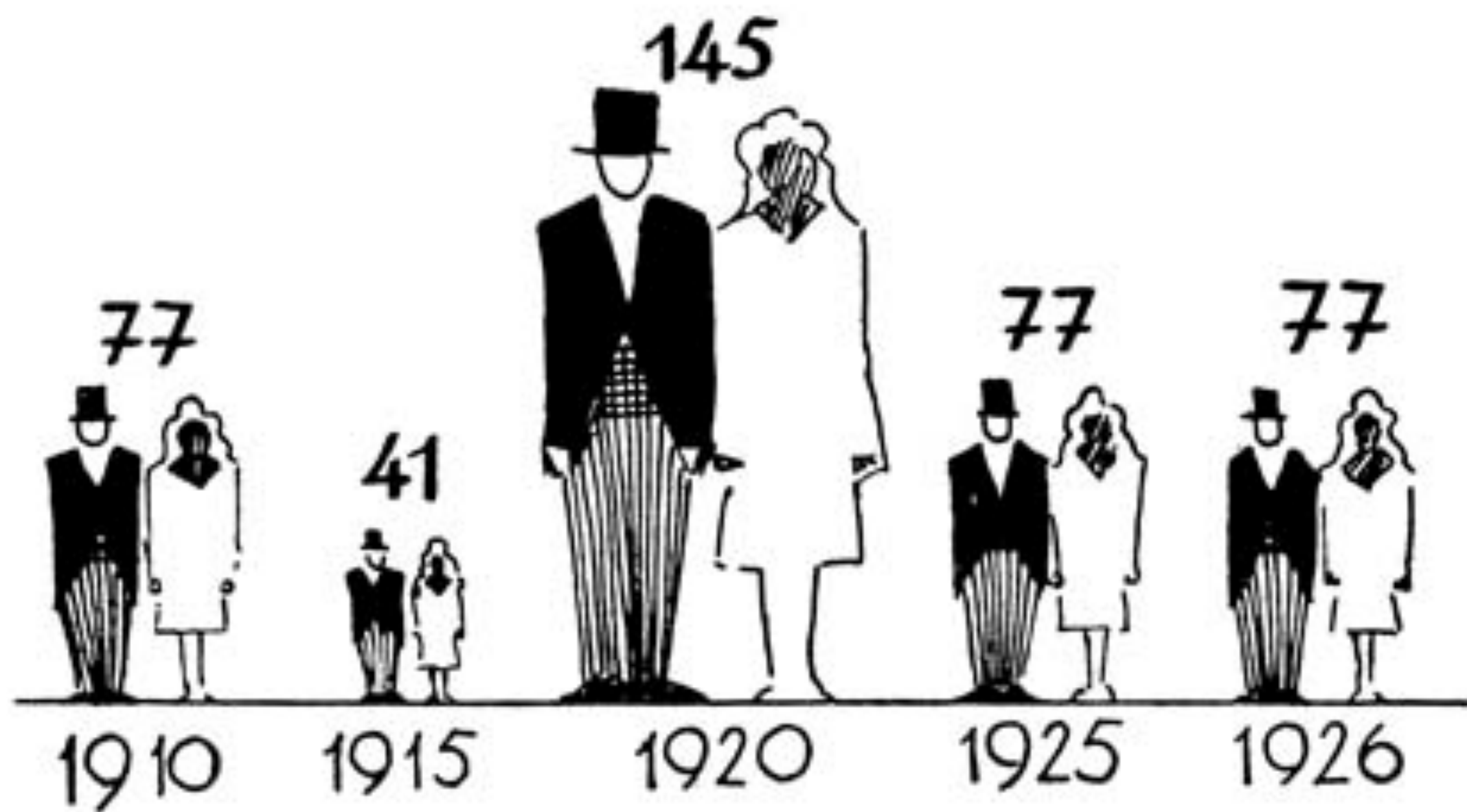
Source: OECD

[Economist.com/graphicdetail](http://www.economist.com/graphicdetail)

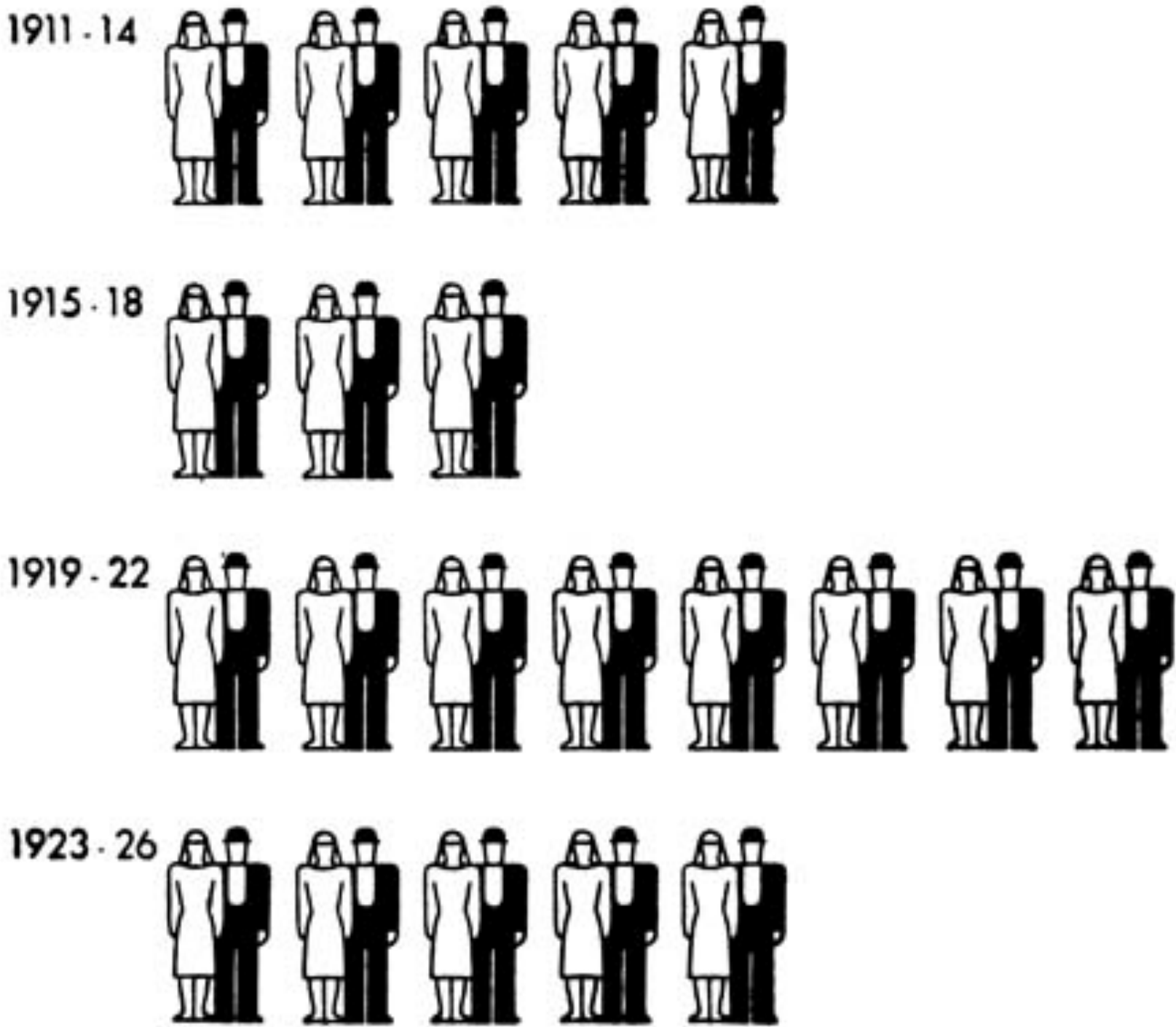
<http://www.economist.com/blogs/graphicdetail/2014/06/daily-chart-13>



Example of bad system : signs of different sizes  
Number of men getting married in Germany out of every 10,000 persons



Men Getting Married in Germany in a Year



1 sign for 100,000 a year



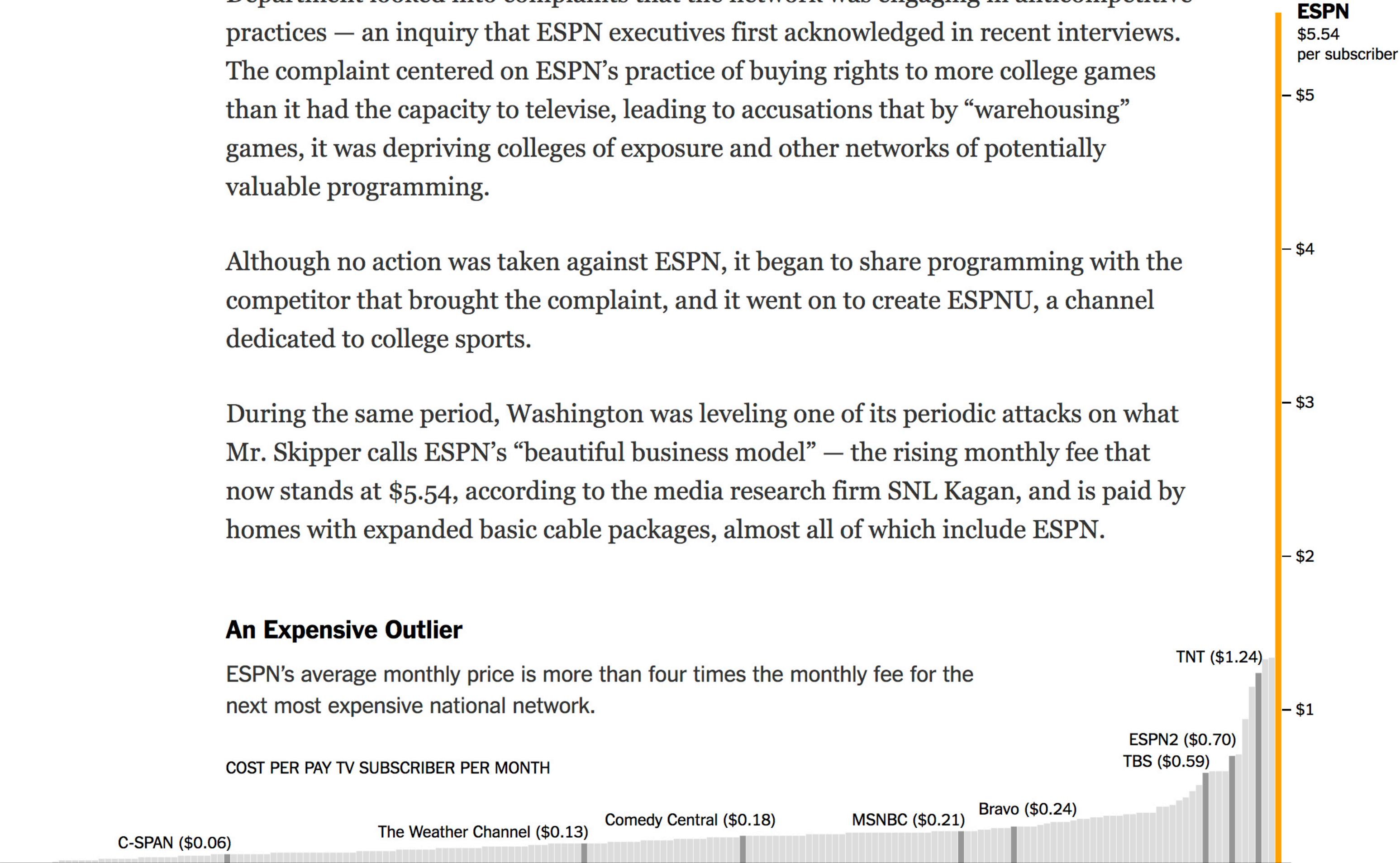
In the mid-2000s, ESPN’s appetite for programming was so voracious that the Justice Department looked into complaints that the network was engaging in anticompetitive practices — an inquiry that ESPN executives first acknowledged in recent interviews. The complaint centered on ESPN’s practice of buying rights to more college games than it had the capacity to televise, leading to accusations that by “warehousing” games, it was depriving colleges of exposure and other networks of potentially valuable programming.

Although no action was taken against ESPN, it began to share programming with the competitor that brought the complaint, and it went on to create ESPNU, a channel dedicated to college sports.

During the same period, Washington was leveling one of its periodic attacks on what Mr. Skipper calls ESPN’s “beautiful business model” — the rising monthly fee that now stands at \$5.54, according to the media research firm SNL Kagan, and is paid by homes with expanded basic cable packages, almost all of which include ESPN.

**An Expensive Outlier**

ESPN’s average monthly price is more than four times the monthly fee for the next most expensive national network.

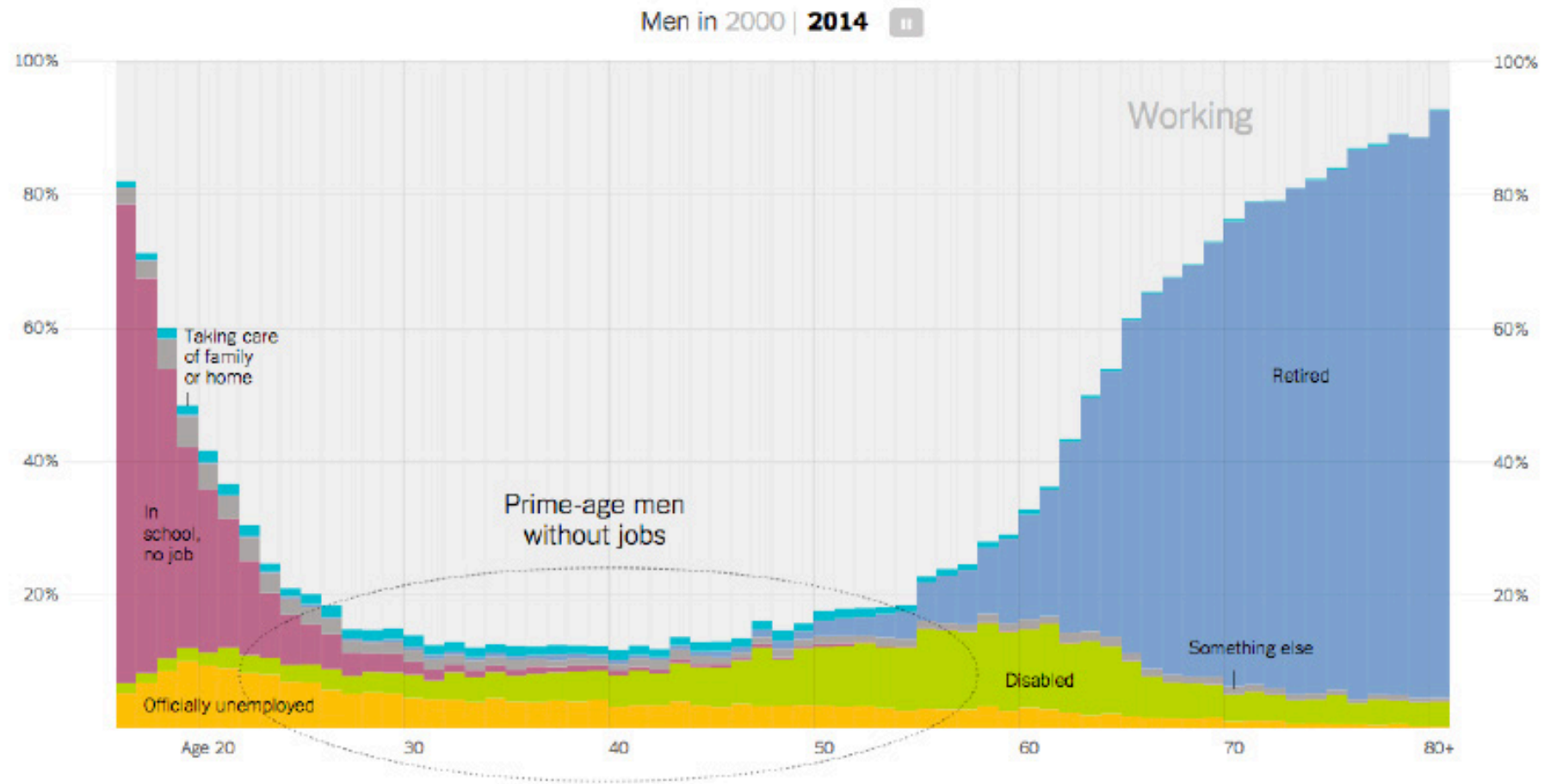


Source: SNL Kagan



# The Rise of Men Who Don't Work, and What They Do Instead

DEC. 11, 2014





There's a strand of the data viz world that argues that everything could be a bar chart. That's possibly true but also possibly a world without joy.

Amanda Cox



# Data Types

## Categorical/Discrete



Countries (USA, Canada)  
Dog breeds (Terrier, Dalmation)  
Colors (Red, Blue)

## Continuous

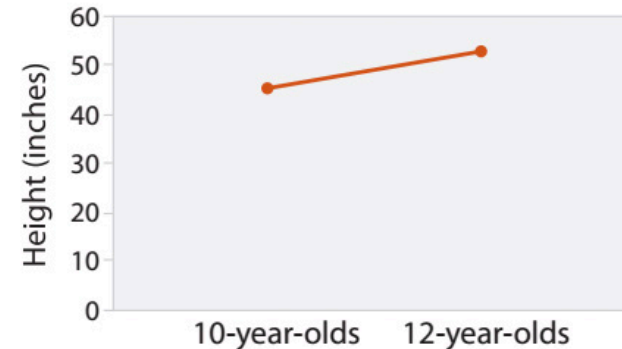
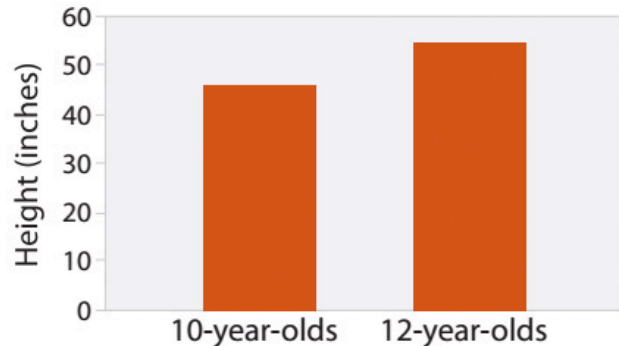
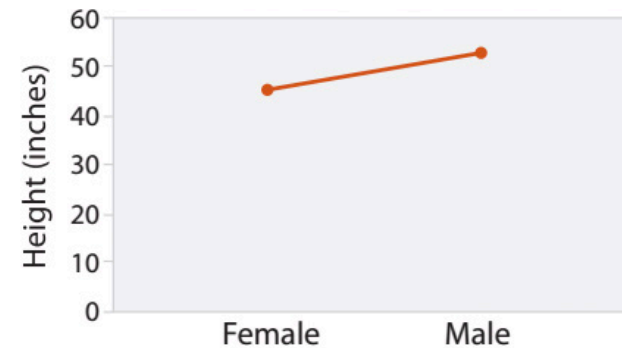
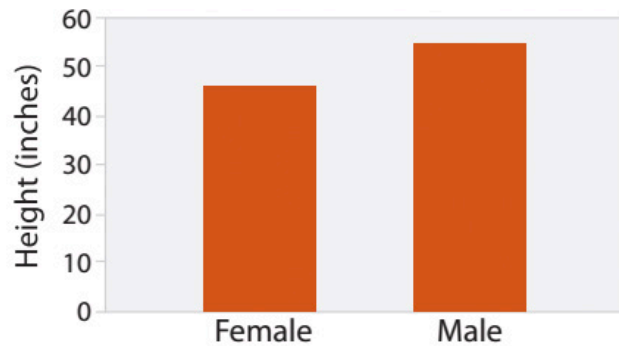


Temperature (50° → 80°F)  
Stock market prices (\$4 → \$10)  
Weight (100 → 200 lbs)



# Bars: Categorical Data

# Lines: Continuous Data



**“The more male a person is,  
the taller he/she is.”**



# Bubbles & Pies

**Parts of a Whole**  
**Use sparingly**

Common mistakes: Too many pieces in a pie chart, Complex legends, Not adding to 100%

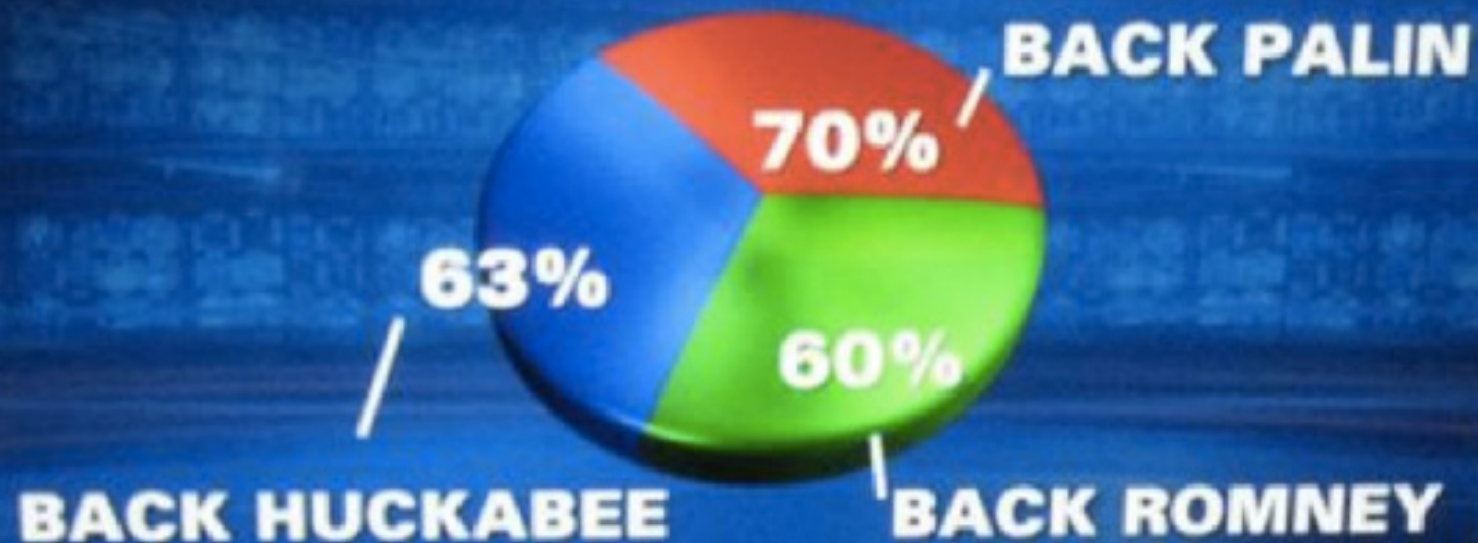






# 2012 PRESIDENTIAL RUN

GOP CANDIDATES



**FOX**

47'

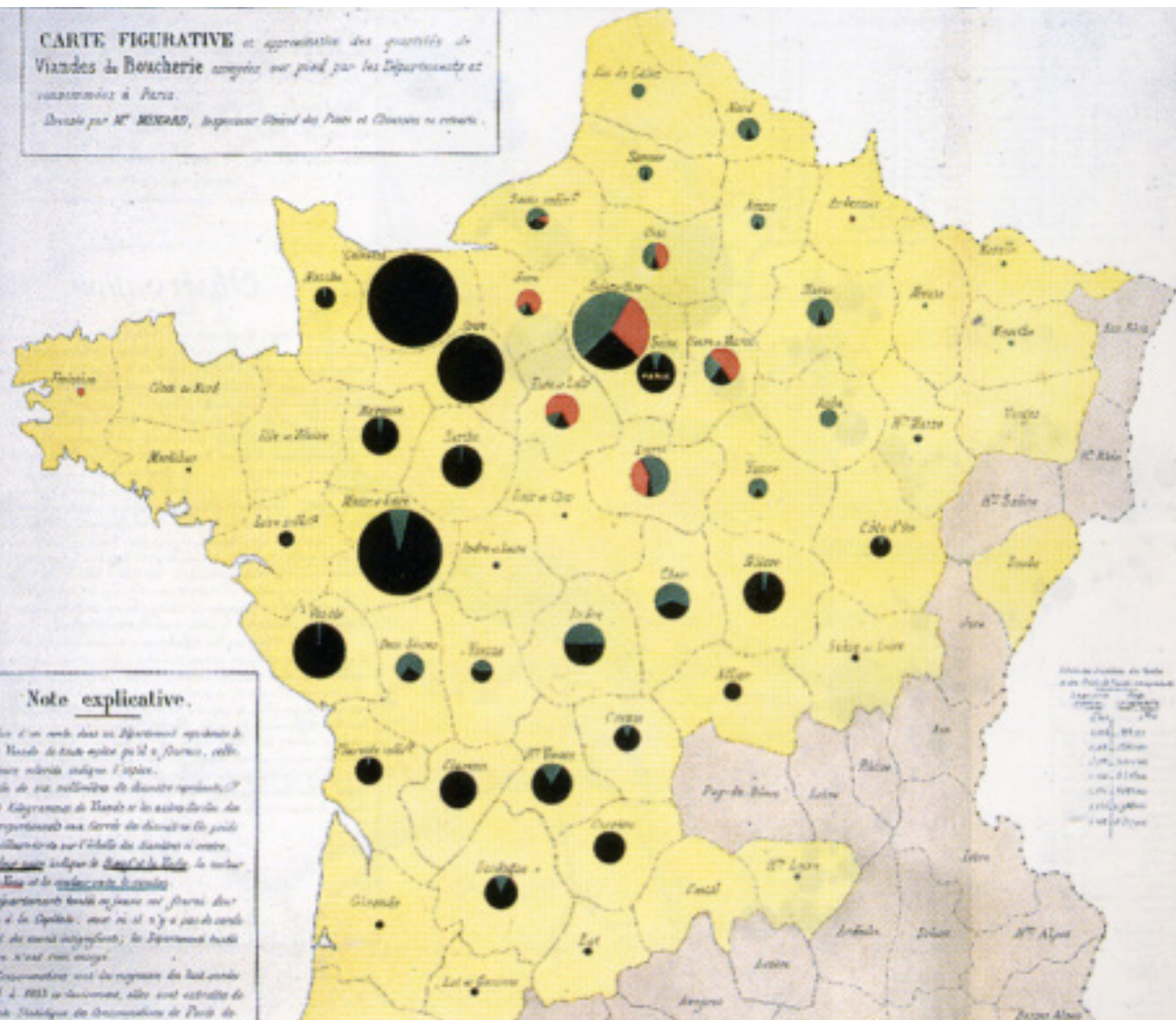
**SOURCE: OPINIONS**

**DYNAMIC**



**CARTE FIGURATIVE** et approximation des quantités de  
Viandes de Boucherie consommées sur pied par les Départements et  
consommées à Paris.

Dressée par M<sup>r</sup> MENARD, Inspecteur Général des Pêches et Chasses en France.



**Note explicative.**

La surface d'un cercle dans un Département représente le poids de Viande de Boucherie qu'il a consommée, celle du Secteur coloré indique l'espèce.

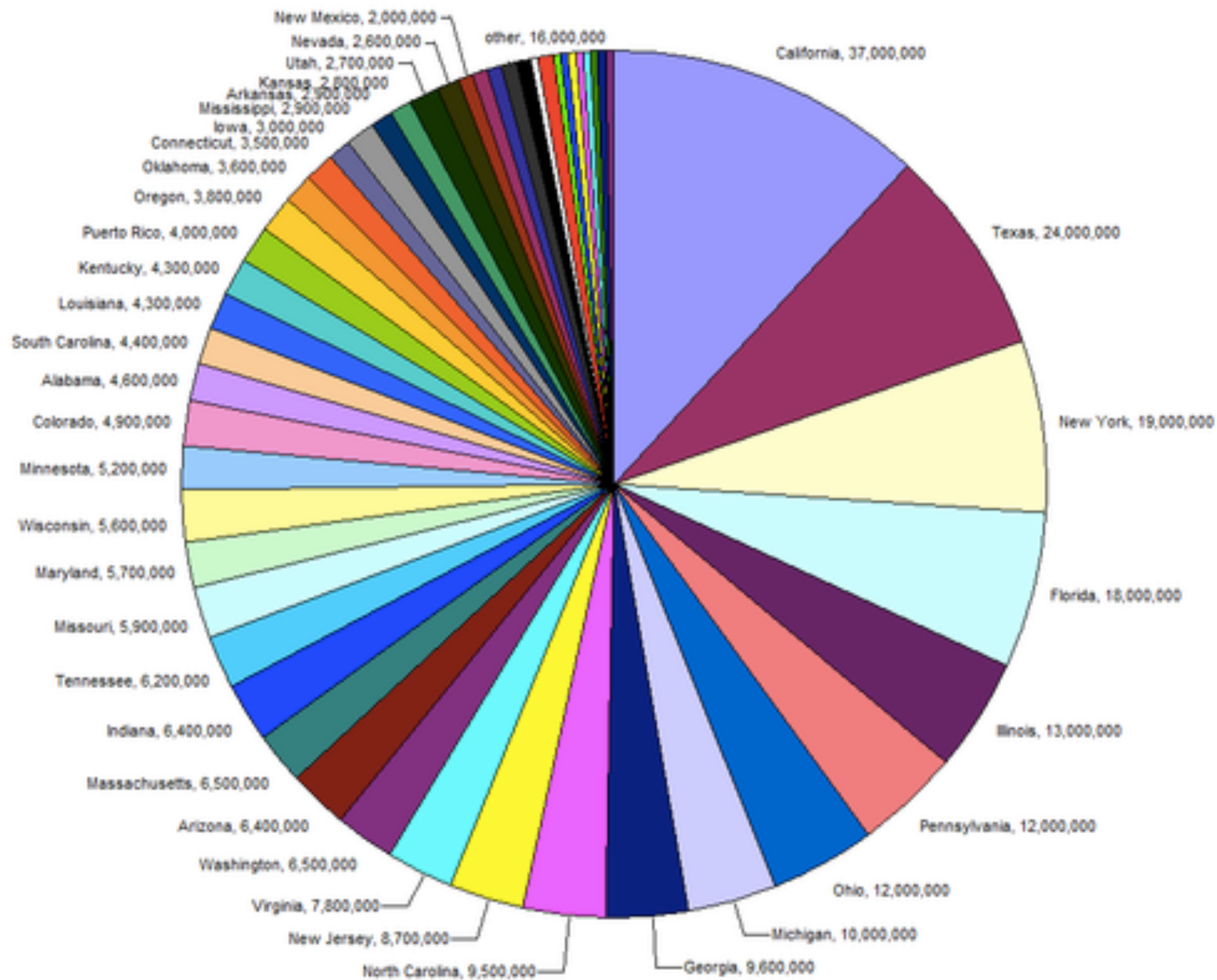
Un cercle de six millimètres de diamètre représente 100 000 Kilogrammes de Viande et les autres cercles du poids proportionnels aux cercles de diamètre de poids ont d'ailleurs été sur l'échelle des diamètres ci-dessus.

La couleur noire indique le Bœuf, le rouge le Veau, le vert le Mouton, le bleu le Porc.

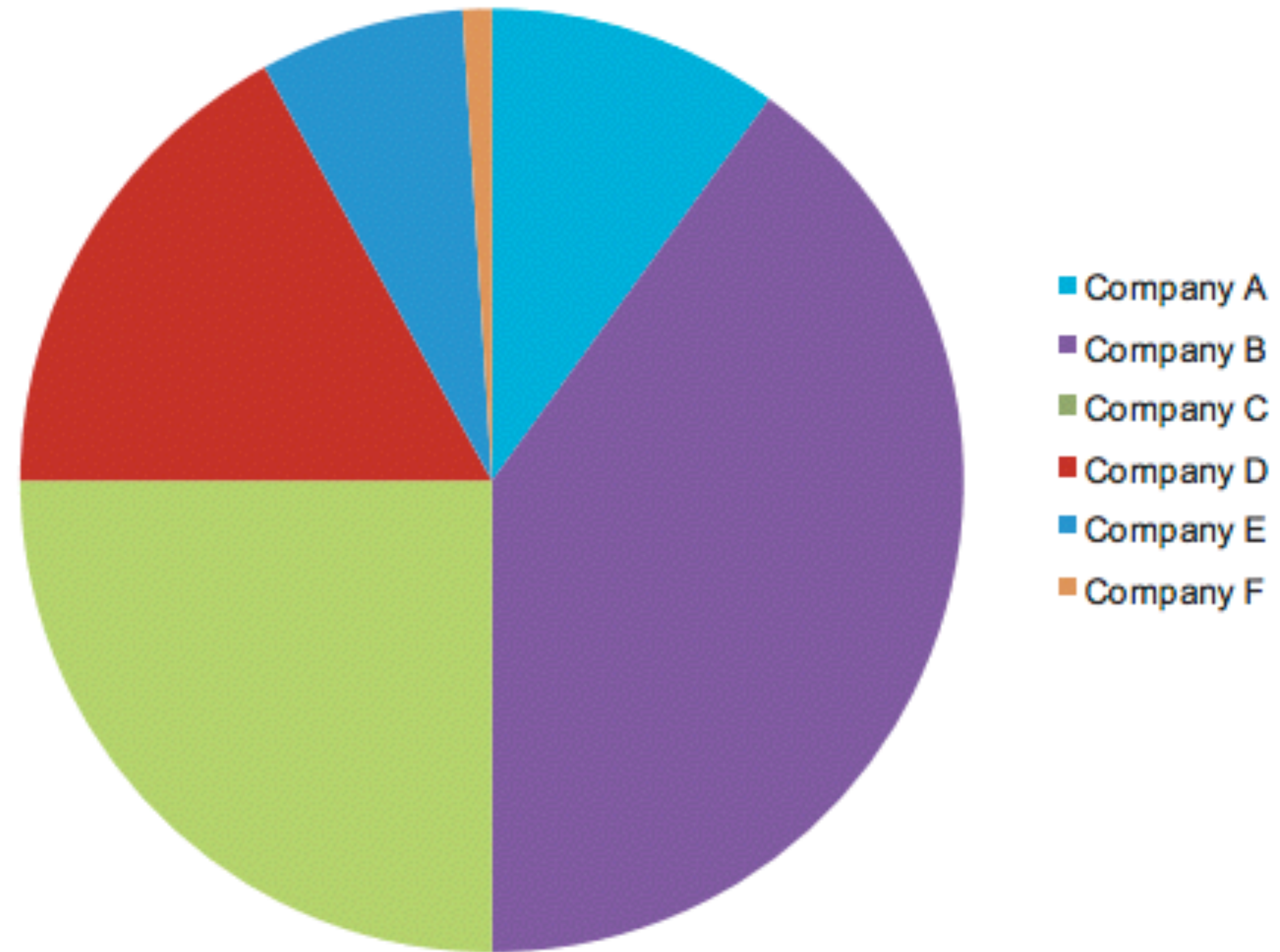
Les Départements hachés en blanc ont fourni des Bœufs à la Capitale, mais si il n'y a pas de cercle ont fait des vaches insignifiantes, les Départements hachés en blanc n'ont rien envoyé.

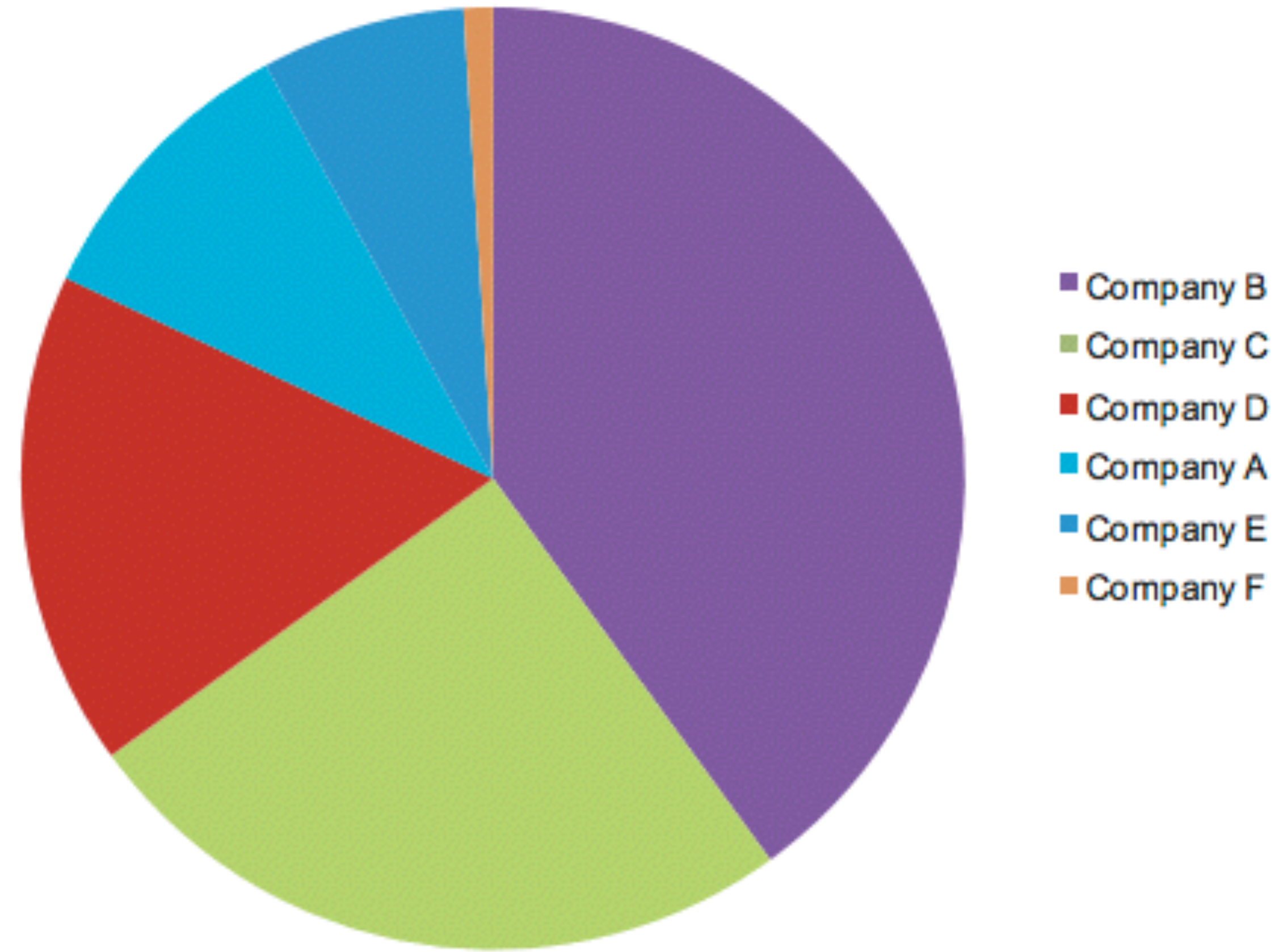
Les Consommations sont les moyennes des huit années de 1845 à 1852 se trouvent, elles sont extraites de l'Annuaire Statistique de l'Administration de Paris de



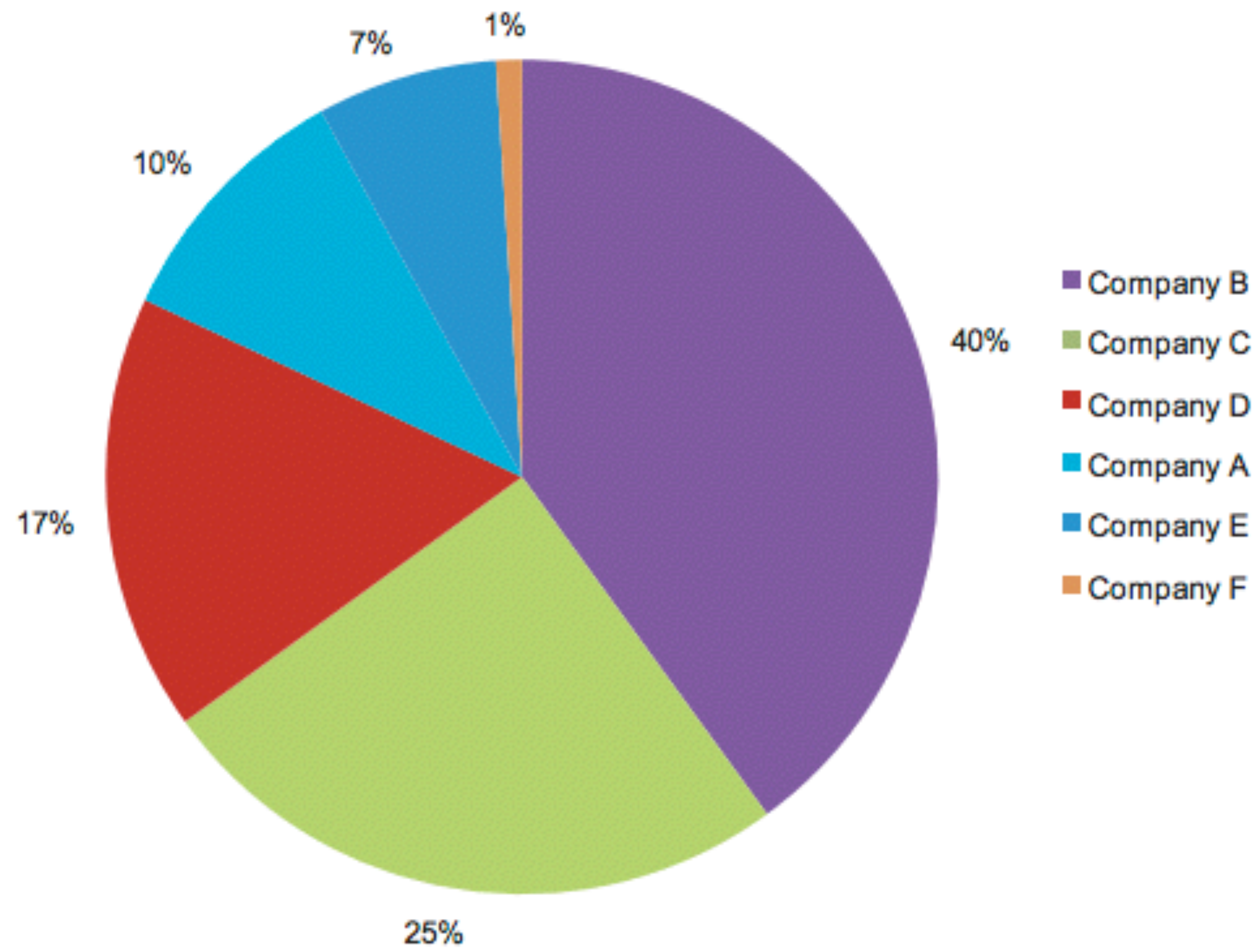


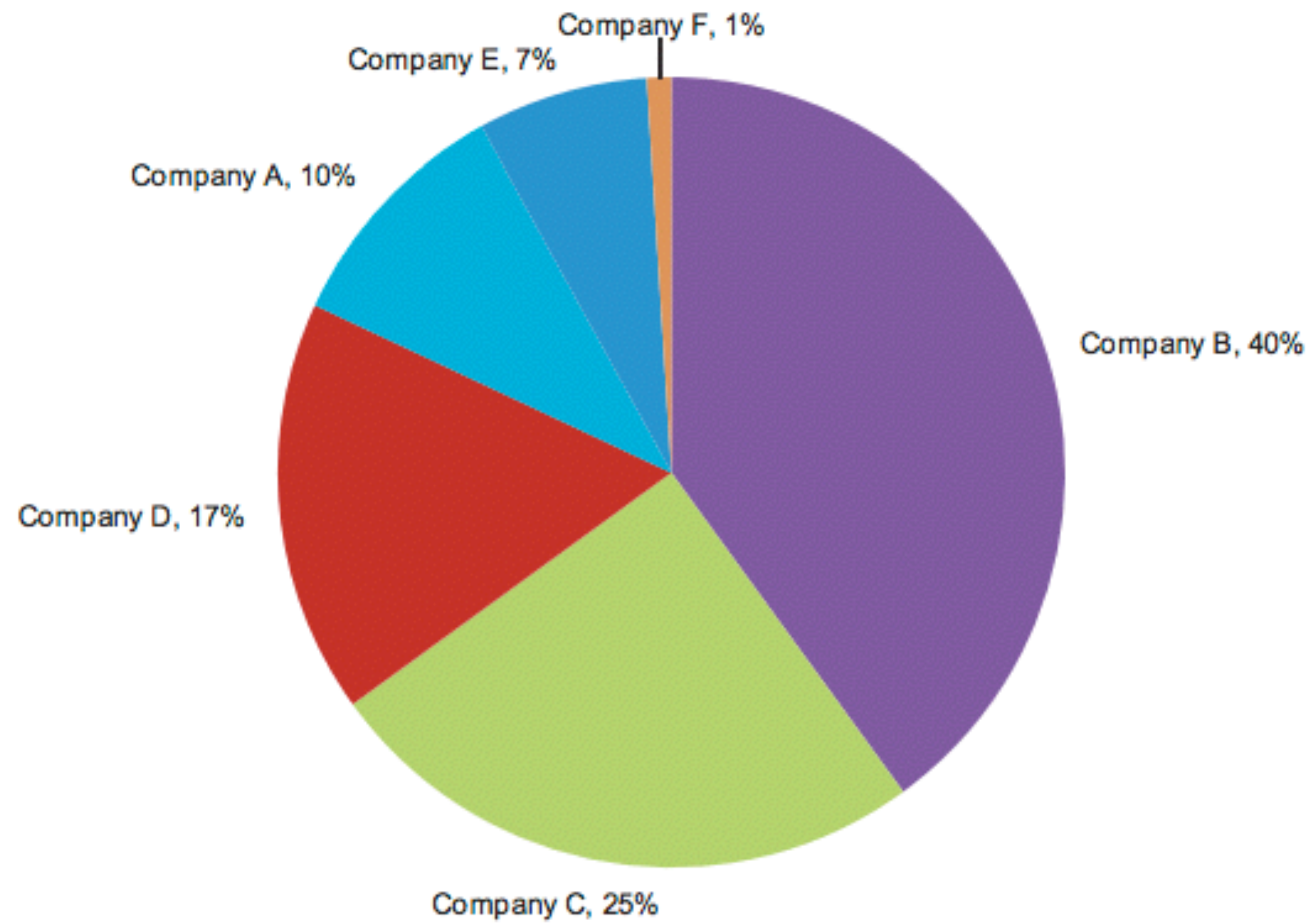






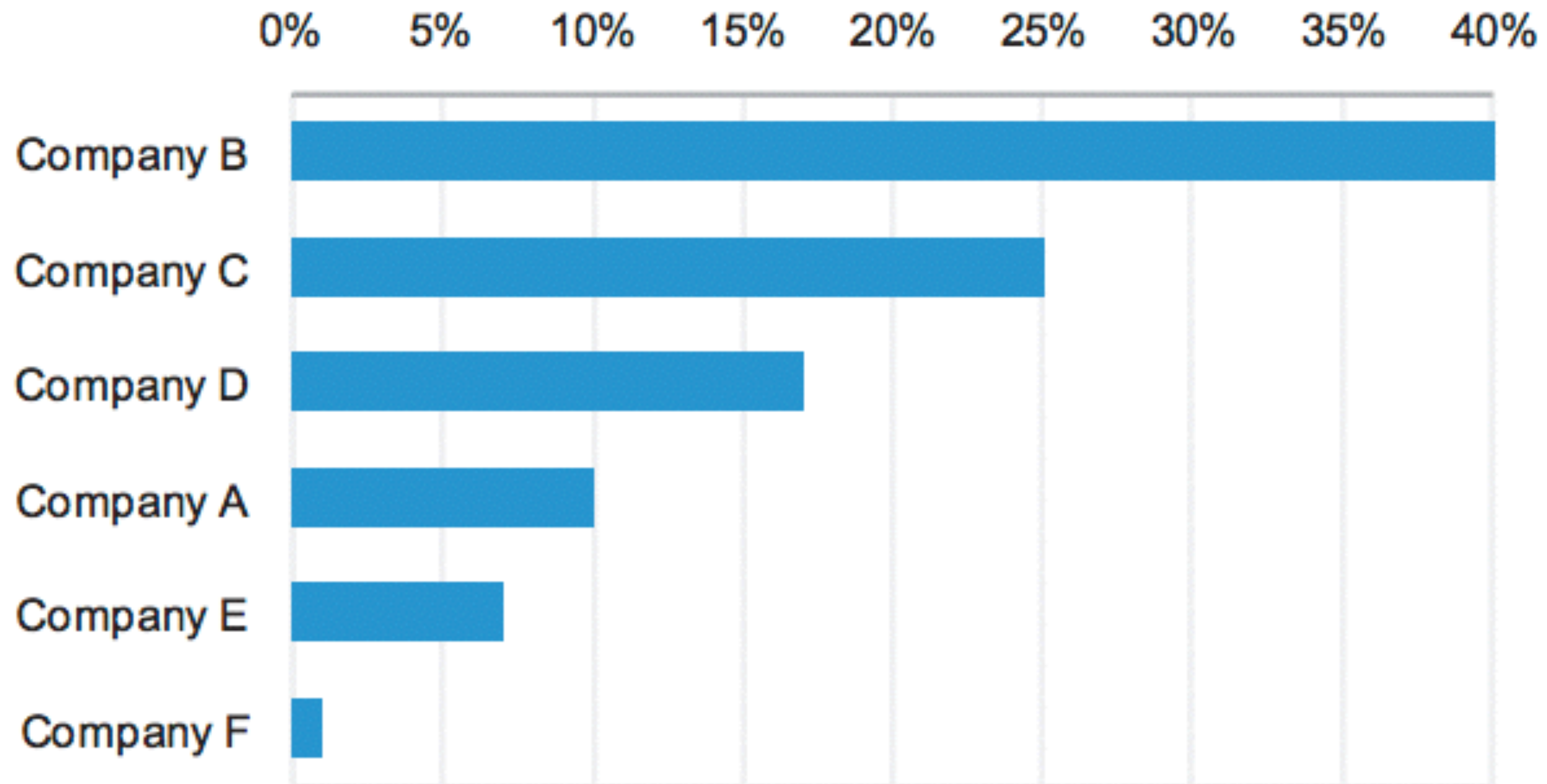








### Company Percentages of Total Market Share



BBC FOUR



<https://www.youtube.com/watch?v=jbkSRLYSojo>



**Chart**

**FORMS II**

**(the fancier ones)**

# Scatterplot

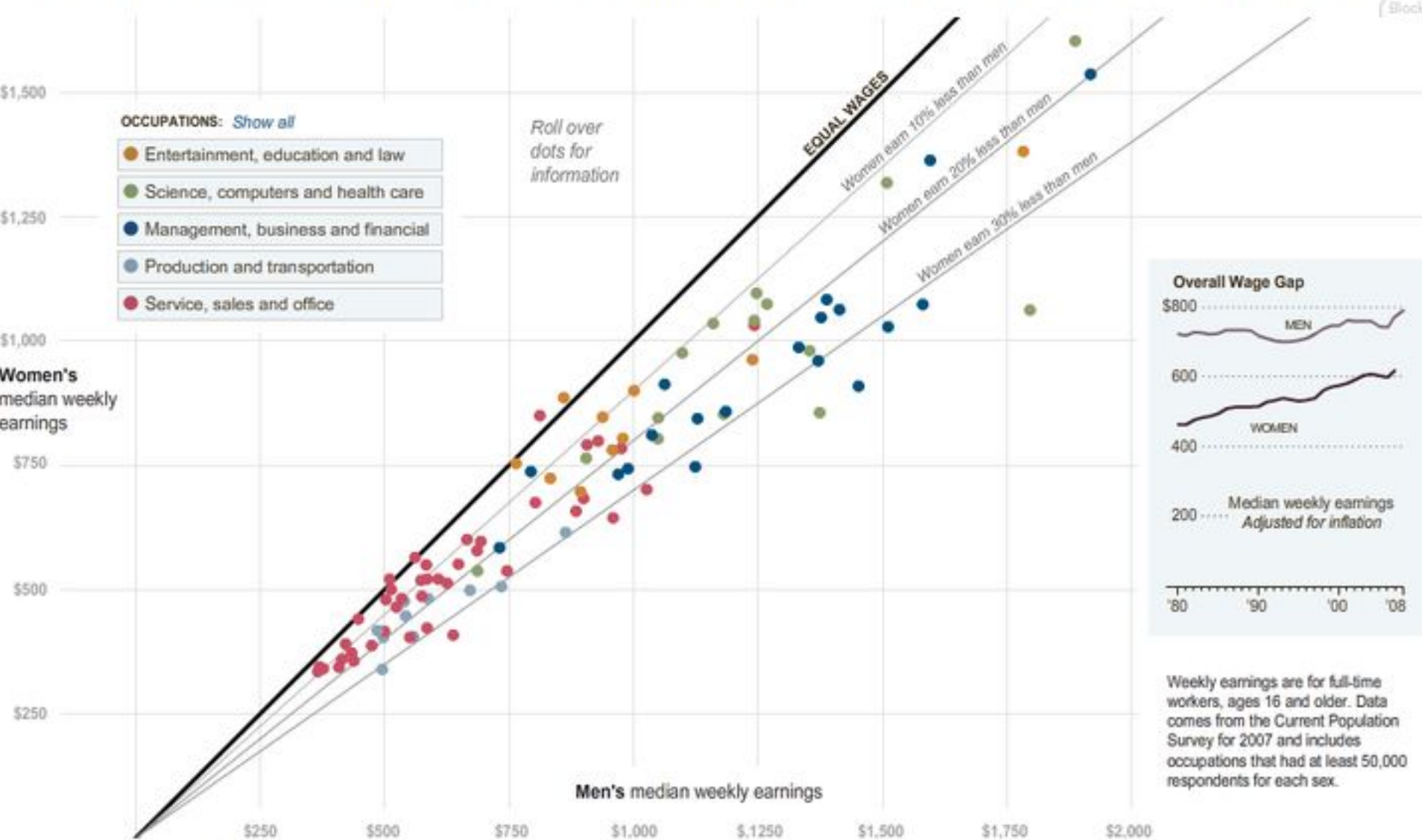
**Showing relationships**  
**Individual data points**

Common mistakes: Drawing dubious conclusions, Not adding a trend line



# Why Is Her Paycheck Smaller?

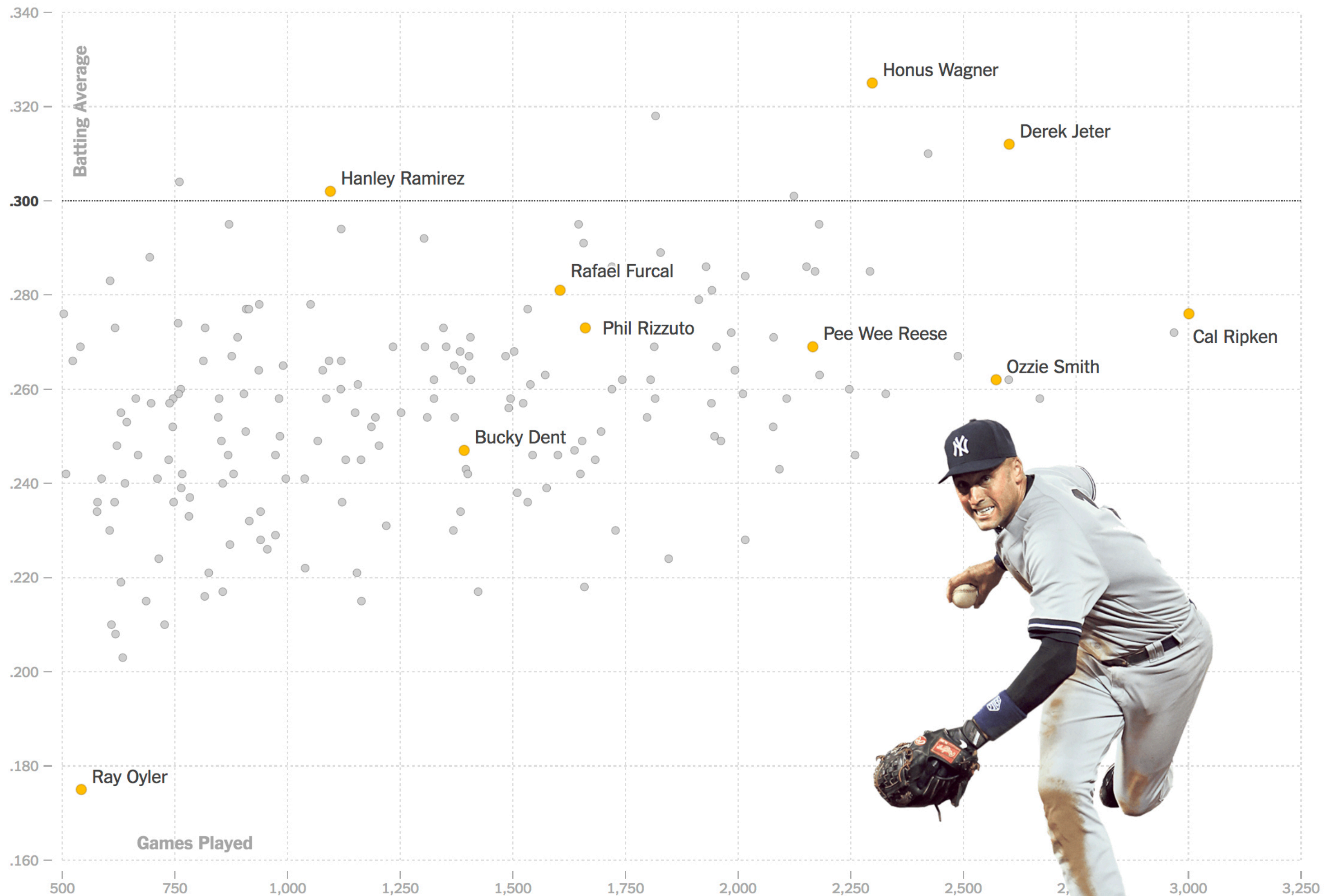
Nearly every occupation has the gap — the seemingly unbridgeable chasm between the size of the paycheck brought home by a woman and the larger one earned by a man doing the same job. Economists cite a few reasons: discrimination as well as personal choices within occupations are two major factors, and part of the gap can be attributed to men having more years of experience and logging more hours.



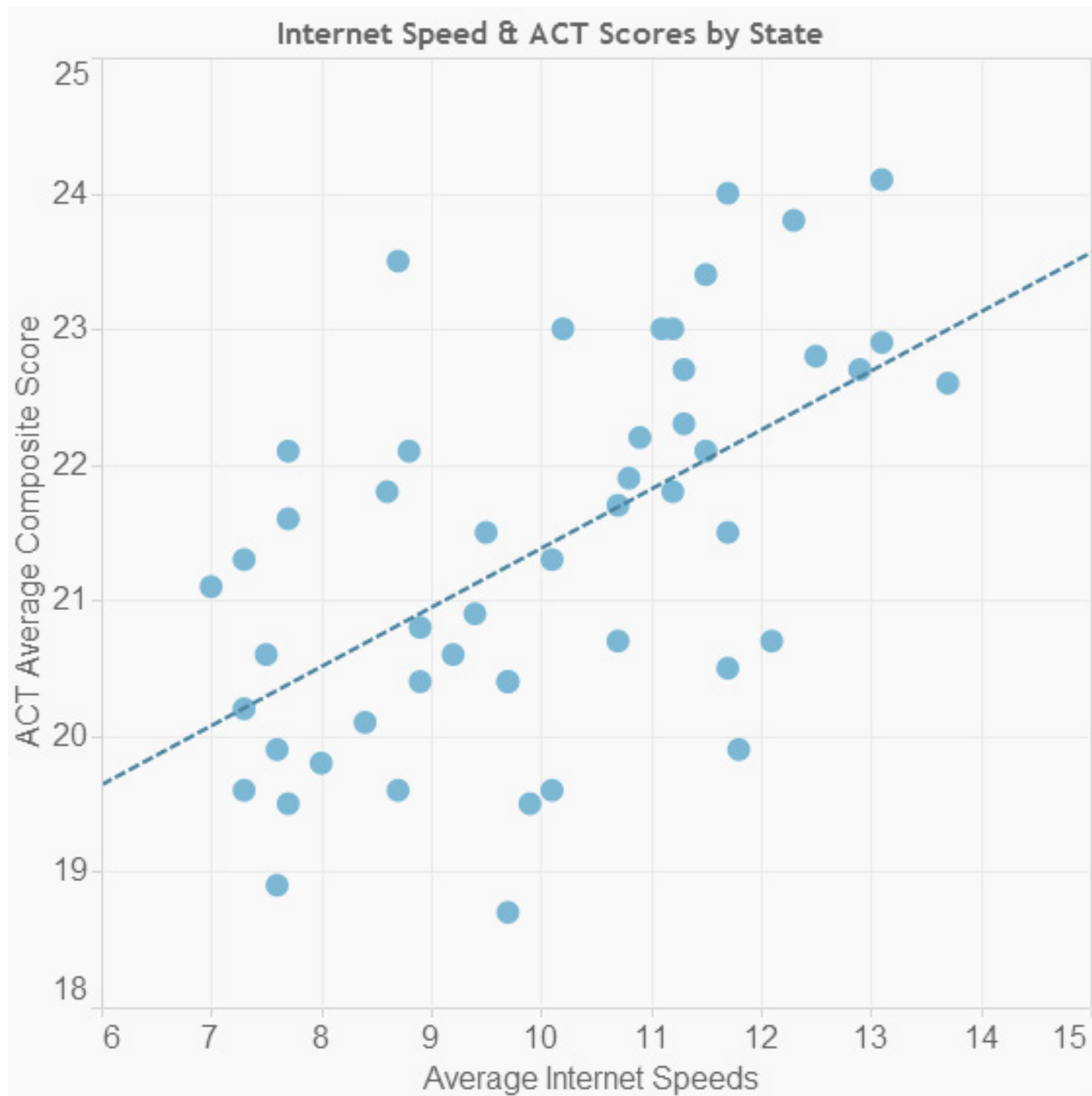
# Long-Lived Greatness

By LARRY BUCHANAN, TIM WALLACE and DEREK WATKINS FEB. 13, 2014

Among the 185 players who spent more than three-quarters of their career as a shortstop and played at least 500 games in the majors, Derek Jeter not only has one of the highest batting averages, but also has shown extraordinary longevity, logging more than 2,600 games over 19 seasons.



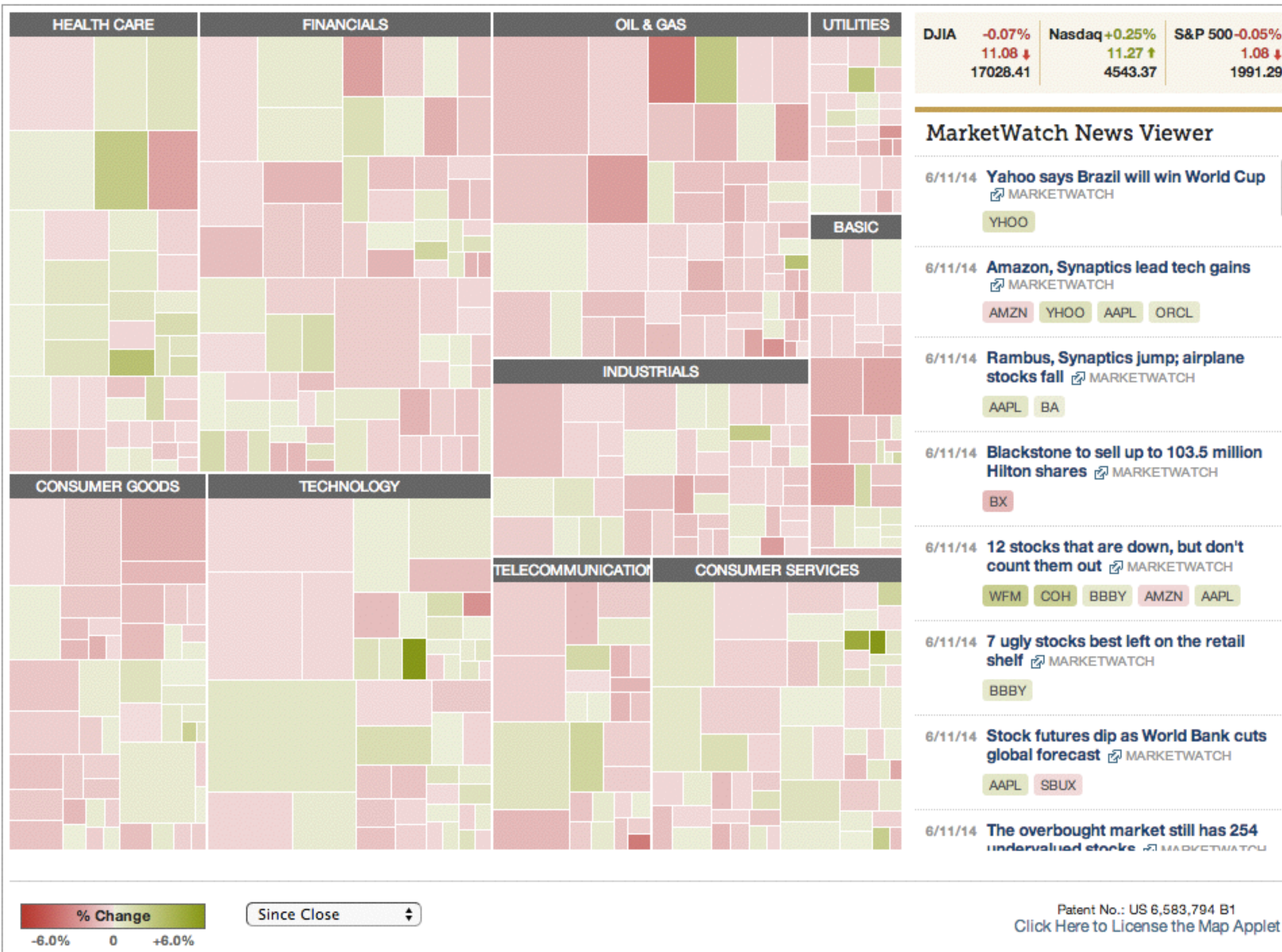




# **Treemaps**

**Parts of a whole**  
**Complex divisions**







ZOOM IN

ZOOM OUT

### Food and beverages 15%

The high price of oil is a factor that has made food prices rise quickly.

### Miscellaneous 3%

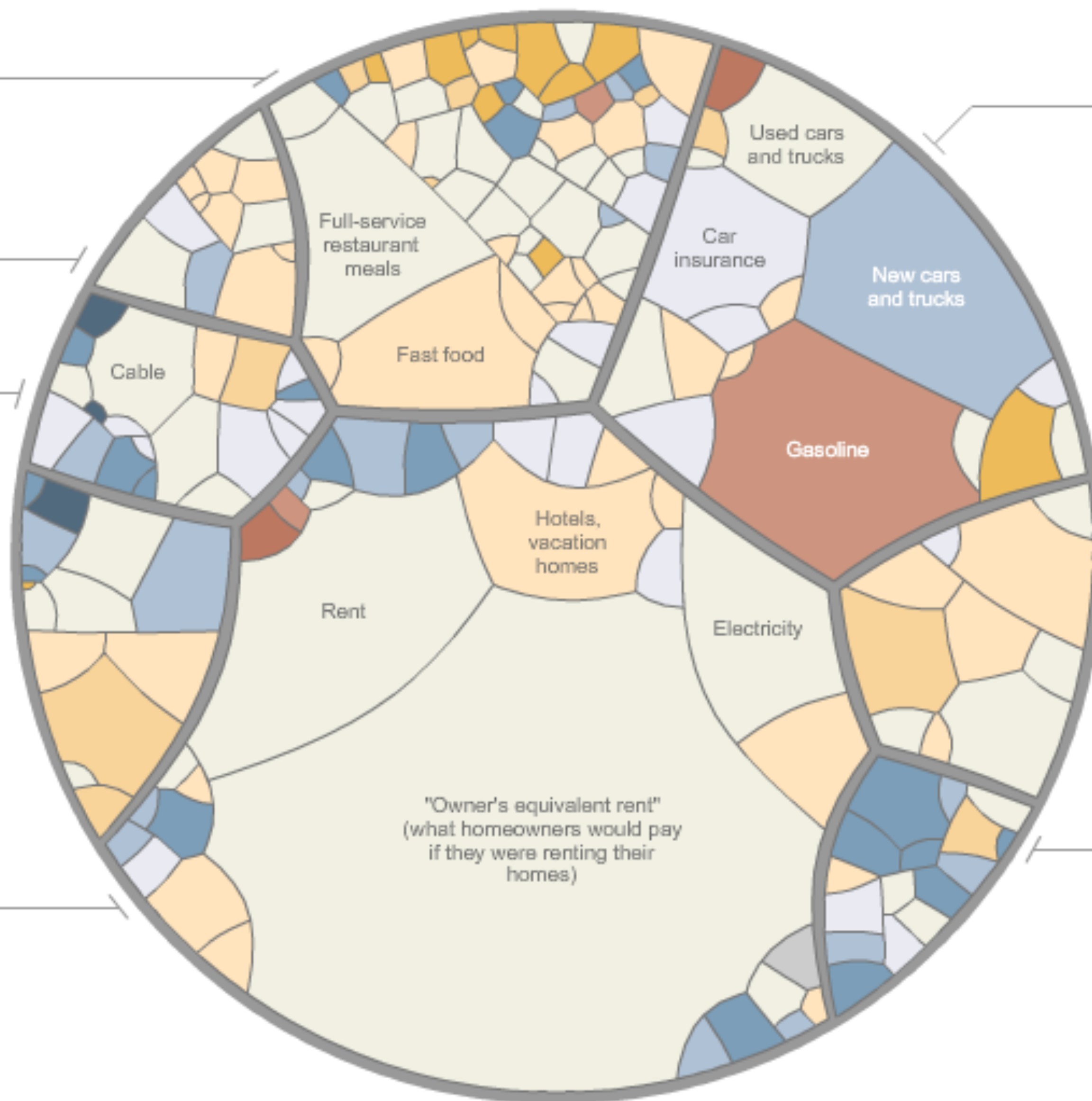
### Recreation 6%

### Education/Communication 6%

Cellphones were added to the index in 1997. Because the Consumer Price Index can be slow to add new goods, which are often cheaper, it may overstate parts of inflation.

### Housing 42%

In the C.P.I., home ownership costs track rent prices more closely than housing prices. This means inflation may have been understated when home prices were rising faster than rents.



### Transportation 18%

Gas is 5.2 percent of spending nationwide, but only 3.8 percent in the New York area.

### Health care 6%

As a group, the elderly spend about twice as much of their budget on medical care.

### Apparel 4%

The ratio of spending on women's clothes to that on men's clothes is about 2 to 1.



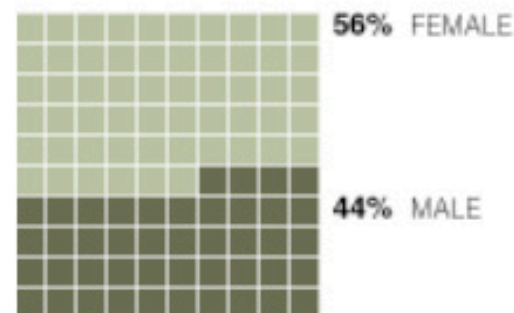
# **Waffle**

**Parts of a whole**  
**Showing composition**

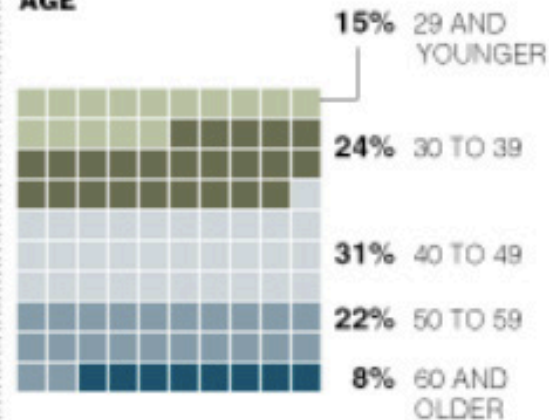
# On the Couch

In one survey conducted in 2001 by the American Psychoanalytic Association, 950 psychoanalysts from 36 states answered general questions about 2,791 of their patients.

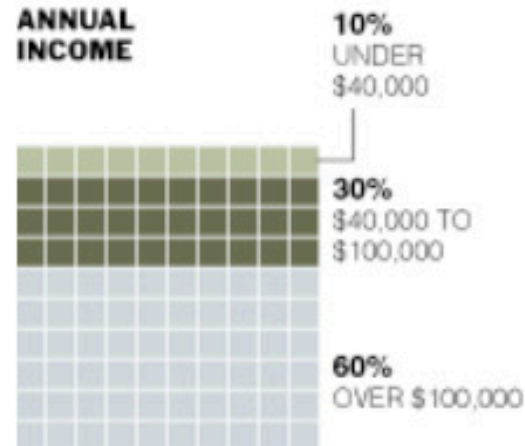
## GENDER



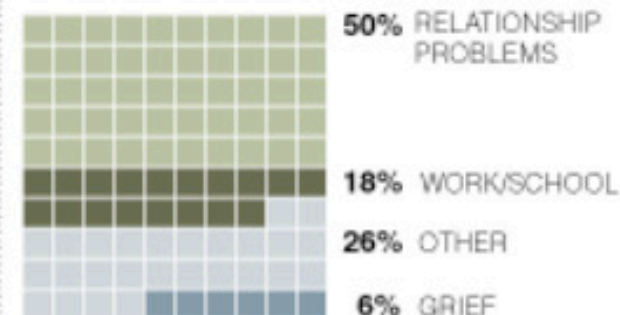
## AGE



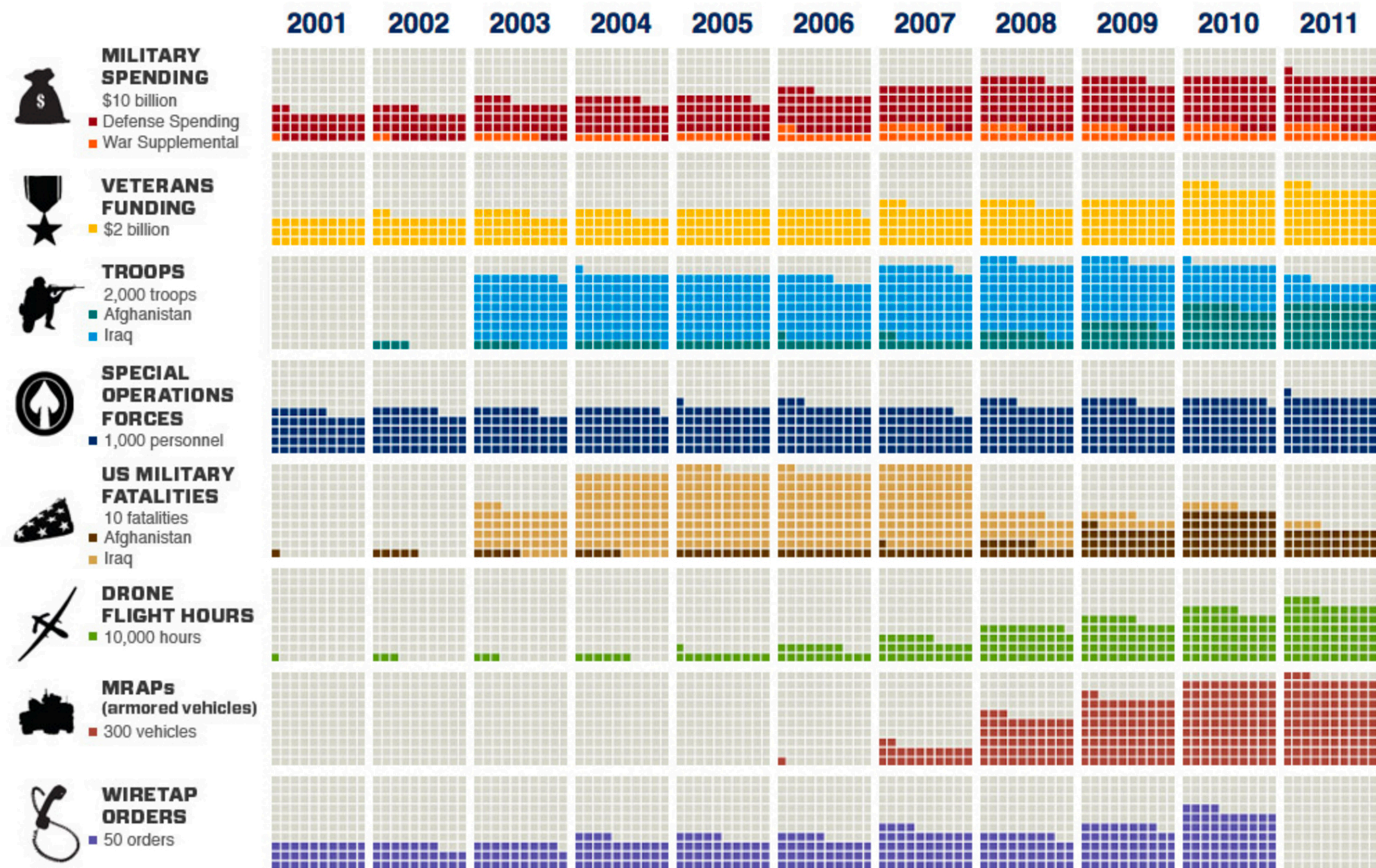
## ANNUAL INCOME



## REASONS FOR REFERRAL TO THERAPIST









# **Small Multiples**

**Repetition**

**Compare small changes**



## Mental Health Providers Score Highest in Intensity of Office Visits

Office visits are reimbursed on a scale of 1-5, with 5 being the most intensive and costly. Mental health professionals bill Medicare for level 5 visits most frequently compared to other specialties, with cancer doctors following close behind. Here's the breakdown of office visits by specialty (for patients seen at least once before).

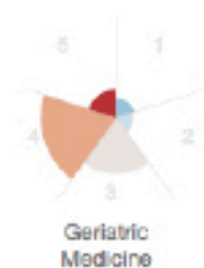
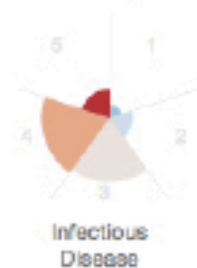
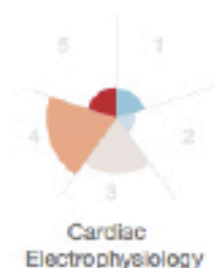
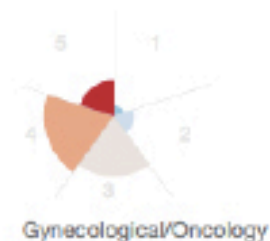
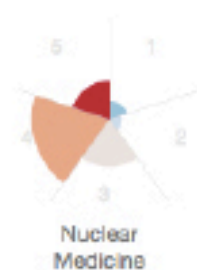
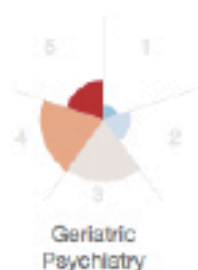


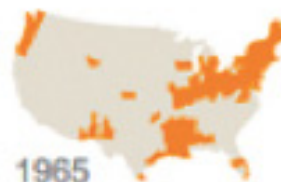
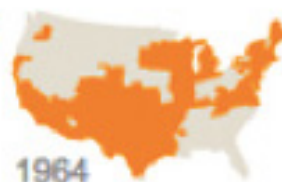
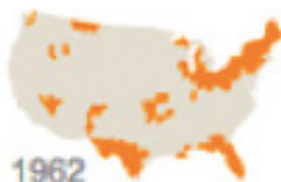
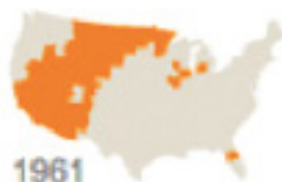
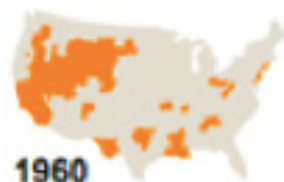
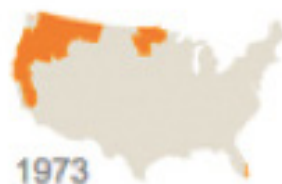
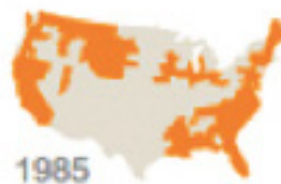
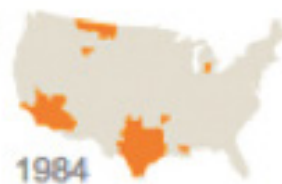
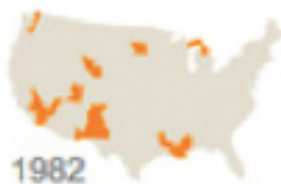
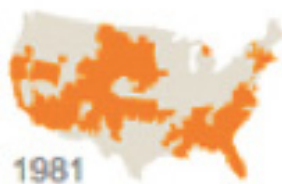
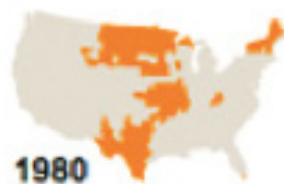
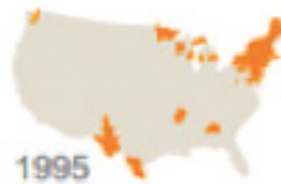
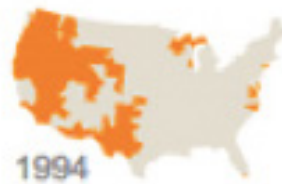
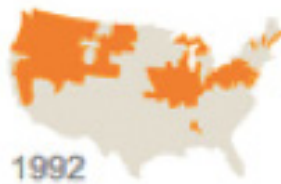
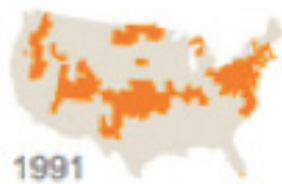
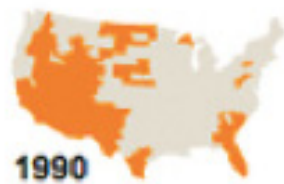
BY LEVEL 5 VISITS

BY TOP SPECIALTIES



The bigger the slice, the higher percentage of office visits at that level. Hover over each slice to see more detail. Arranged by specialties with highest % of level 5 visits.

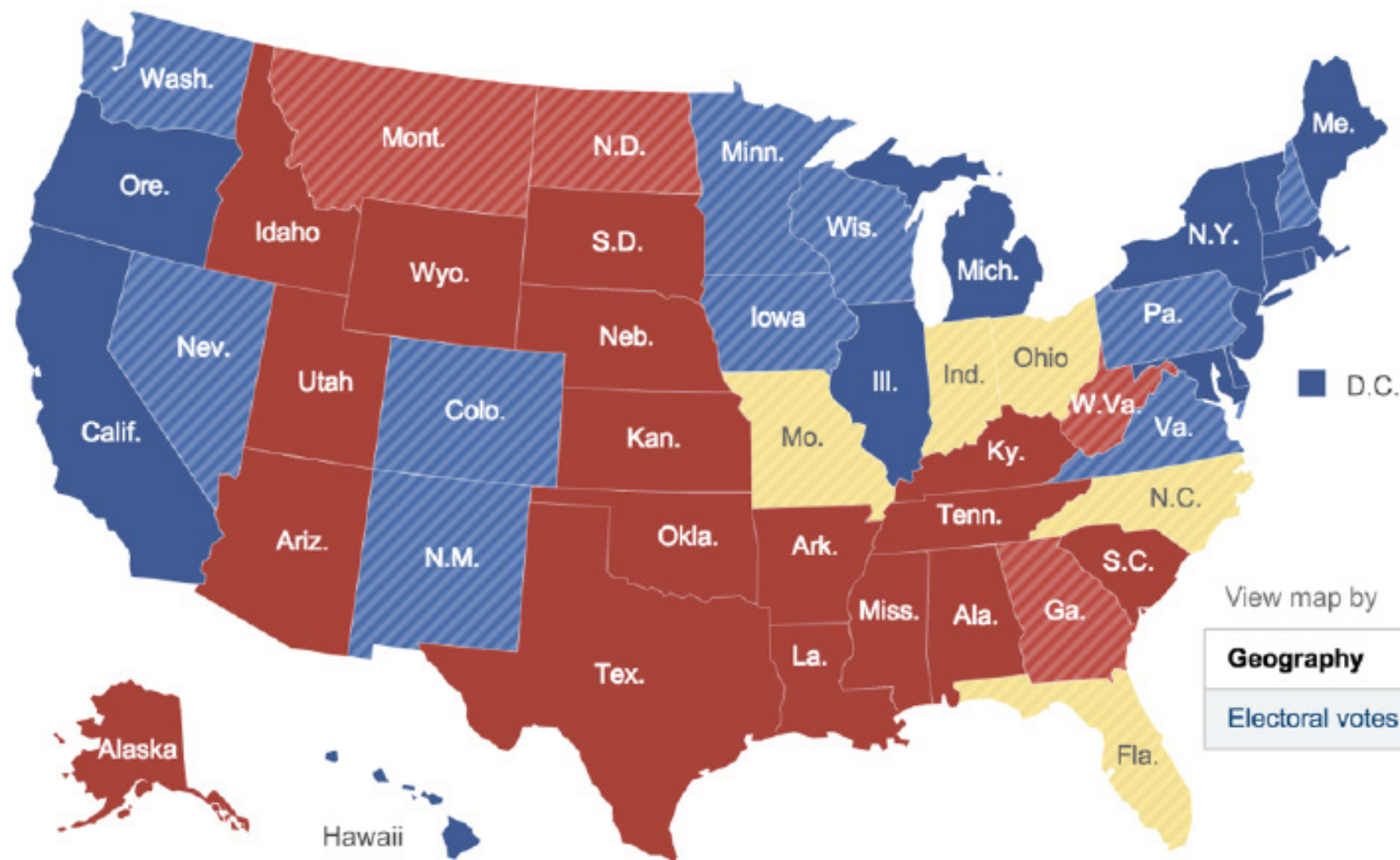




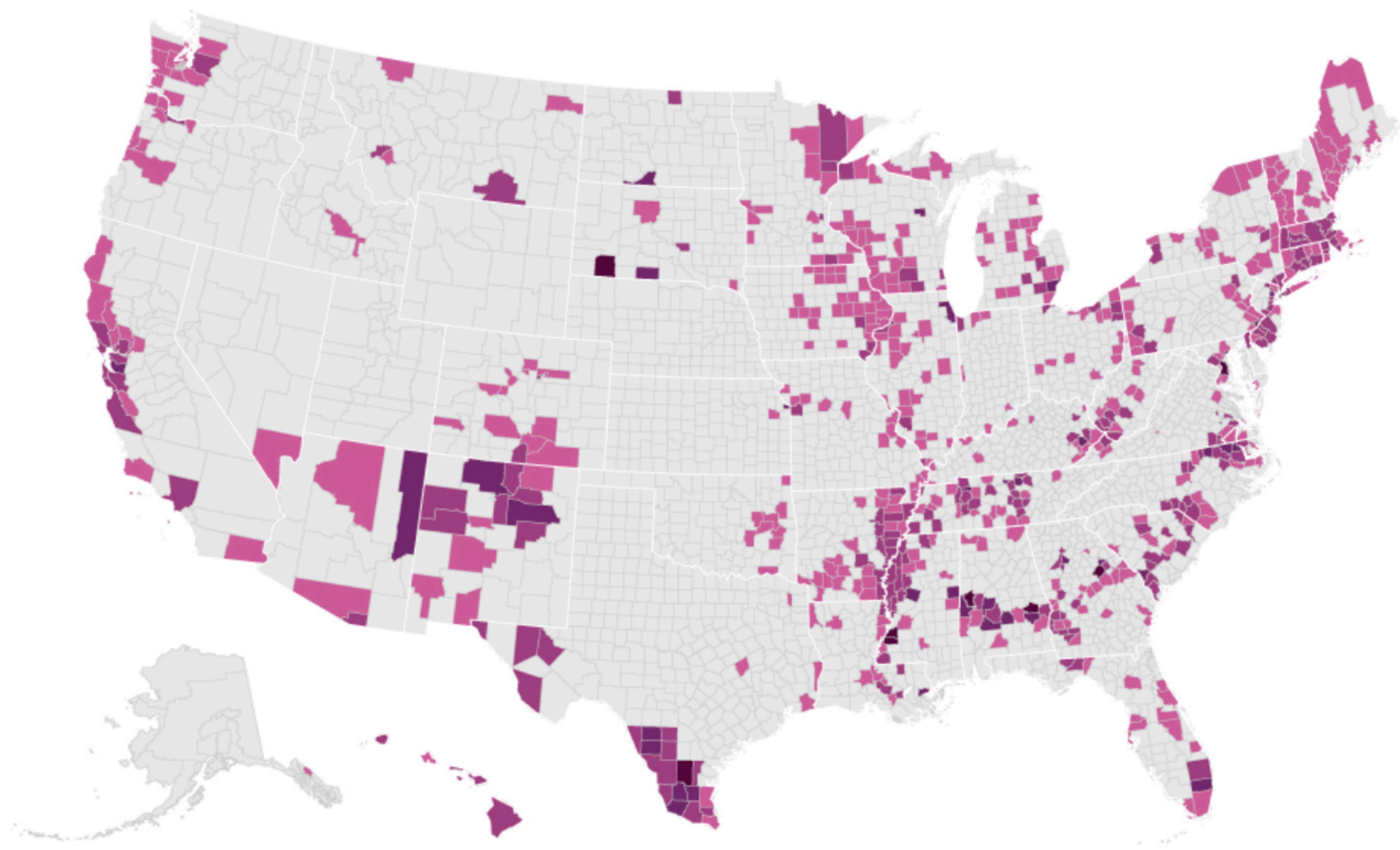


# **Maps & Cartograms**

**Geographic information**  
**Place & Location is important**  
**Compare countries/states/cities**



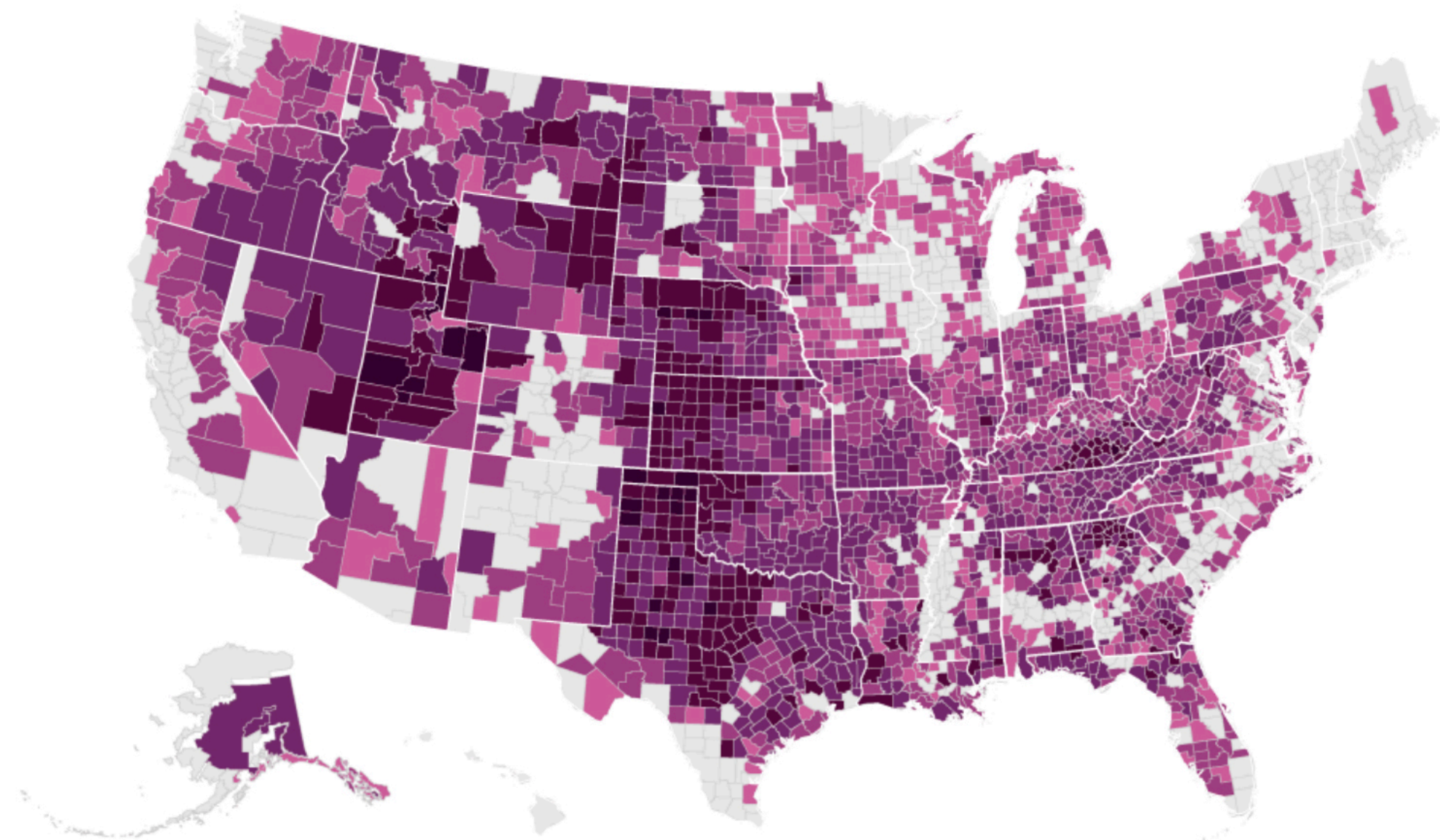




**2000**

LOSER: Al Gore (Democrat)

WINNER: George W. Bush (Republican)



**2012**

LOSER: Mitt Romney (Republican)

WINNER: Barack Obama (Democrat)

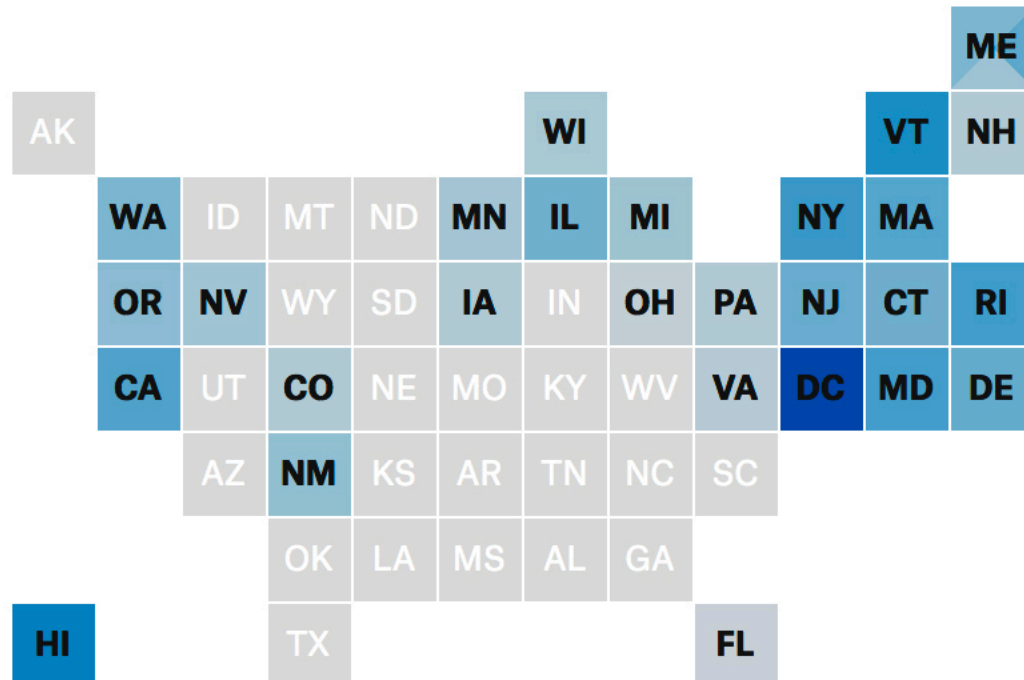
# What Would It Take To Turn **Red** States **Blue** ?

Change the settings below to see how shifts in party preference and turnout by different demographic groups would affect the 2016 presidential election.

By Aaron Bycoffe and David Wasserman

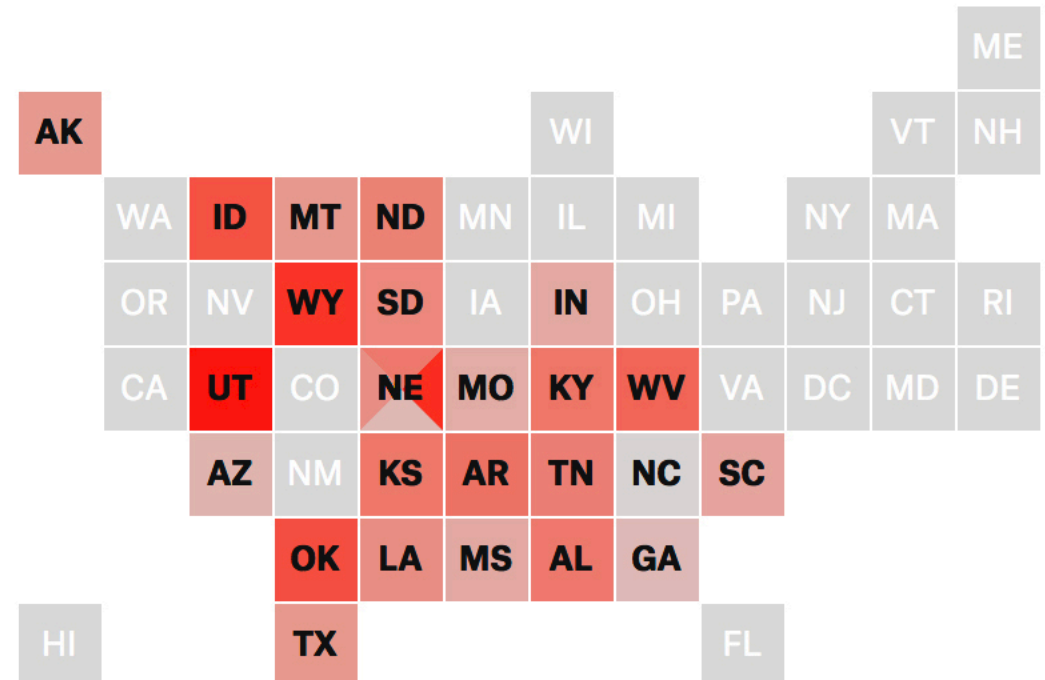
## CLINTON

ELECTORAL VOTES: **332** ✓  
POPULAR VOTE: 51.6%

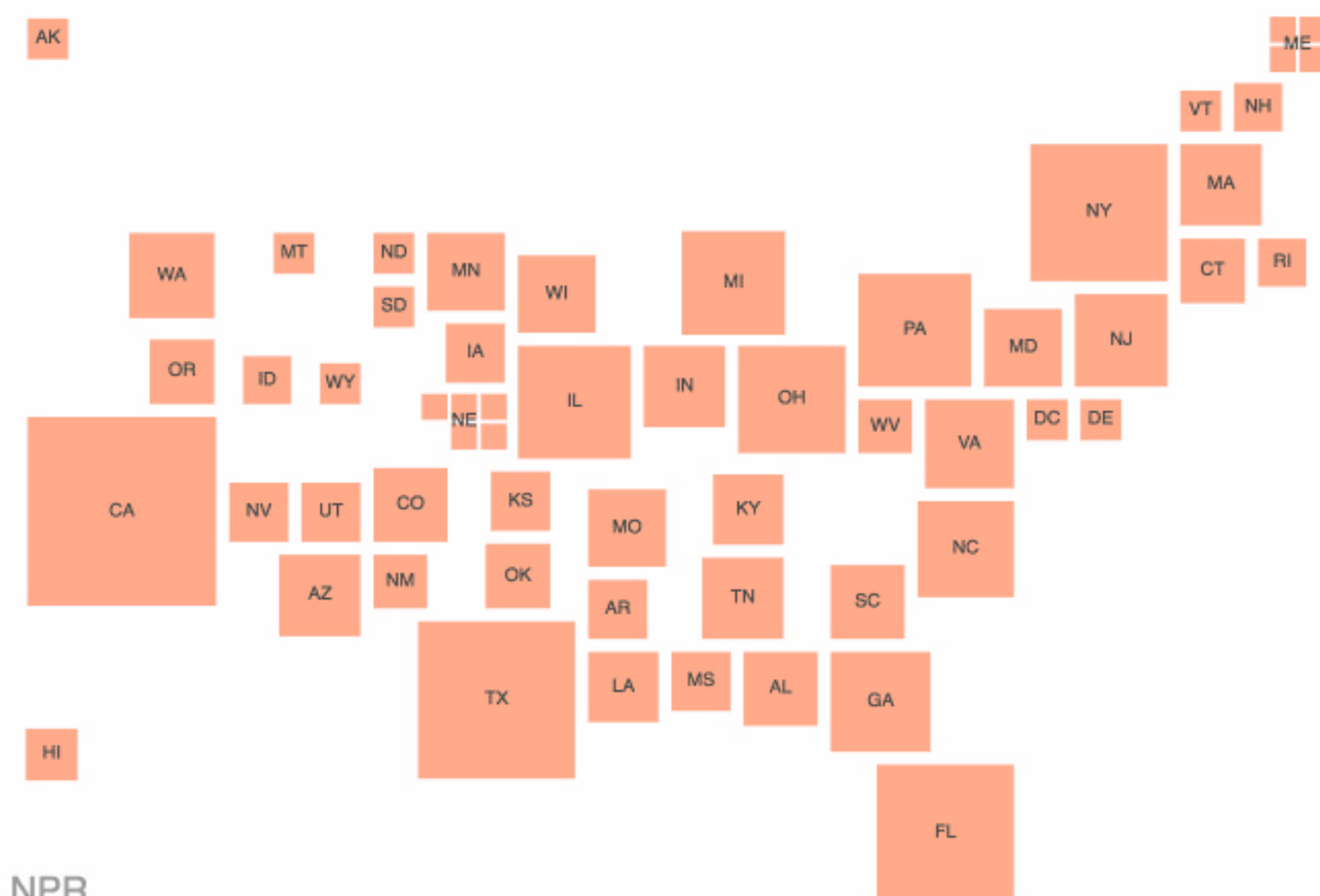
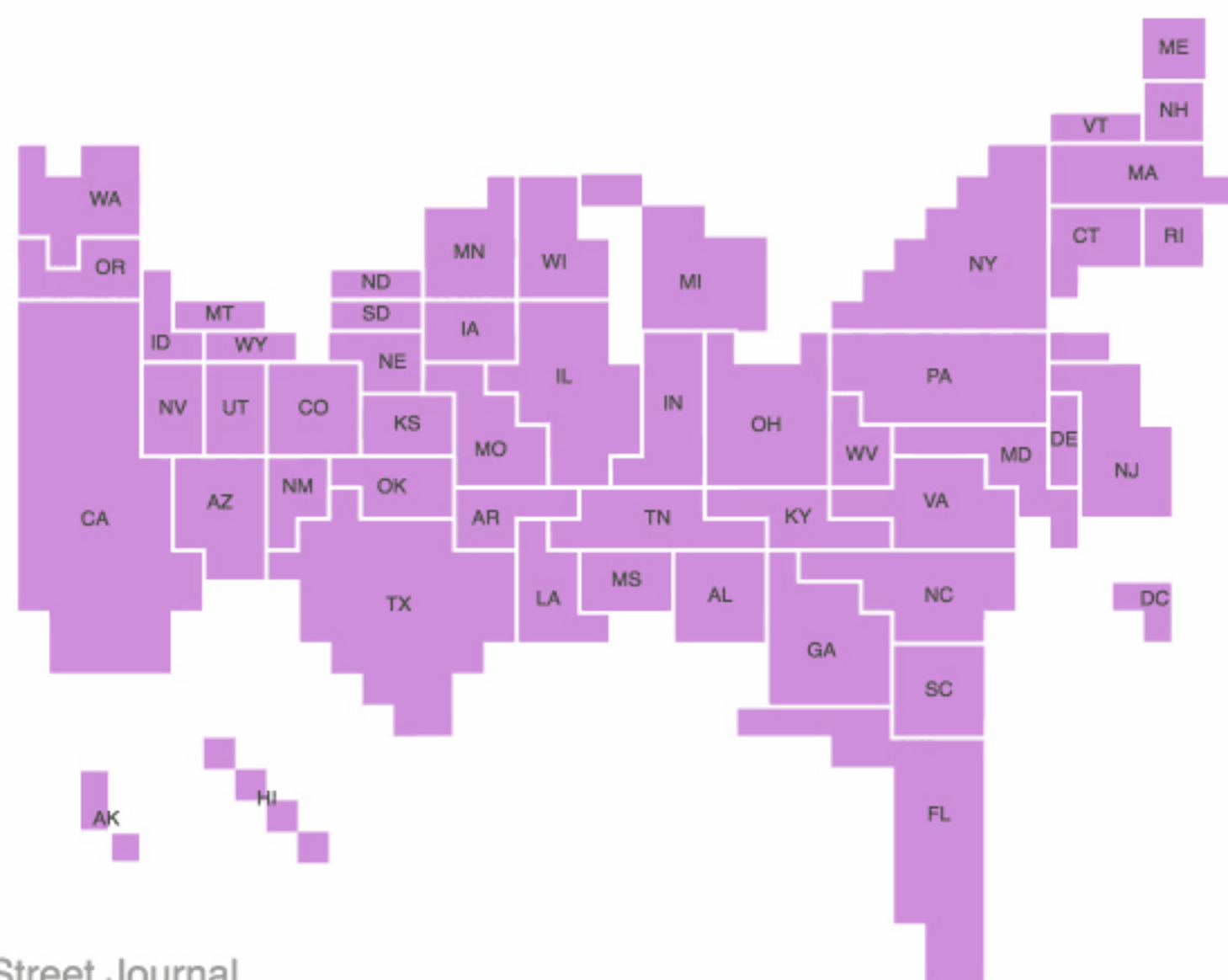
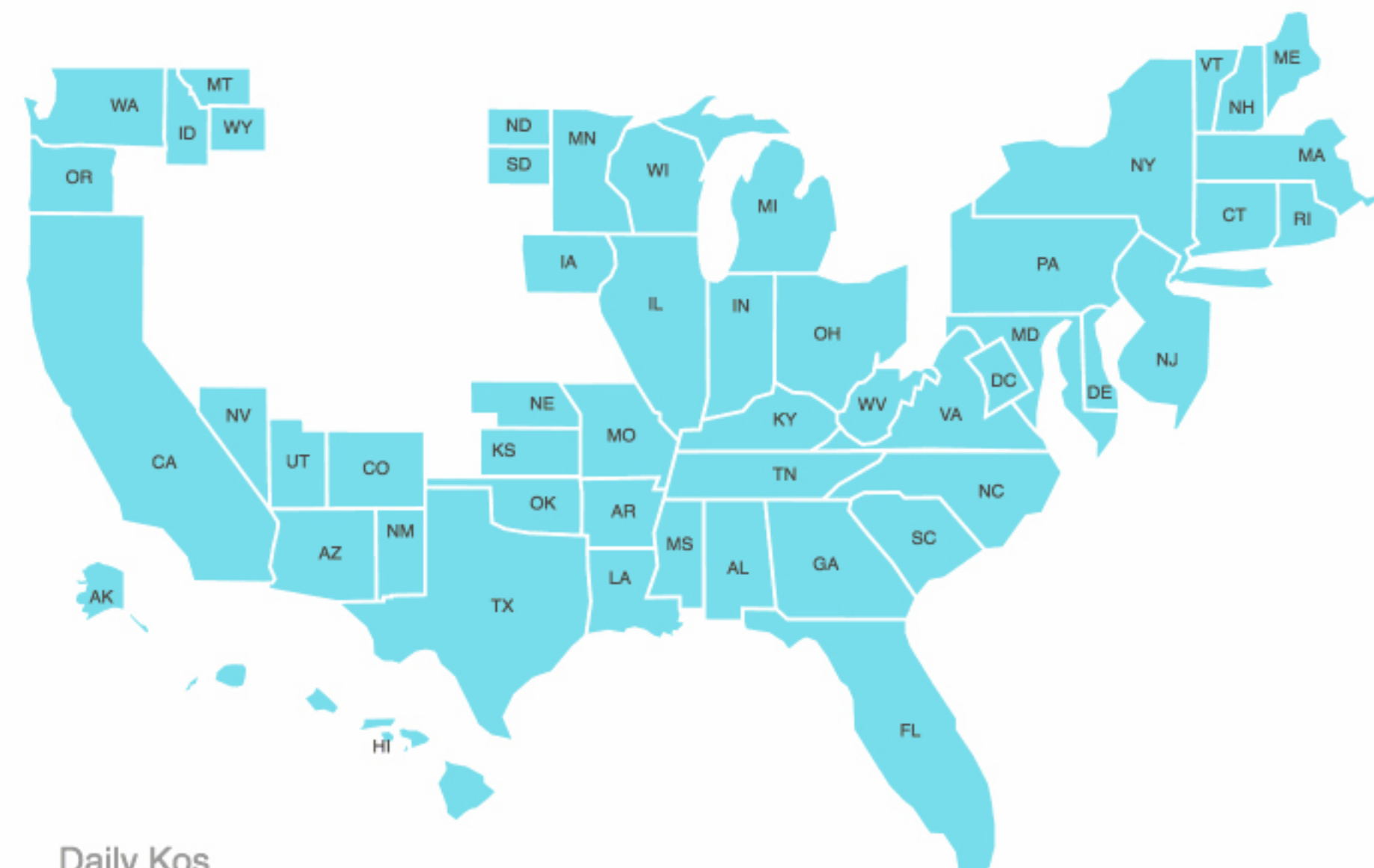
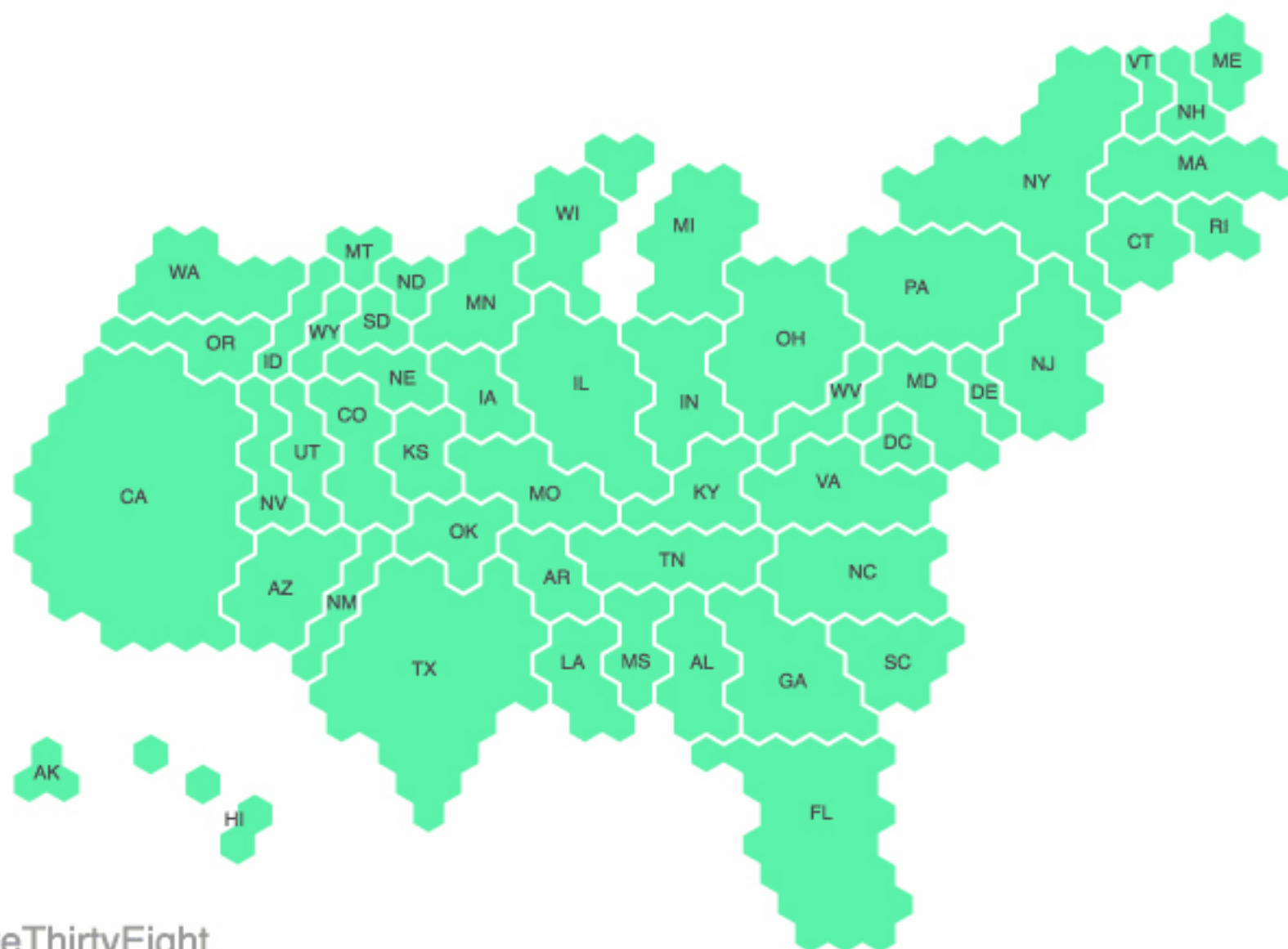


## TRUMP

ELECTORAL VOTES: 206  
POPULAR VOTE: 46.6%









# A TAXONOMY OF TRANSITIONS

racial / ethnic  
self-identification  
in chicago  
in the year 2010

white ■  
black ■  
asian ■  
hispanic ■  
other ■

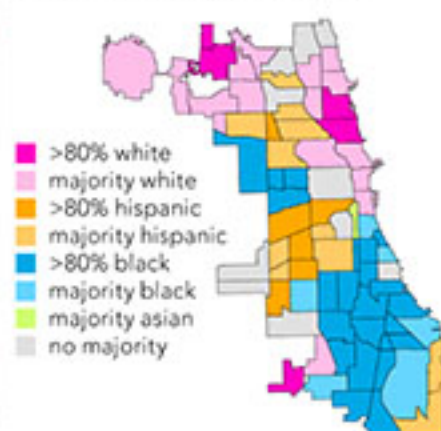
the black lines show  
chicago's official  
community areas.

each dot represents  
twenty-five people.  
here, hispanic is  
exclusive of other  
categories.

block-level data  
from the U.S. census.

scale 1:200,000

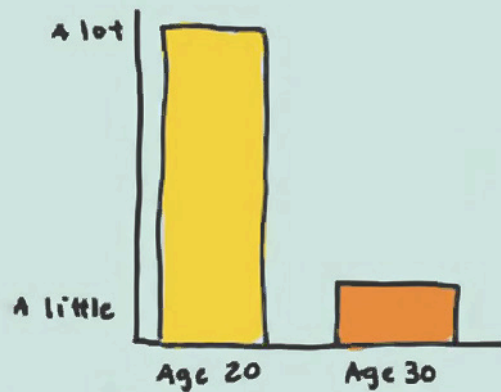
The same data, aggregated by community  
area and shown with solid colors.



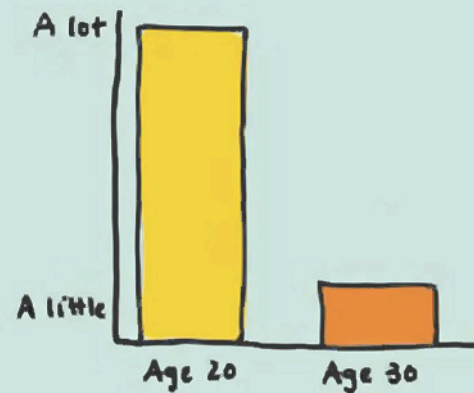


# **Name That Chart Form**

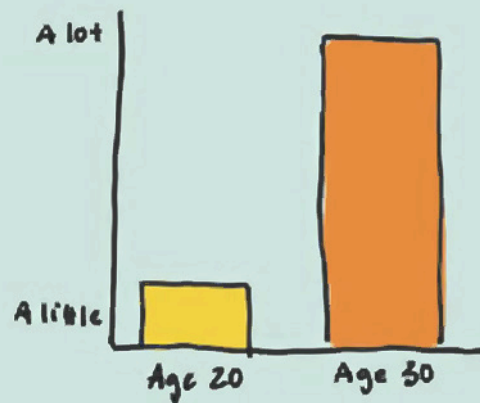
Proportion of furniture from IKEA



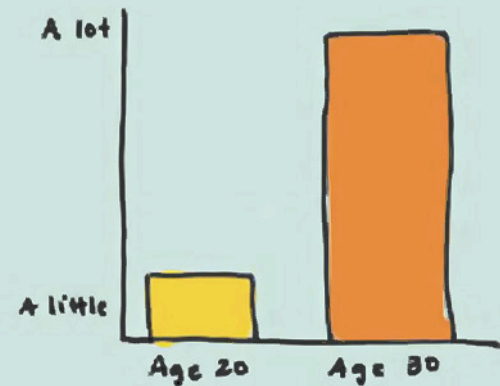
How much of a fuck I give



How comfortable my shoes are



How much of my parents' advice I take







VISUALS | Hannah Fairfield

## Driving Safety, in Fits and Starts

**A** MERICANS drive a staggering number of miles — close to three trillion every year, according to the government. (That is half a light-year, or 120 million trips around the world.) And although traffic accidents remain a major public safety problem, the biggest killer of people ages 5 to 34, vehicle travel is far safer than it was a few decades ago.

Several factors appear to account for the sharp decline in fatalities. Technology (like anti-lock brakes and air bags) and road behavior (like wearing seat belts and driving sober) have both improved greatly since 1950.

Americans almost always drive more each year than the previous one — at least until recently, when the recession curtailed road habits. And the auto fatality rate has been decreasing since the 1960s, when cars with massive engines carried their unbuckled passengers on primarily two-lane roads.

The safety data is usually charted as deaths per miles traveled. But what happens when the metrics are teased apart, and familiar data is charted in an unfamiliar way?

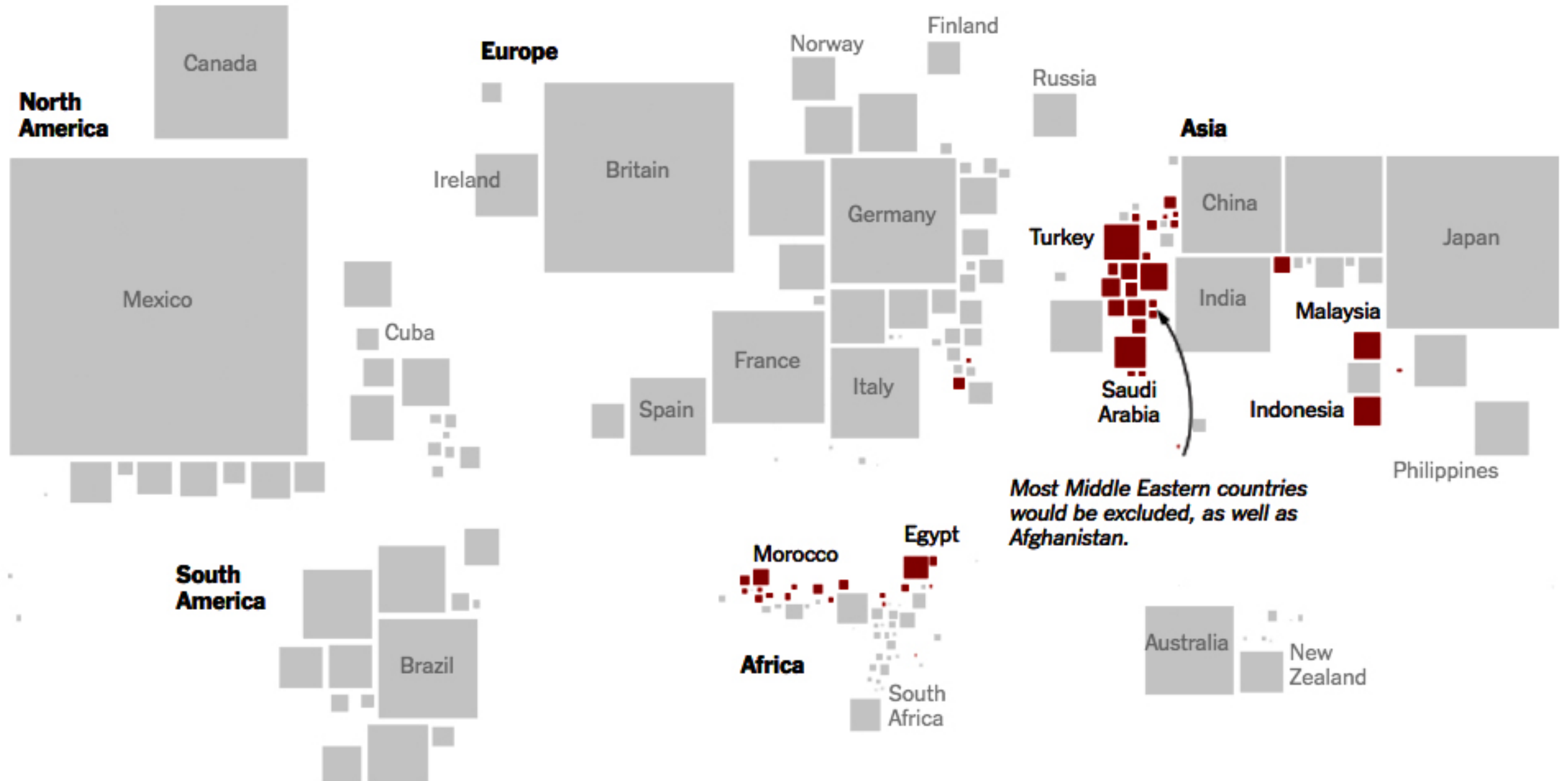
Plotting the two most important variables against each other — miles traveled versus deaths per 100,000 population — yields a pattern that looks like a plateau followed by a steep drop. It evokes the theory of punctuated equilibrium, proposed by the paleontologists Stephen Jay Gould and Niles Eldredge, which suggests that instead of continuous gradual evolution, change occurs abruptly after periods of virtual standstill.

“You see fatalities drop after a breakthrough in new technologies or behaviors, and then plateau until the next one,” said David L. Strickland, administrator of the National Highway Traffic Safety Administration. “It takes time for new safety technologies to work their way into the whole fleet of cars on the road.”

Sources: National Highway Traffic Safety Administration; Federal Highway Administration

THE NEW YORK TIMES

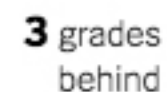
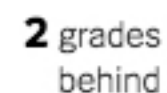
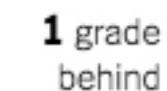
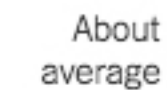
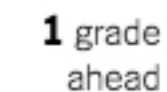
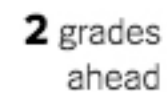
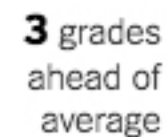
Barring immigrants from **countries where more than 50 percent of the population is Muslim** would keep out about **1 million** people each year.



Squares sized by the average number of immigrants and visitors who entered the United States from that country in the last 10 years.



There are large gaps between white children and their black and Hispanic classmates. The gaps are largest in places with large economic disparities.



← Poorer

### Parents' socioeconomic status

Richer →

# Mapping 50 Years of Melting Ice in Glacier National Park

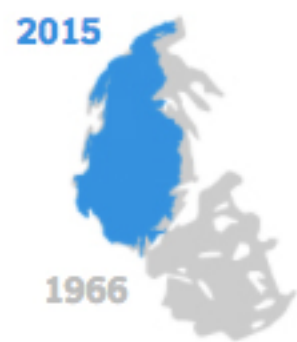
By NADJA POPOVICH MAY 24, 2017

## Ice extent for every glacier in Glacier National Park in 1966 and 2015

Lost 50 percent or more coverage area

### Agassiz

Lost 213 acres (54%)



### Sperry

Lost 133 acres (40%)



### Jackson

Lost 129 acres (41%)



### Grinnell

Lost 113 acres (45%)



### Kintla

Lost 107 acres (33%)



### Harrison

Lost 98 acres (19%)



### Rainbow

Lost 93 acres (26%)



### Two Ocean

Lost 87 acres (82%)



### Blackfoot

Lost 83 acres (18%)



### Logan

Lost 70 acres (56%)



### Stanton

Lost 65 acres (49%)



### Chaney

Lost 57 acres (41%)



### Boulder

Lost 48 acres (85%)



### Shepard

Lost 44 acres (72%)



### Dixon

Lost 41 acres (57%)



### Whitecrow

Lost 34 acres (57%)



### Herbst

Lost 34 acres (81%)



### Ipasha

Lost 33 acres (41%)



### Carter

Lost 32 acres (37%)



### Harris

Lost 28 acres (77%)





# Drug Deaths in America Are Rising Faster Than Ever

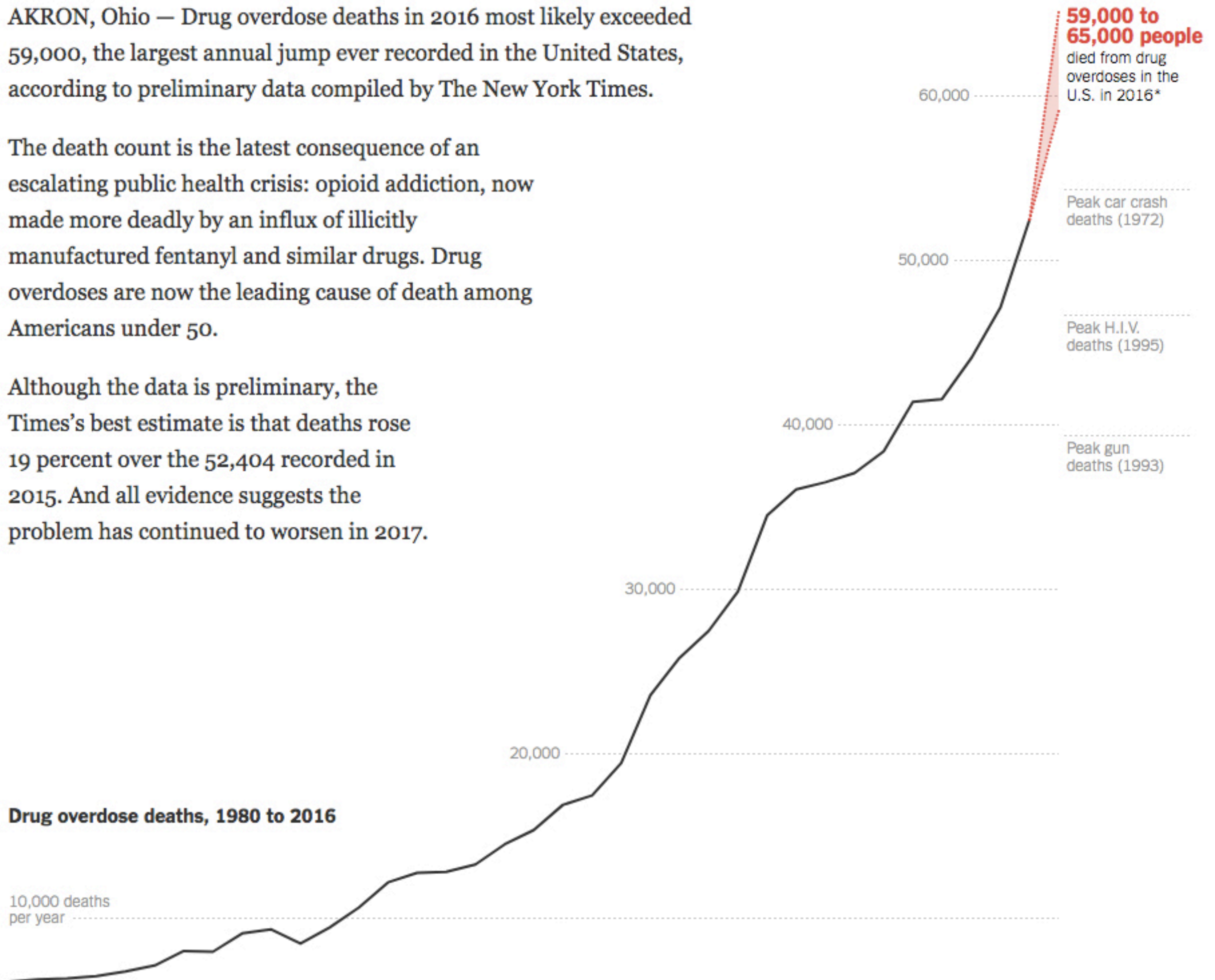
By JOSH KATZ JUNE 5, 2017

New data compiled from hundreds of health agencies reveals the extent of the drug overdose epidemic last year.

AKRON, Ohio — Drug overdose deaths in 2016 most likely exceeded 59,000, the largest annual jump ever recorded in the United States, according to preliminary data compiled by The New York Times.

The death count is the latest consequence of an escalating public health crisis: opioid addiction, now made more deadly by an influx of illicitly manufactured fentanyl and similar drugs. Drug overdoses are now the leading cause of death among Americans under 50.

Although the data is preliminary, the Times's best estimate is that deaths rose 19 percent over the 52,404 recorded in 2015. And all evidence suggests the problem has continued to worsen in 2017.



# Percentages of Violence

The higher the risk score (the farthest left column) the more likely a person was “Party to Violence” (PTV) in Chicago, meaning they were involved in a shooting or murder. The top 1,400 people have scores of 429 and up, and they were involved in less than 20 percent of the city’s total gun violence in 2016.

