

How to lie with Graphics ?

Christophe Bontemps

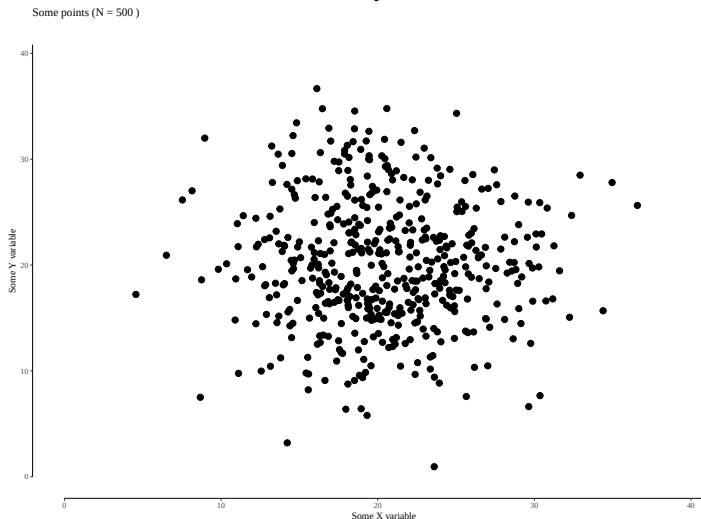
Toulouse School of Economics, INRA

 *@Xtophe_Bontemps*

15 novembre 2019

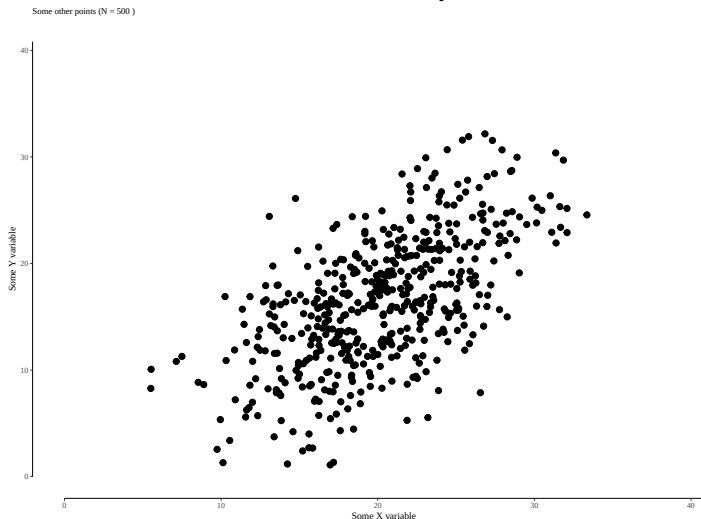
[-FOREWORD-] : WHAT'S DATA VISUALISATION ?

What do you see ?

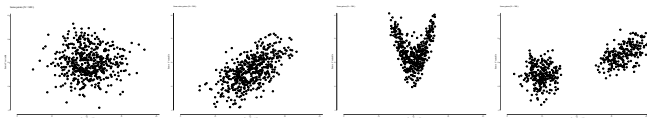


[-FOREWORD-] : WHAT'S DATA VISUALISATION ?

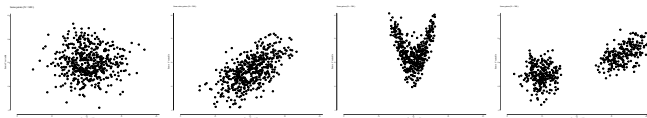
And here, what do you see ?



“DATA VISUALISATION” AS A STATISTICAL TEST

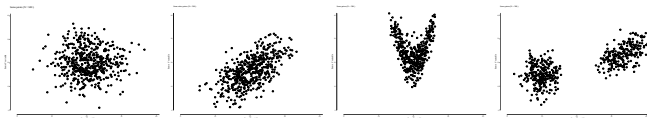


“DATA VISUALISATION” AS A STATISTICAL TEST



“ The human eye acts as a broad feature detector and general statistical test”. Buja et al. (2009)

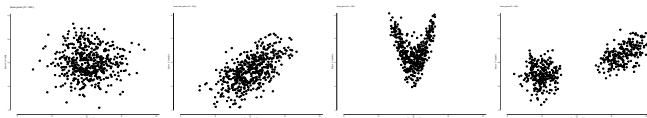
"DATA VISUALISATION" AS A STATISTICAL TEST



"The human eye acts as a broad feature detector and general statistical test". Buja et al. (2009)

Test : $H_0 : \{\text{There is "nothing" }\} = \{\text{No relation}\}$

"DATA VISUALISATION" AS A STATISTICAL TEST



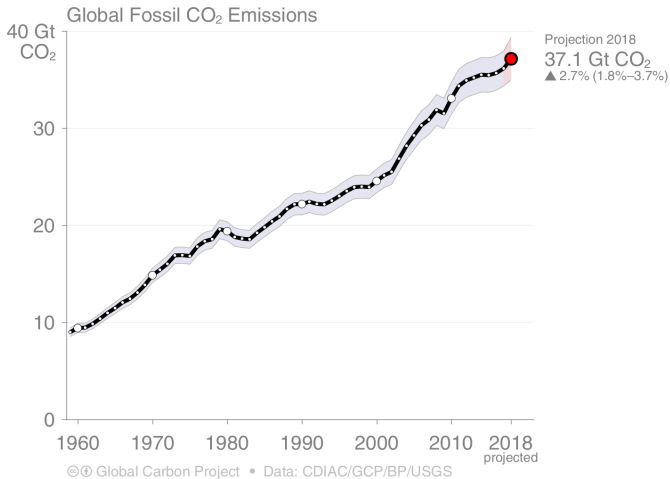
"The human eye acts as a broad feature detector and general statistical test". Buja et al. (2009)

Test : H_0 : {There is "nothing" } = {**No** relation}

H_1 : { There is "something" } = {There is **some** relation
(Correlation, linearity, heterogeneity, groups..) }

[- WHAT WE DO : -] : IMPLICIT COMPARISONS

What does this curves tells you ?

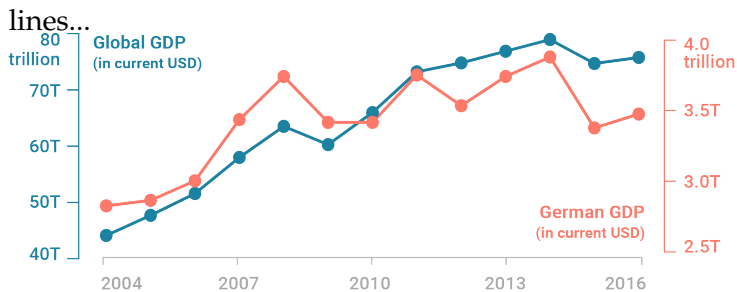


[- WHAT WE DO : -] : EXPLICIT COMPARISONS

We compare : surfaces...

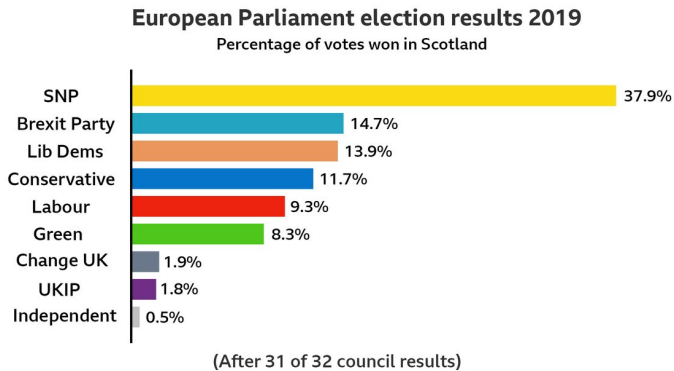


[- WHAT WE DO : -] : EXPLICIT COMPARISONS



[- WHAT WE DO : -] : EXPLICIT COMPARISONS

length...



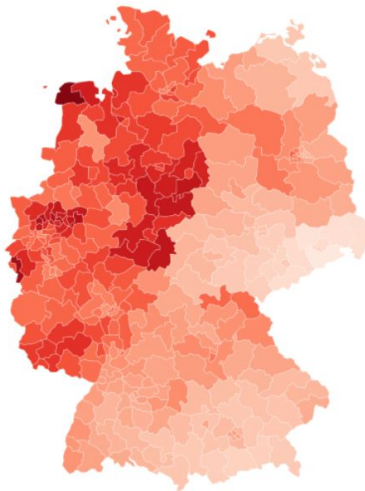
[- WHAT WE DO : -] : EXPLICIT COMPARISONS

colors...

SPD



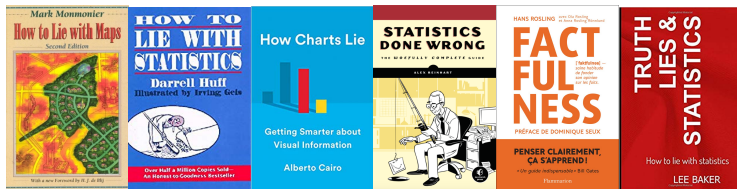
5% 40%



What if all of this was a lie ?



Should we learn to lie ? !



[- THIS TALK -]

Definition :

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“**Lie**” : What You See (on a screen)

Is **Not**

What You Have (in the data)

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Many (conflicting) “ rules” on dataviz

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Decipher graphics and identify visual lies

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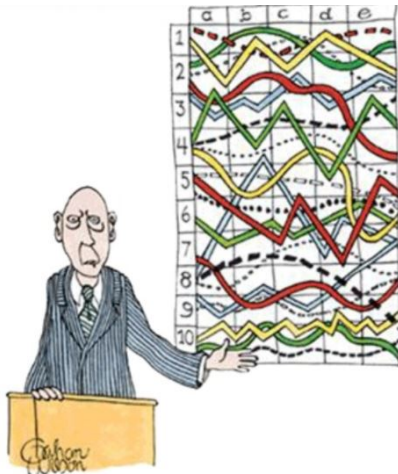
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At least, it is **fun** !

...really fun !

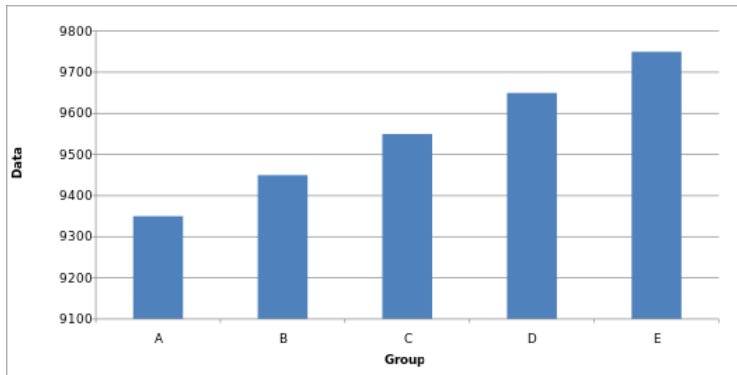
[- VISUAL LIES ! -]



**"I'll pause
for a moment
so you can let
this information
sink in."**

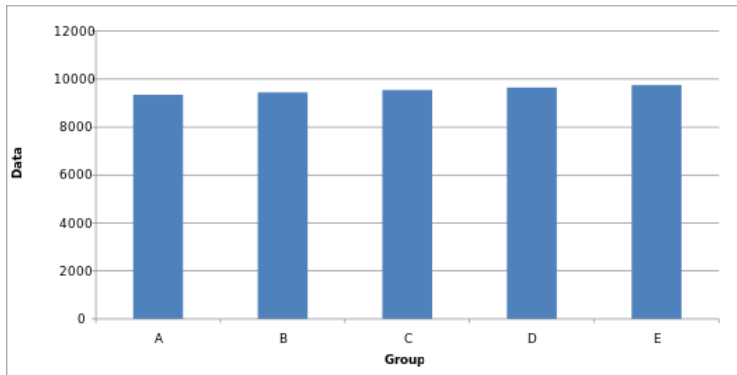
Source : New Yorker

[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS ! -]



Source : Wikipedia: Misleading graph

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Source : Wikipedia: Misleading graph

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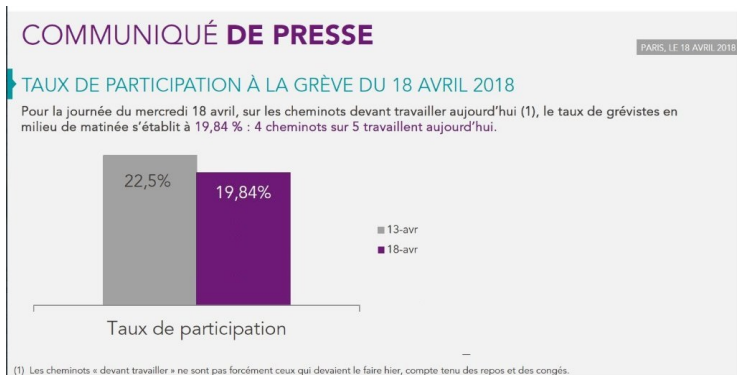
Exemple : SNCF (2018)



Source : Les Décodeurs (le Monde)

[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

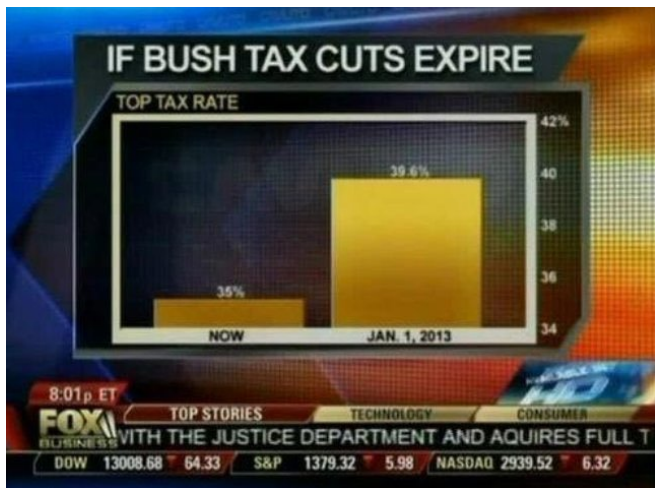
Exemple : SNCF - Corrected (2018)



Source : Les Décodeurs (le Monde)

[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

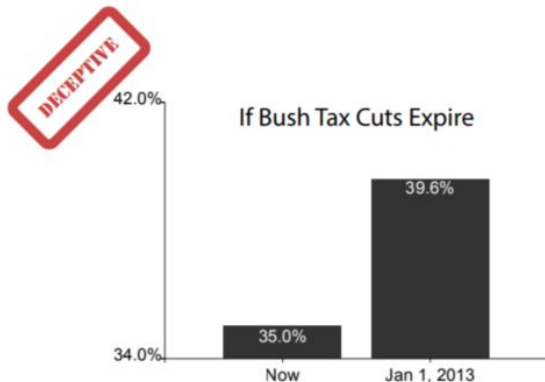
Example : Fox news



Source : Techna Verba Scripta

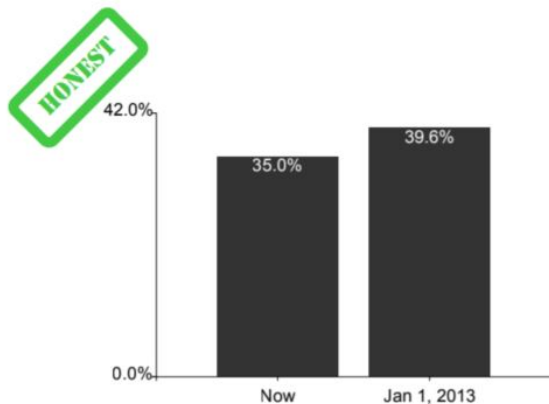
[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

So this is bad :



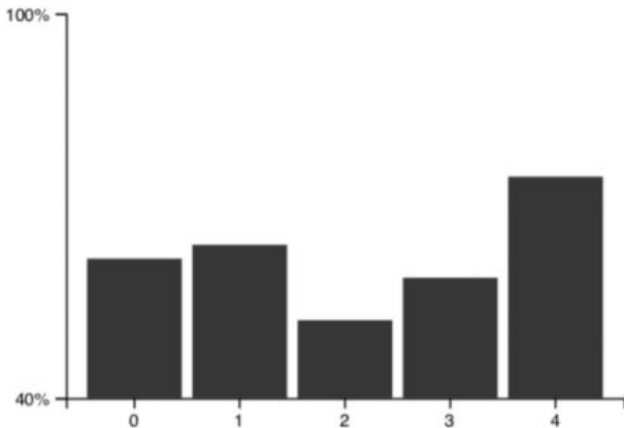
[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

This is good :



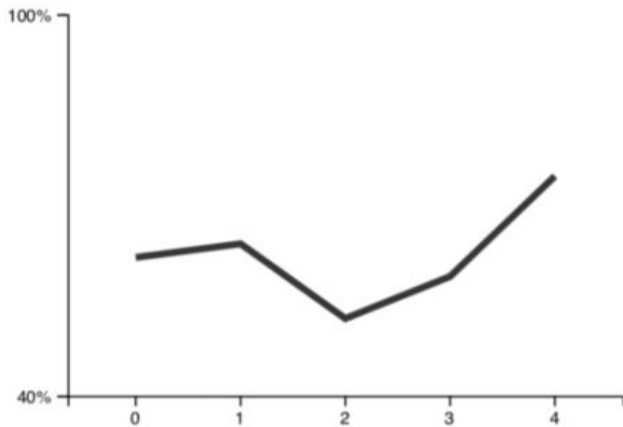
[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

Bad :



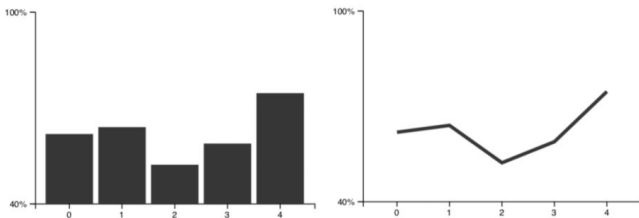
[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

Bad or good ?



[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

Correll et al. (2019) show empirically that there is
“ no robust difference in the impact of truncation on bar charts and line charts : truncation serves to exaggerate effect sizes in both types of graphs.”

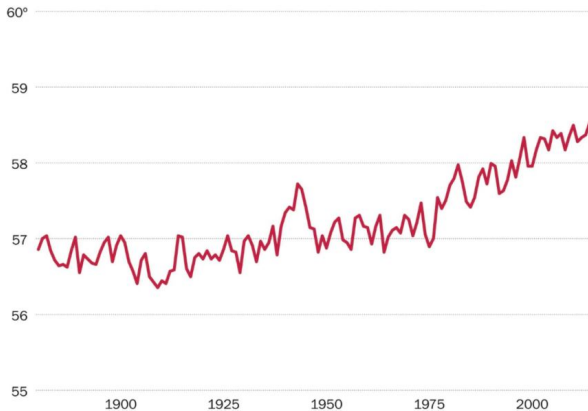


[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

Bad ?

Average global temperature by year

Data from NASA/GISS.



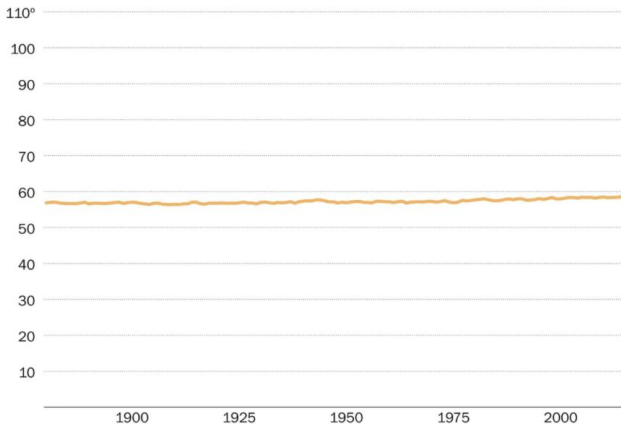
Washington Post (December, 2015)

[-RULE #1 : USE DEVILISH (TRUNCATED) AXIS !-]

Good ?

Average global temperature by year, 50x scale

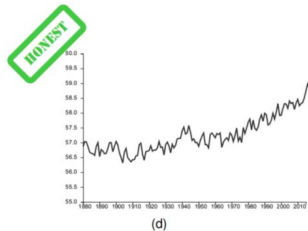
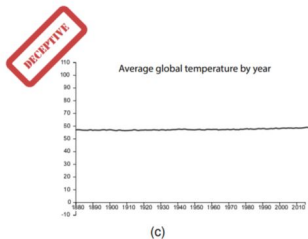
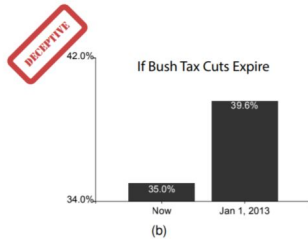
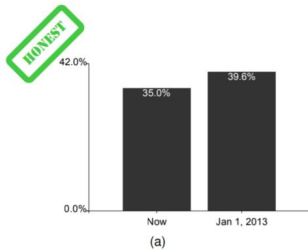
Data from NASA/GISS.



Washington Post, reproducing National Review (December, 2015)

[-RULE #0 : LYING IS EASY! -]

Ruling is hard !



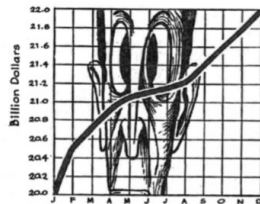
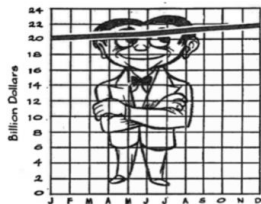
[-RULE #0 : LYING IS EASY! -]

Discussing it is easy :

see Cairo (2019), Correll et al. (2019), Allen and Erhardt (2016), Isenberg et al. (2011), Kelleher and Wagener (2011), Tufte (2001), Cleveland et al. (1982) ...

[-RULE #0 : LYING IS EASY! -]

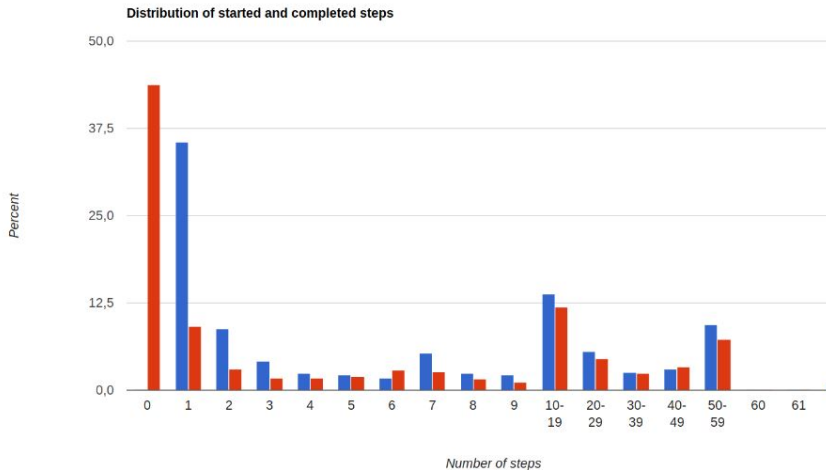
So **lying** is easy :



From Huff (1993)

[-RULE #0 : LYING IS EASY! -]

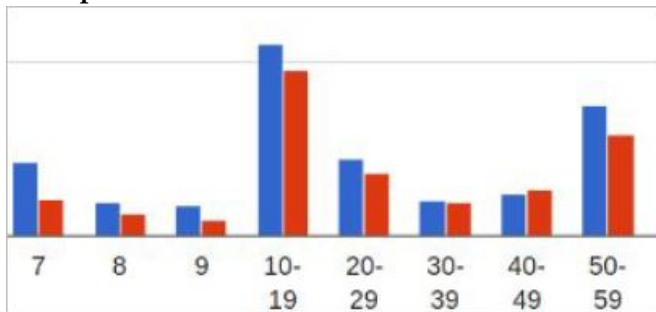
Examples are common !



My 2017' students (Jan & Mohamed), but also recent researchers' presentations

[-RULE #0 : LYING IS EASY! -]

Examples are common !

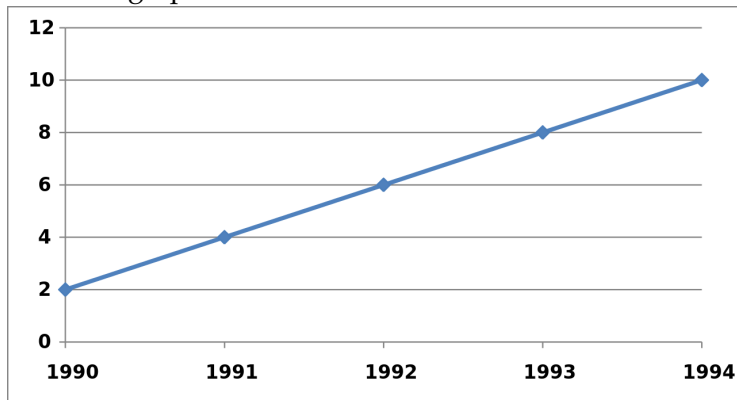


Source :

My 2017' students (Jan & Mohamed), but also recent researchers' presentations

[-RULE #2-BIS : PLAY WITH SCALES !-]

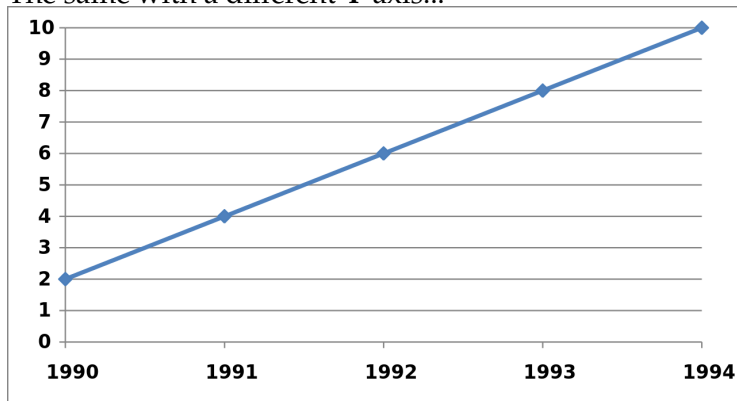
Here is a graphic



Source : Wikipedia: Misleading graph

[-RULE #2-BIS : PLAY WITH SCALES !-]

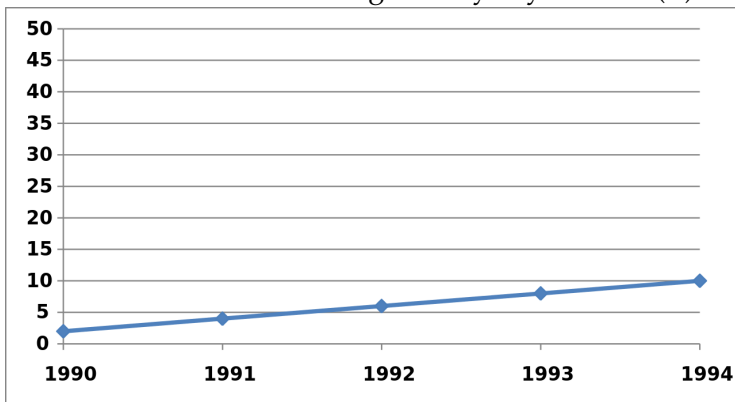
The same with a different Y-axis...



Source : Wikipedia: Misleading graph

[-RULE #2-BIS : PLAY WITH SCALES !-]

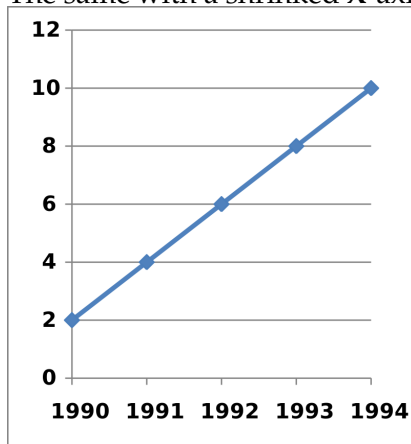
The same with a Y-axis that goes way beyond max(Y)...



Source : Wikipedia: Misleading graph

[-RULE #2-BIS : PLAY WITH SCALES !-]

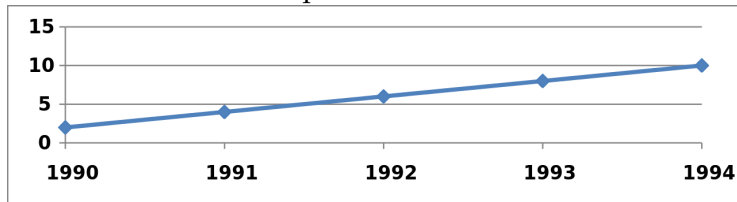
The same with a shrunk X-axis



Source : Wikipedia: Misleading graph

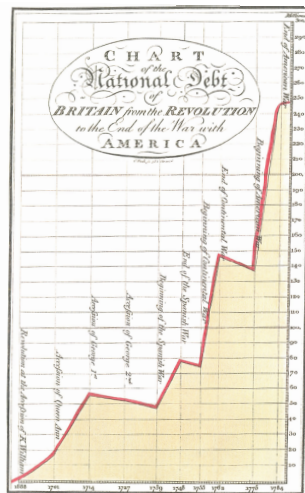
[-RULE #2-BIS : PLAY WITH SCALES !-]

The same with a widespread X-axis and a short Y-axis



Source : Wikipedia: Misleading graph

[-RULE #2-BIS : EXAMPLE-]



The Divisions at the Bottom are Years, & those on the Right hand Money.

FIGURE – Source : Tufte (2001) from Playfair(1786).

[-RULE #2-BIS : EXAMPLE-]

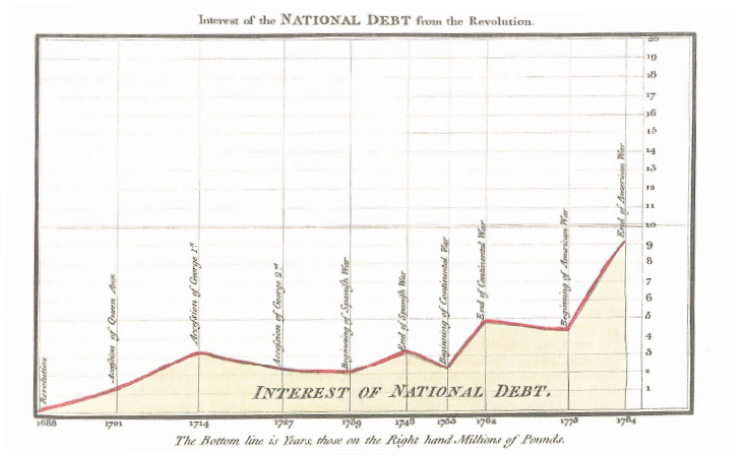
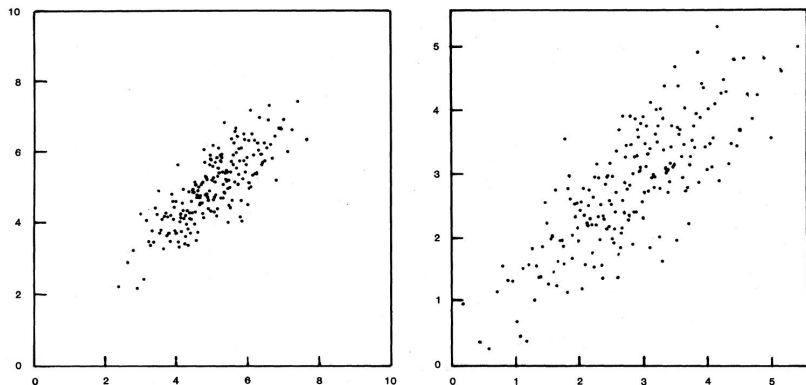


FIGURE – Source : Tufte (2001) from Playfair(1786).

[-RULE #2-BIS : SUBTLE THINGS...!-]

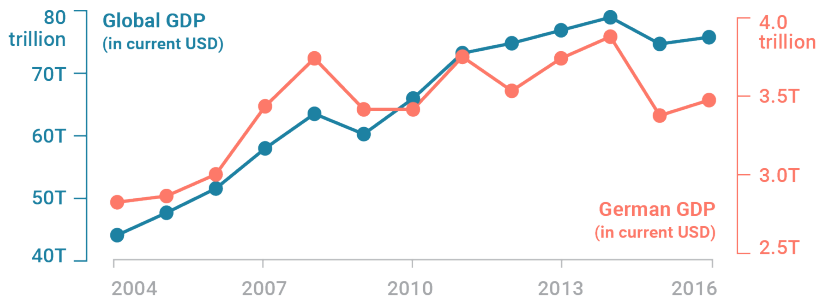
Which sample has the highest correlation?



From Cleveland et al. (1982)

[- RULE #3 : USE DOUBLE AXES ! -]

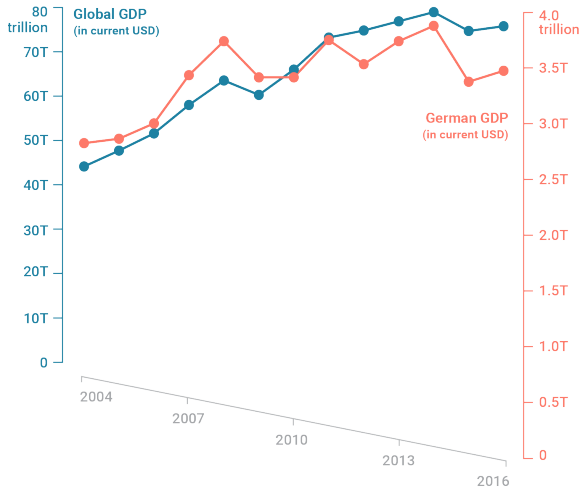
An apparently harmless example :



Source : Lisa Charlotte Rost, data from World bank

[- RULE #3 : USE DOUBLE AXES ! -]

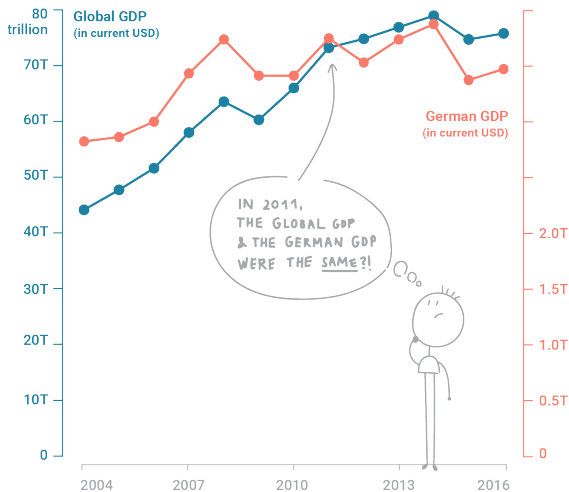
Zero baseline are not aligned !



Source : Lisa Charlotte Rost, data from World bank

[- RULE #3 : USE DOUBLE AXES ! -]

Does aligned zero baselines solve the problem ?



Source : Lisa Charlotte Rost, data from World bank

[- RULE #3 : USE DOUBLE AXES! -]

When playing with scales, anything may happen...



Orange steady,
Blue massively increasing.



Blue steady,
Orange increasing.



Both started at the same
level, but Orange increased
far more than Blue.



Both started at the same
level, but Blue increased far
more than Orange.



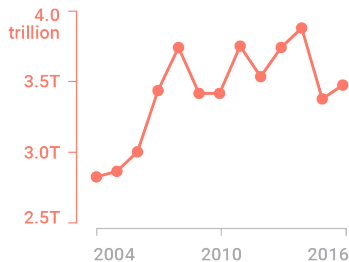
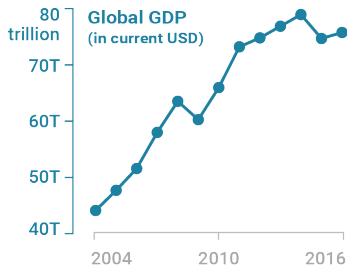
Both started with the
same increase, then Blue
raced to the top.



Both steady.

[- RULE #3 : USE DOUBLE AXES ! -]

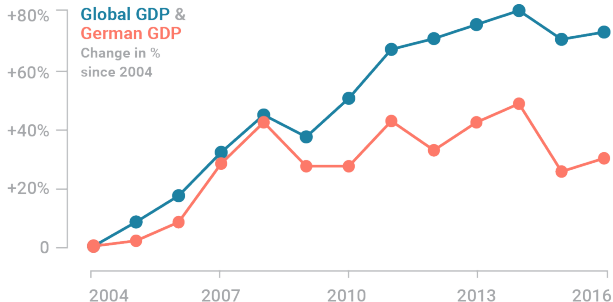
Solution 1 : Two graphs



Source : Lisa Charlotte Rost, data from World bank

[- RULE #3 : USE DOUBLE AXES ! -]

Solution : Indexes



The German GDP and the global GDP **are not** growing at the same rate since 2008 !

Source : Lisa Charlotte Rost, data from World bank

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Senile dementia

Age Adjusted Deaths from Senile Dementia
(ICD F01, F03 & 290)

Plotted against glyphosate use on corn & soy
($R = 0.9942$, $p < 1.822e-09$)

Sources: USDA:NASS; CDC

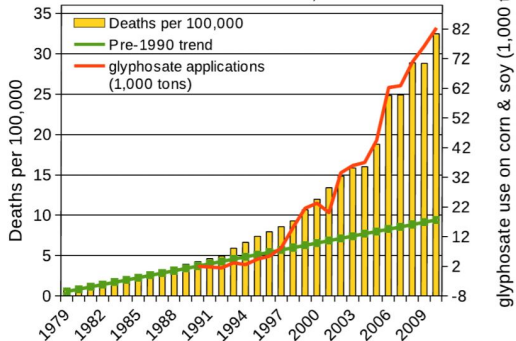


Figure 24. Correlation between age-adjusted dementia deaths and glyphosate applications.

Source : Calling Bullshit- Original paper Swanson et al. Journal of Organic System (2014)

[- RULE #3 : EXAMPLES -]

Glyphosate vs Thyroid

Thyroid Cancer Incidence Rate (age adjusted)

plotted against glyphosate applied to U.S. corn & soy ($R = 0.988$, $p \leq 7.612e-09$)
 along with %GE corn & soy crops $R = 0.9377$, $p \leq 2.152e-05$
 sources: USDA:NASS; SEER

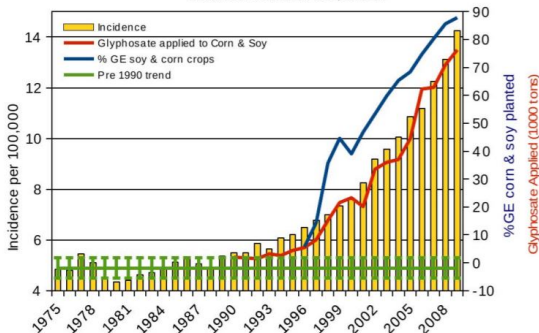


Figure 10. Correlation between age-adjusted thyroid cancer incidence and glyphosate applications and percentage of US corn and soy crops that are GE.

Source : Calling Bullshit- Original paper Swanson et al. Journal of Organic System (2014)

[- RULE #3 : EXAMPLES -]

Glyphosate vs Parkinson

Age Adjusted Deaths from Parkinson's disease
(ICD G20 & 332.0)

plotted against glyphosate use on corn & soy ($R = 0.8754$, $p \leq 1.631e-06$)
and percent GE corn & soy planted ($R = 0.9516$, $p \leq 5.398e-06$)
sources: USDA:NASS; CDC

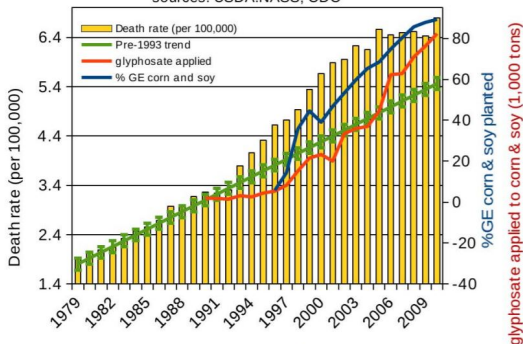


Figure 26. Correlation between age-adjusted Parkinson's disease deaths and glyphosate applications and percentage of US corn and soy crops that are GE.

Source : Calling Bullshit- Original paper Swanson et al. Journal of Organic System (2014)

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Diabetes

Annual Incidence of Diabetes (age adjusted)

plotted against %GE corn & soy crops planted ($R = 0.9547$, $p < 1.978e-06$)
 along with glyphosate applied to corn & soy in US ($R = 0.935$, $p < 8.303e-08$)
 sources: USDA:NASS; CDC

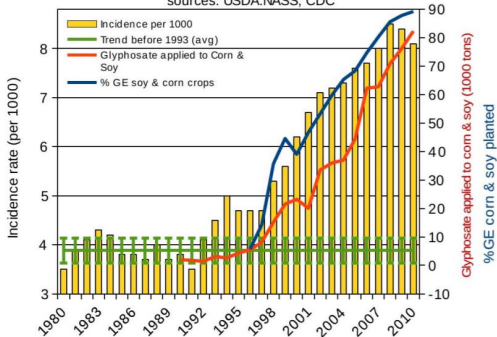


Figure 14. Correlation between age-adjusted diabetes incidence and glyphosate applications and percentage of US corn and soy crops that are GE.

Source : Calling Bullshit- Original paper Swanson et al. Journal of Organic System (2014)

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Strokes

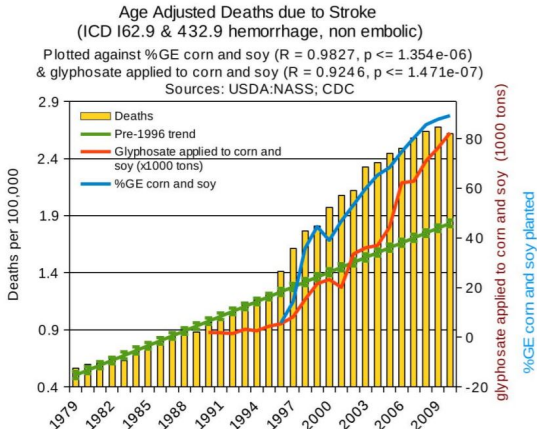


Figure 12. Correlation between age-adjusted hemorrhagic stroke deaths and glyphosate applications and percentage of US corn and soy crops that are GE.

Source : Calling Bullshit- Original paper Swanson et al. Journal of Organic System (2014)

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Hypertension

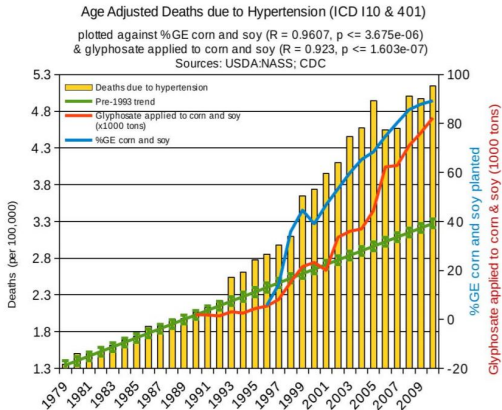


Figure 11. Correlation between age-adjusted hypertension deaths and glyphosate applications and percentage of US corn and soy crops that are GE.

Source : Calling Bullshit- Original paper Swanson et al. Journal of Organic System (2014)

[- RULE #3 : EXAMPLES IN ECONOMICS -]

Assets *vs* Working Time

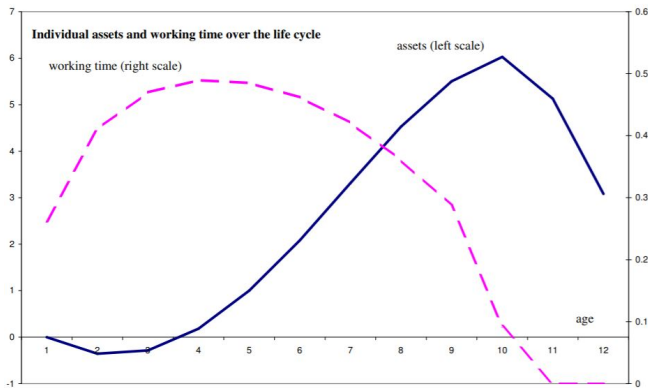


Figure 8. Life-cycle in the benchmark equilibrium.

Source : Mateos-Planas (2010) - **AER!**

[- RULE #3 : EXAMPLES IN ECONOMICS -]

Capital *vs* Income tax rate

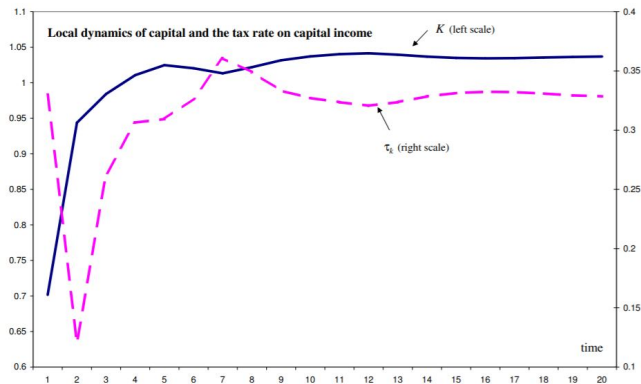
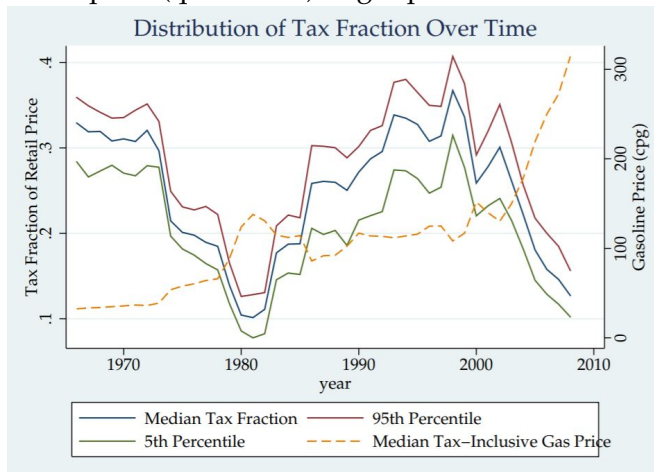


Figure 9. Dynamic adjustment to a fall in assets.

Source : Mateos-Planas (2010) - AER!

[- RULE #3 : EXAMPLES IN ECONOMICS -]

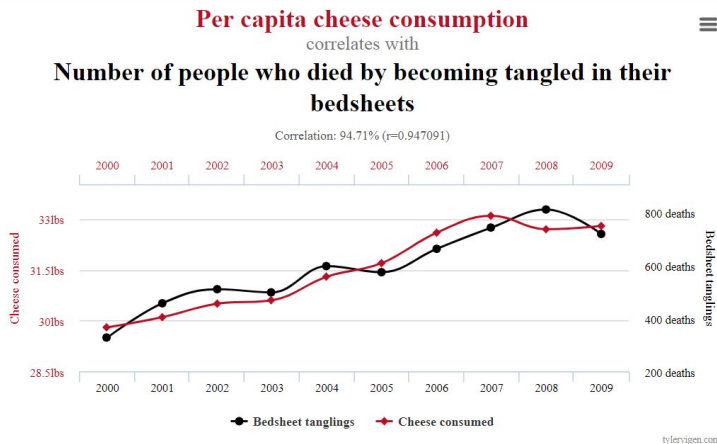
Retail price (quantiles?) *vs* gas price



Source : Li et al. (2014) - AEA-Eco. Pol.!

[- RULE #3 : EXAMPLES IN ECONOMICS -]

Nearly as funny :



Data sources: U.S. Department of Agriculture and Centers for Disease Control & Prevention

Source : Vigen (2015) - **Spurious Correlations**

[-RULE #4 : SELECT YOUR SCOPE -]

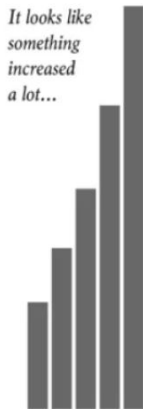


FIGURE – Are you looking at the right thing ?

[-RULE #4 : SELECT YOUR SCOPE-]

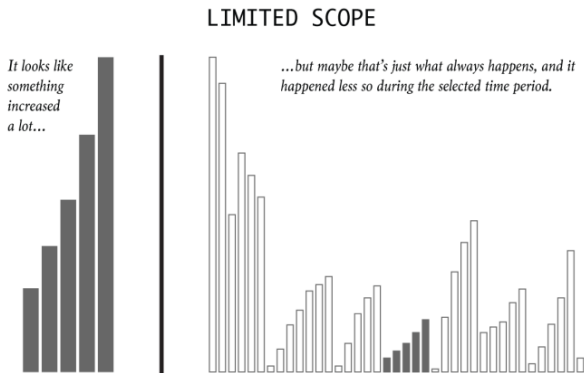


FIGURE – Cherry picking ?

Source : Flowing data

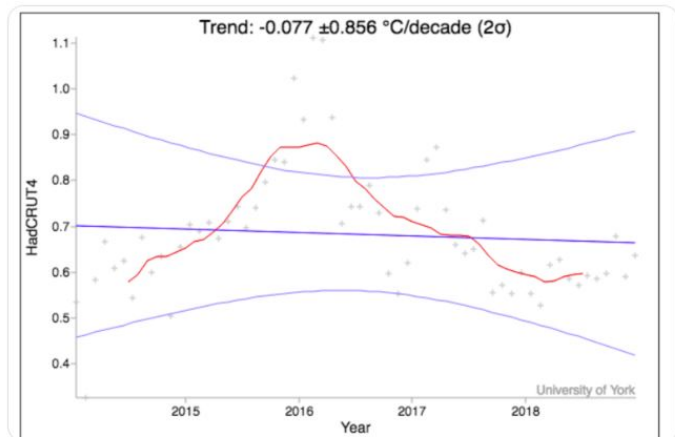
[-RULE #4 : EXAMPLE-]



GWPF

@thegwpfcom

Ignore climate hysteria & look at the facts: Global temperature has been falling for the last 3 years.



[-RULE #4 : EXAMPLE-]

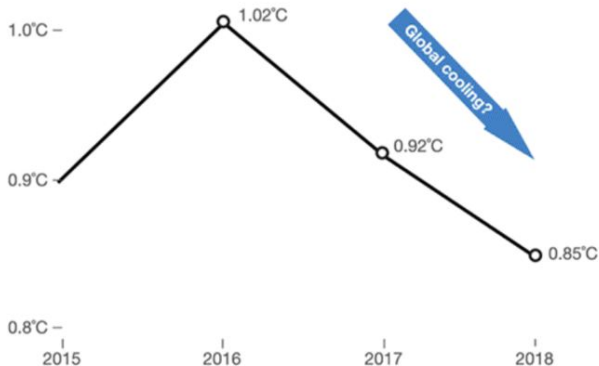


FIGURE – Cherry picking !

Source : "Nope, Earth Isn't Cooling". NASA, 2019.

[-RULE #4 : EXAMPLE-]

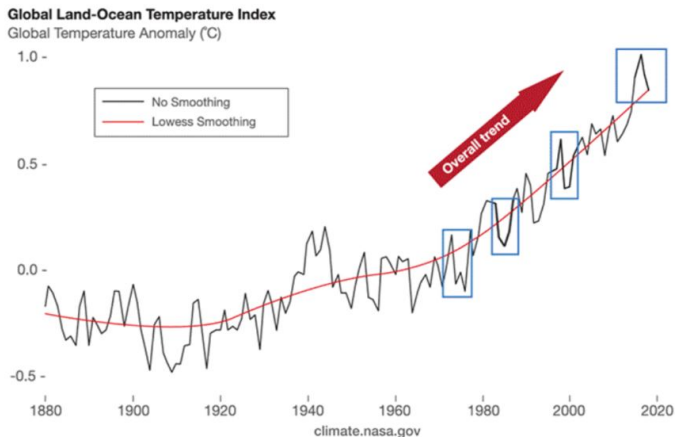
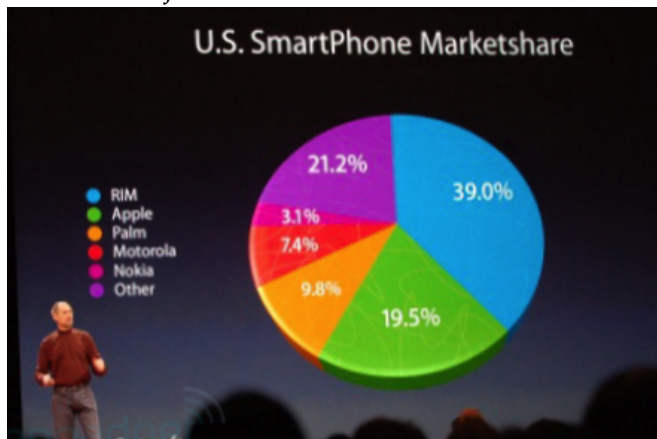


FIGURE – Cherry picking !

Source : "Nope, Earth Isn't Cooling". NASA, 2019.

[- RULE #5 : USE 3D PIE CHARTS -]

Do as Steve Jobs !

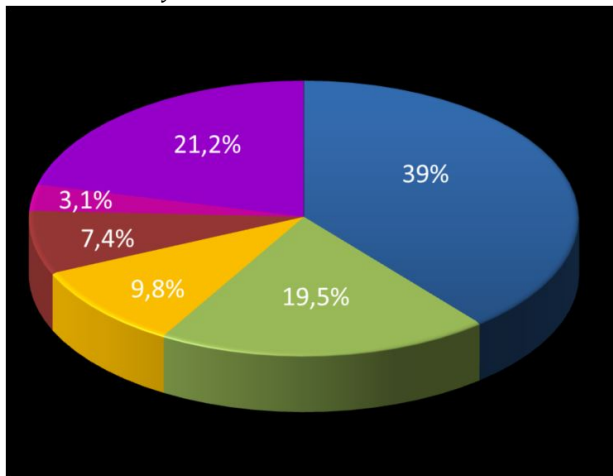


Source

(Macworld 2008 keynote lecture)

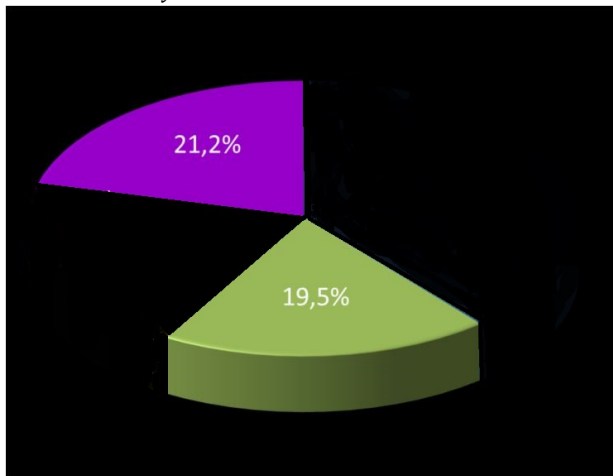
[- RULE #5 : USE 3D PIE CHARTS -]

Do as Steve Jobs !



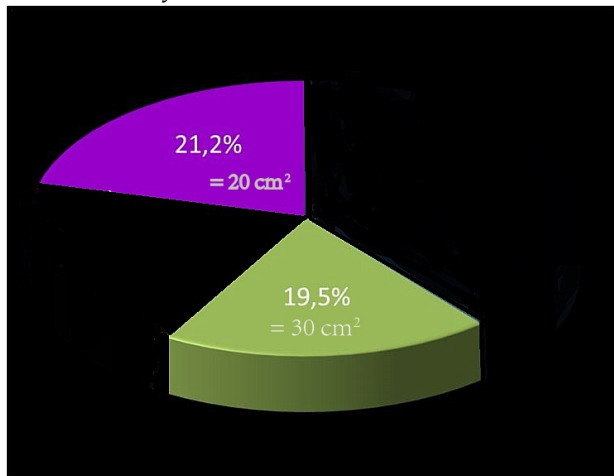
[- RULE #5 : USE 3D PIE CHARTS -]

Do as Steve Jobs !

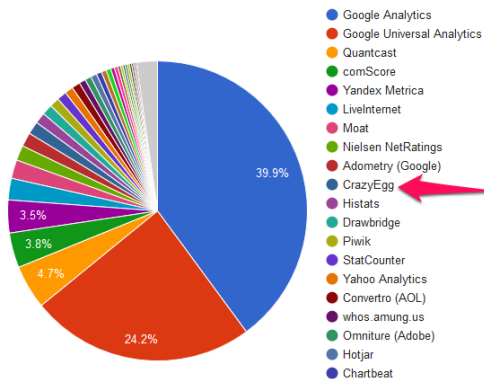


[- RULE #5 : USE 3D PIE CHARTS -]

Do as Steve Jobs : Lie!

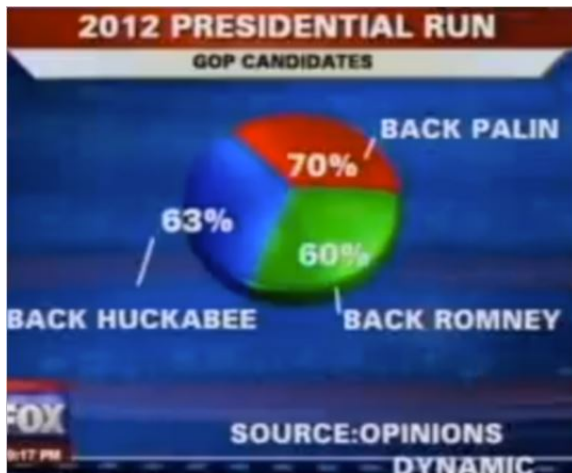


[- RULE #5-BIS : USE PIE CHARTS -]



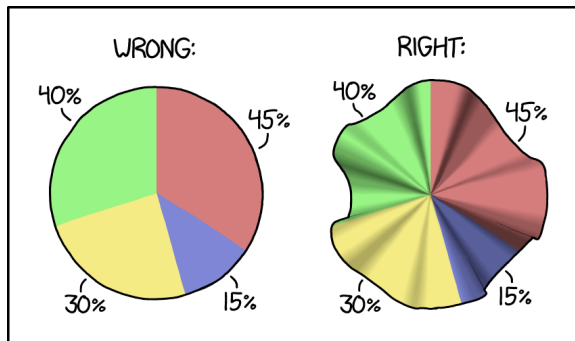
From WTF Visualisations

[- RULE #5-BIS : USE PIE CHARTS -]



From FOX News

[- RULE #5-BIS : USE PIE CHARTS -]

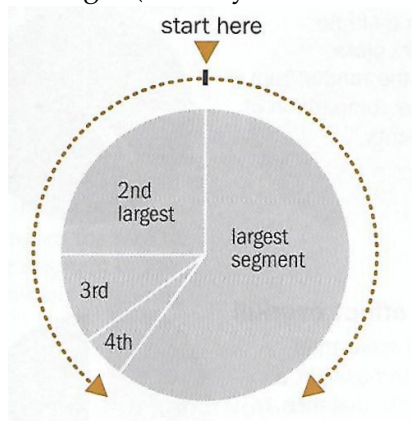


HOW TO MAKE A PIE CHART IF YOUR
PERCENTAGES DON'T ADD UP TO 100

From XKCD

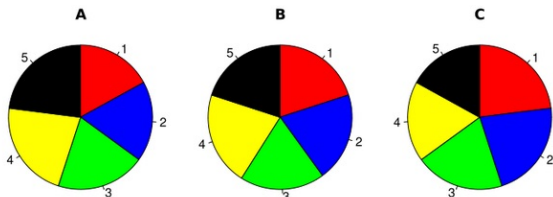
[SO YOU REALLY WANT TO DO A PIE CHART ? -]

Do it right (unlike your software !)



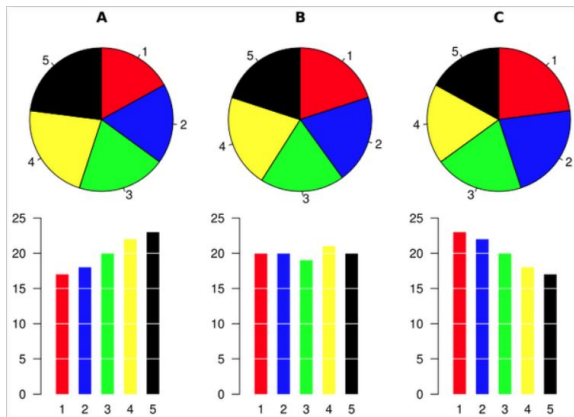
from Wong (2010)

[- RULE #6 : USE SEVERAL PIE CHARTS -]



From Freakeconometrics

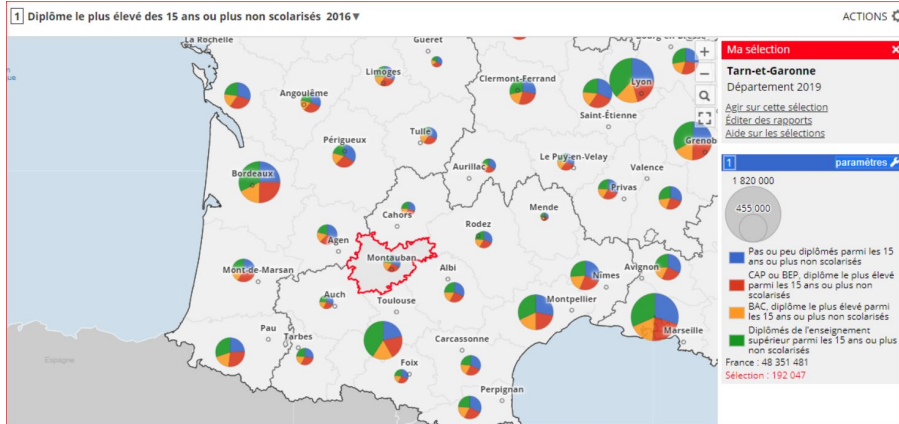
[- RULE #6 : USE SEVERAL PIE CHARTS -]



From Freakeconometrics

[- RULE #6 : USE SEVERAL PIE CHARTS -]

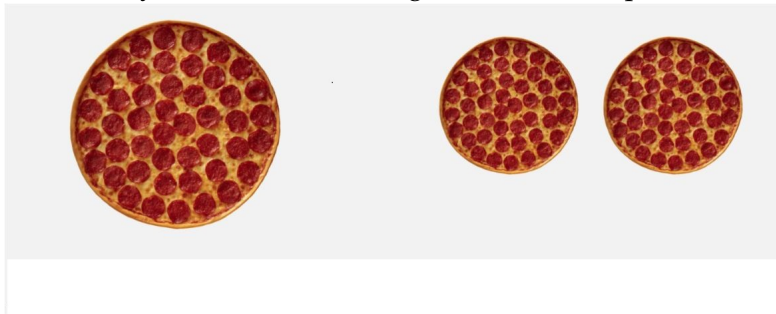
People use it.



INSEE

[- RULE #7 : USE AREAS -]

Maximize your intakes : One big or two smaller pizzas ?



Source : Fermat's library

[- RULE #7 : USE AREAS -]

One big > two smaller pizzas !



$$\text{Area} = \pi(18/2)^2 = 254 \text{ in}^2$$

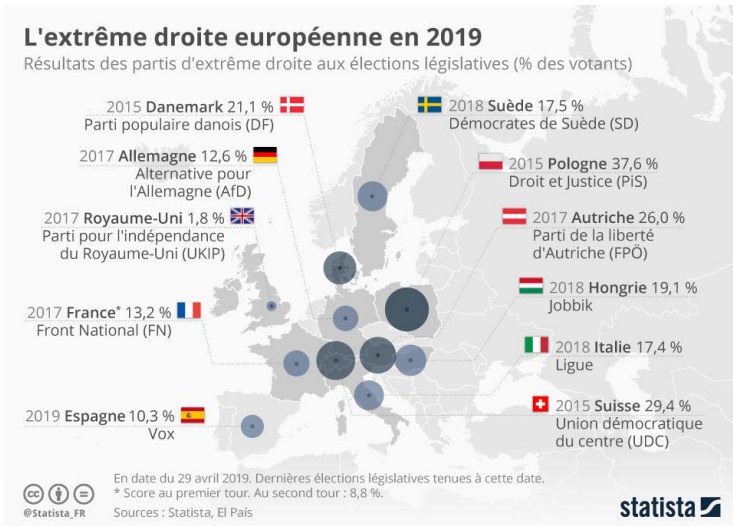


$$\text{Area} = 2\pi(12/2)^2 = 226 \text{ in}^2$$

Source : Fermat's library

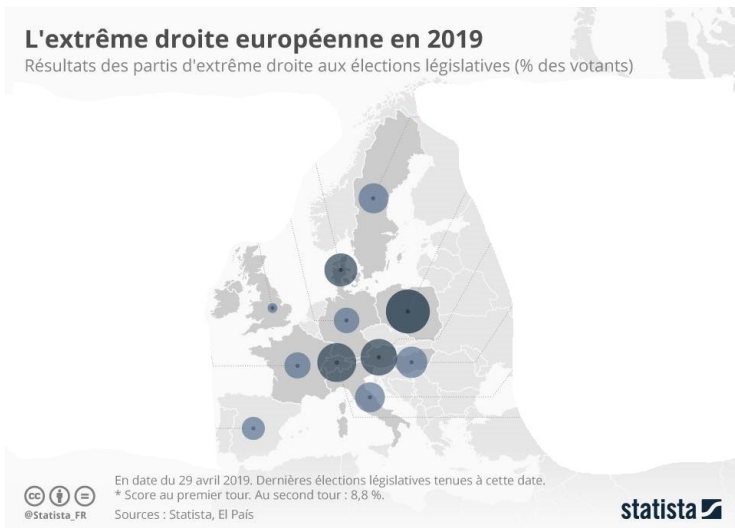
[- RULE #7 : USE AREAS -]

How to compare ?



[- RULE #7 : USE AREAS -]

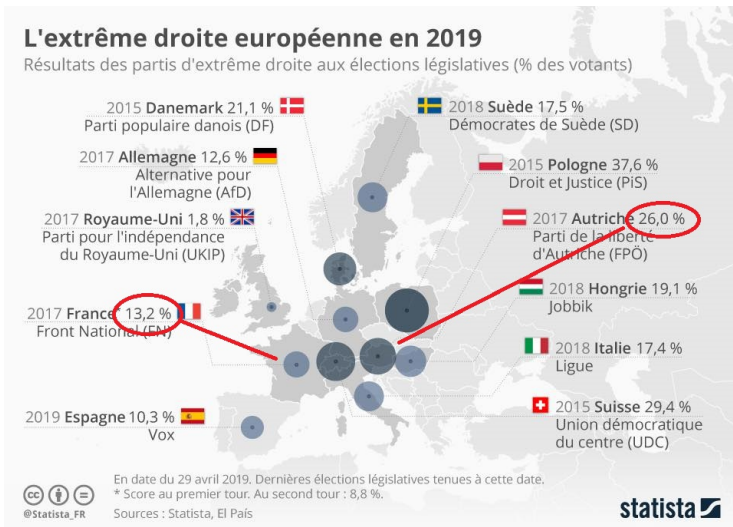
How to compare ?



Source : Statista, el país

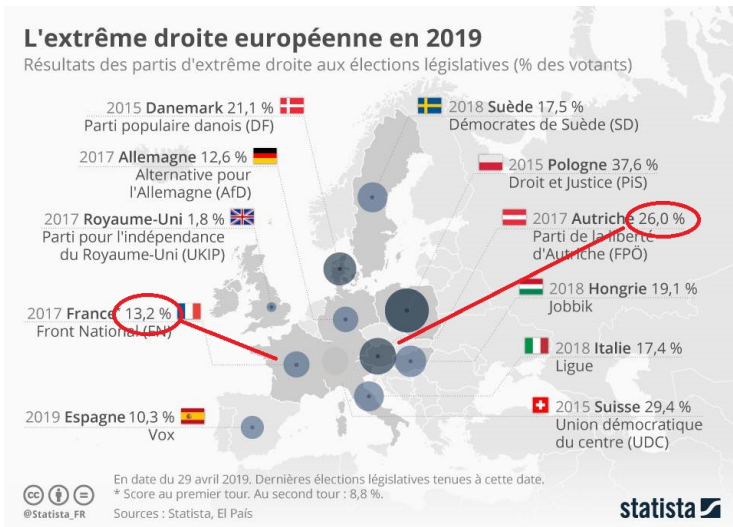
[- RULE #7 : USE AREAS -]

How to compare ?



[- RULE #7 : USE AREAS -]

How to compare?



[- RULE #7 BIS : WORKS ALSO WITH SQUARES-]

If 100% of the US prisoners are represented by the big green square...what is the percentage for each group ?

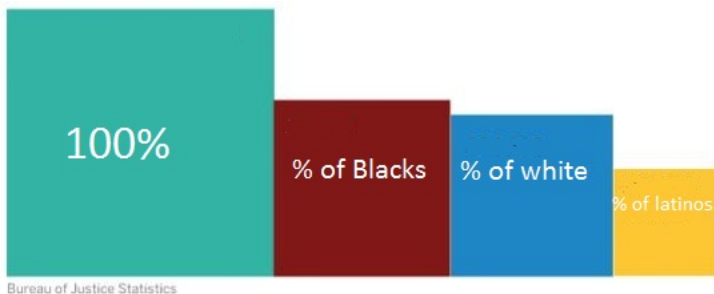


FIGURE – Ethic composition of prisoners in Jail in 2008 in the USA.
(*Le Monde* 5/12/2014)

[- RULE #7 BIS : WORKS ALSO WITH SQUARES-]

If 100% of the US prisoners are represented by the big green square...what is the percentage for each group ?

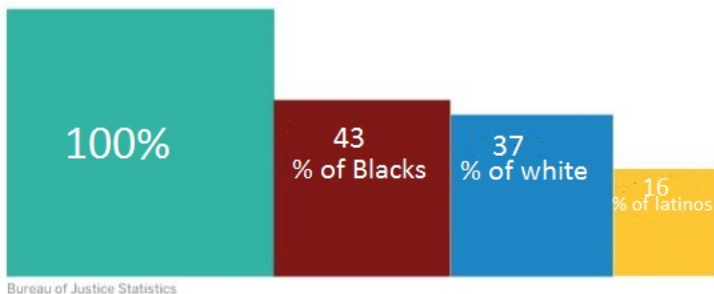
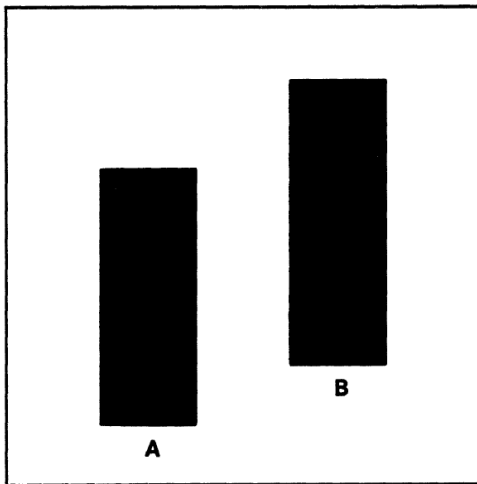


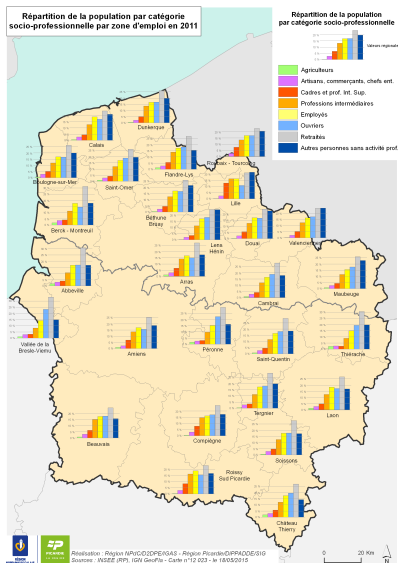
FIGURE – Ethic composition of prisoners in Jail in 2008 in the USA.
(*Le Monde* 5/12/2014)

[- RULE #8 : USE [UNALIGNED] BARS -]

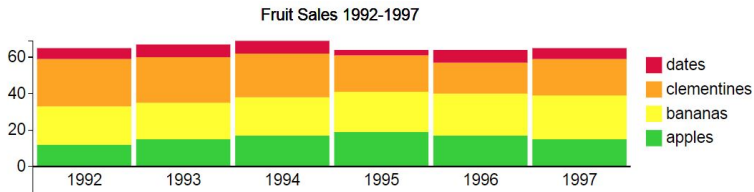


Source : Cleveland and McGill (1984)

[- RULE #8 : USE [UNALIGNED] BARS -]



[- RULE #8-BIS : USE STACKED BARCHARTS -]



[- SOLUTION #8-BIS : ALIGN THE BARS ! -]

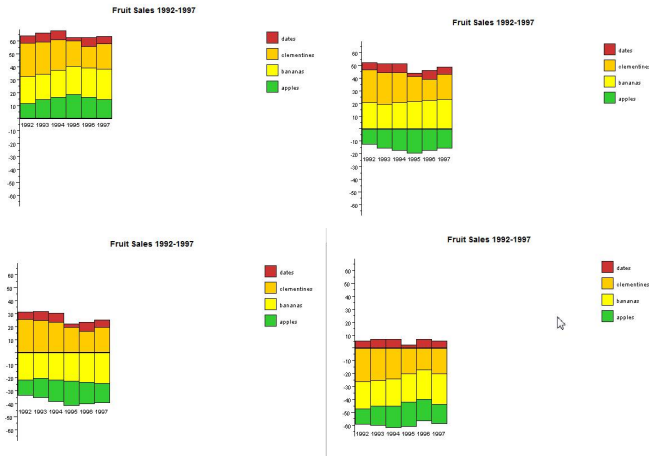
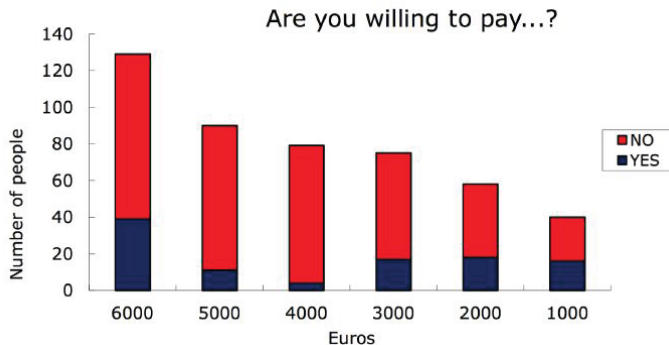


FIGURE – From Dix and Ellis (1998) example

See also the dynamic version

[- RULE #8-BIS : USE STACKED BARCHARTS -]

Kind of stupid example :



Source : The TSEconomics Journal (TSE)

[- RULE #9 : USE LINES (LOTS OF THEM!) -]

Observe this graphic carefully :

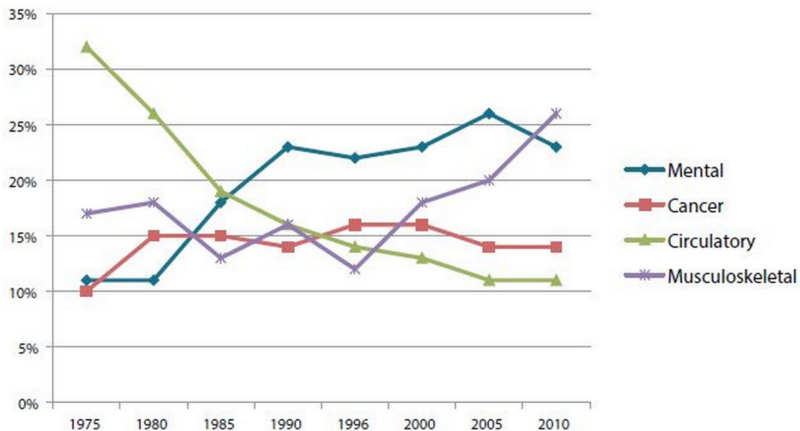


FIGURE – Major Cause of Worker Disability (1975-2010) (J. Schwabish, 2014).

LEGITIMATE QUESTIONS :

- ▶ in 2010, what is the major cause of disability ?

LEGITIMATE QUESTIONS :

- ▶ in 2010, what is the major cause of disability ?
- ▶ in 1975, what was the major cause of disability ?

LEGITIMATE QUESTIONS :

- ▶ in 2010, what is the major cause of disability ?
- ▶ in 1975, what was the major cause of disability ?
- ▶ In the recent years, which causes have increased/decreased the most ?

LEGITIMATE QUESTIONS :

- ▶ in 2010, what is the major cause of disability ?
- ▶ in 1975, what was the major cause of disability ?
- ▶ In the recent years, which causes have increased/decreased the most ?

▶ . . .

LEGITIMATE QUESTIONS :

- ▶ in 2010, what is the major cause of disability ?
- ▶ in 1975, what was the major cause of disability ?
- ▶ In the recent years, which causes have increased/decreased the most ?
- ▶ ...
- ▶ You do not remember a damn thing of this graph !

[- SOLUTION #9 : USE *small multiples* -]

Initial DI Worker Awards by Major Cause of Disability—
Calendar Years 1975–2010
(Percent)

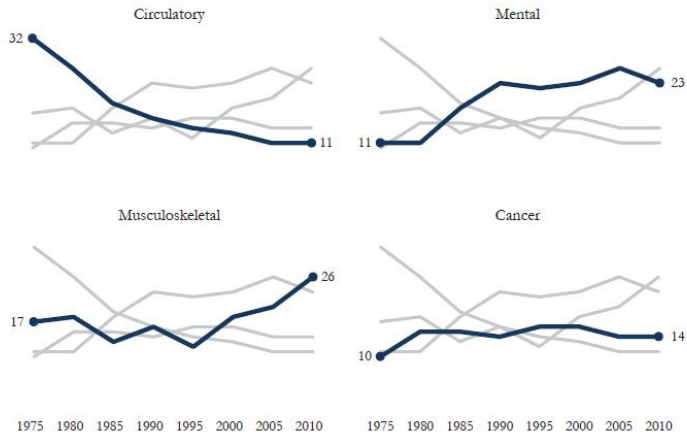
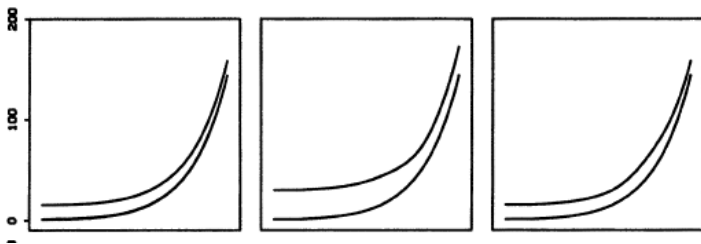


FIGURE – Major Cause of Disability - 1975-2010 (J. Schwabish, 2014).

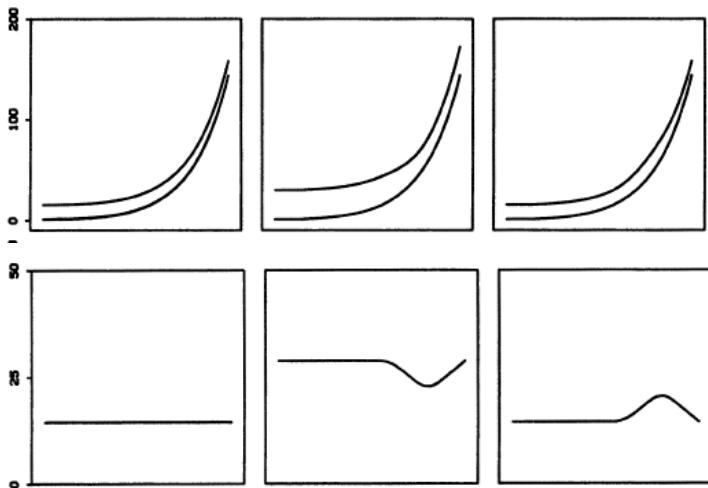
[- RULE #9BIS : USE LINES (COMPARE) -]

For each graph, compute the difference between the 2 lines.



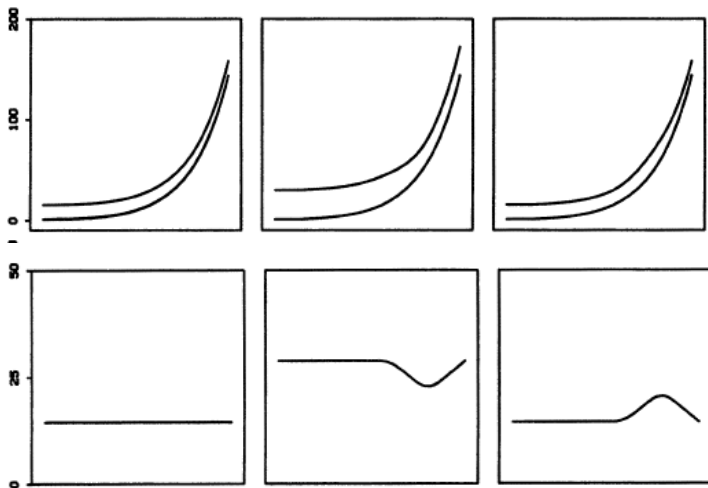
[- RULE #9BIS : USE LINES (COMPARE) -]

For each graph, compute the difference between the 2 lines.



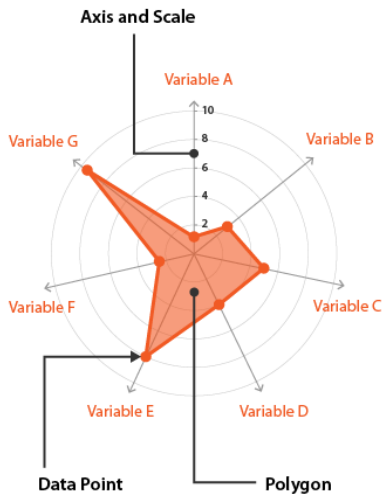
[- RULE #9BIS : USE LINES (COMPARE) -]

For each graph, compute the difference between the 2 lines.

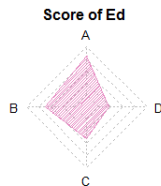
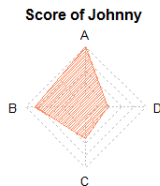
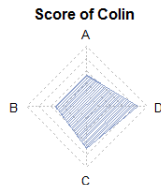
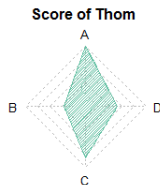


From Cleveland and McGill (1984)

[- RULE #10 : USE RADAR PLOTS (OR WEB PLOTS) -]

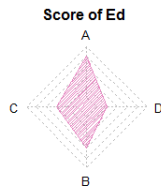
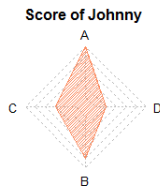
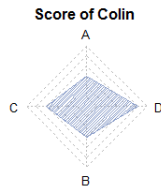
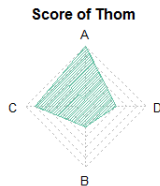


[- RULE #10 : USE RADAR PLOTS -]



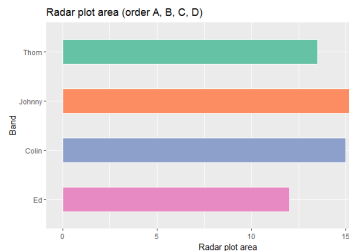
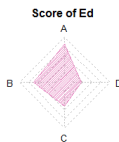
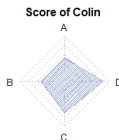
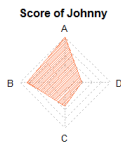
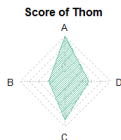
Source : Xtophe's blog: [Why you should never use radar plots](#)

[- RULE #10 : USE RADAR PLOTS -]



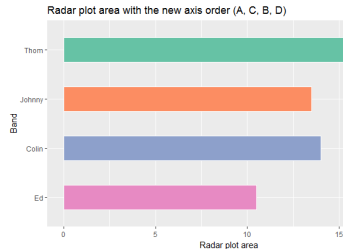
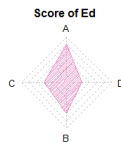
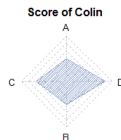
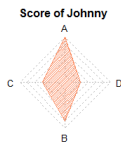
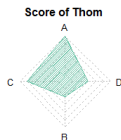
Source : Xtophe's blog: [Why you should never use radar plots](#)

[- RULE #10 : USE RADAR PLOTS -]



Source : Xtophe's blog: [Why you should never use radar plots](#)

[- RULE #10 : USE RADAR PLOTS -]



Source : Xtophe's blog: [Why you should never use radar plots](#)

[- SUPER RULE #1 : USE MAPS -]

Which are the biggest “countries” in the world (in surface)?



[- SUPER RULE #1 : USE MAPS -]

True size of countries

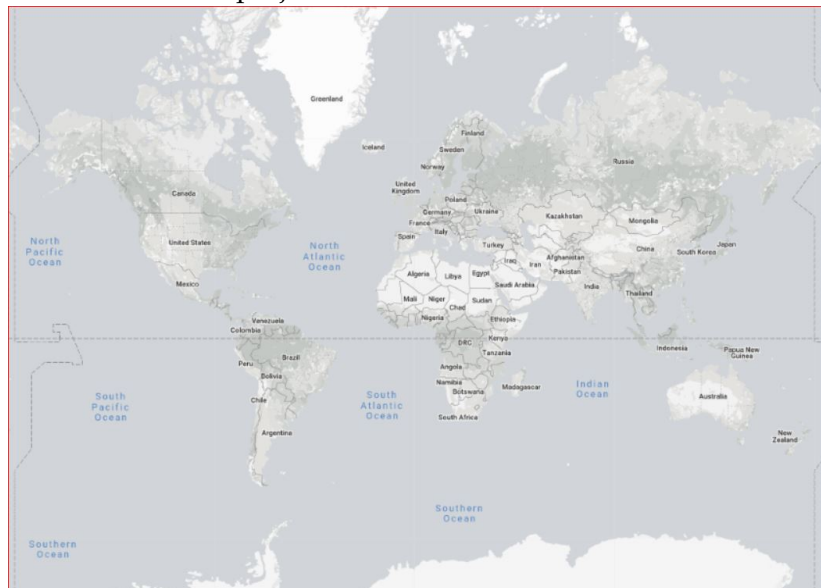


Source : <http://metrocosm.com/mercator/> , see also

<https://thetruesize.com/>

[- SUPER RULE #1 : USE MAPS -]

Use the Mercator projection !



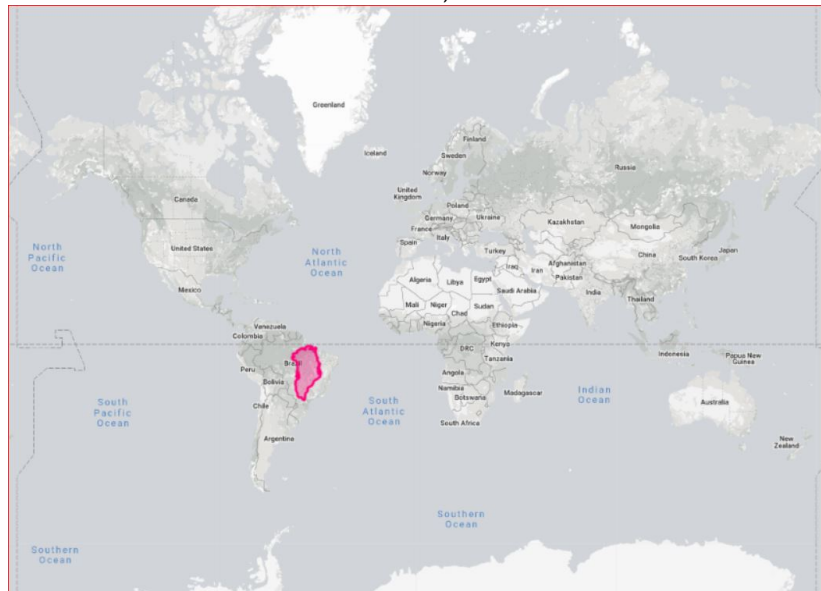
[- SUPER RULE #1 : USE MAPS -]

Is Greenland greater than Brazil ?



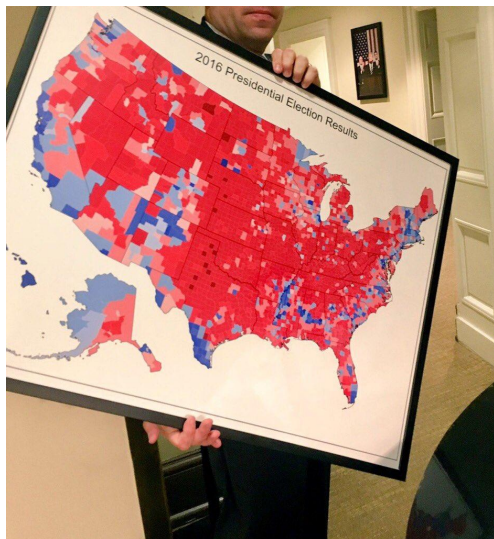
[- SUPER RULE #1 : USE MAPS -]

Solution : Greenland $\simeq 2.1$ M km², Brazil $\simeq 8.5$ M km² !



[- SUPER RULE #2 : USE ELECTORAL MAPS -]

Élections présidentielles aux USA en 2016 (par "*counties*")



[- SUPER RULE #2 : USE ELECTORAL MAPS -]

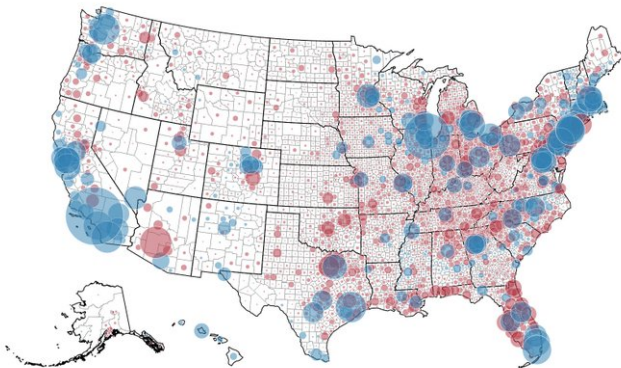
Élections présidentielles aux USA en 2016 (par *counties*)



Source : Lara Trump on Twitter (01/10/2019)

[- SUPER RULE #2 : USE ELECTORAL MAPS -]

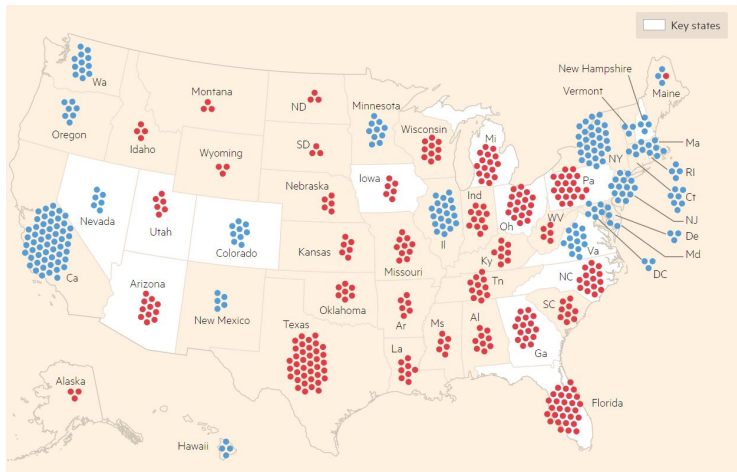
Élections présidentielles aux USA en 2016 (Nombre de votes)



Source : @MInesCR (Twitter)

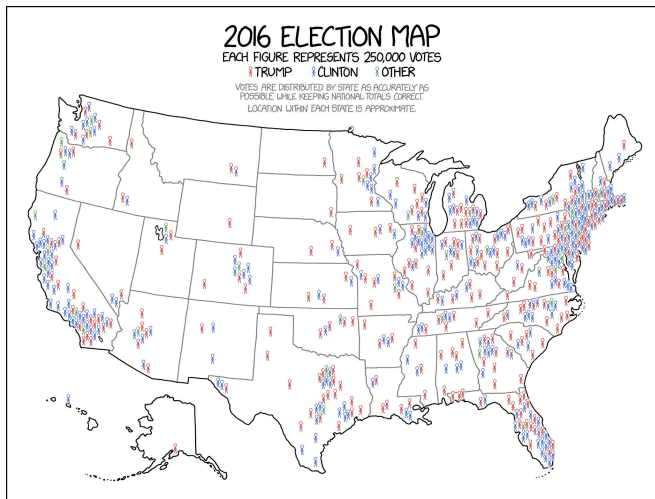
[- SUPER RULE #2 : USE ELECTORAL MAPS -]

Élections présidentielles aux USA en 2016 (Nombre de grands électeurs)



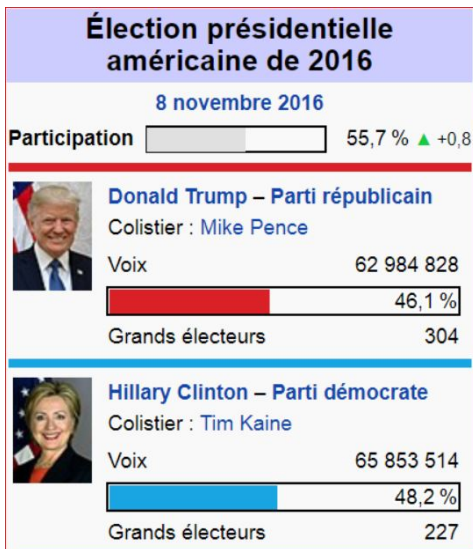
[- SUPER RULE #2 : USE ELECTORAL MAPS -]

Élections présidentielles aux USA en 2016 (Nombre de votes)



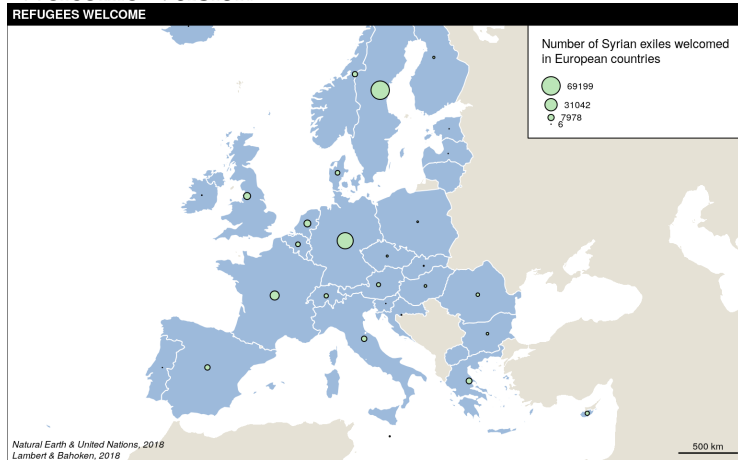
[- SUPER RULE #2 : USE ELECTORAL MAPS -]

Élections présidentielles aux USA en 2016 (Chiffres)



[- SUPER RULE #2 : USE STATISTICAL MAPS -]

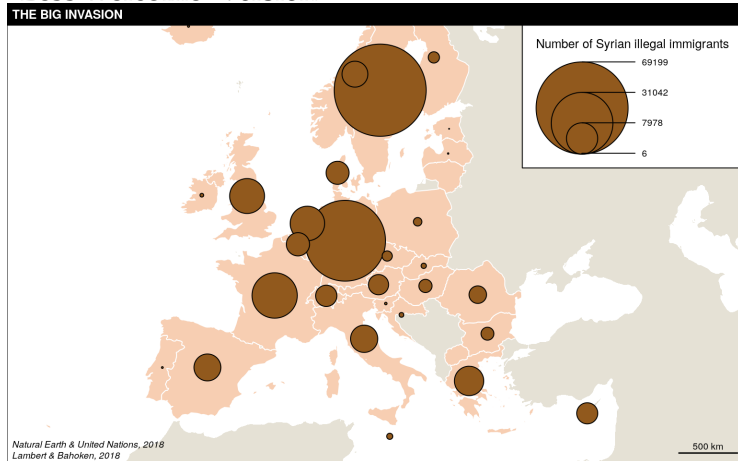
"Welcome" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #2 : USE STATISTICAL MAPS -]

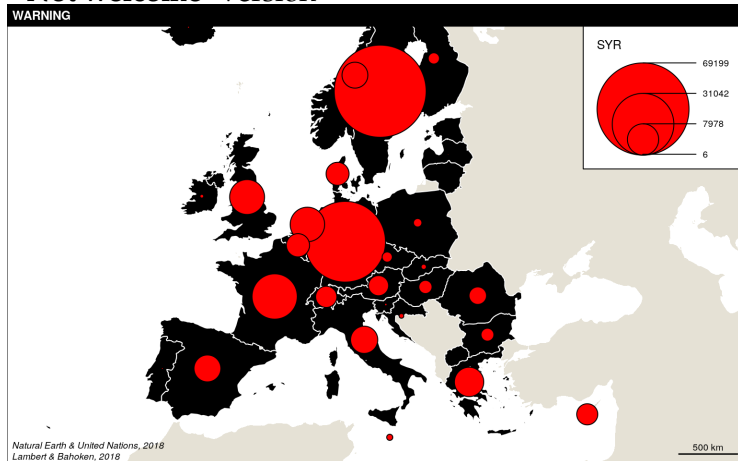
"Less welcome" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #2 : USE STATISTICAL MAPS -]

"Not welcome" version

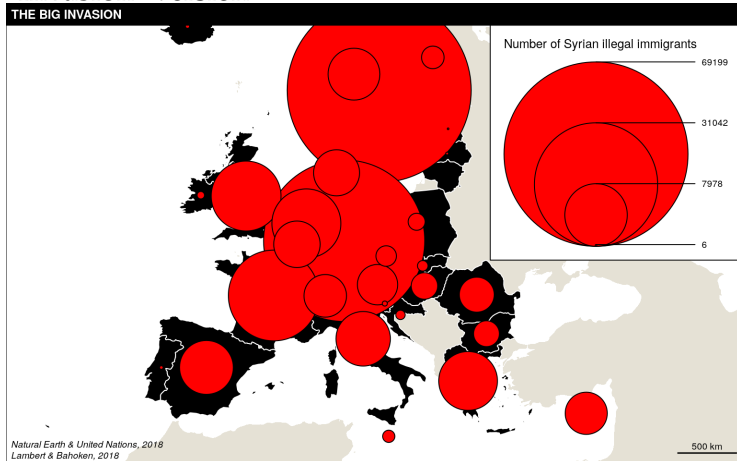


Source :

Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #2 : USE STATISTICAL MAPS -]

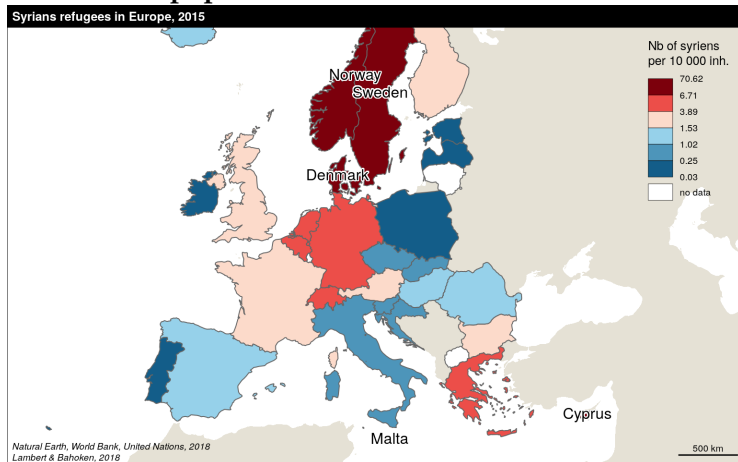
"Invasion" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #2 : USE STATISTICAL MAPS -]

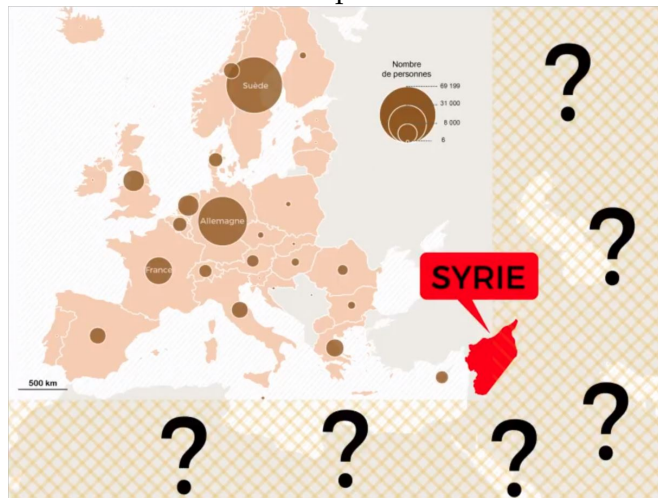
"Relative to population" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #2 : USE STATISTICAL MAPS -]

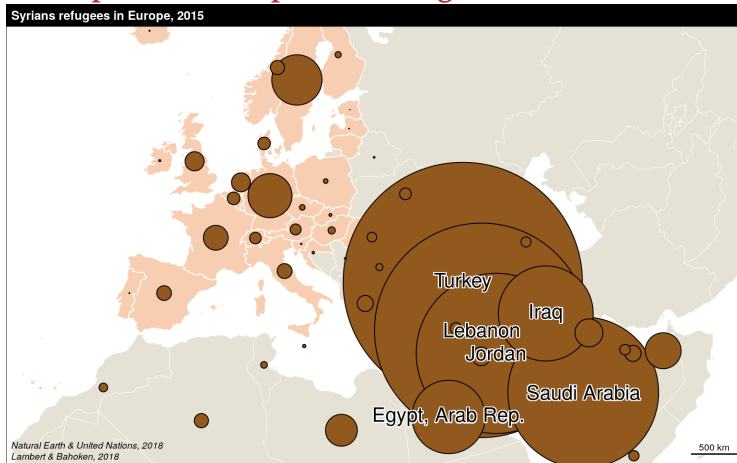
"All of this is a lie !" The picture is zoomed !



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #2 : USE STATISTICAL MAPS -]

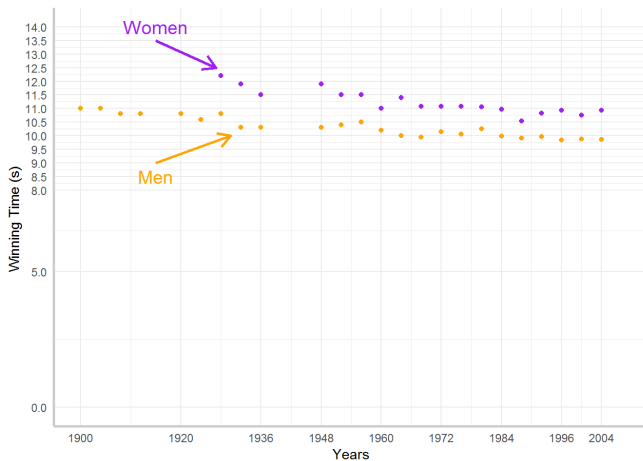
Be suspicious of maps, not of migrants !



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- SUPER RULE #3 : EXTRAPOLATE -]

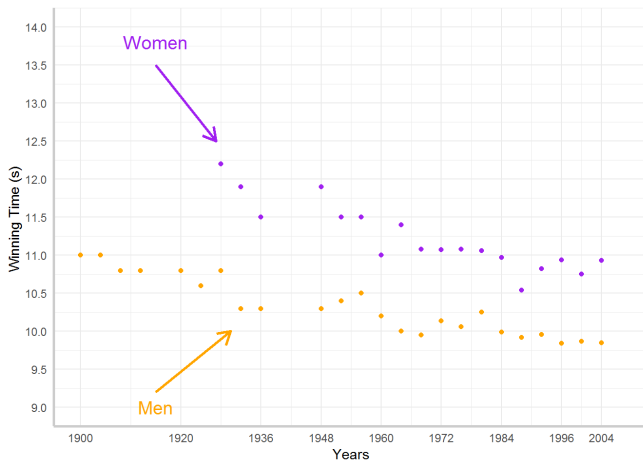
An example : The gender gap in 100-meters Olympics



Adapted from : Calling Bullshit

[- SUPER RULE #3 : EXTRAPOLATE -]

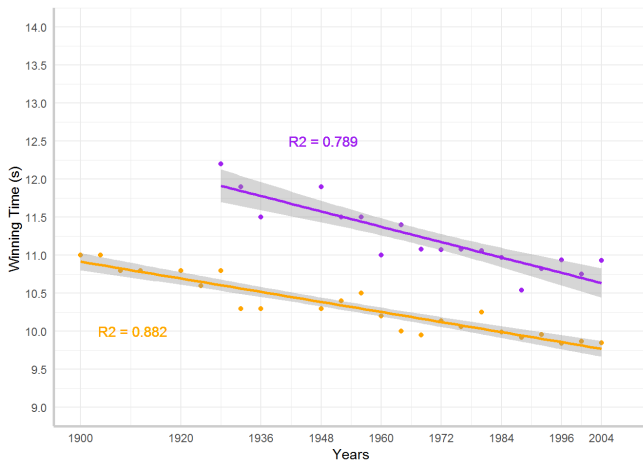
Let us reduce the y-axis scale



Adapted from : Calling Bullshit

[- SUPER RULE #3 : EXTRAPOLATE -]

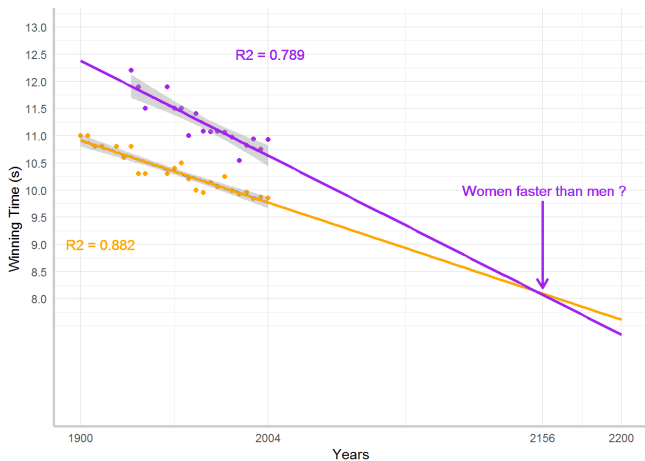
Now, let us draw a regression line



Adapted from : Calling Bullshit

[- SUPER RULE #3 : EXTRAPOLATE -]

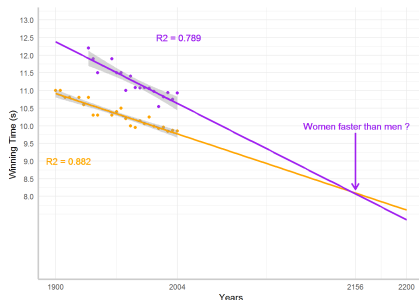
Extrapolate : Women will run faster in 2156 !



Adapted from : Calling Bullshit

[- SUPER RULE #3 : EXTRAPOLATE -]

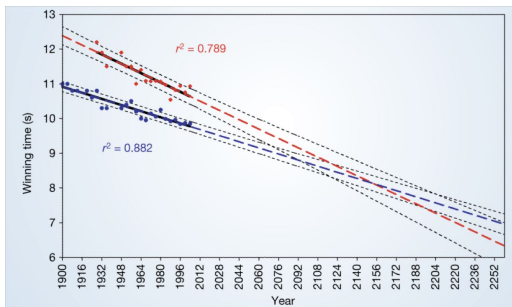
No journal will publish this !



Published as "*Momentous sprint at the 2156 Olympics?*", A. Tatem, C. Guerra, P. Atkinson & S. Hay, *Nature* (2004) **431**,525

[- SUPER RULE #3 : EXTRAPOLATE -]

No journal will publish this !



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[- SUPER RULE #3 : EXTRAPOLATE -]

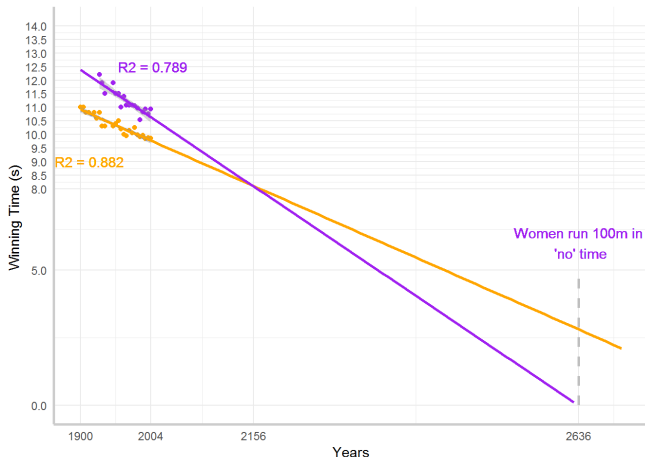
No journal will publish this !



Published as "*Momentous sprint at the 2156 Olympics?*", A. Tatem, C. Guerra, P. Atkinson & S. Hay, Nature (2004) 431,525

[- SUPER RULE #3 : JUST FOR FUN -]

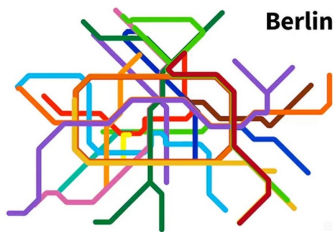
Reductio ad absurdum : Move forward : Year 2636 !



Adapted from : Calling Bullshit

[- LYING FOR A GOOD REASON -]

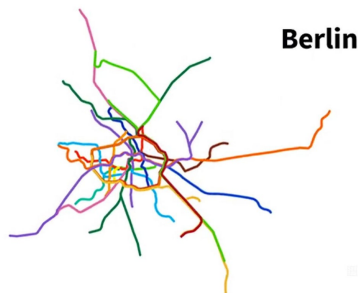
There are many visualisation that transform the data for clarity : **Subway maps** for example



Source The Guardian

[- LYING FOR A GOOD REASON -]

There are many visualisation that transform the data for clarity : **Subway maps** for example



[- LYING FOR A GOOD REASON -]

Subway maps that match the physical reality are quite rare



Source Benjamin Schmidt

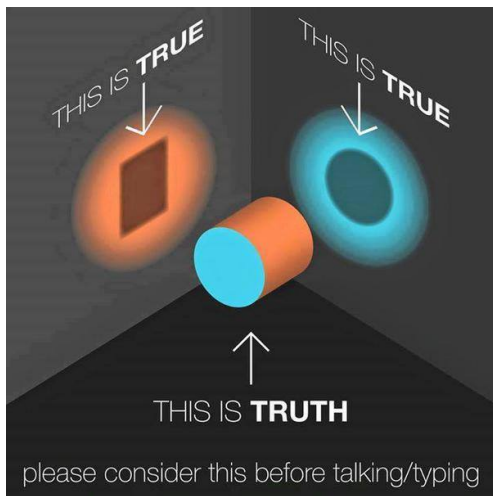
[- LYING FOR A GOOD REASON -]

Ski resort maps



Source Pierre Novat

[- THE TRUTH... -]



[- COMFORTING LIES... -]



@Xtophe_Bontemps

<http://data.visualisation.free.fr>

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KEEP IN TOUCH !

Christophe

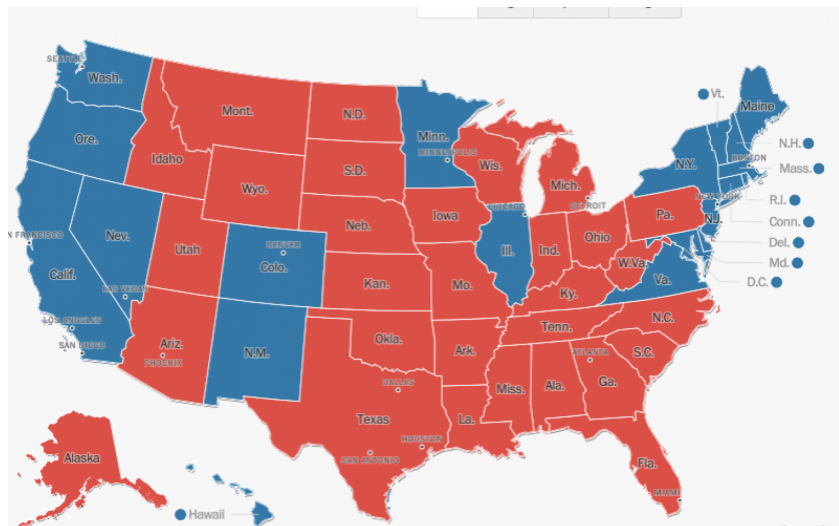
<http://data.visualisation.free.fr>

 *@Xtophe_Bontemps*



[- SUPER RULE #3 : USE ELECTORAL MAPS -]

USA election : 2016 results as a map : Washington Post

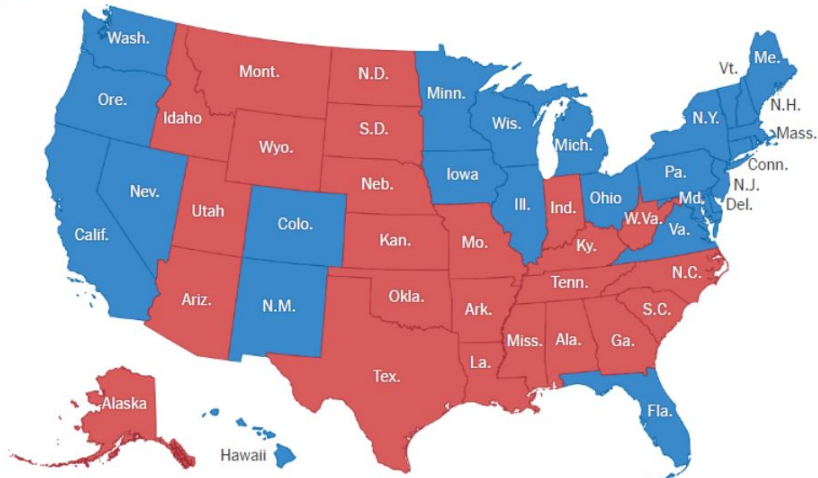


[- SUPER RULE #3 : USE ELECTORAL MAPS -]

USA election : 2012 results as a map : New York Time

The blue states reflect a total of 332 electoral votes for Barack Obama

■ Dem. ■ Rep.

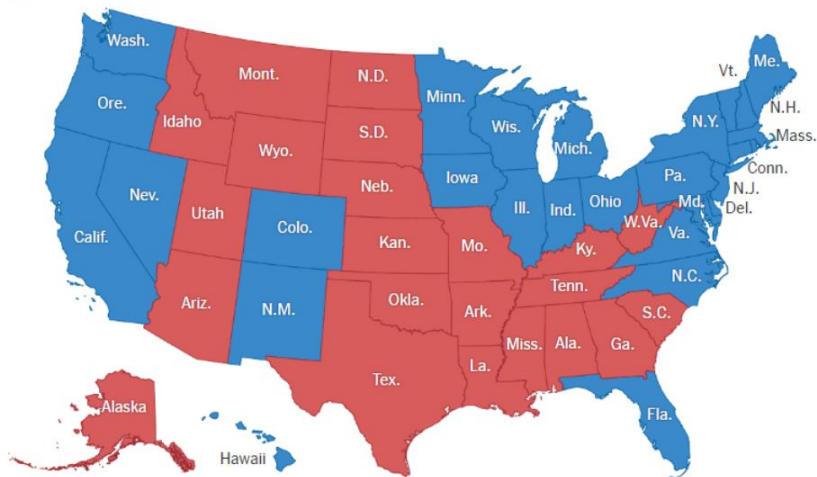


[- SUPER RULE #3 : USE ELECTORAL MAPS -]

USA election : 2008 results as a map : New York Time

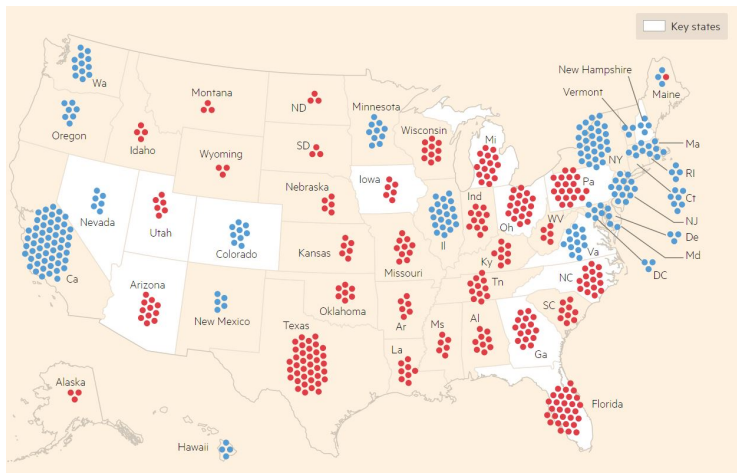
The blue states reflect a total of 365 electoral votes for Barack Obama

■ Dem. ■ Rep.



[- SUPER RULE #3 : USE ELECTORAL MAPS -]

Maybe a better map ? From *Financial Times* blog



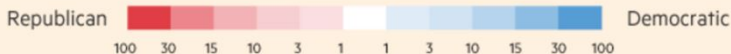
From *Financial Times*

[- SUPER RULE #3 : USE ELECTORAL MAPS -]

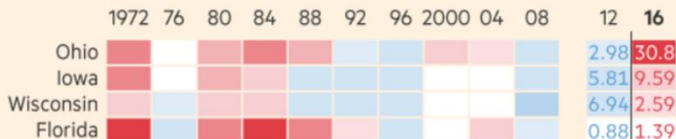
Maybe spatial information is not the most relevant !

How the vote changed in 2016

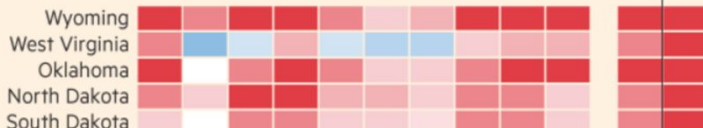
Presidential margins of victory by state, 1972–2016 (percentage points)



States that flipped between 2012 and 2016

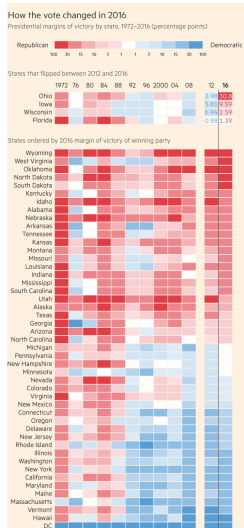
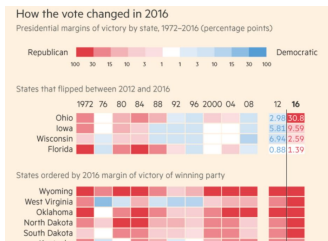


States ordered by 2016 margin of victory of winning party

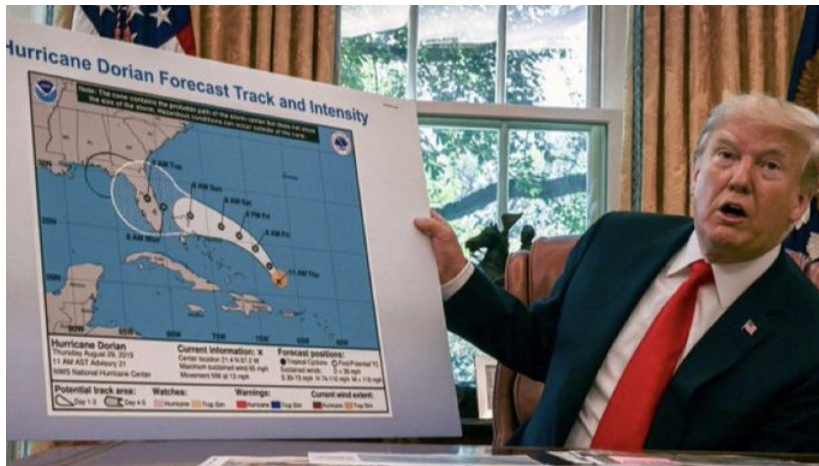


[- SUPER RULE #3 : USE ELECTORAL MAPS -]

Maybe spatial information is not the most relevant ! (Back to maps)

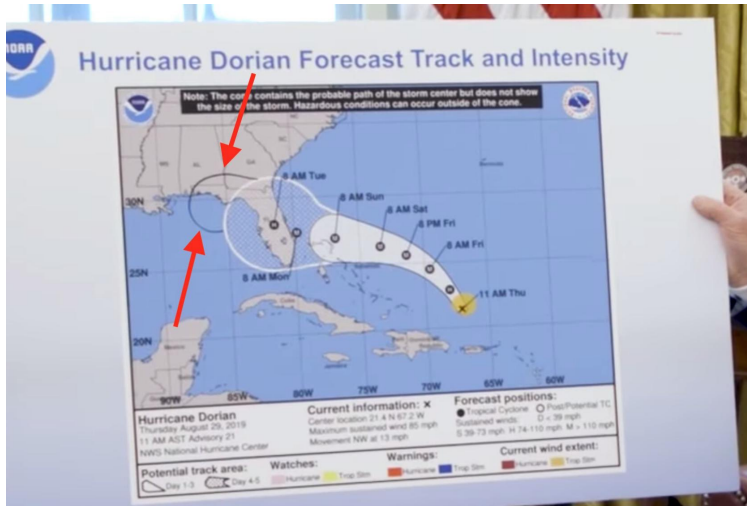


[- RÈGLE N° 9 : DESSINEZ VOUS-MÊME -]



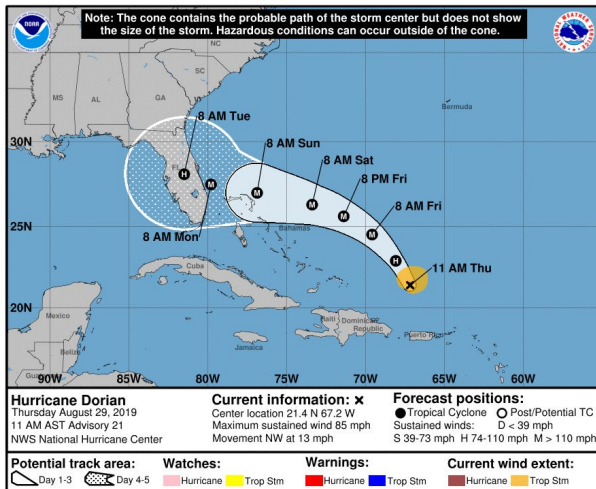
Source : Washington Post

[- RÈGLE N° 9 : DESSINEZ VOUS-MÊME -]



Source : Washington Post

[- RÈGLE N° 9 : DESSINEZ VOUS-MÊME -]



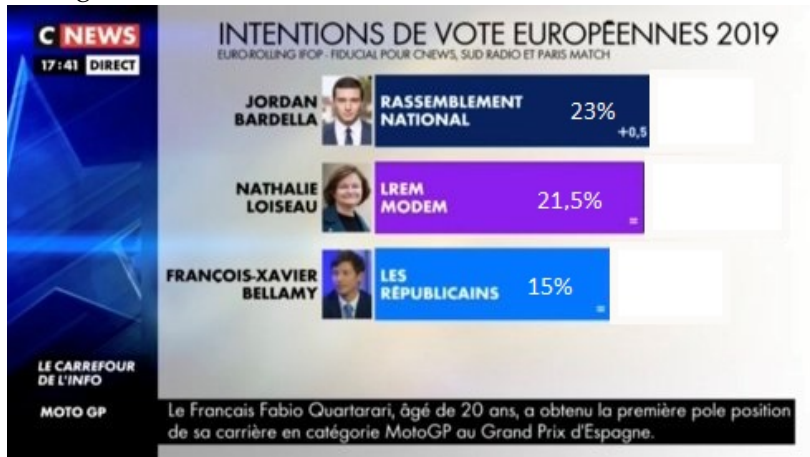
[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Original



[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Corrigé

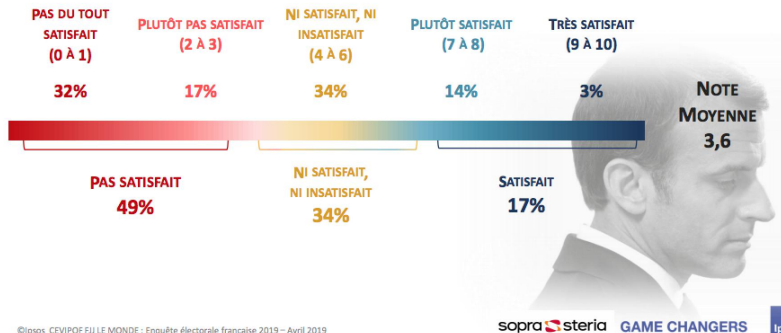


[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Original

La satisfaction à l'égard de l'action d'Emmanuel Macron (1/3)

■ D'une manière générale, êtes-vous satisfait ou pas de l'action du président de la République Emmanuel Macron ?

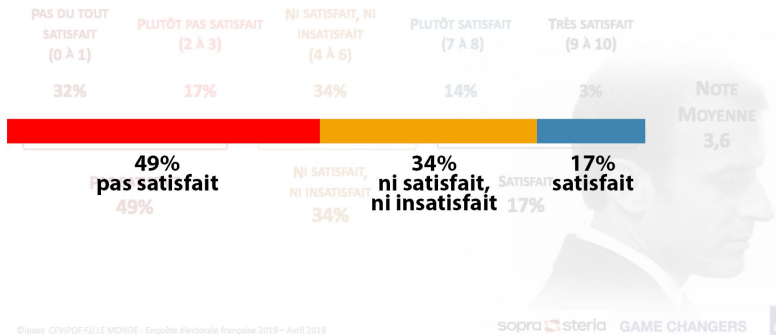


[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Corrigé

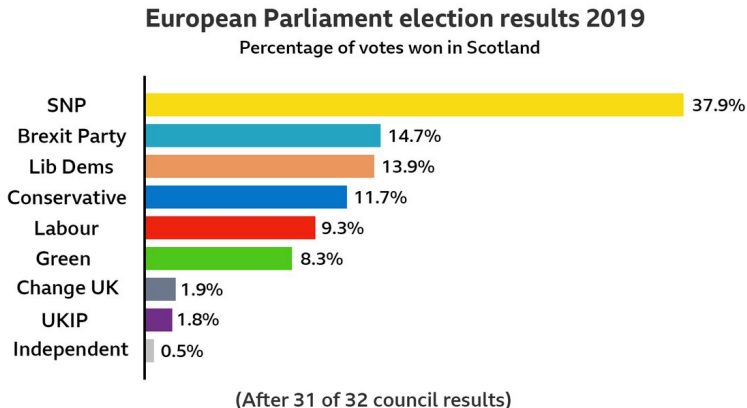
La satisfaction à l'égard de l'action d'Emmanuel Macron (1/3)

■ D'une manière générale, êtes-vous satisfait ou pas de l'action du président de la République Emmanuel Macron ?



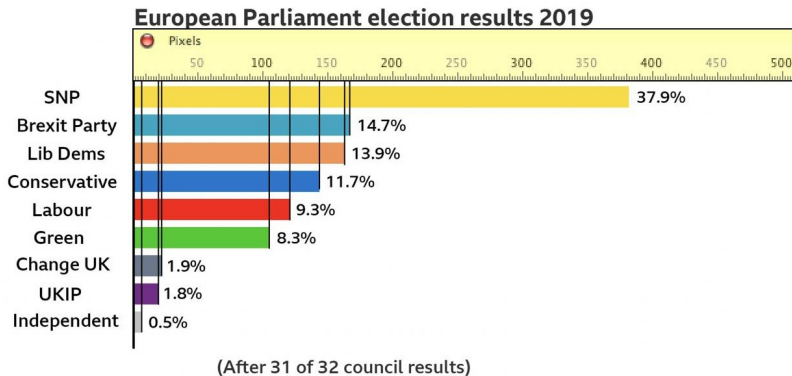
[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Original



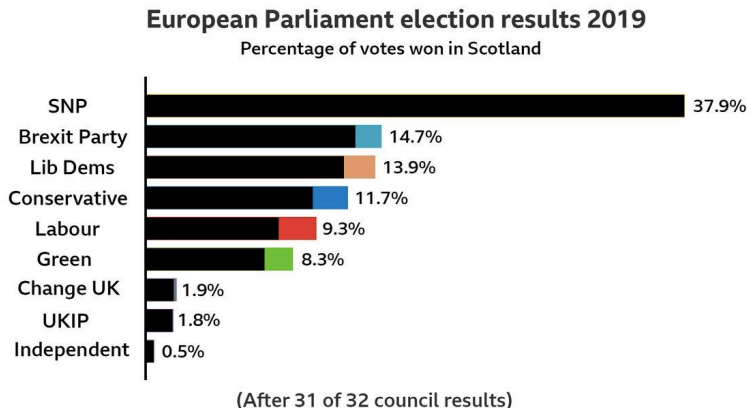
[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Détection



[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Correction

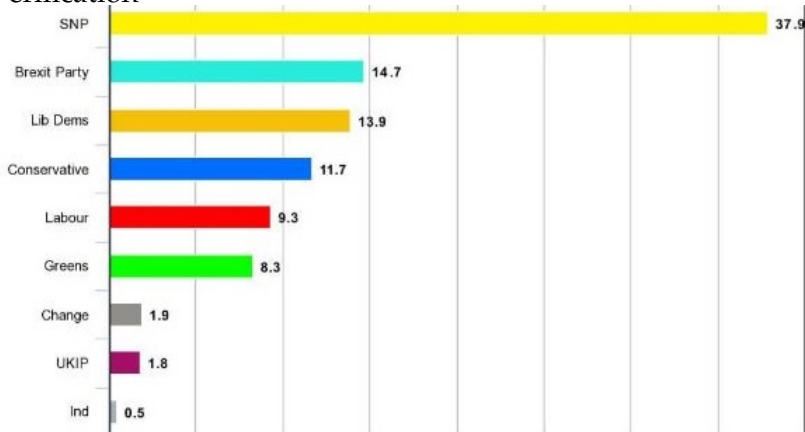


BBC

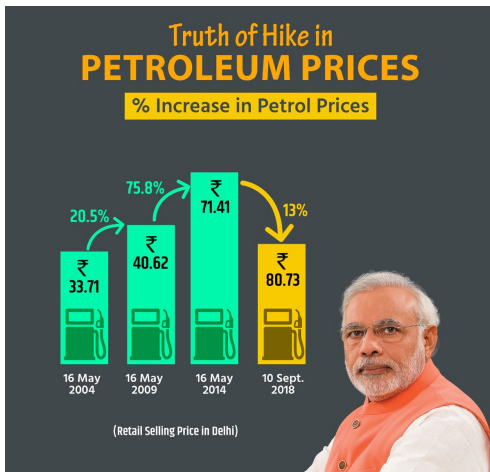
Coloured areas on bars are incorrect

[- RÈGLE N° 10 : SOYEZ SUBTIL -]

Vérification



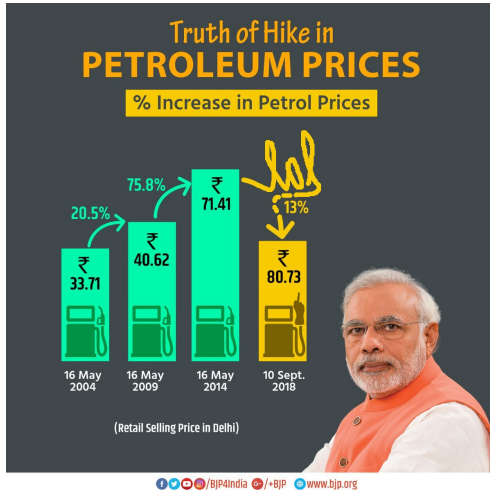
[- RÈGLE N° 10 : SOYEZ SUBTIL (OU PAS !) -]



Original

[f](#) [t](#) [v](#) [p](#) /BJP4India [+BJP](#) [www.bjp.org](#)

[- RÈGLE N° 10 : SOYEZ SUBTIL (OU PAS !) -]

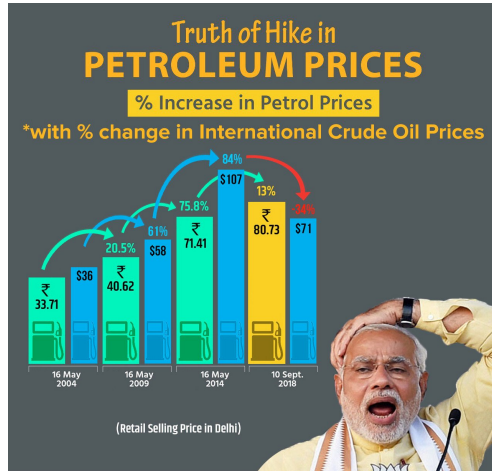


LOL!

Truth of hike in petrol prices!

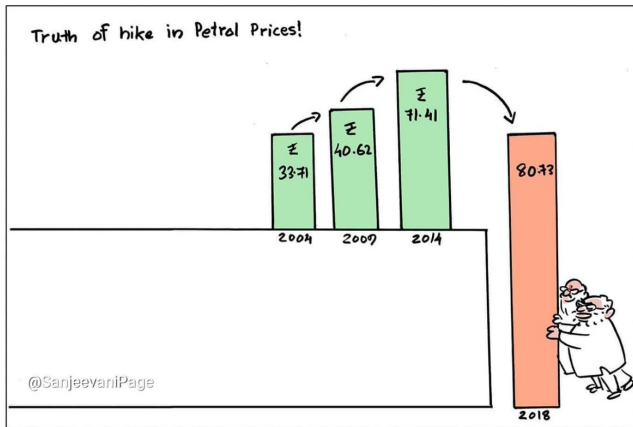


[- RÈGLE N° 10 : SOYEZ SUBTIL (OU PAS !) -]



Justification !

[- RÈGLE N° 10 : SOYEZ SUBTIL (OU PAS !) -]



LOL!

[- RÈGLE N° 10 : SOYEZ SUBTIL (OU PAS!) -]

Les chiffres ne trompent pas...

