

Agenda

- **Tophat reading/homework quiz**
- **Stickies update**
- **Homework policy update**
- **We will grade your homework and post grades next week**

- **Principles of visualization**
- **Group-work**

GO TO TOP HAT

STICKIES:
Keep them down
until you are
(done) or (stuck)

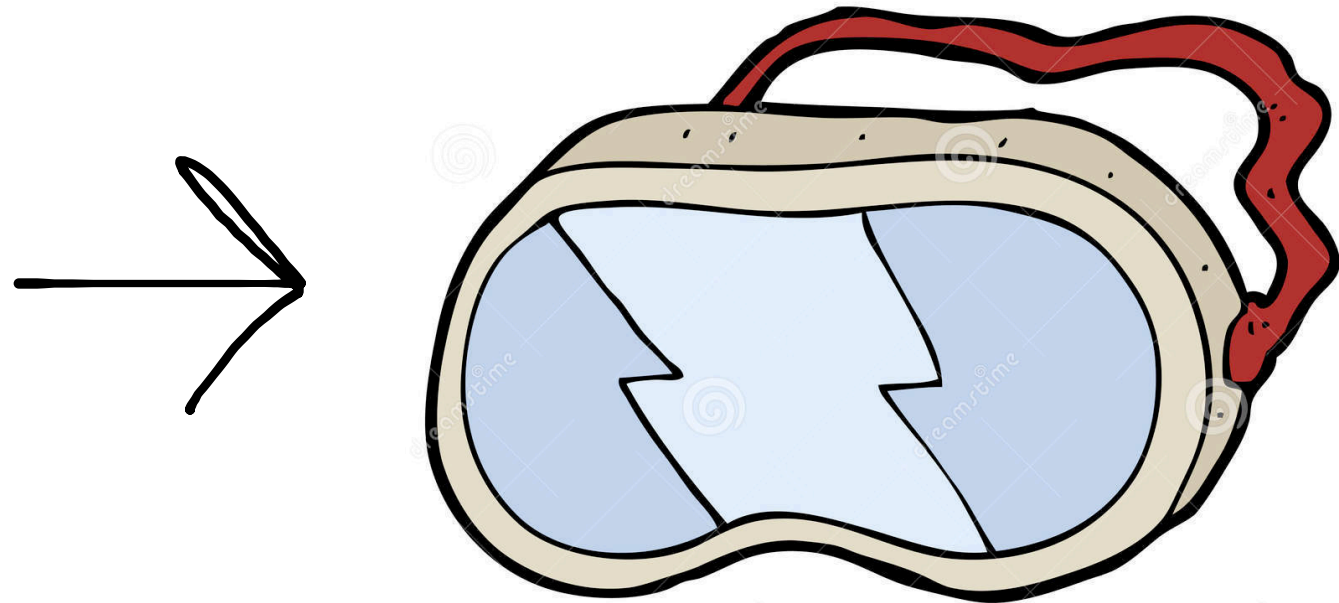


Week 2 Day 2

PRINCIPLES OF VISUALIZATION



DATA VIZ GOGGLES



Edward Tufte

- Hates powerpoint
 - Thinks reports are the way to go
- BUT...
- Tufte uses a presentation format
 - Tufte typically presents his theories to large audiences (400+) in a one-way format

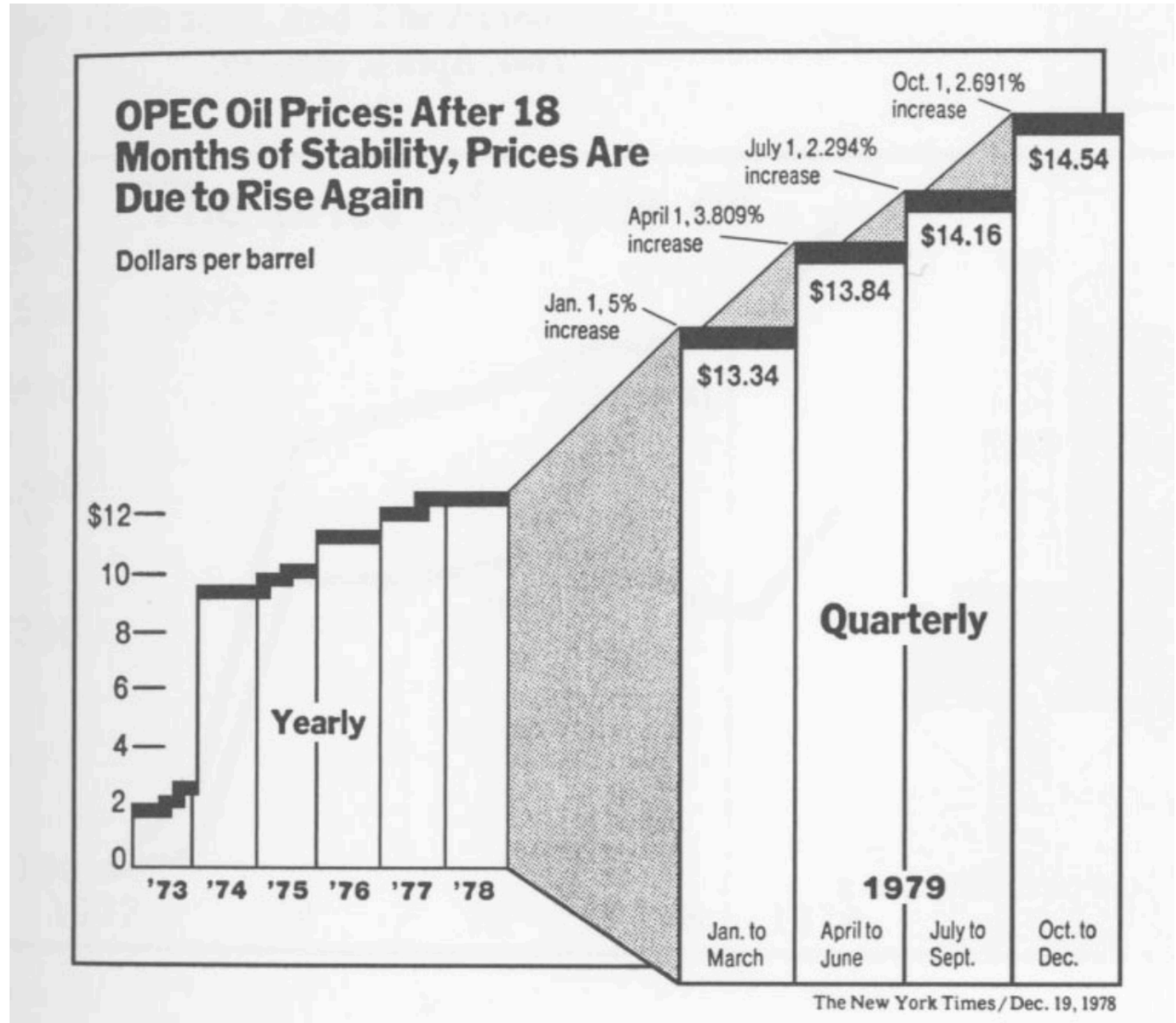


Principles of Graphical Integrity

1. Above all else show the data.
2. Maximize the data-ink ratio/erase non-data ink.
3. Revise and edit.

Above
all else,
show
the data

*Show data not
design
variation*



Maximize the data ink ratio

the proportion of a graphic's ink devoted to the non-redundant display of data information

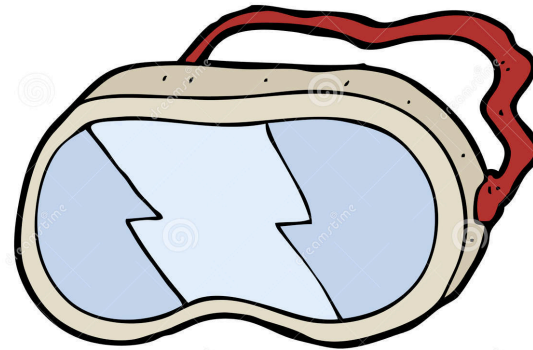
$$\text{Data ink ratio} = \frac{\text{data ink}}{\text{total ink}}$$

Context + “Chartjunk”

- **Vibrating chartjunk:** cross-hatching or patterns that distract the mind from the key insights
- **Grids:** make them a lighter gray, not black, if you are going to use them
- **Self-promoting graphics** where color schemes and patterns are introduced for artistic appeal rather than information content.

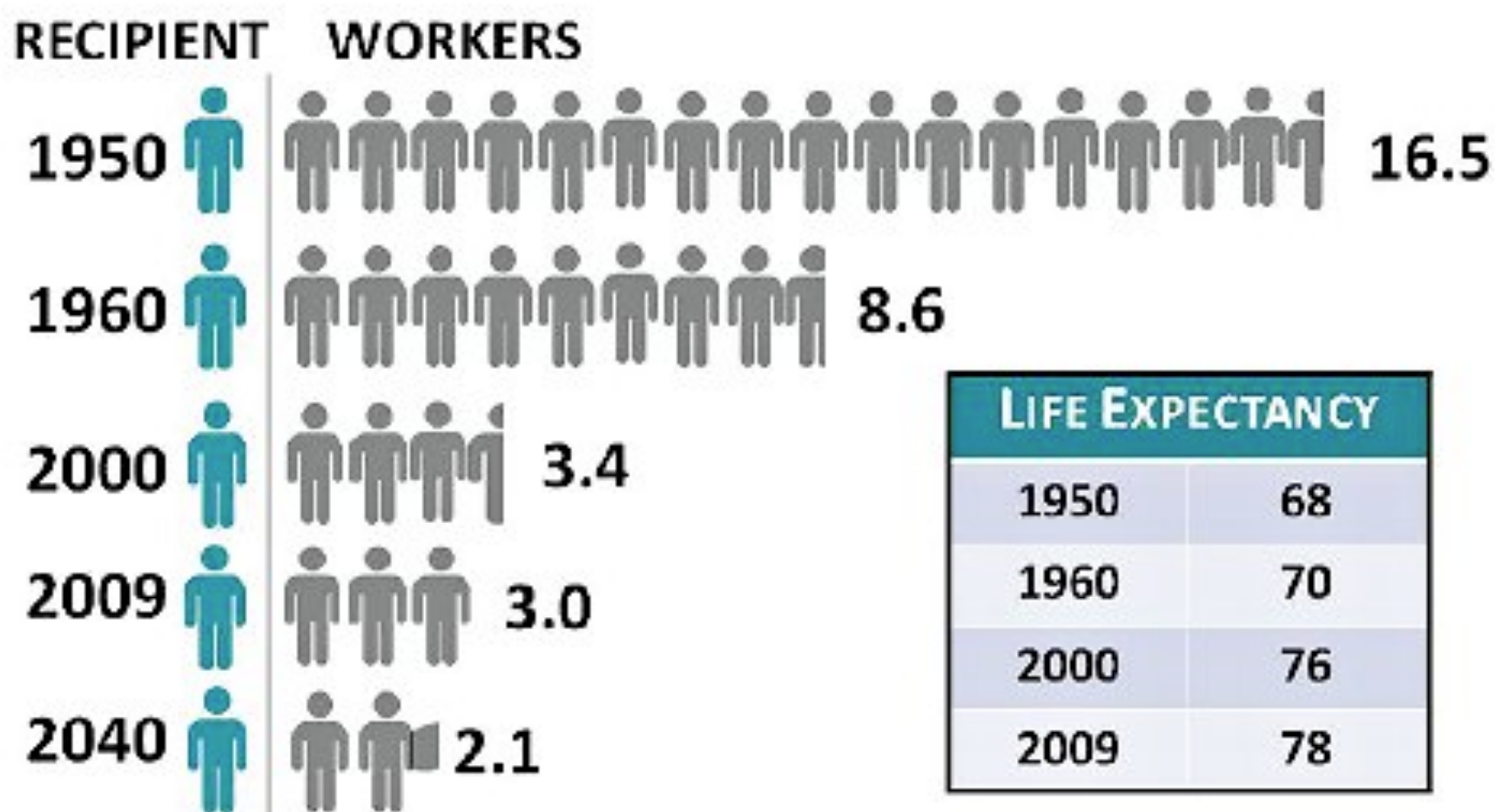
The Elements of Graphing Data (1985)

- Foundation of “Grammar of Graphics”
- Leland Wilkinson
- Preceded Tufte’s work
- Four major categories in the principles of graph construction:
 1. Clear vision
 2. Clear understanding
 3. Scales
 4. General strategy



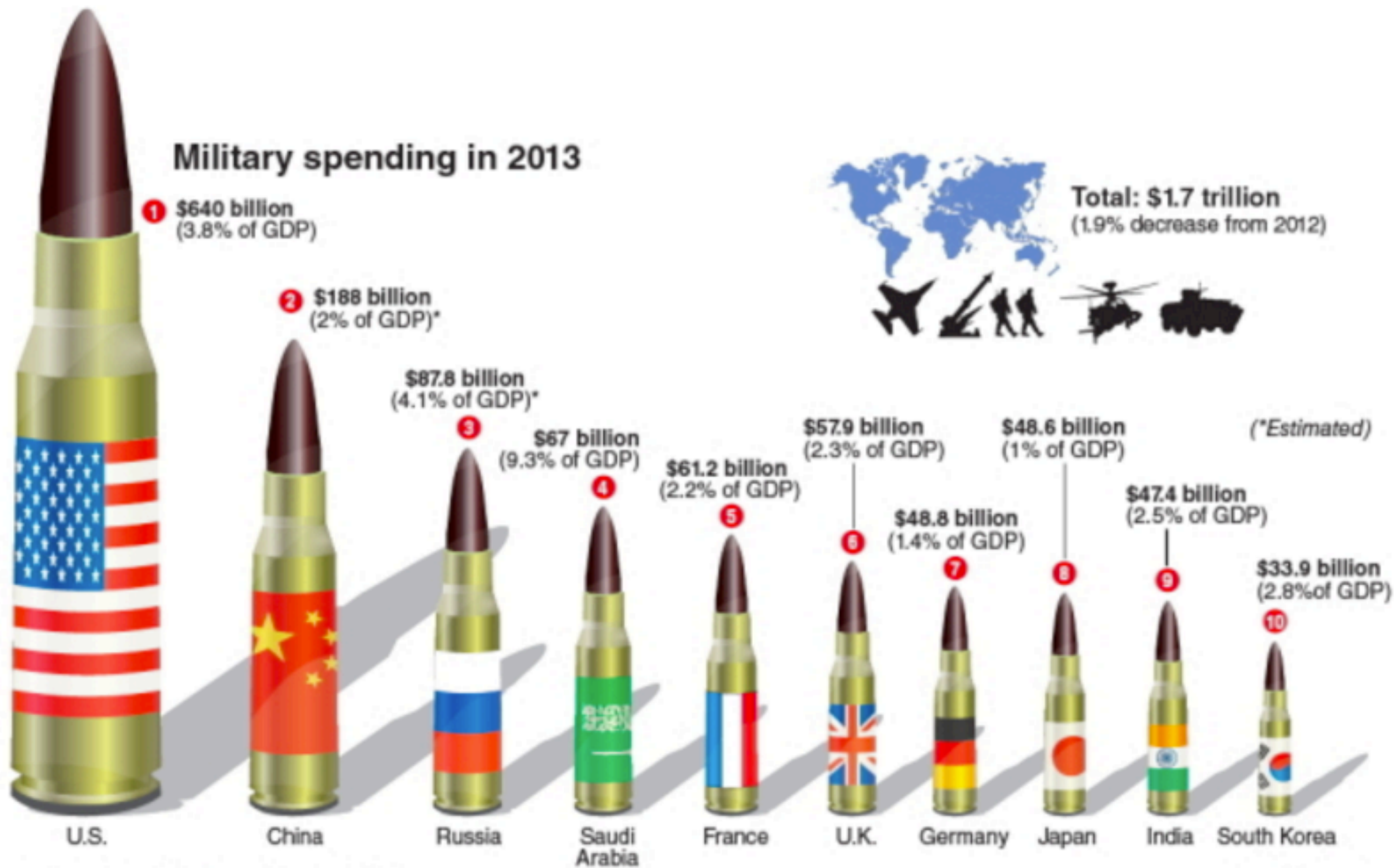
Chartjunk examples

TAXPAYERS SUPPORTING EACH SOCIAL SECURITY RECIPIENT

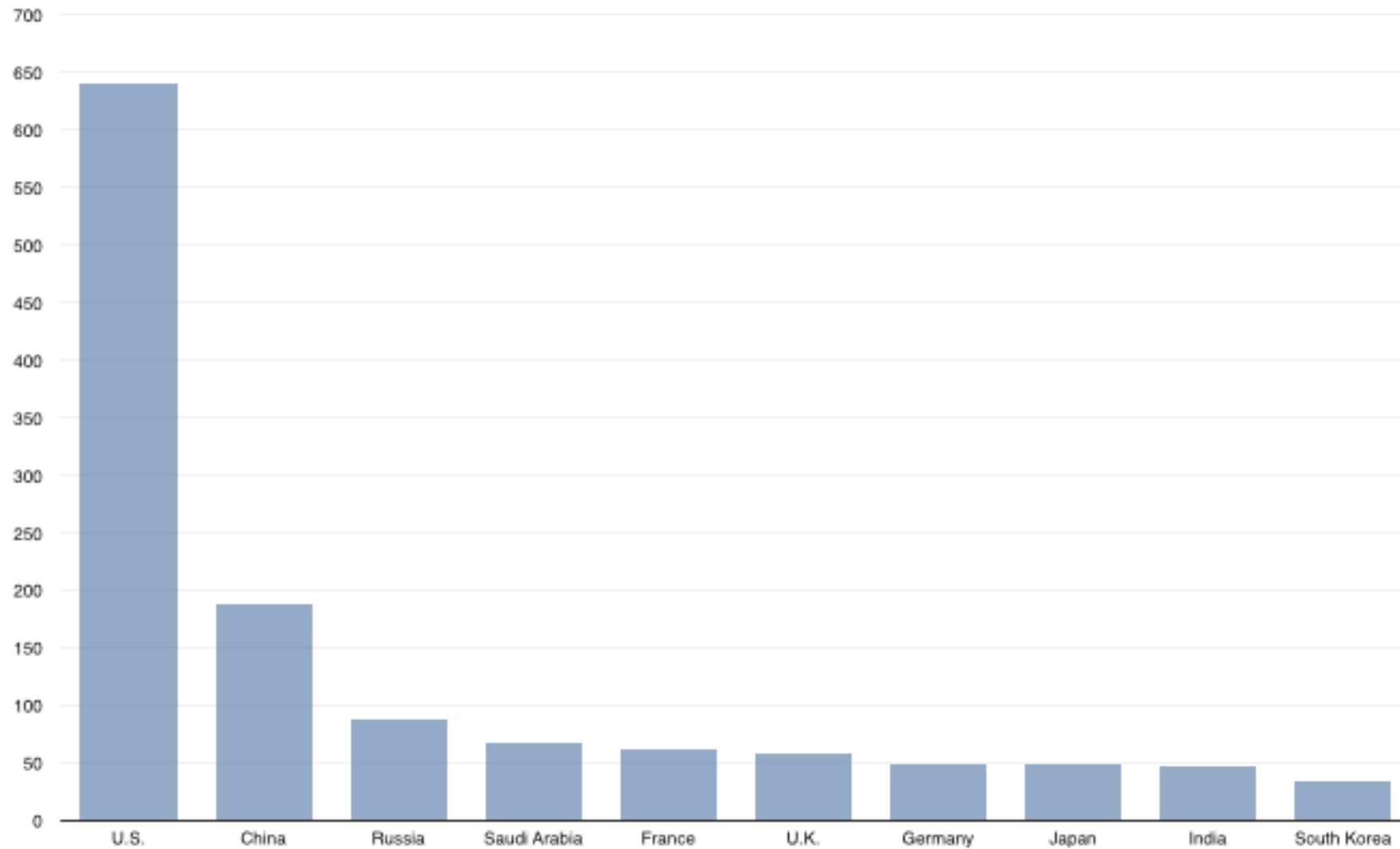


SOURCE: SOCIAL SECURITY ADMINISTRATION, *THE 2010 ANNUAL REPORT OF THE BOARD OF TRUSTEES*; CENTERS FOR DISEASE CONTROL, *U.S. LIFE TABLES*

Military spending in 2013



■ Military spending in 2013 (billion)



Militancy Considerations

Non-Violent

Violent

1400 BC

3 BC

610

622

2010

Torah

Bible

Koran

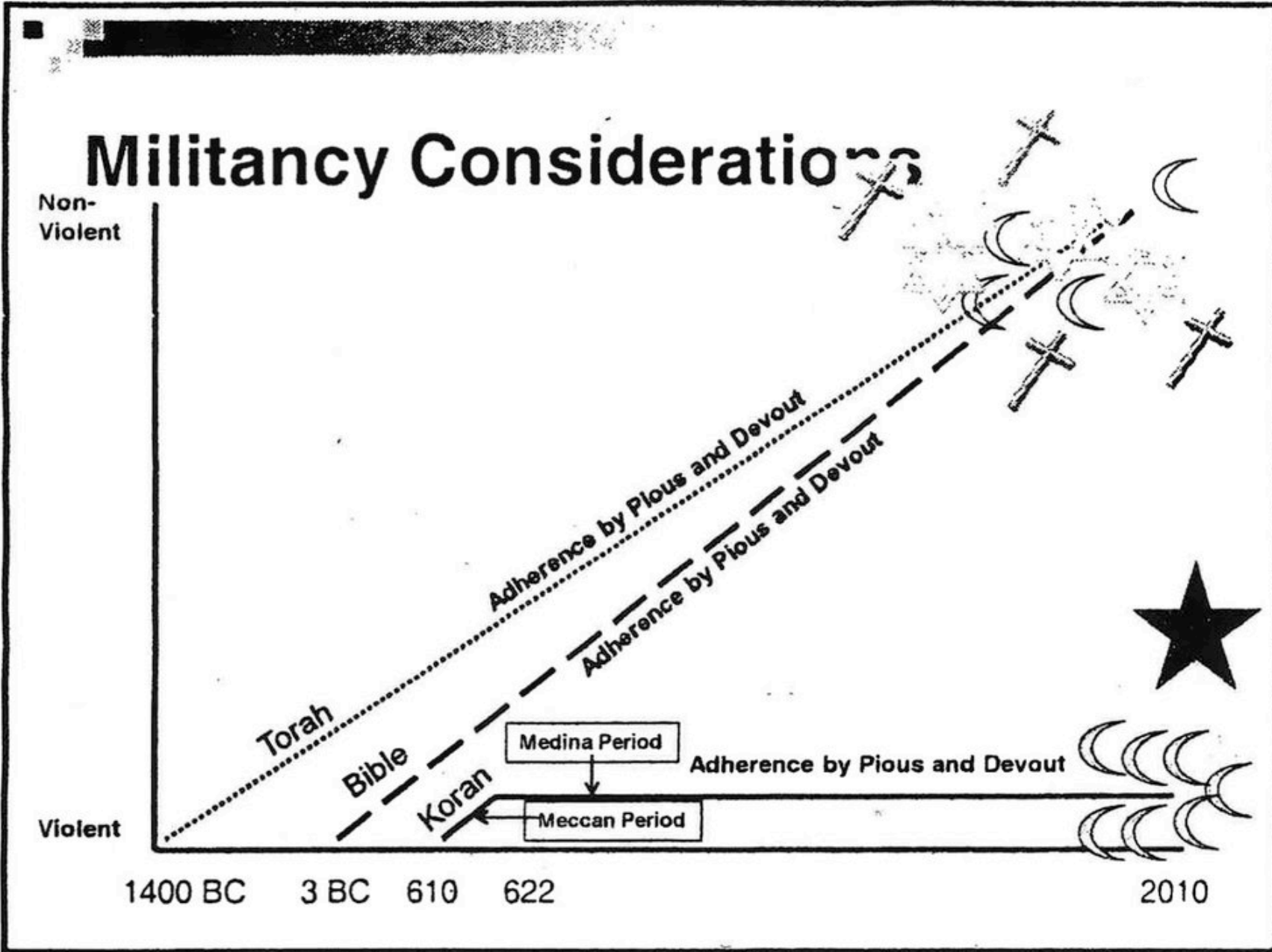
Medina Period

Meccan Period

Adherence by Pious and Devout

Adherence by Pious and Devout

Adherence by Pious and Devout



SOUTHWEST BORDER APPREHENSIONS

OCTOBER - APRIL



Source: U.S. Border Patrol

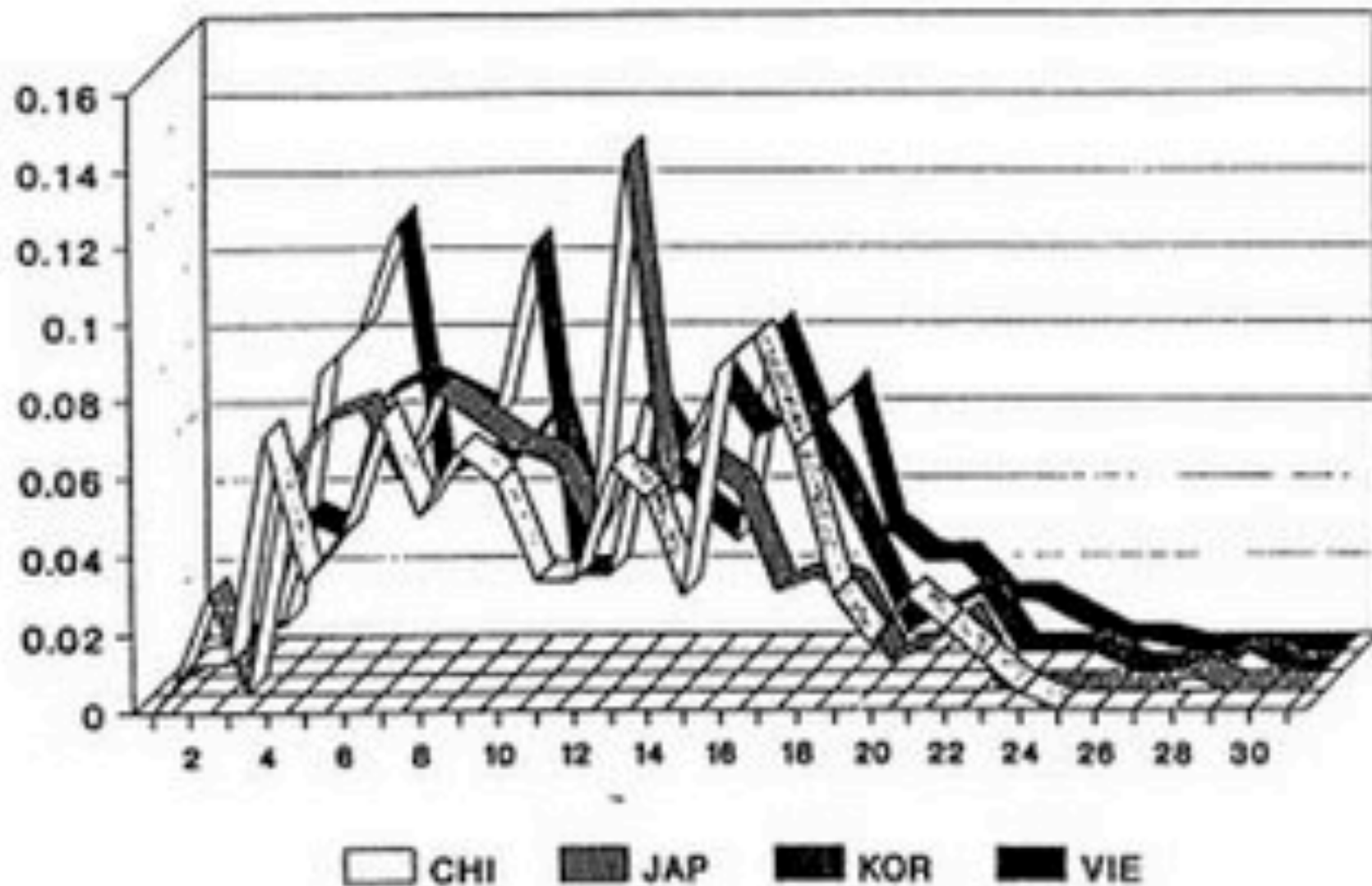
Happening
now

\$43 BIL IN FEB, DOWN 3.4% FROM JAN'S REVISED

NAS ▼ 35.18

B

**BINNED FREQUENCY DATA - D10S28
CHINESE, JAPANESE, KOREAN, VIETNAMESE**



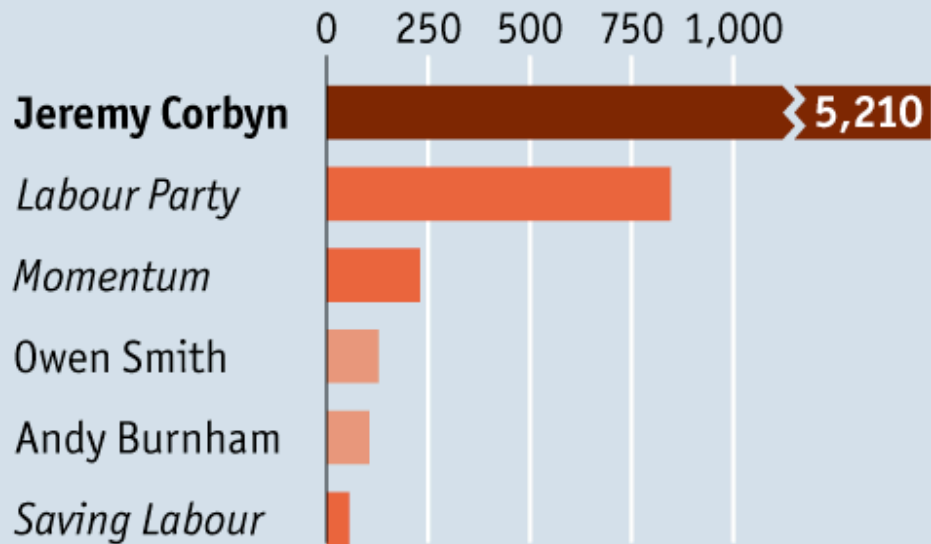
Your turn: Graphic Design Activity

1. Get into groups
2. Imagine how you would “rework” each chart/graphic from the Economist
 - Is it misleading?
 - Is it confusing?
 - What would you change?
3. Take notes
4. Once done, brainstorm a set of 3-5 “golden rules” of your own. Write them on a white board.

Original

Left-click

Average number of likes per Facebook post
2016

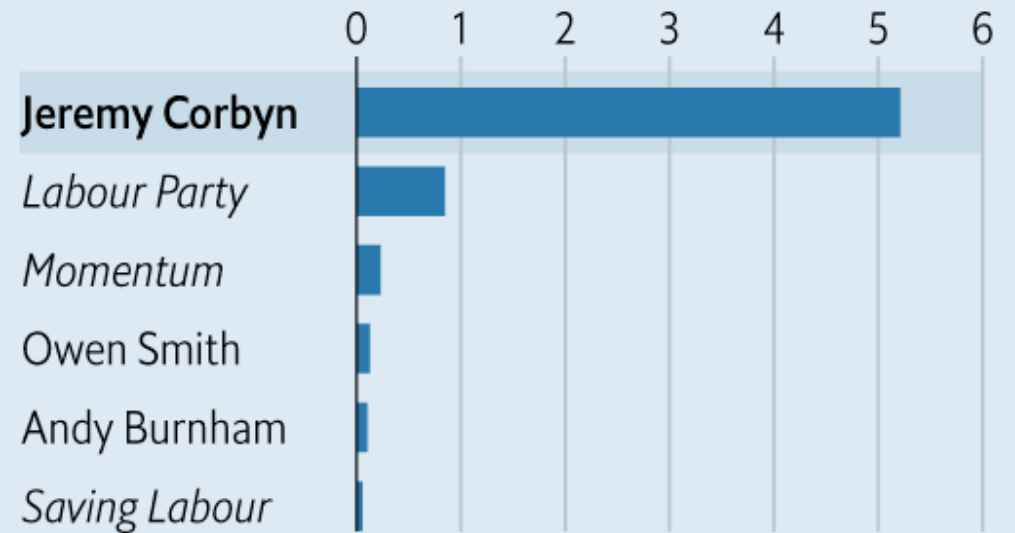


Source: Facebook

Better

Left-click

Average number of likes per Facebook post
2016, '000



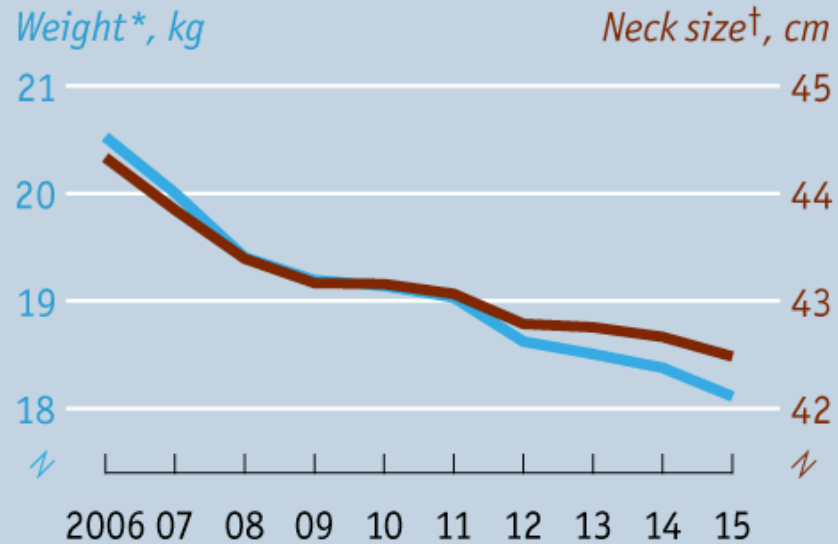
Source: Facebook

MISLEADING CHARTS (1)

Original

Fit as a butcher's dog

Characteristics of dogs registered with the UK's Kennel Club, average when fully grown



Sources: Kennel Club; *The Economist*

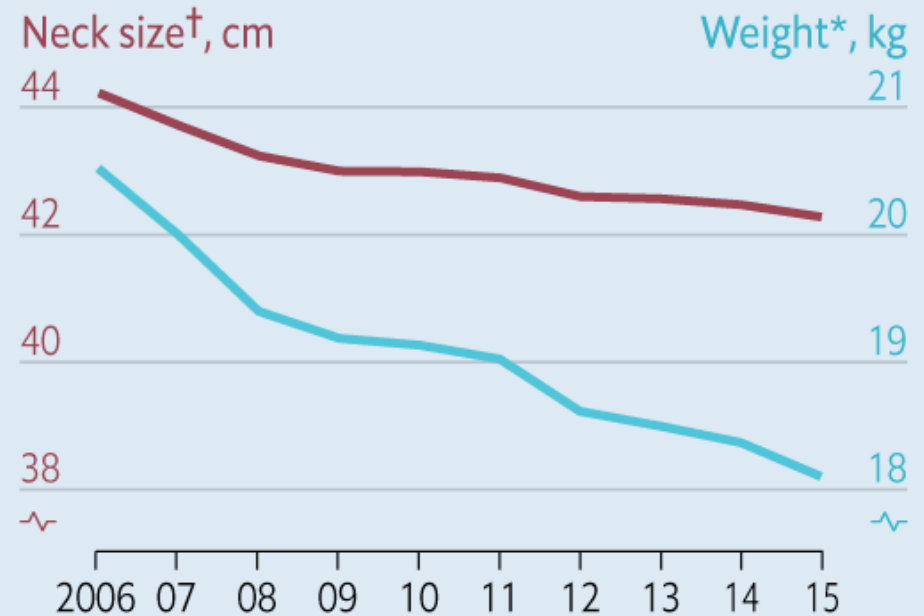
*Where at least 50 are registered per year

†Where at least 100 are registered per year

Better

Fit as a butcher's dog

Characteristics of dogs registered with the UK's Kennel Club, average when fully grown



Sources: Kennel Club; *The Economist*

*Where at least 50 are registered per year

†Where at least 100 are registered per year

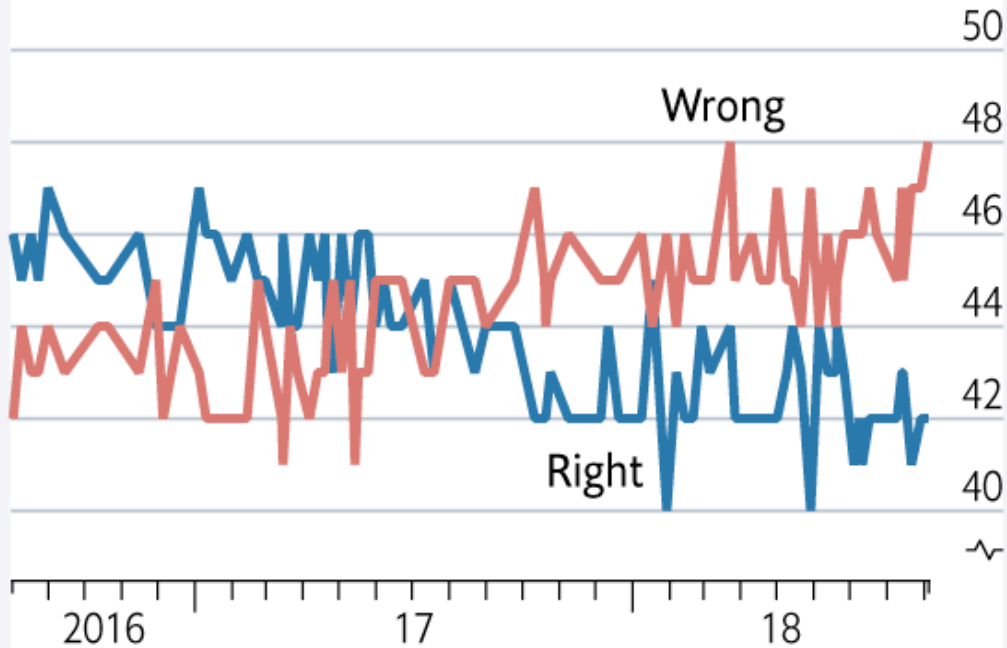
MISLEADING CHARTS (2)

Original

Bremorse

"In hindsight, do you think Britain was right or wrong to vote to leave the EU?"

% responding



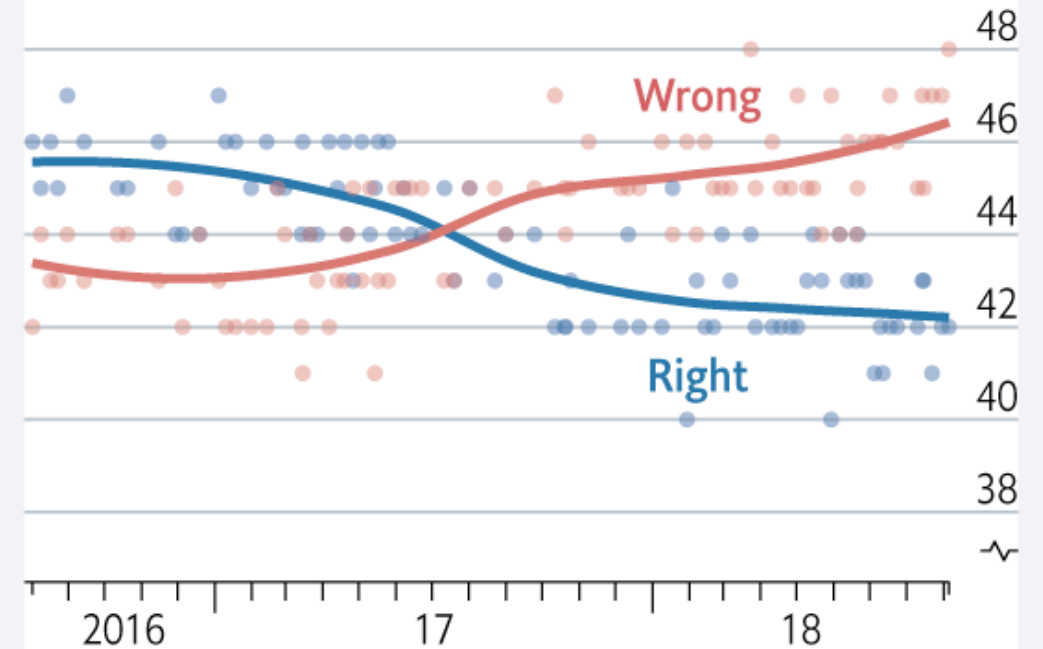
Source: NatCen Social Research

Better

Bremorse

"In hindsight, do you think Britain was right or wrong to vote to leave the EU?"

% responding



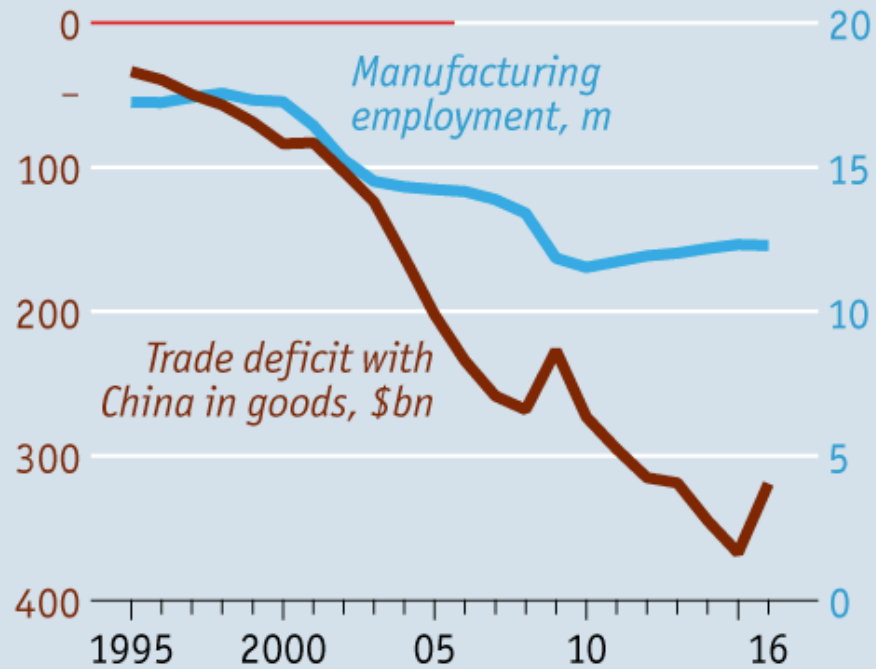
Source: NatCen Social Research

MISLEADING CHARTS (3)

Original

Free markets and free workers

United States



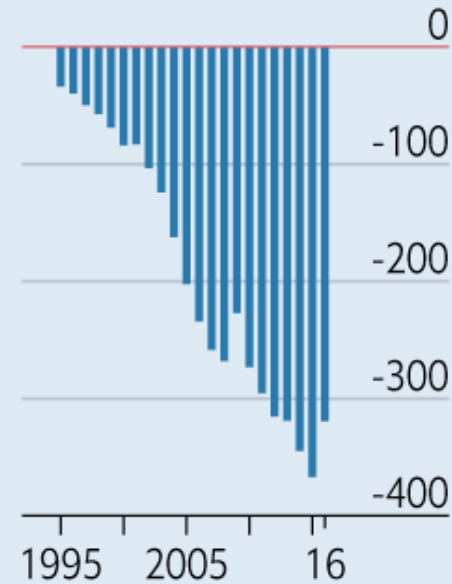
Sources: US Census Bureau; BLS

Better

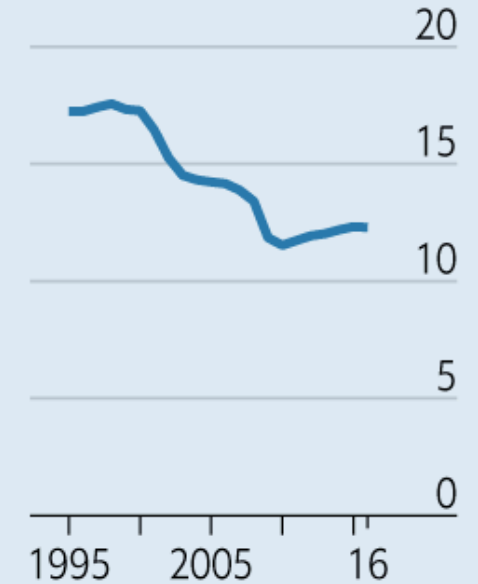
Free markets and free workers

United States

Trade deficit with
China in goods, \$bn



Manufacturing
employment, m



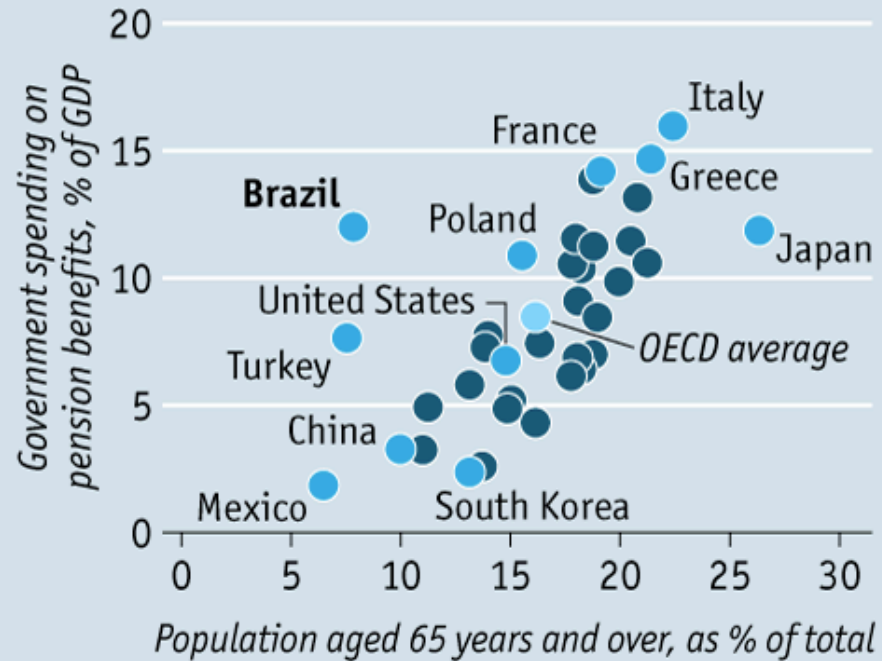
Sources: US Census Bureau; BLS

CONFUSING CHARTS (4)

Original

Brazil's golden oldie blowout

Latest available

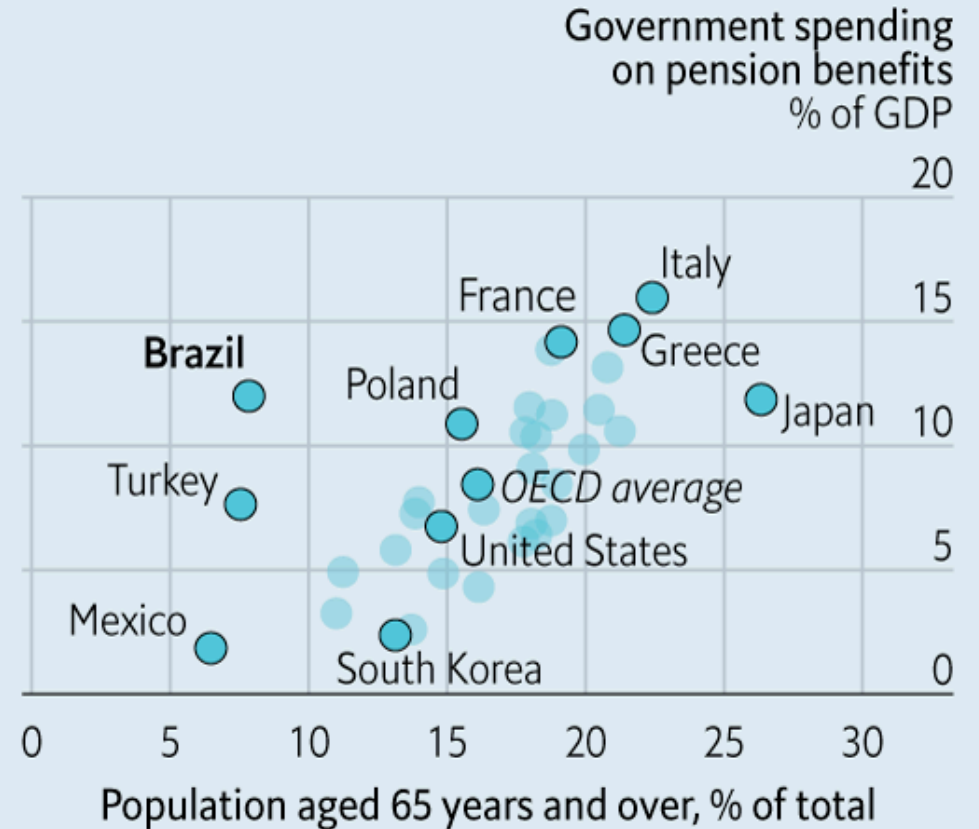


Sources: OECD; World Bank; Previdência Social

Better

Brazil's golden oldie blowout

Latest available



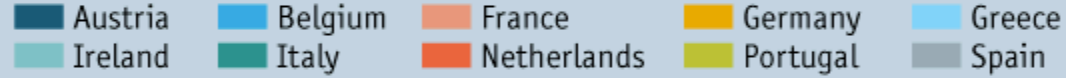
Sources: OECD; World Bank; Previdência Social

CONFUSING CHARTS (5)

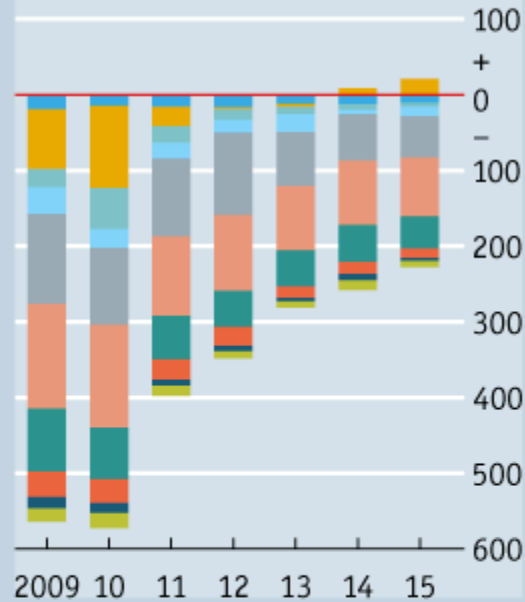
Original

Surfeit of surpluses

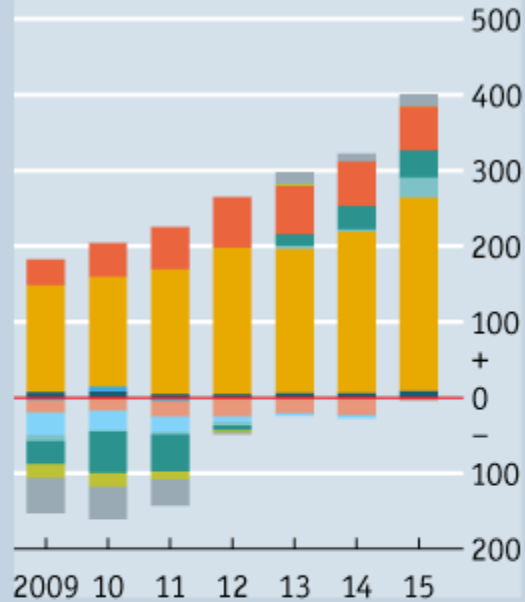
Selected euro-area countries, €bn



Budget balances



Current-account balances



Sources: Eurostat; National statistics

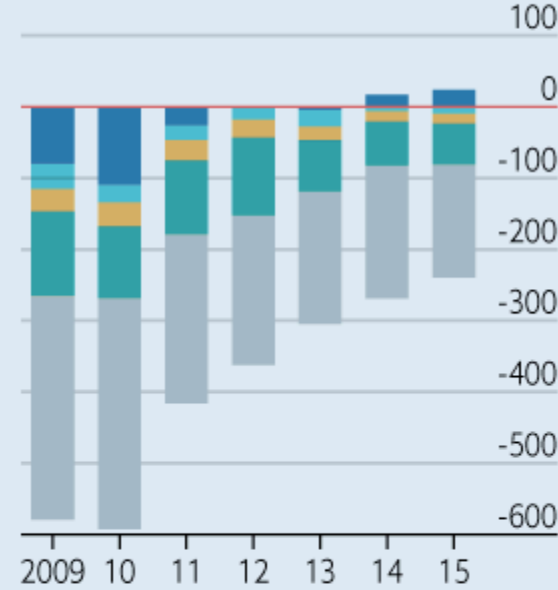
Better

Surfeit of surpluses

Euro-area, €bn

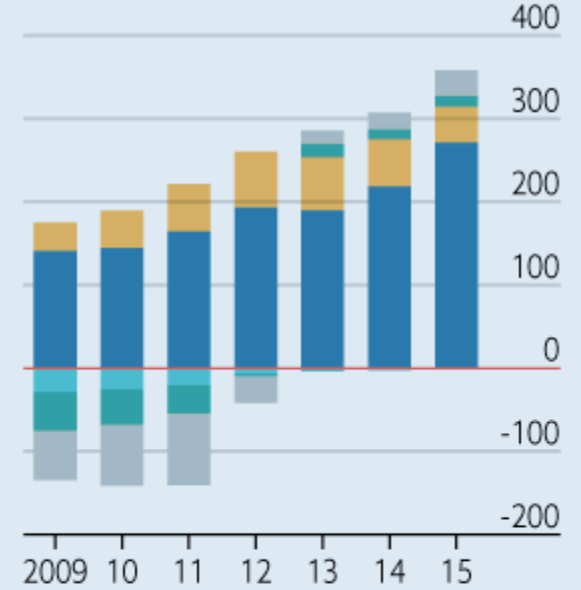


Budget balance



Source: Eurostat

Current-account balance



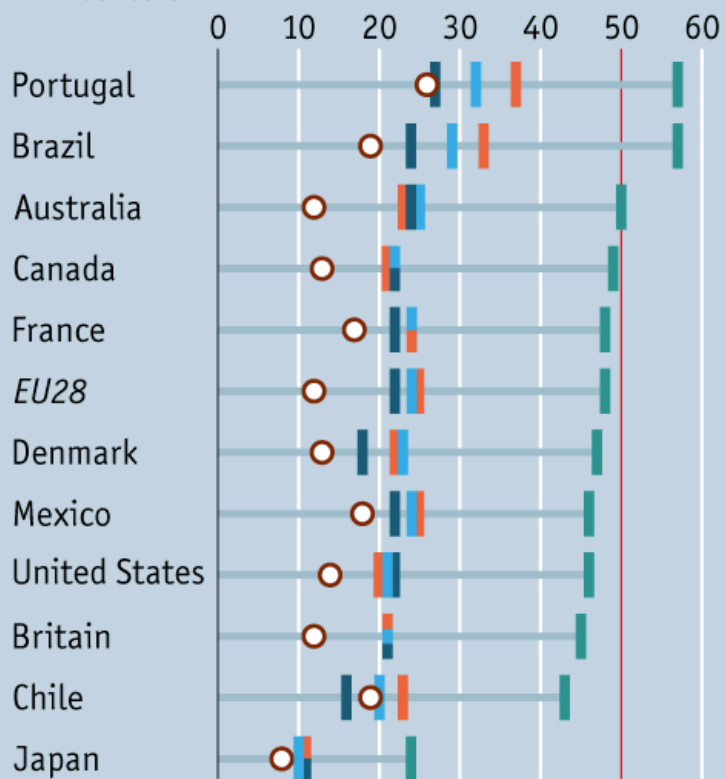
Charts that conceal their point (6)

Original

Still a man's world

Women among researchers with papers published*
2011-15, % of total, in:

■ health sciences ■ engineering
■ physical sciences ■ computer science, maths
○ Inventors†



Sources: "Gender in the Global Research Landscape" by Elsevier; *The Economist*

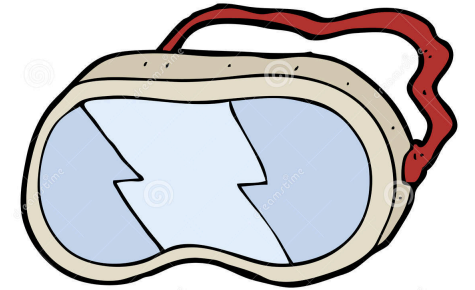
*Indexed in Scopus
†Who filed patent applications

Better



(7)

What would you program your goggles to look for?



Homework

- Posted on github in the “agenda”
- New repository structure:
 - Last name (that is in brightspace)
 - dorff-hw-repo
 - week1 = folder name
 - Week1-assign1 = assignment name