How to Lie with Graphics ?

Christophe Bontemps

Toulouse School of Economics, INRAE

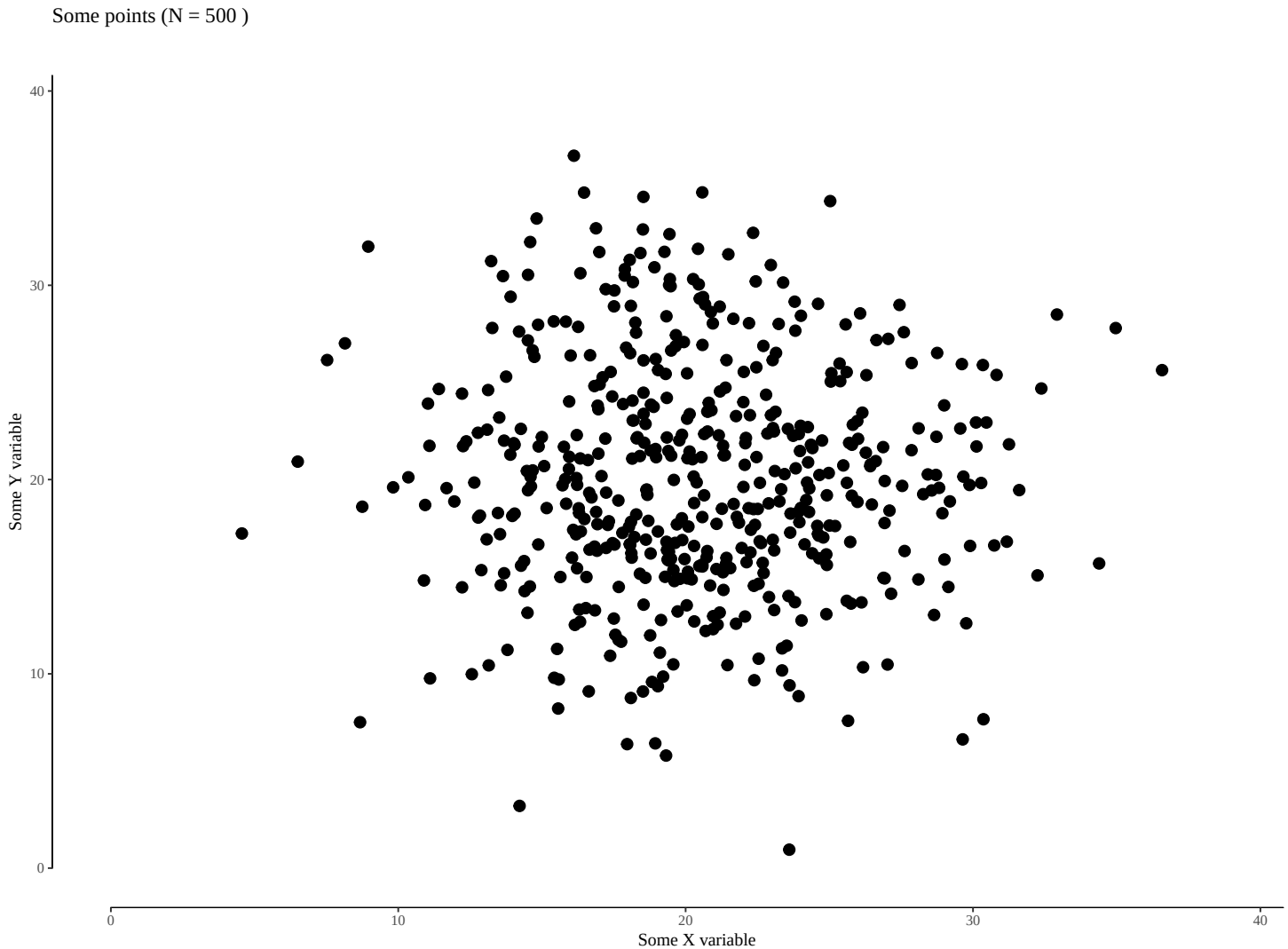
Toulouse School of Economics

INRAE
la science pour la vie, l'humain, la terre

SMART-LERECO - February, 2020

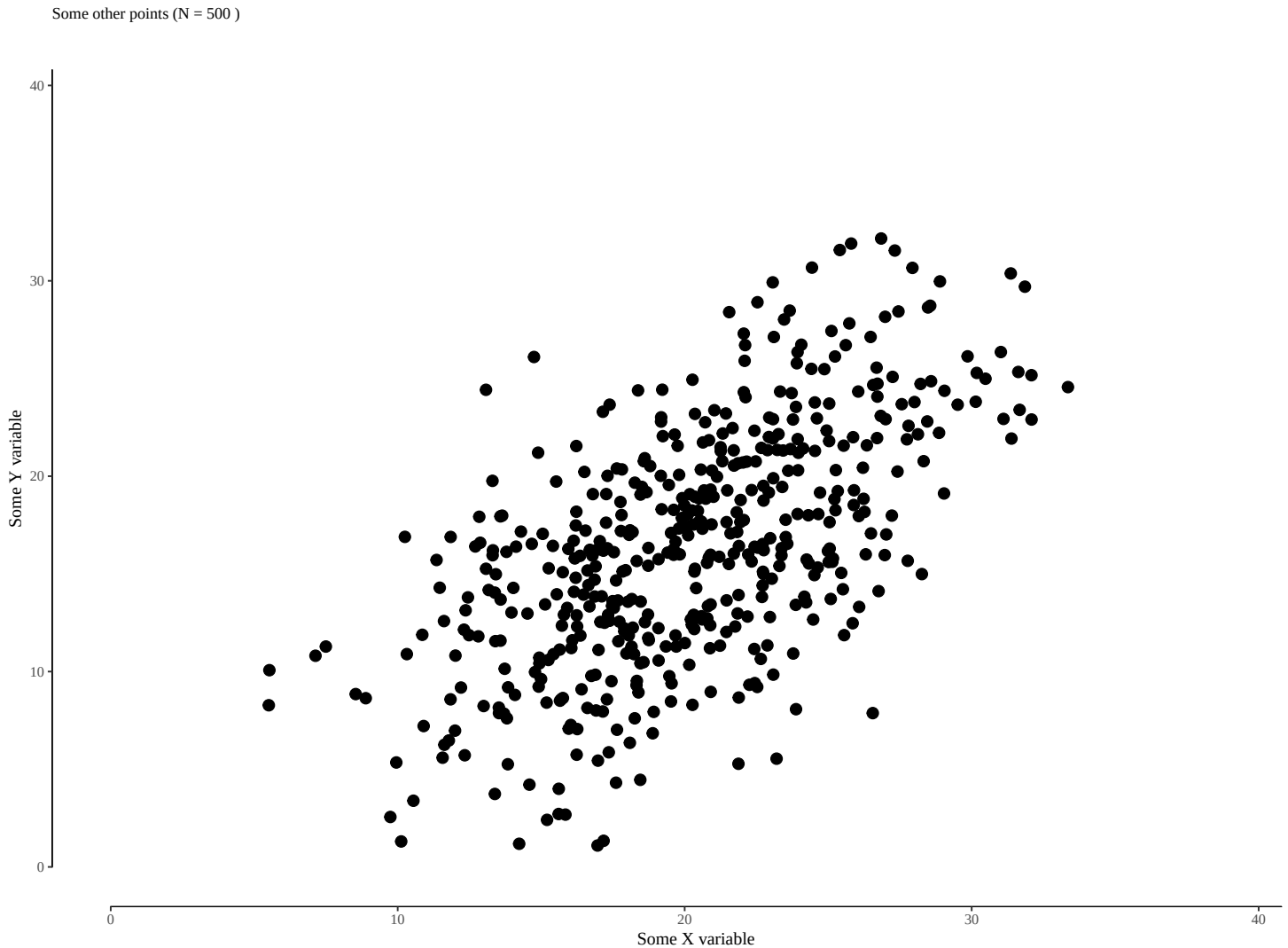
[-Foreword-] : What's Data Visualisation ?

What do you see ?

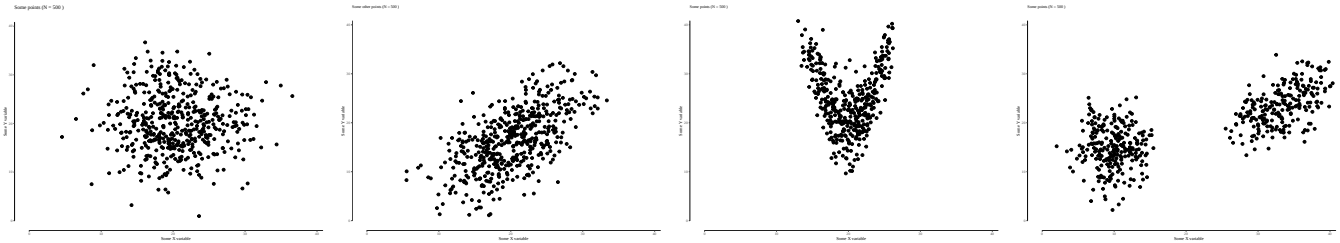


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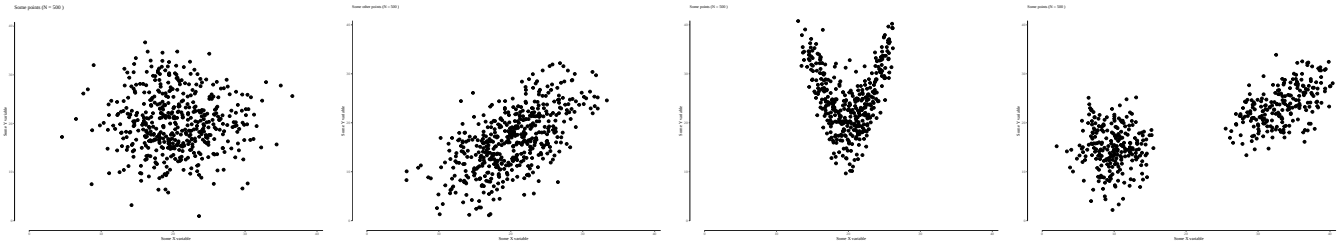
And here, what do you see ?



"Data visualisation" as a statistical test

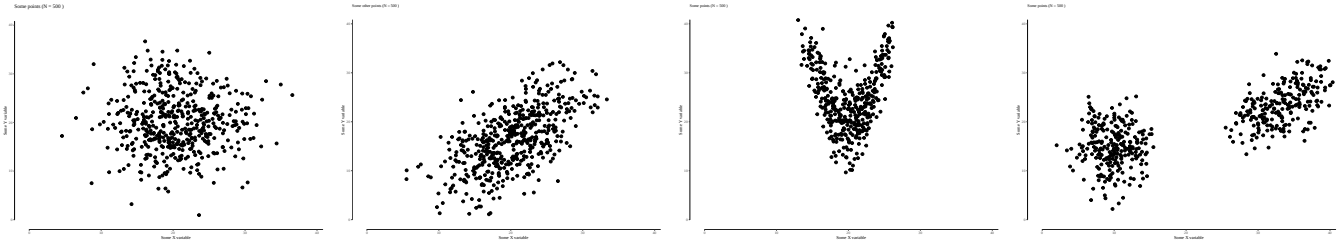


"Data visualisation" as a statistical test



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

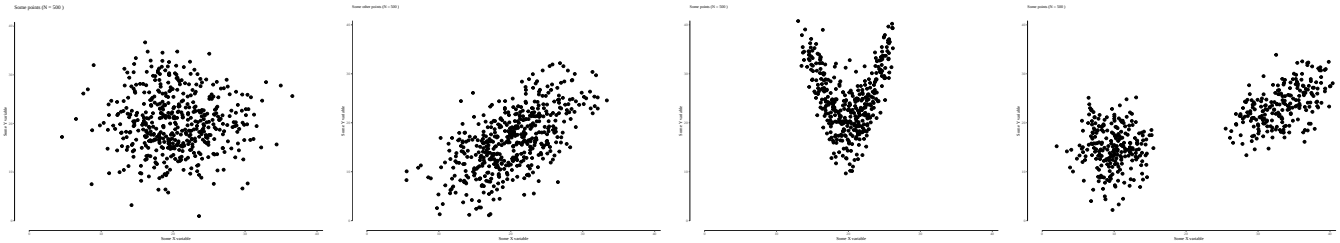
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Test : H_0 : {There is "nothing" } = {**No** relation}

"Data visualisation" as a statistical test



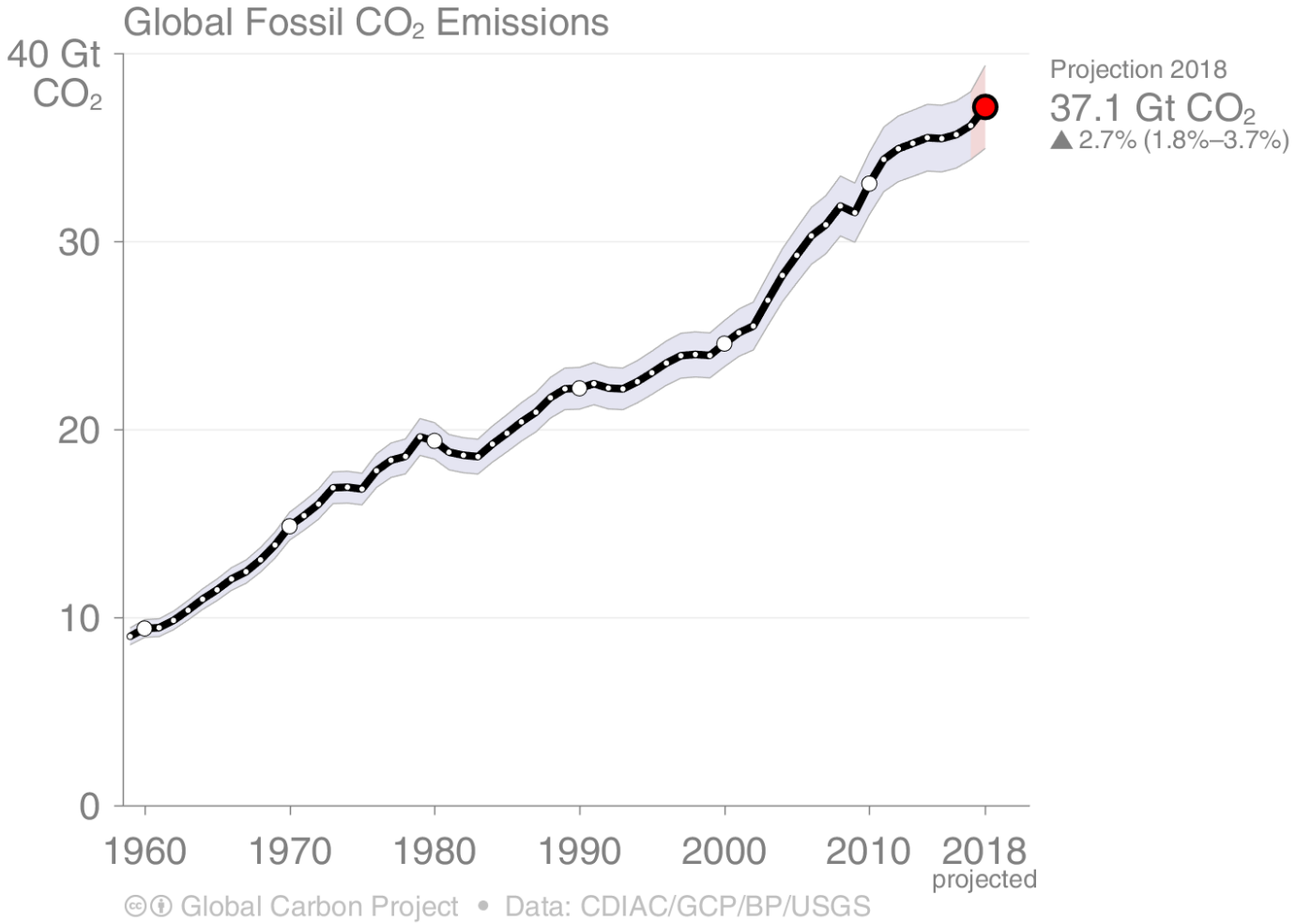
" The human eye acts is a broad feature detector and general statistical test". Buja et al. (2009)

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 ?



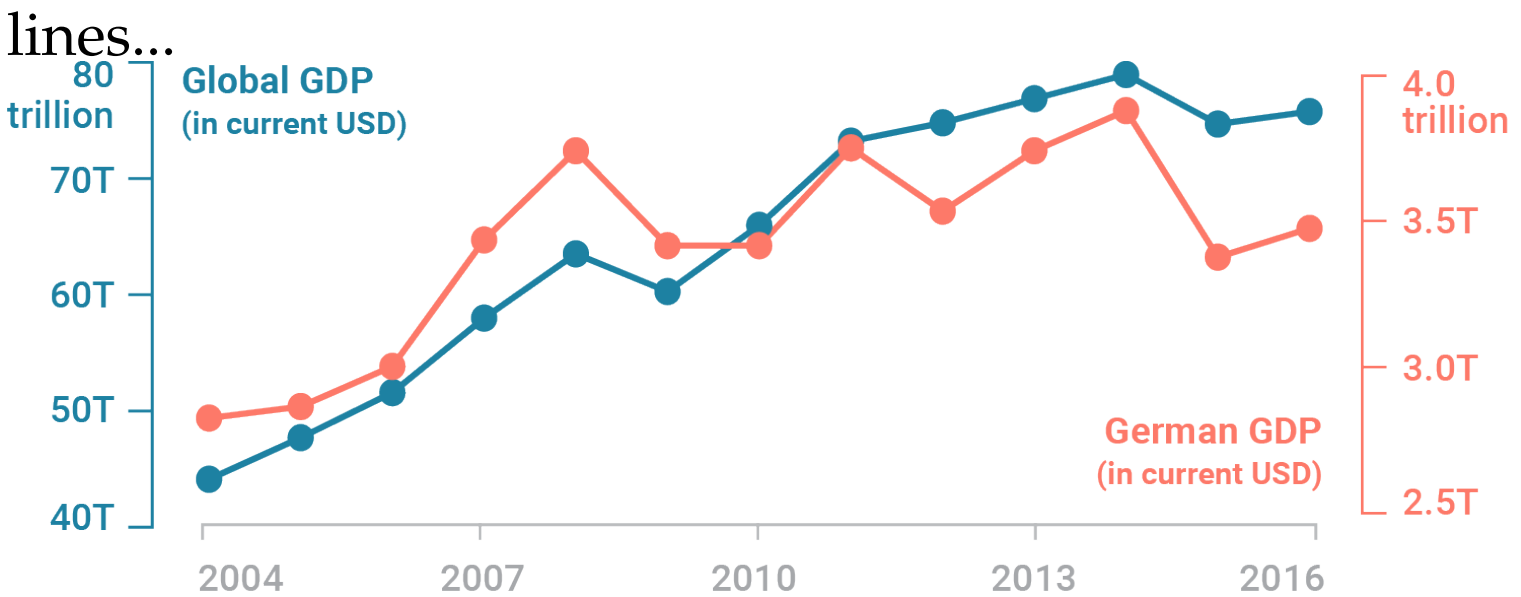
[- WHAT WE DO : -] : EXPLICIT COMPARISONS

We compare : surfaces...



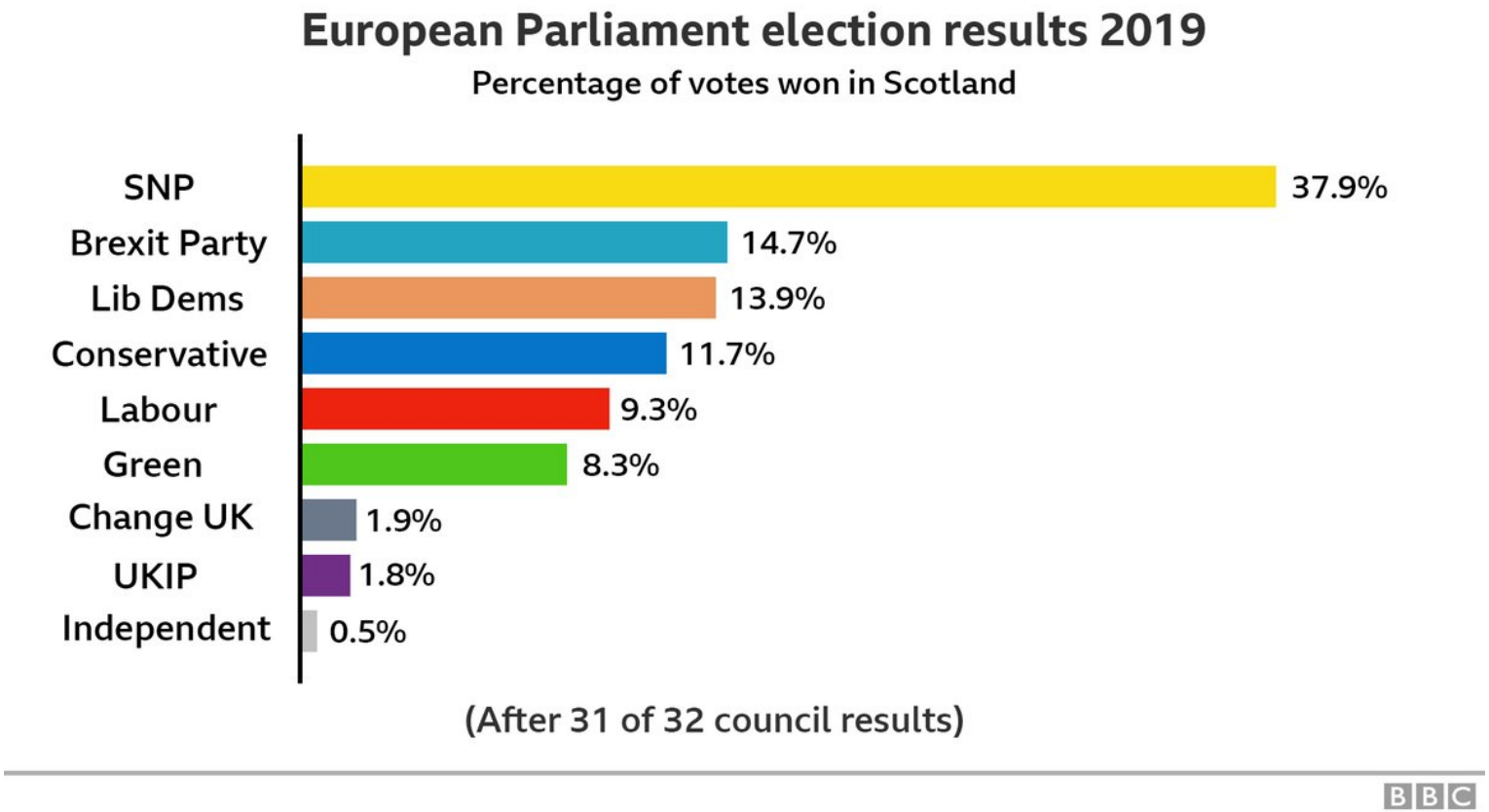


[- WHAT WE DO : -] : EXPLICIT COMPARISONS



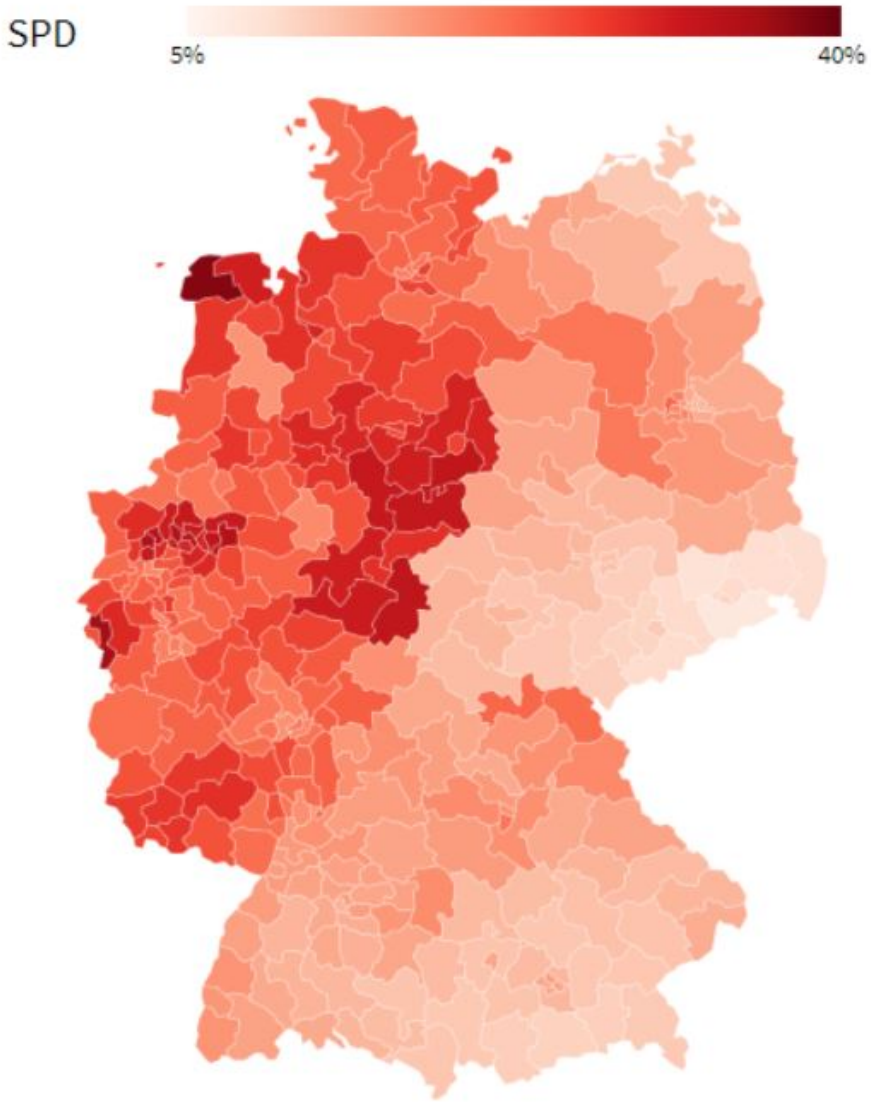
[- WHAT WE DO : -] : EXPLICIT COMPARISONS

length...

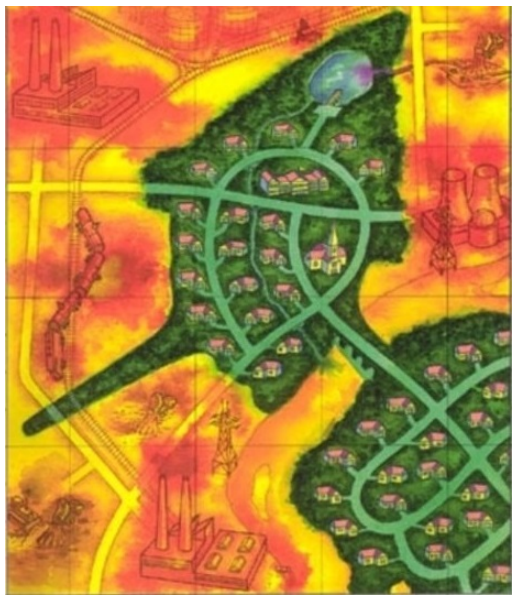


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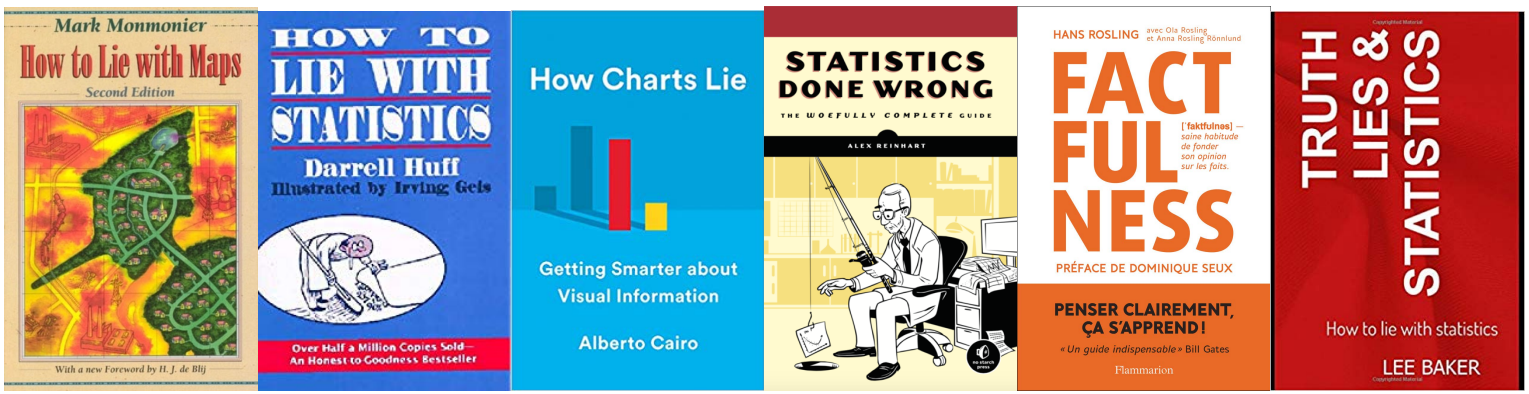
colors...



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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10+ rules for "lying" in a future paper ?

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Is **Not**
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My goal :

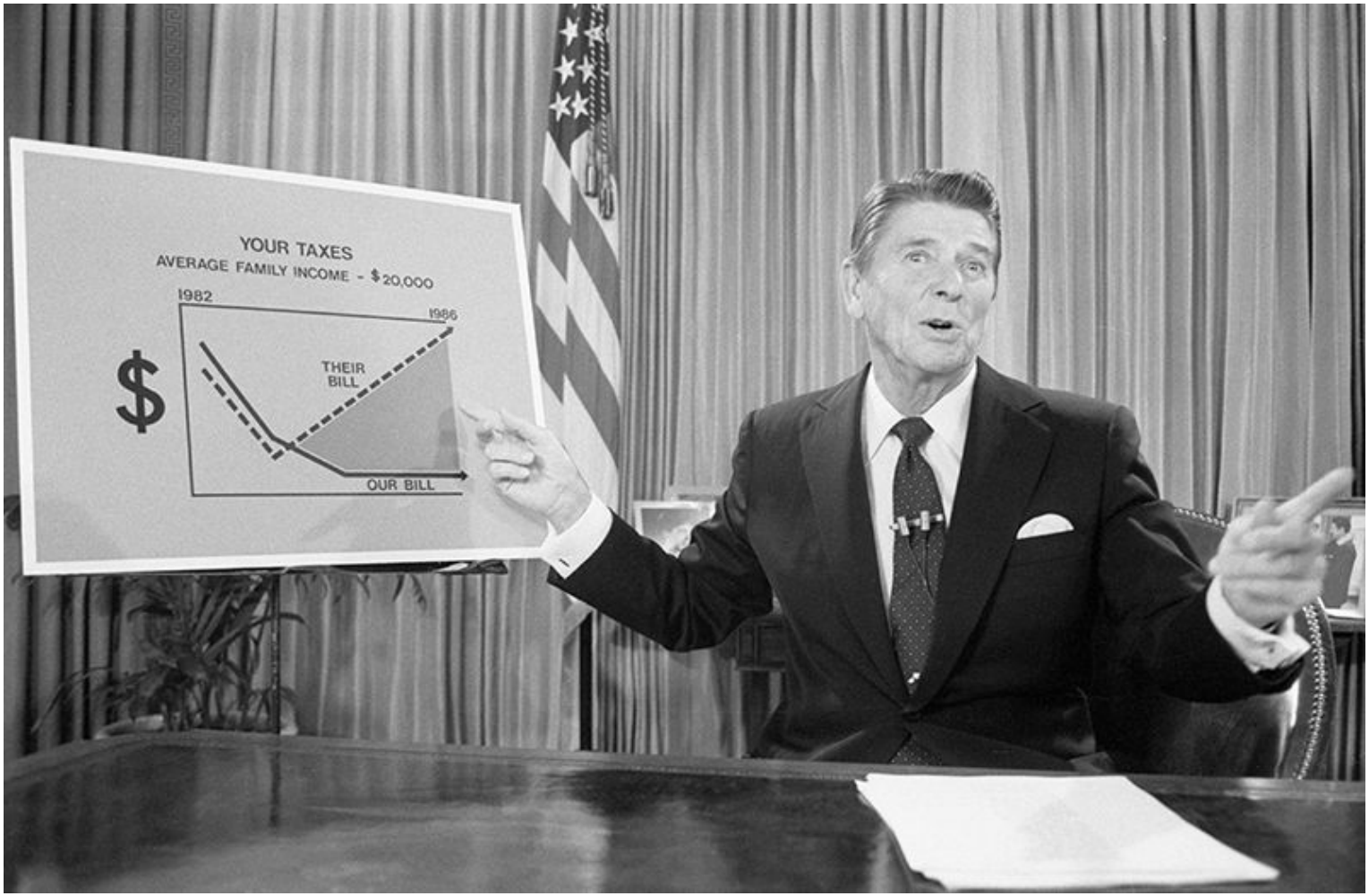
Decipher graphics and identify visual lies

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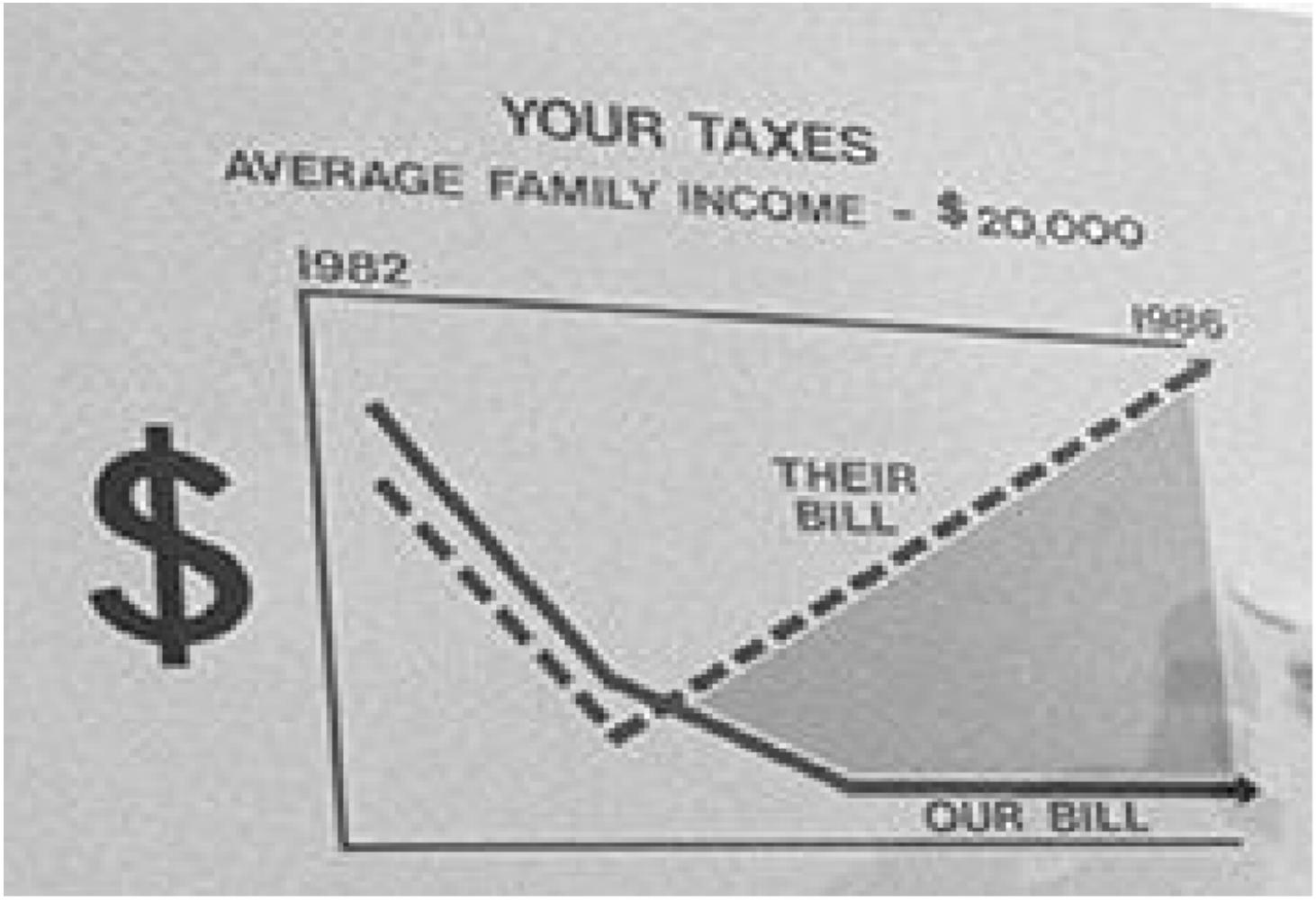
10+ rules for "lying" in a future paper ?

At least, it is **fun** !

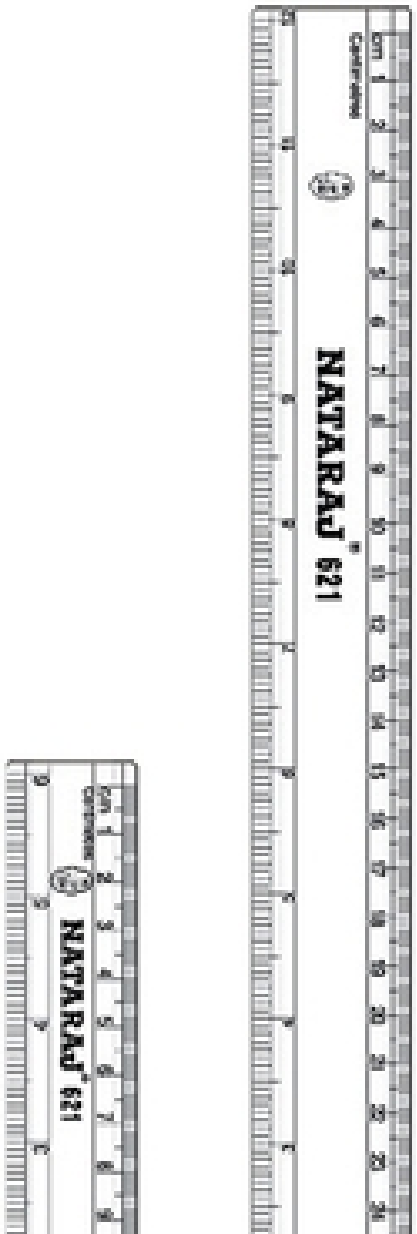
[- VISUAL LIES ARE POPULAR -]



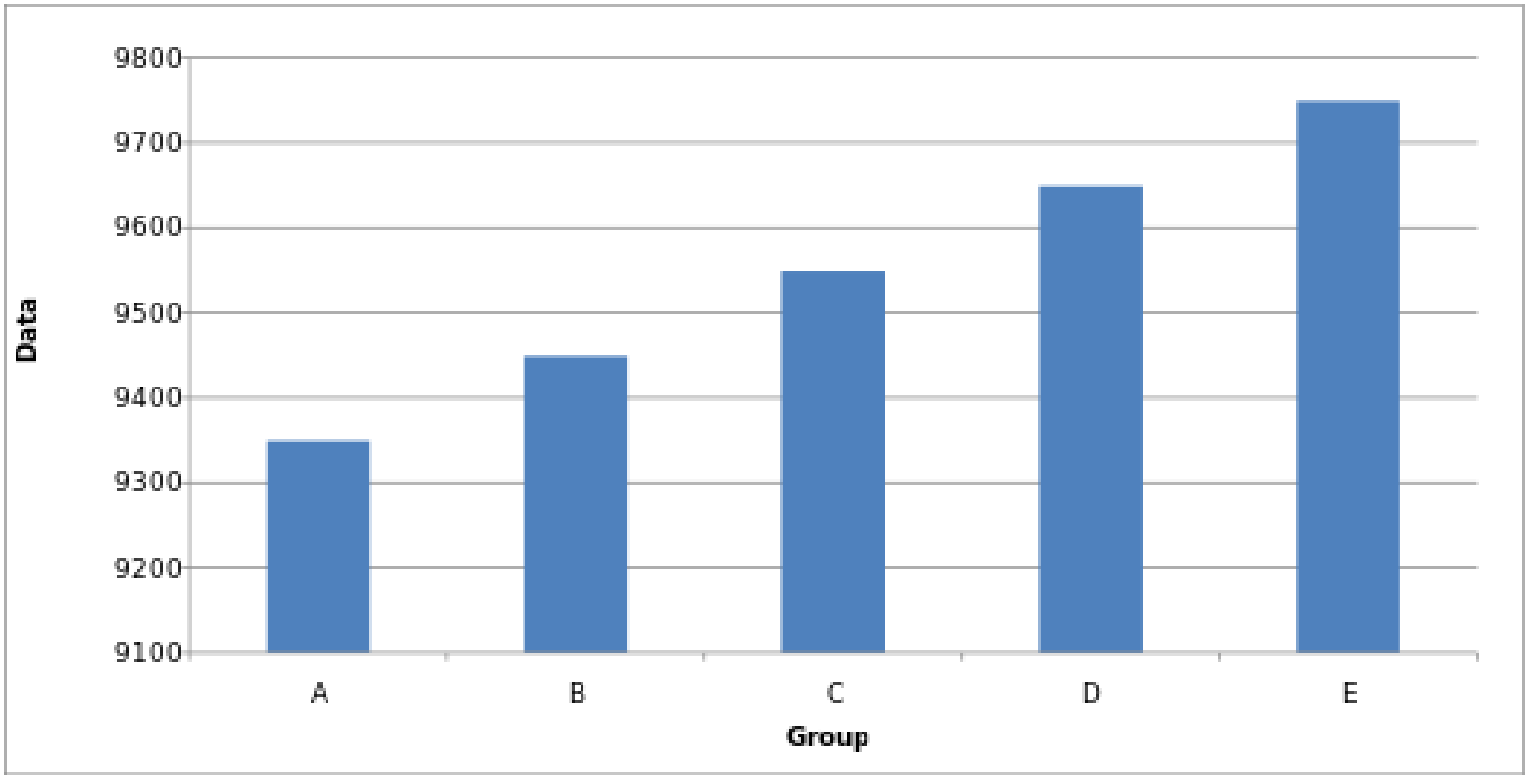
[- VISUAL LIES ARE POPULAR -]



[- Rule #1 : Use devilish axis ! -]

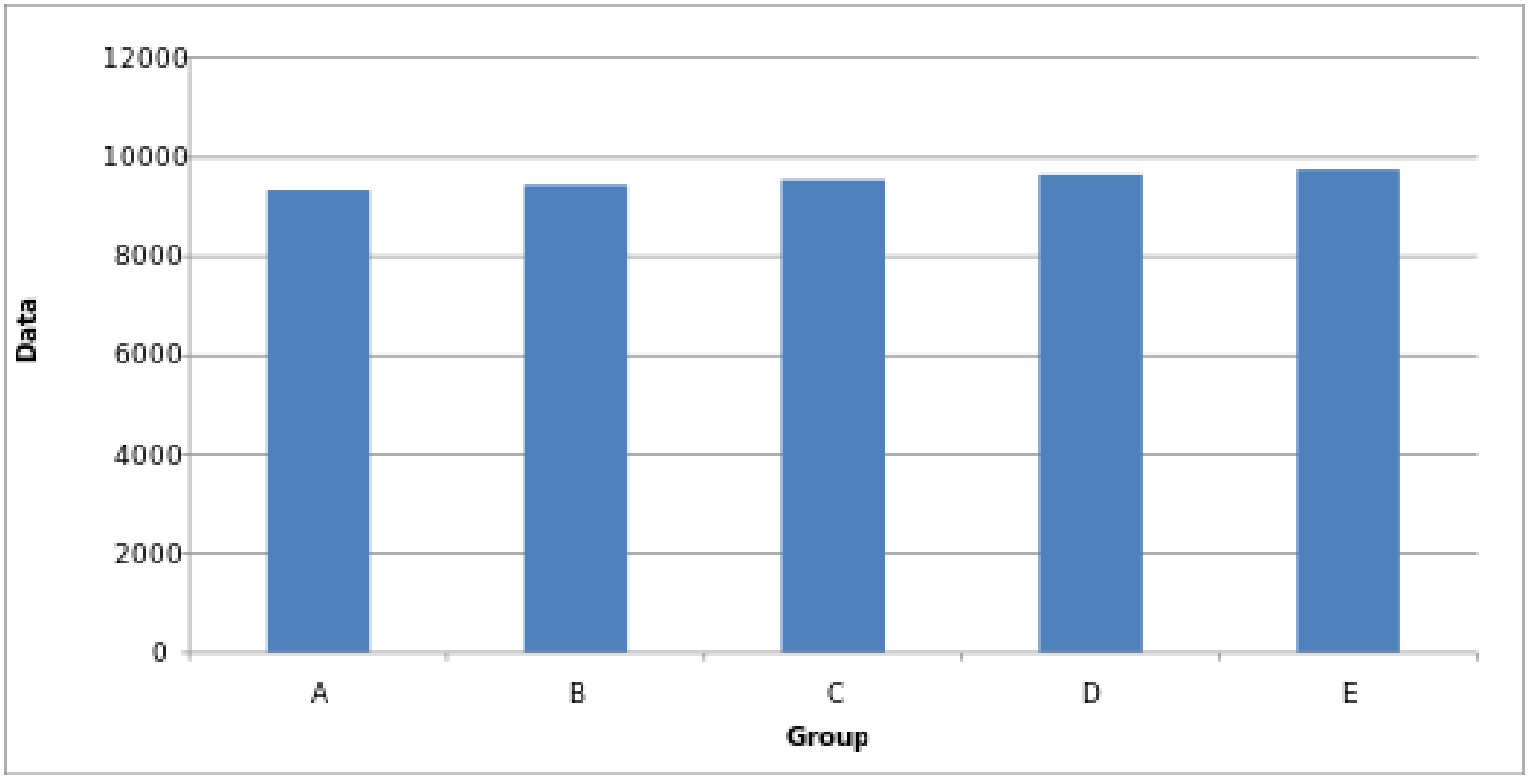


[-Rule #1 : Use devilish (truncated) axis ! -]



Source : Wikipedia: Misleading graph

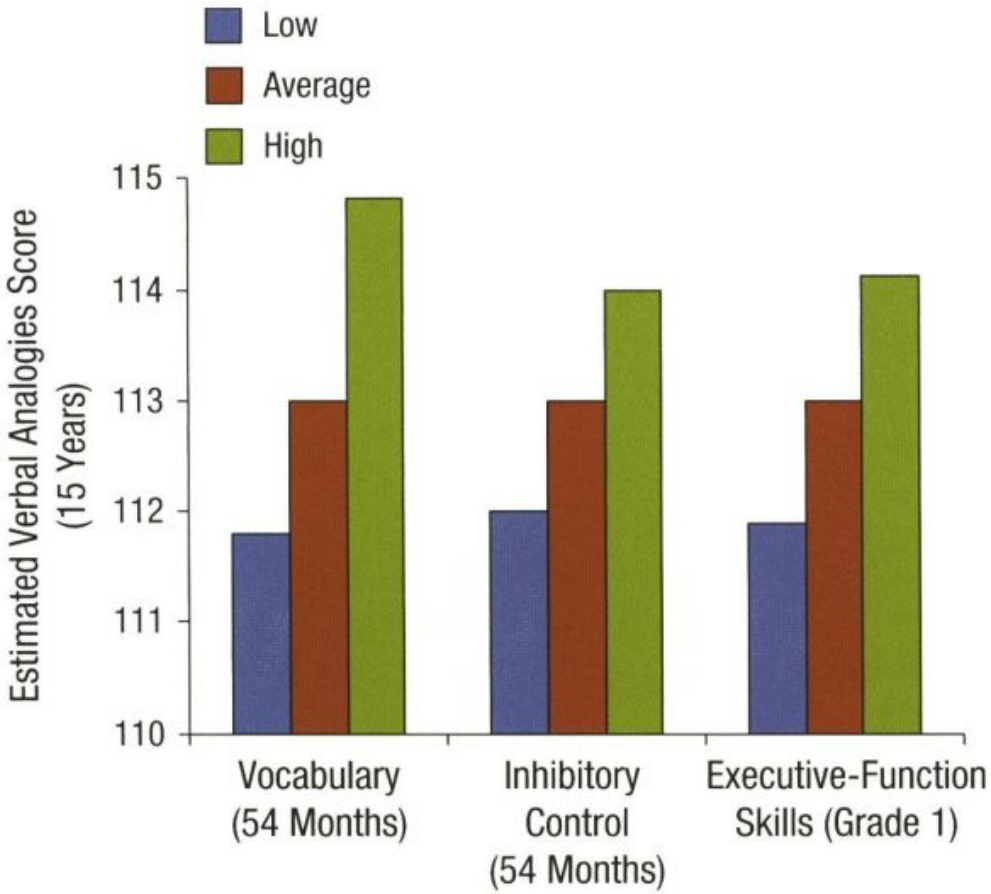
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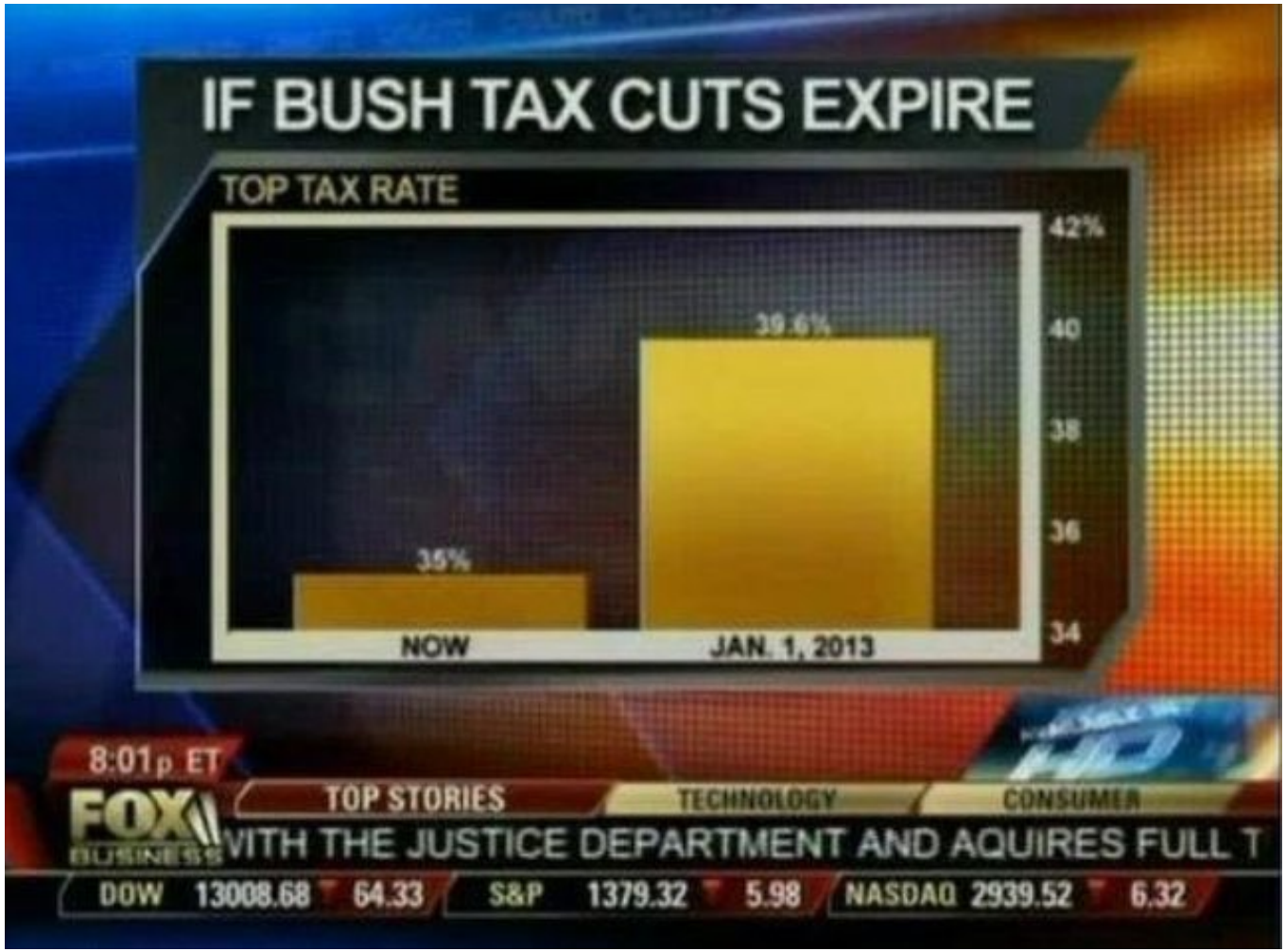
Example : Published paper



Source : Richland and Burchinal (2013)

[-Rule #1 : Use devilish (truncated) axis !-]

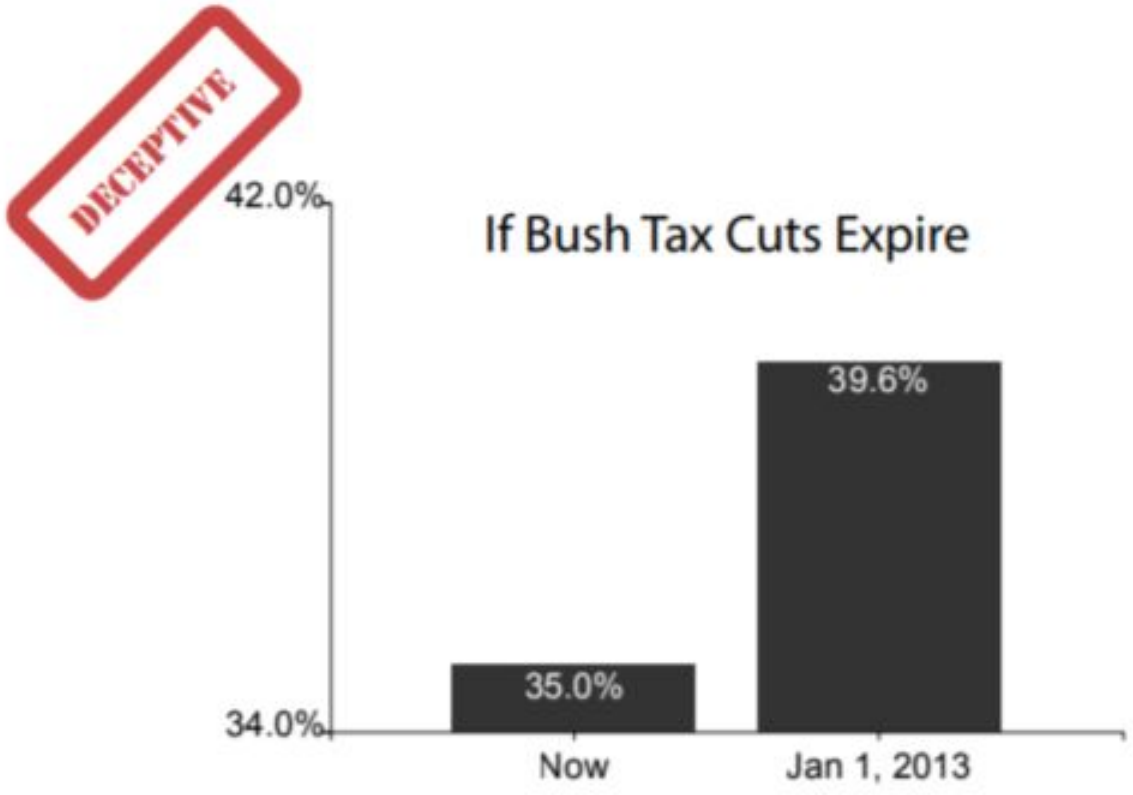
Example : Fox news



Source : Techna Verba Scripta

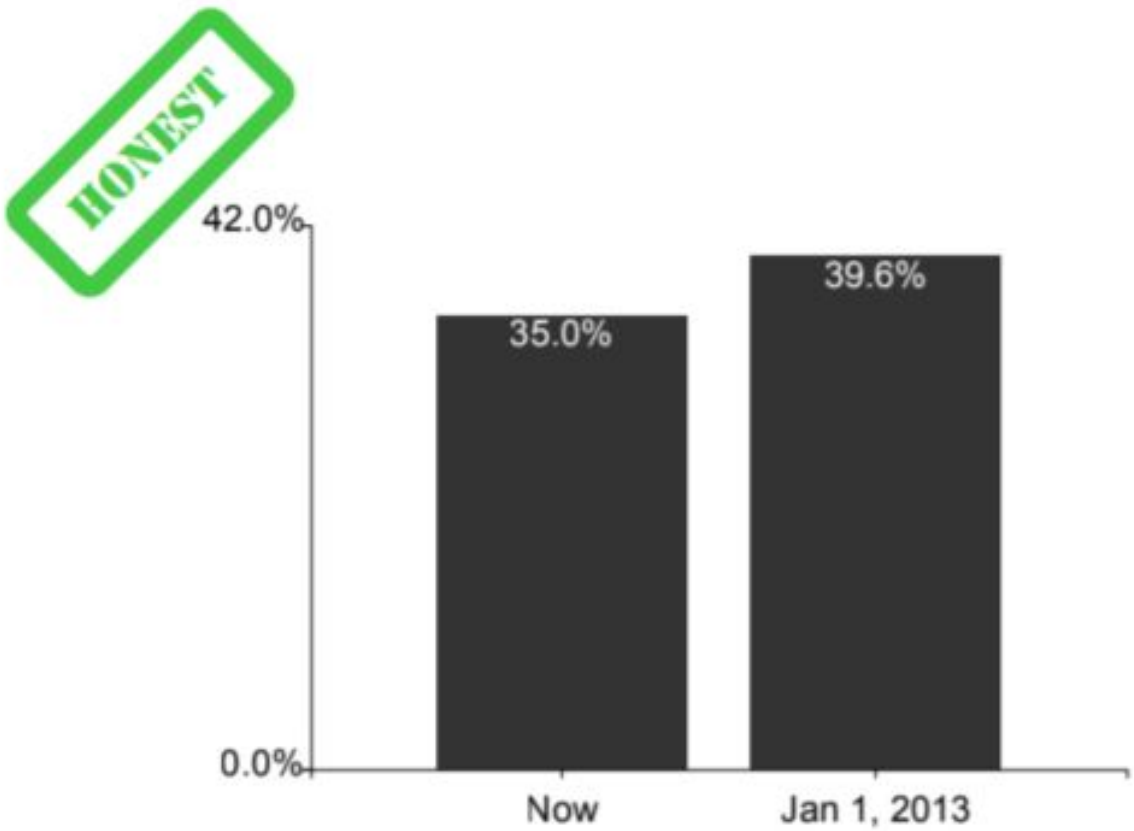
[-Rule #1 : Use devilish (truncated) axis !-]

So this is bad :



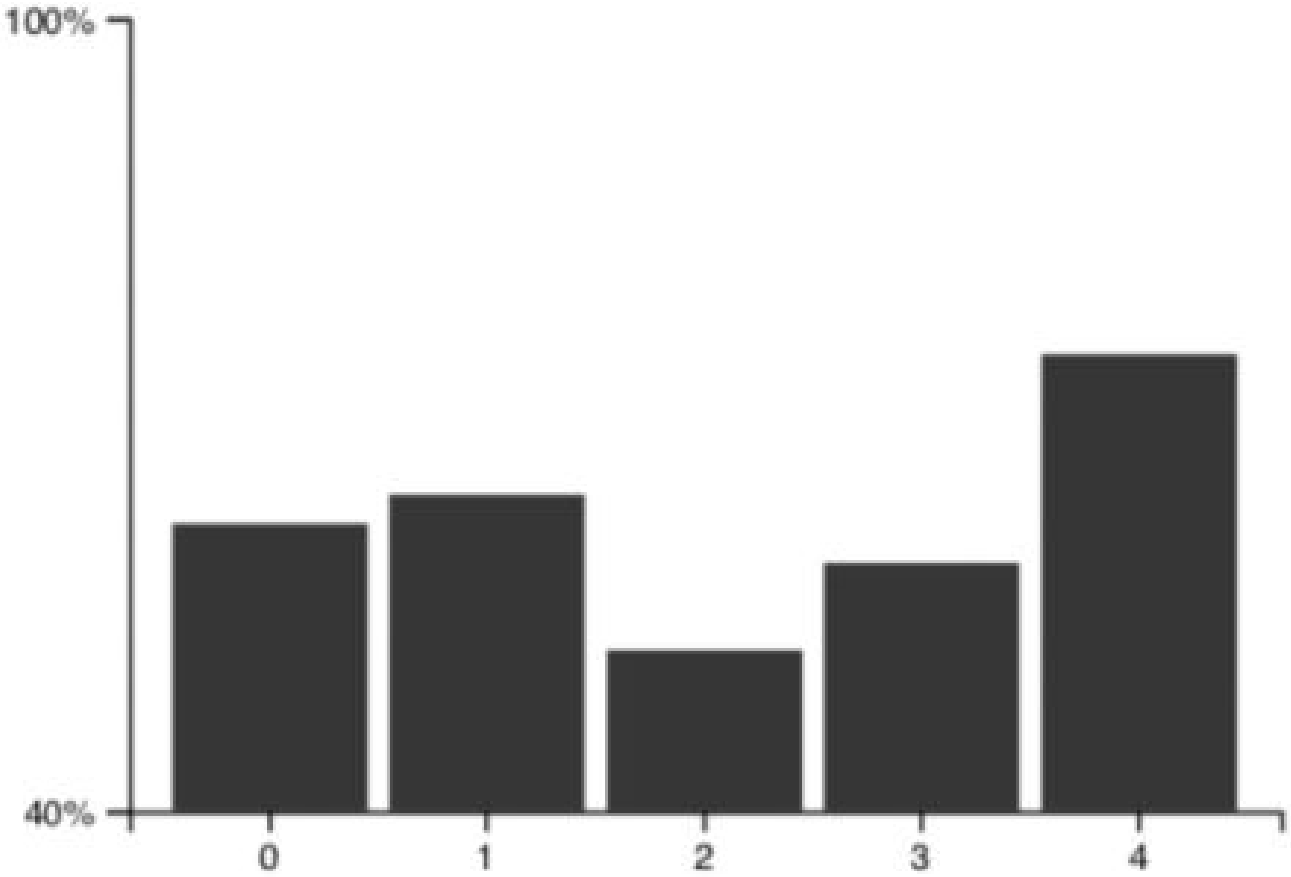
[-Rule #1 : Use devilish (truncated) axis !-]

This is good :



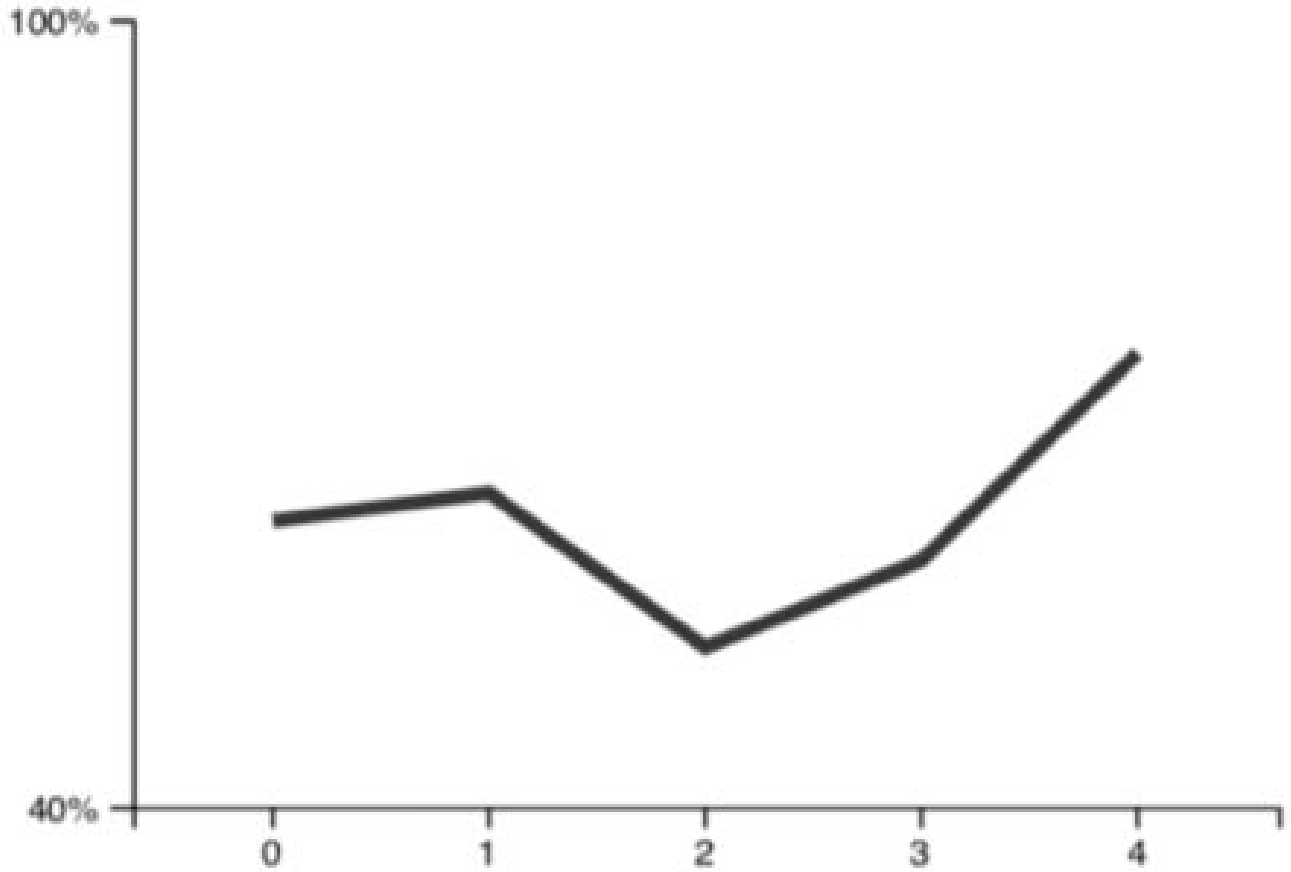
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This is also bad :



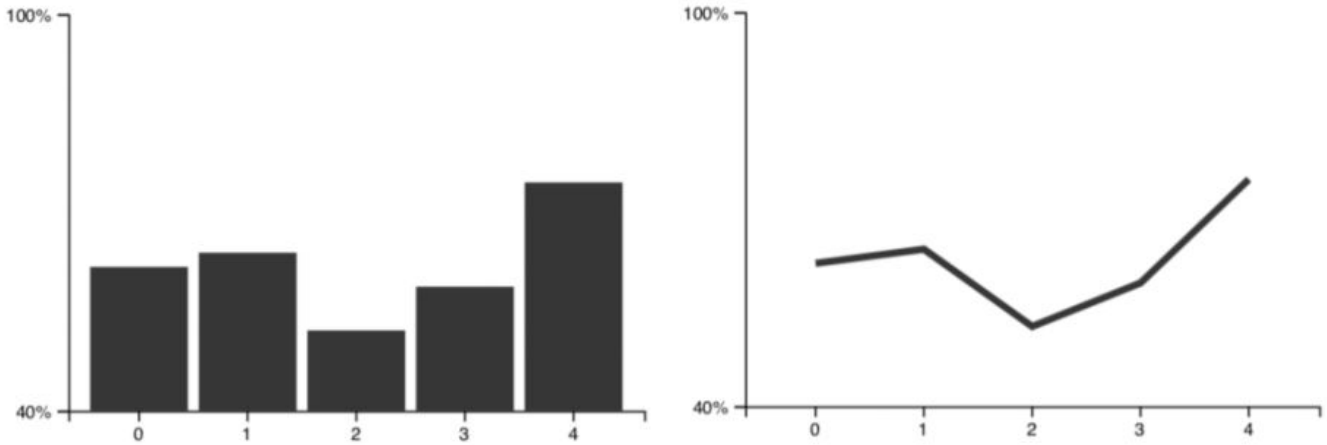
[-Rule #1 : Use devilish (truncated) axis !-]

Bad or good ?



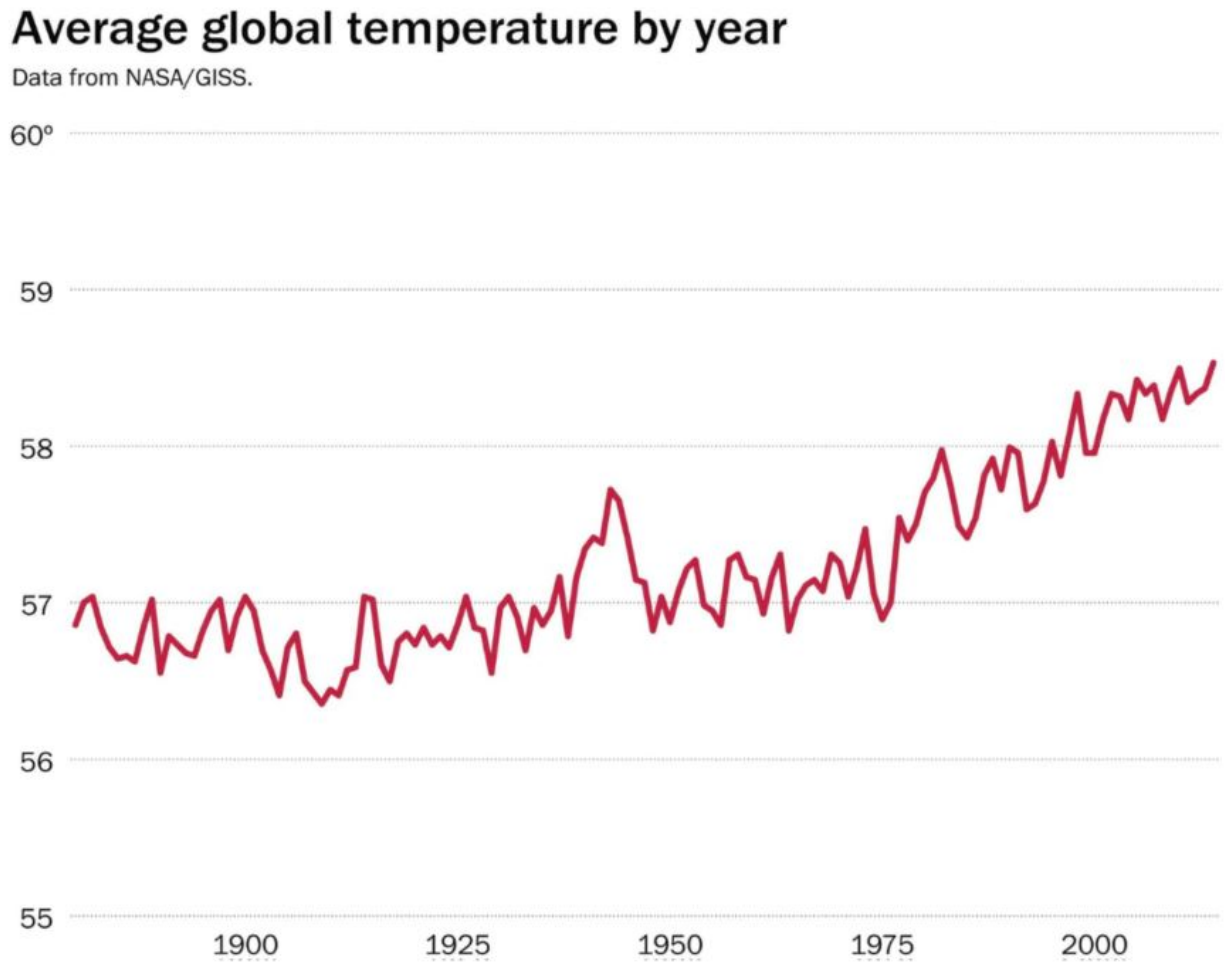
[-Rule #1 : Use devilish (truncated) axis !-]

Correll et al. (2019) show empirically that there is :
*“ no robust difference (...) : truncation serves to exaggerate effect sizes in **both** types of graphs.”*



[-Rule #1 : Use devilish (truncated) axis !-]

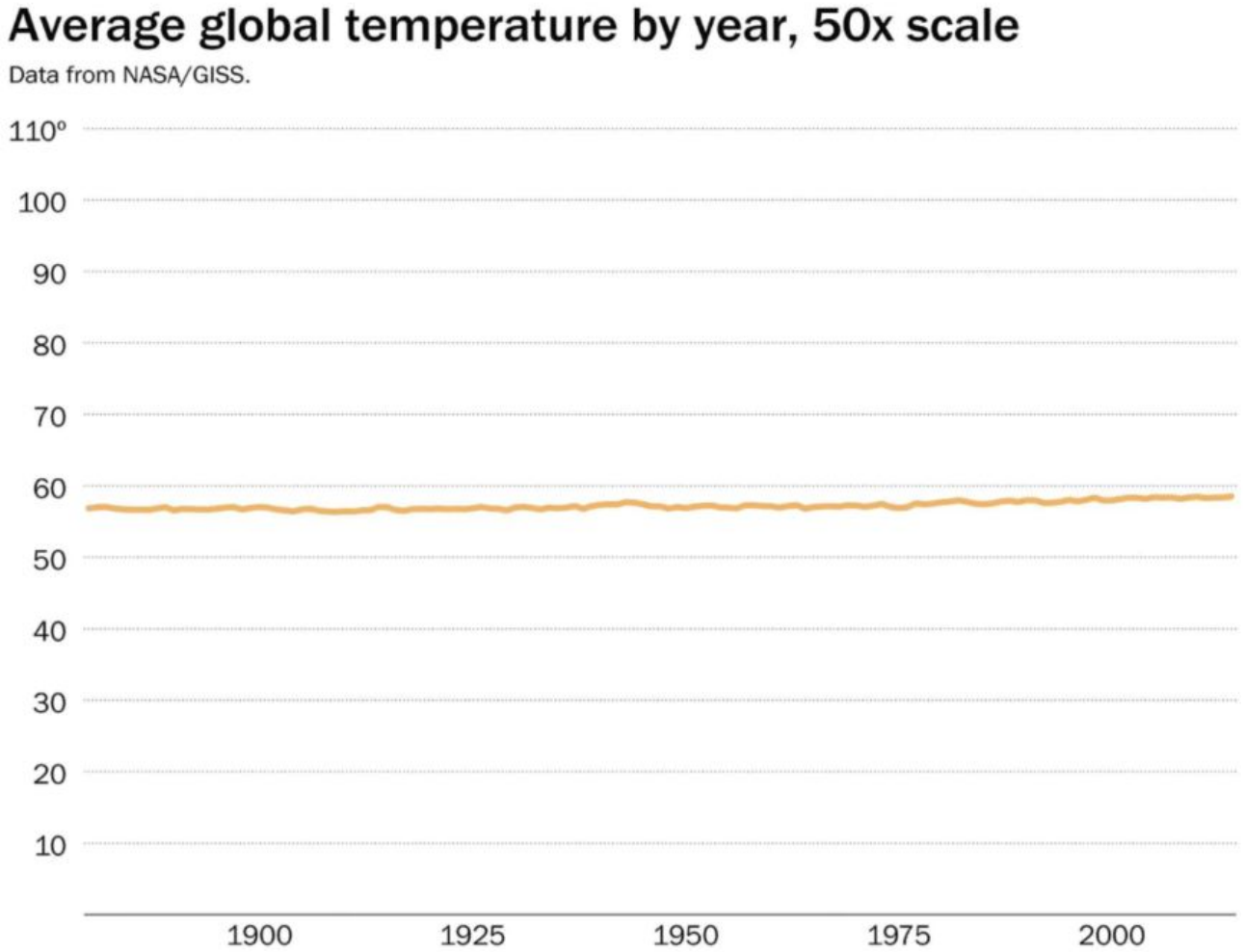
Bad ?



Washington Post (December, 2015)

[-Rule #1 : Use devilish (truncated) axis !-]

Good ?

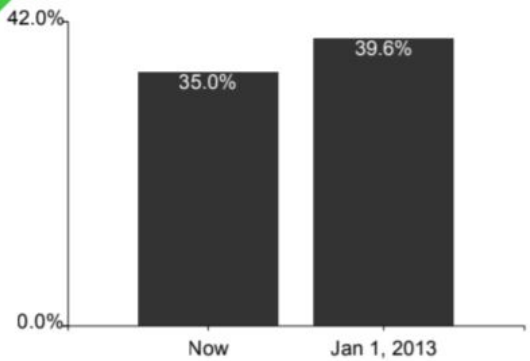


Washington Post, reproducing National Review (December, 2015)

[-Rule #0 : Lying is easy ! -]

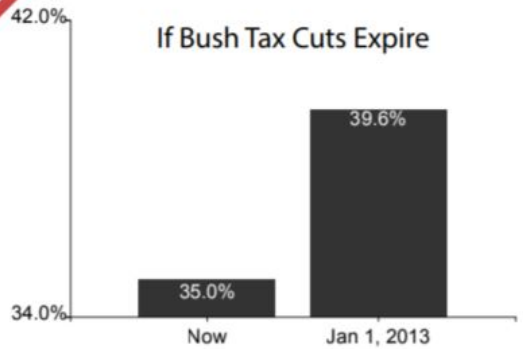
Ruling is hard !

HONEST



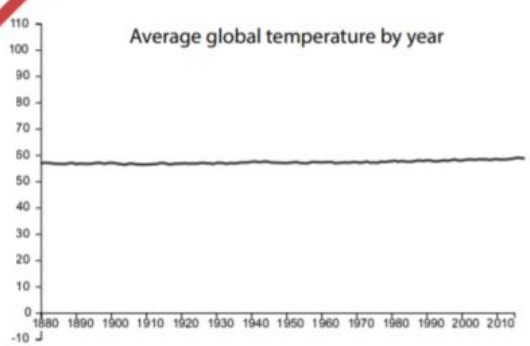
(a)

DECEPTIVE



(b)

DECEPTIVE



(c)

HONEST



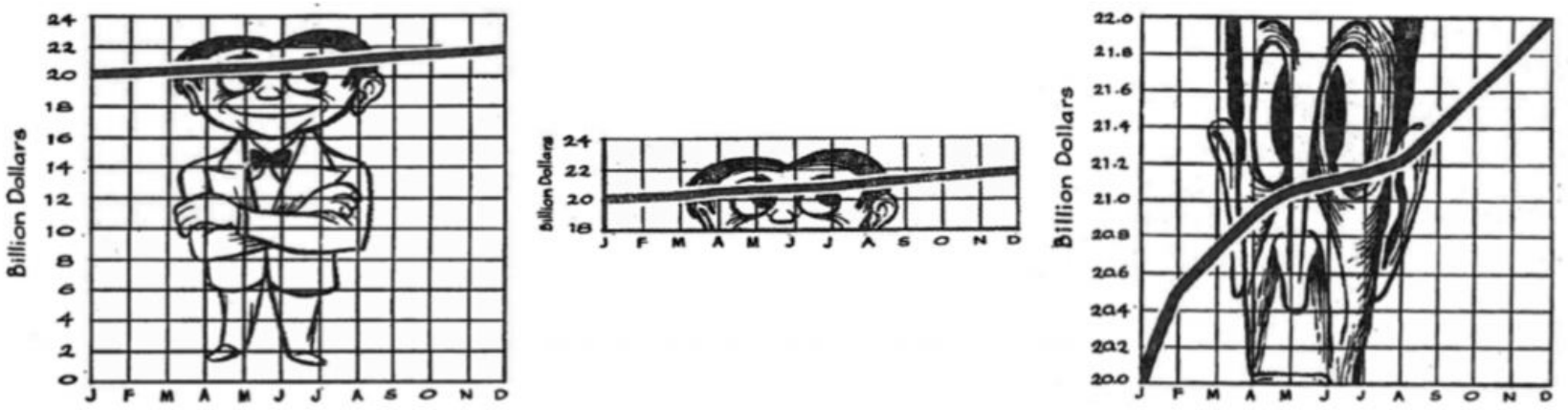
(d)

[-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) $\cdots$

[-Rule #0 : Lying is easy ! -]

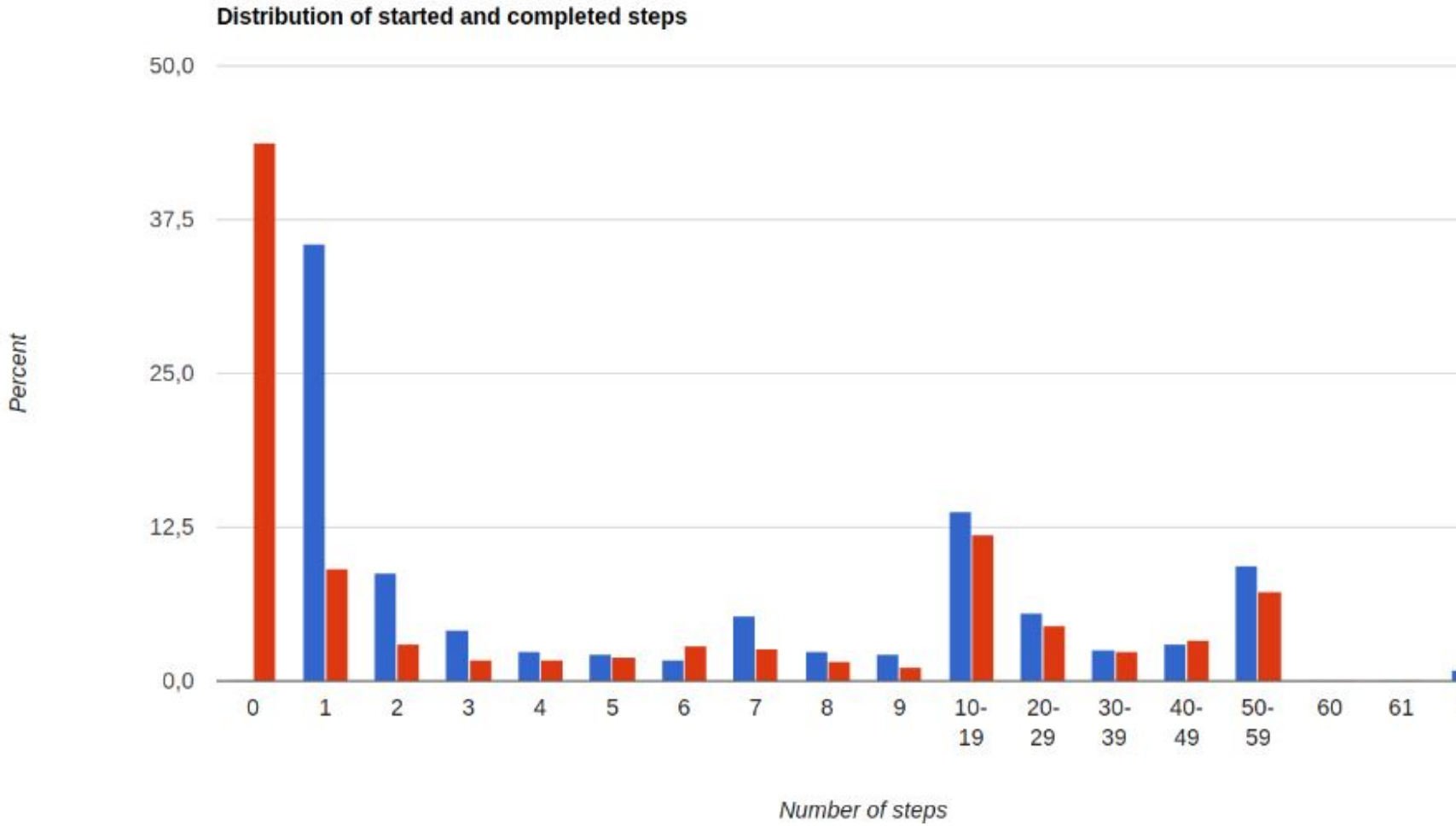
So **lying** is easy :



From Huff (1993)

[-Rule #0 : Lying is easy ! -]

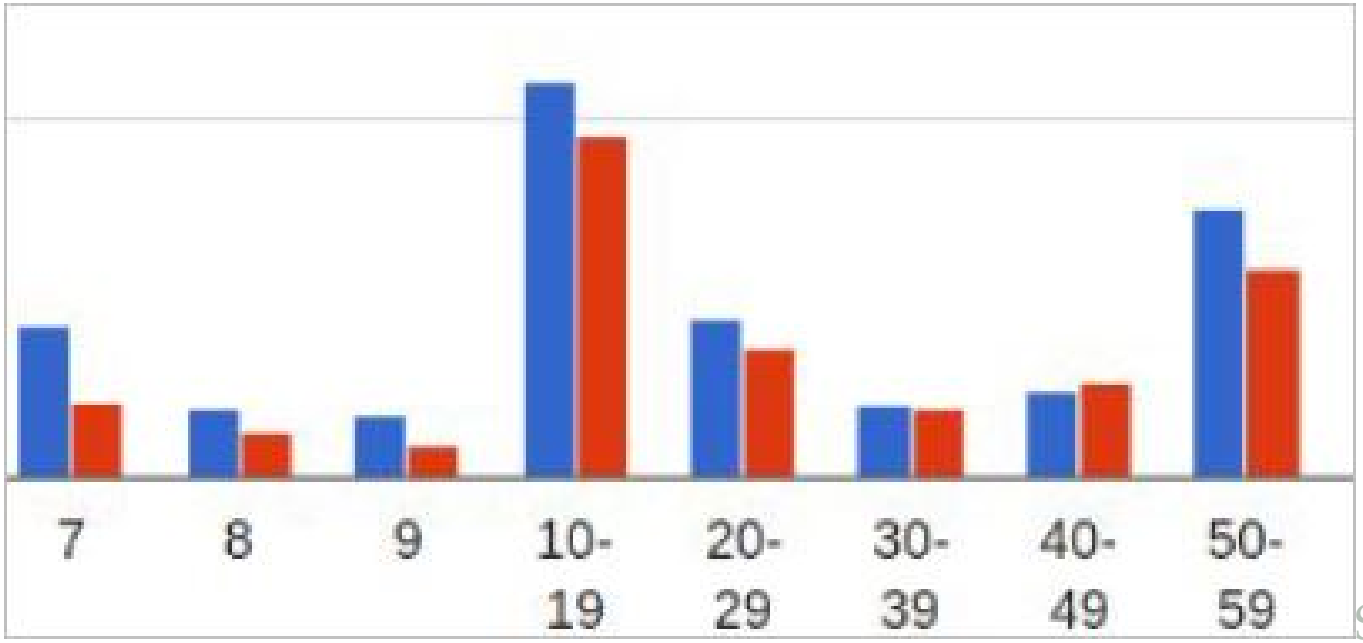
Examples are common !



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

[-Rule #0 : Lying is easy ! -]

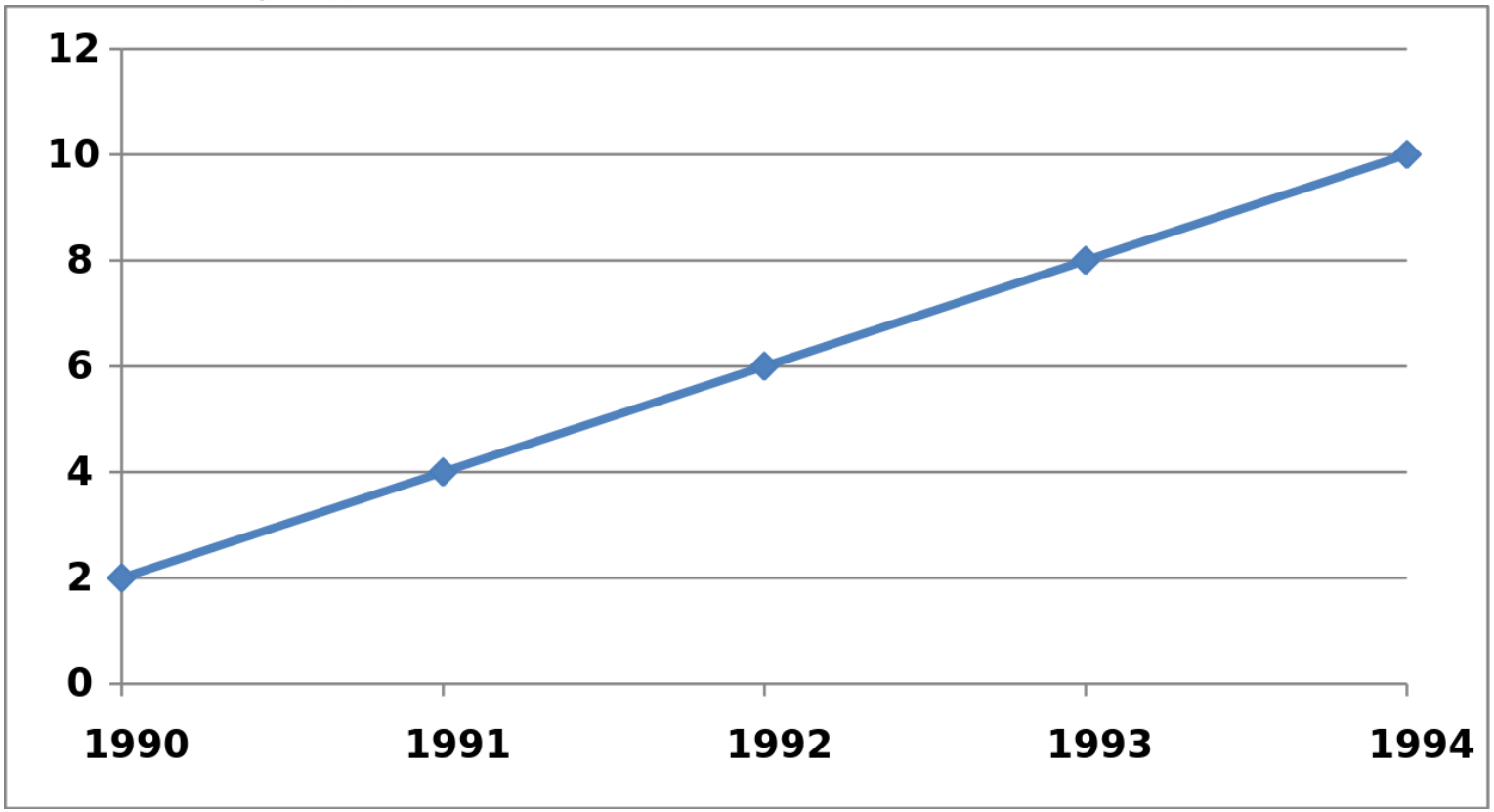
Examples are common !



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

[-Rule #2-bis : Play with scales !-]

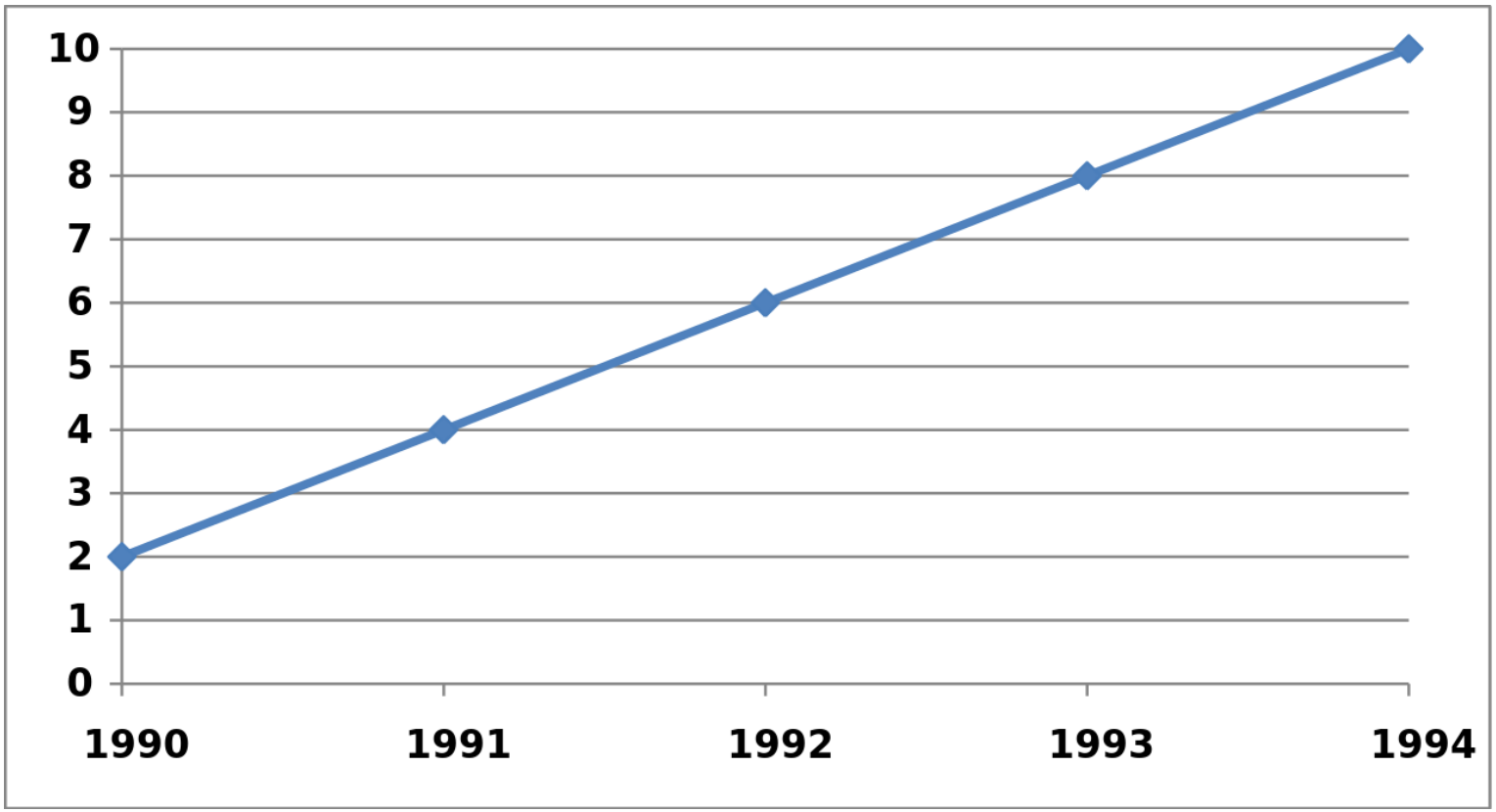
Here is a graphic



Source : Wikipedia: Misleading graph

[-Rule #2-bis : Play with scales !-]

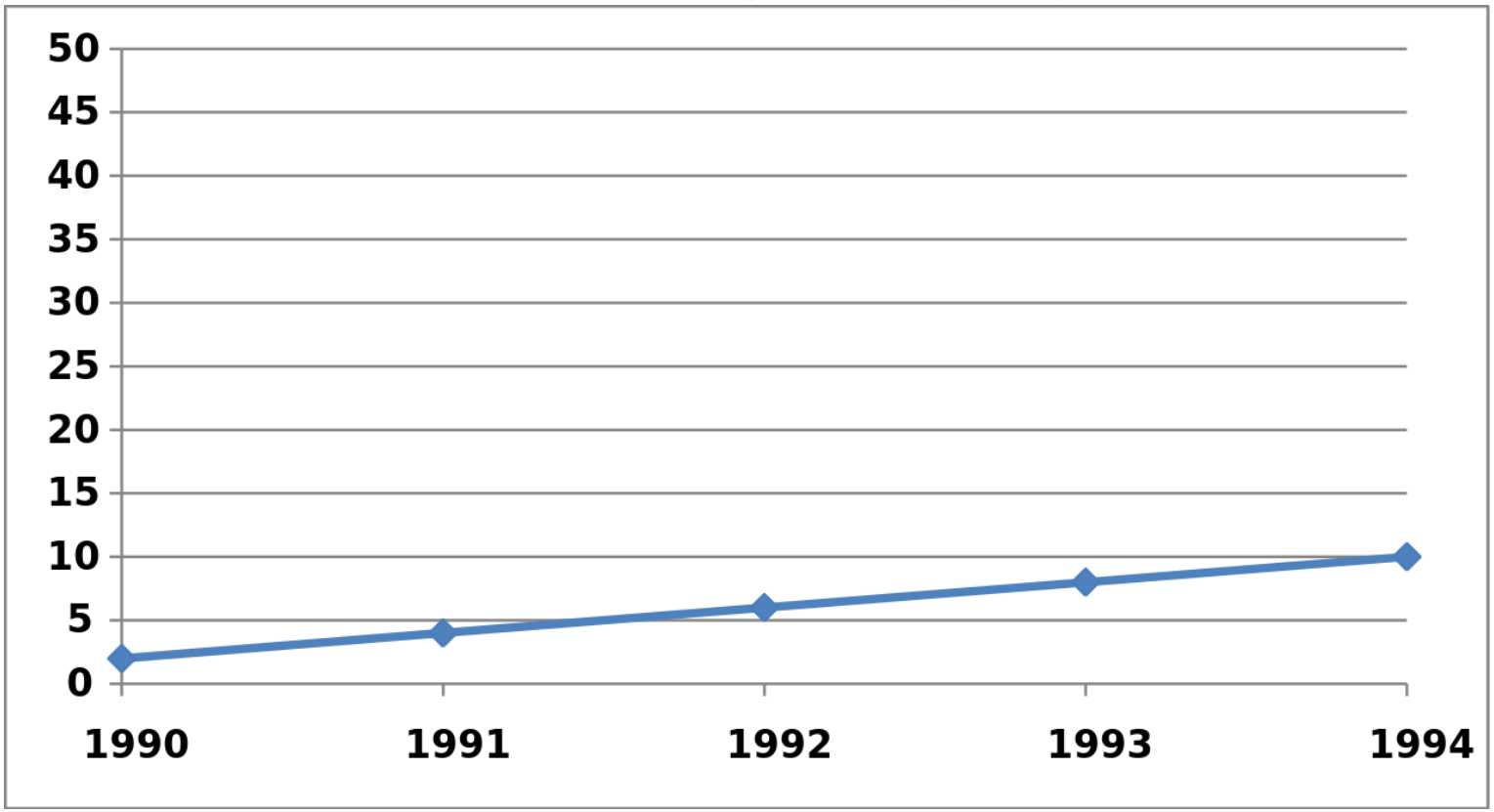
The same with a different **Y**-axis...



Source : Wikipedia: Misleading graph

[-Rule #2-bis : Play with scales !-]

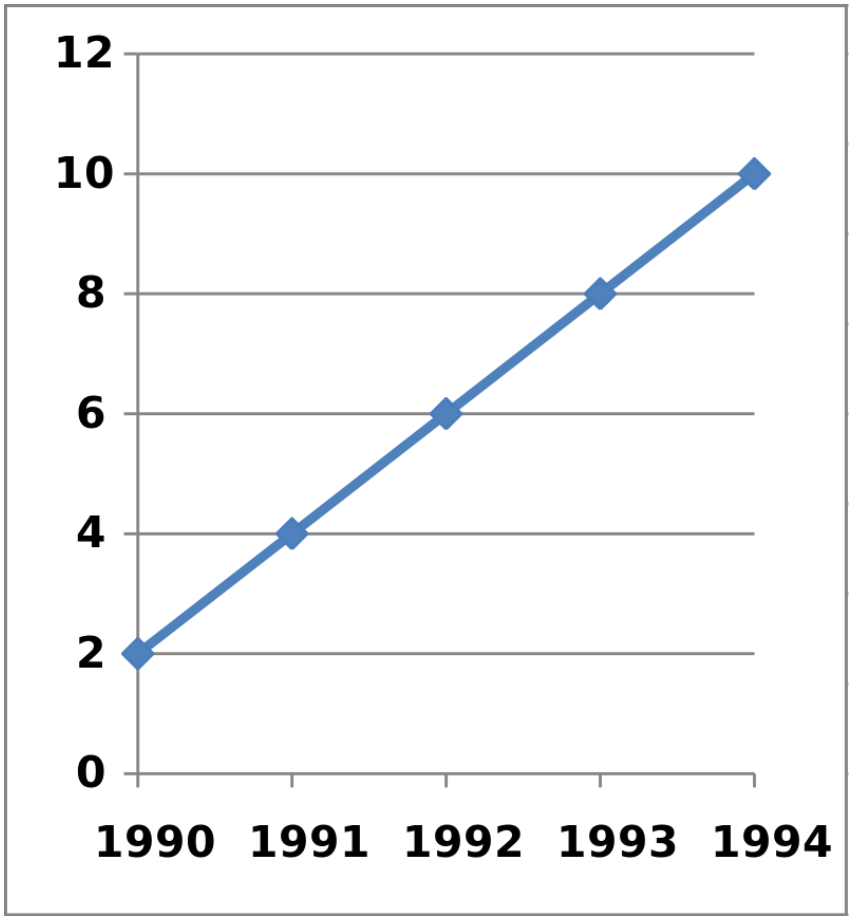
The same with a **Y**-axis that goes way beyond max(Y)...



Source : Wikipedia: Misleading graph

[-Rule #2-bis : Play with scales !-]

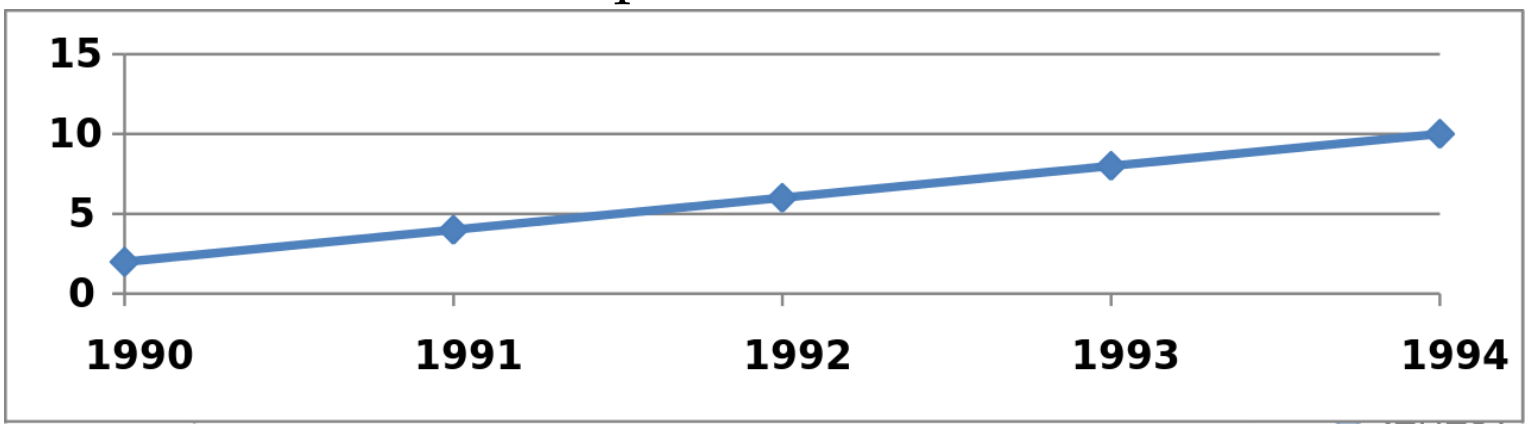
The same with a shrinked **X**-axis



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-]

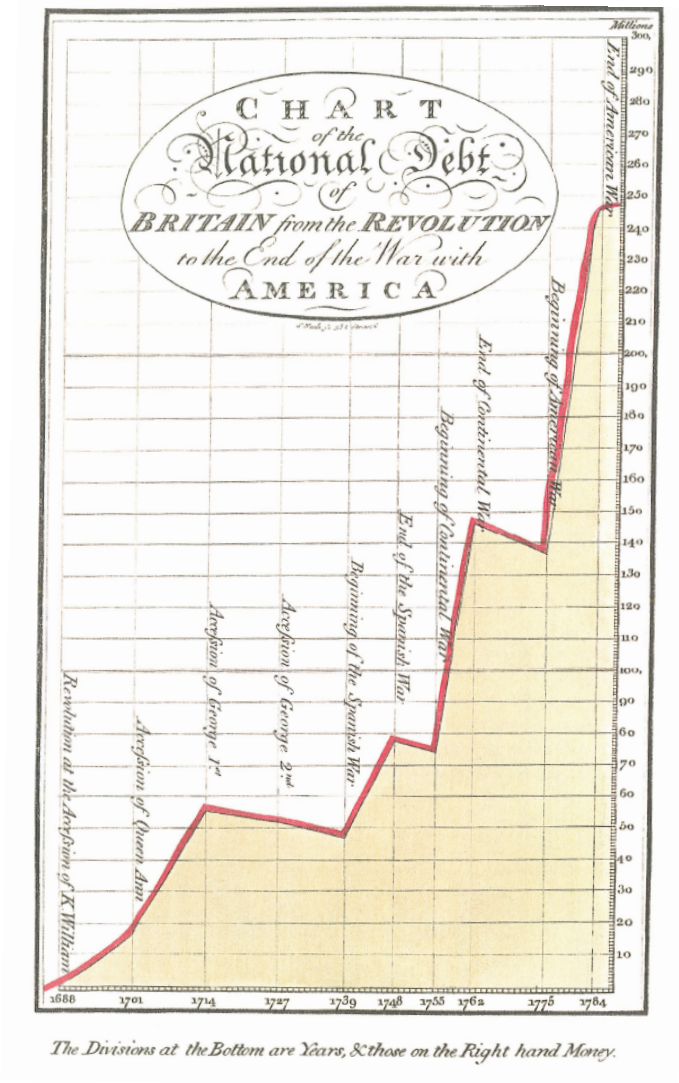


FIGURE – Source : Tufte (2001) from Playfair(1786).

[-RULE #2-BIS : EXAMPLE-]

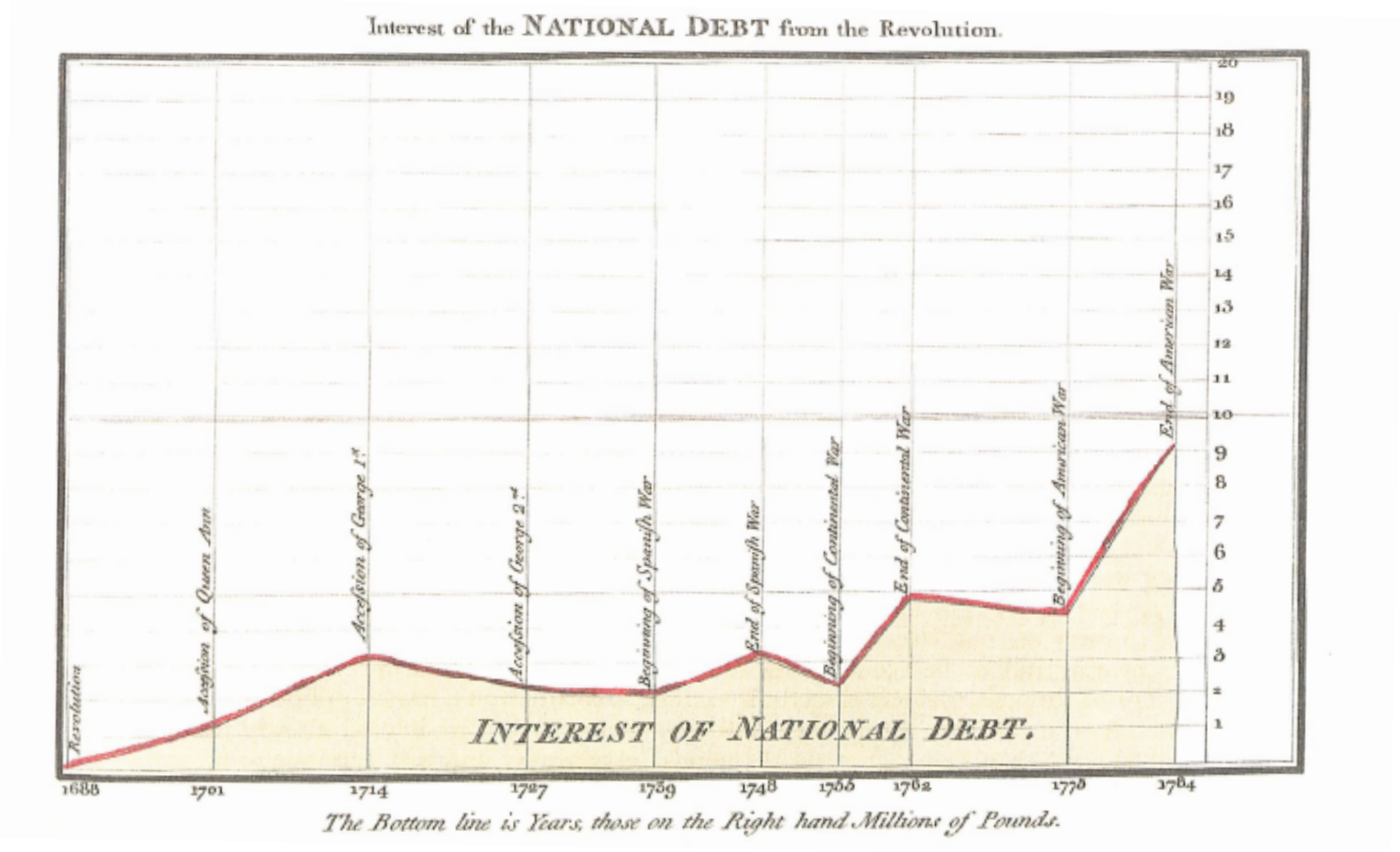
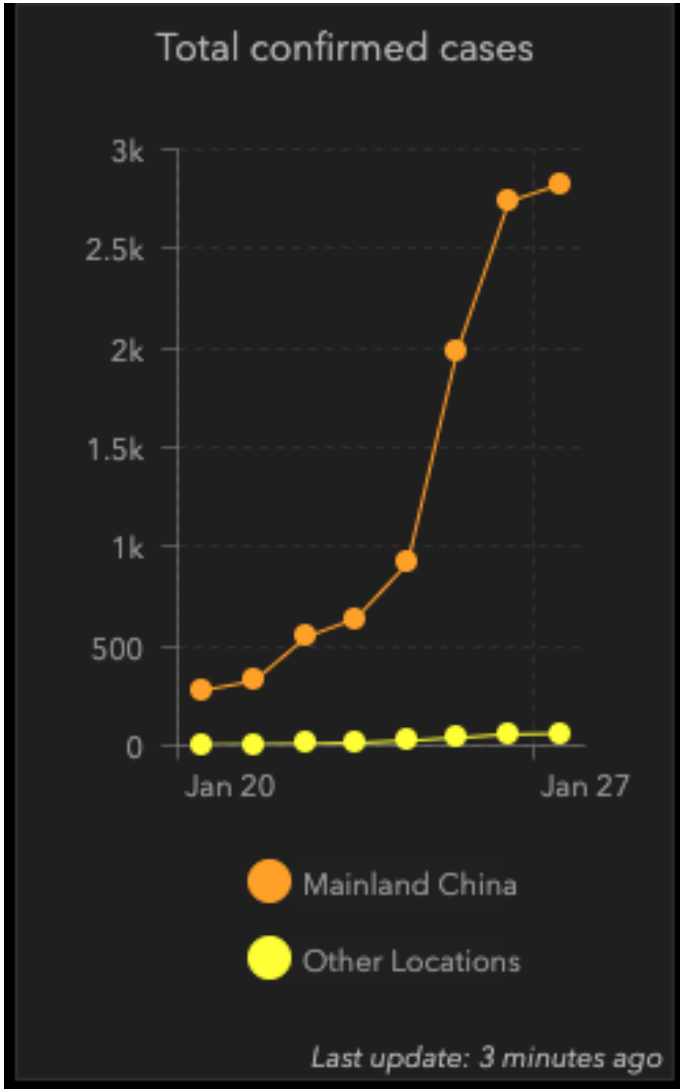


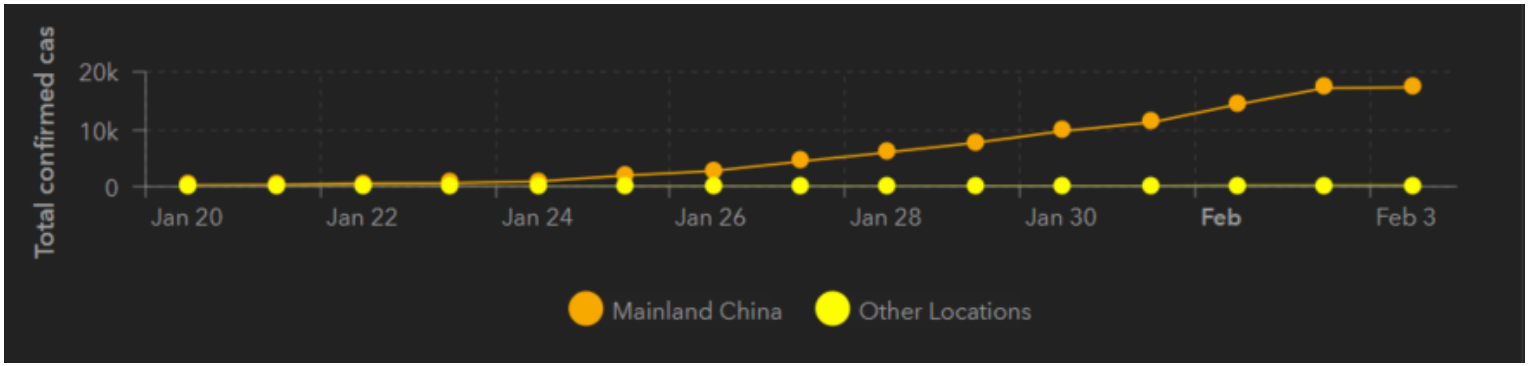
FIGURE – Source : Tufte (2001) from Playfair(1786).

[-Applying Rule #2-bis : Coronavirus-]



Source : Science Alert (2020)

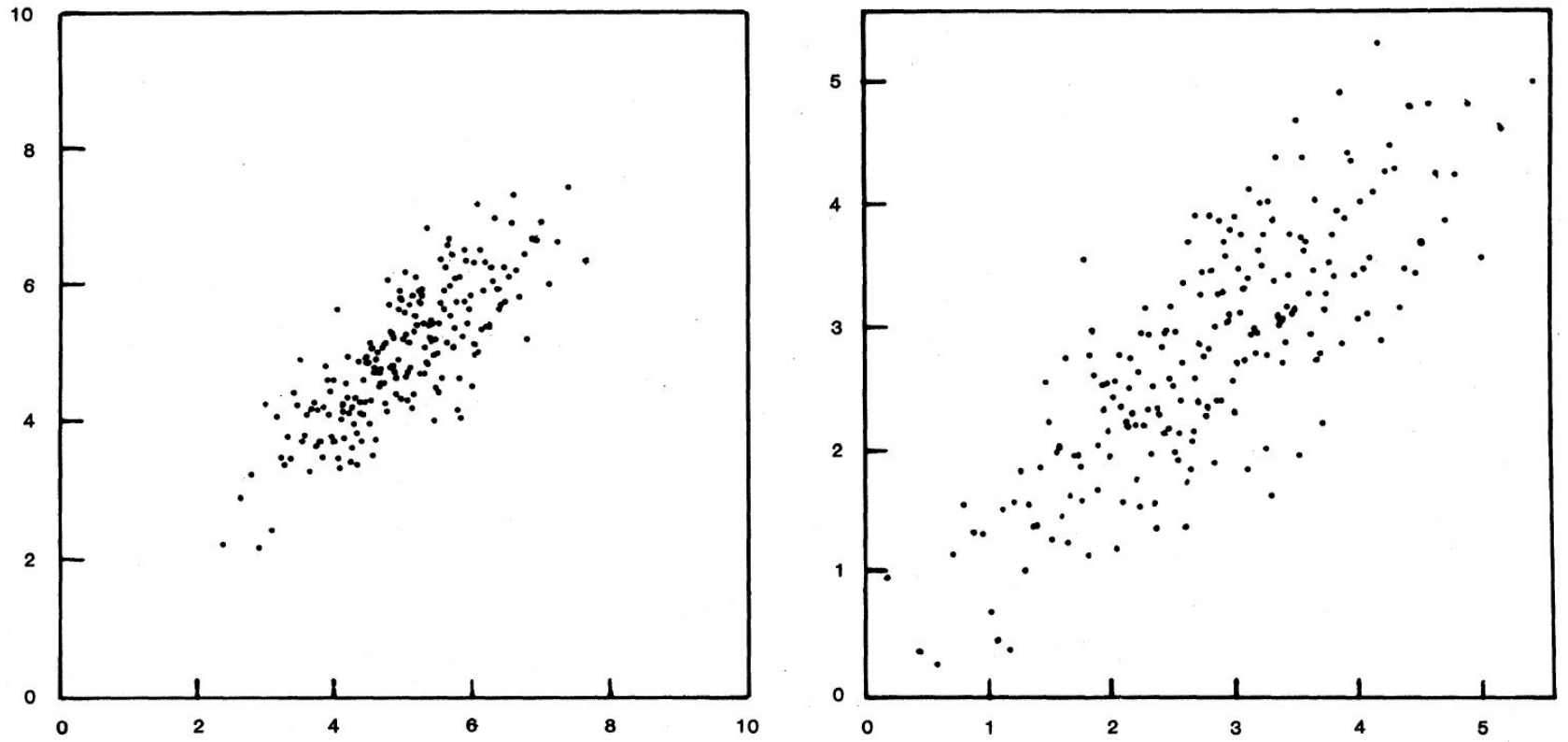
[-Applying Rule #2-bis : Coronavirus-]



Source : John Hopkins CSSE (2020)

[-Rule #2-bis : Subtle things... !-]

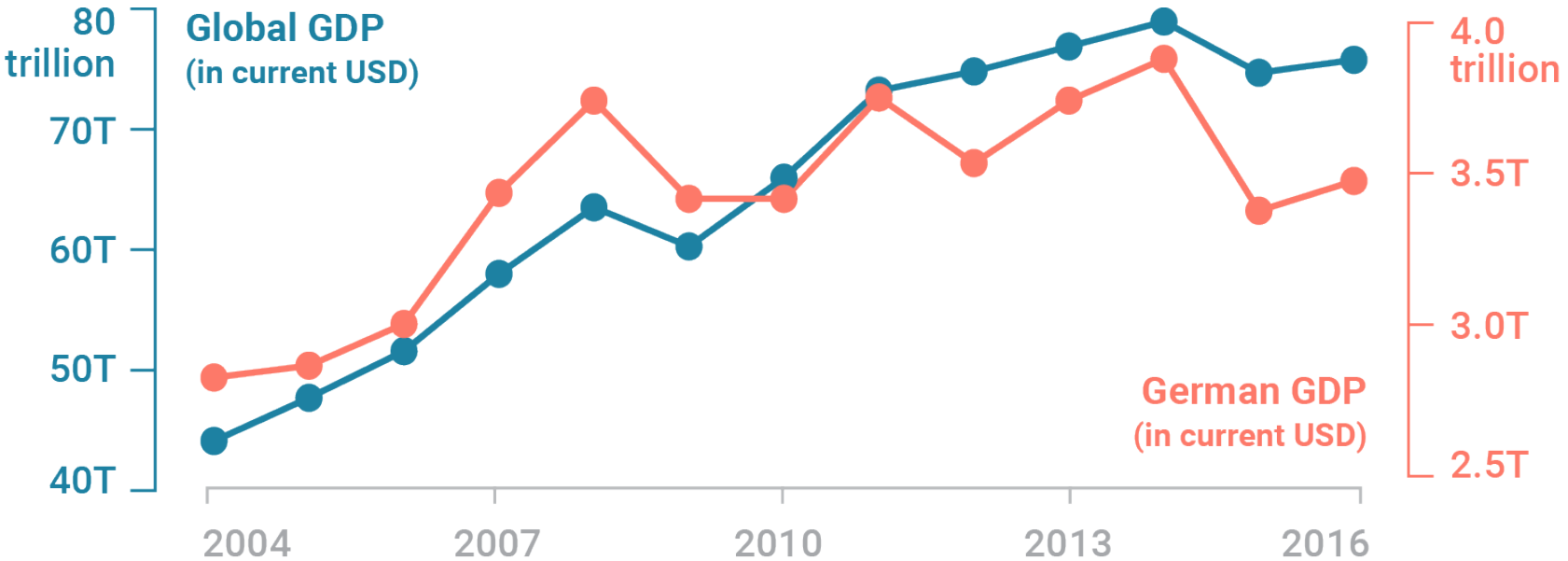
Which sample has the highest correlation ?



From Cleveland et al. (1982)

[- Rule #3 : Use double axes ! -]

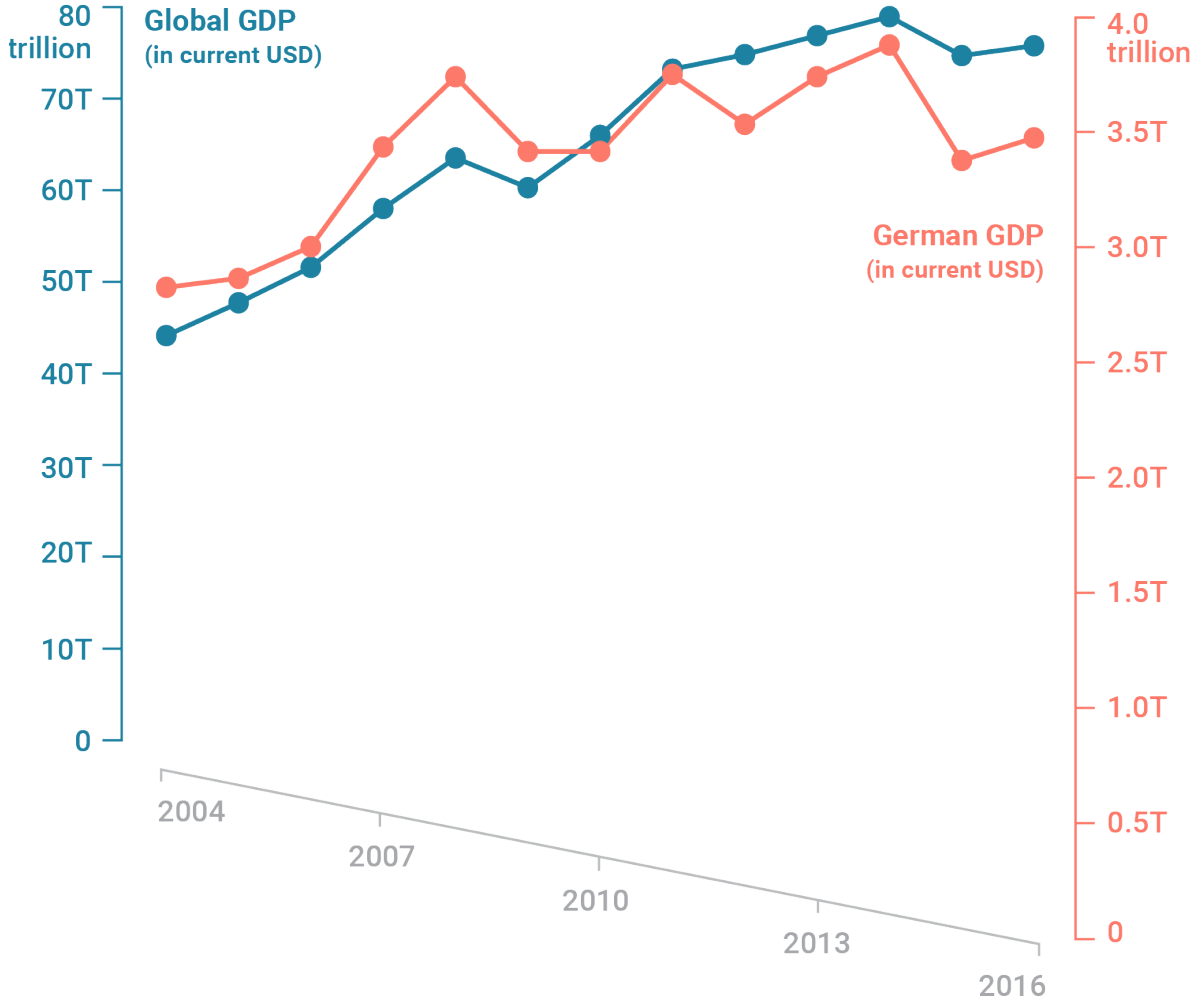
An apparently harmless example :



Source : Lisa Charlotte Rost, data from World bank

[- Rule #3 : Use double axes ! -]

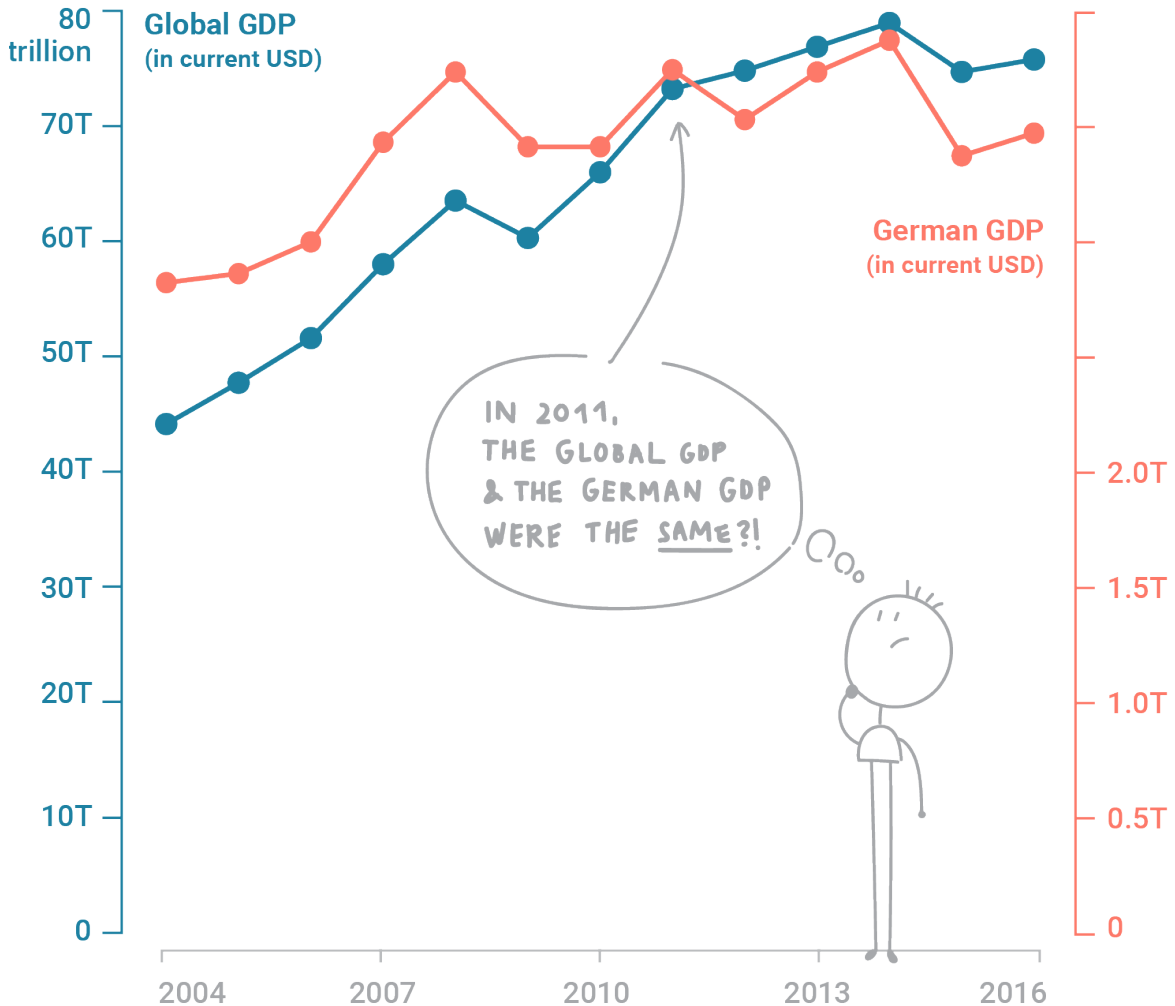
Zero baseline are not aligned !



Source : Lisa Charlotte Rost, data from World bank

[- Rule #3 : Use double axes ! -]

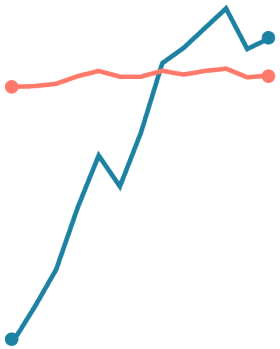
Does aligned zero baselines solve the problem ?



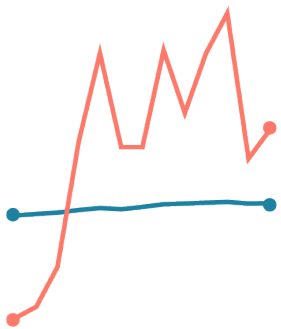
Source : Lisa Charlotte Rost, data from World bank

[- Rule #3 : Use double axes ! -]

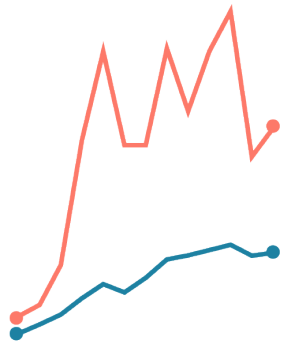
When playing with scales, anything may happen...



Orange steady,
Blue massively increasing.



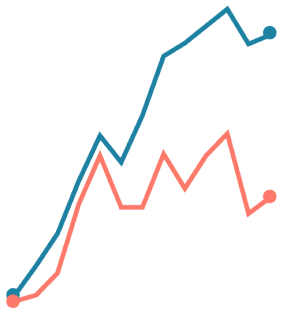
Blue steady,
Orange increasing.



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.

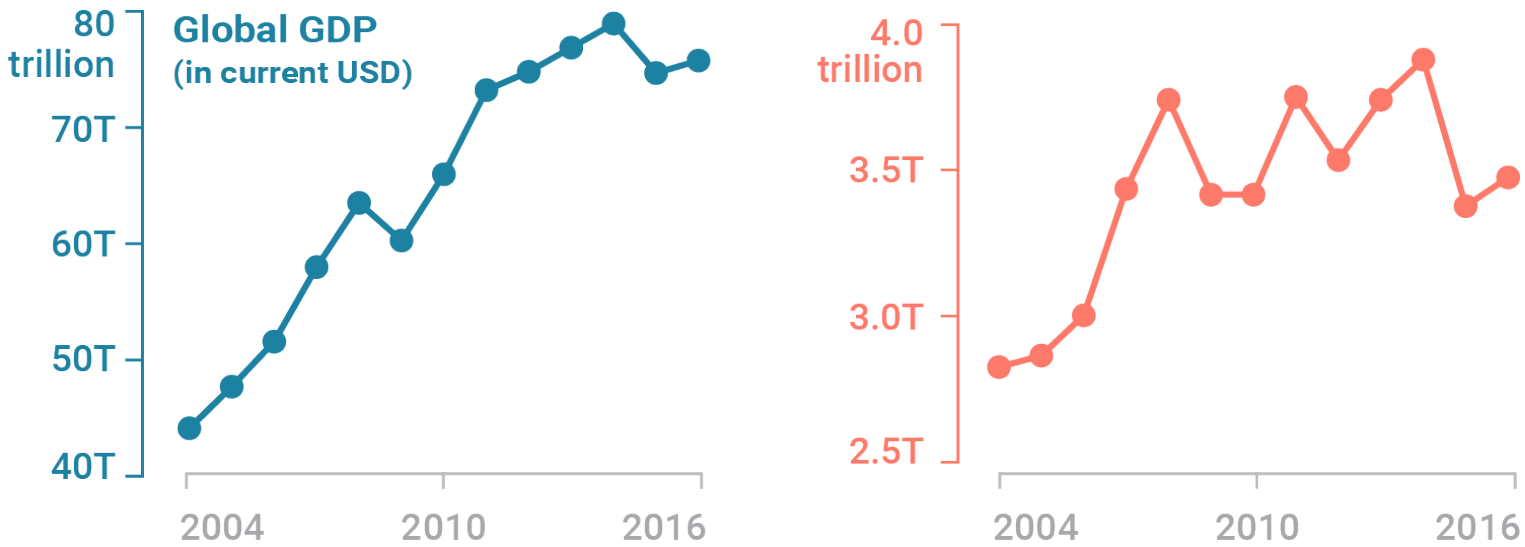


Both steady.

Source : Lisa Charlotte Rost, data from World bank

[- Rule #3 : Use double axes ! -]

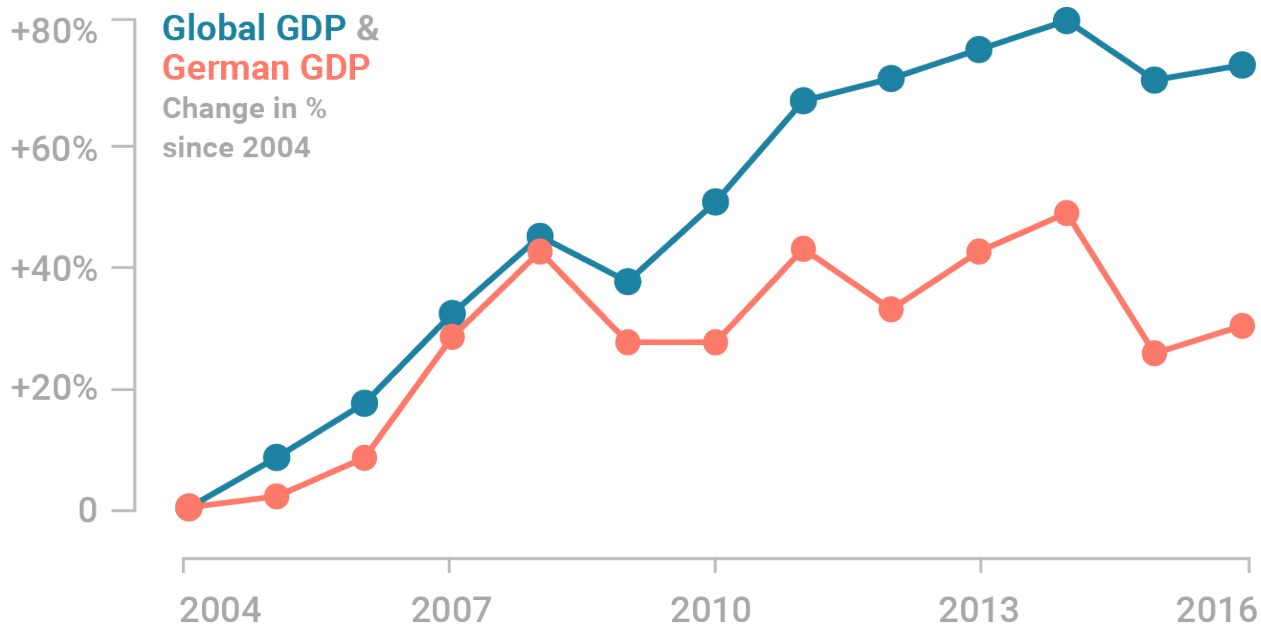
Solution 1 : Two graphs



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

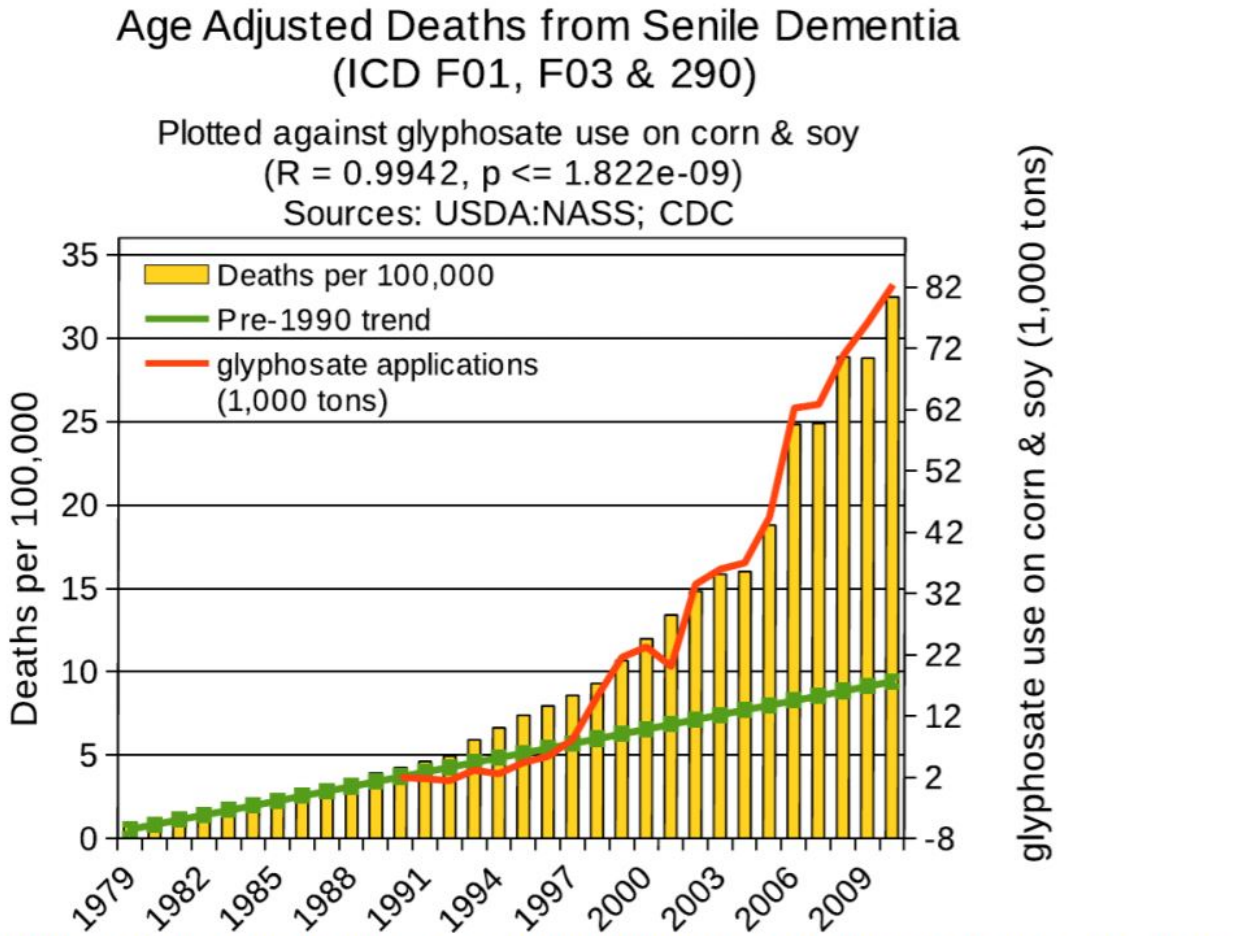


Figure 24. Correlation between age-adjusted dementia deaths and glyphosate applications.

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

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Tyroid

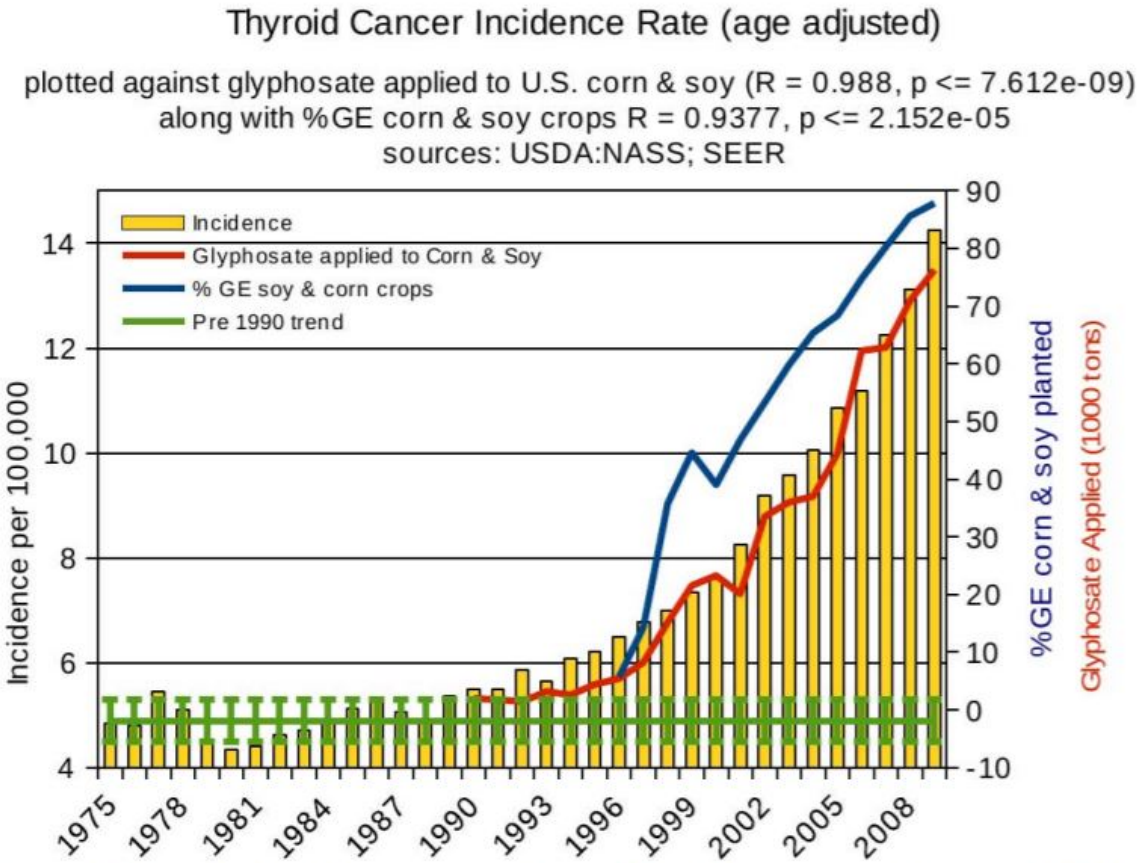


Figure 10. Correlation between age-adjusted thyroid cancer incidence and glyphosate applications and percentage of US corn and soy crops that are GE.

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

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Parkinson

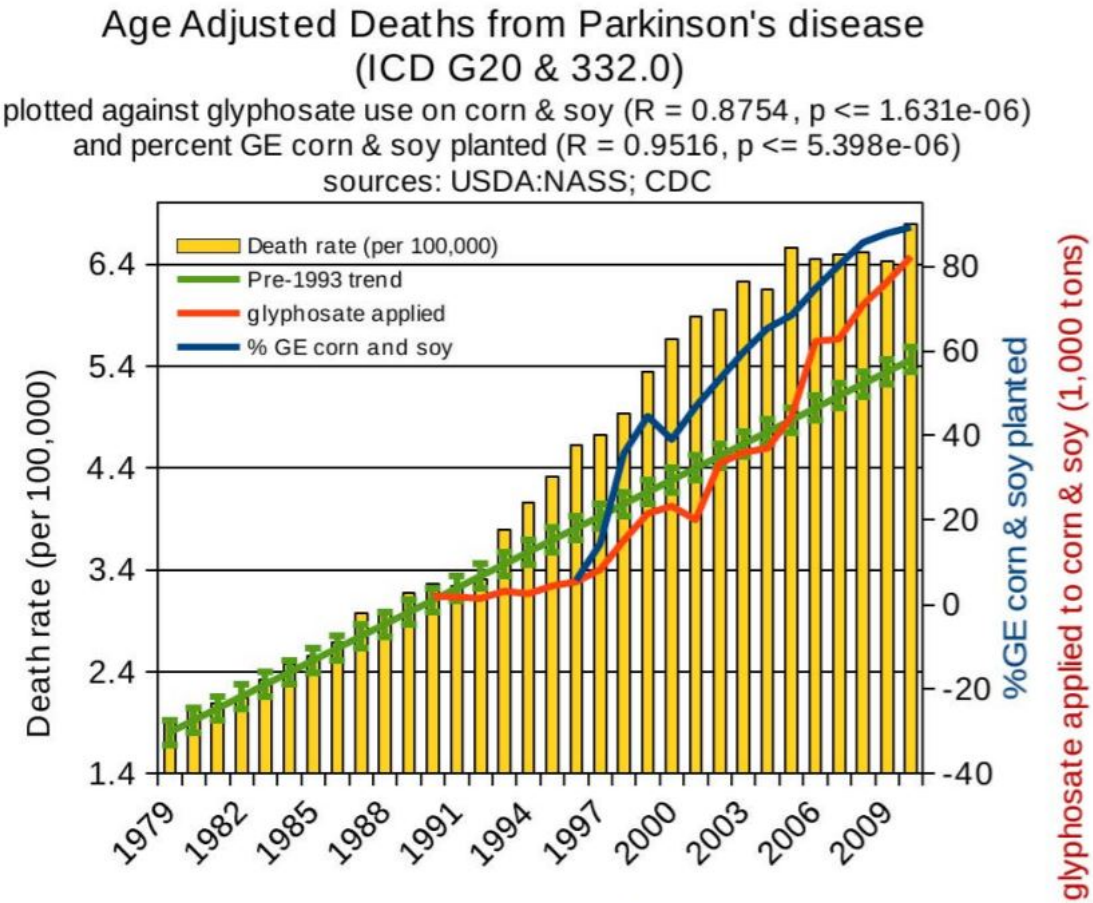


Figure 26. Correlation between age-adjusted Parkinson's disease deaths and glyphosate applications and percentage of US corn and soy crops that are GE.

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

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Diabetes

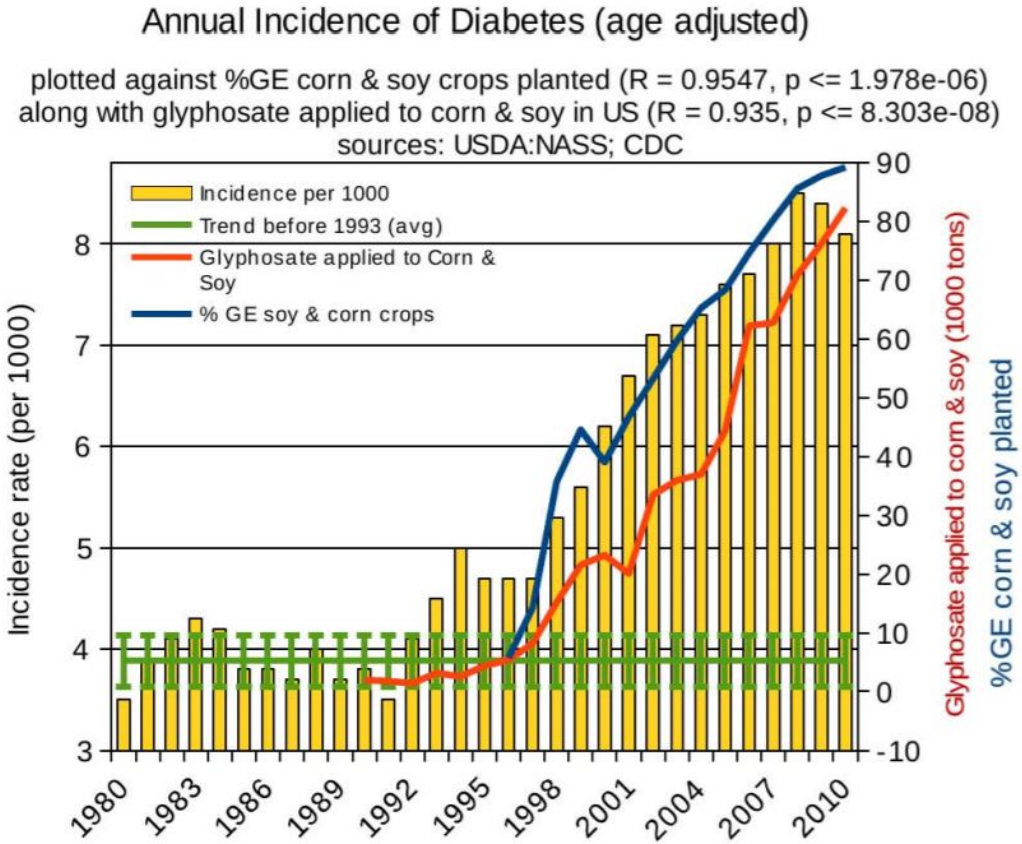


Figure 14. Correlation between age-adjusted diabetes incidence and glyphosate applications and percentage of US corn and soy crops that are GE.

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

[- Rule #3 : Examples -]

Glyphosate *vs* Strokes

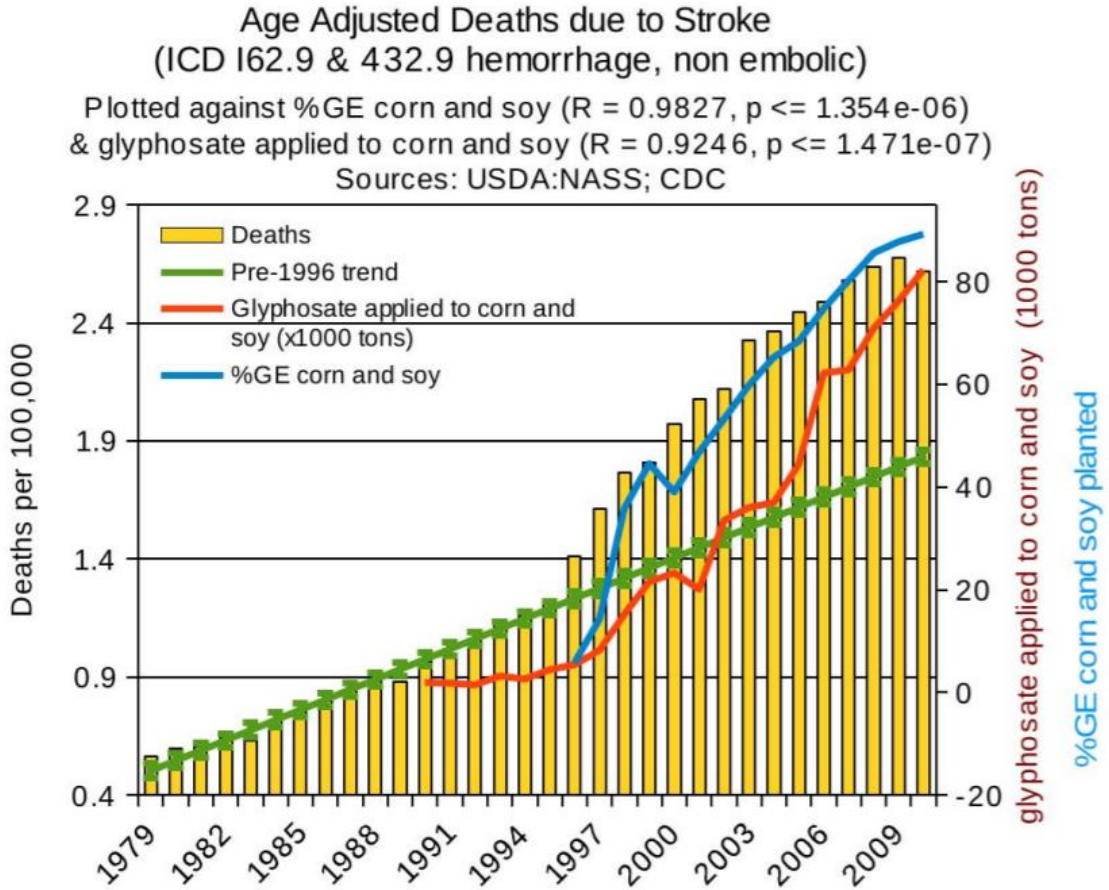


Figure 12. Correlation between age-adjusted hemorrhagic stroke deaths and glyphosate applications and percentage of US corn and soy crops that are GE.

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

[- RULE #3 : EXAMPLES -]

Glyphosate *vs* Hypertension

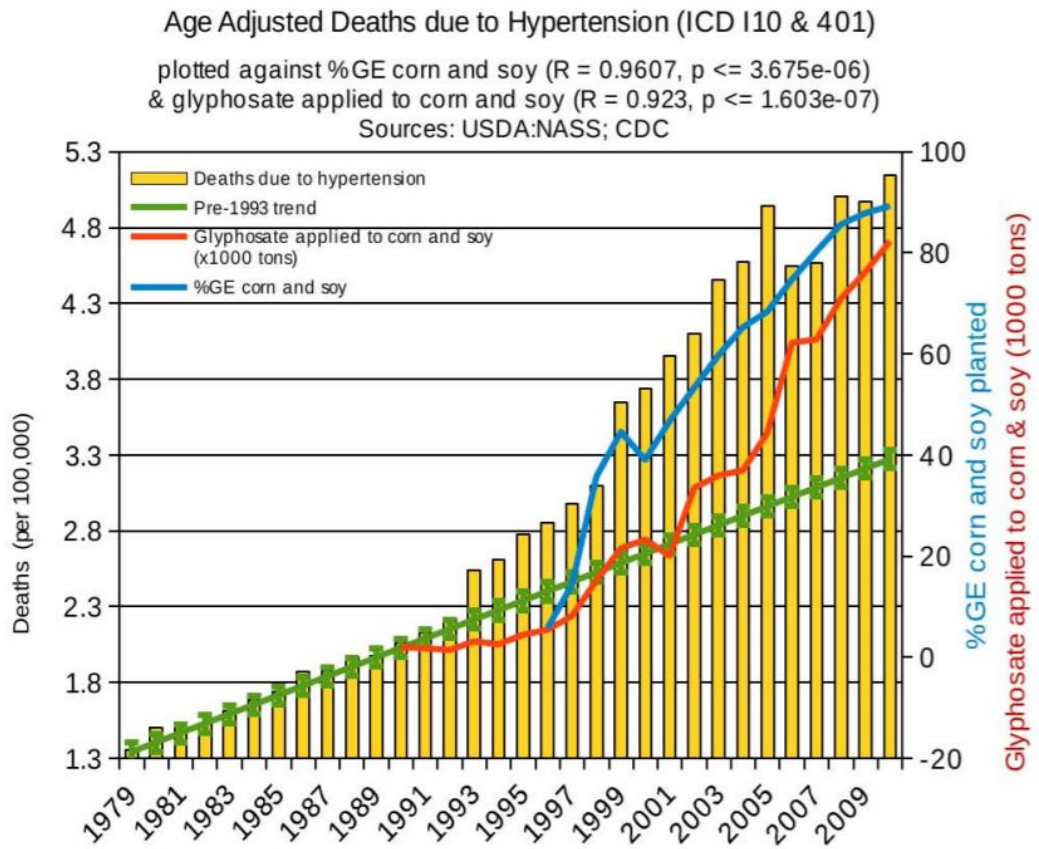


Figure 11. Correlation between age-adjusted hypertension deaths and glyphosate applications and percentage of US corn and soy crops that are GE.

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

[- RULE #3 : EXAMPLES IN ECONOMICS -]

Assets *vs* Working Time

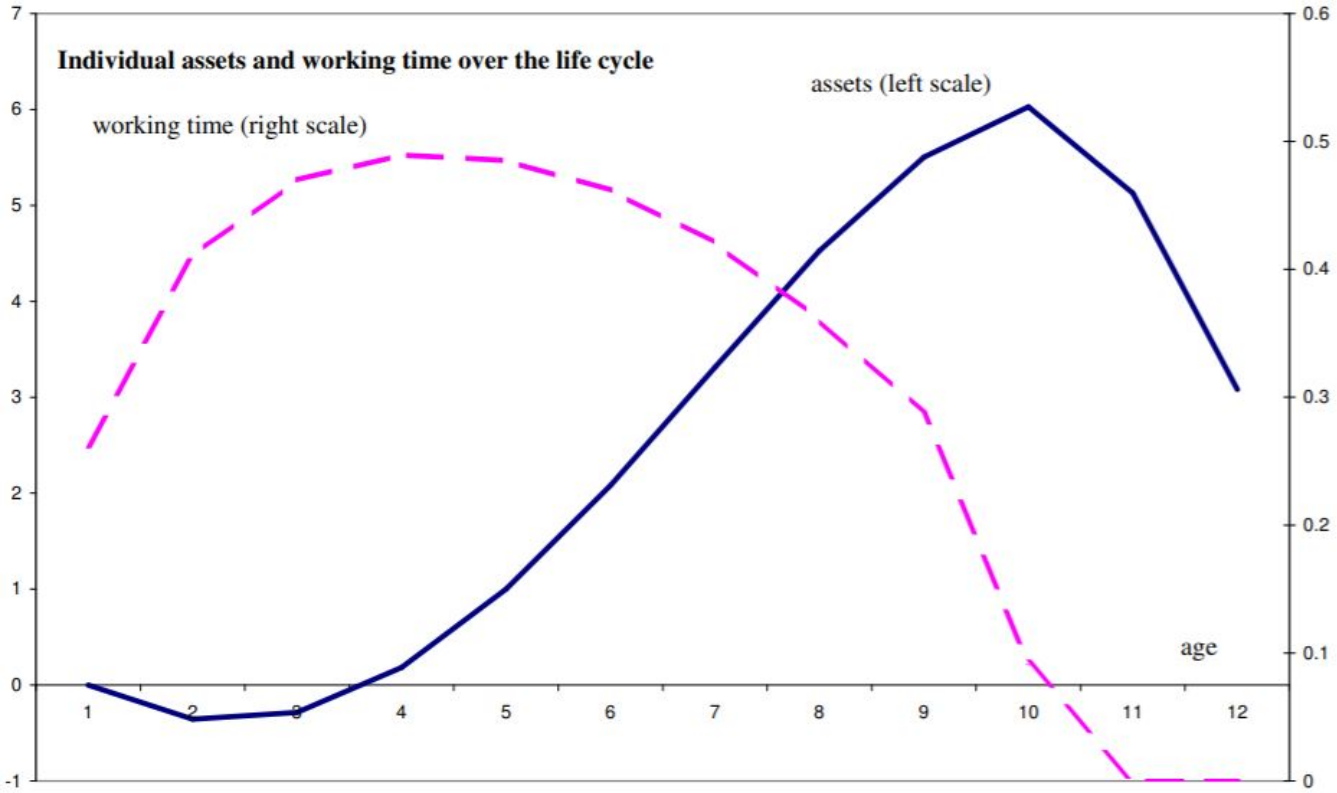
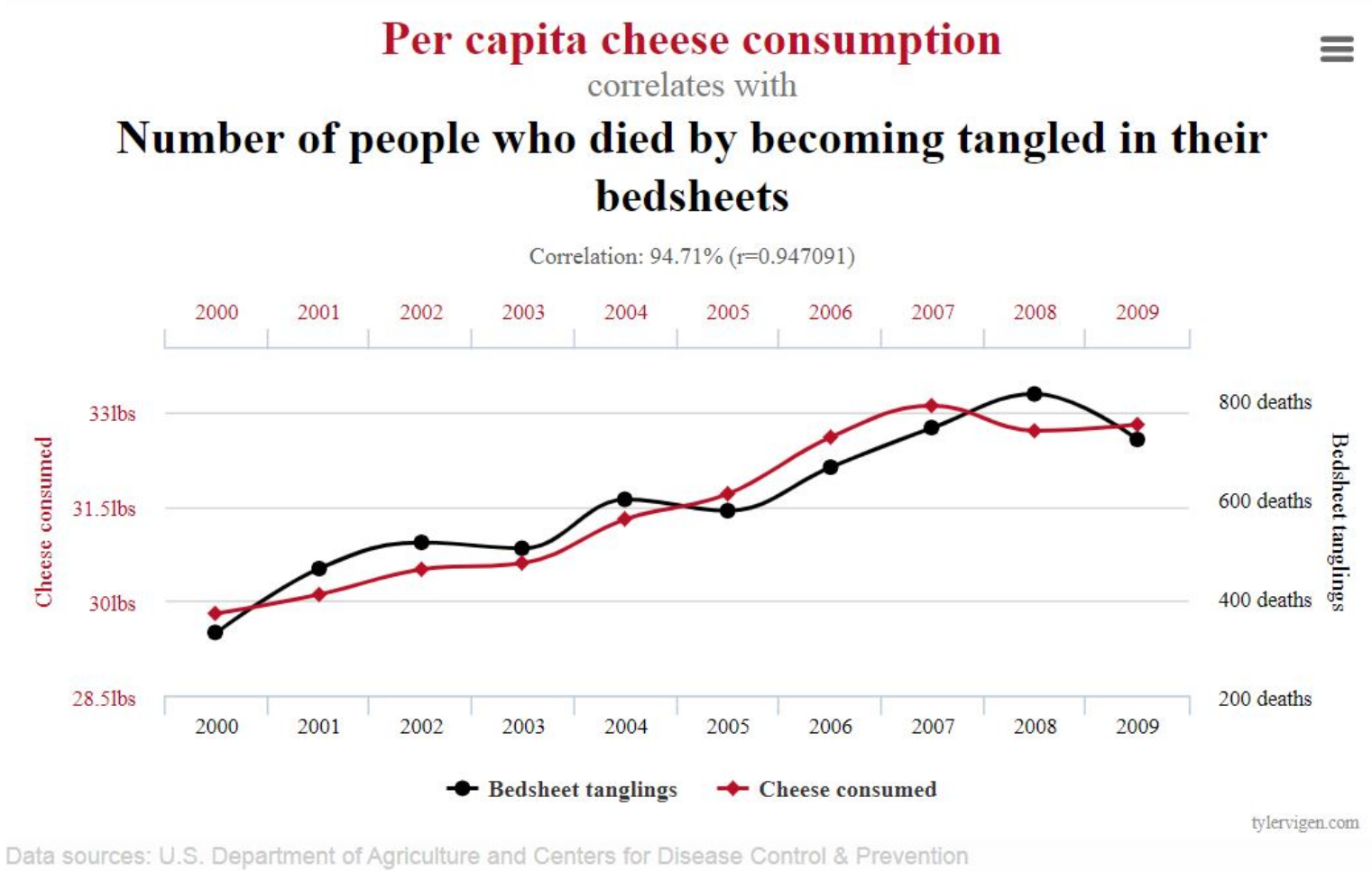


Figure 8. Life-cycle in the benchmark equilibrium.

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

[- Rule #3 : Examples in Economics -]

Nearly as funny :



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

[-Rule #4 : Select your scope -]

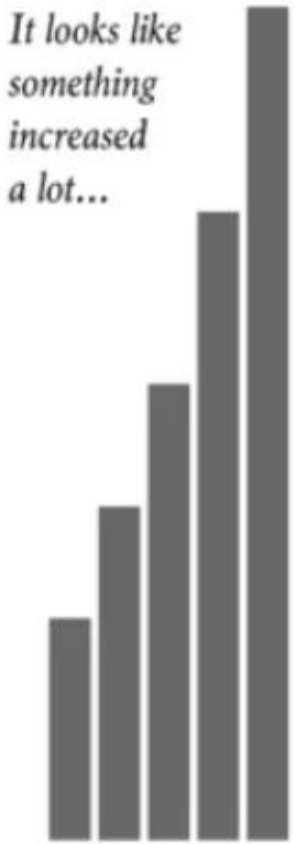


FIGURE – Are you looking at the right thing ?

[-Rule #4 : Select your scope-]

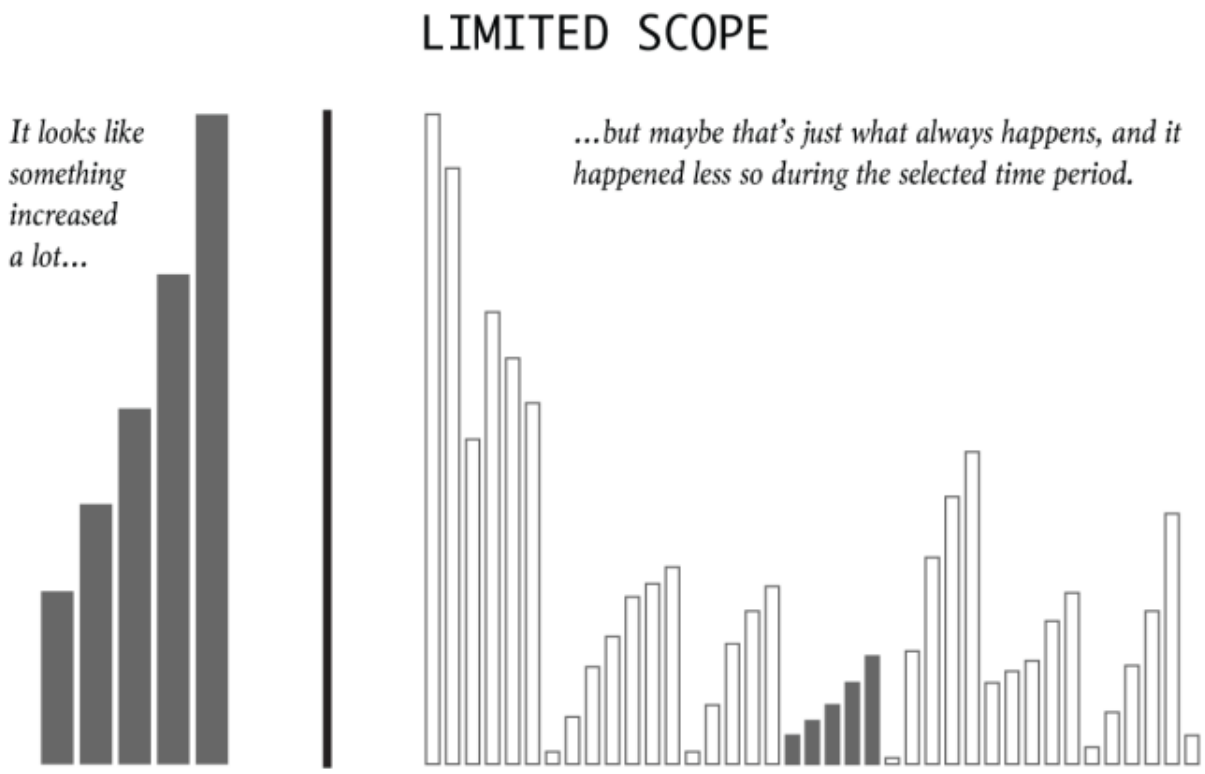


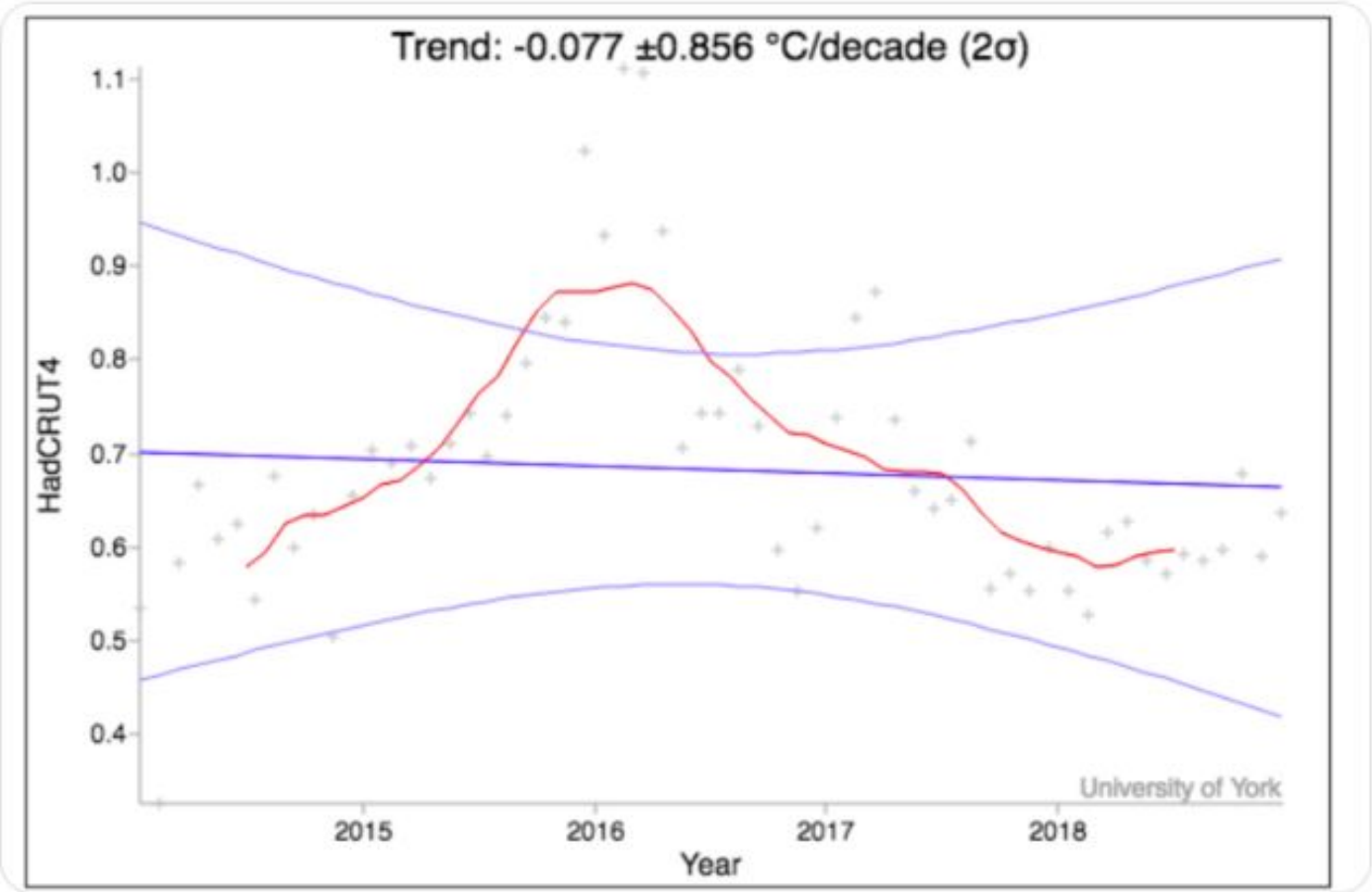
Figure – Cherry picking ?

Source : Flowing data

[-Applying Rule #4 : Global Warming-]

GWPF
@thegwpfcom

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



[-Applying Rule #4 : Global Warming-]

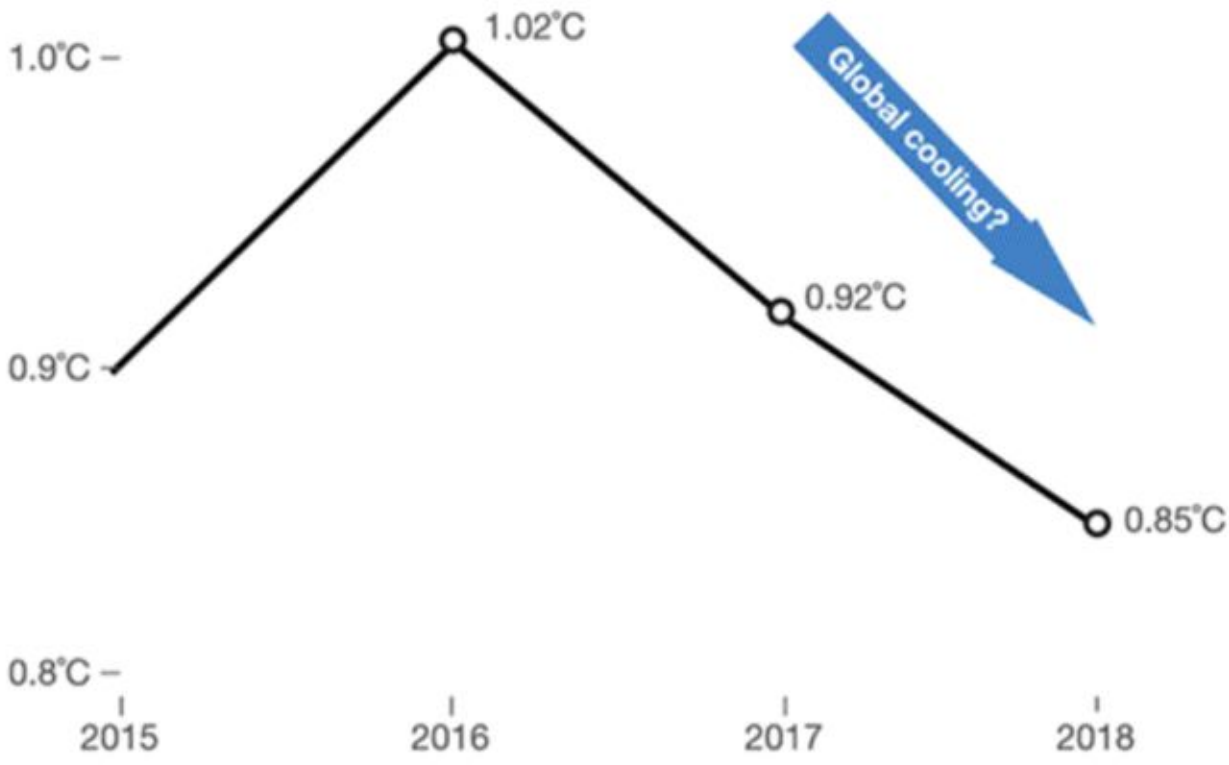


Figure – Cherry picking !

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

[-Applying Rule #4 : Global Warming-]

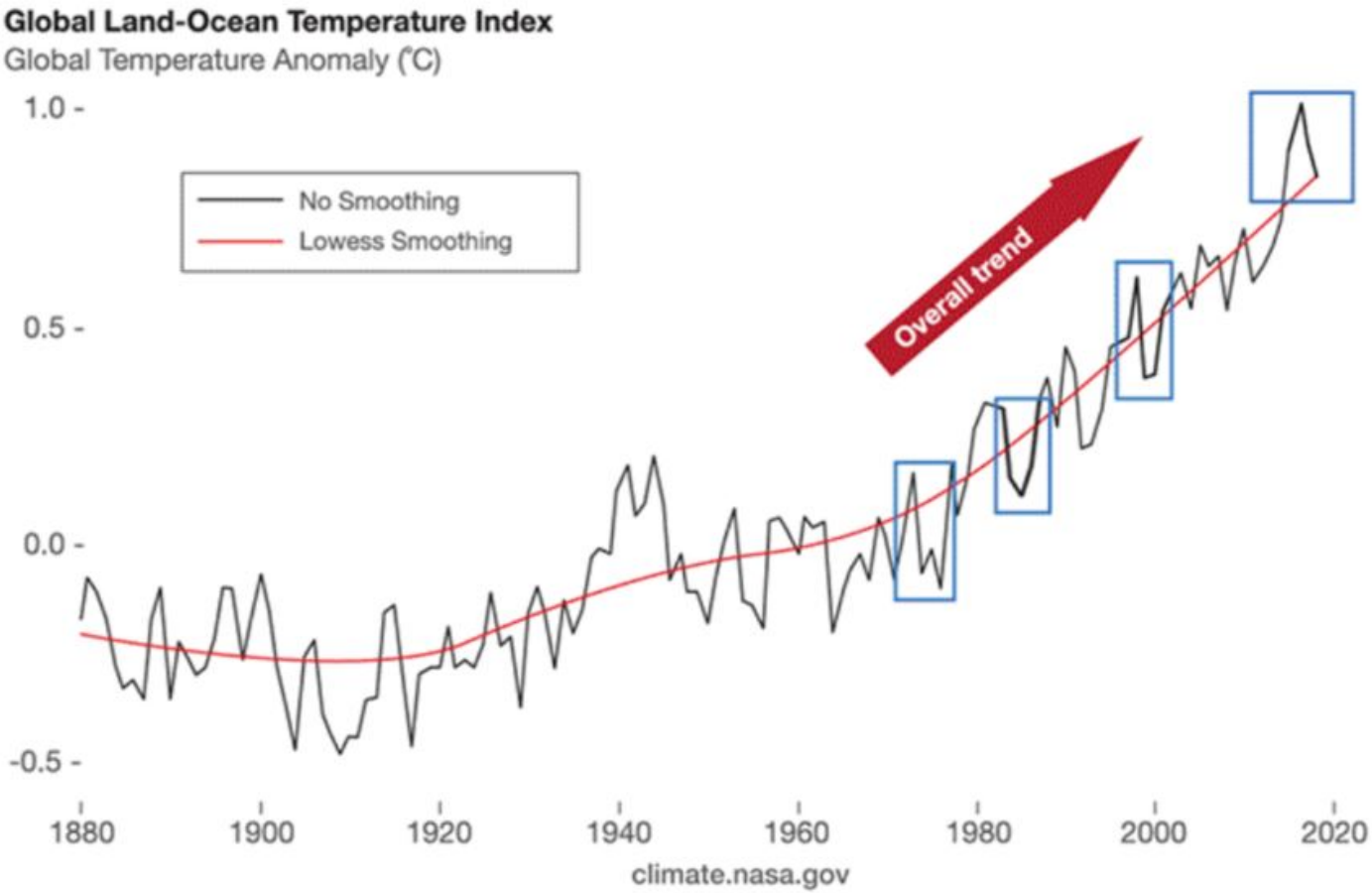


Figure – Cherry picking !

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

[-Applying Rule #4 : Brexit !-]

POUND RISES
+9% THIS YEAR

Brexit currency confounds doomsayers

Occasionally we look at general economic indicators to keep you informed. Below is the progress of the pound against the dollar this year.



Source :

Pro-Brexit site(Facts4eu.org)

[-Applying Rule #4 : Brexit !-]



[-Applying Rule #4 : Brexit !-]



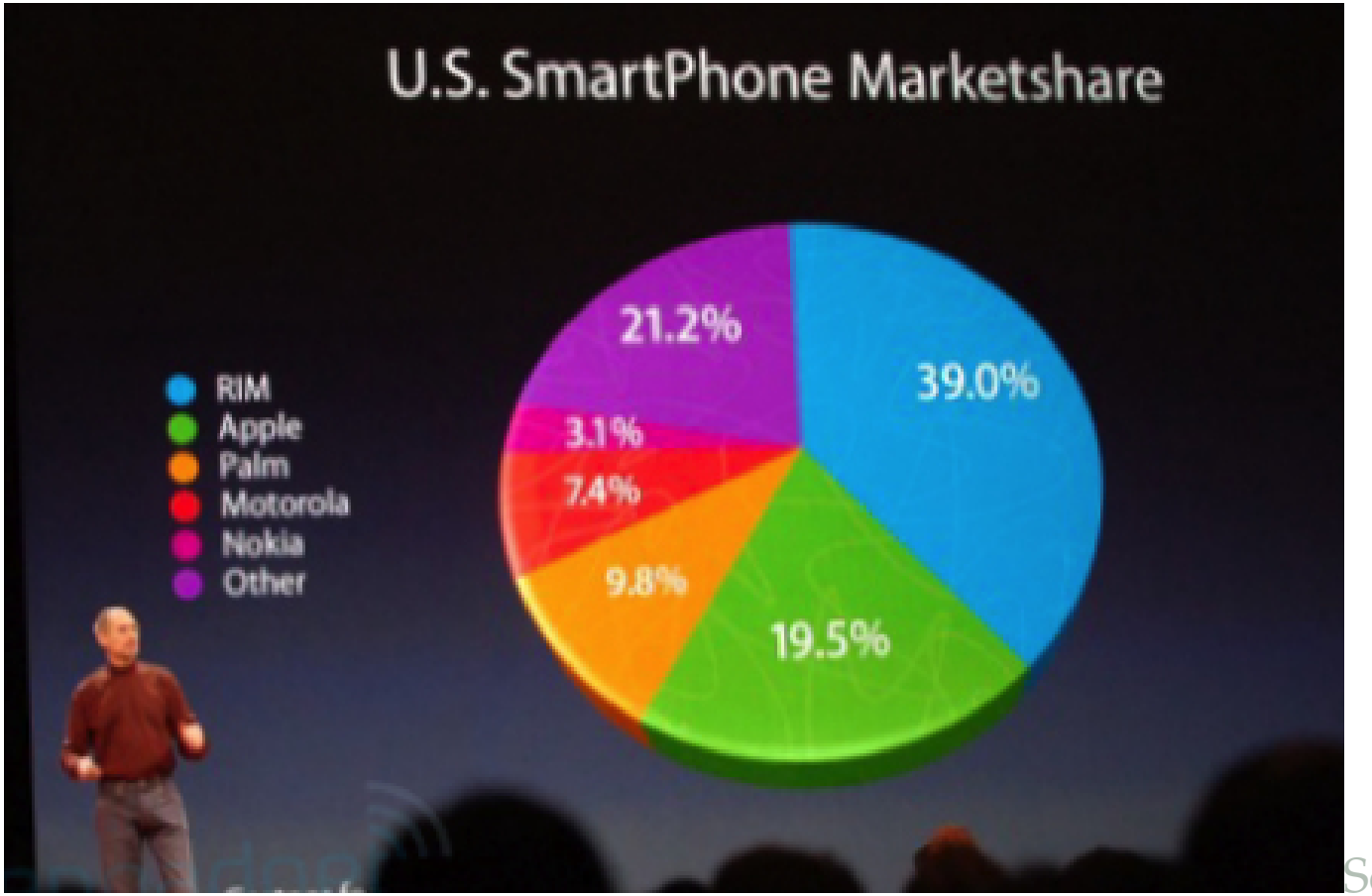
[- Rule #5a : Use 3D Bars -]



Source ?

[- Rule #5b : Use 3D pie charts -]

Do as Steve Jobs !

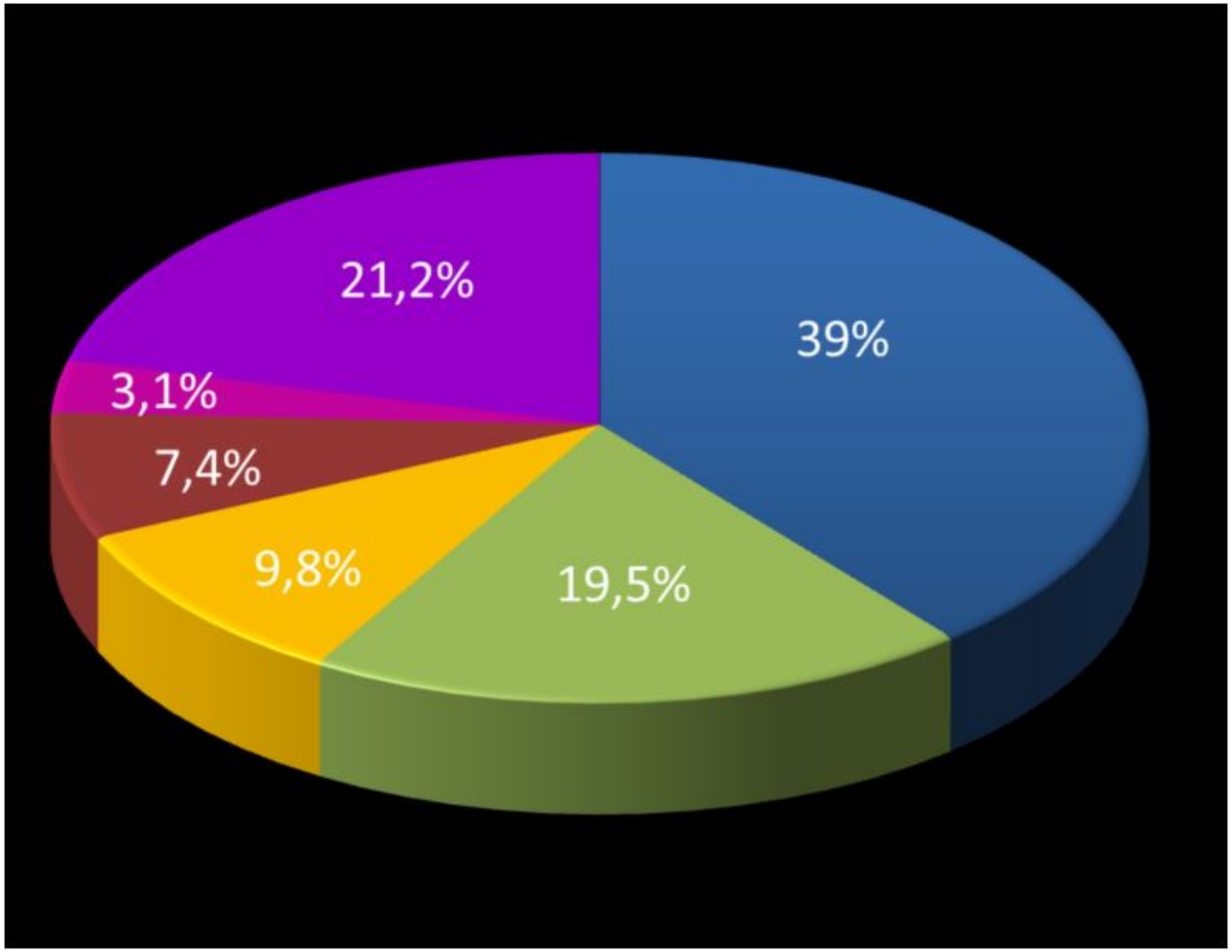


Source

(Macworld 2008 keynote lecture

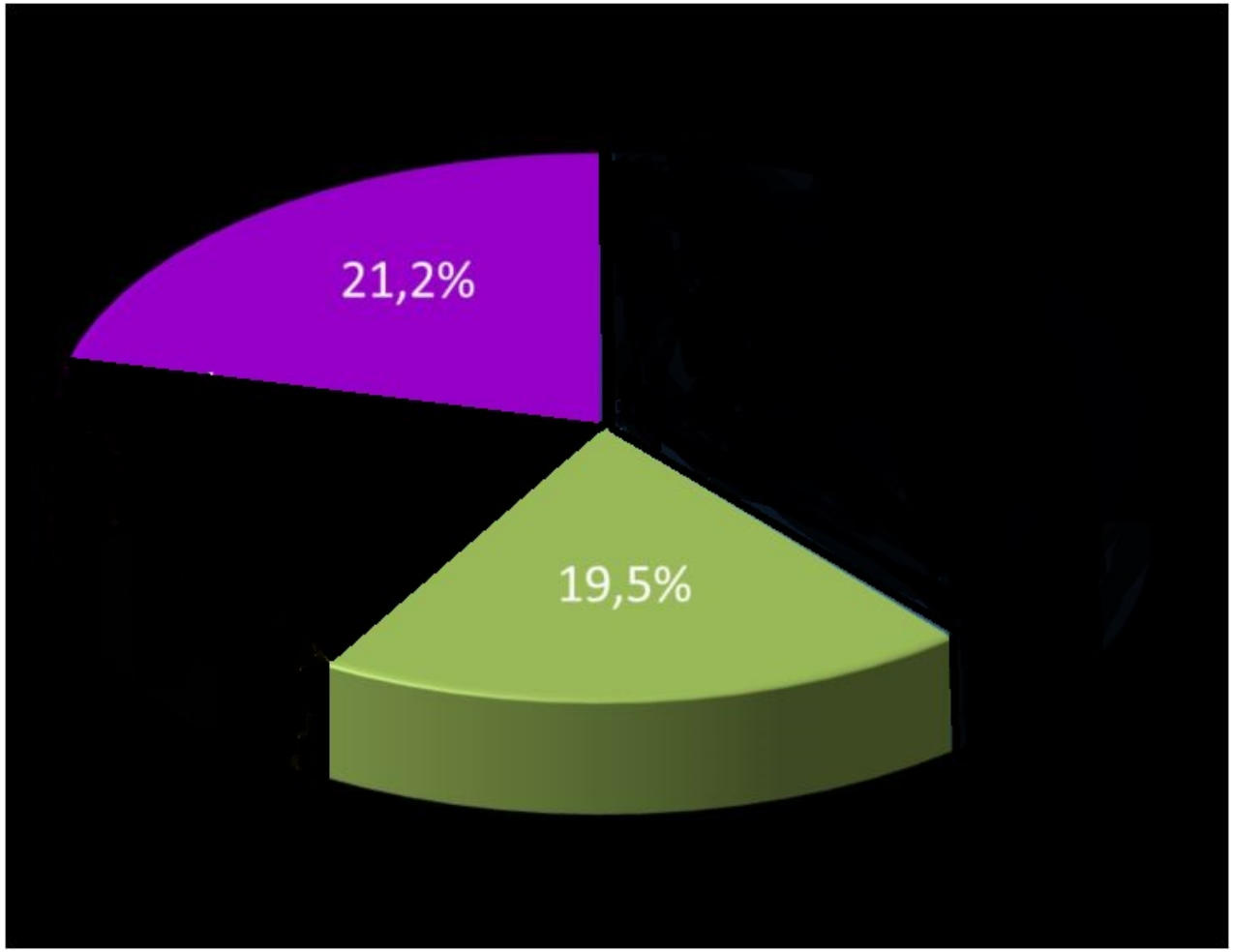
[- Rule #5b : Use 3D pie charts -]

Do as Steve Jobs !



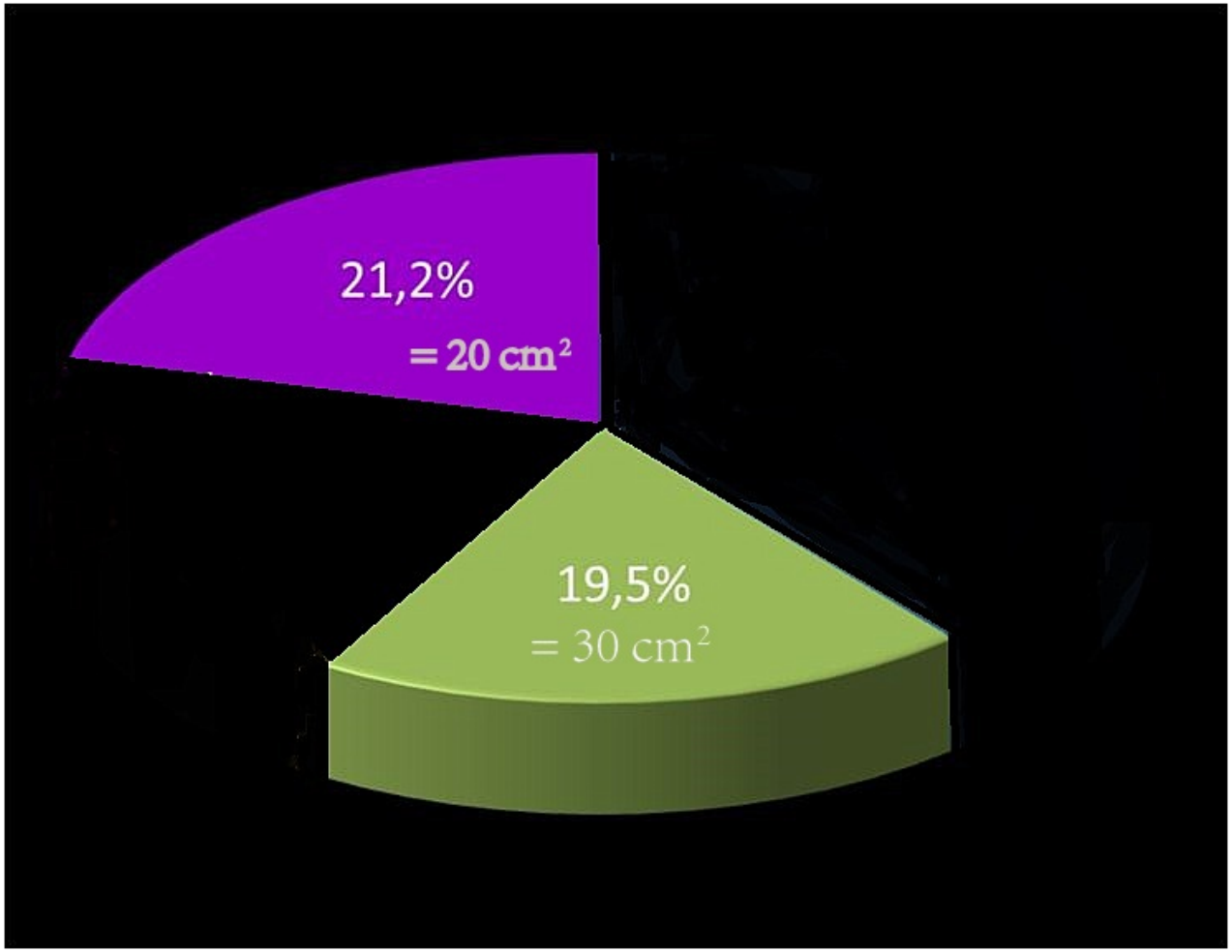
[- Rule #5b : Use 3D pie charts -]

Do as Steve Jobs !

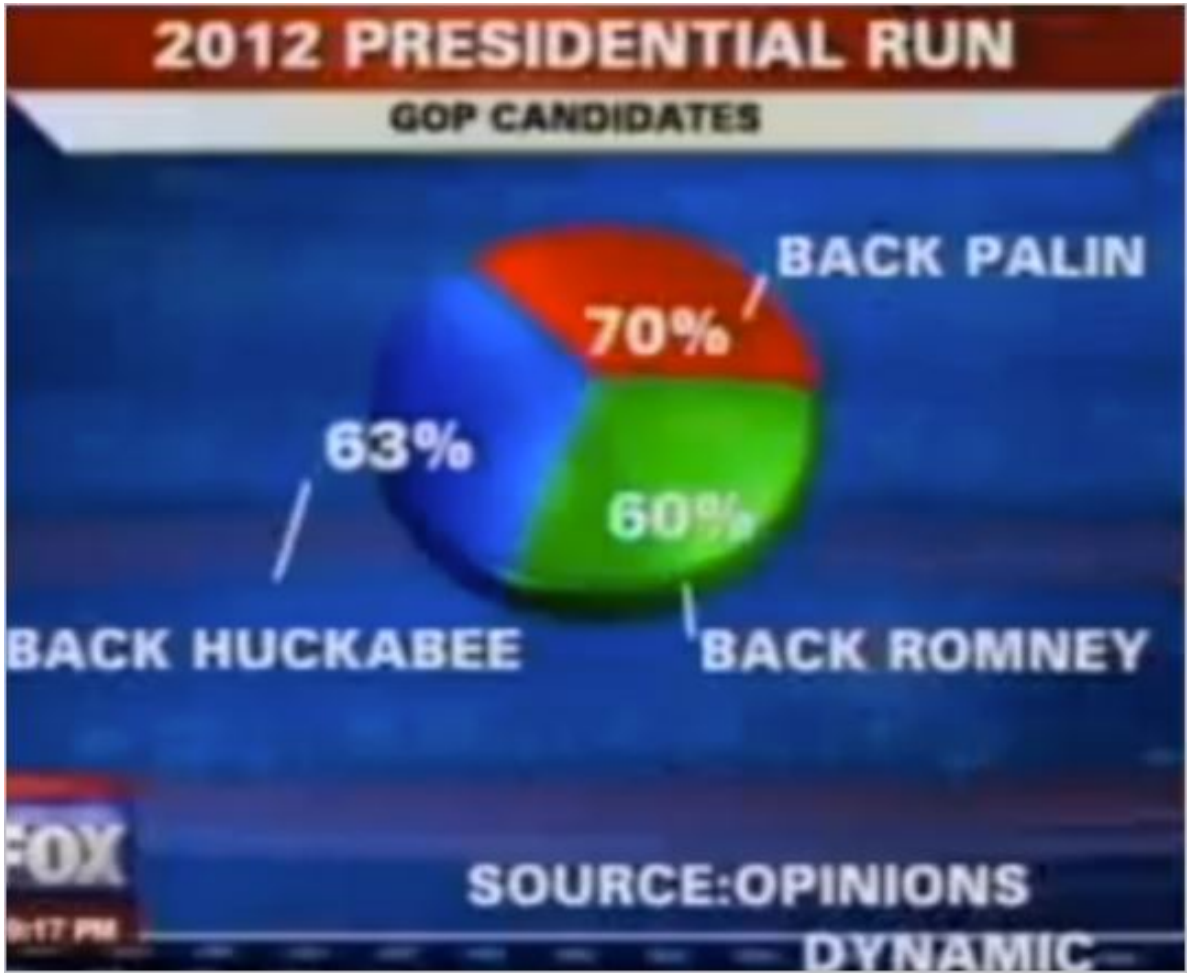


[- Rule #5b : Use 3D pie charts -]

Do as Steve Jobs : **Lie !**

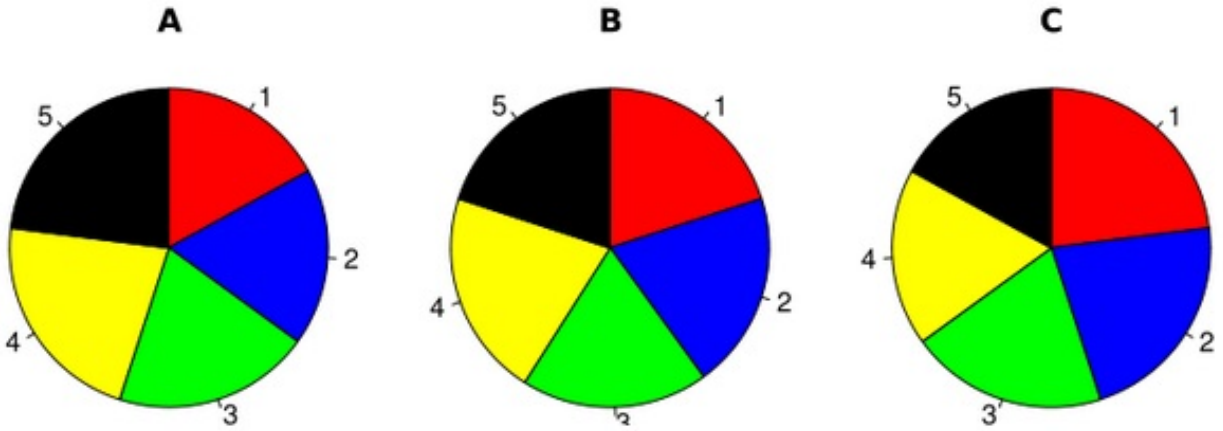


[- A NOTE ON PIE CHARTS -]



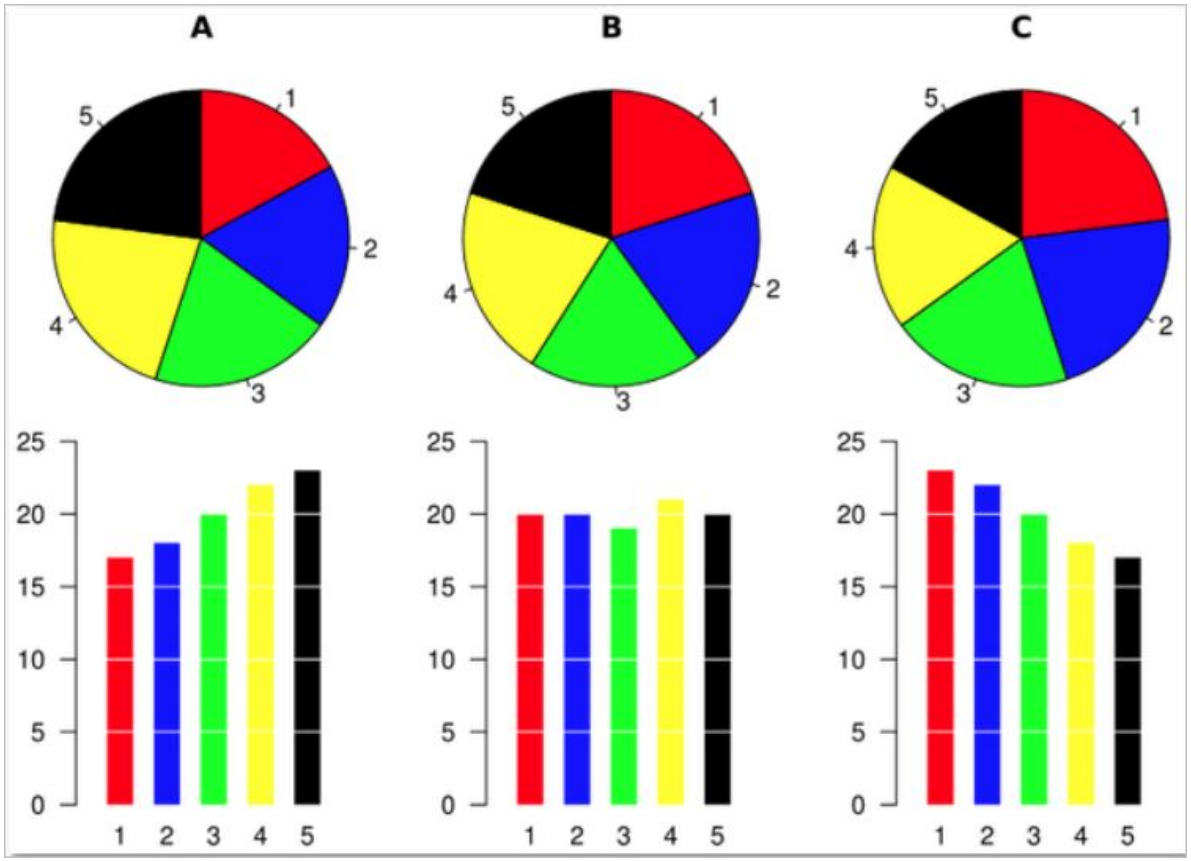
From FOX News

[- Rule #6 : Use several pie charts -]



From Freakeconometrics

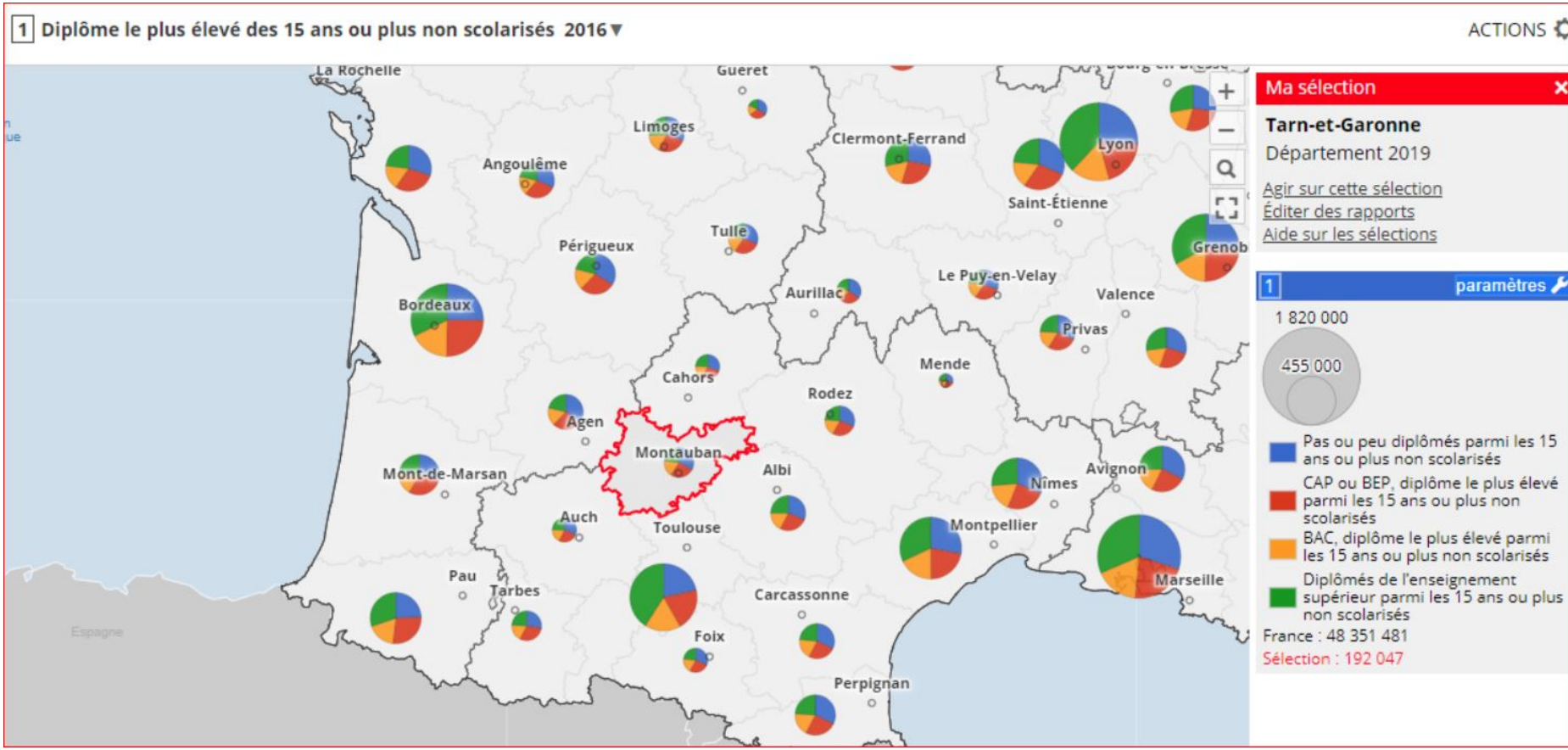
[- Rule #6 : Use several pie charts -]



From Freakeconometrics

[- Rule #6 : Use several pie charts -]

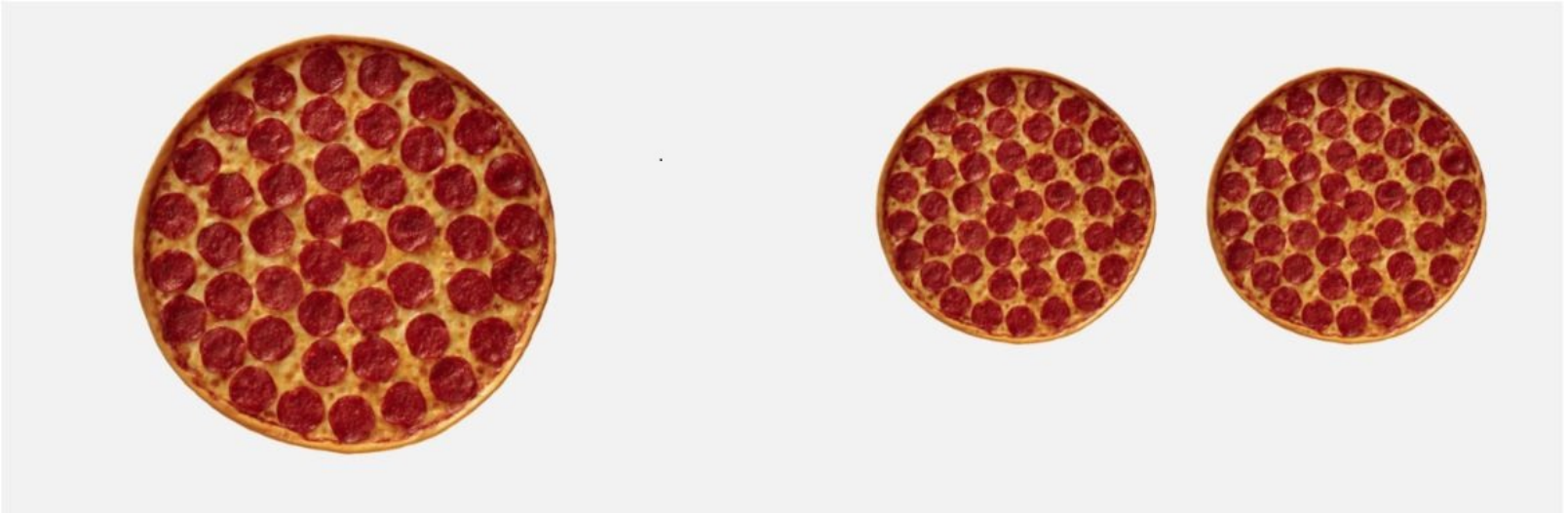
People use it.



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 !





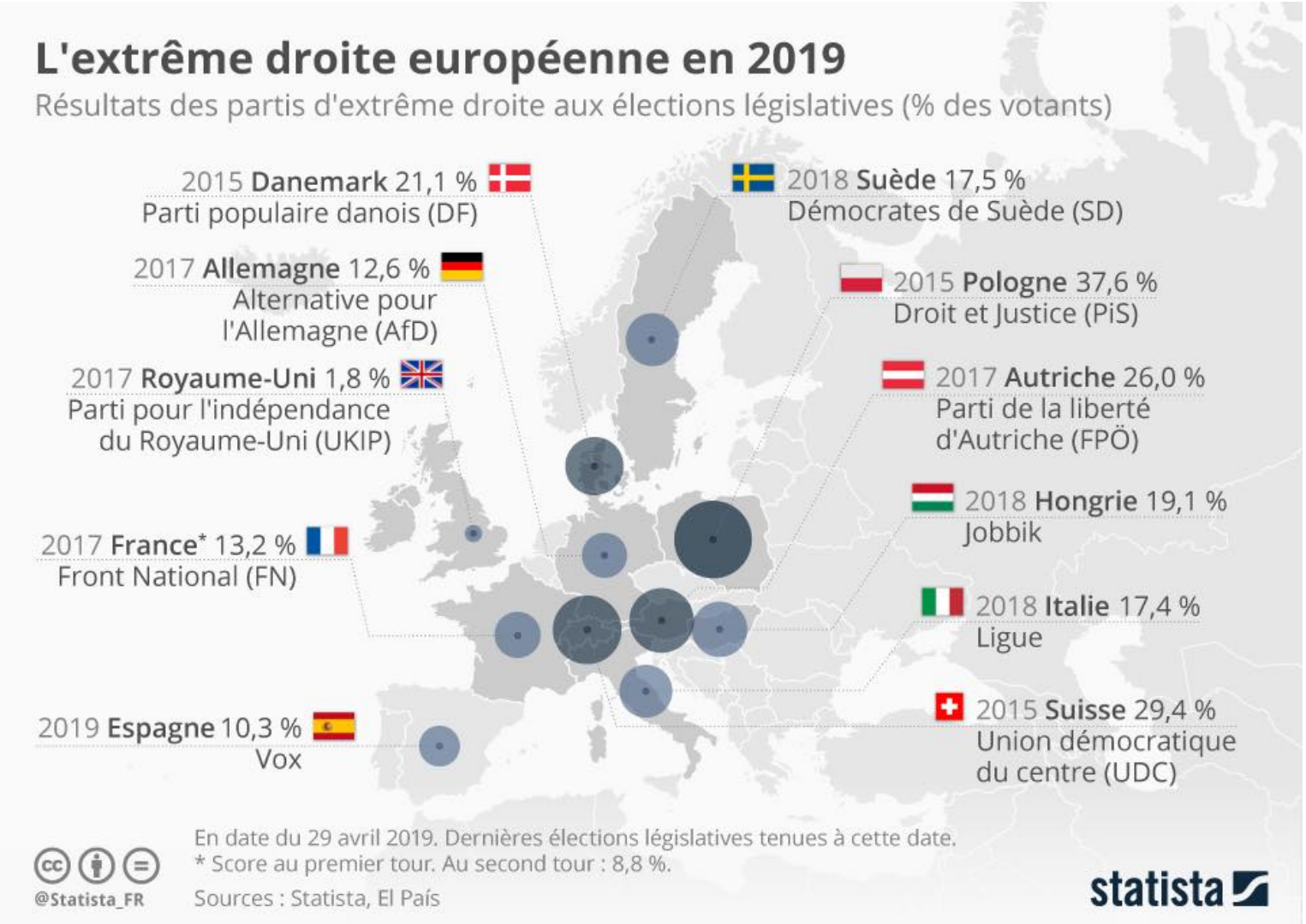
$\text{Area} = \pi(18/2)^2 = 254 \text{ in}^2$

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

Source : Fermat's library

[- Rule #7 : Use areas -]

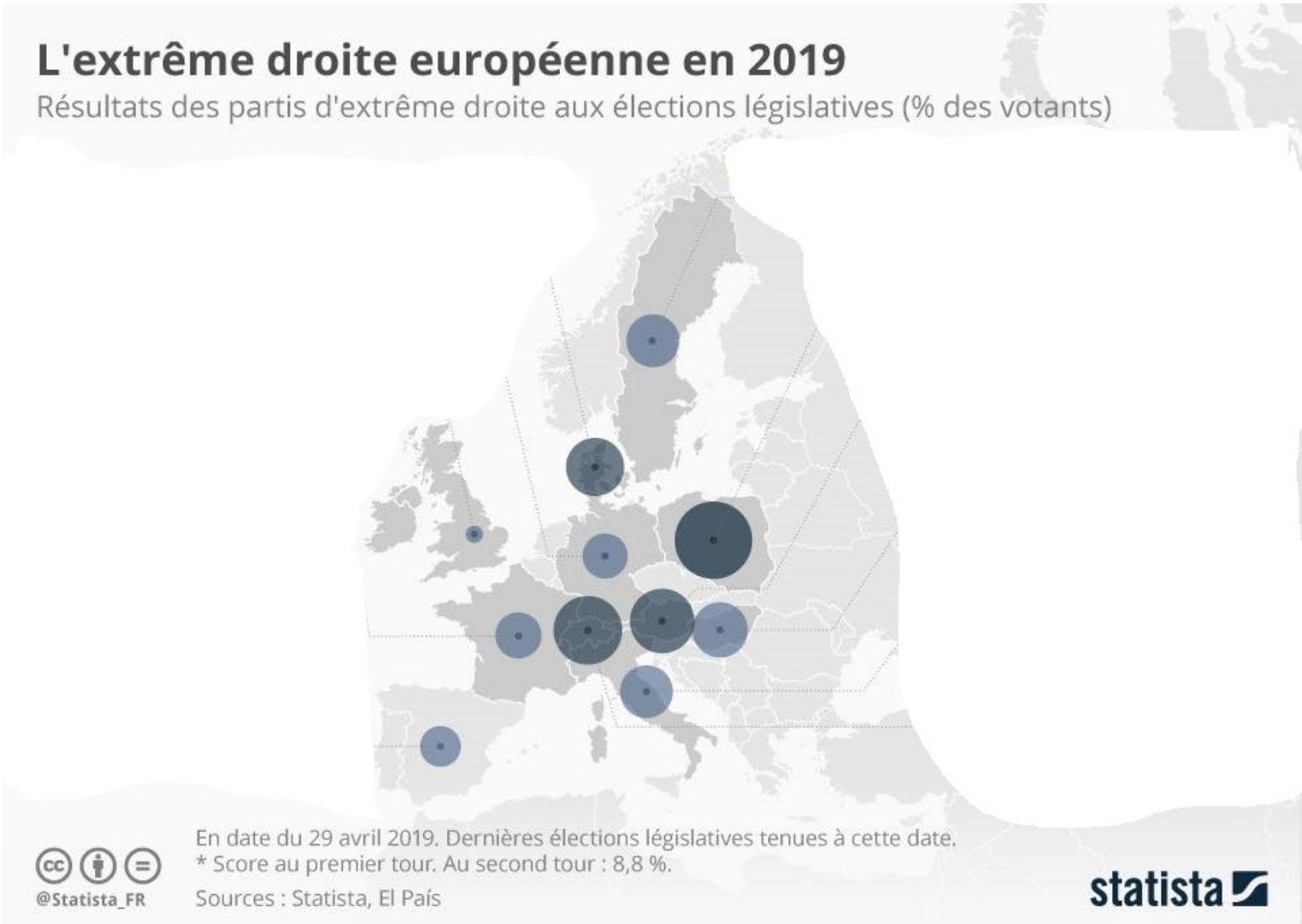
How to compare ?



Source : Statista, el pais

[- Rule #7 : Use areas -]

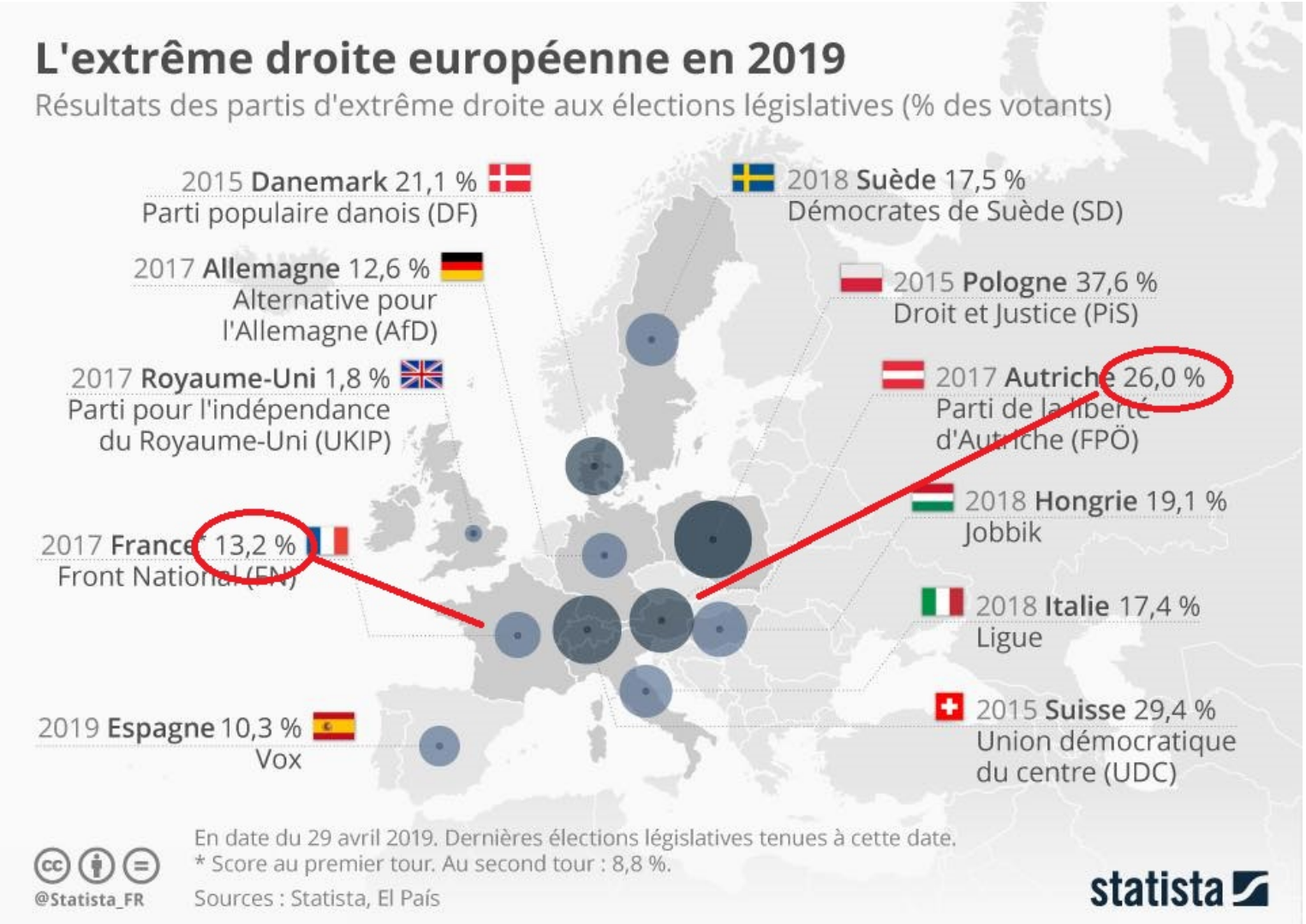
How to compare ?



Source : Statista, el pais

[- Rule #7 : Use areas -]

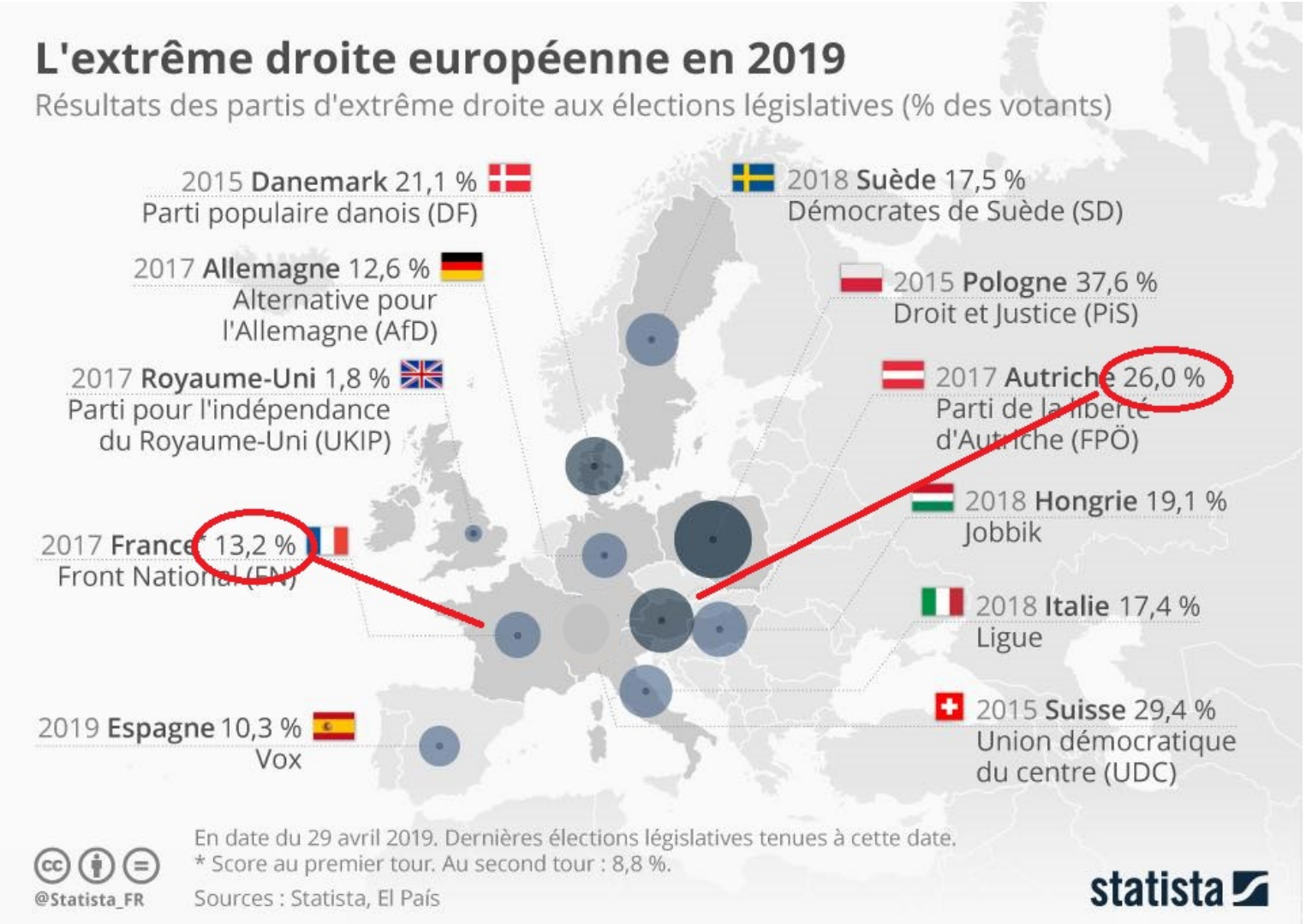
How to compare ?



Source : Statista, el pais

[- Rule #7 : Use areas -]

How to compare ?



Source : Statista, el pais

[- 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 ?

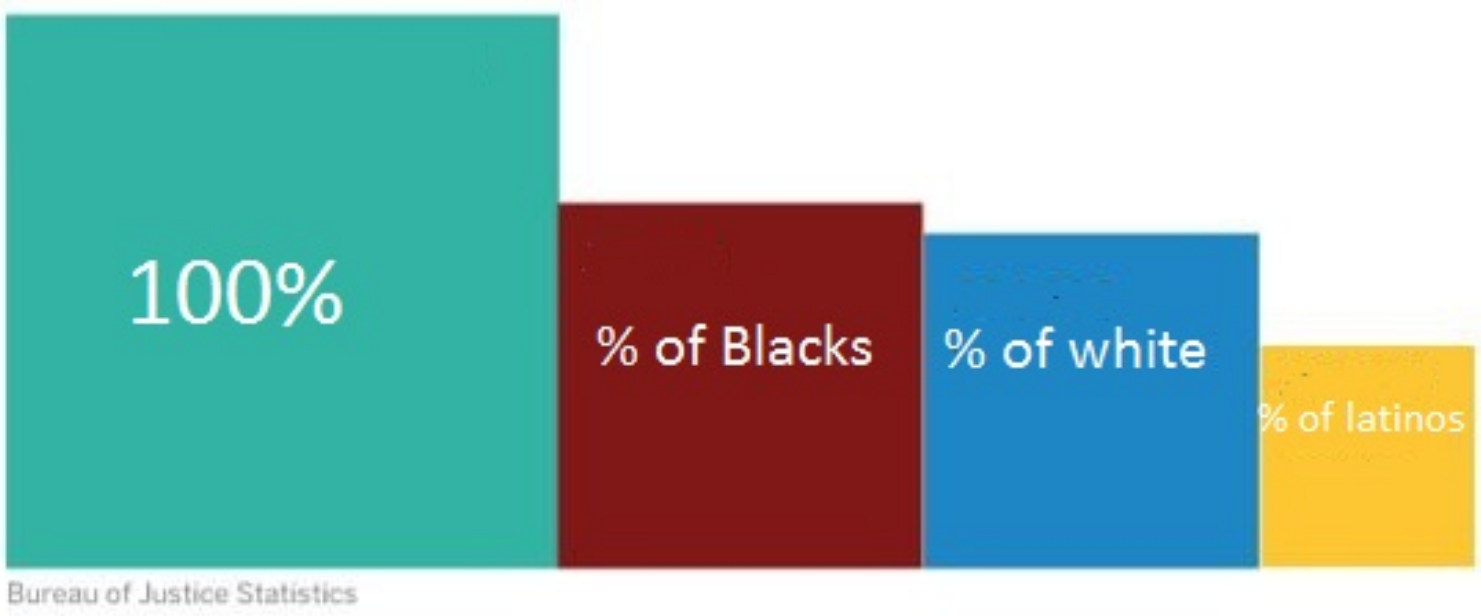


FIGURE – Ethic composition of prisoners in Jail in 2008 in the USA. *(Le Monde 5/12/2014)*

[- 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 ?

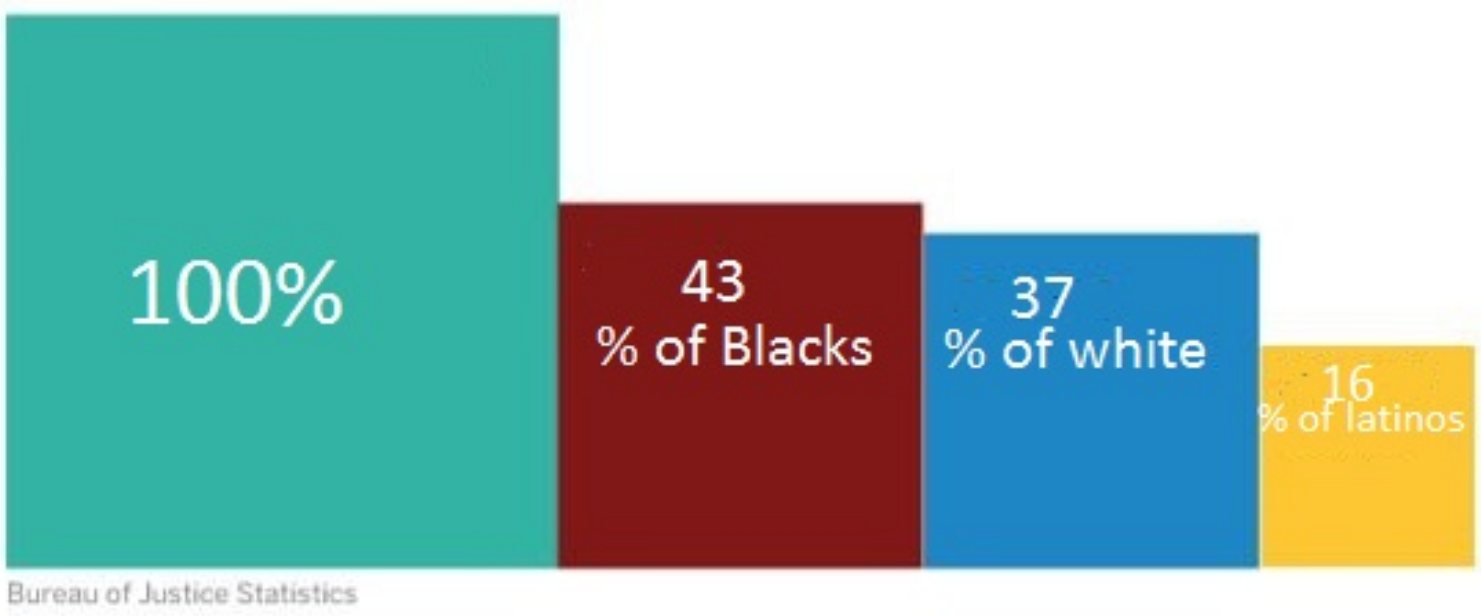
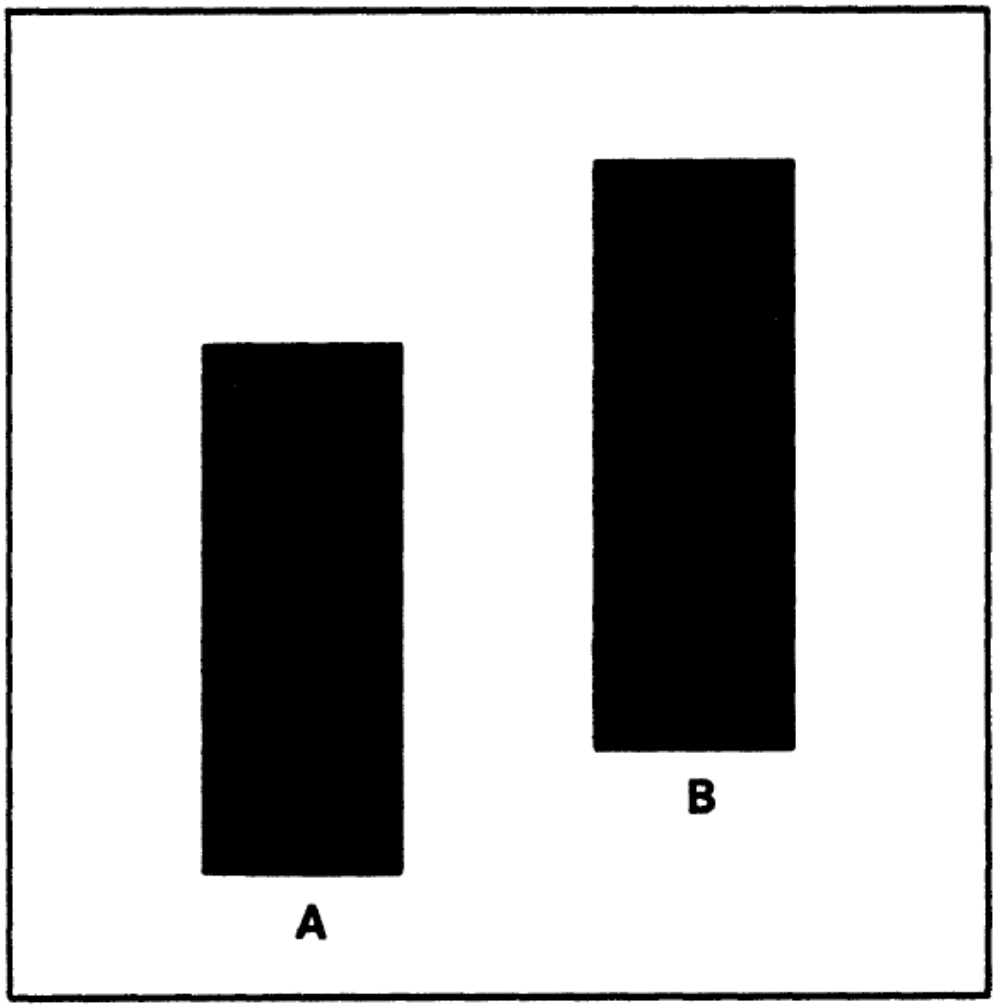


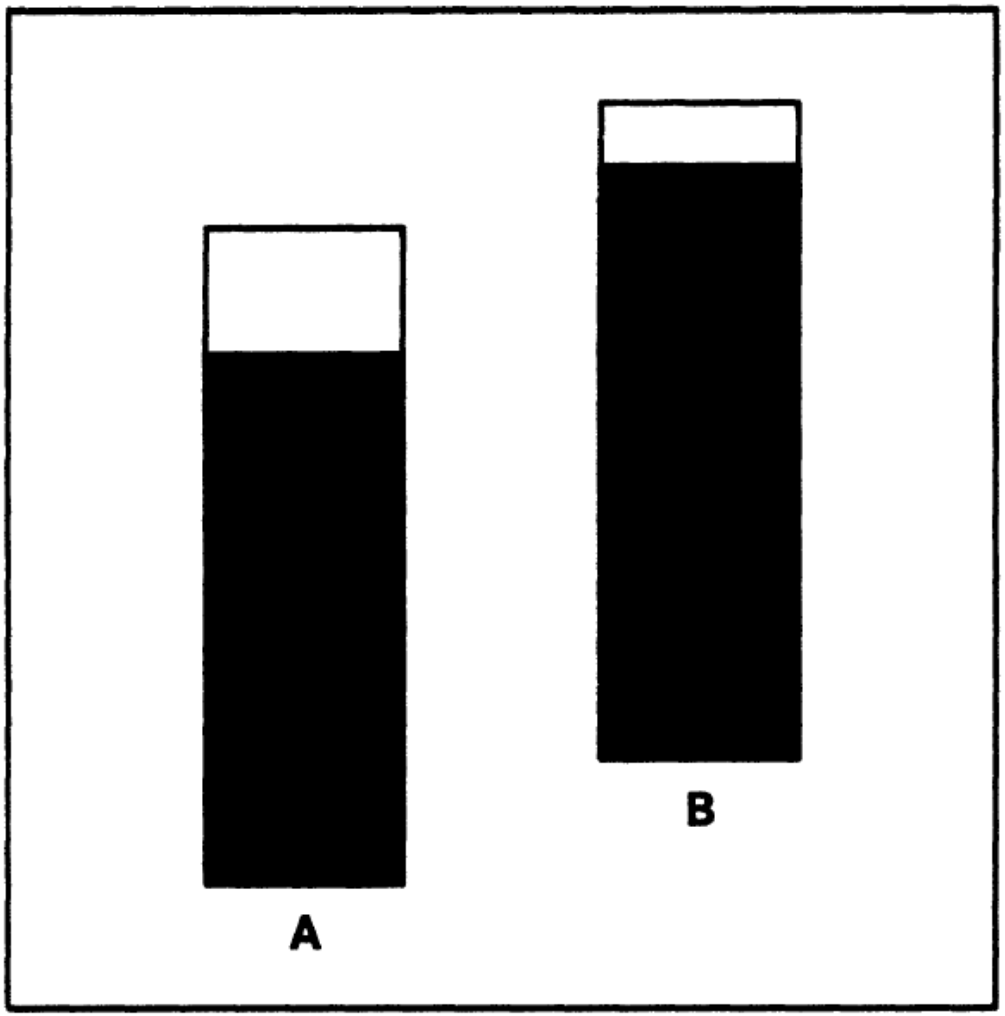
FIGURE – Ethic composition of prisoners in Jail in 2008 in the USA. *(Le Monde 5/12/2014)*

[- Rule #8 : Use [unaligned] bars -]



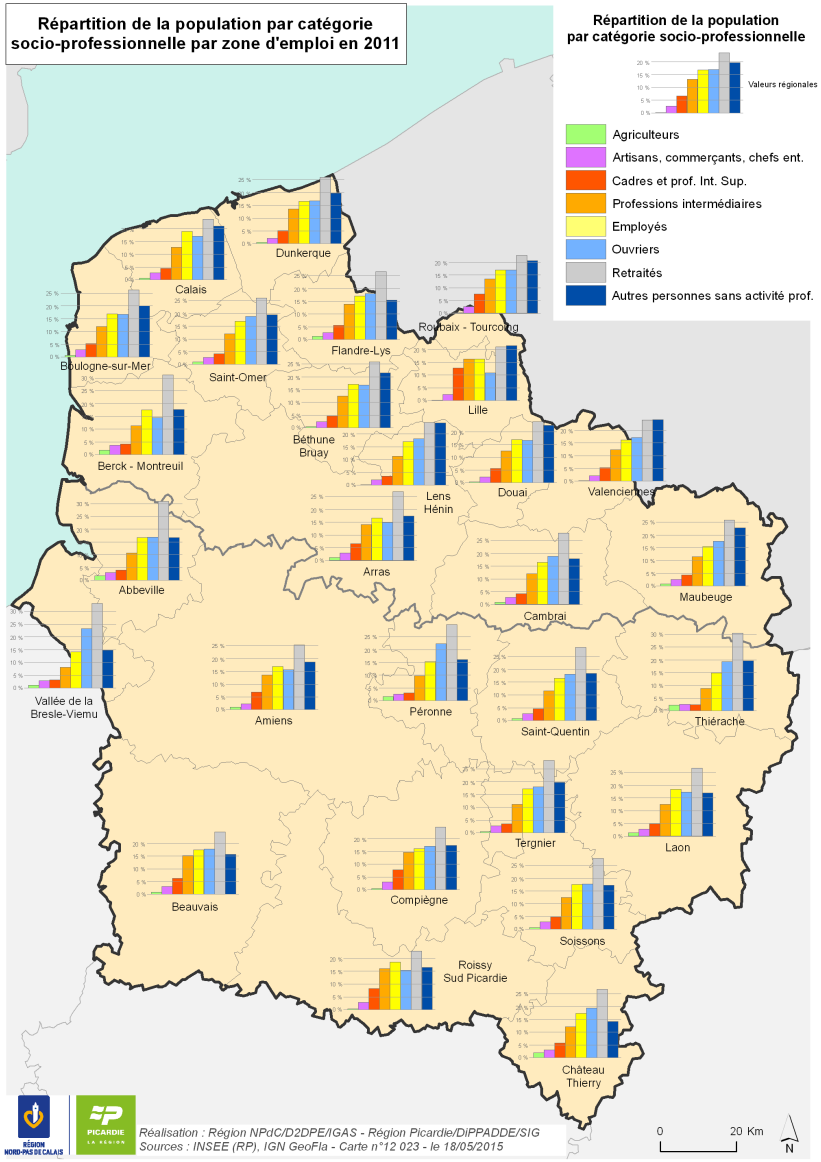
Source : Cleveland and McGill (1984)

[- Rule #8 : Use [unaligned] bars -]

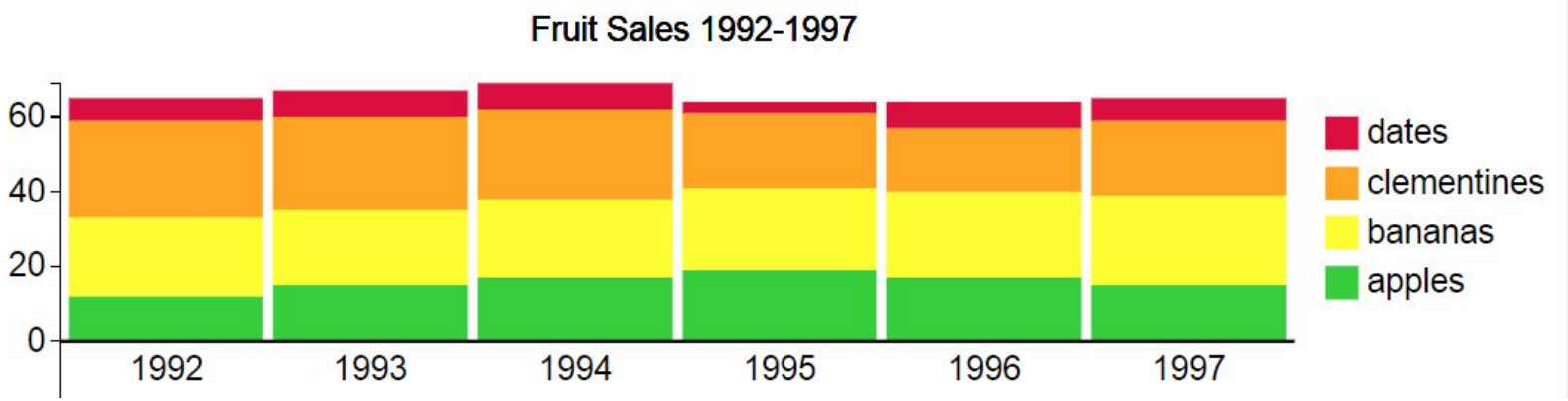


Source : Cleveland and McGill (1984)

[- Rule #8 : Use [unaligned] bars -]



[- Rule #8-bis : Use Stacked barcharts -]



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

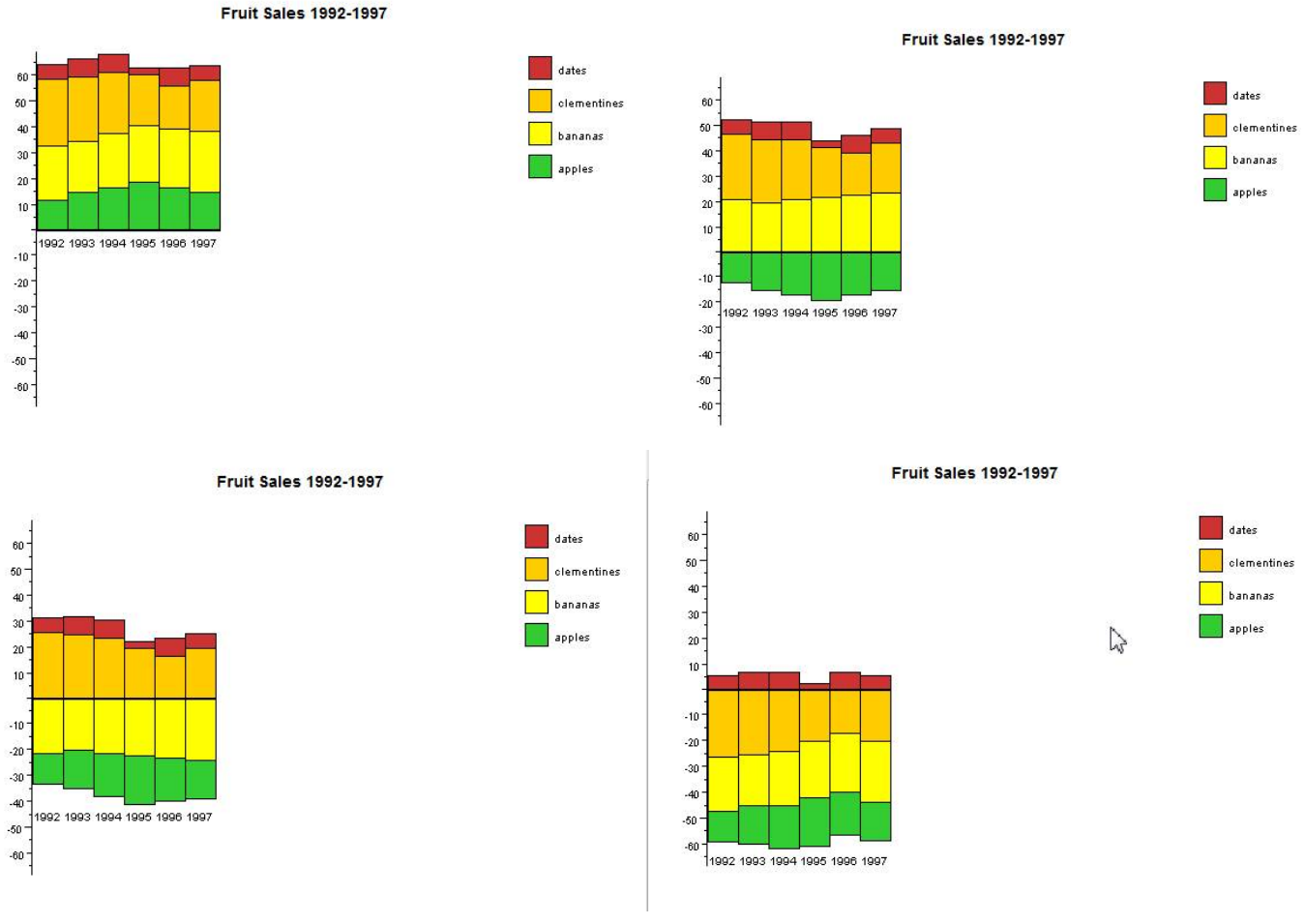
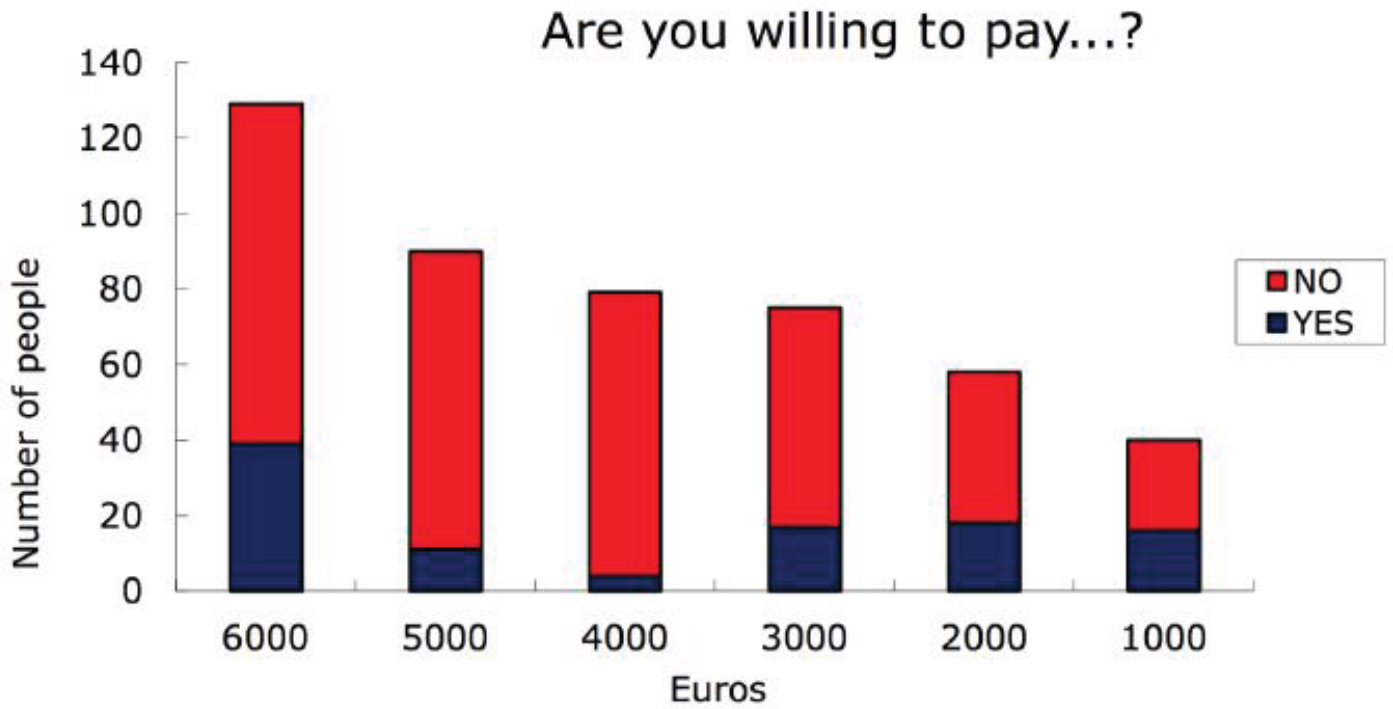


FIGURE – From Dix and Ellis (1998) example

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 :

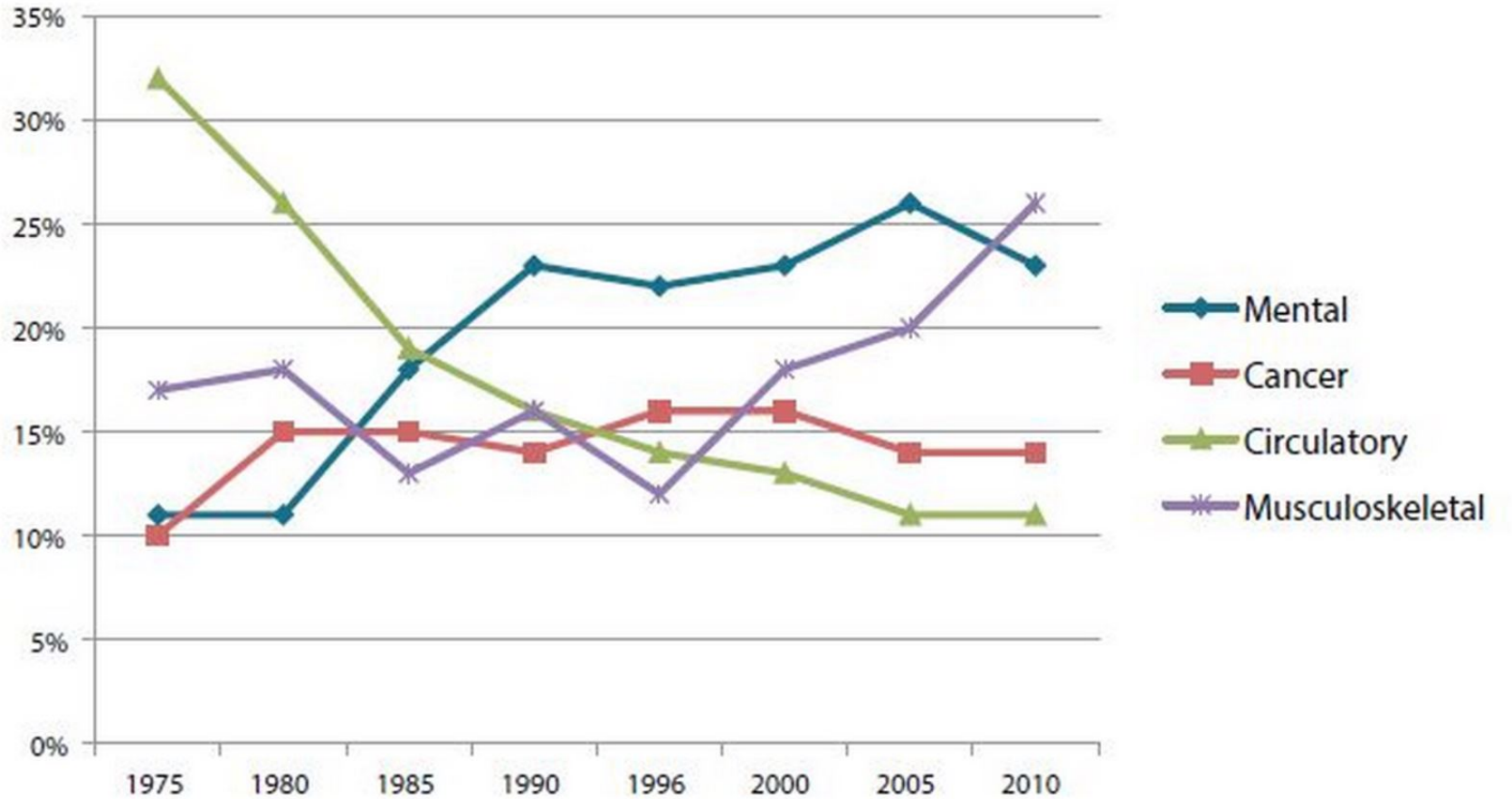


FIGURE – Major Cause of Worker Disability (1975-2010) (J. Schwabish, 2014).

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* -]

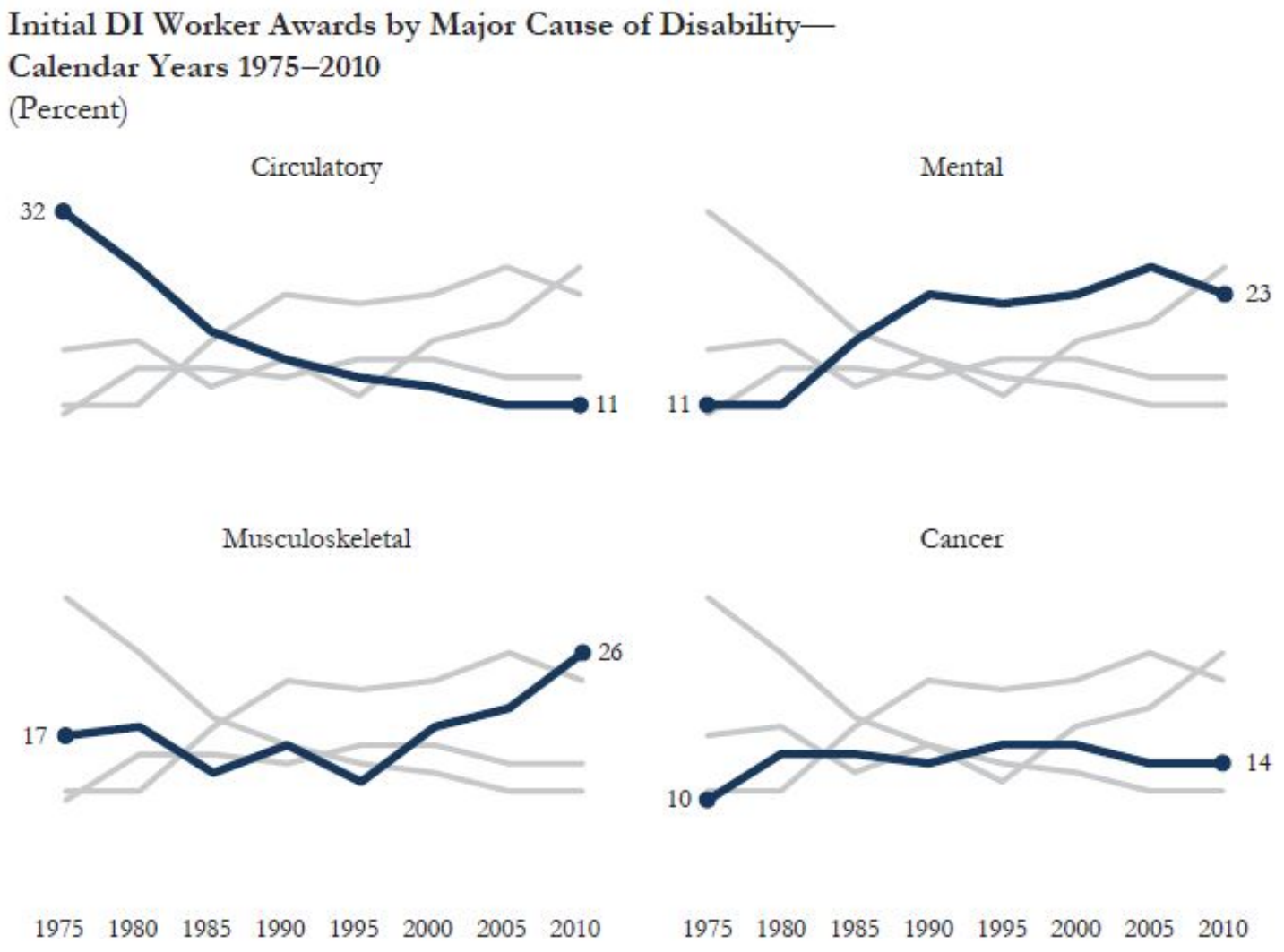
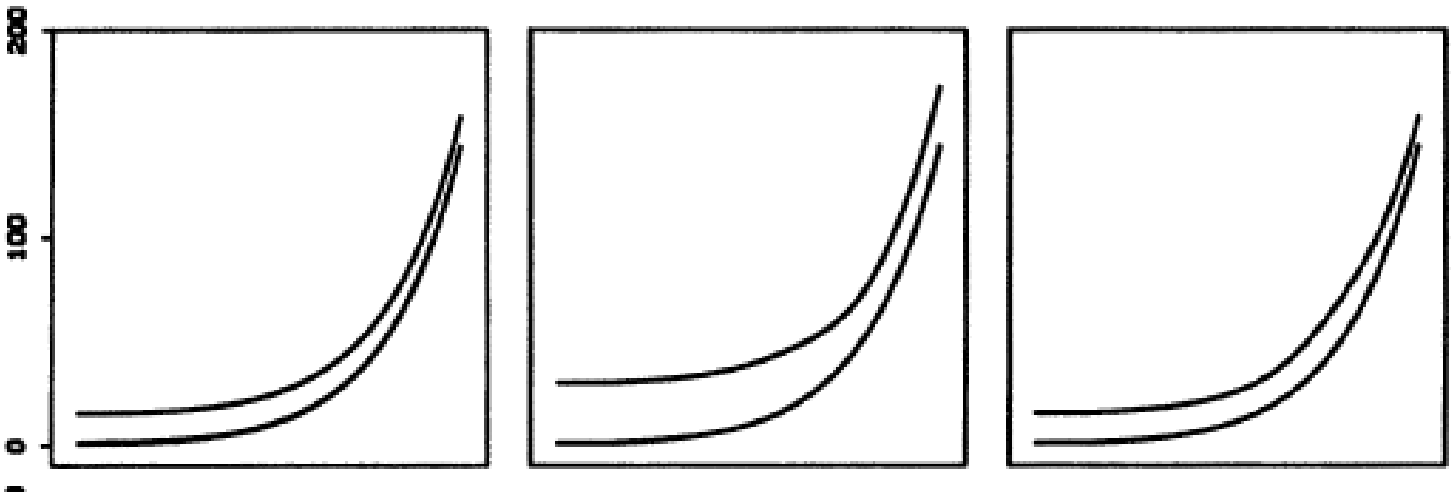


FIGURE – Major Cause of Disability - 1975-2010 (J. Schwabish, 2014).

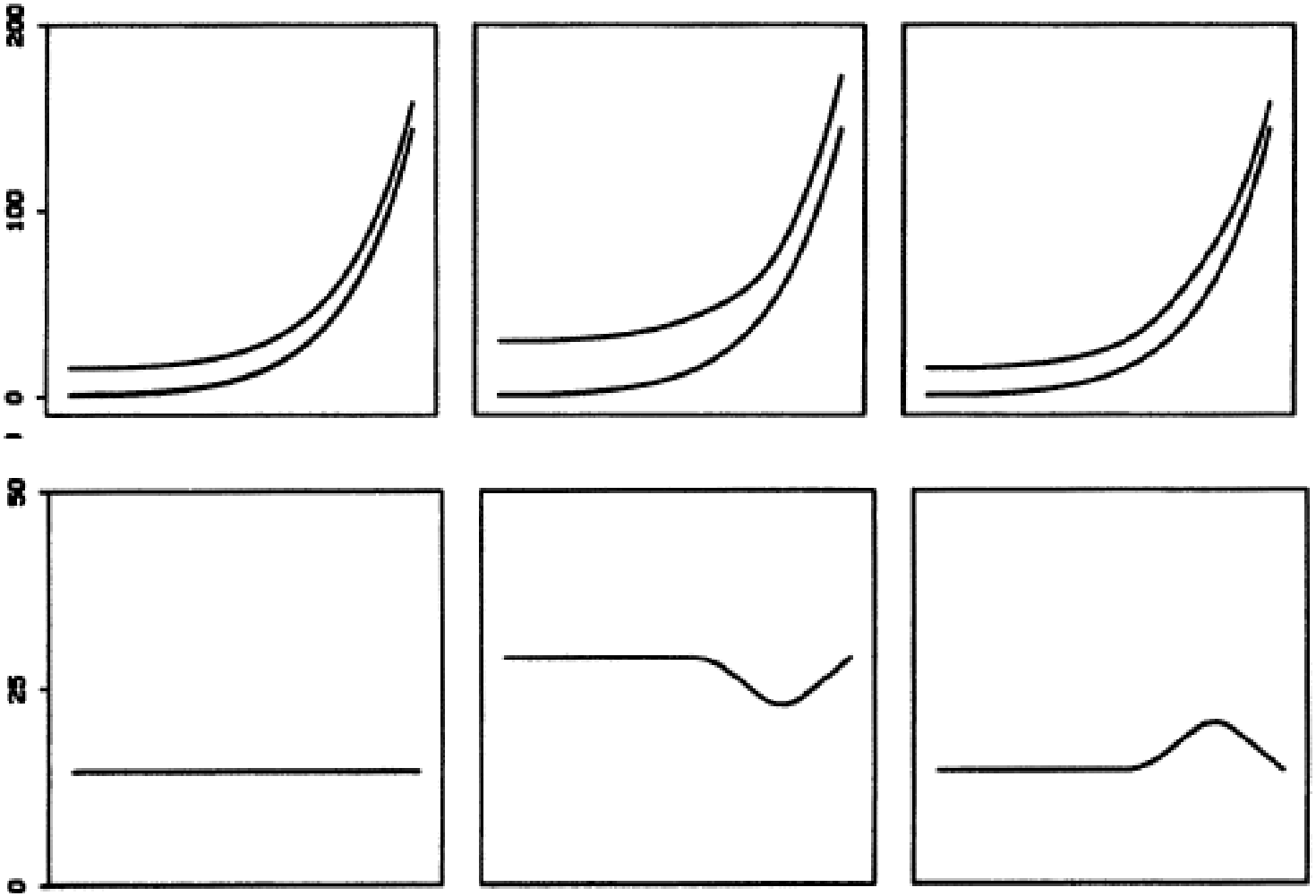
[- RULE #9BIS : USE LINES (COMPARE) -]

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



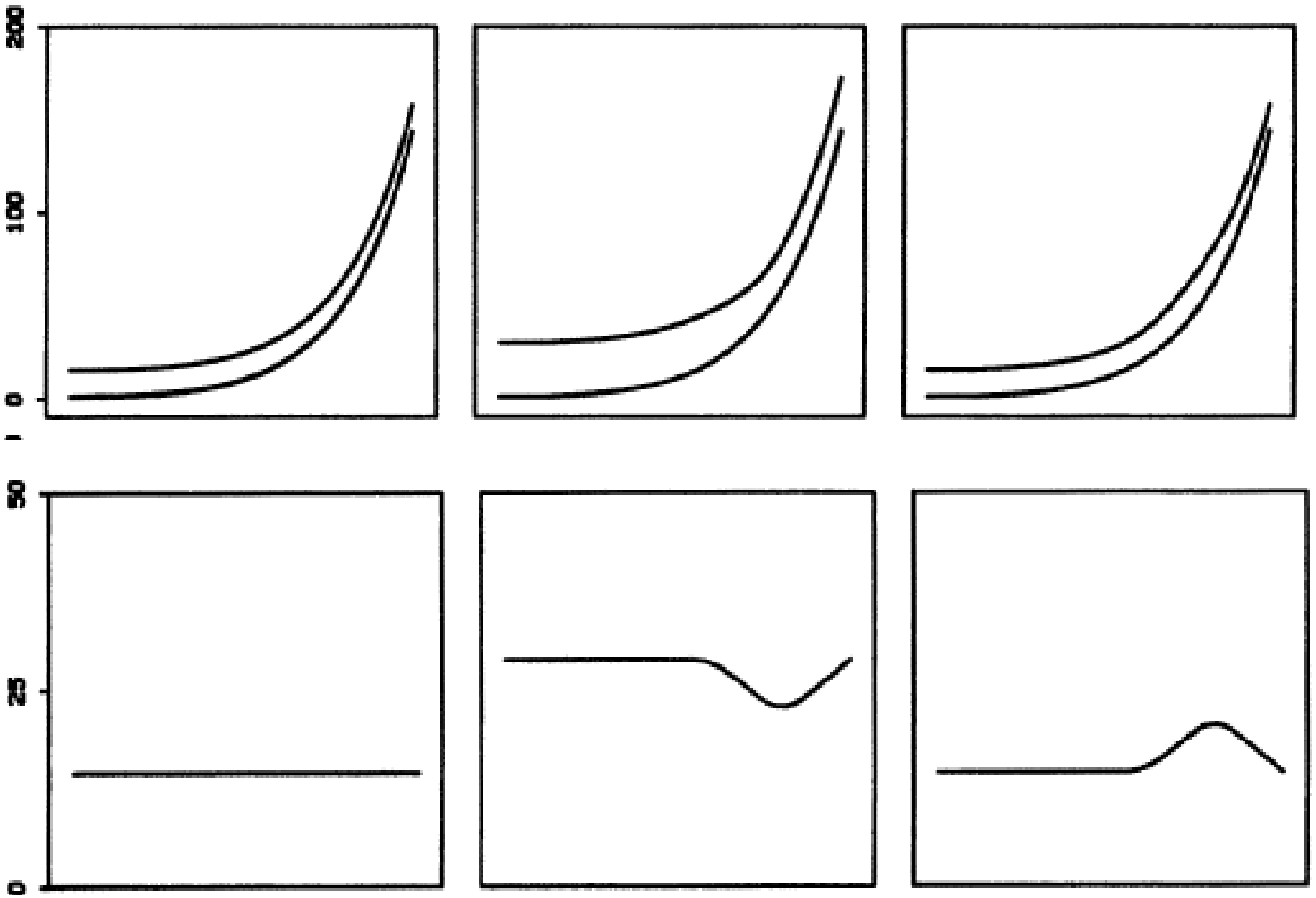
[- Rule #9bis : Use lines (Compare) -]

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



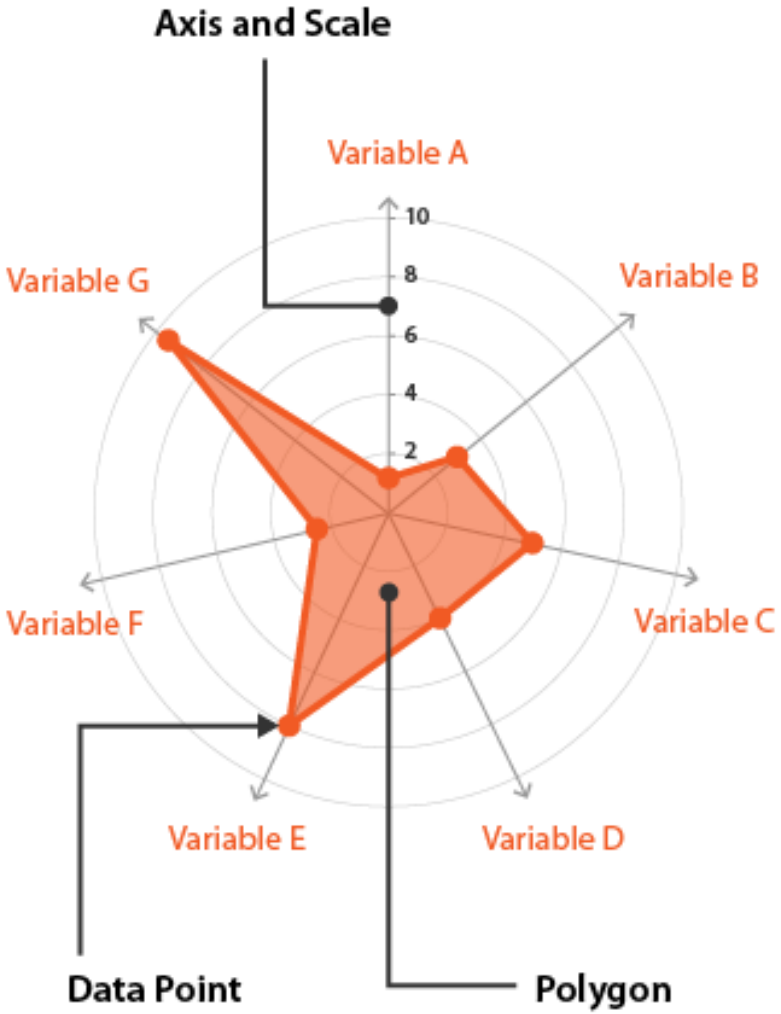
[- RULE #9BIS : USE LINES (COMPARE) -]

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



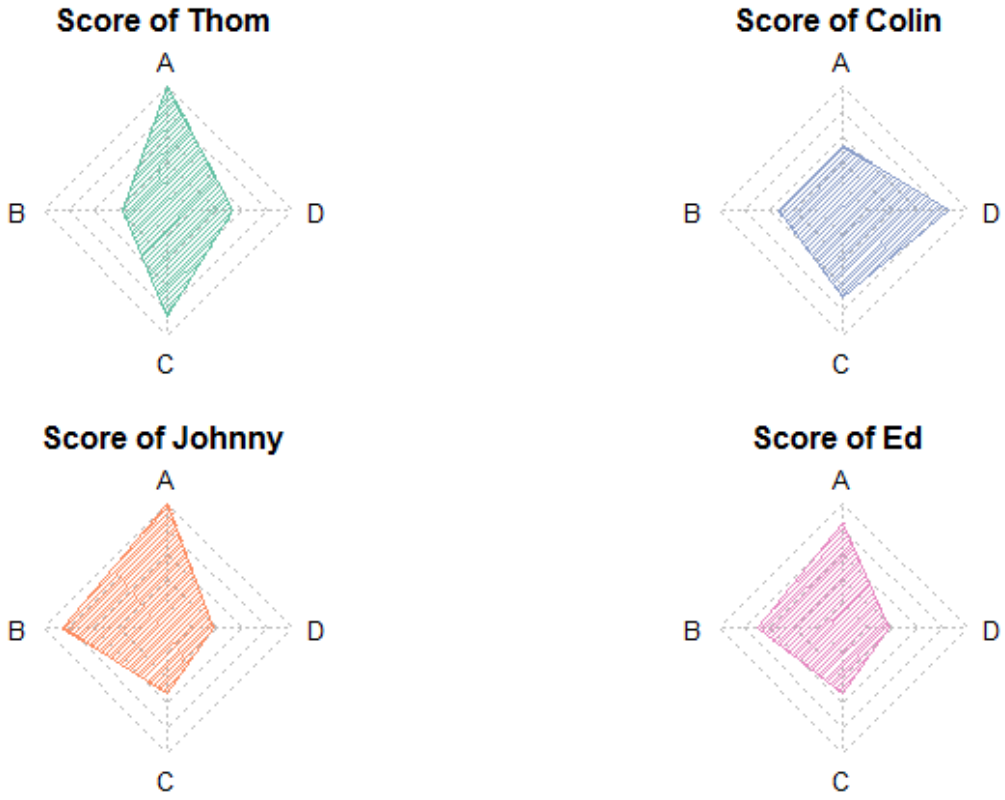
From Cleveland and McGill (1984)

[- Rule #10 : Use radar plots (or Web plots) -]



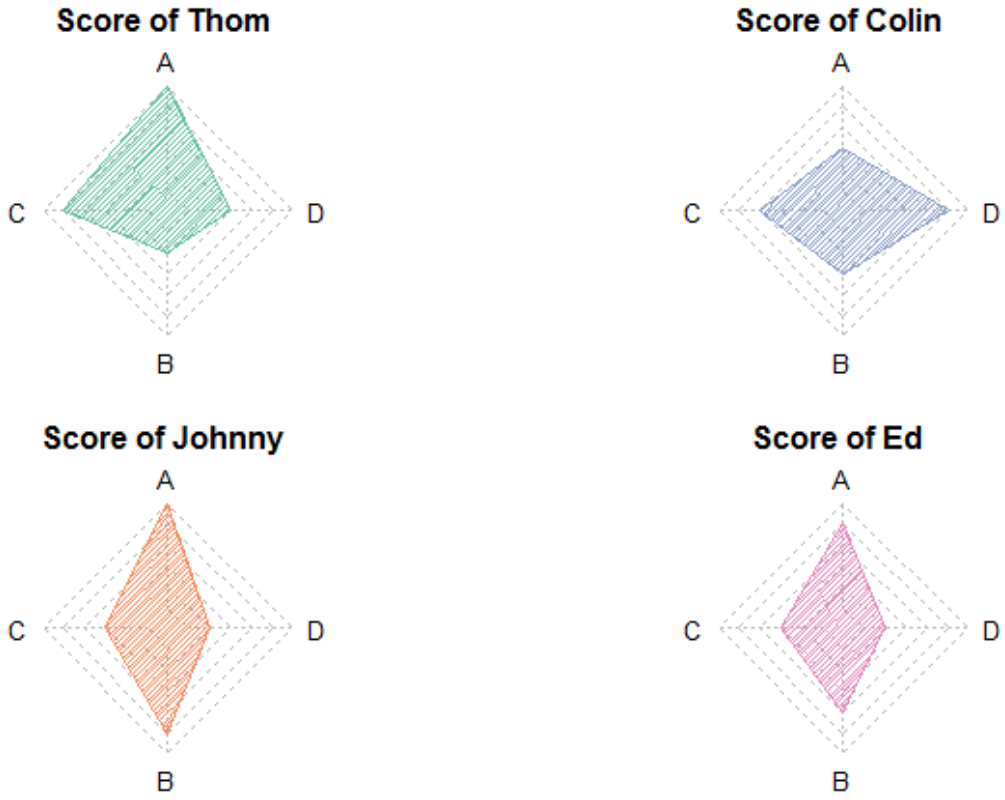
Source : Dataviz catalogue

[- Rule #10 : Use radar plots -]



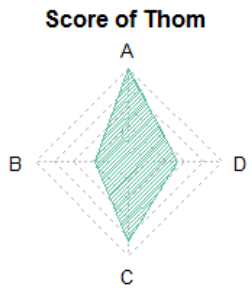
Source : Xtophe's blog: Why you should never use radar plots

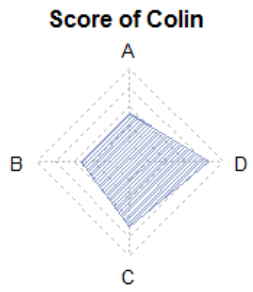
[- Rule #10 : Use radar plots -]

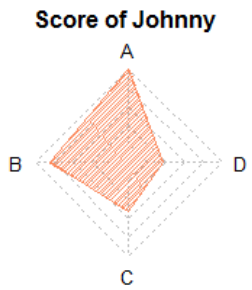


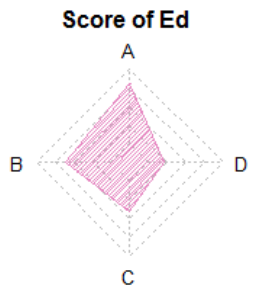
Source : Xtophe's blog: Why you should never use radar plots

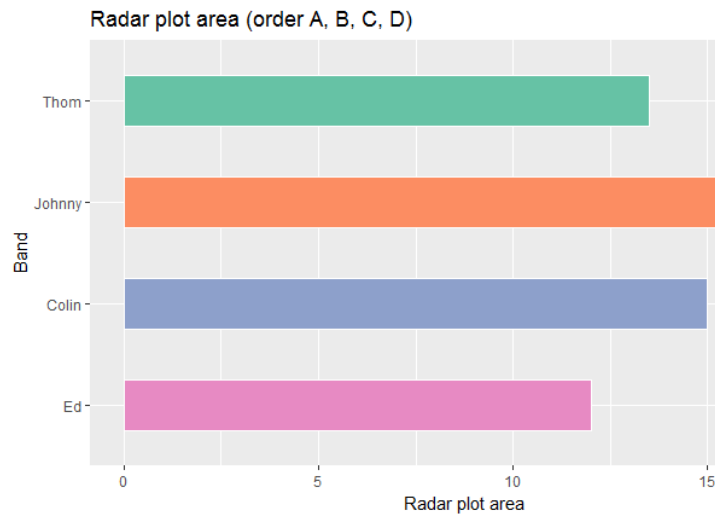
[- Rule #10 : Use radar plots -]





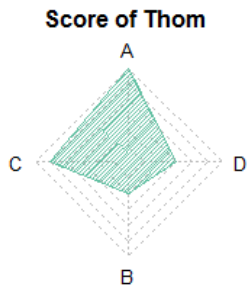


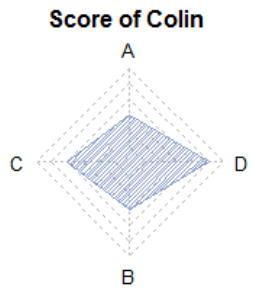


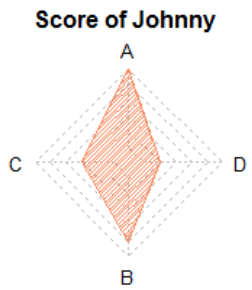


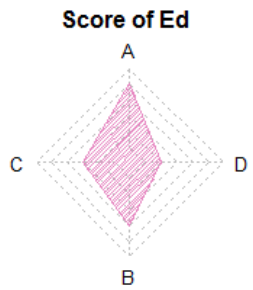
Source : Xtophe's blog: Why you should never use radar plots

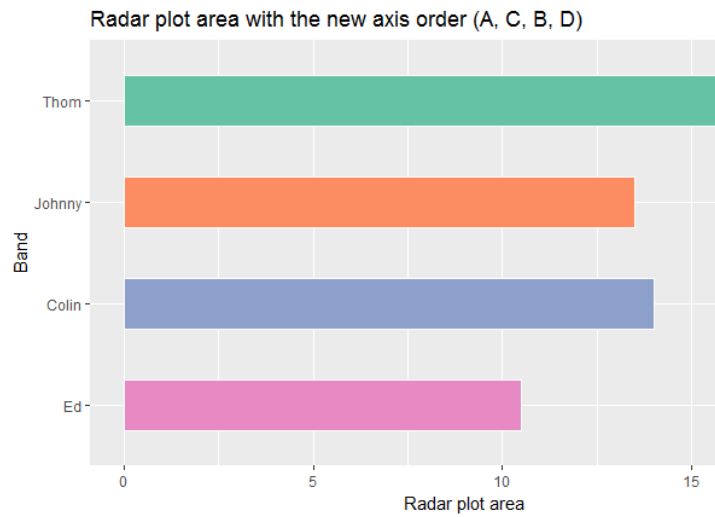
[- Rule #10 : Use radar plots -]







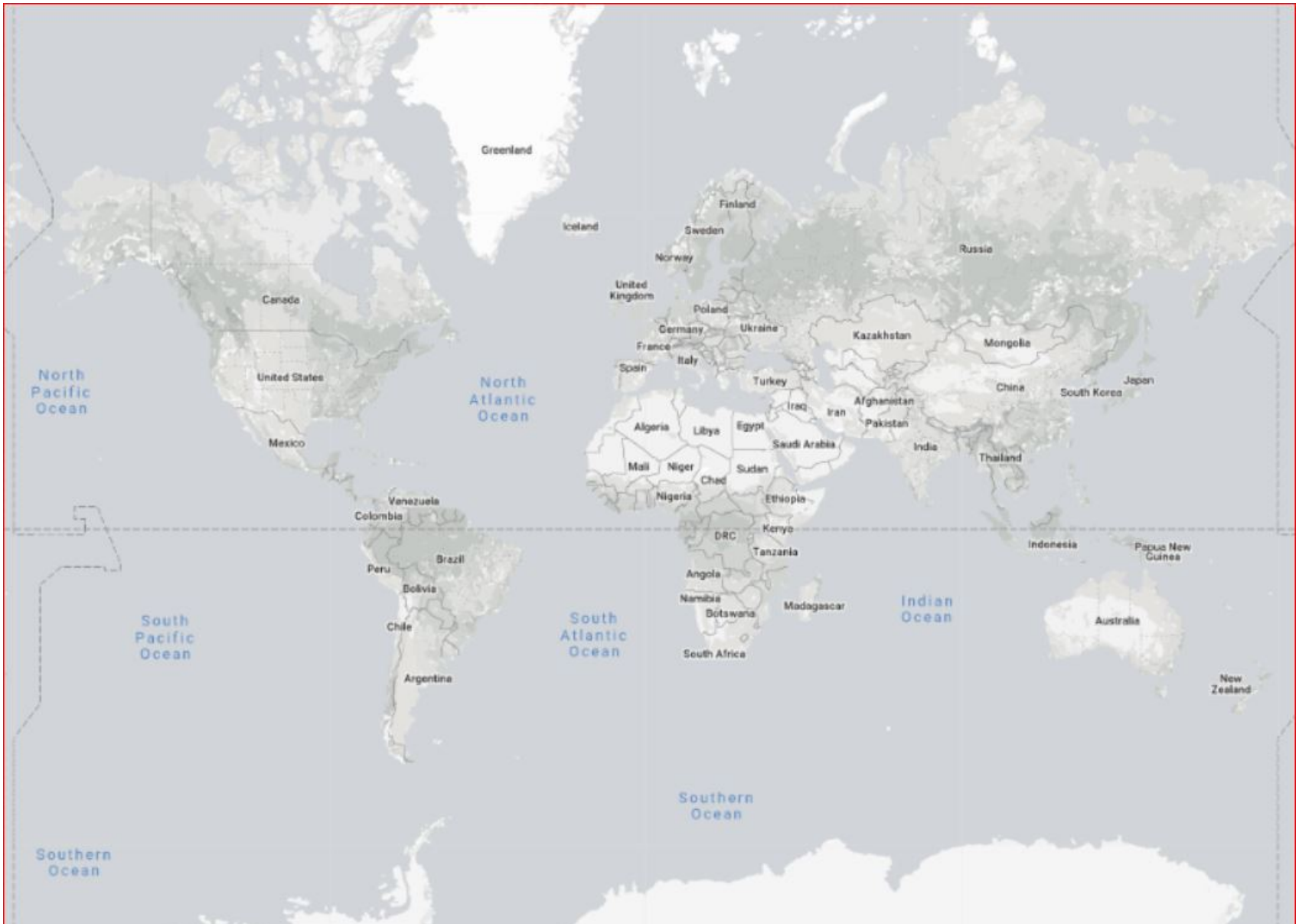




Source : Xtophe's blog: Why you should never use radar plots

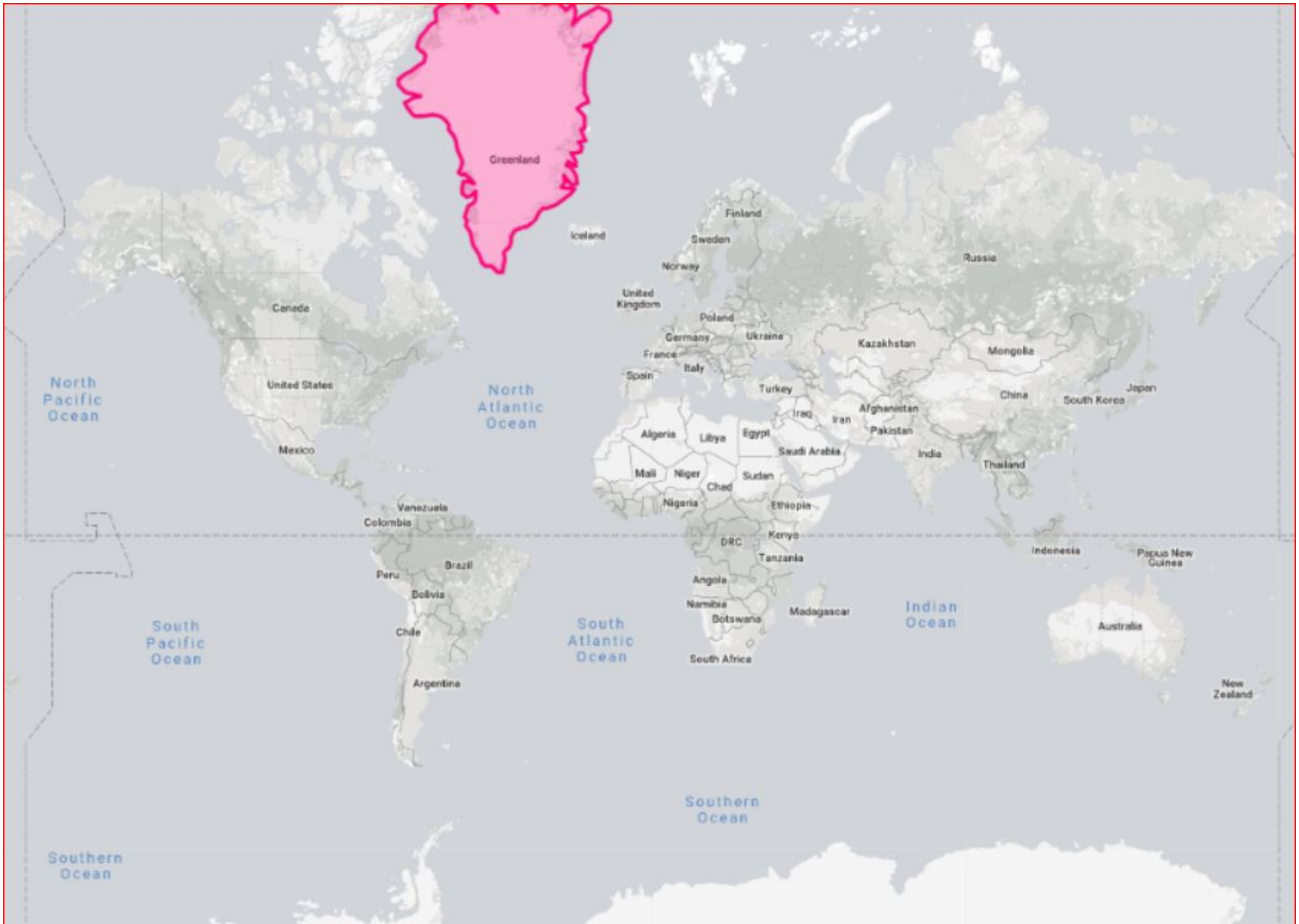
[- Super Rule #1 : Use Maps -]

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



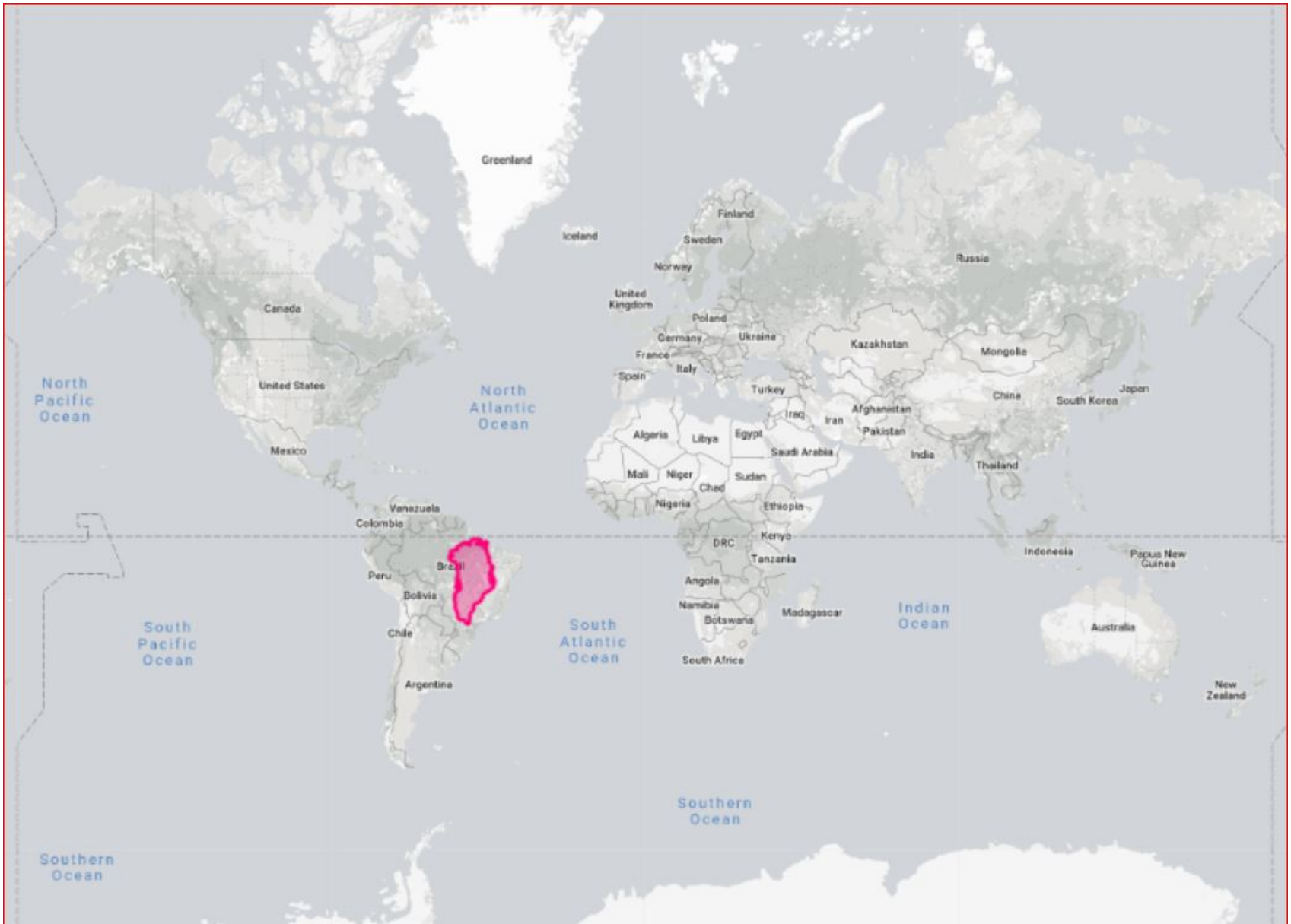
[- Super Rule #1 : Use Maps -]

Is Greenland greater than Brazil ?



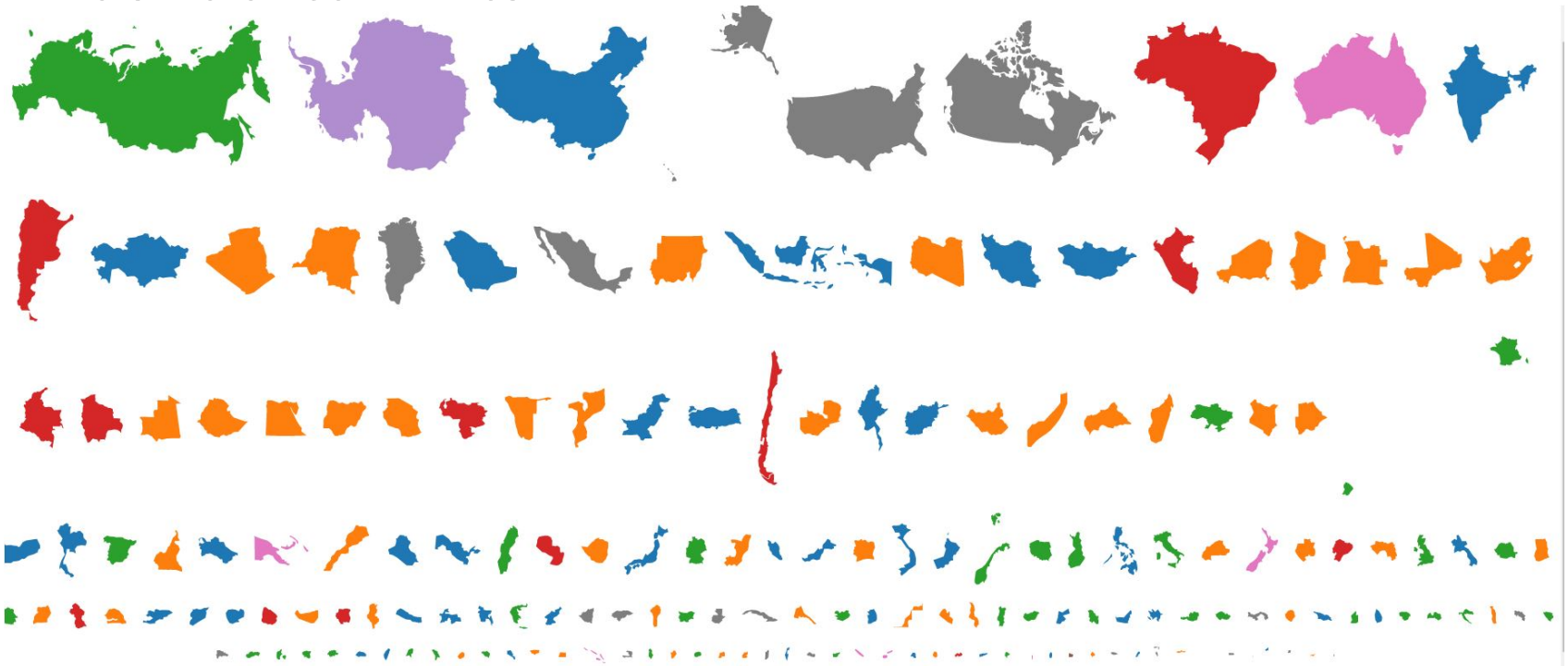
[- Super Rule #1 : Use Maps -]

Solution : Greenland $\simeq$ 2.1 M km^2, Brazil $\simeq$ 8.5 M km^2 !



[- Super Rule #1 : Use Maps -]

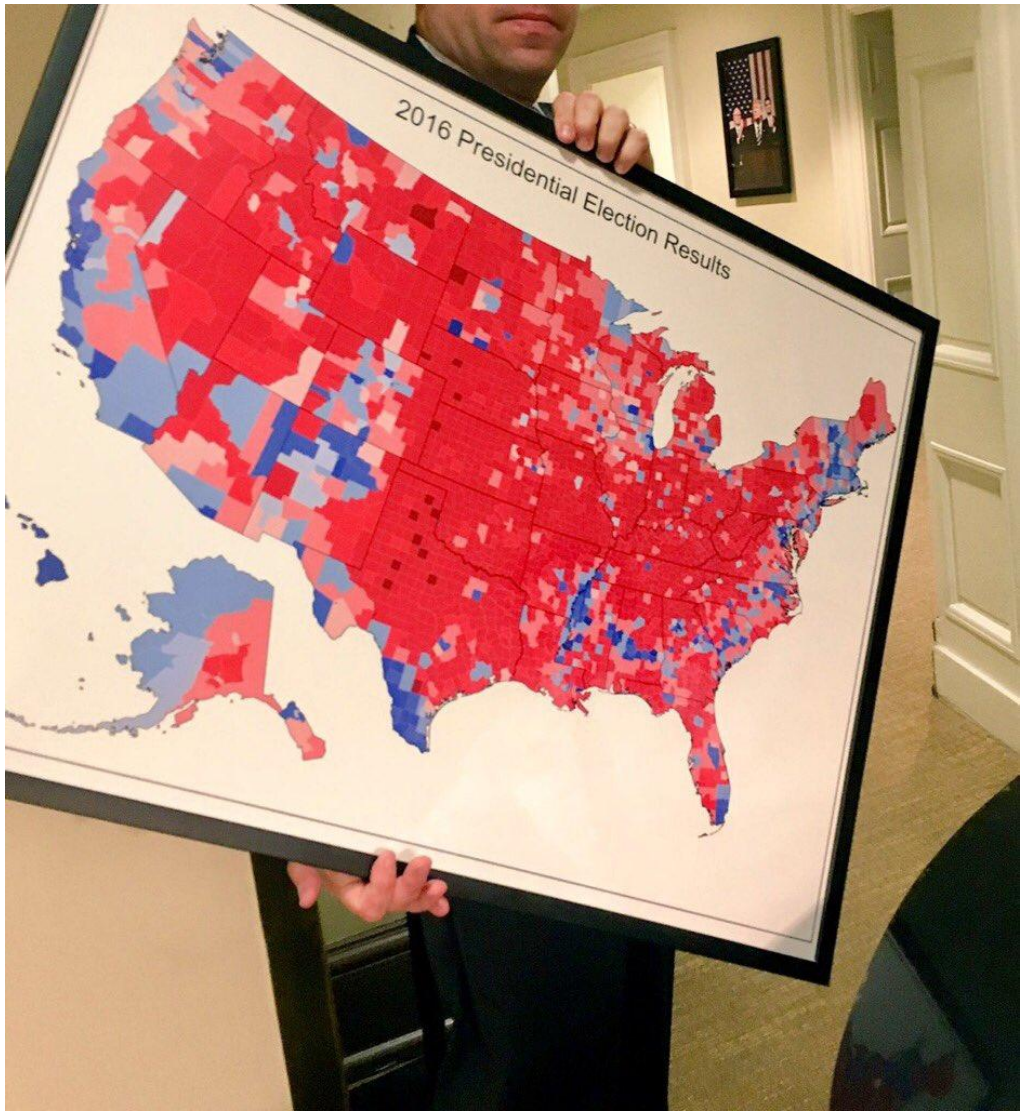
True size of countries



Source : http://metrocosm.com/mercator/ , see also https://thetruesize.com/

[- Super Rule #2 : Use Electoral Maps -]

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



Source : Tom Vinogt (Fox News)

[- Super Rule #2 : Use Electoral Maps -]

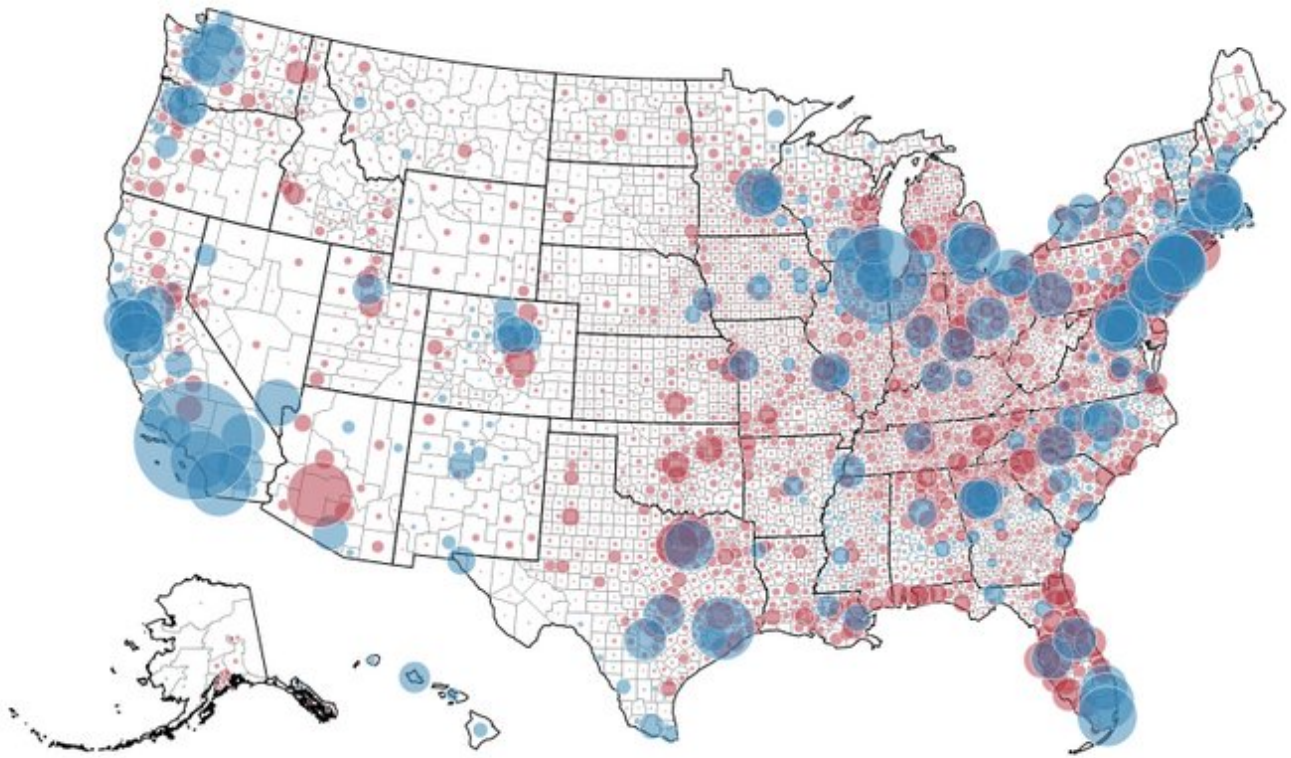
2016 US Election "map" (per *counties*)



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

[- Super Rule #2 : Use Electoral Maps -]

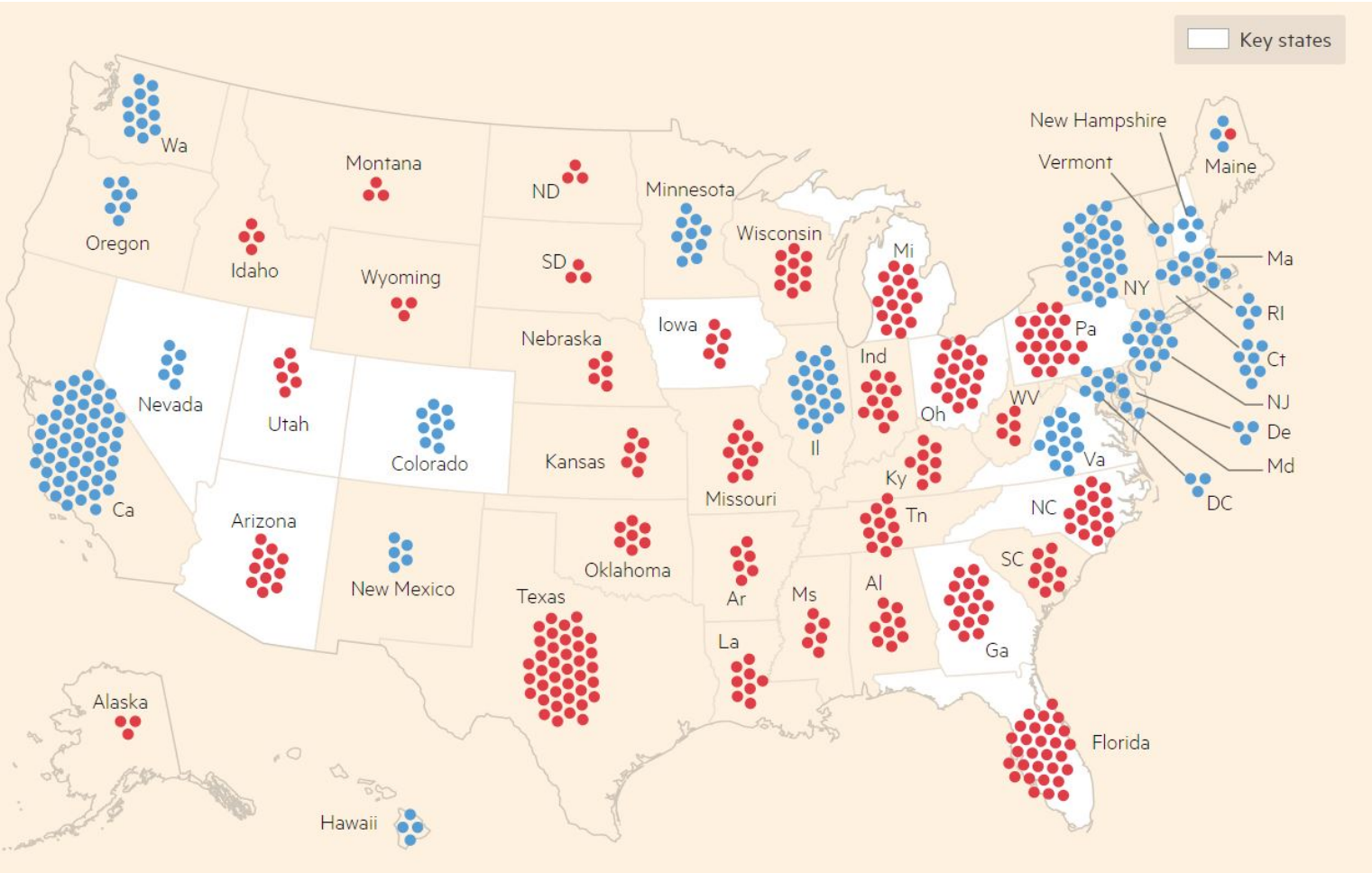
2016 US Election "map" (per *nb of votes*)



Source : @MInesCR (Twitter)

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

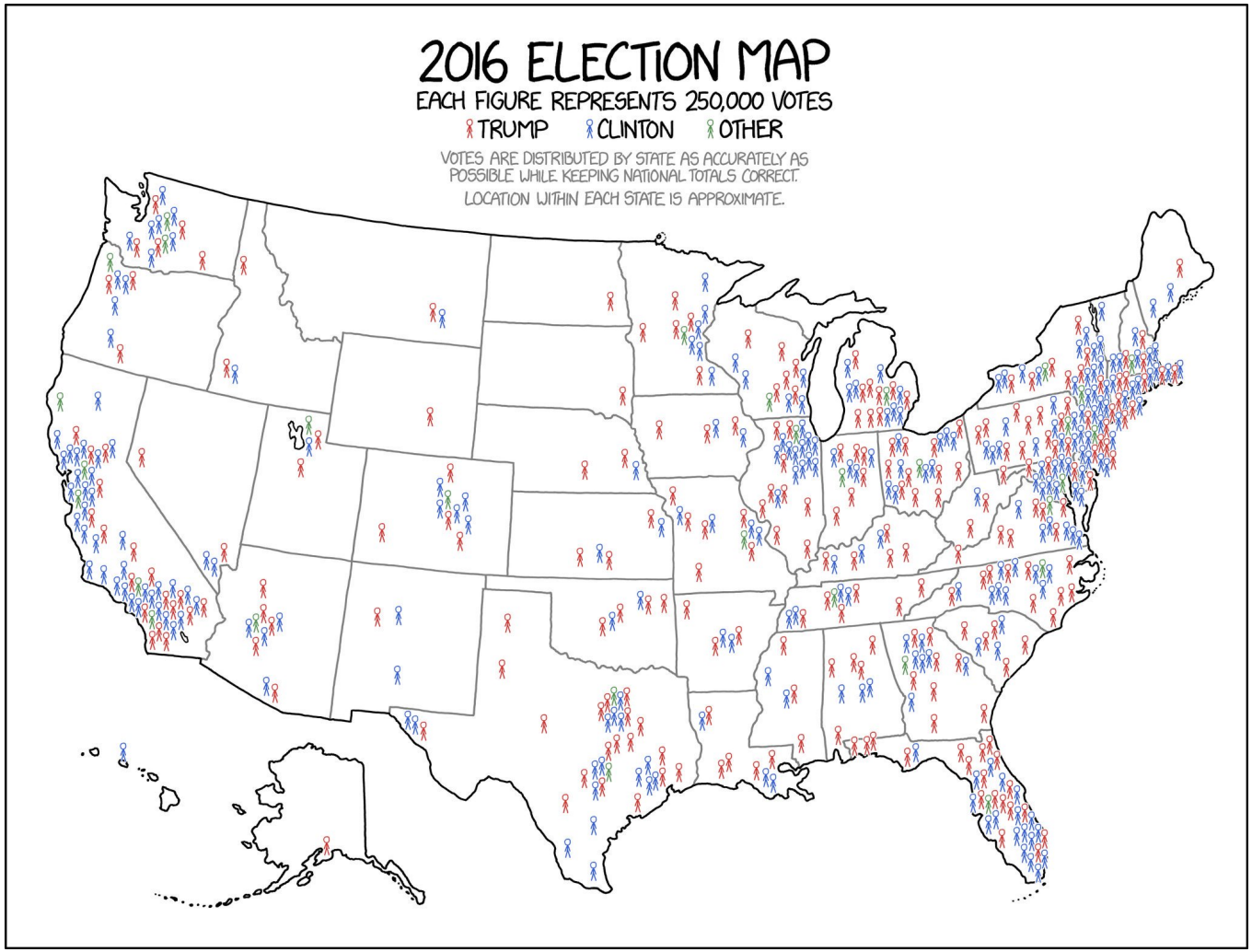
2016 US Election "map" (per *Nb of representatives*)



Source : *Financial Times*

[- Super Rule #2 : Use Electoral Maps -]

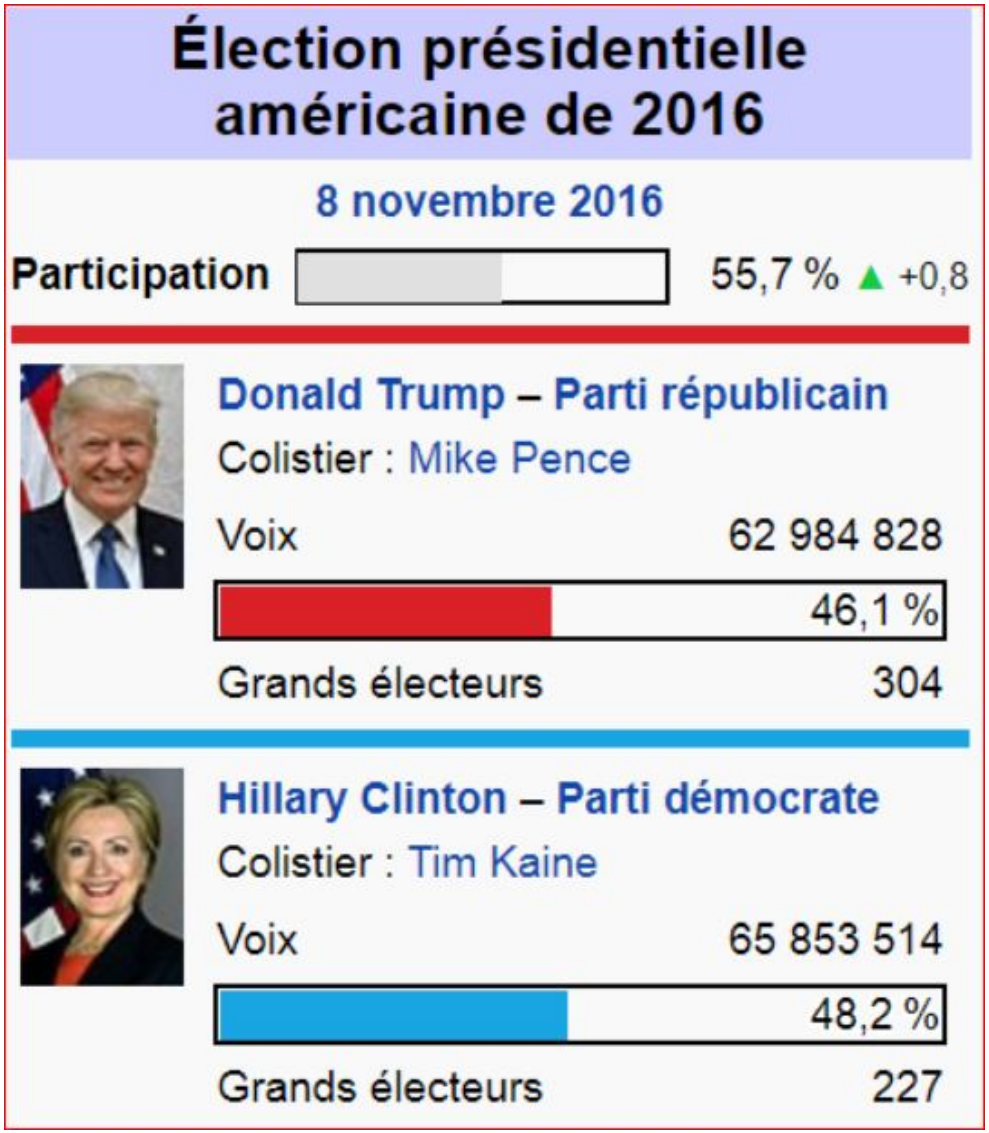
2016 US Election "map" (nb of *votes*)



Source : XKCD

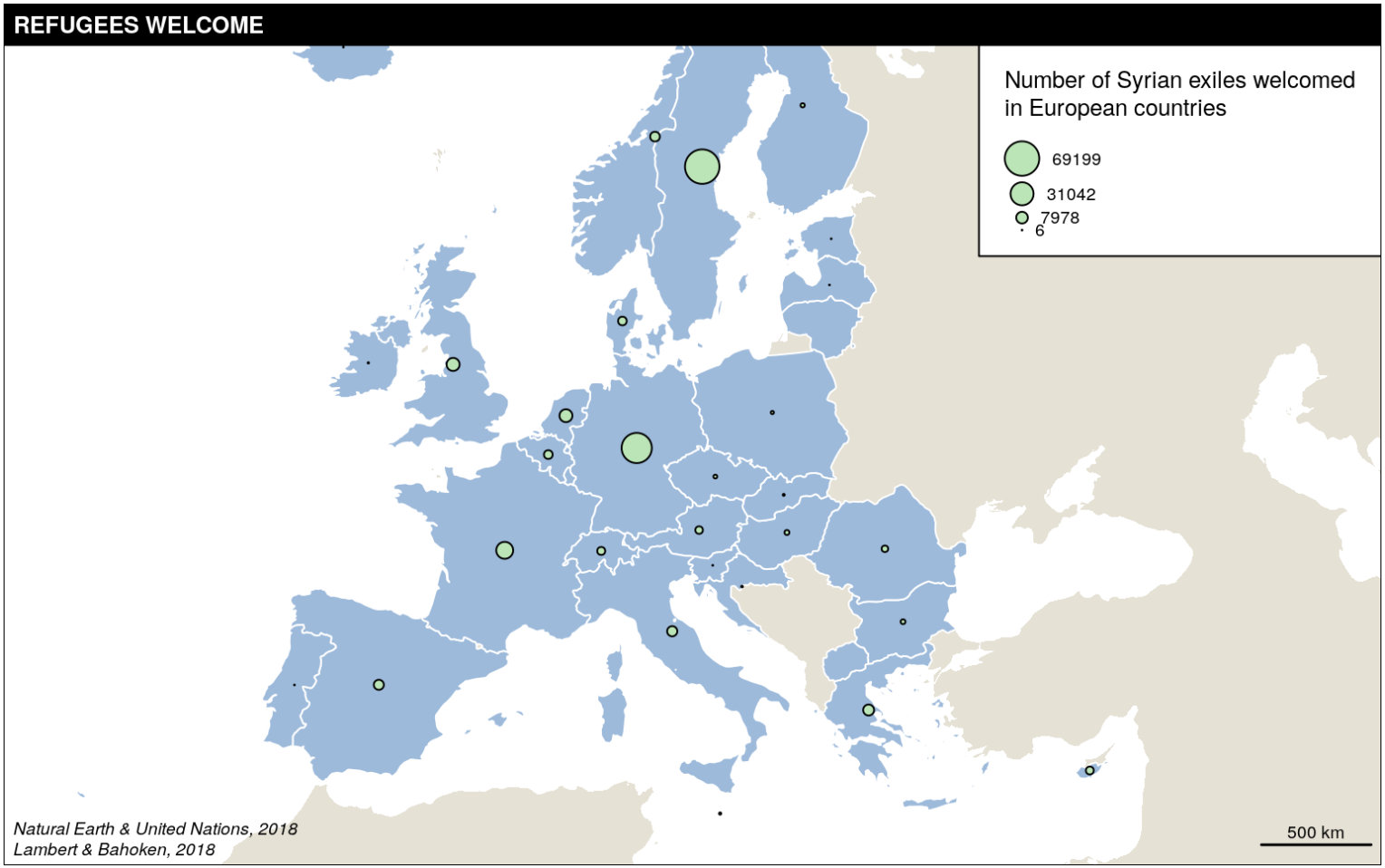
[- Super Rule #2 : Use Electoral Maps -]

2016 US Election : *raw numbers*



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

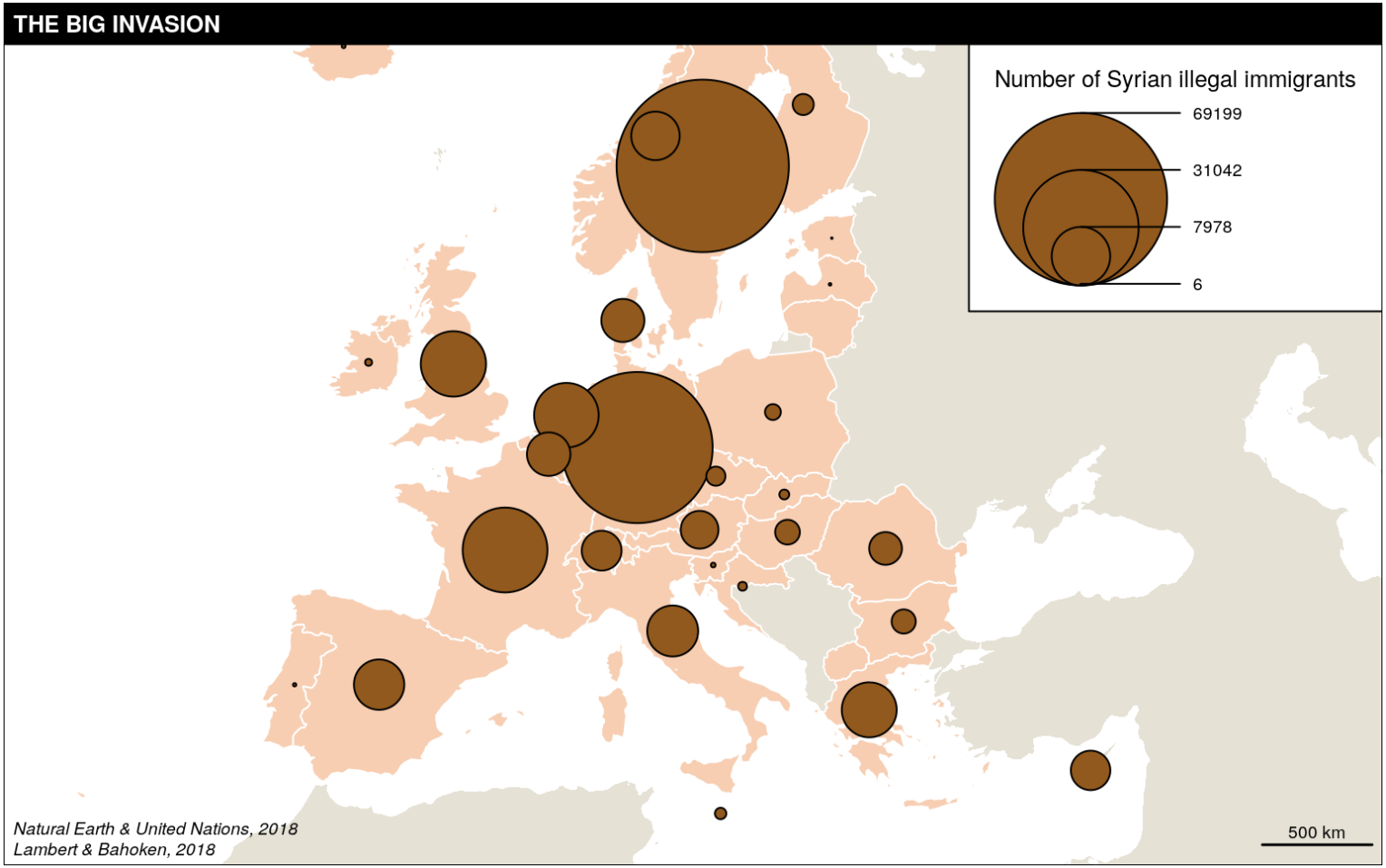
"**Welcome**" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

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

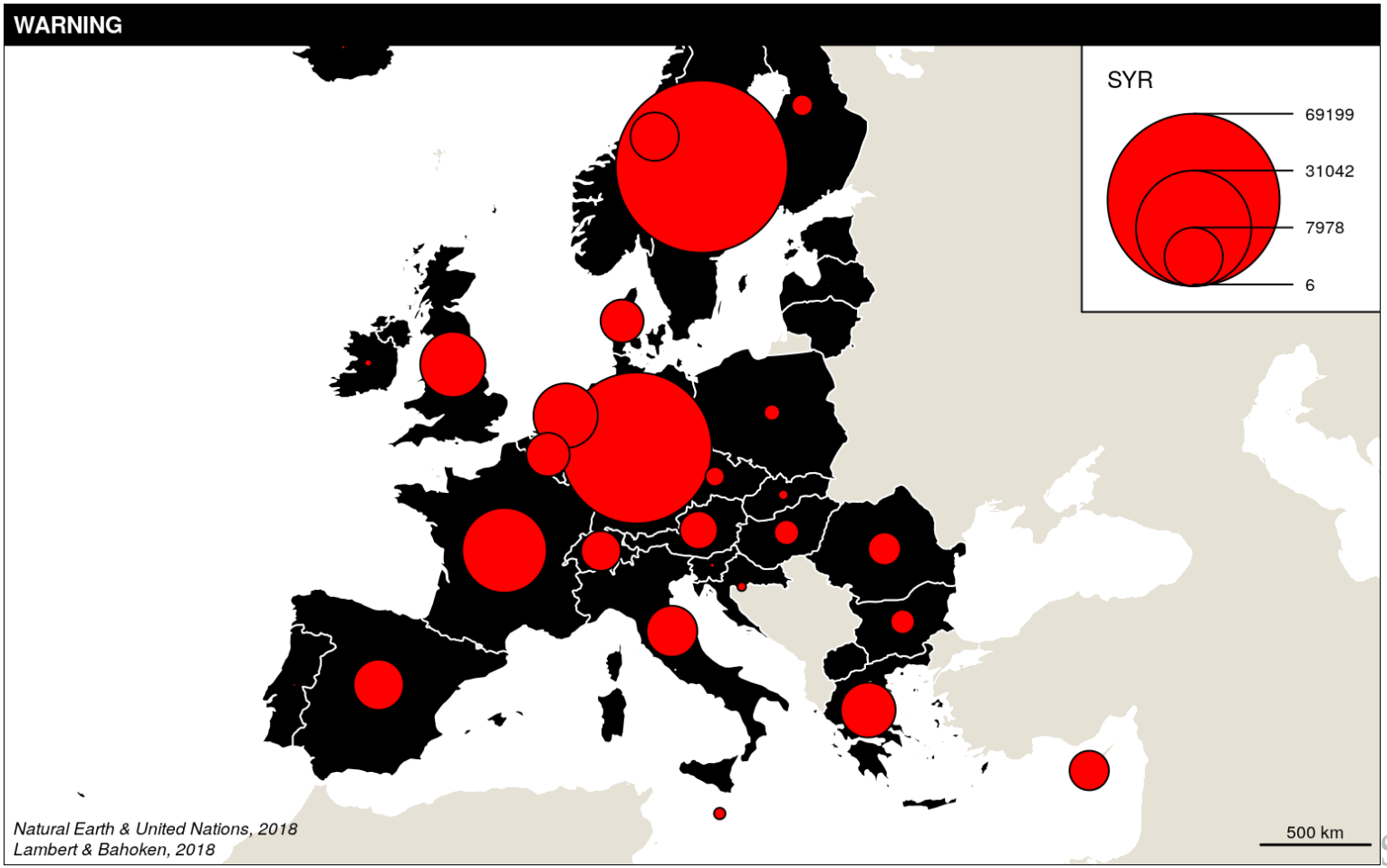
"Less welcome" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

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

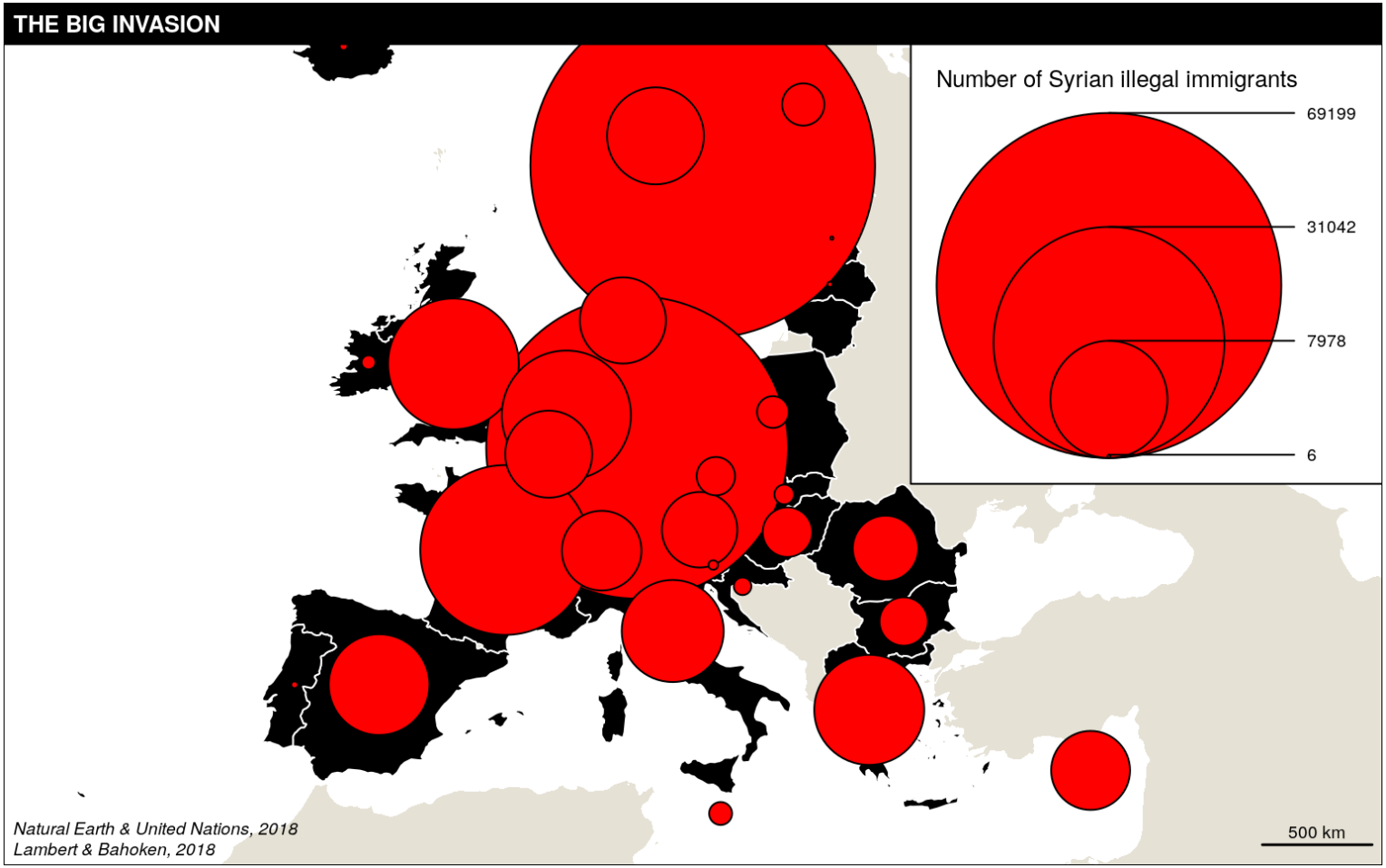
" Not welcome" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- Super Rule #2 : Use Statistical Maps -]

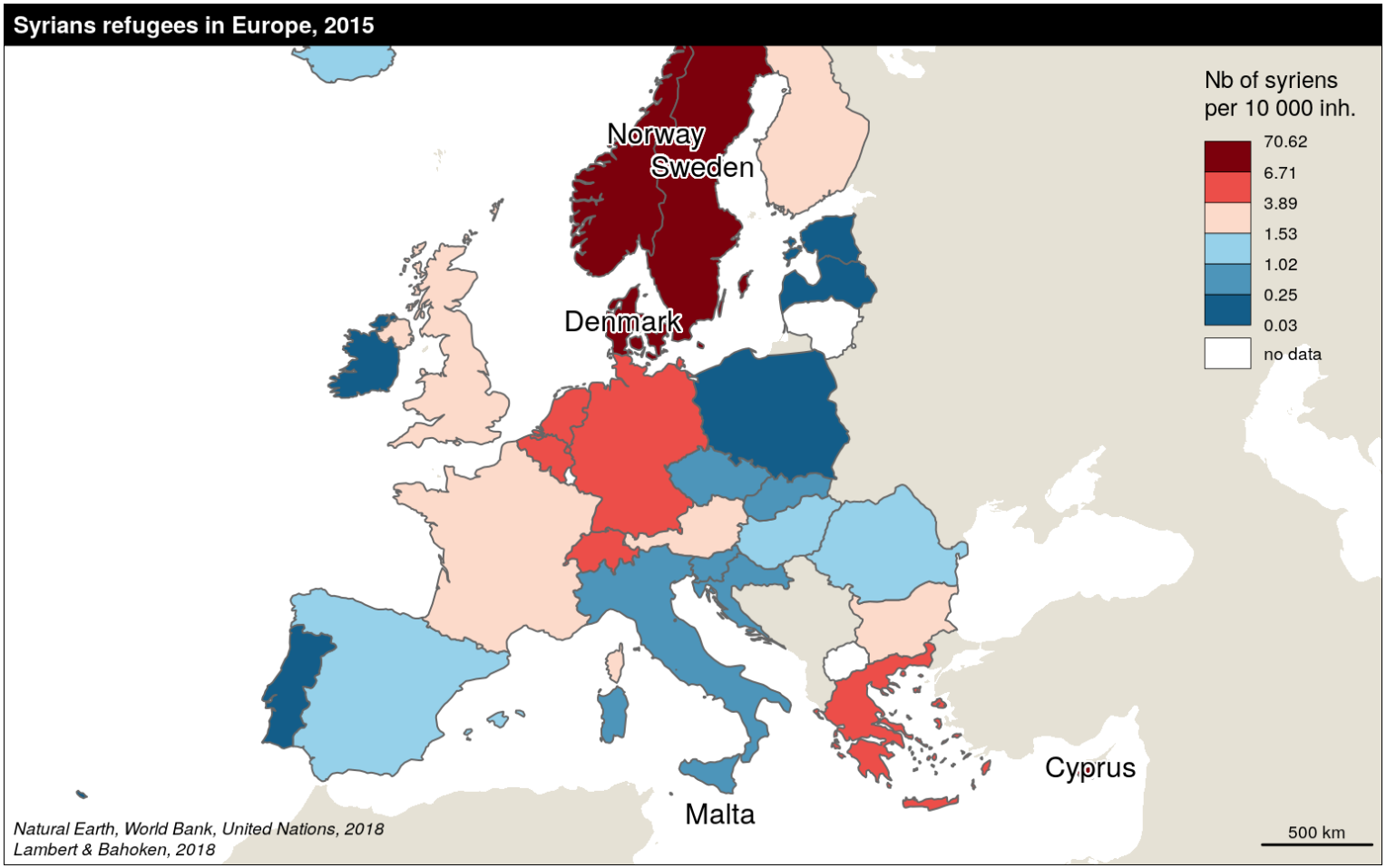
"Invasion" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

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

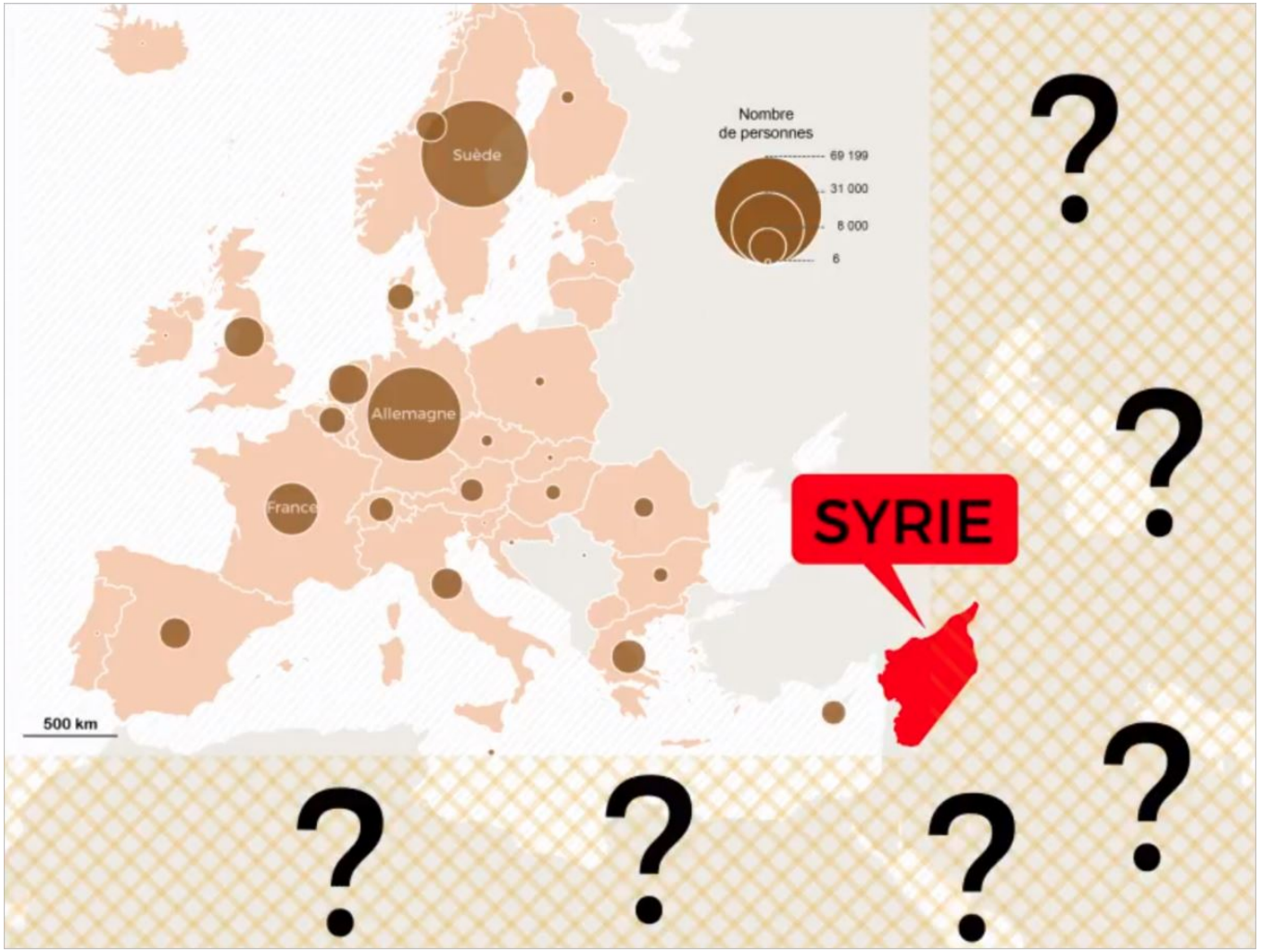
"Relative to population" version



Source : Françoise BAHOKEN & Nicolas LAMBERT

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

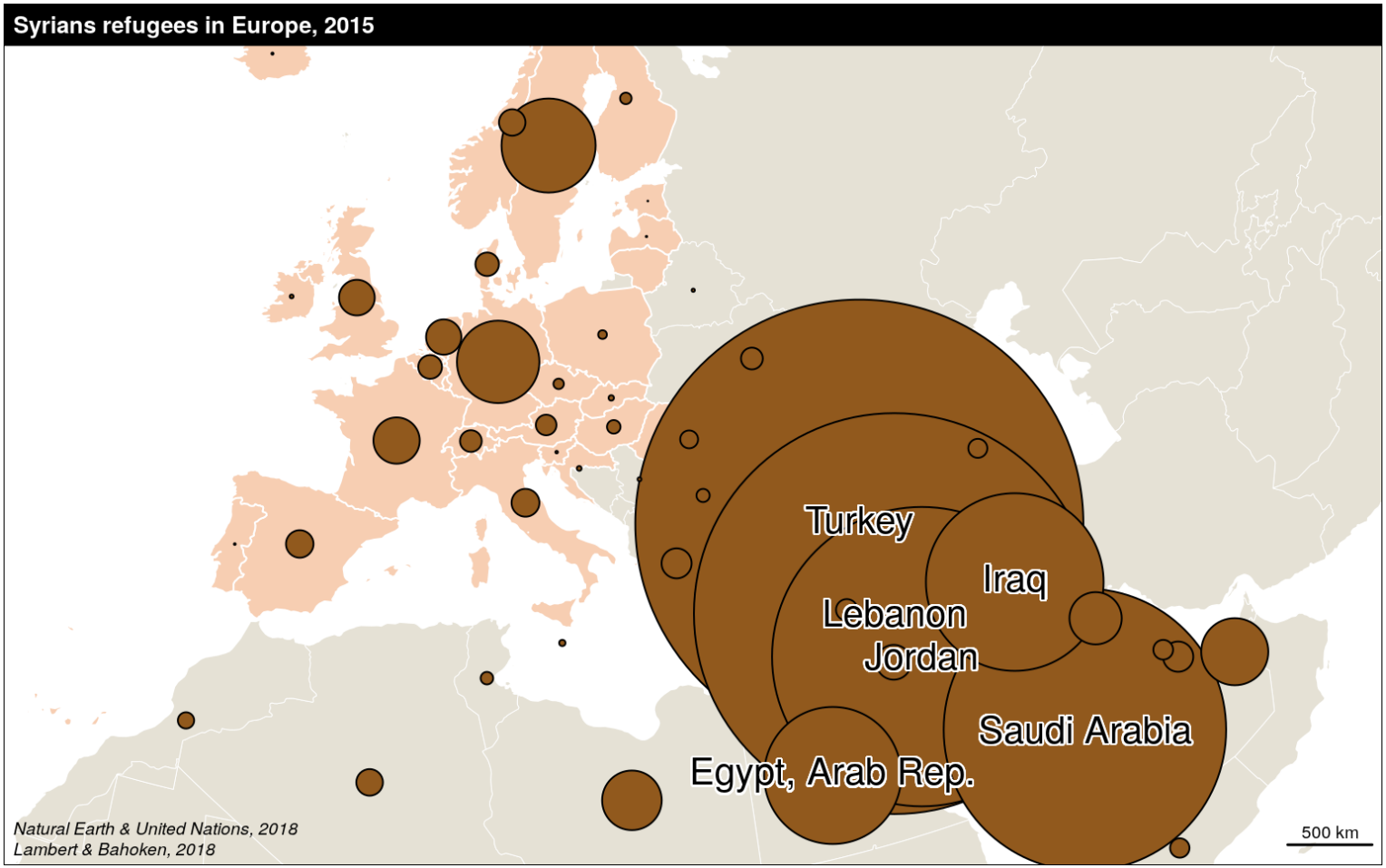
"All of this is a lie !" The picture is zoomed !



Source : Françoise BAHOKEN & Nicolas LAMBERT

[- Super Rule #2 : Use Statistical Maps -]

Be suspicious of maps, not of migrants !



Source : Françoise BAHOKEN & Nicolas LAMBERT

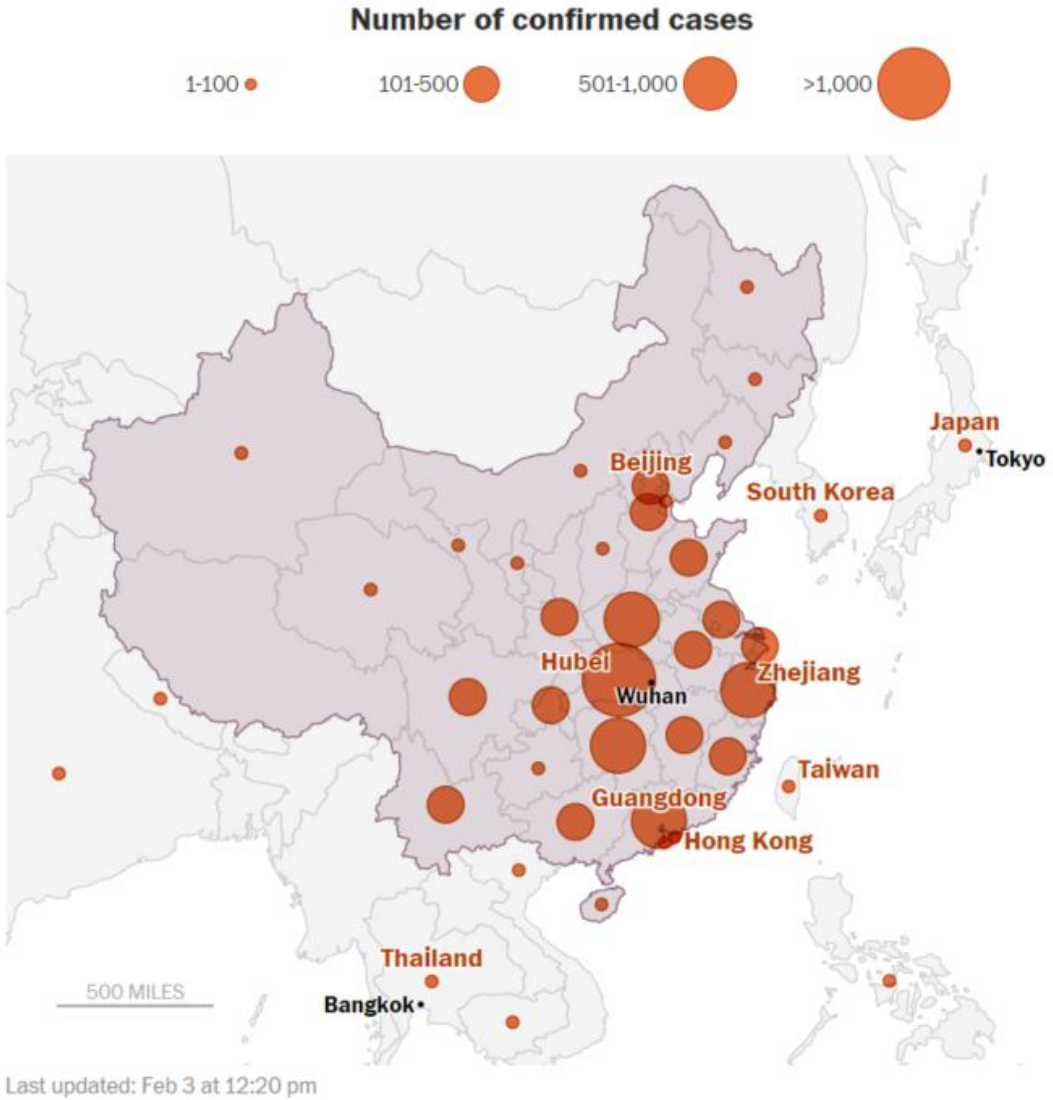
[- Applying Super Rule #2 : Coronavirus -]



Source : John Hopkins CSSE

From Sylvain Genevois' blog

[- Applying Super Rule #2 : Coronavirus -]



Source : Washington Post

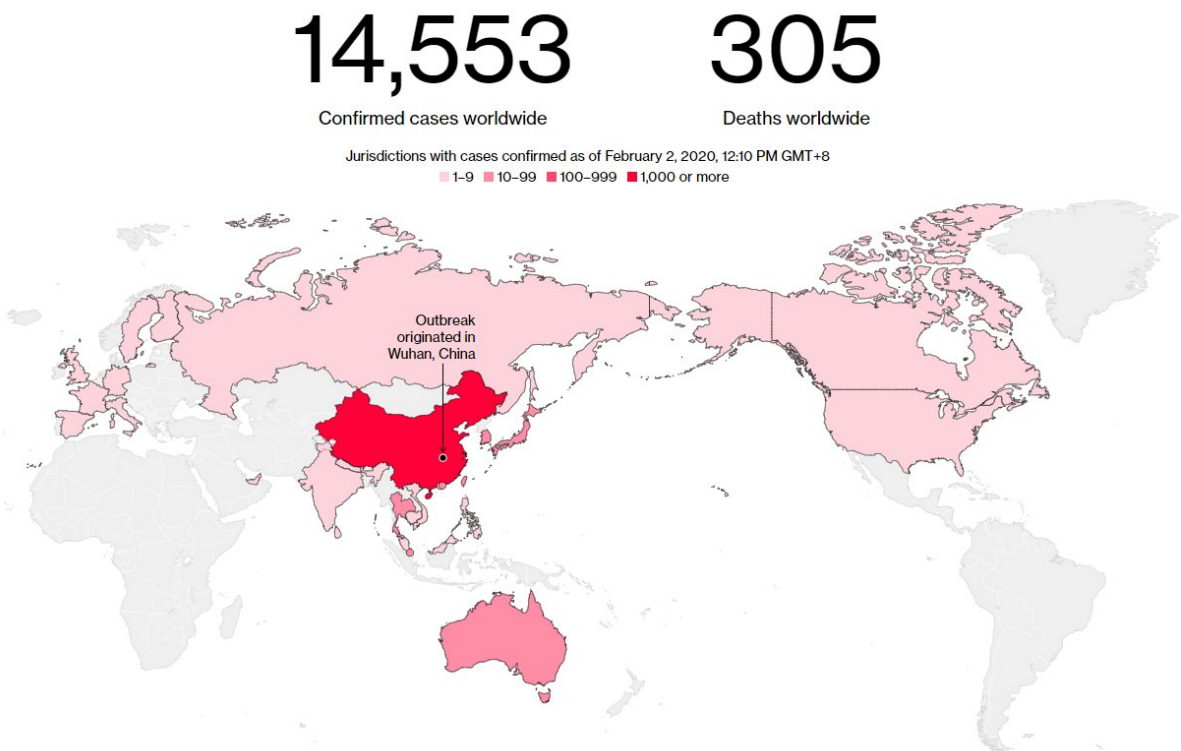
[- Applying Super Rule #2 : Coronavirus -]



Source : New York Times

From Sylvain Genevois' blog

[- Applying Super Rule #2 : Coronavirus -]



Source : Bloomberg

From Sylvain Genevois' blog

[- Applying Super Rule #2 : Coronavirus -]

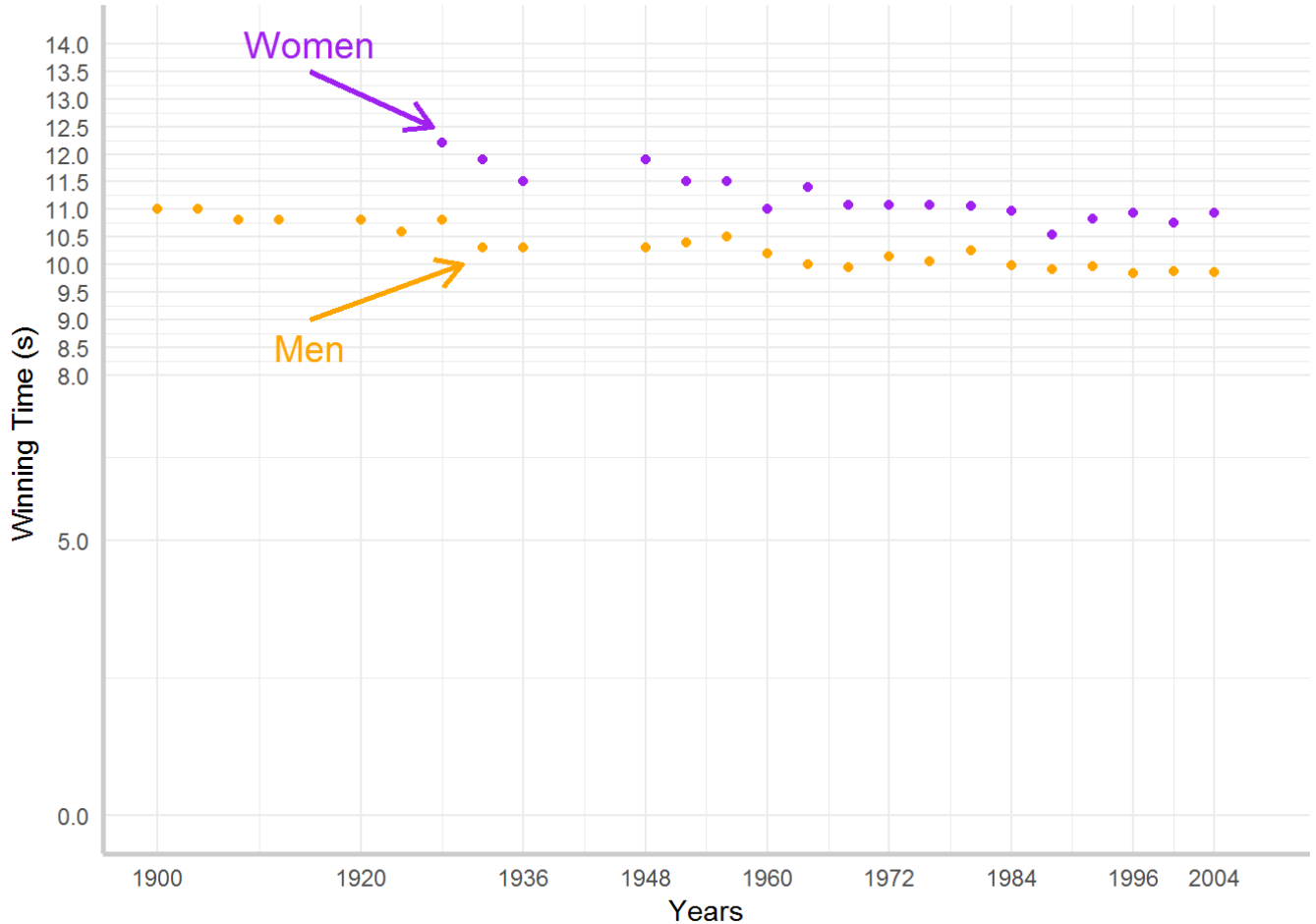


Source : Lies Breaker

From Sylvain Genevois' blog

[- Super Rule #3 : Extrapolate -]

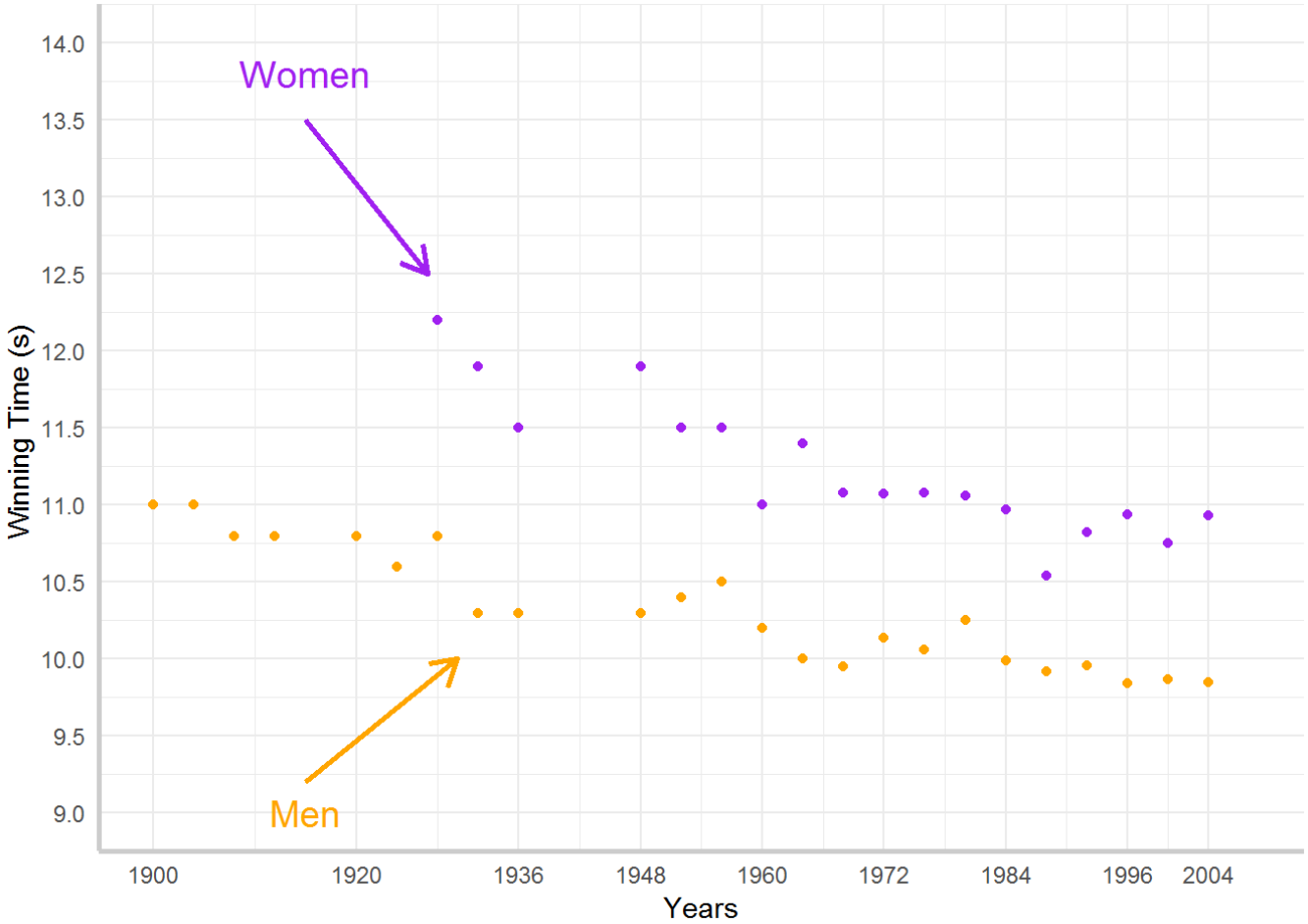
An example : The gender gap in 100-meters Olympics



Adapted from : Calling Bullshit

[- Super Rule #3 : Extrapolate -]

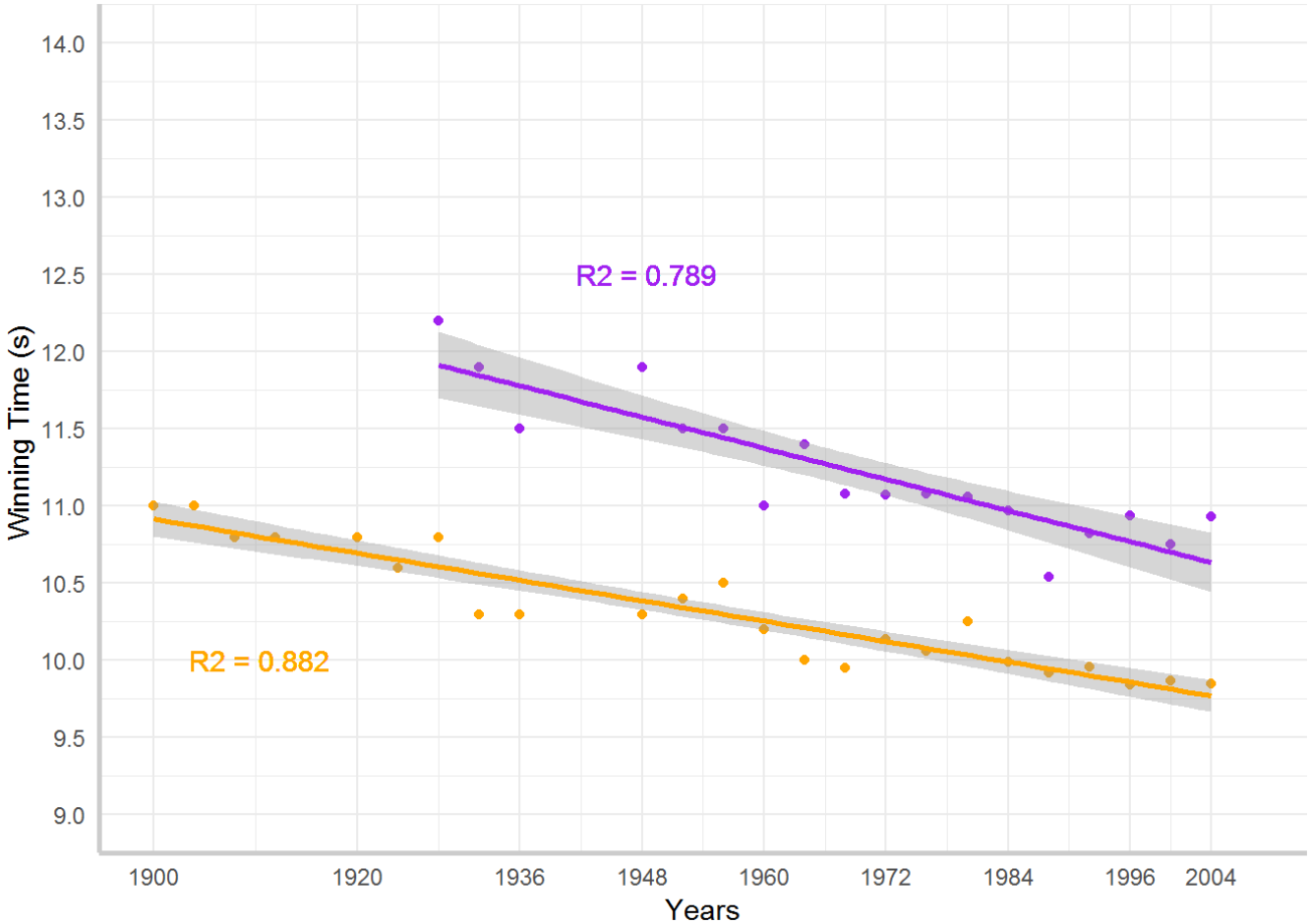
Let us reduce the y-axis scale



Adapted from : Calling Bullshit

[- Super Rule #3 : Extrapolate -]

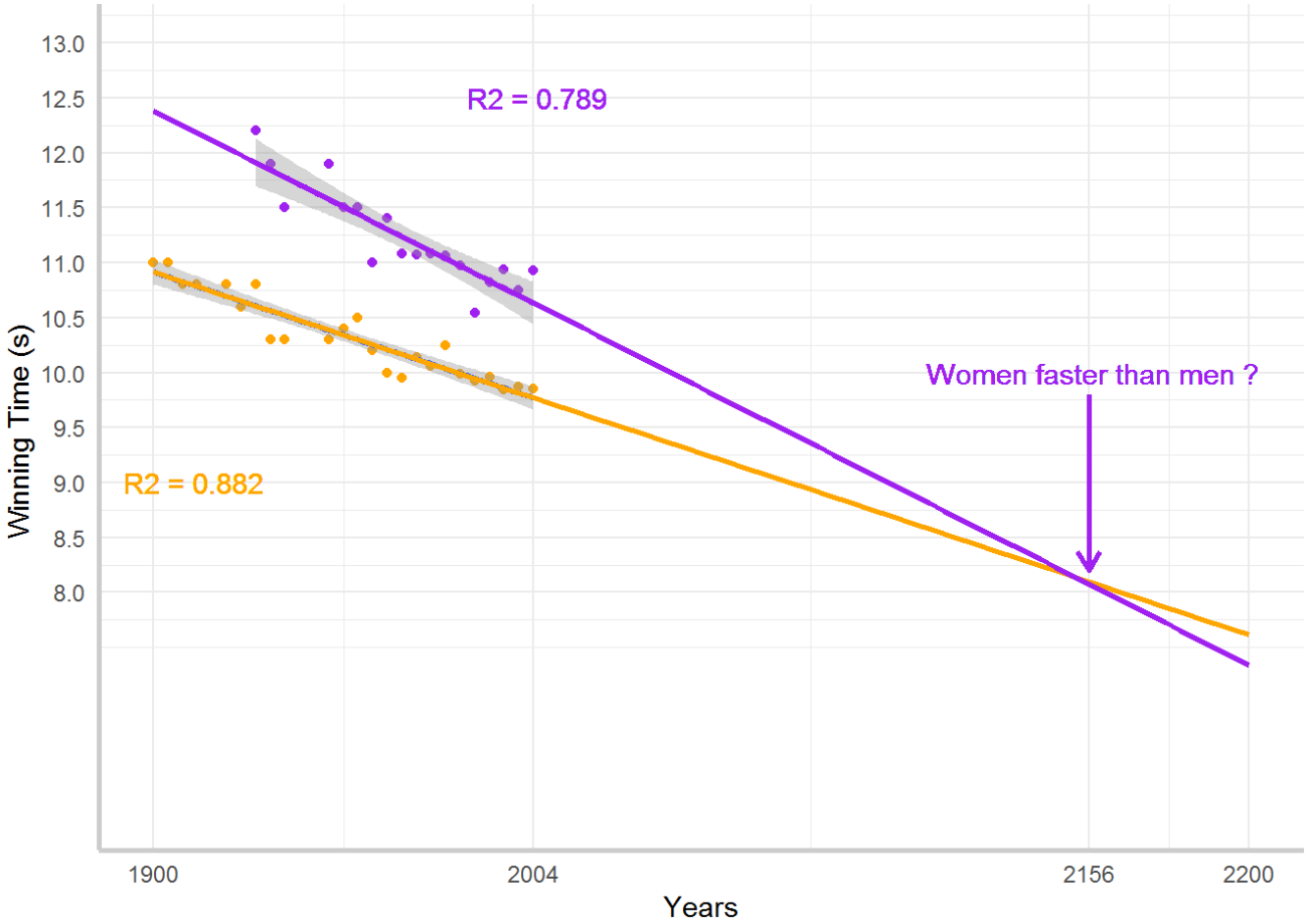
Now, let us draw a regression line



Adapted from : Calling Bullshit

[- Super Rule #3 : Extrapolate -]

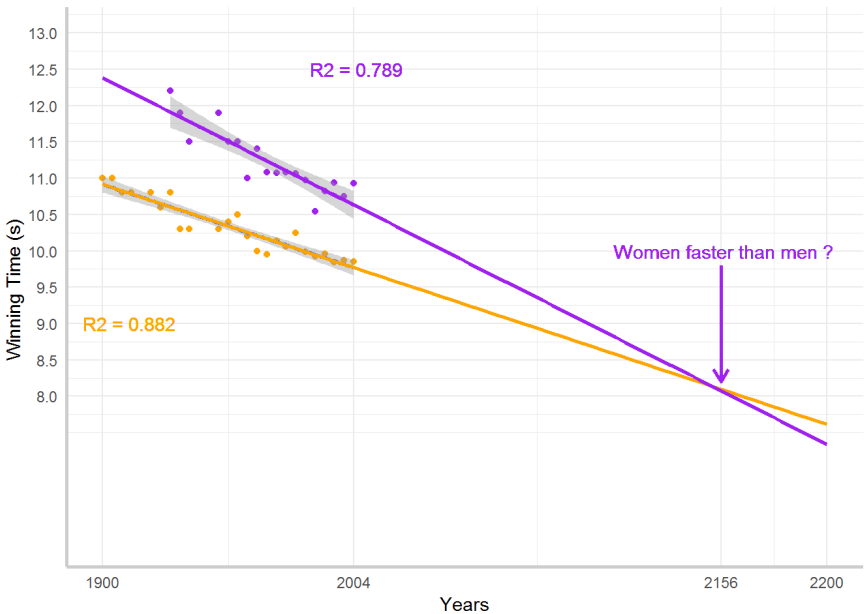
Extrapolate : Women will run faster in 2156 !



Adapted from : Calling Bullshit

[- SUPER RULE #3 : EXTRAPOLATE -]

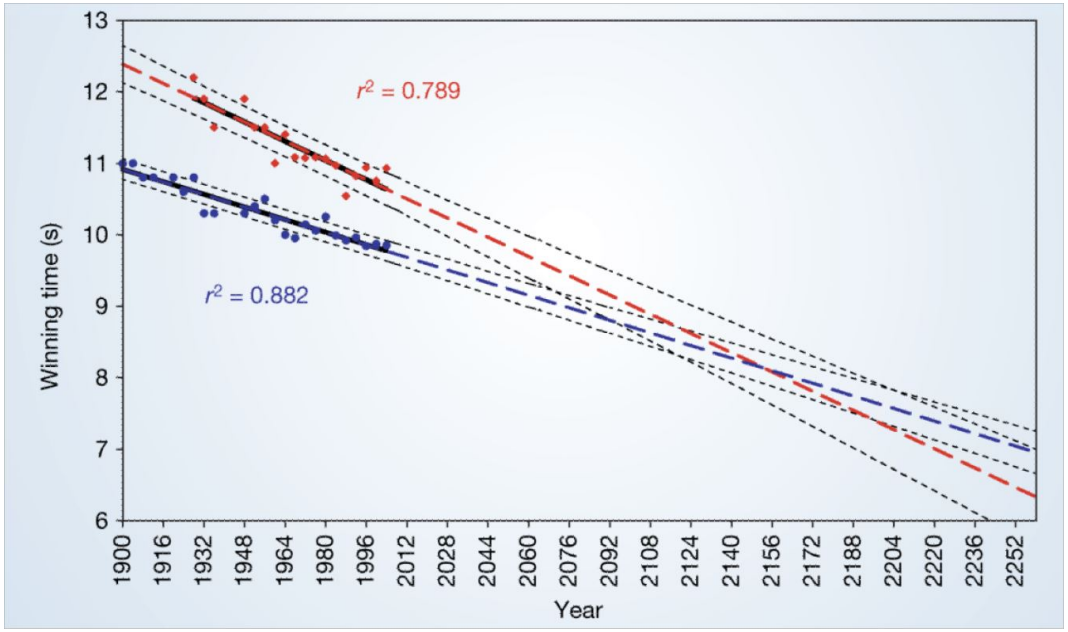
No journal will publish this !



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 !



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 !


MENU

nature
International journal of science

Brief Communication | Published: 29 September 2004

Athletics

Momentous sprint at the 2156 Olympics?

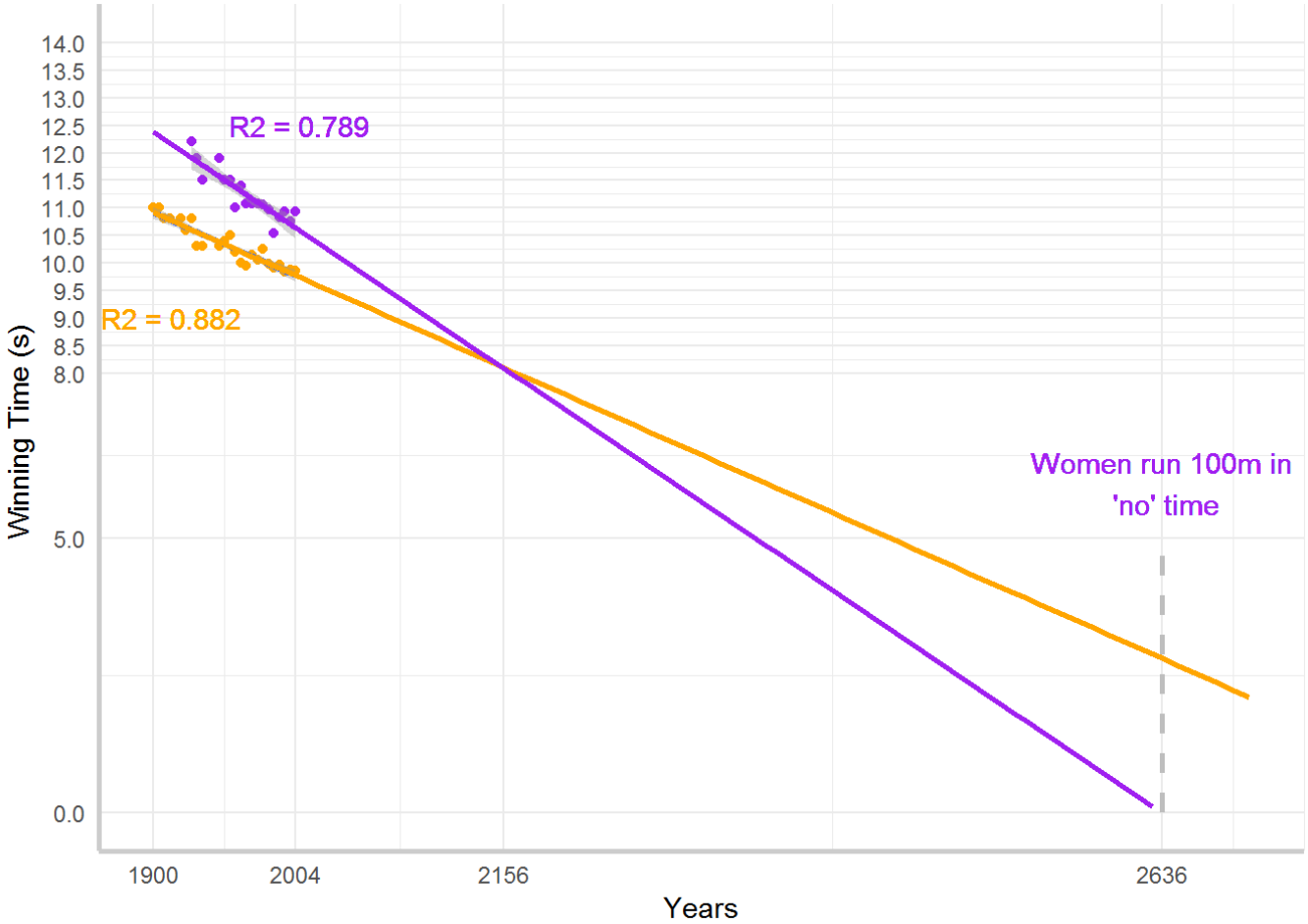
Andrew J. Tatem ✉, Carlos A. Guerra, Peter M. Atkinson & Simon I. Hay

Nature **431**, 525 (30 September 2004) | Download Citation ⬇

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 -]

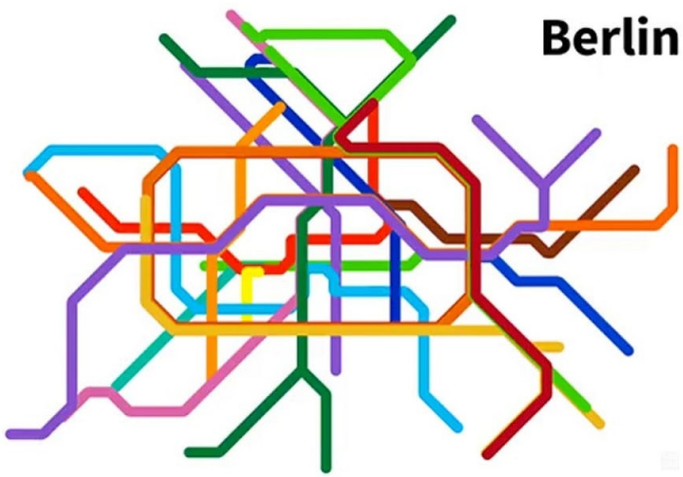
Reductio ad absurdum : Move forward : **Year 2636** !



Adapted from : Calling Bullshit

[- Lying for a good reason -]

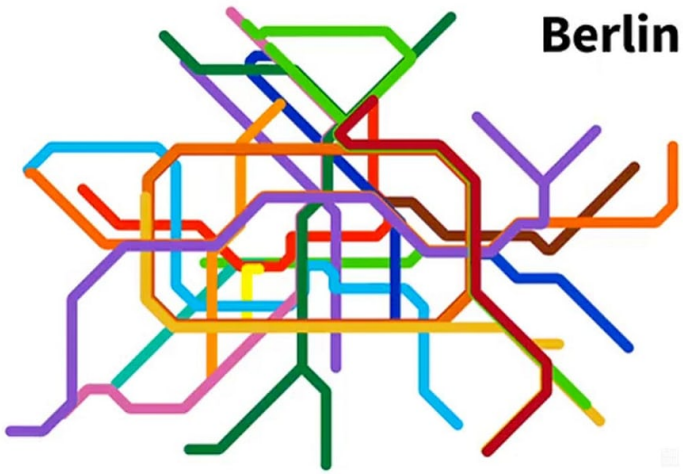
There are many visualisation that transform the data for clarity : **Subway maps** for example

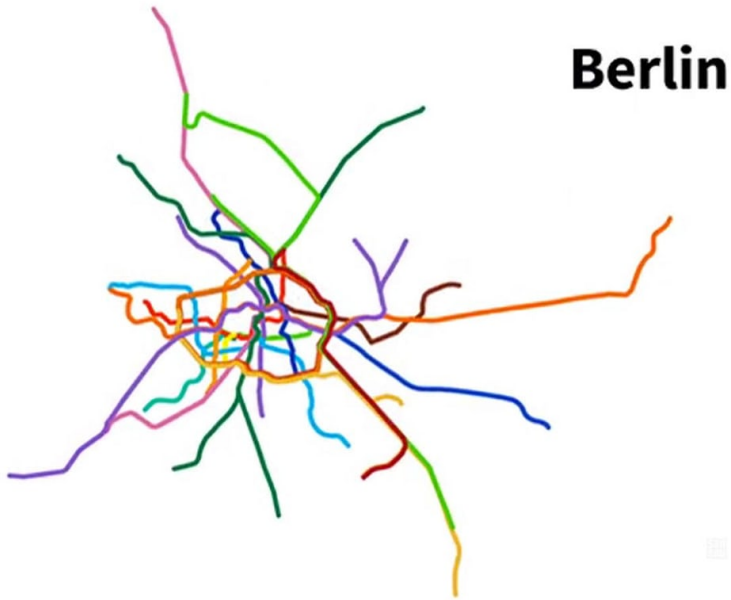


Source The Guardian

[- Lying for a good reason -]

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





Source The Guardian

[- 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

[- To conclude -]

"If an editor should print bad English he would lose his position".

[- To conclude -]

"If an editor should print bad English he would lose his position".

"Many editors are using and printing bad methods of graphic presentation, but they hold their jobs just the same."

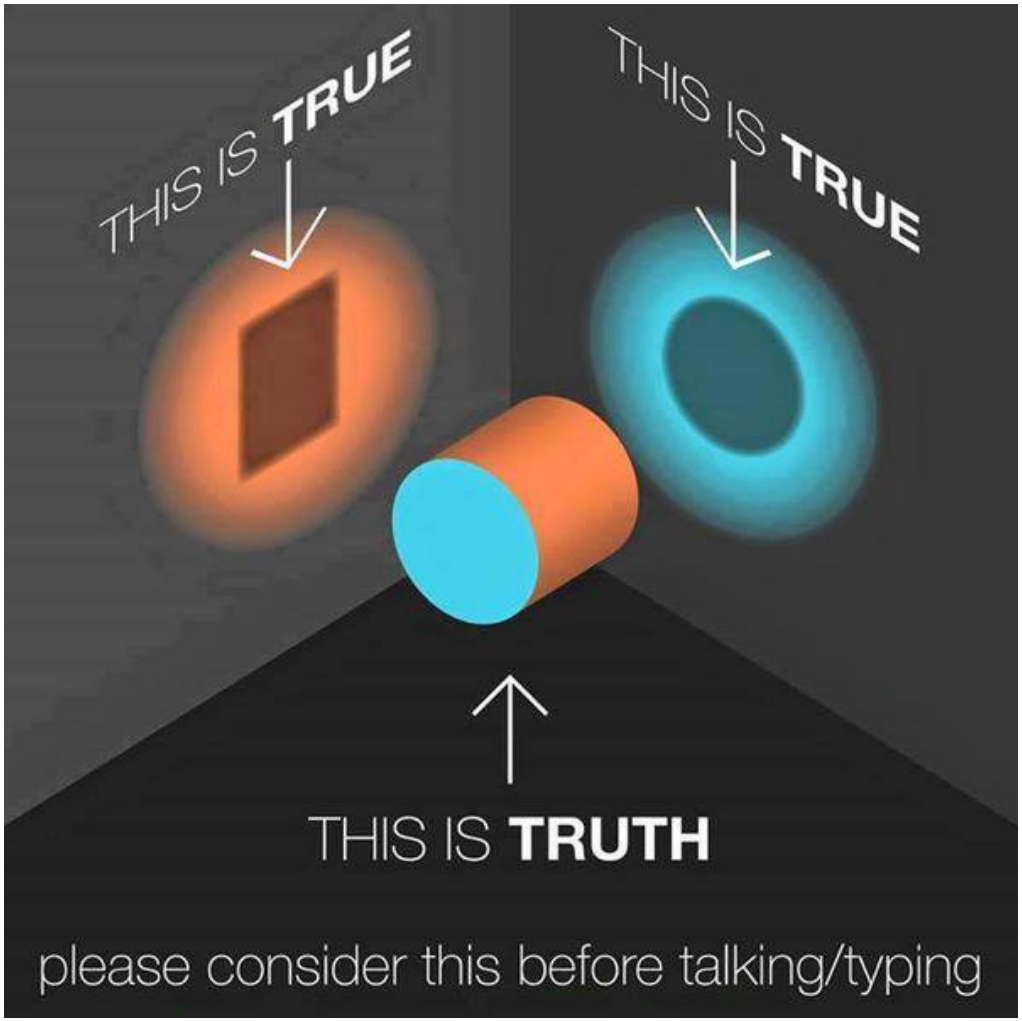
[- To conclude -]

"If an editor should print bad English he would lose his position".

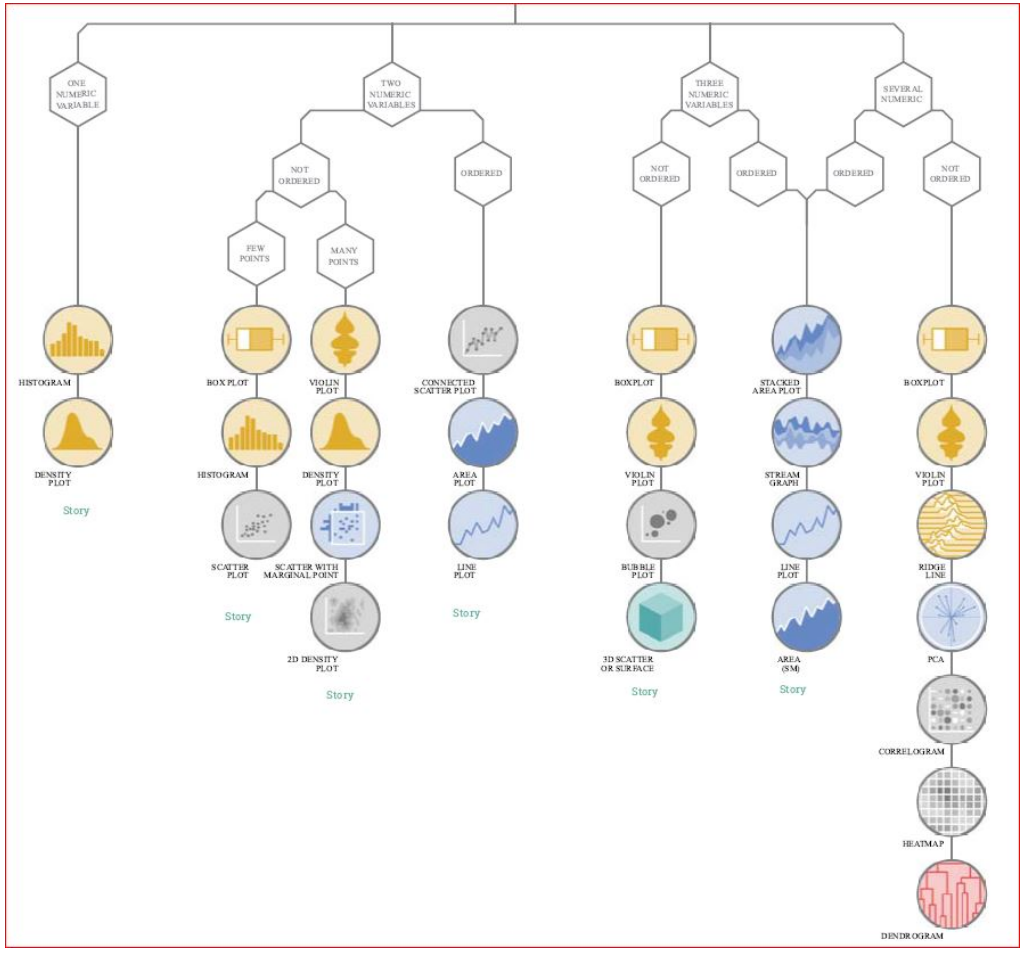
"Many editors are using and printing bad methods of graphic presentation, but they hold their jobs just the same."

Brinton (1914)

[- The truth... -]


THIS IS TRUE
THIS IS TRUE
THIS IS TRUTH
please consider this before talking/typing

[- Some help -]



https://www.data-to-viz.com/

[- Comforting lies... -]



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http://data.visualisation.free.fr

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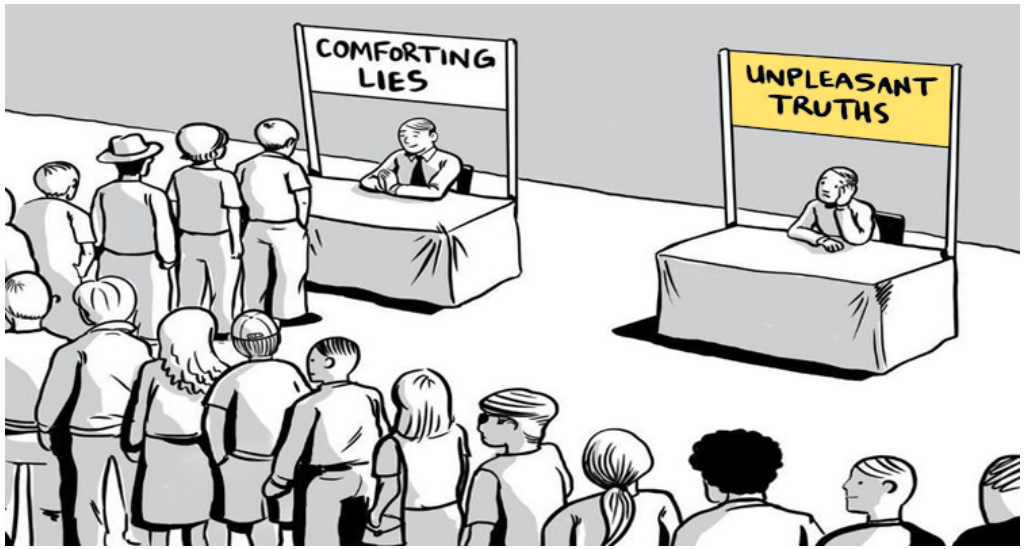
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Keep in Touch !

Christophe

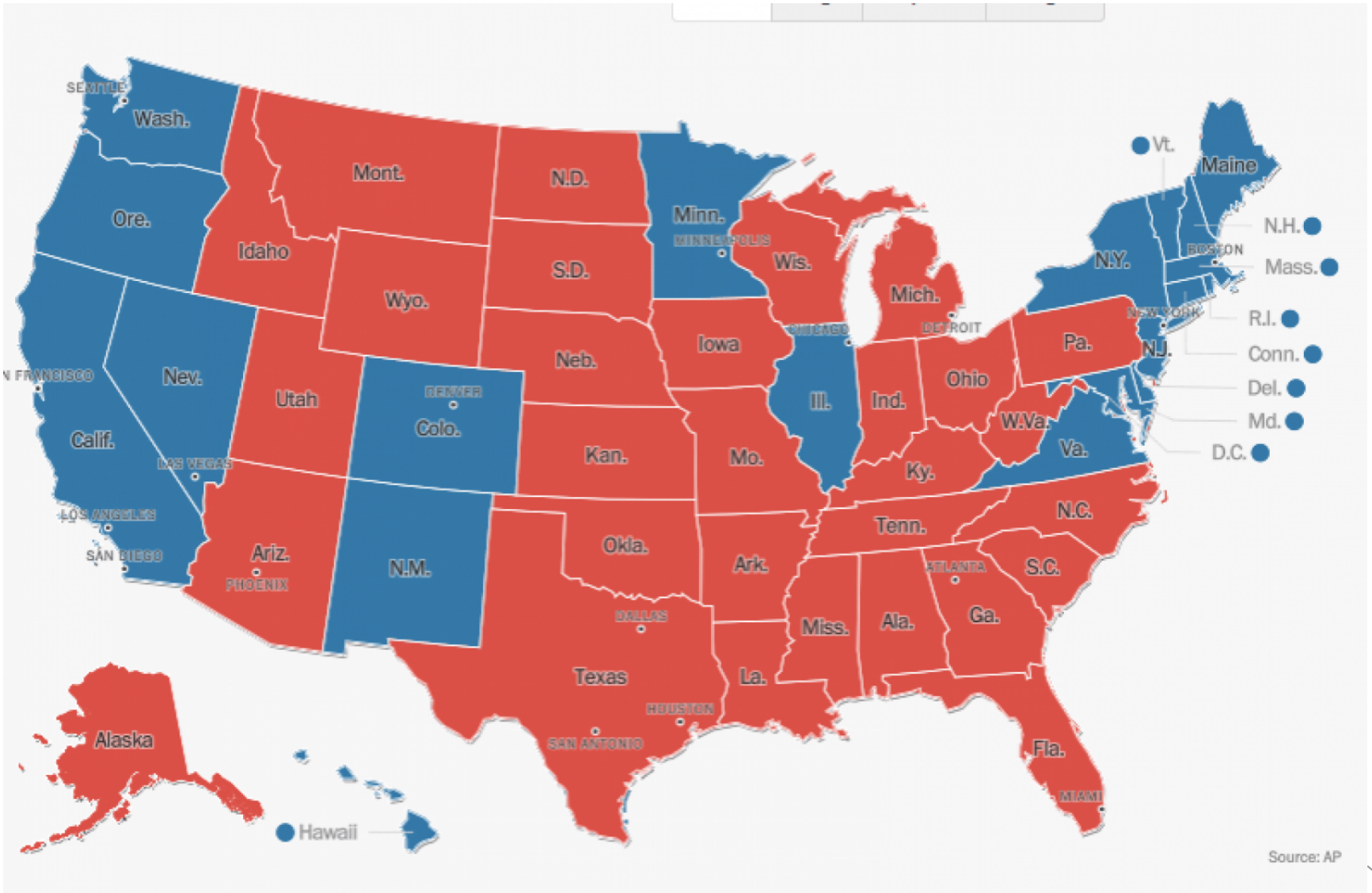
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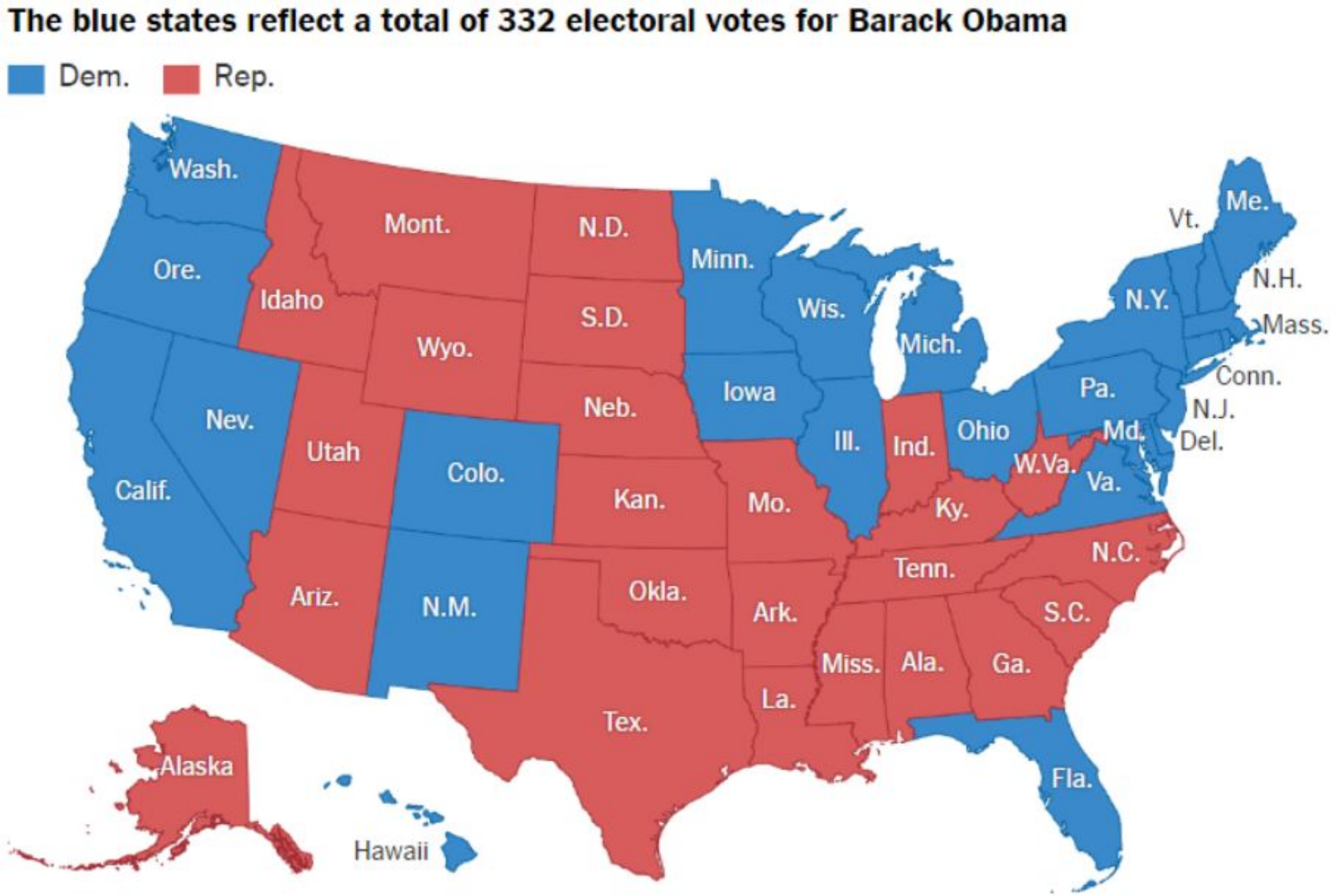
[- Super Rule #3 : Use Electoral Maps -]

USA election : **2016** results as a map : Washington Post



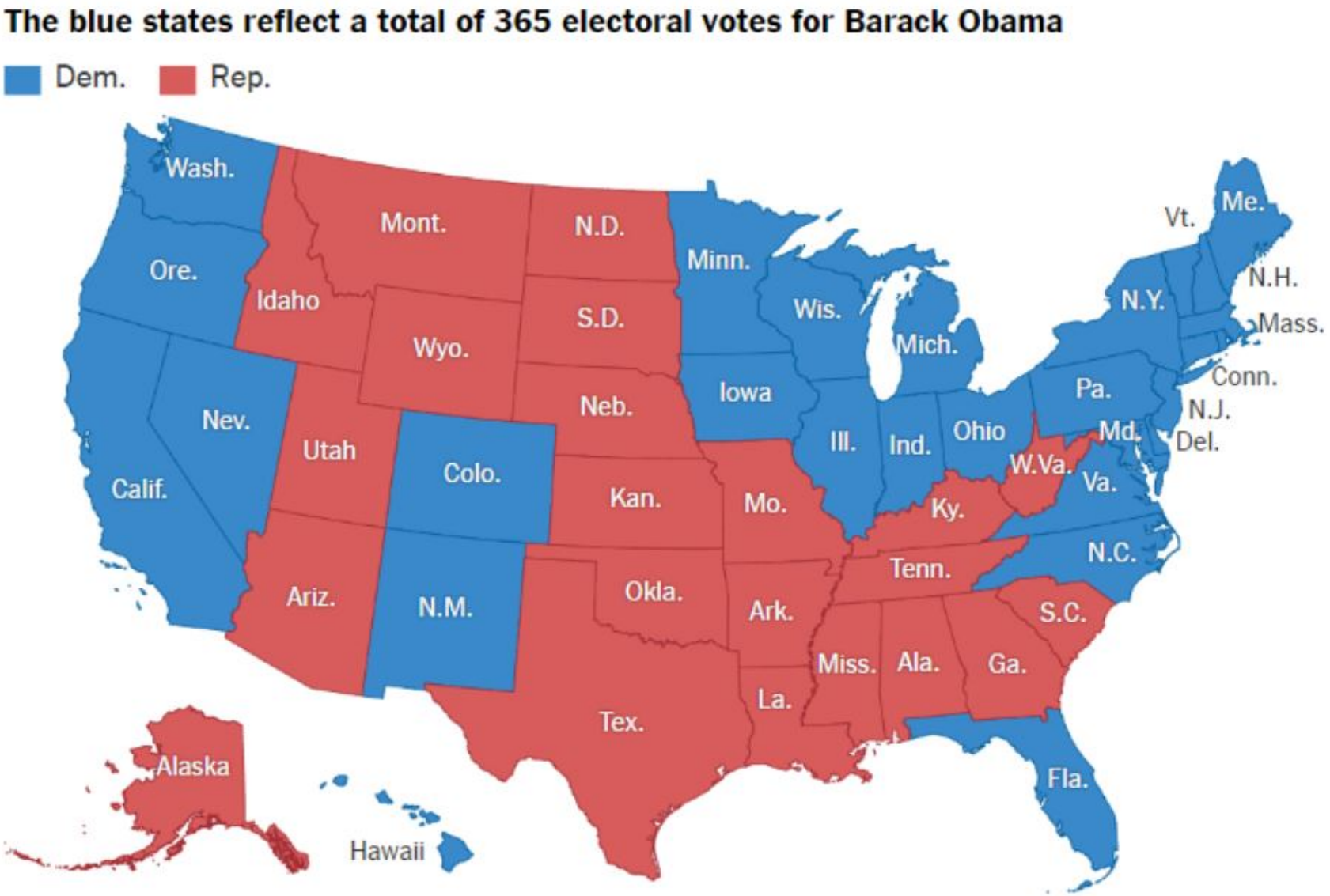
[- Super Rule #3 : Use Electoral Maps -]

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



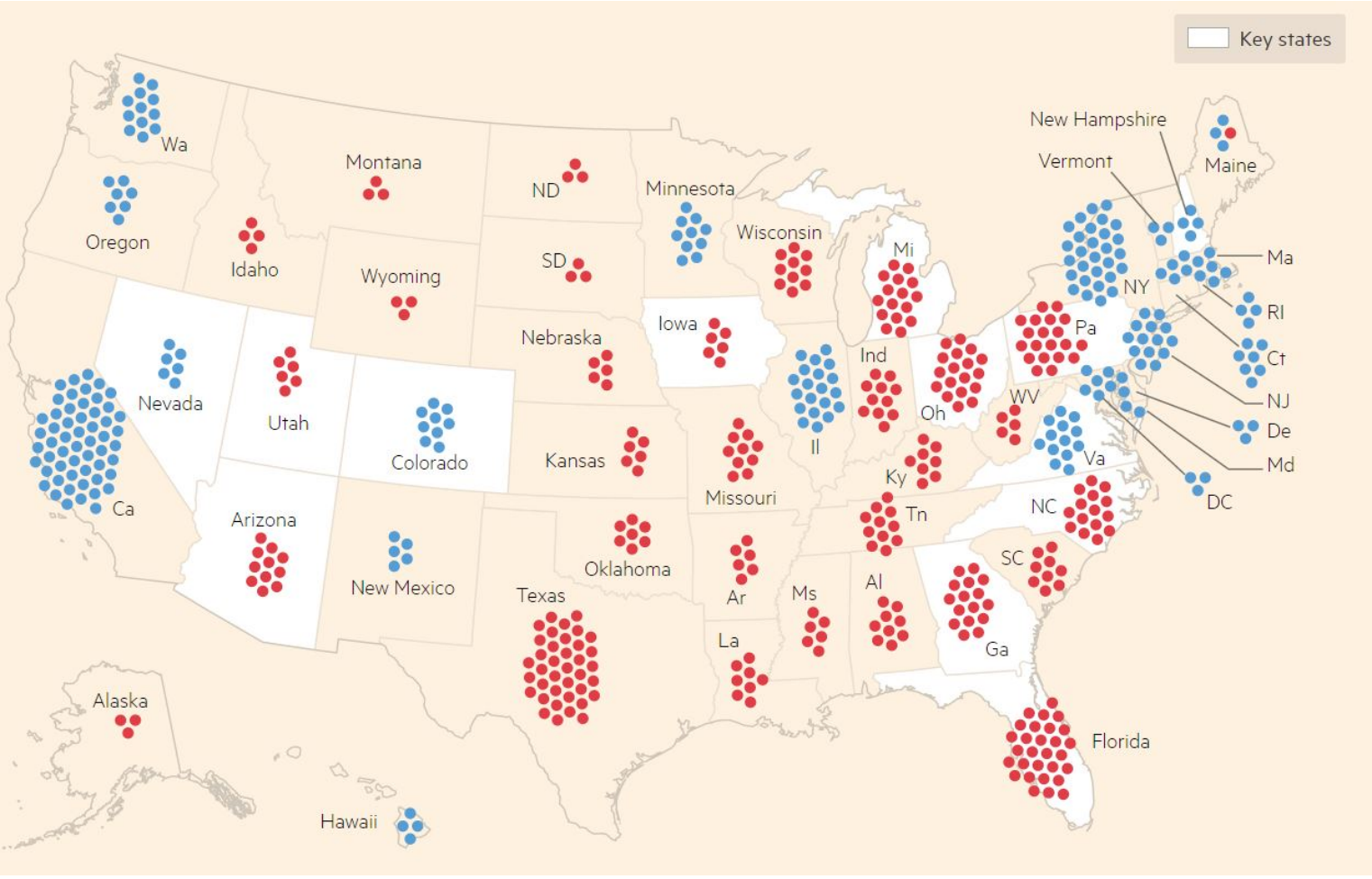
[- Super Rule #3 : Use Electoral Maps -]

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



[- Super Rule #3 : Use Electoral Maps -]

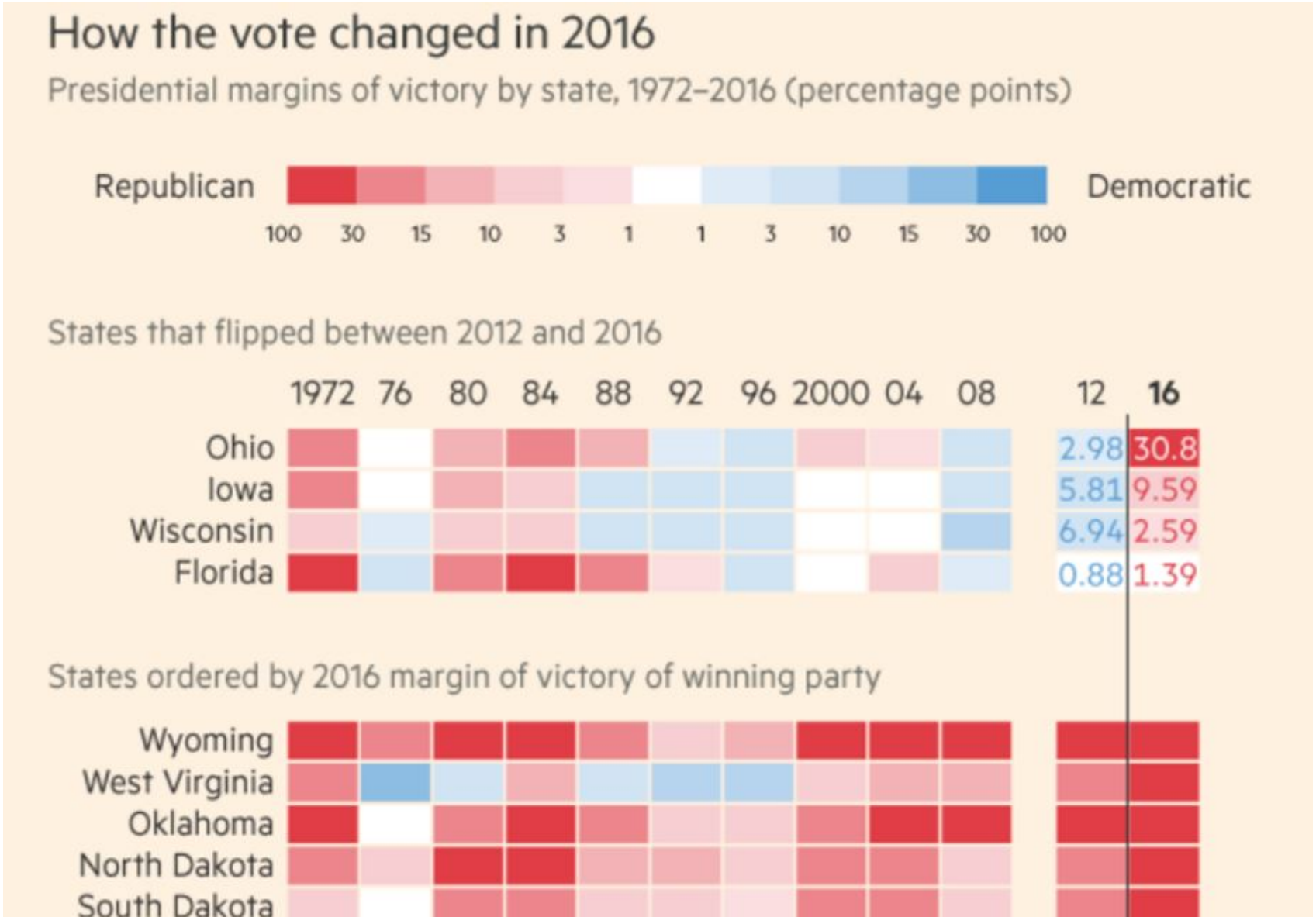
Maybe a better map ? From *Financial Times blog*



From *Financial Times*

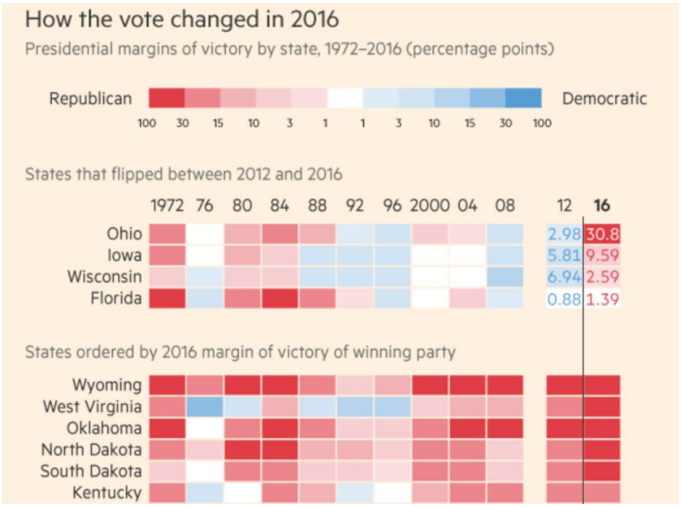
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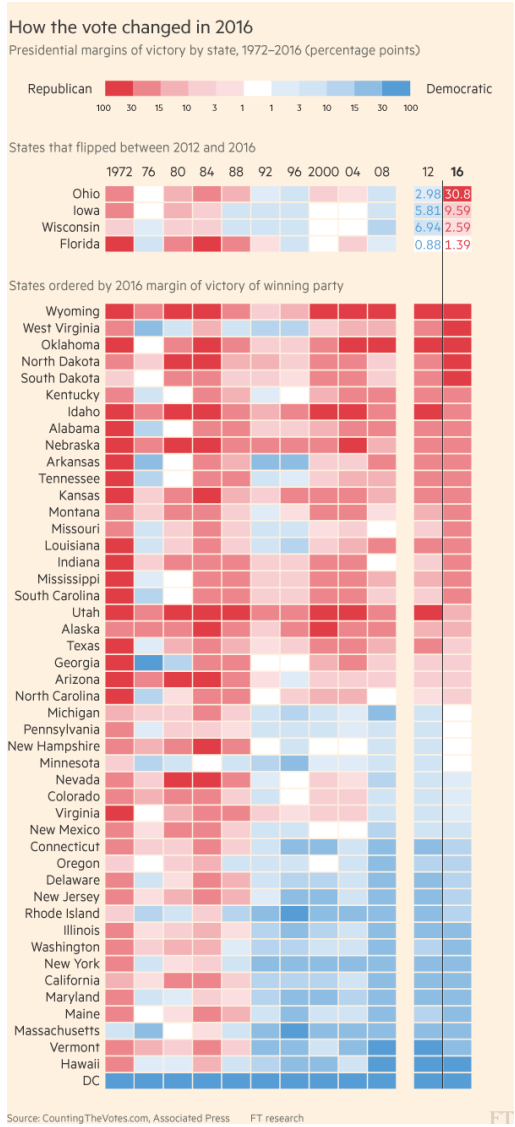
Maybe spatial information is not the most relevant !



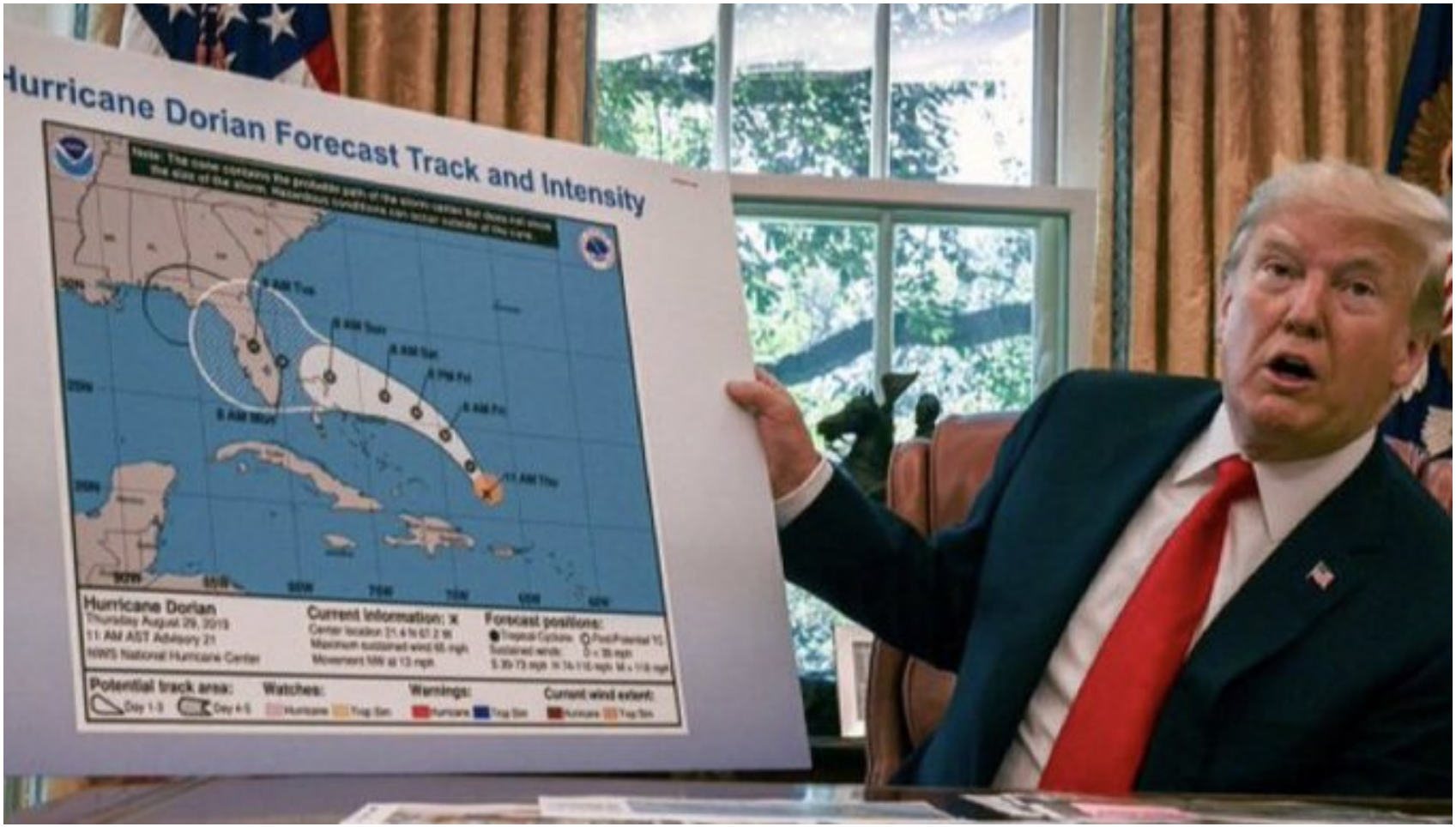
[- Super Rule #3 : Use Electoral Maps -]

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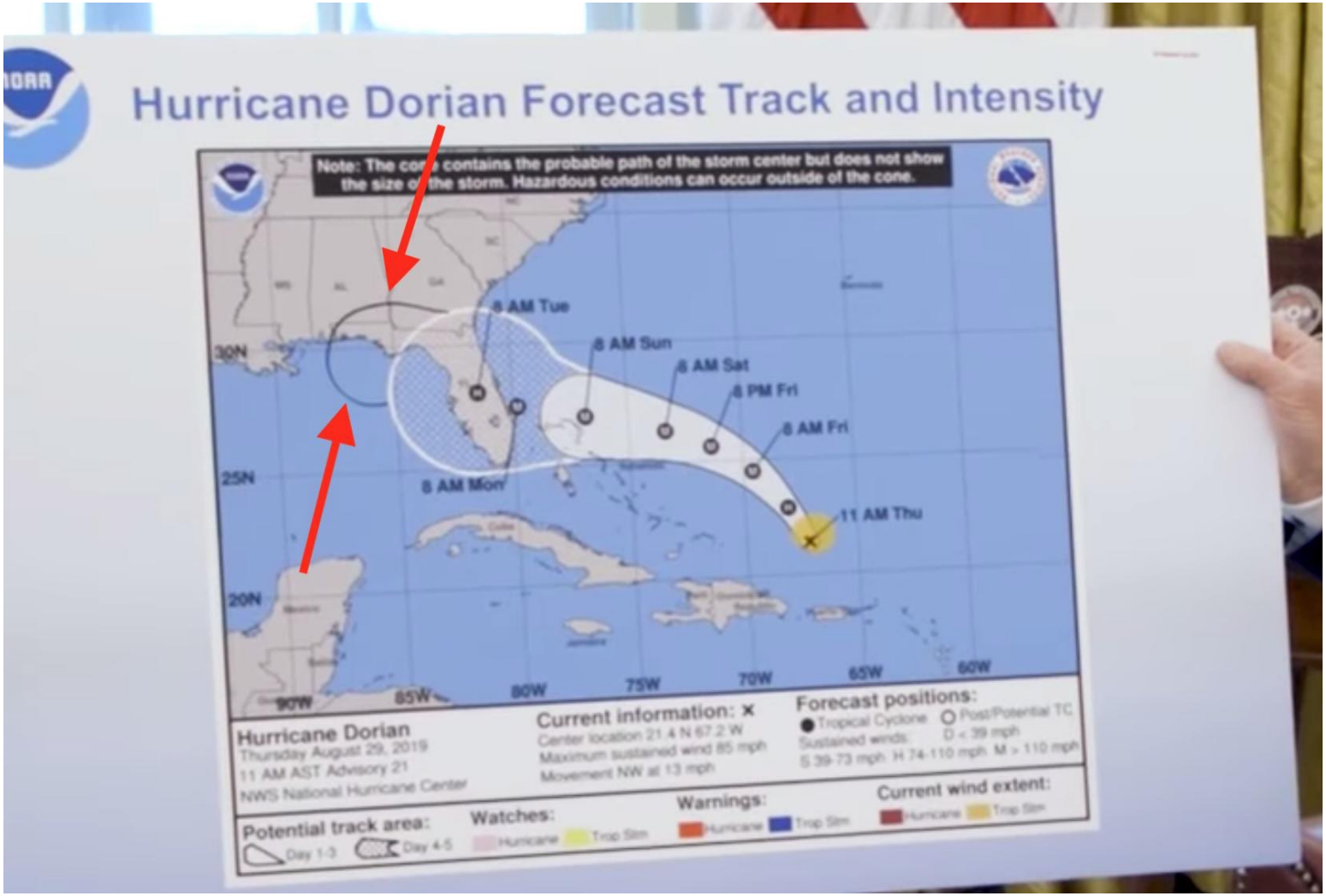


[- Règle Nº 9 : Dessinez vous-même -]



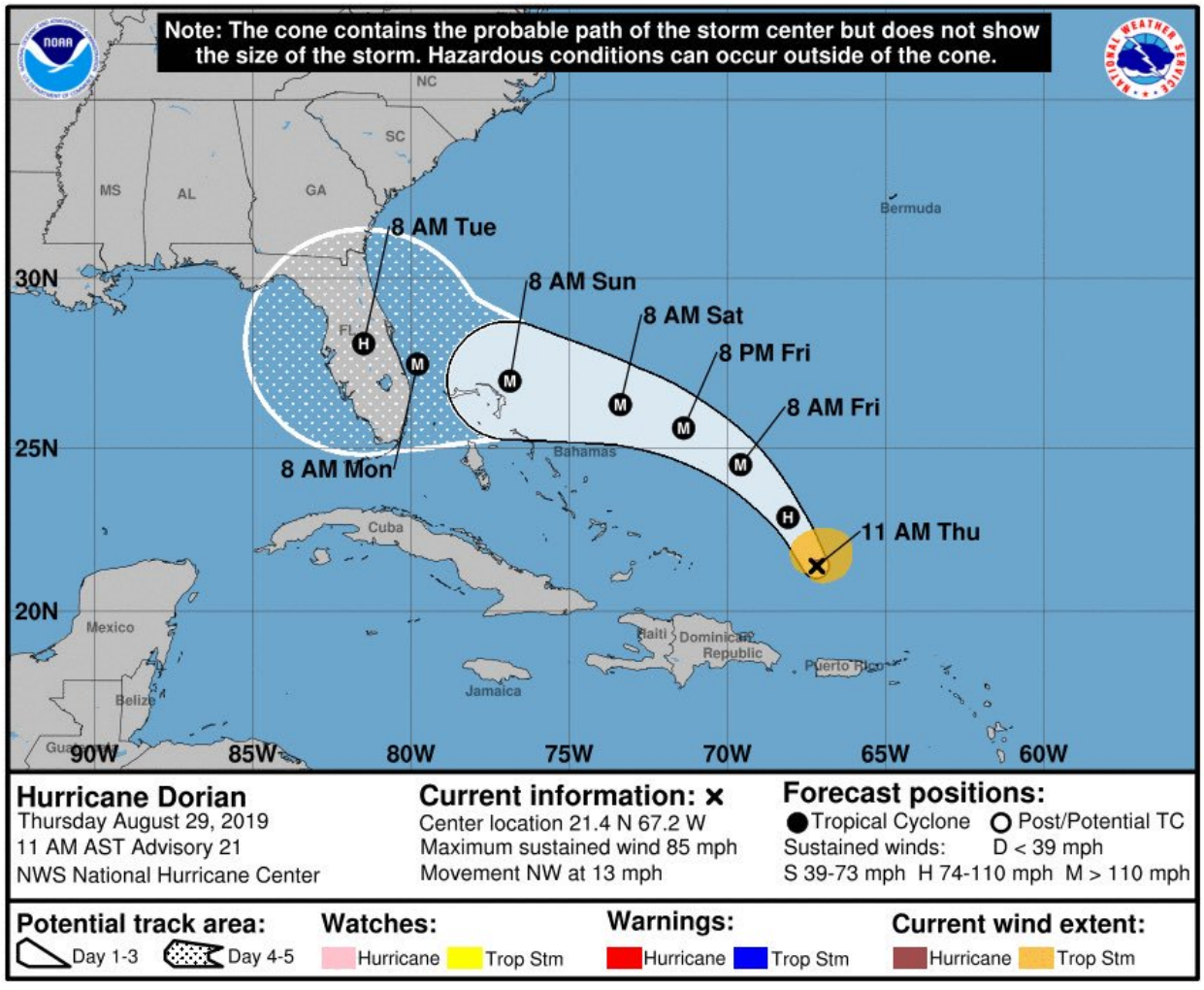
Source : Washington Post

[- Règle Nº 9 : Dessinez vous-même -]



Source : Washington Post

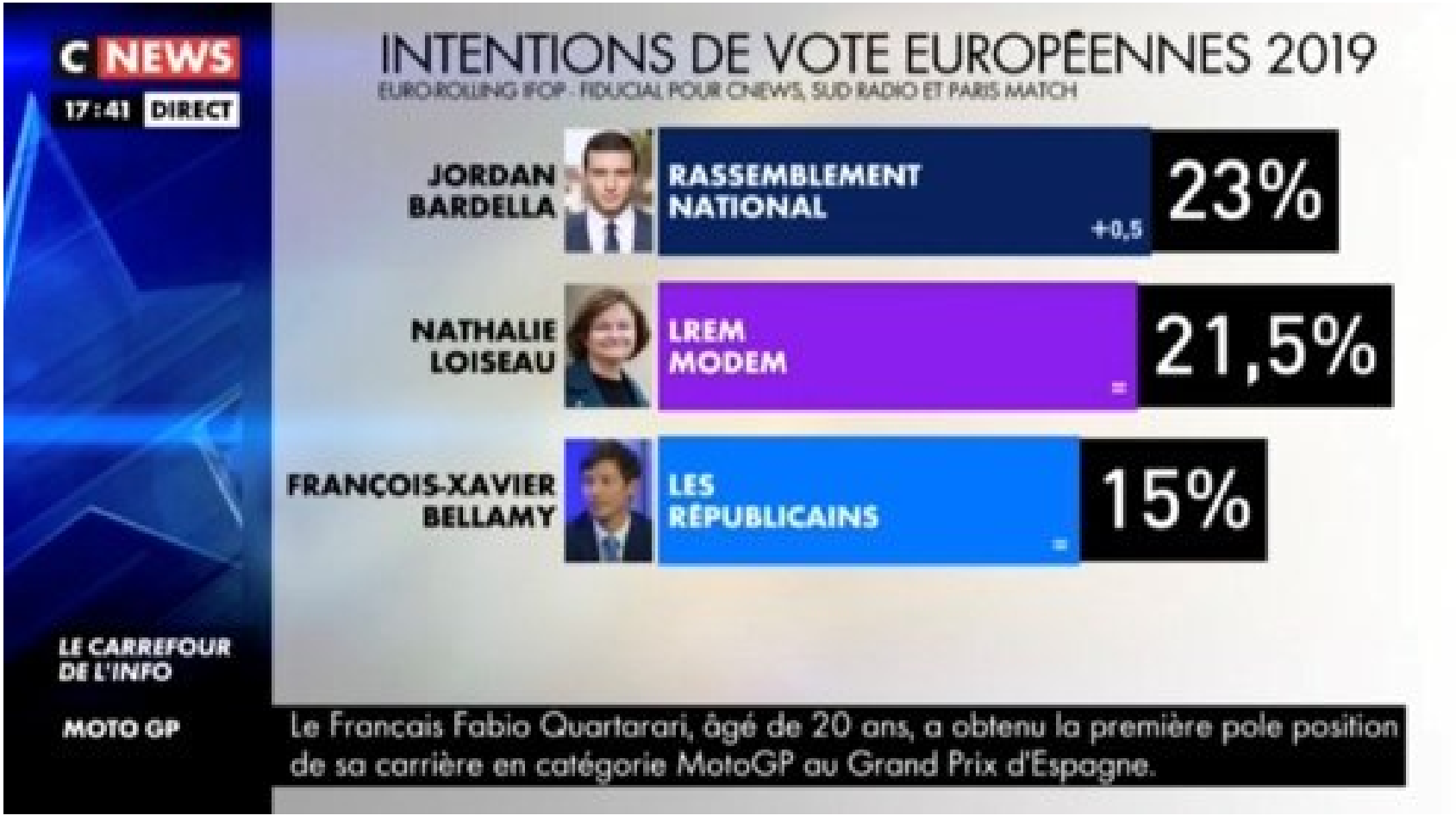
[- Règle Nº 9 : Dessinez vous-même -]



Source : Washington Post

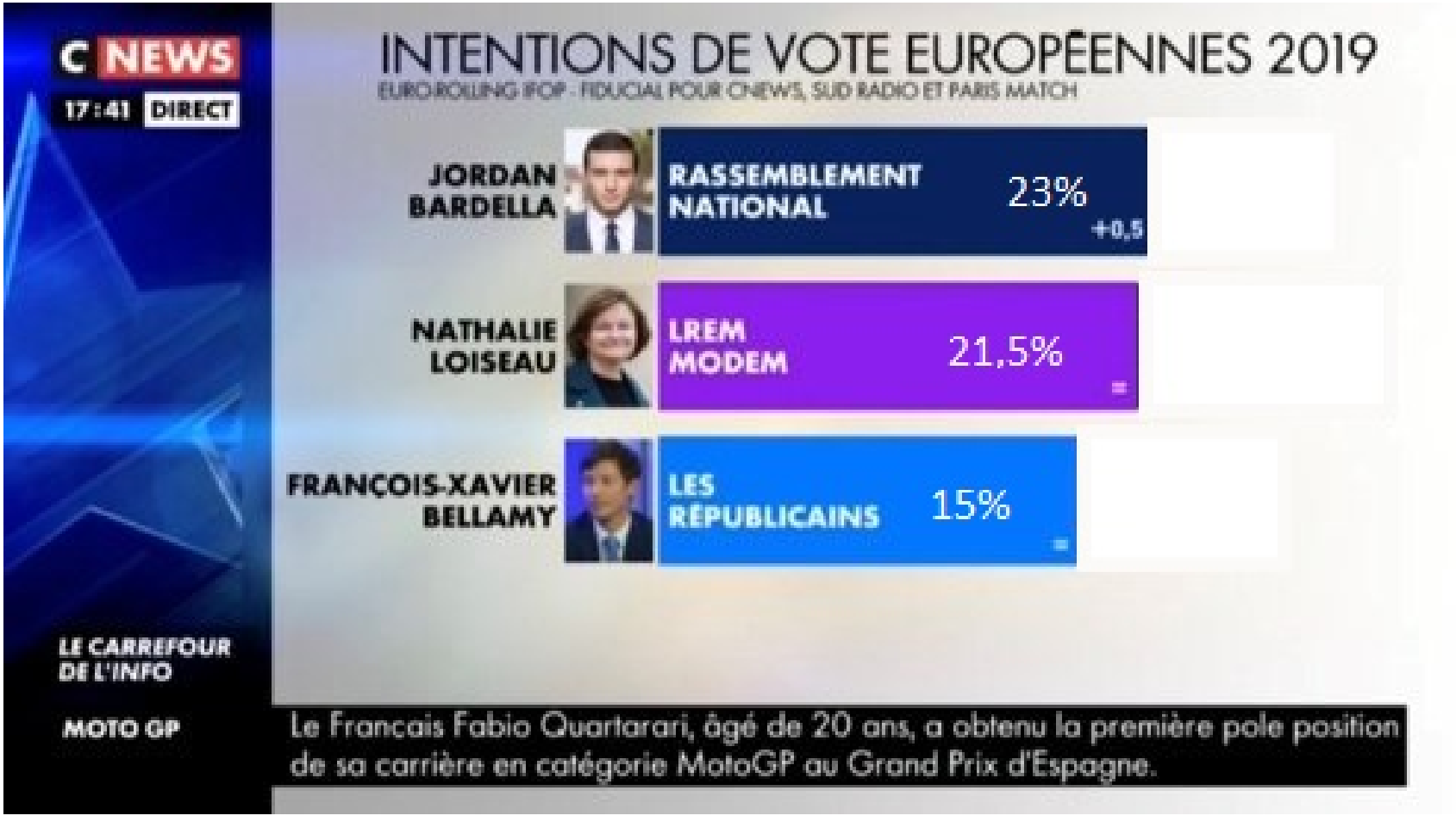
[- Règle Nº 10 : Soyez subtil -]

Original



[- Règle Nº 10 : Soyez subtil -]

Corrigé



[- Règle Nº 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 ?

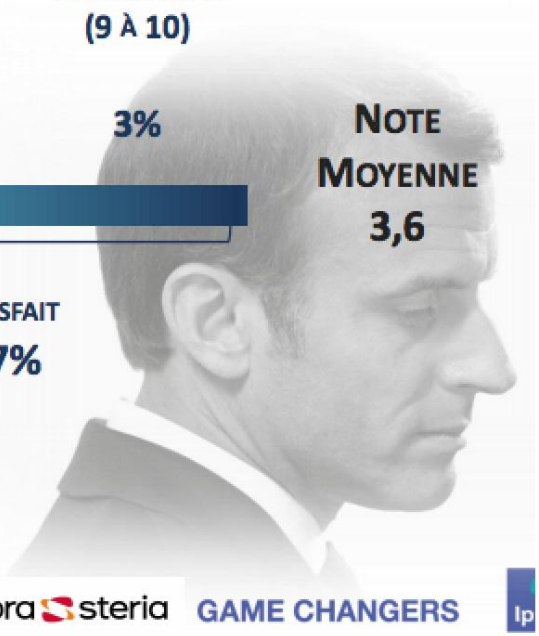
PAS DU TOUT SATISFAIT (0 À 1)	PLUTÔT PAS SATISFAIT (2 À 3)	NI SATISFAIT, NI INSATISFAIT (4 À 6)	PLUTÔT SATISFAIT (7 À 8)	TRÈS SATISFAIT (9 À 10)
32%	17%	34%	14%	3%

PAS SATISFAIT 49%

NI SATISFAIT, NI INSATISFAIT 34%

SATISFAIT 17%

NOTE MOYENNE 3,6

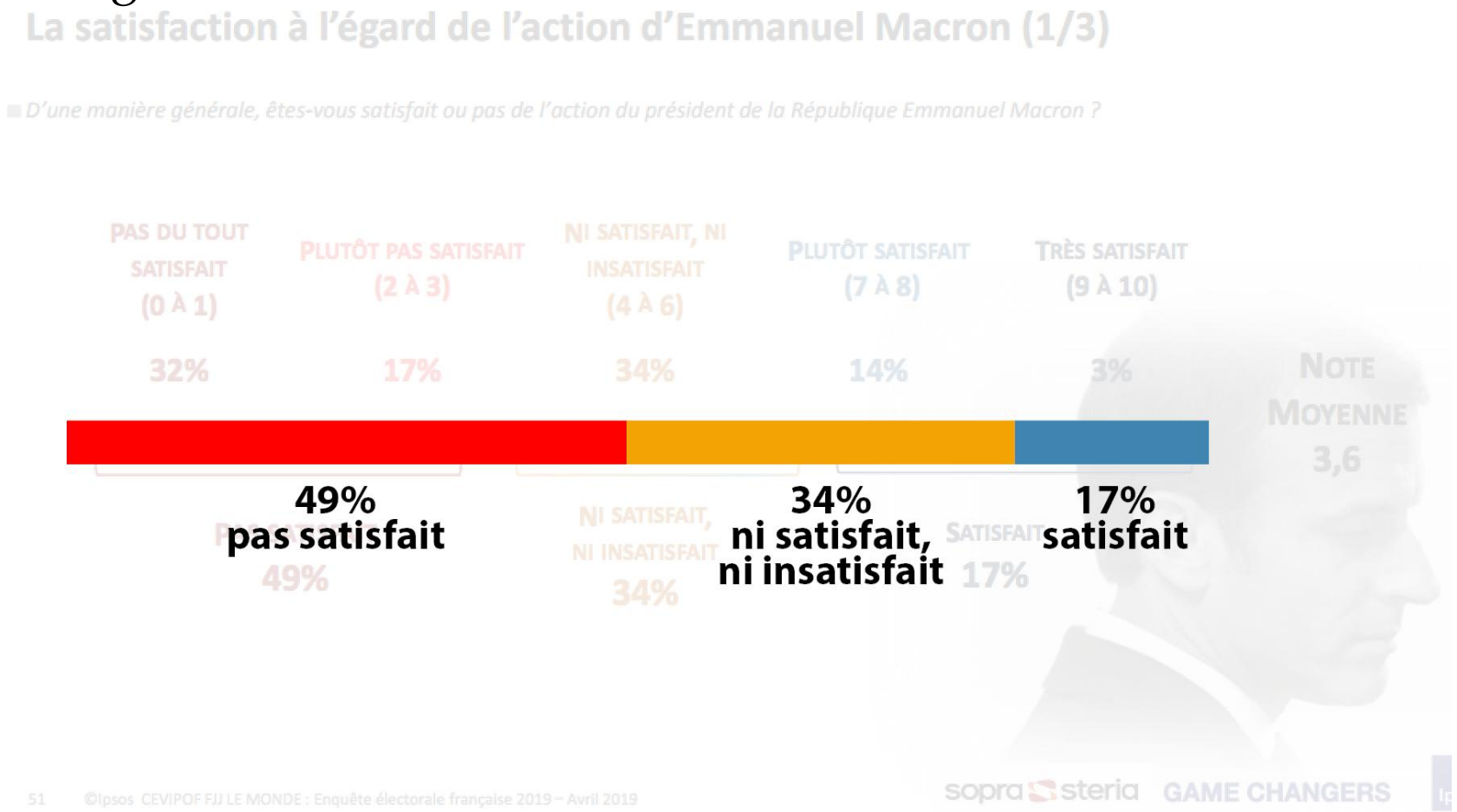


51 ©Ipsos CEVIPOF FJJ LE MONDE : Enquête électorale française 2019 – Avril 2019

sopra steria GAME CHANGERS

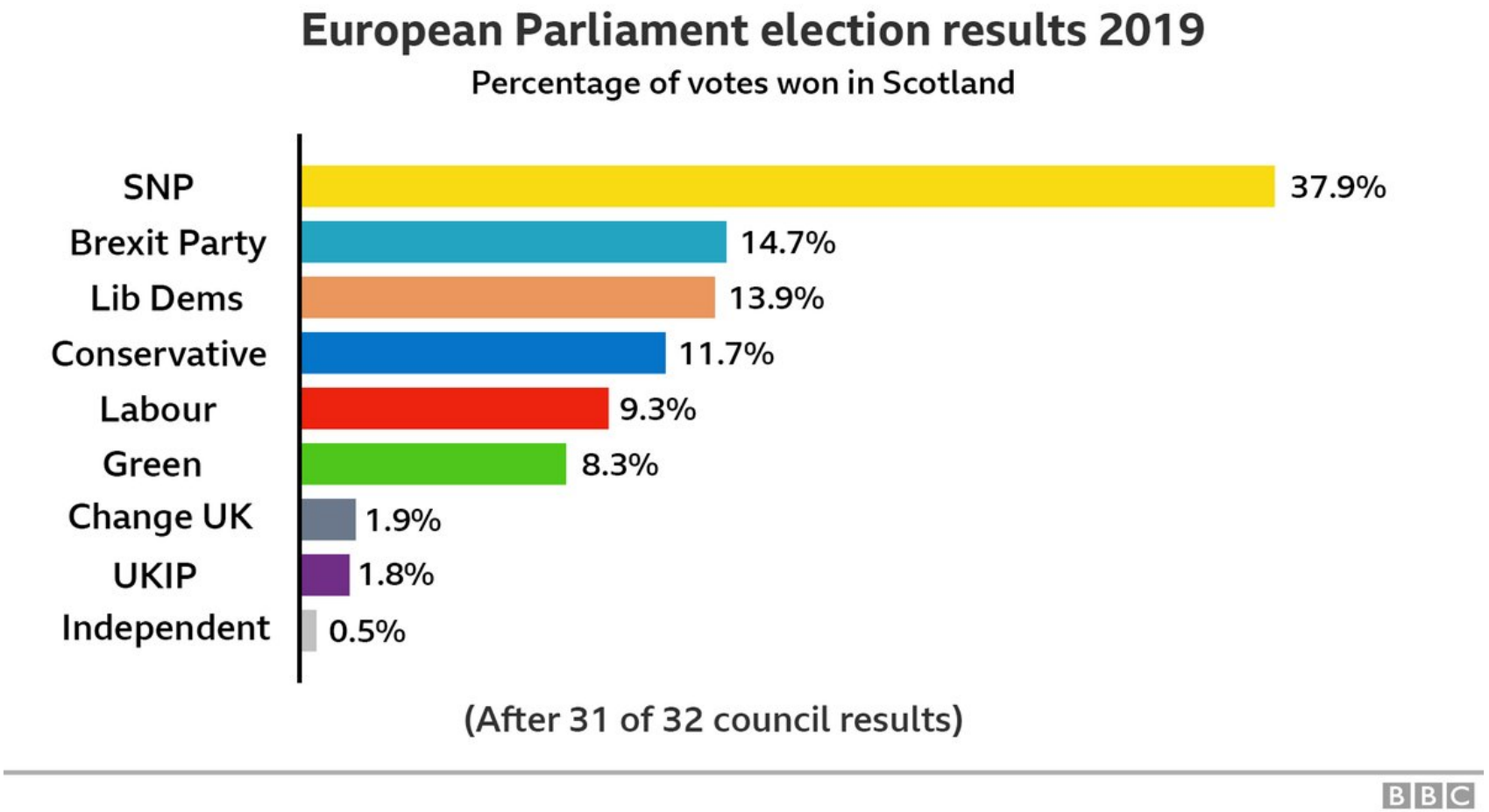
[- Règle Nº 10 : Soyez subtil -]

Corrigé



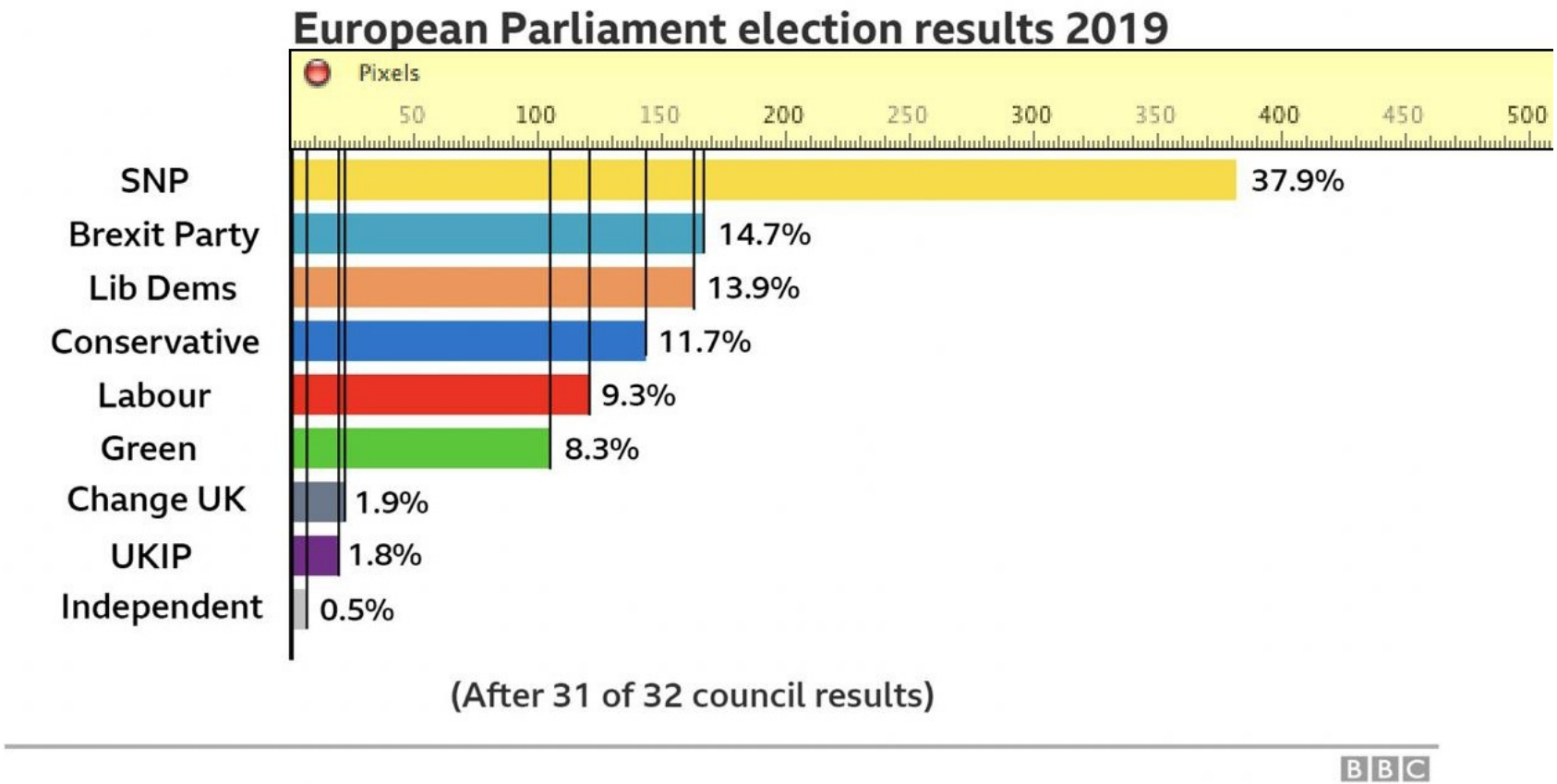
[- Règle Nº 10 : Soyez subtil -]

Original



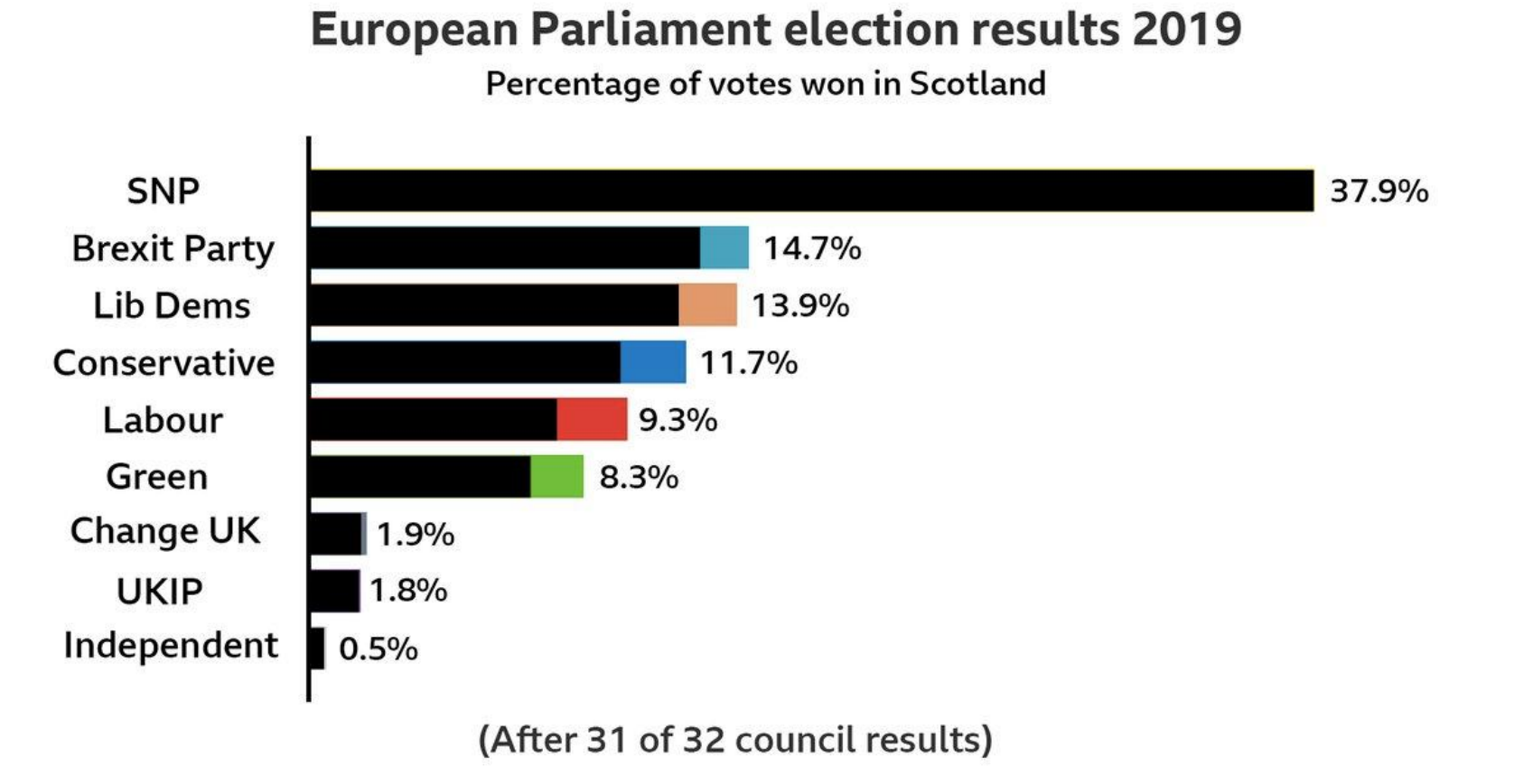
[- Règle Nº 10 : Soyez subtil -]

Détection



[- Règle Nº 10 : Soyez subtil -]

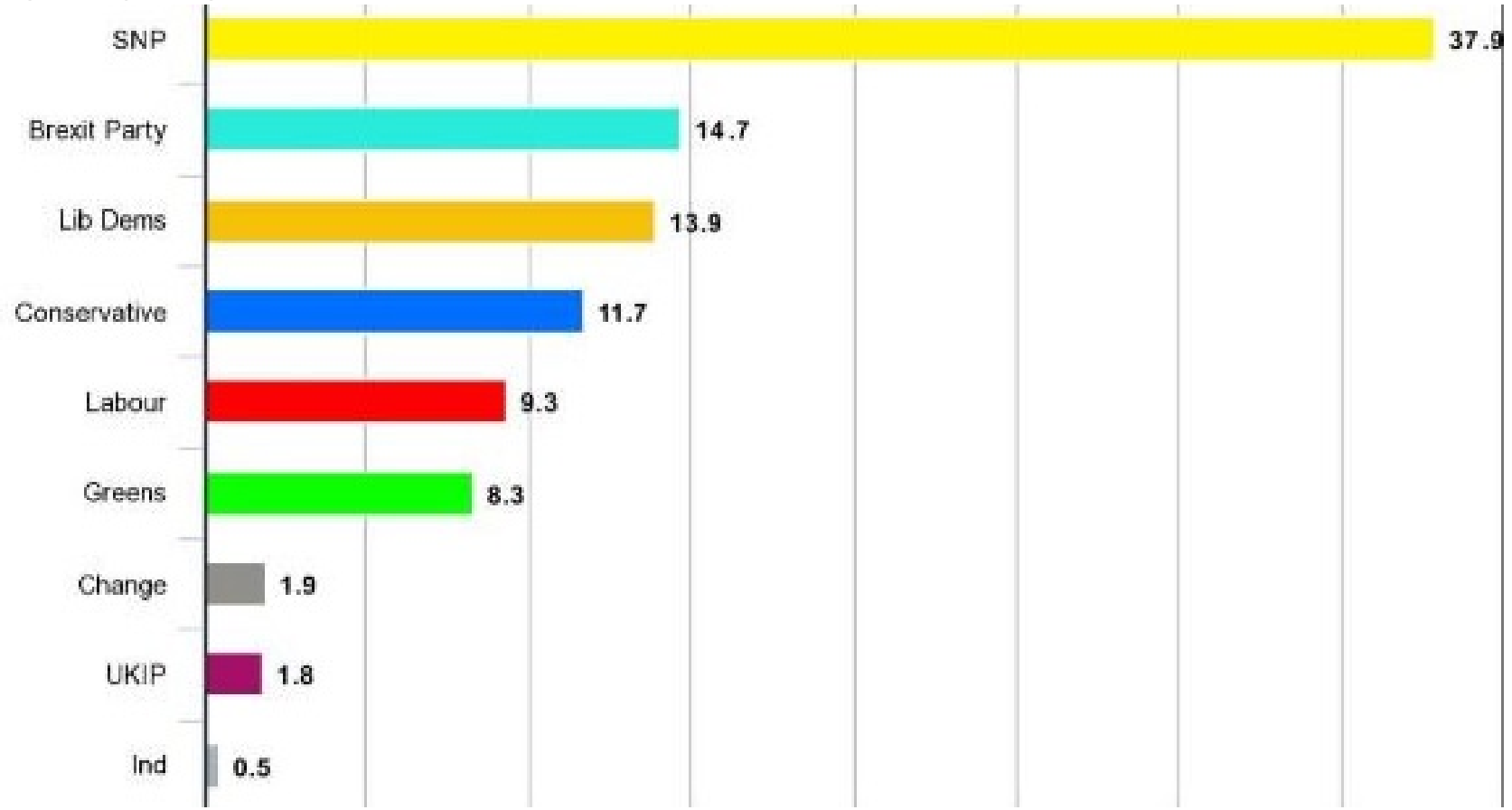
Correction



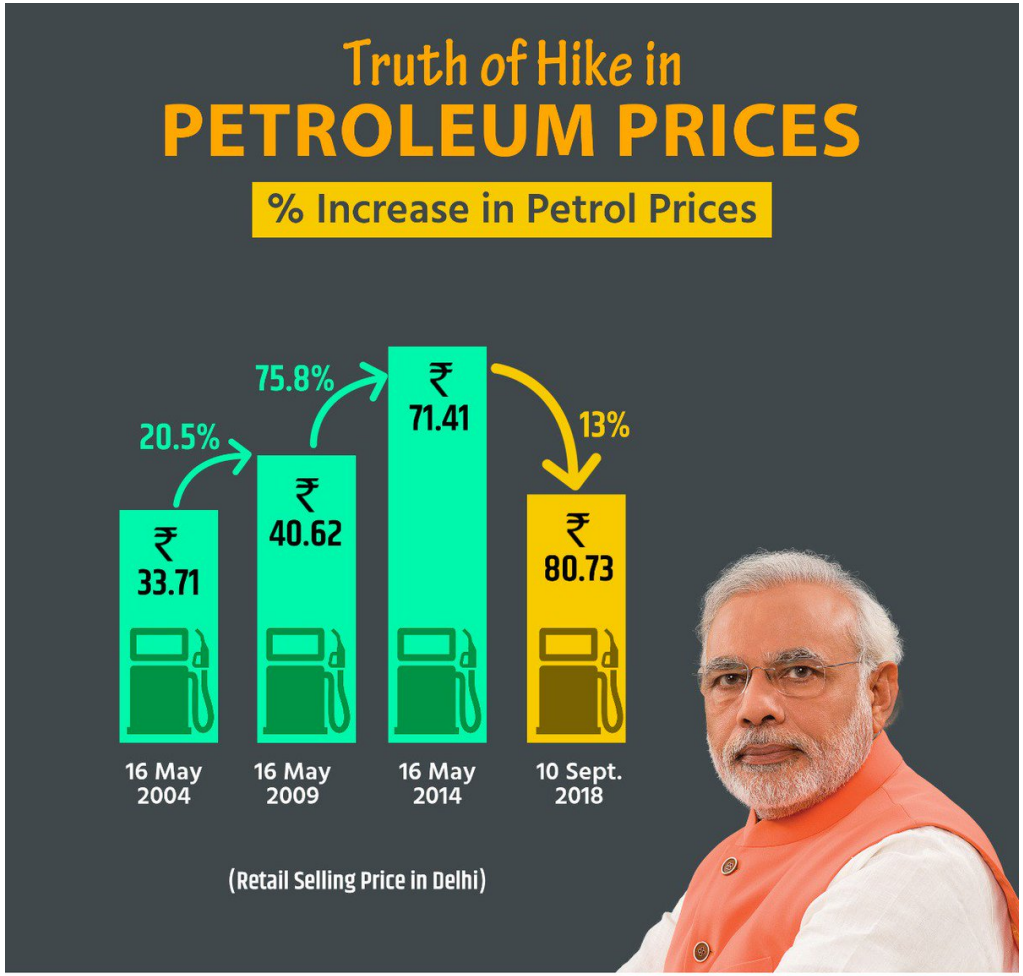
Coloured areas on bars are incorrect

[- Règle Nº 10 : Soyez subtil -]

Vérification

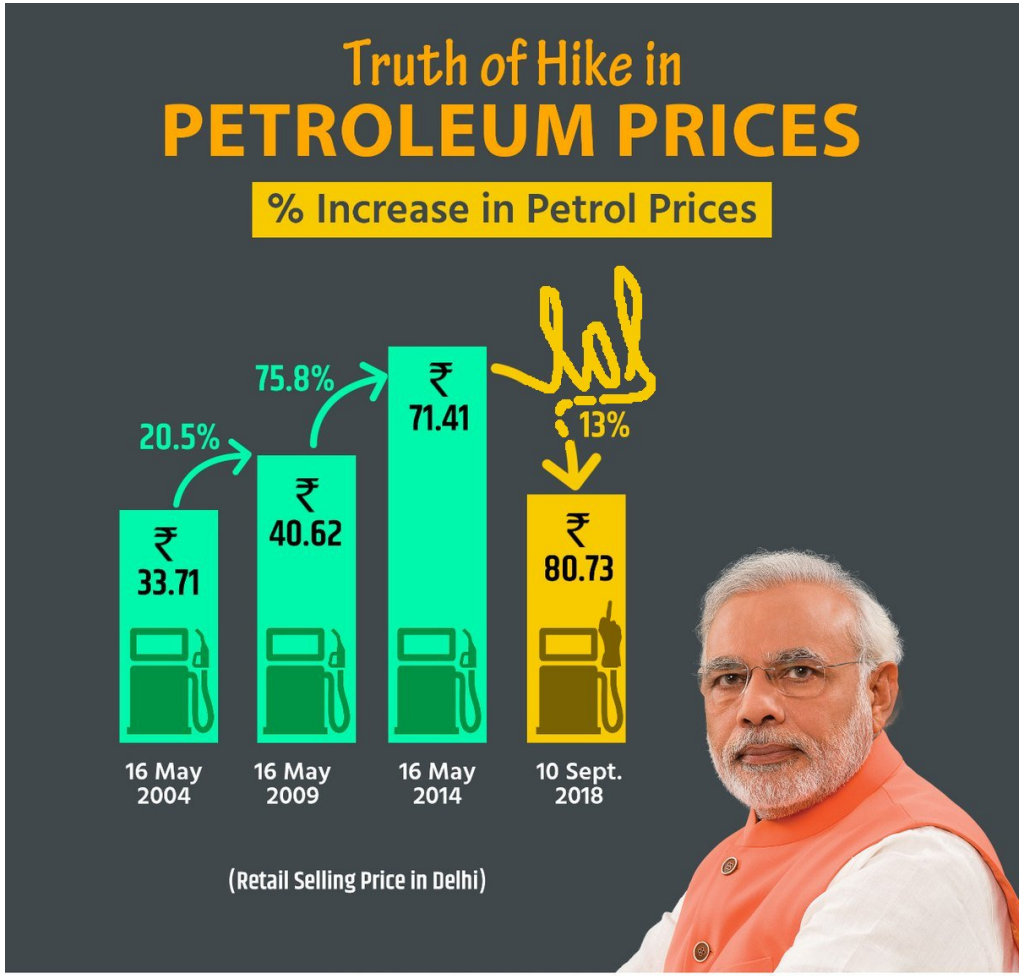


[- Règle Nº 10 : Soyez subtil (ou pas !) -]



Original

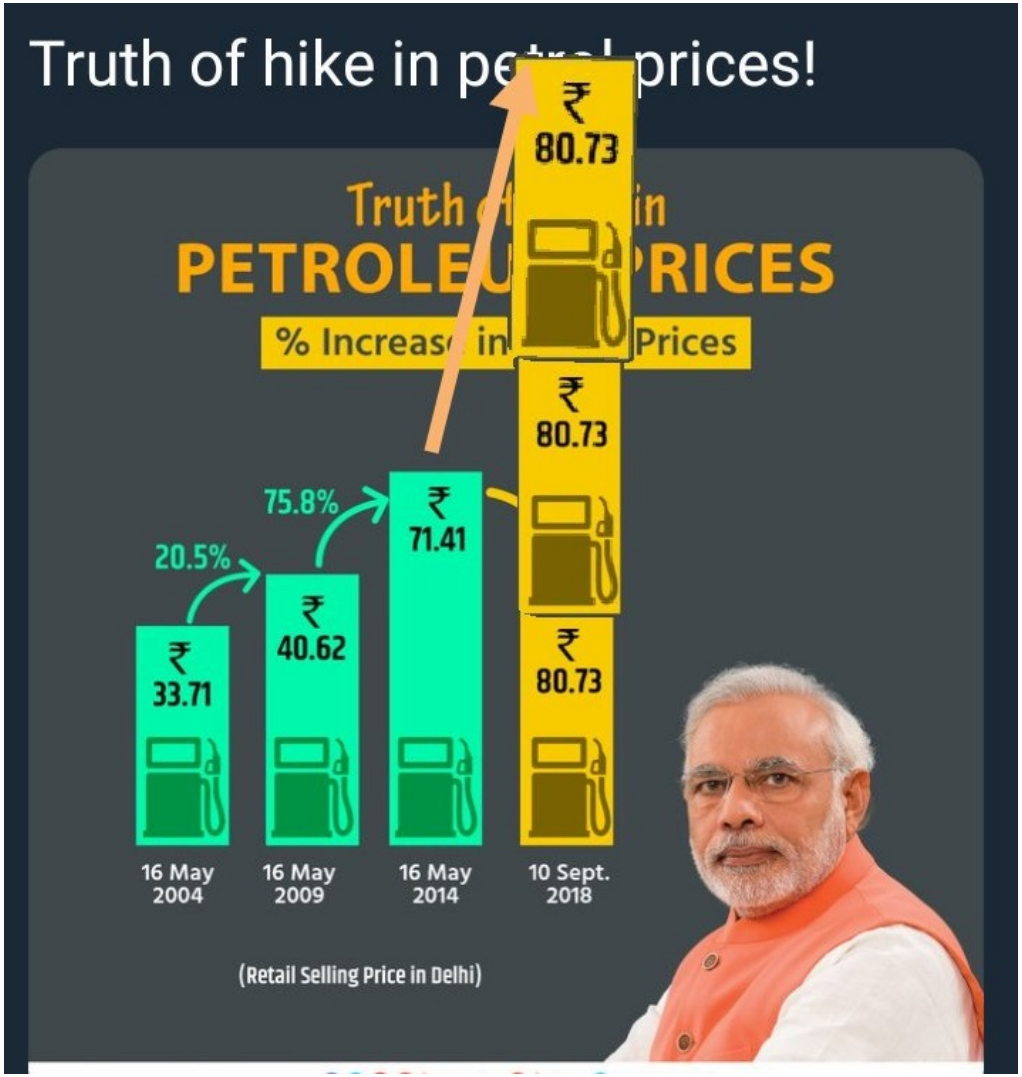
[- Règle Nº 10 : Soyez subtil (ou pas !) -]



LOL !

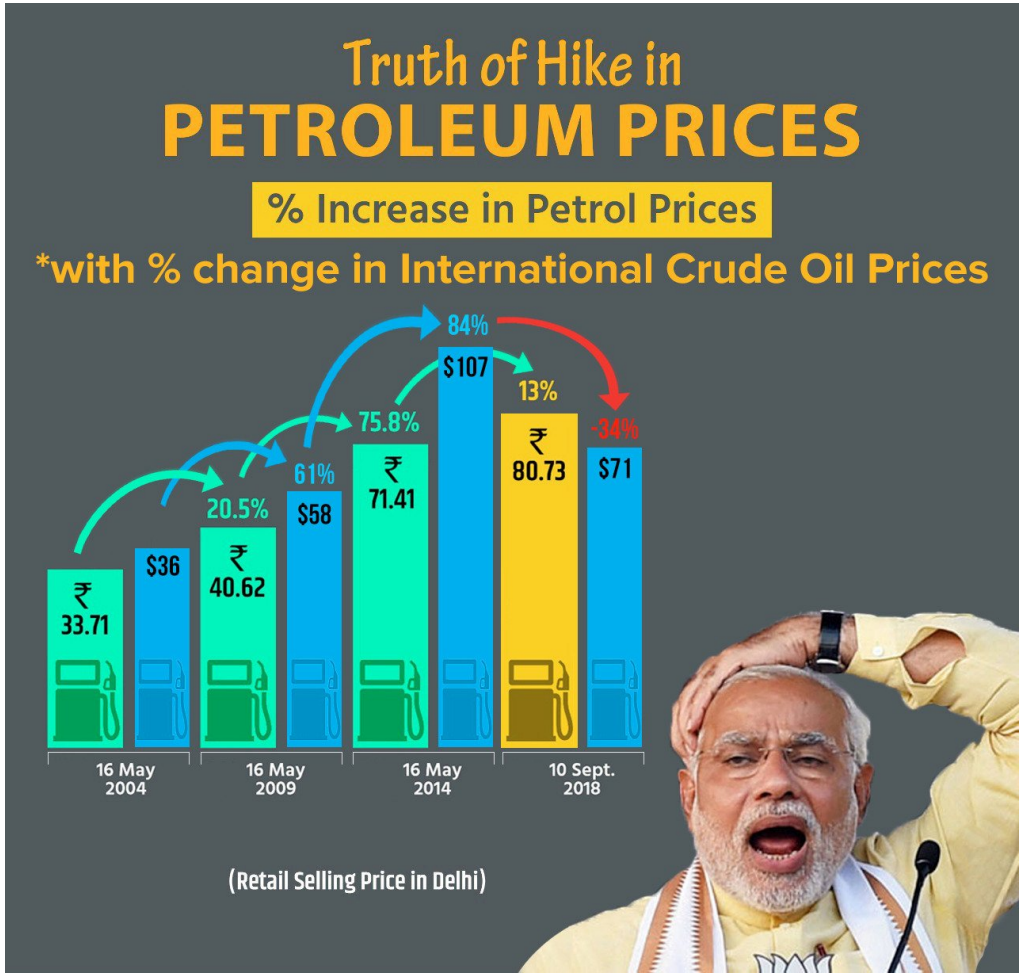
[- Règle N° 10 : Soyez subtil (ou pas !) -]

Correction ?

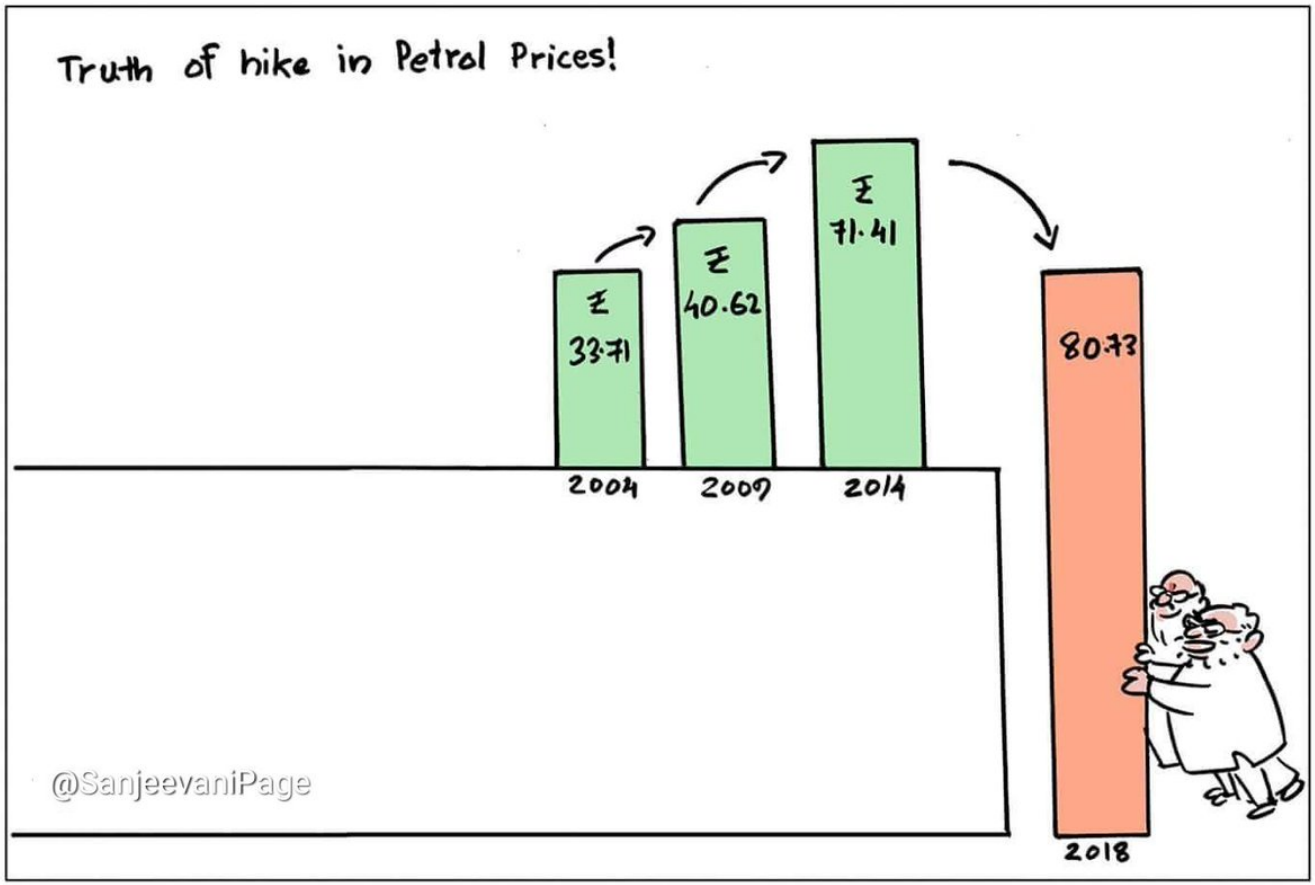


[- Règle Nº 10 : Soyez subtil (ou pas !) -]

Justification !



[- Règle N° 10 : Soyez subtil (ou pas !) -]



LOL !

[- Règle Nº 10 : Soyez subtil (ou pas !) -]

Les chiffres ne trompent pas...

