

Turning the Tide

New Directions in Health Communication

Mars Exploration Rover: Misión a Marte

Fagrima

El calamar gigante

DIAGRAM NEWS IN PERSPECTIVE

Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

Alberto Cairo, Francisco Lima, Marco Vergatti

PRELIMINARY DATA FROM THE 2010 CENSUS creates an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew, on average, 12% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy social security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables at play in this story.

1 BRAZIL'S POPULATION IS BIGGER

The 2010 Census has revealed a 9.4% population increase between 2000 and 2010. The differences between states, as you can see on the chart on the right, are noticeable. Most rich states, such as São Paulo and Rio, didn't grow as fast as the ones in the north east.

Year	Population
2000	168,708,170
2010	190,732,694

State	2000	2010	Change
AP	475,132	648,823	36.8%
MS	346,897	426,494	23.5%
MT	307,026	390,785	27.3%
DF	2,494,646	2,688,629	7.8%
PA	3,392,387	3,468,304	2.3%
AM	3,392,387	3,392,387	0.0%
TO	1,383,832	1,370,838	-0.9%
GO	5,592,226	5,849,426	4.6%
RR	2,479,019	2,499,206	0.8%
SE	5,383,880	6,028,864	11.4%
ES	3,388,426	3,684,217	8.7%
MA	3,414,776	4,402,940	28.9%
AC	279,792	282,428	0.9%
RO	1,270,387	1,281,828	0.9%
CE	3,439,493	3,880,087	12.8%
AL	2,823,421	3,080,984	9.2%
PI	3,057,232	3,388,770	11.0%
PE	3,444,646	3,744,422	8.7%
RN	2,444,226	2,688,426	10.0%
PR	2,914,426	3,144,426	7.9%
SP	11,914,426	12,914,426	8.4%
RS	10,914,426	10,914,426	0.0%
SC	3,414,426	3,614,426	5.9%
BA	5,414,426	5,614,426	3.7%
MT	3,414,426	3,614,426	5.9%
MS	3,414,426	3,614,426	5.9%

AVERAGE +9.4%

Data updated on November 4, 2010
The map shows the change in population in Brazilian municipalities between 2000 and 2010. 1,670 cities and towns, from a total of 5,486, lost population. Rio Grande do Sul is the state with the largest number of municipalities that lost inhabitants, due to a significant drop in fertility rates and economic stagnation.

Sources: IBGE, UN WorldPop, César Marques (UNICAMP)

Cassini-Huygens cita con Saturno

Los portaaviones clase 'Nimitz'

Mesacre en Madrid

La presa de las Tres Gargantas

Tiro con arco

Tiro en Ciudad Lineal

Designing better

CHARTS & MAPS



Hi #TurningTheTide, here are the slides I used today:

<https://www.dropbox.com/s/l3fhh1syr6bcvvp/ColumbiaTurningTheTide.pdf?dl=0>



 Who's in this photo?



Tweet



the functional art

2012

the truthful art

data, charts, and maps
for communication

alberto cairo

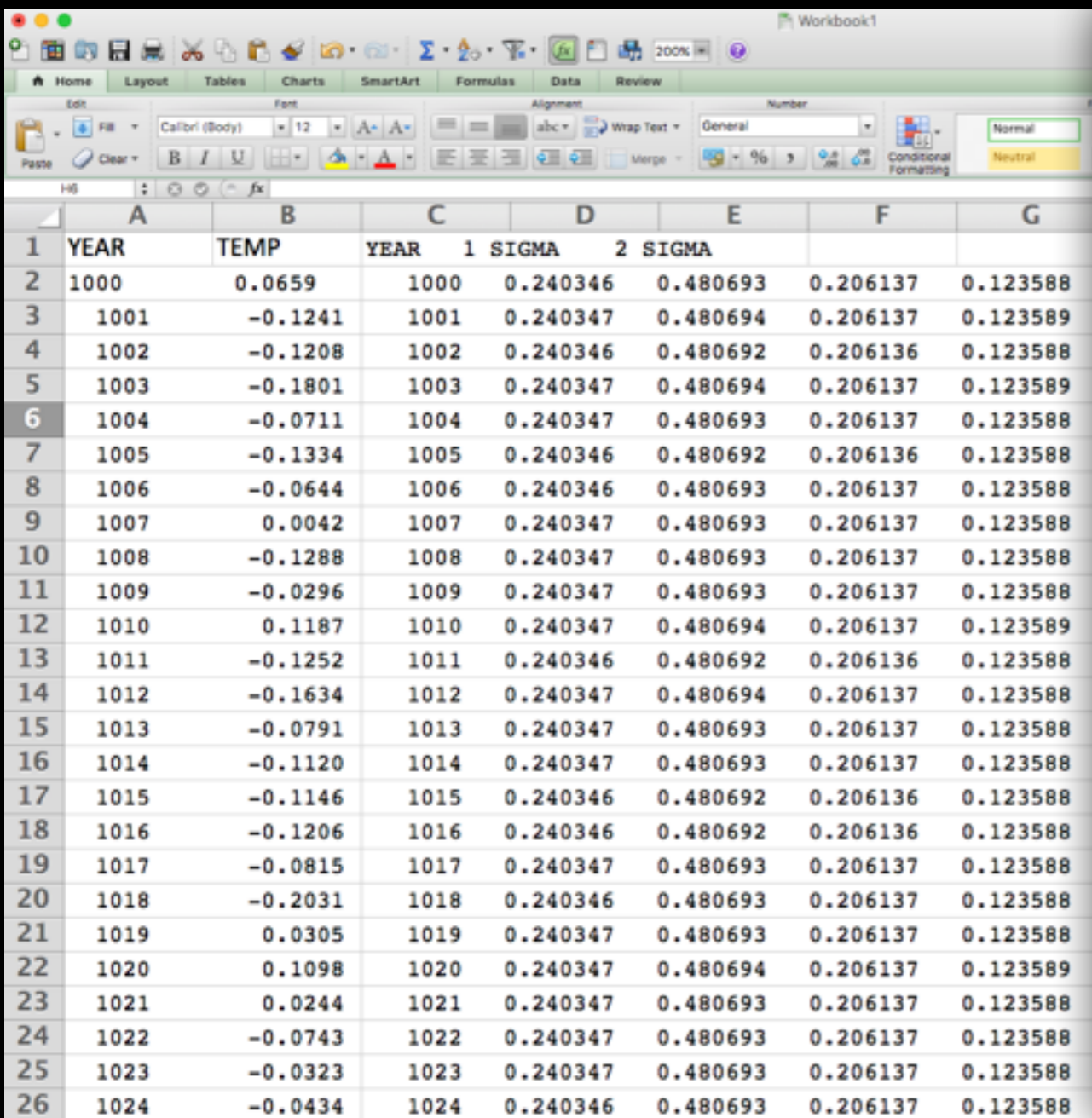
"Welcome to Alberto's world. Cairo has done it all in *The Functional Art*: theory, practice, examples. And he's done it brilliantly. It is the most comprehensive and sensible book yet on real-world information graphics; we won't need another one for a long time."

Nigel Holmes, former graphics director for *Time* magazine and founder of Explanation Graphics

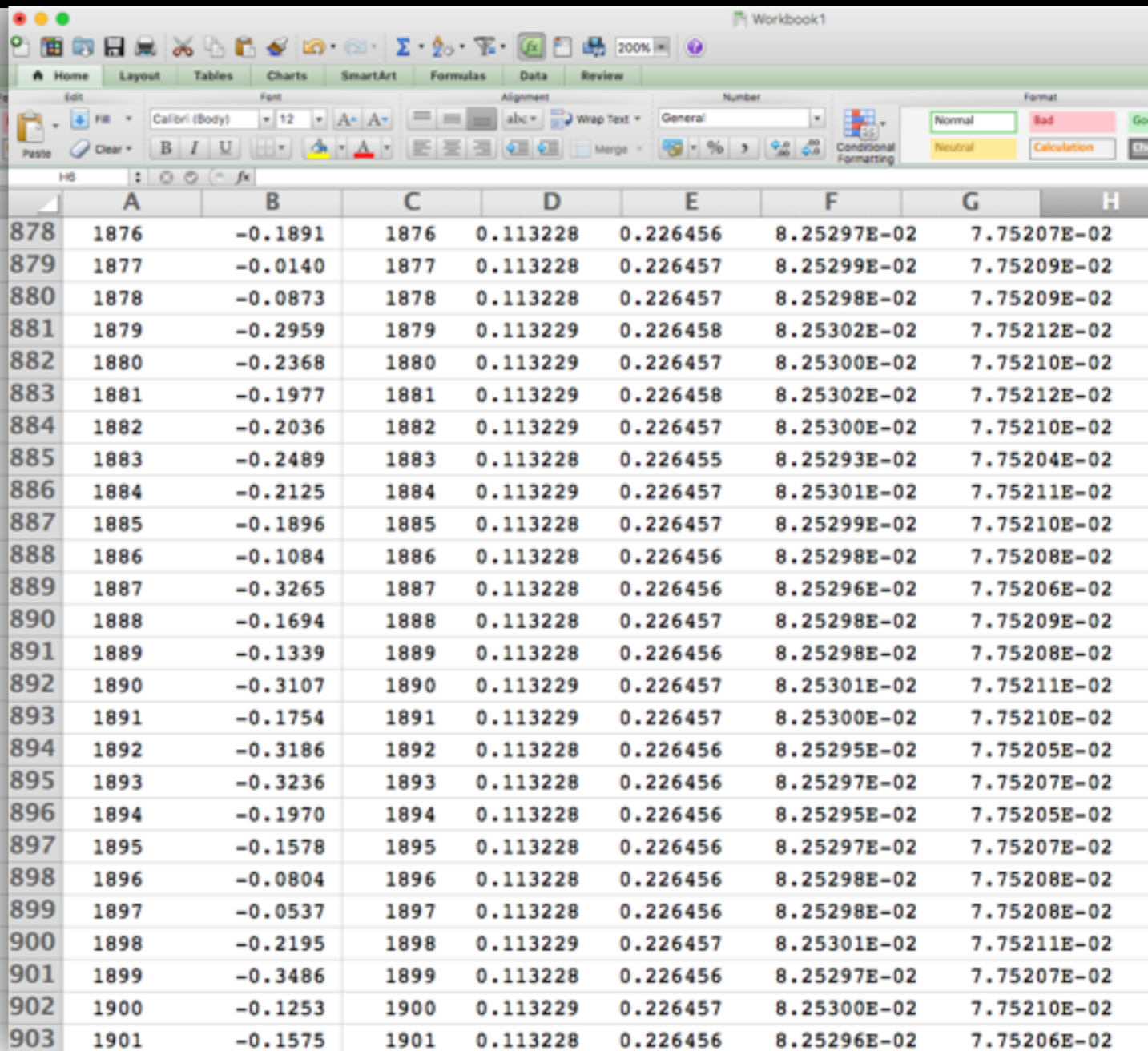
A visualization is a representation designed to enable **exploration**, **discovery**, or **communication**

2016

Try to extract useful information from this:

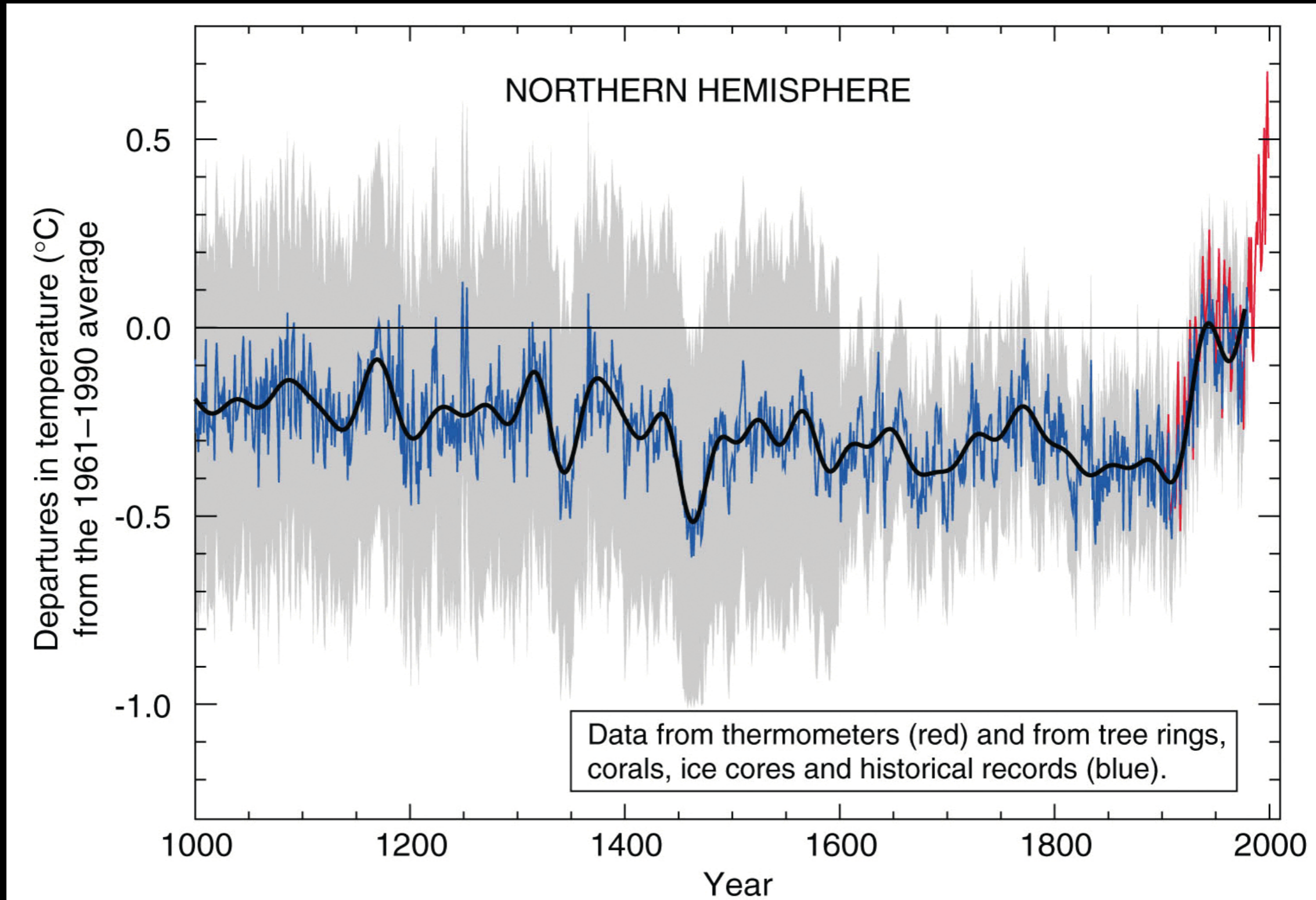


	A	B	C	D	E	F	G
1	YEAR	TEMP	YEAR	1 SIGMA	2 SIGMA		
2	1000	0.0659	1000	0.240346	0.480693	0.206137	0.123588
3	1001	-0.1241	1001	0.240347	0.480694	0.206137	0.123589
4	1002	-0.1208	1002	0.240346	0.480692	0.206136	0.123588
5	1003	-0.1801	1003	0.240347	0.480694	0.206137	0.123589
6	1004	-0.0711	1004	0.240347	0.480693	0.206137	0.123588
7	1005	-0.1334	1005	0.240346	0.480692	0.206136	0.123588
8	1006	-0.0644	1006	0.240346	0.480693	0.206137	0.123588
9	1007	0.0042	1007	0.240347	0.480693	0.206137	0.123588
10	1008	-0.1288	1008	0.240347	0.480693	0.206137	0.123588
11	1009	-0.0296	1009	0.240347	0.480693	0.206137	0.123588
12	1010	0.1187	1010	0.240347	0.480694	0.206137	0.123589
13	1011	-0.1252	1011	0.240346	0.480692	0.206136	0.123588
14	1012	-0.1634	1012	0.240347	0.480694	0.206137	0.123588
15	1013	-0.0791	1013	0.240347	0.480693	0.206137	0.123588
16	1014	-0.1120	1014	0.240347	0.480693	0.206137	0.123588
17	1015	-0.1146	1015	0.240346	0.480692	0.206136	0.123588
18	1016	-0.1206	1016	0.240346	0.480692	0.206136	0.123588
19	1017	-0.0815	1017	0.240347	0.480693	0.206137	0.123588
20	1018	-0.2031	1018	0.240346	0.480693	0.206137	0.123588
21	1019	0.0305	1019	0.240347	0.480693	0.206137	0.123588
22	1020	0.1098	1020	0.240347	0.480694	0.206137	0.123589
23	1021	0.0244	1021	0.240347	0.480693	0.206137	0.123588
24	1022	-0.0743	1022	0.240347	0.480693	0.206137	0.123588
25	1023	-0.0323	1023	0.240347	0.480693	0.206137	0.123588
26	1024	-0.0434	1024	0.240346	0.480693	0.206137	0.123588



	A	B	C	D	E	F	G	H
878	1876	-0.1891	1876	0.113228	0.226456	8.25297E-02	7.75207E-02	
879	1877	-0.0140	1877	0.113228	0.226457	8.25299E-02	7.75209E-02	
880	1878	-0.0873	1878	0.113228	0.226457	8.25298E-02	7.75209E-02	
881	1879	-0.2959	1879	0.113229	0.226458	8.25302E-02	7.75212E-02	
882	1880	-0.2368	1880	0.113229	0.226457	8.25300E-02	7.75210E-02	
883	1881	-0.1977	1881	0.113229	0.226458	8.25302E-02	7.75212E-02	
884	1882	-0.2036	1882	0.113229	0.226457	8.25300E-02	7.75210E-02	
885	1883	-0.2489	1883	0.113228	0.226455	8.25293E-02	7.75204E-02	
886	1884	-0.2125	1884	0.113229	0.226457	8.25301E-02	7.75211E-02	
887	1885	-0.1896	1885	0.113228	0.226457	8.25299E-02	7.75210E-02	
888	1886	-0.1084	1886	0.113228	0.226456	8.25298E-02	7.75208E-02	
889	1887	-0.3265	1887	0.113228	0.226456	8.25296E-02	7.75206E-02	
890	1888	-0.1694	1888	0.113228	0.226457	8.25298E-02	7.75209E-02	
891	1889	-0.1339	1889	0.113228	0.226456	8.25298E-02	7.75208E-02	
892	1890	-0.3107	1890	0.113229	0.226457	8.25301E-02	7.75211E-02	
893	1891	-0.1754	1891	0.113229	0.226457	8.25300E-02	7.75210E-02	
894	1892	-0.3186	1892	0.113228	0.226456	8.25295E-02	7.75205E-02	
895	1893	-0.3236	1893	0.113228	0.226456	8.25297E-02	7.75207E-02	
896	1894	-0.1970	1894	0.113228	0.226456	8.25295E-02	7.75205E-02	
897	1895	-0.1578	1895	0.113228	0.226456	8.25297E-02	7.75207E-02	
898	1896	-0.0804	1896	0.113228	0.226456	8.25298E-02	7.75208E-02	
899	1897	-0.0537	1897	0.113228	0.226456	8.25298E-02	7.75208E-02	
900	1898	-0.2195	1898	0.113229	0.226457	8.25301E-02	7.75211E-02	
901	1899	-0.3486	1899	0.113228	0.226456	8.25297E-02	7.75207E-02	
902	1900	-0.1253	1900	0.113229	0.226457	8.25300E-02	7.75210E-02	
903	1901	-0.1575	1901	0.113228	0.226456	8.25296E-02	7.75206E-02	

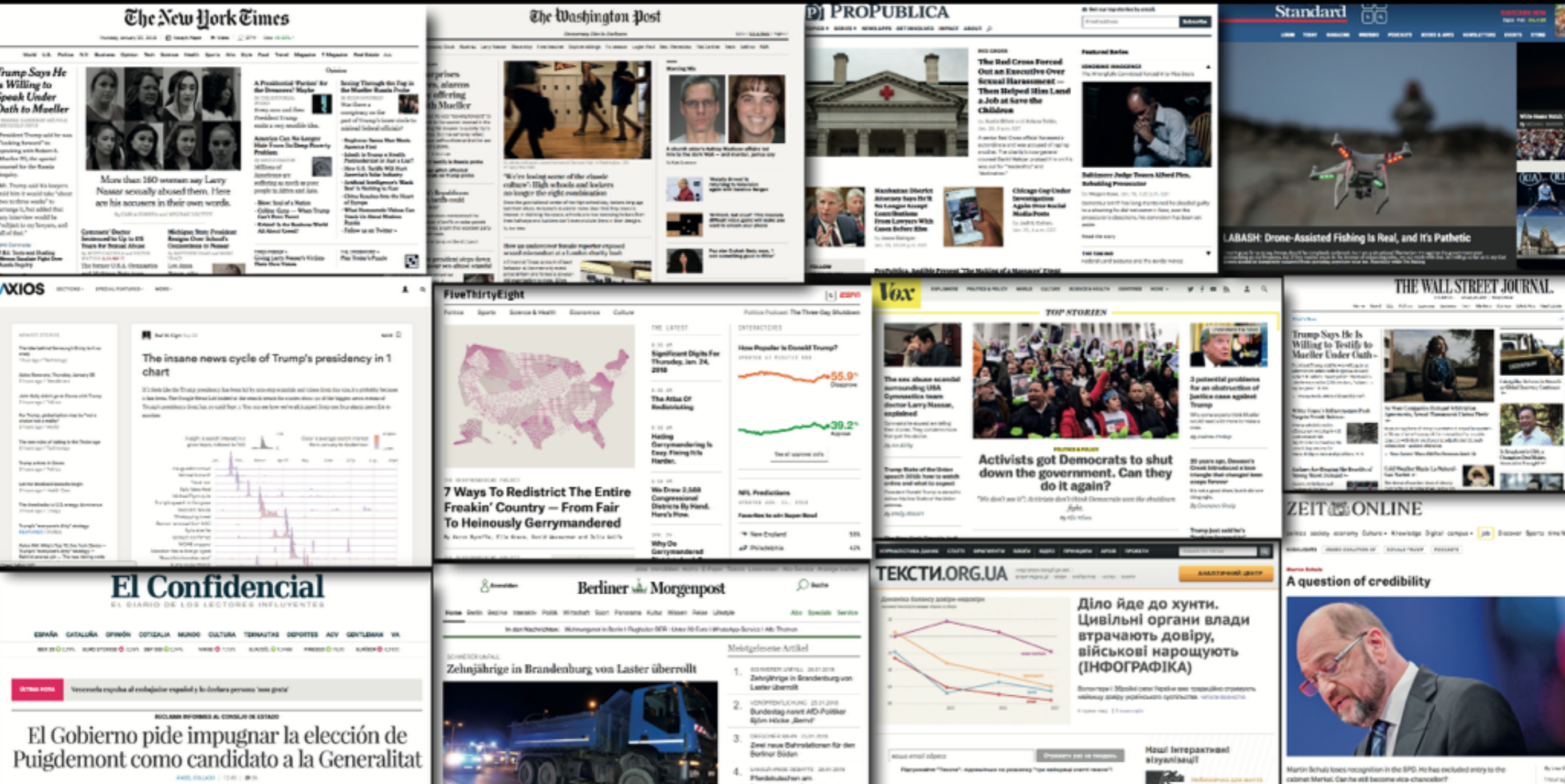
It's easier with a visualization



Michael E. Mann, Raymond S. Bradley, and Malcolm K. Hughes

Intergovernmental Panel on Climate Change (IPCC), Third Report, 2001

VISUALIZATIONS ARE EVERYWHERE NOWADAYS...



To learn how to design better data visualizations, it's necessary to understand what data visualizations are made of.

A FRAMEWORK

+

ONE OR MORE VISUAL ENCODINGS

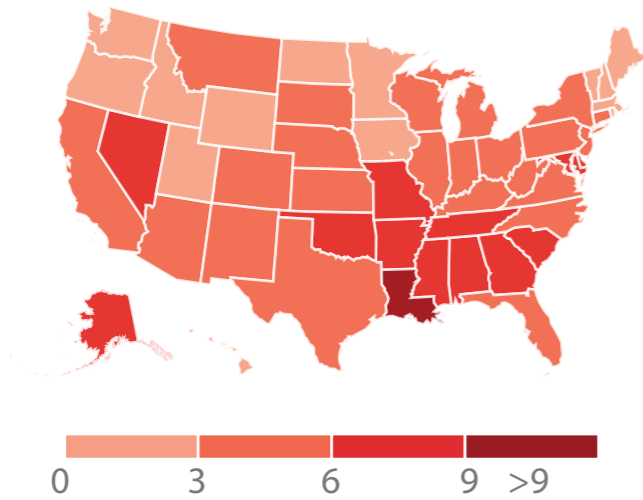
+

ANNOTATIONS

COMPLETE CHART

MURDERS

Rate per 100,000 people (2015)

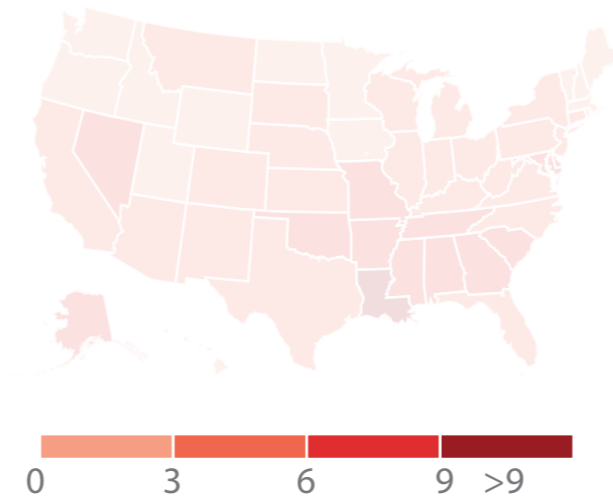


Source: FBI Uniform Crime Reports

FRAMEWORK

MURDERS

Rate per 100,000 people (2015)

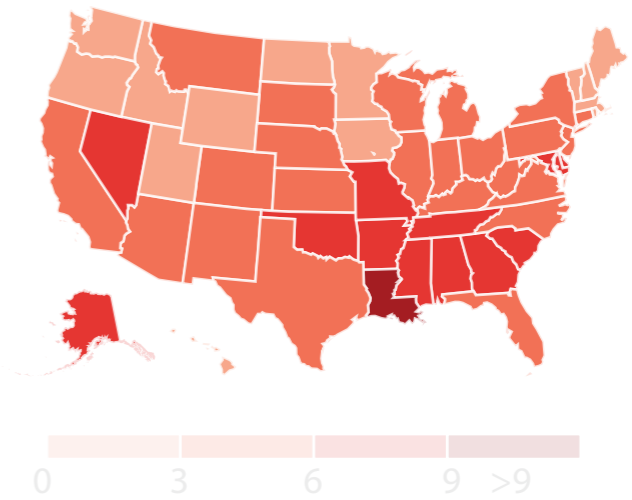


Source: FBI Uniform Crime Reports

CONTENT (ENCODING)

MURDERS

Rate per 100,000 people (2015)

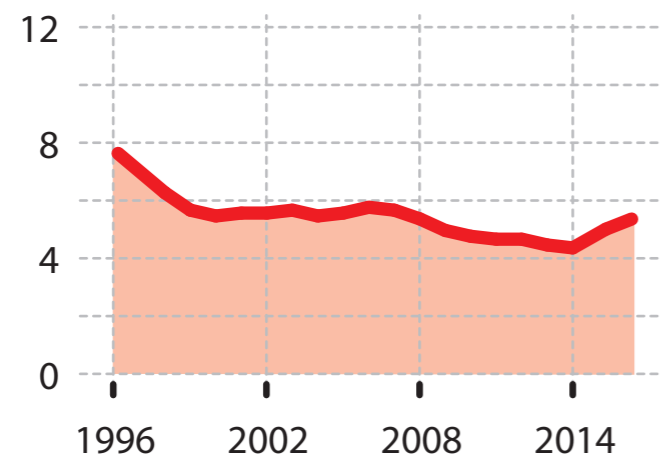


Source: FBI Uniform Crime Reports

COMPLETE CHART

MURDERS

Rate per 100,000 people

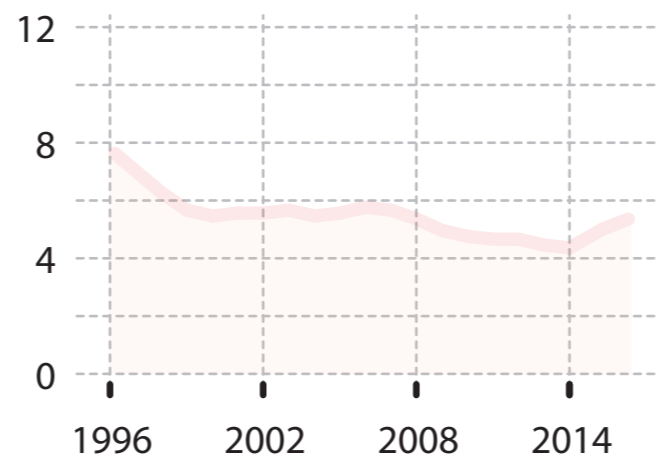


Source: FBI Uniform Crime Reports

FRAMEWORK

MURDERS

Rate per 100,000 people

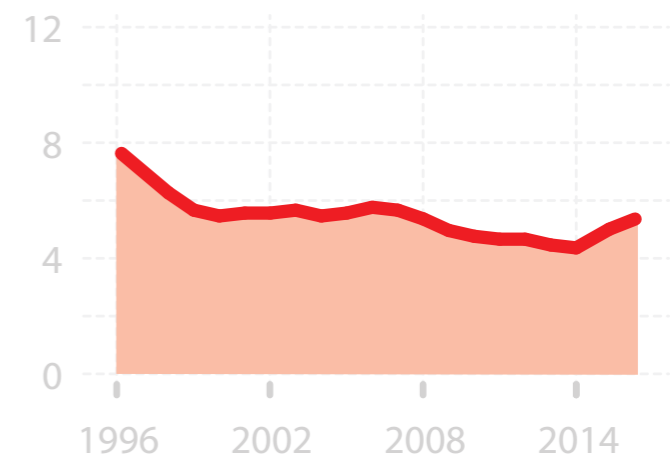


Source: FBI Uniform Crime Reports

CONTENT (ENCODING)

MURDERS

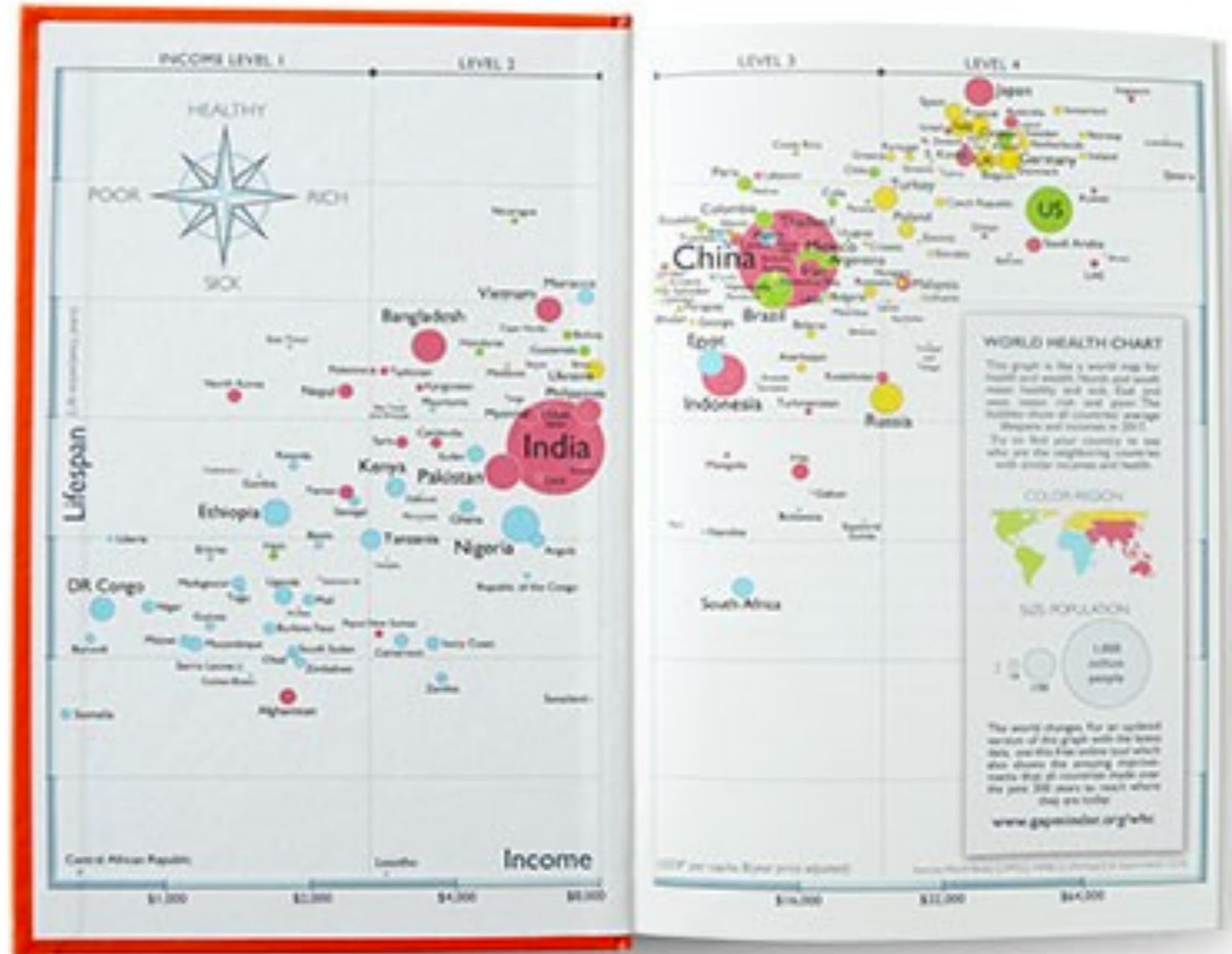
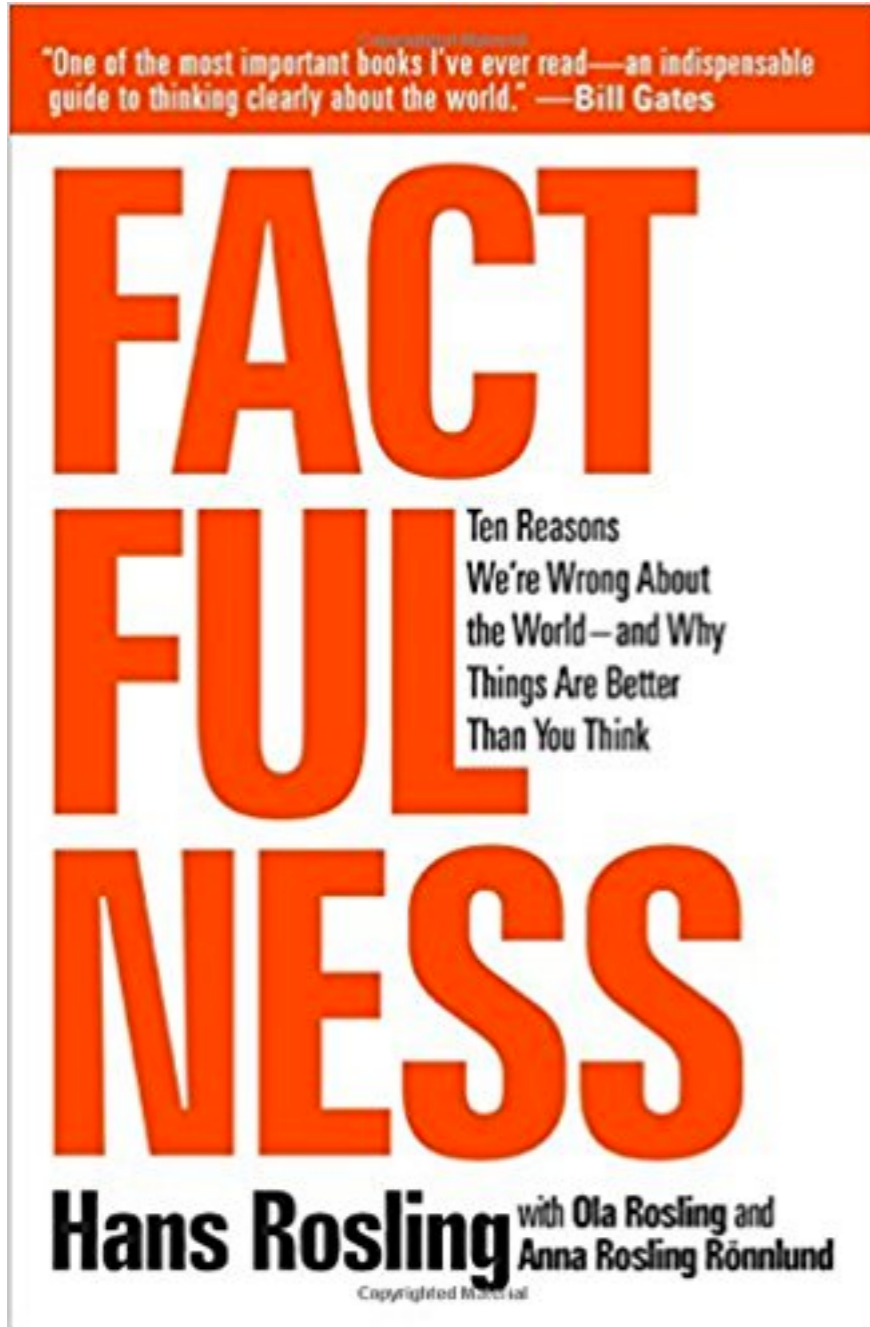
Rate per 100,000 people



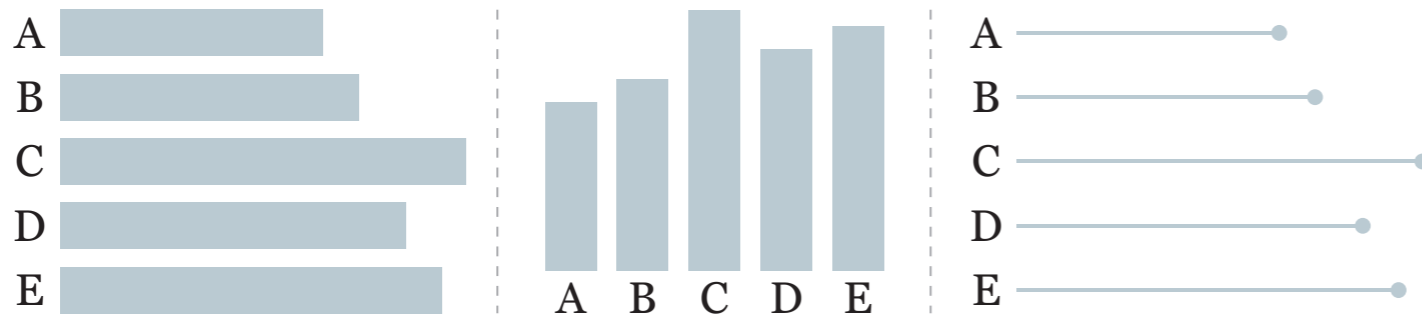
Source: FBI Uniform Crime Reports

BBC FOUR

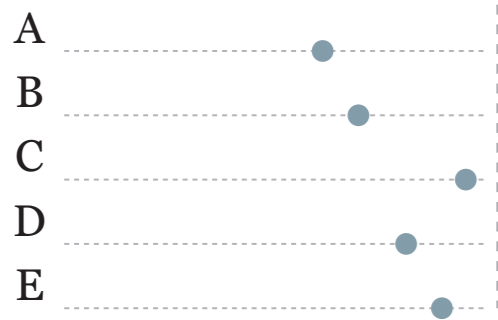




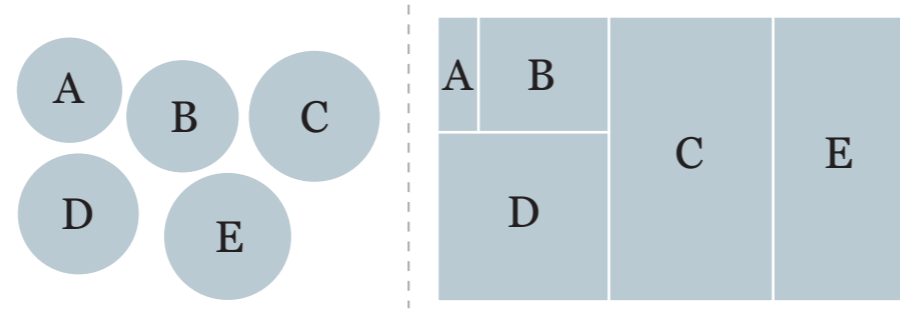
Length or height



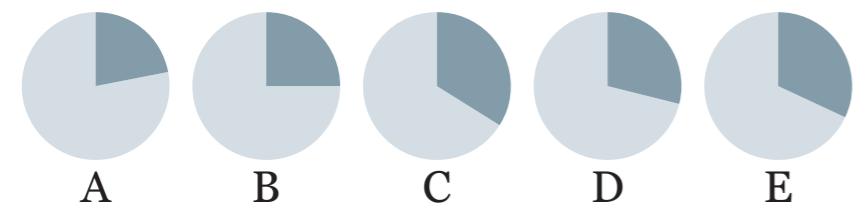
Position



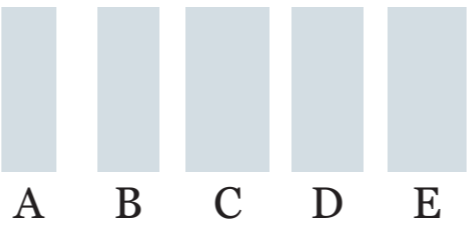
Area



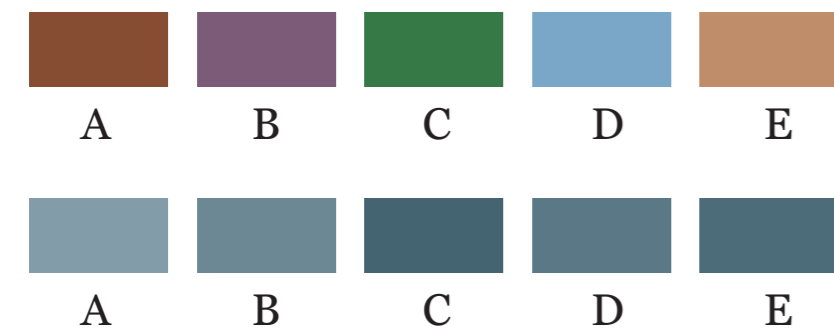
Angle/area



Line weight



Hue and shade



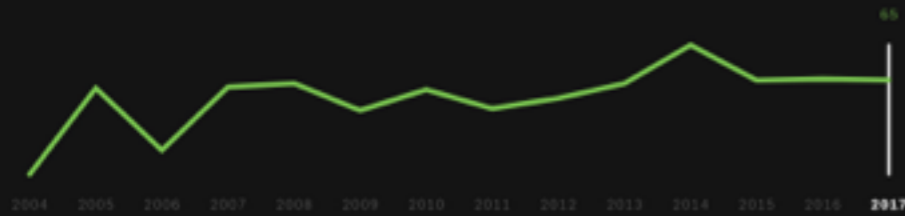
Figures represented
in all these graphics:
22%, 25%, 34%, 29%, 32%

Visual encoding

Searching for Cancer ▾

GOOGLE TRENDS DATA

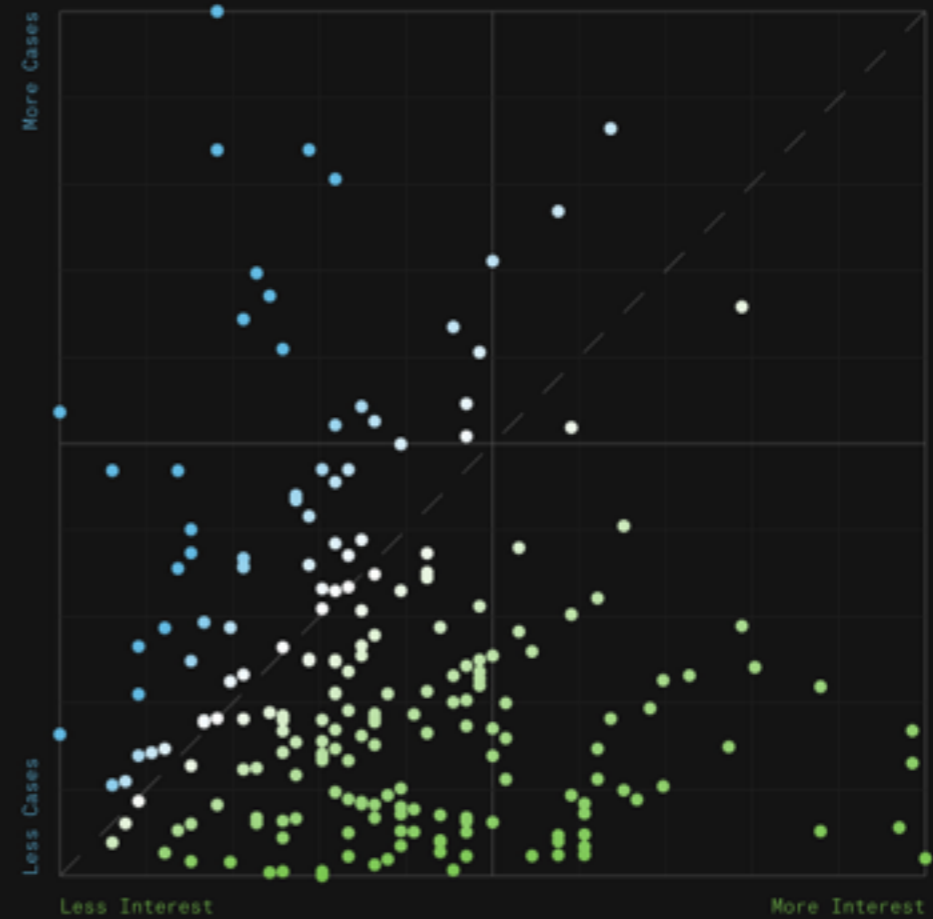
Search Interest in Cancer Over Time



Searching for Obesity ▾

Search Interest in Obesity vs Prevalence Rate of Obesity

All metro areas ▾



Google search data, Jan. 1, 2004-present. Obesity prevalence rate, 2013.

<https://www.schemadesign.com/work/searching-for-health>

<http://www.searching-for-health.com/>

Many tools —many of them free and easy to use

the functional art
alberto cairo's weblog on visualization, infographics, and data journalism

Home | Contact the author | Speaking & Consulting | The Truthful Art book | The Functional Art book | Reviews | **Tutorials & Resources** | Reading now

Wednesday, April 25, 2018

Visualization myths: Henry Beck and the London Underground map

Human nature dictates that whenever we group, we start devising a shared identity, bonding around imaginary heroes, myths, and legends. Visualization, infographics, and data journalism aren't exceptions. Years ago, I wrote about the myths surrounding **John Snow's undeniable achievements**, and I often need to point out that most visualizations that look very innovative have precedents. **It happened just yesterday with one of my graphics**. Perhaps it's because I've always been skeptical of nationalisms and other strong identities that I prefer my myths and heroes to exist exclusively in the movies and novels I enjoy **watching** and **reading**.

This morning I discovered another possible myth. I guess you're all familiar with **Henry Beck's 1933 London Underground map**. We've learned that it's a landmark in the history of information design thanks to **books, articles**, and talks (including mine), but it turns out that the story is —as it often

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<https://flourish.studio/>



Hi #TurningTheTide, here are the slides I used today:

<https://www.dropbox.com/s/l3fhh1s3r6bcvvp/ColumbiaTurningTheTide.pdf?dl=0>



Who's in this photo?



Tweet

THANKS!

Turning the Tide

New Directions in Health Communication

The infographic grid includes the following panels:

- Mars Exploration Rover: Misión a Marte**: Shows the rover's components and mission details.
- Foguera**: Illustrates the components of a rocket engine.
- El calamar gigante**: Shows a giant squid with anatomical labels.
- Cassini-Huygens cita con Saturno**: Shows the Cassini spacecraft and its mission to Saturn.
- Los portaaviones clase "Nimitz"**: Shows an aircraft carrier with various deck and hull components.
- Mesacre en Madrid**: Shows a street scene with a building and a car, illustrating a tragic event.
- La presa de las Tres Gargantas**: Shows a large dam structure with technical specifications.
- Tiro con arco**: Shows an archer in a dynamic pose with a bow and arrow.
- Tiroteo en Ciudad Lineal**: Shows a street scene with a car and a person, illustrating a shooting incident.

DIAGRAM NEWS IN PERSPECTIVE

Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

Alberto Cairo, Francisco Lima, Marco Vergatti

PRELIMINARY DATA FROM THE 2010 CENSUS creates an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew, on average, 12% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy social security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables at play in this story.

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MA	3,383,480	4,428,484	30.9%
PI	2,776,792	3,821,428	37.7%
PE	3,276,792	3,821,428	16.3%
CE	3,423,423	3,821,428	11.6%
GO	3,423,423	3,821,428	11.6%
ES	3,423,423	3,821,428	11.6%
PR	3,423,423	3,821,428	11.6%
RS	4,423,423	4,423,428	0.0%
RO	1,423,423	1,423,428	0.0%
MT	1,423,423	1,423,428	0.0%
MS	1,423,423	1,423,428	0.0%
MA	1,423,423	1,423,428	0.0%
PI	1,423,423	1,423,428	0.0%
PE	1,423,423	1,423,428	0.0%
CE	1,423,423	1,423,428	0.0%
GO	1,423,423	1,423,428	0.0%
ES	1,423,423	1,423,428	0.0%
PR	1,423,423	1,423,428	0.0%
RS	1,423,423	1,423,428	0.0%

BRASIL'S POPULATION IS BIGGER

The 2010 Census has revealed a 9.4% population increase between 2000 and 2010. The differences between states, as you can see on the chart on the right, are noticeable. Most rich states, such as São Paulo and Rio, didn't grow as fast as the ones in the north east.

2000: 168,708,170
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AVERAGE: +9.4%

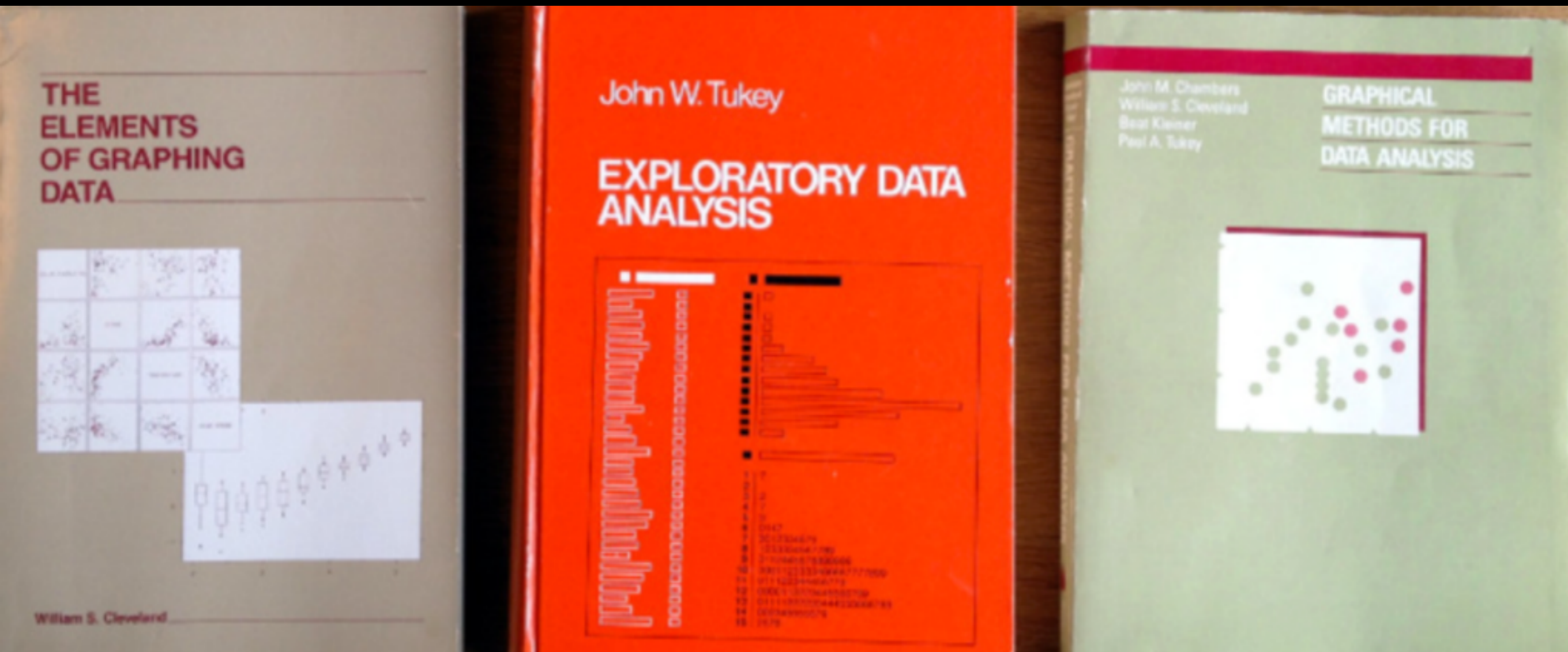
DATA updated on November 4, 2010

The map shows the change in population in Brazilian municipalities between 2000 and 2010. 1,670 cities and towns, from a total of 5,405, lost population. Rio Grande do Sul is the state with the largest number of municipalities that lost inhabitants, due to a significant drop in fertility rates and domestic migration.

Source: IBGE, UN WorldPop, César Marques (UNICAMP)

EXPLORATION

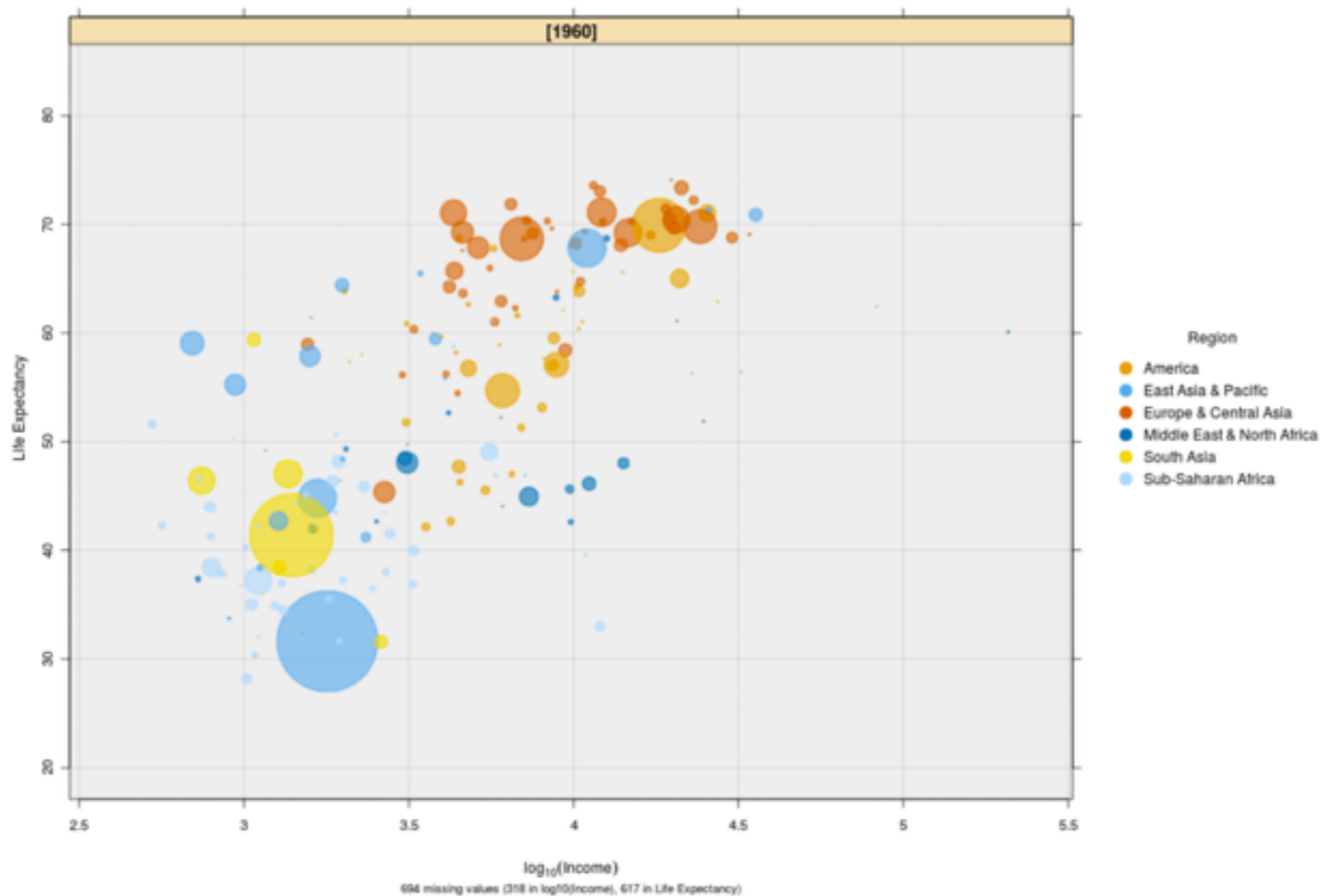
Never trust summary statistics alone. Always visualize your data



VISUALIZATION FOR DETECTING FEATURES IN DATA

A little exercise with InZight

Life Expectancy versus log₁₀(Income) subset by Year_cat (size proportional to Populationtotal)



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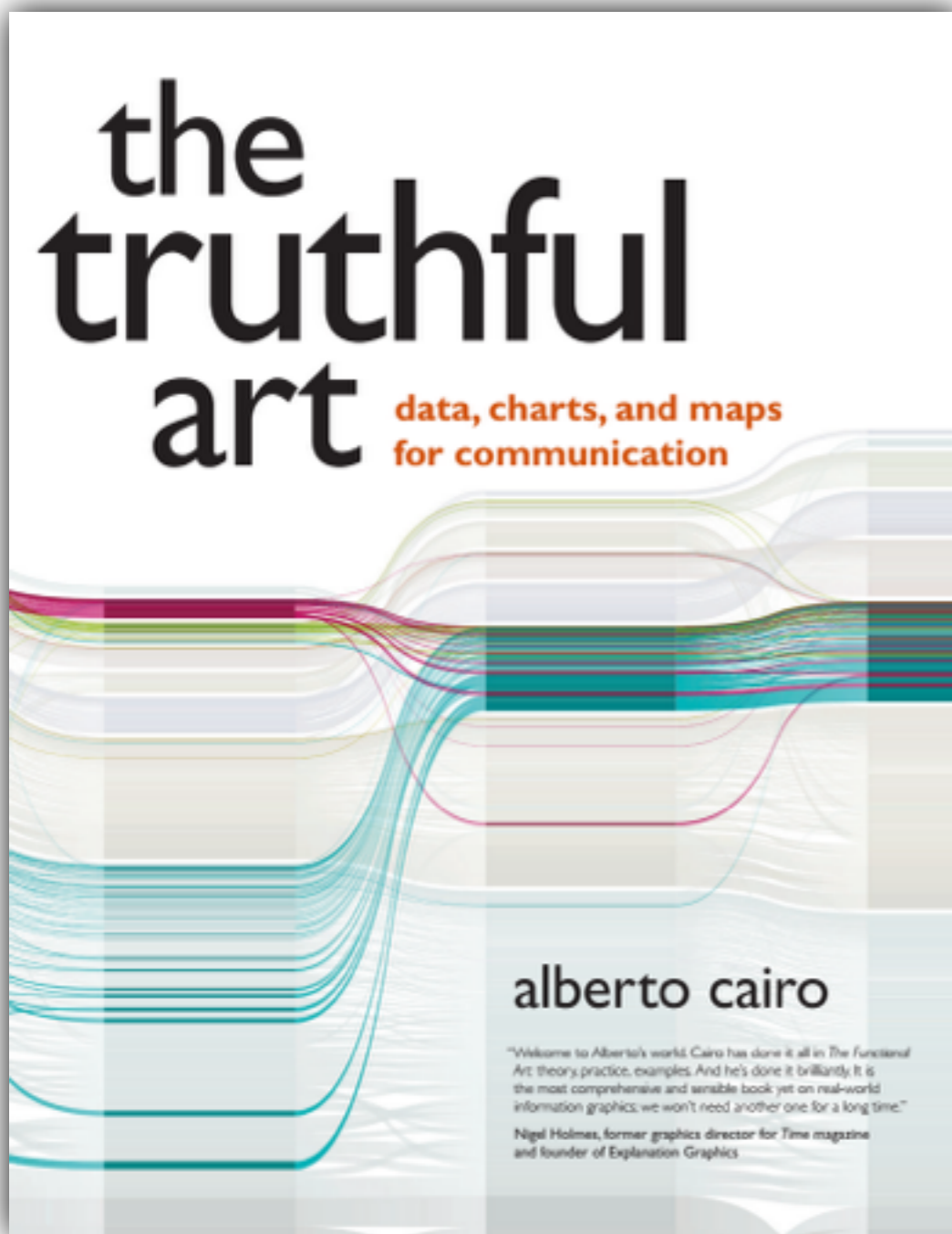
Latest Version: 3.1 ([what's new?](#))
Release Date: 13th December, 2016
Price: 100% Free!

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inzight Lite

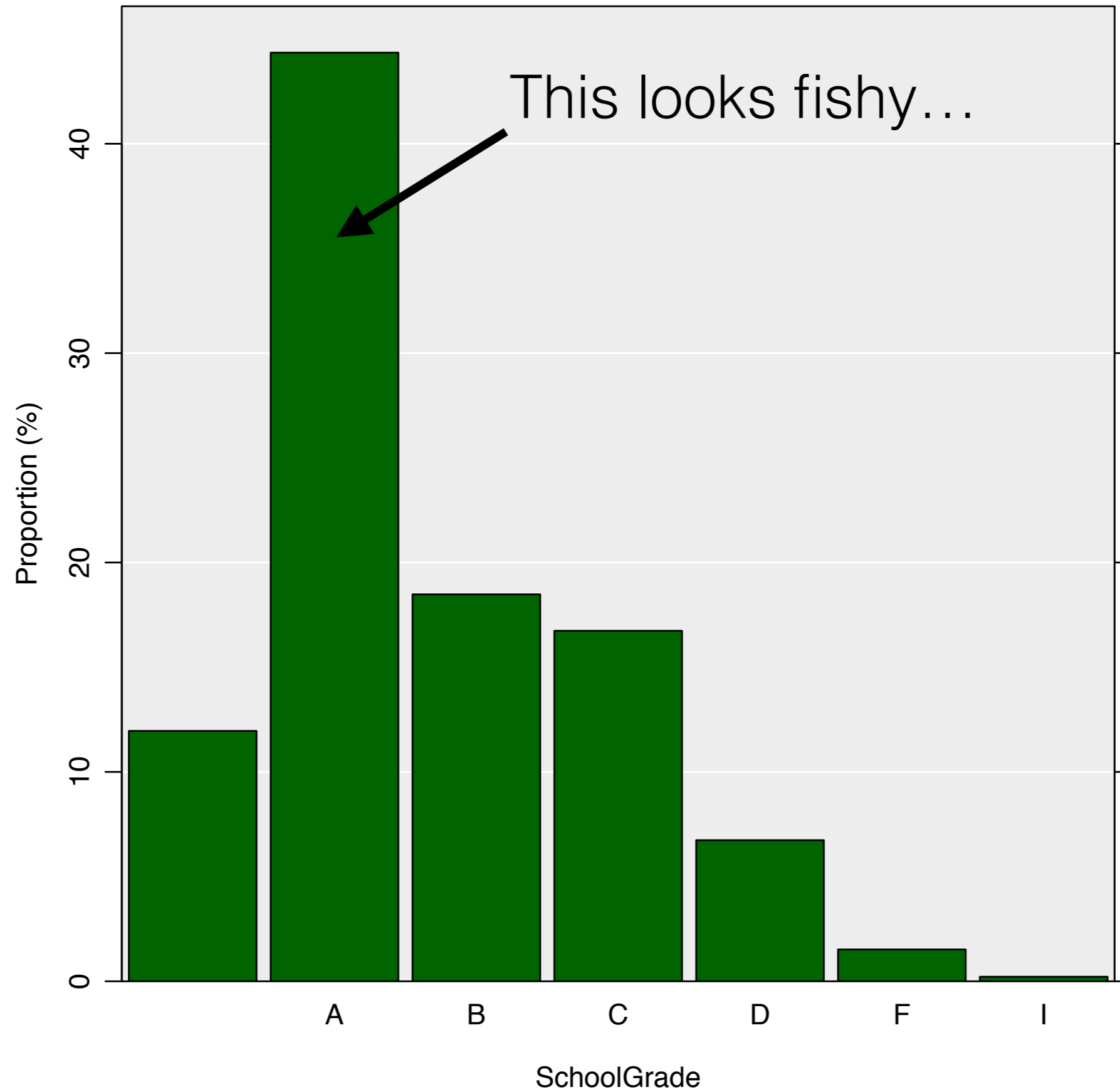
<https://www.stat.auckland.ac.nz/~wild/iNZight/index.php>

Schools in Miami-Dade County



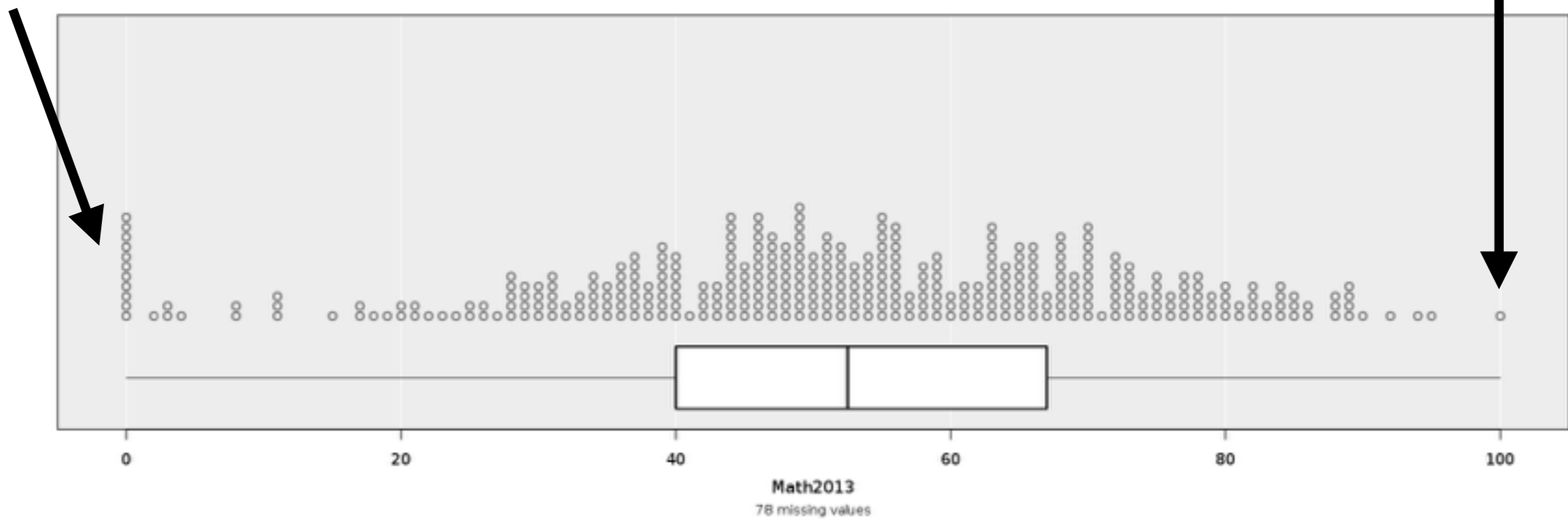
	A	B	C	D	E	F	G	H	
1	SchoolName	BoardDistrict	SchoolGrade	Reading2012	Reading2013	ReadingDiffe	Math2012	Math2013	Ma
2	0041 AIR BAS	9 A		82	80	-2	71	75	
3	0070 CORAL	9 A		71	73	2	64	56	
4	0071 EUGEN	5 A		69	69	0	66	64	
5	0072 SUMMI	9 B		57	50	-7	50	54	
6	0073 MANDA	9 C		34	32	-2	38	39	
7	0081 LENOR	2 F		28	29	1	26	47	
8	0091 BOB GF	4 A		68	70	2	68	66	
9	0092 NORMA	3 A		73	72	-1	78	77	
10	0100 MATER	4 A		68	68	0	73	76	
11	0101 ARCOL	2 C		39	32	-7	41	39	
12	0102 MIAMI	9 D		38	41	3	43	47	
13	0111 MAYA /	5 B		45	35	-10	59	50	
14	0121 AUBUR	6 A		53	51	-2	56	55	
15	0122 DR ROL	5 A		65	64	-1	66	63	
16	0125 NORMA	7 A		70	67	-3	74	70	
17	0161 AVOCA	9		45	33	-12	45	45	
18	0201 BANYA	8 A		73	74	1	72	70	
19	0211 DR MA	7 A		71	71	0	74	68	
20	0231 AVENTI	3 A		68	68	0	67	67	
21	0241 R K BRO	3 A		76	75	-1	81	77	
22	0251 ETHEL I	8 A		85	80	-5	89	90	
23	0261 BEL-AIF	9 D		32	32	0	36	48	
24	0271 BENT T	8 A		70	61	-9	69	60	
25	0311 GOULD	9 B		36	40	4	51	52	
26	0312 MATER	4 A		75	76	1	84	85	
27	0321 BISCAY	3 B		45	42	-3	52	50	
28	0332 SOMER	9 A		62	66	4	54	64	
29	0339 SOMER	9 B		67	57	-10	60	54	
30	0341 ARCH C	1 B		47	48	1	47	48	
31	0342 PINECR	7 A		72	75	3	78	76	
32	0361 BISCAY	1 D		37	35	-2	39	37	
33	0400 RENAI	5 A		80	82	2	76	82	
34	0401 VAN E I	2 A		46	44	-2	62	56	
35	0410 ACADE	8 A		68	69	1	62	74	

Distribution of SchoolGrade

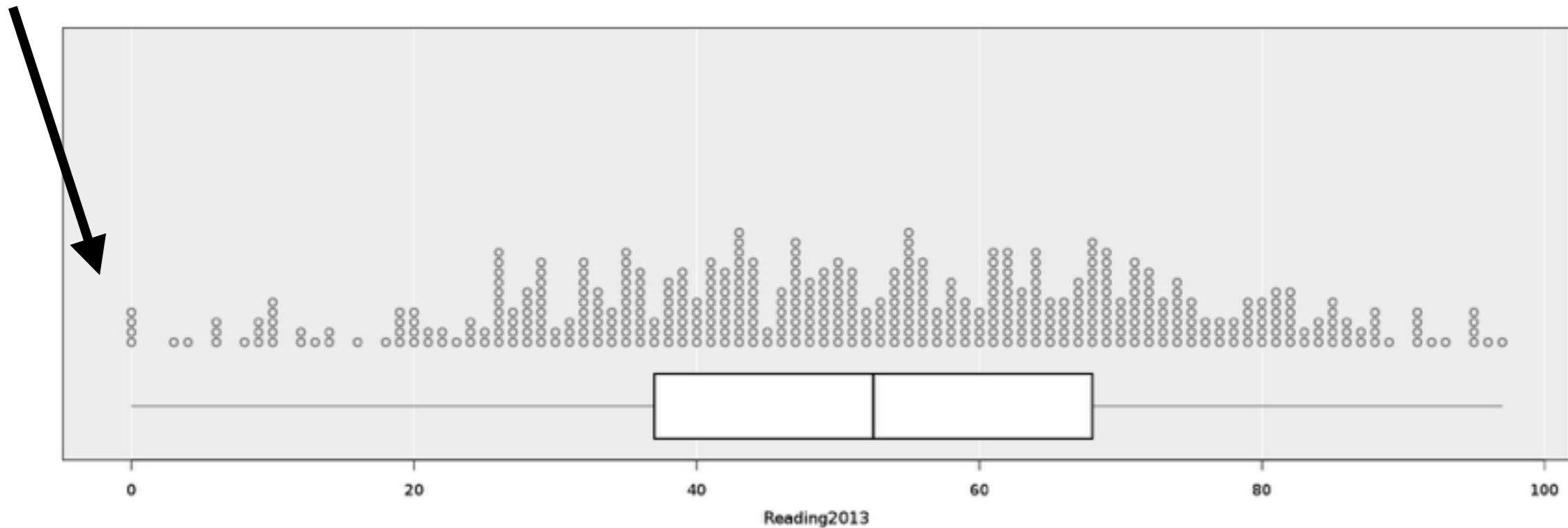


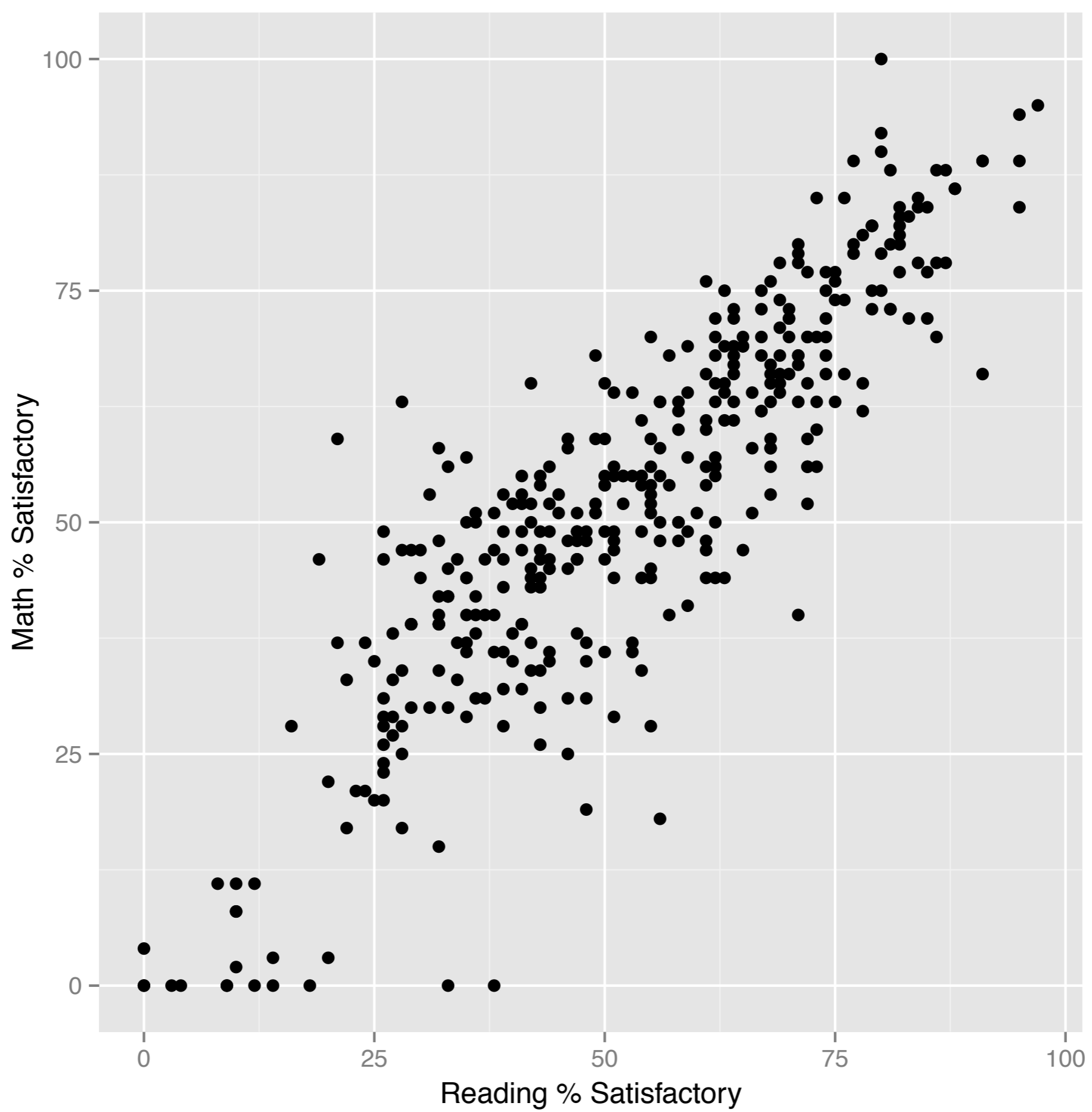
Why no students pass Math tests in these schools?

What about this school?

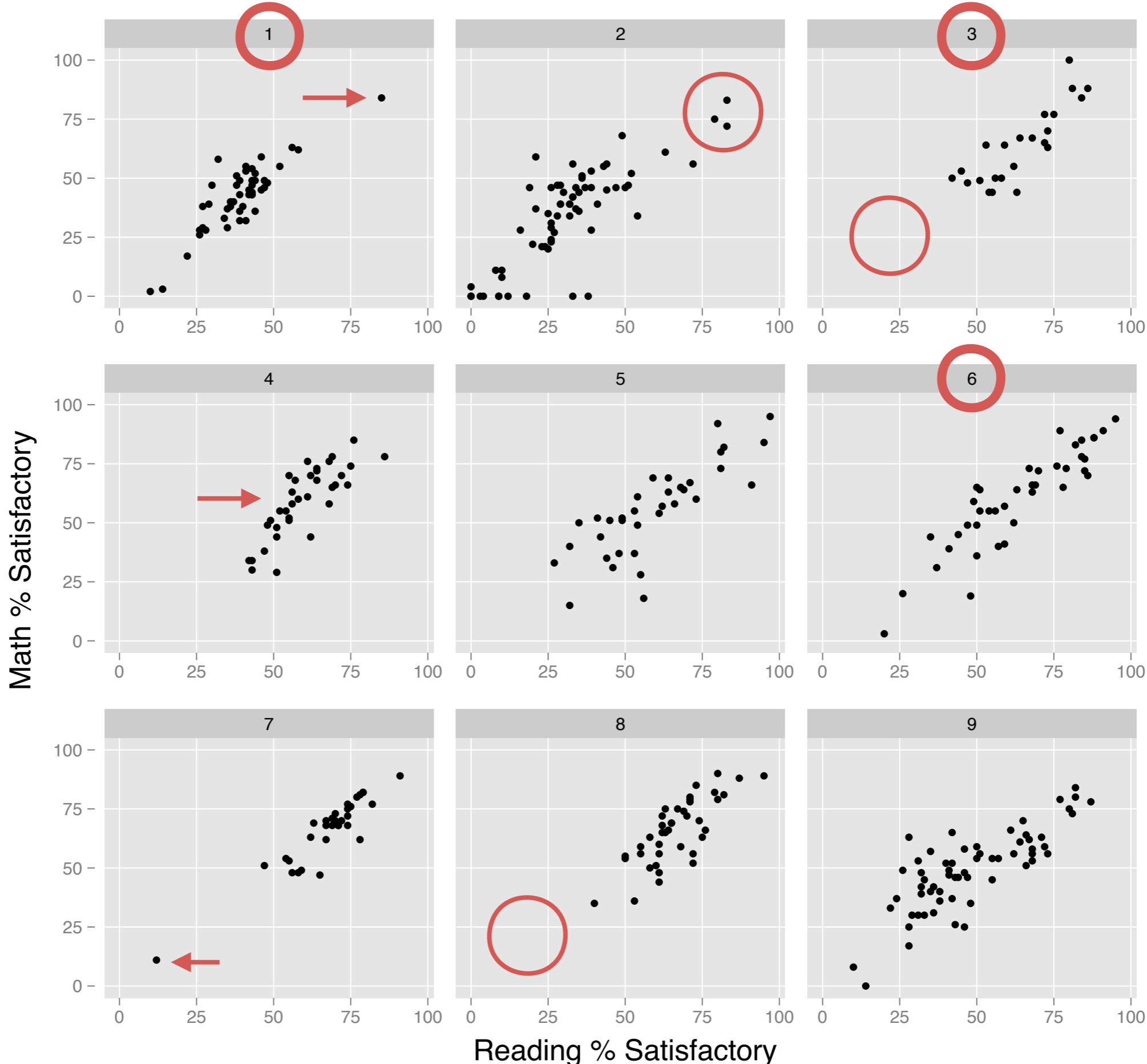


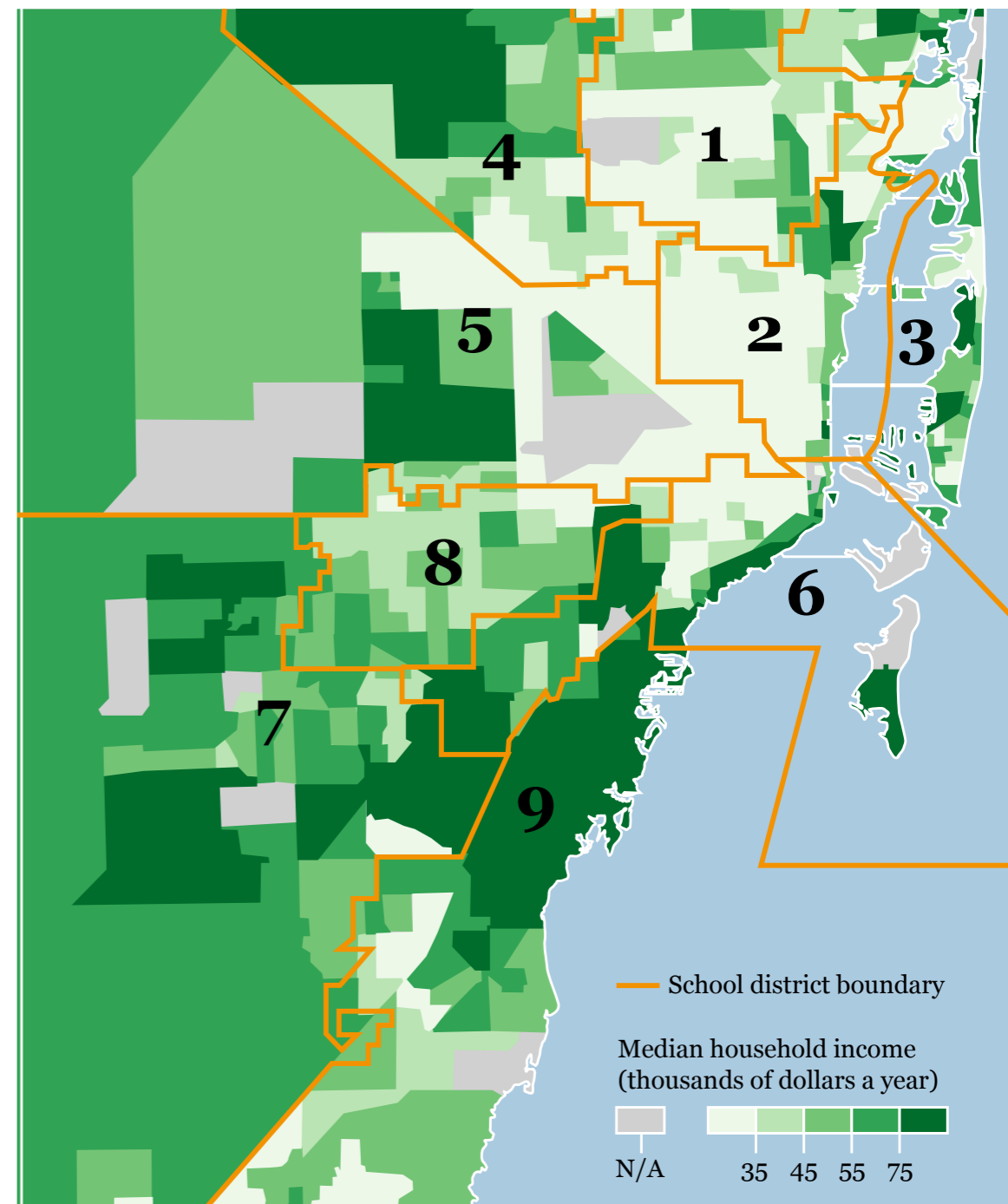
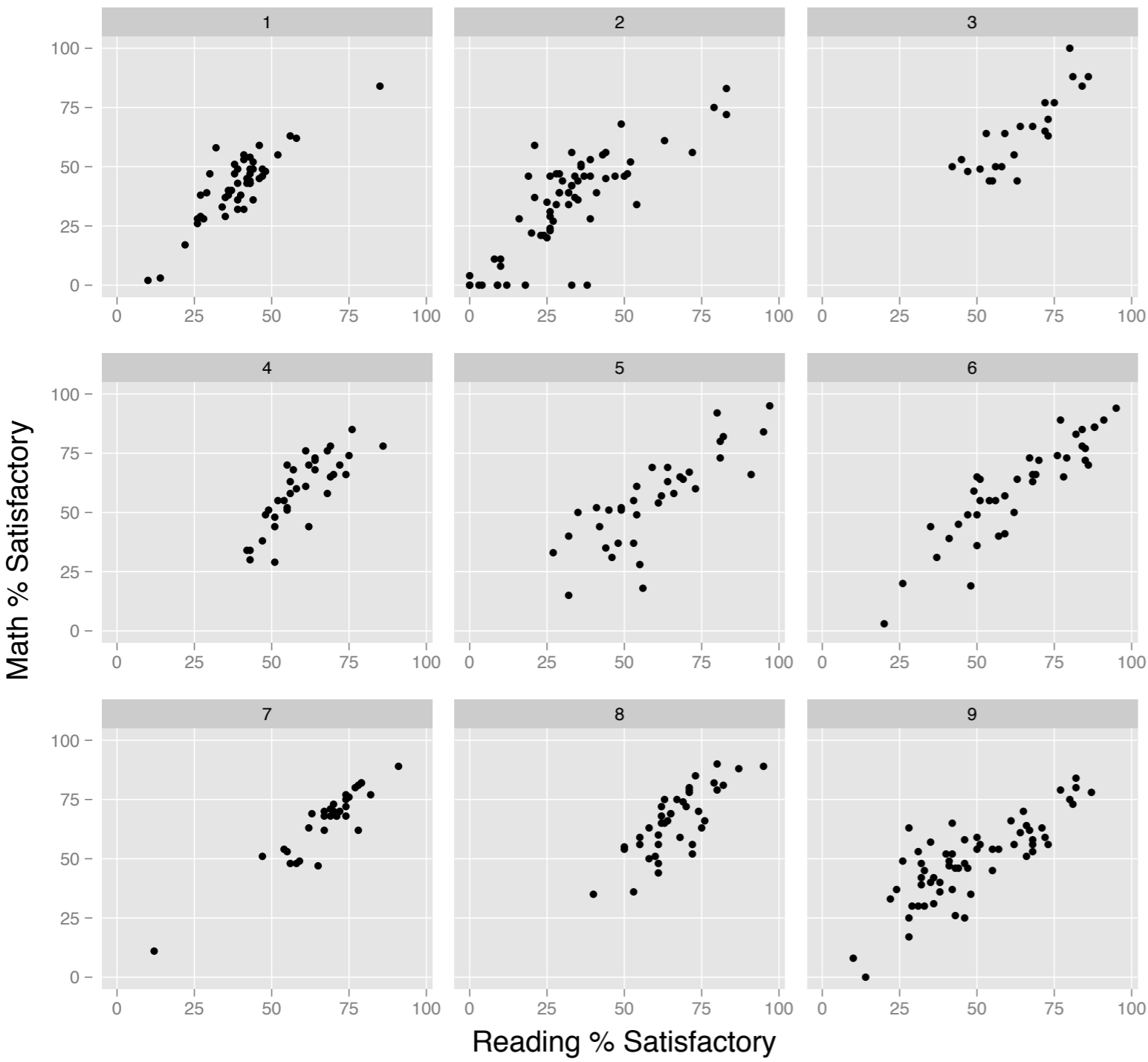
Why no students pass reading tests in these schools?





○ Potential interesting clues
→





More and more tools —many of them free and easy to use

the functional art
alberto cairo's weblog on visualization, infographics, and data journalism

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Wednesday, April 25, 2018

Visualization myths: Henry Beck and the London Underground map

Human nature dictates that whenever we group, we start devising a shared identity, bonding around imaginary heroes, myths, and legends. Visualization, infographics, and data journalism aren't exceptions. Years ago, I wrote about the myths surrounding **John Snow's undeniable achievements**, and I often need to point out that most visualizations that look very innovative have precedents. **It happened just yesterday with one of my graphics**. Perhaps it's because I've always been skeptical of nationalisms and other strong identities that I prefer my myths and heroes to exist exclusively in the movies and novels I enjoy **watching** and **reading**.

This morning I discovered another possible myth. I guess you're all familiar with **Henry Beck's 1933 London Underground map**. We've learned that it's a landmark in the history of information design thanks to **books, articles,** and talks (including mine), but it turns out that the story is —as it often

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NEW BOOK AVAILABLE

the truthful art
data, charts, and maps for communication

<http://www.thefunctionalart.com/p/instructors-guide.html>

Turning the Tide

New Directions in Health Communication

Mars Exploration Rover: Misión a Marte

Egipcia

El calamar gigante

Cassini-Huygens: cita con Saturno

Los portaaviones clase "Nimitz"

Mesacre en Madrid

La presa de las Tres Gargantas

Tiro con arco

Tiroteo en Ciudad Lineal

DIAGRAM NEWS IN PERSPECTIVE

Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

Alberto Cairo, Francisco Lima, Marco Vergatti

PRELIMINARY DATA FROM THE 2010 CENSUS creates an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew at an average 1.2% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy social security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables of play in this story.

1 BRAZIL'S POPULATION IS BIGGER

The 2010 Census has revealed a 9.4% population increase between 2000 and 2010. The differences between states, as you can see on the chart on the right, are noticeable. Most rich states, such as São Paulo and Rio, didn't grow as fast as the ones in the north east.

State	2000	2010	Change
AP	475,132	648,823	36.8%
MS	3,461,897	4,261,494	23.1%
MT	3,070,006	3,767,085	22.8%
DF	2,494,646	3,488,829	20.0%
PA	3,392,387	3,668,384	20.0%
AM	3,392,387	3,591,773	18.3%
TO	1,383,698	1,570,838	18.3%
MT	3,094,332	2,894,822	16.8%
GO	5,592,238	5,849,428	16.8%
RR	2,479,009	2,699,206	16.7%
SE	5,883,880	6,428,864	16.4%
ES	3,583,436	3,984,247	16.4%
MA	3,514,776	4,409,340	18.7%
PR	2,776,782	2,928,498	18.4%
SC	3,276,787	3,583,829	18.3%
CE	5,499,893	5,980,087	10.3%
AL	2,823,421	3,096,884	9.6%
PI	3,057,232	3,381,776	8.0%
PE	4,844,646	4,744,422	6.0%
AC	4,844,646	4,988,422	4.0%
RO	718,422	824,422	7.0%
SP	31,921,492	39,924,508	7.0%
RS	9,592,492	10,244,727	7.4%
MG	19,992,492	20,992,000	7.0%
BA	14,221,232	15,024,226	6.0%
CE	10,771,232	11,628,226	6.0%
DF	2,823,421	3,096,884	9.6%
AP	475,132	648,823	36.8%

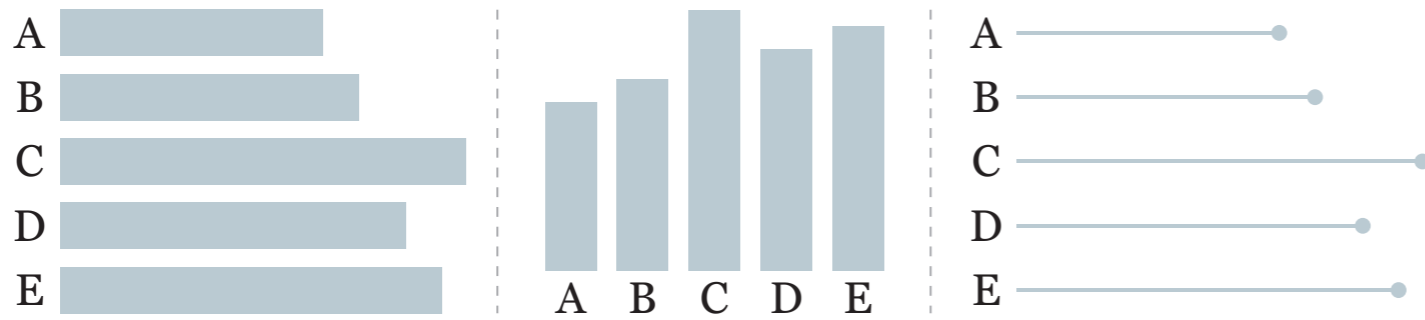
AVERAGE: +9.4%

Data updated on November 4, 2010
The map shows the change in population in Brazilian municipalities between 2000 and 2010. 1,670 cities and towns, from a total of 5,486, lost population. Rio Grande do Sul is the state with the largest number of municipalities that lost inhabitants, due to a significant drop in fertility rates and domestic migration.

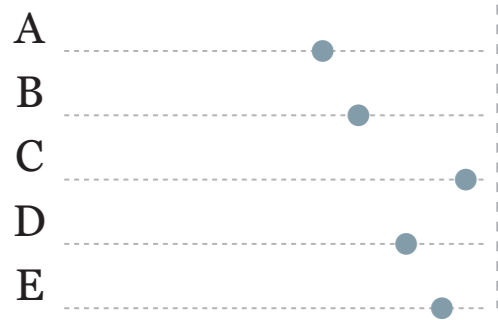
Sources: IBGE, UN World Bank, César Marques (UNICAMP)

CHOOSING THE RIGHT VISUALIZATION

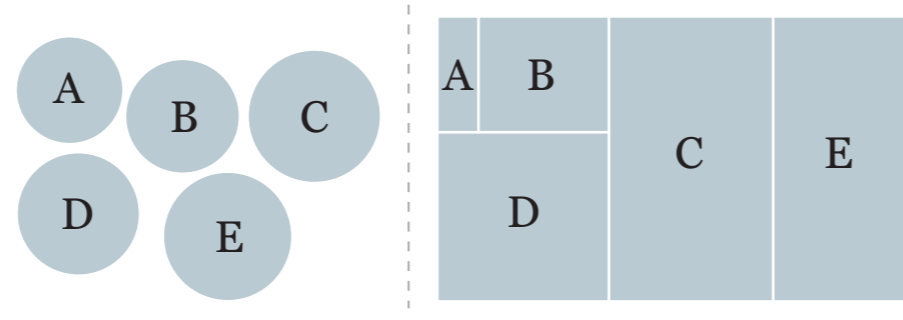
Length or height



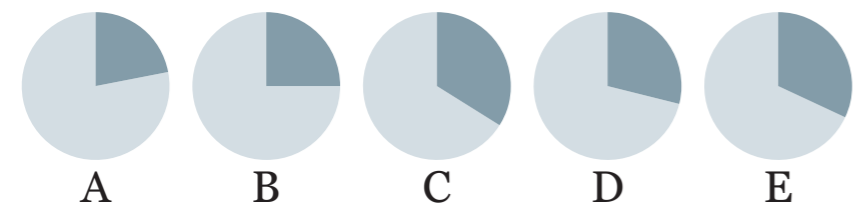
Position



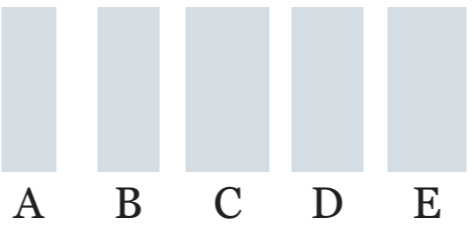
Area



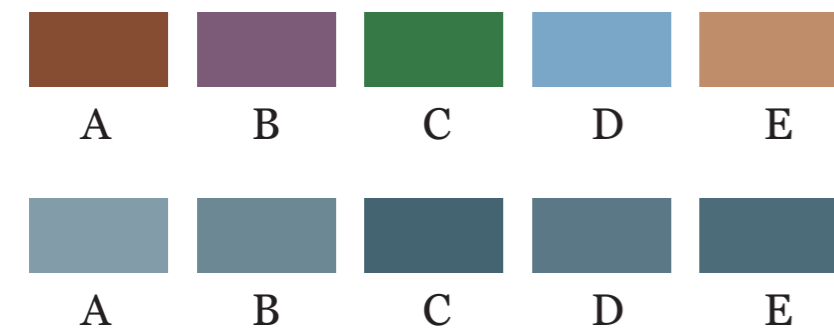
Angle/area



Line weight



Hue and shade



Figures represented
in all these graphics:
22%, 25%, 34%, 29%, 32%

Visual encoding

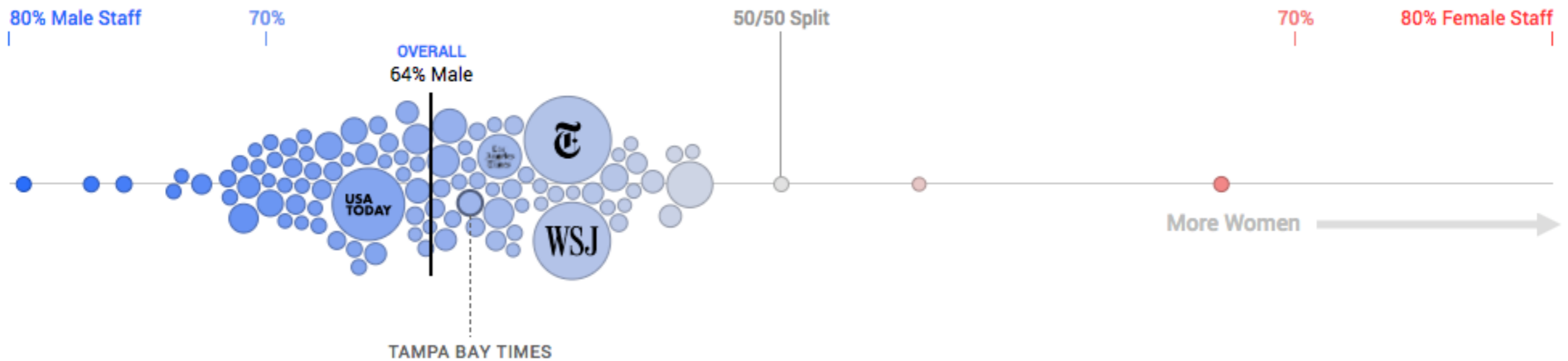
What methods of encoding can you spot here?

AMERICAN SOCIETY of NEWS EDITORS

The Diversity of US Newsrooms

The Newsroom Employment Diversity Survey measures the percentage of women and minorities working in newsrooms nationwide.

▶ Start Tour 1 2 3 4 5



In Partnership
Google News Lab

FILTER

Gender

Race

Find a Newsroom

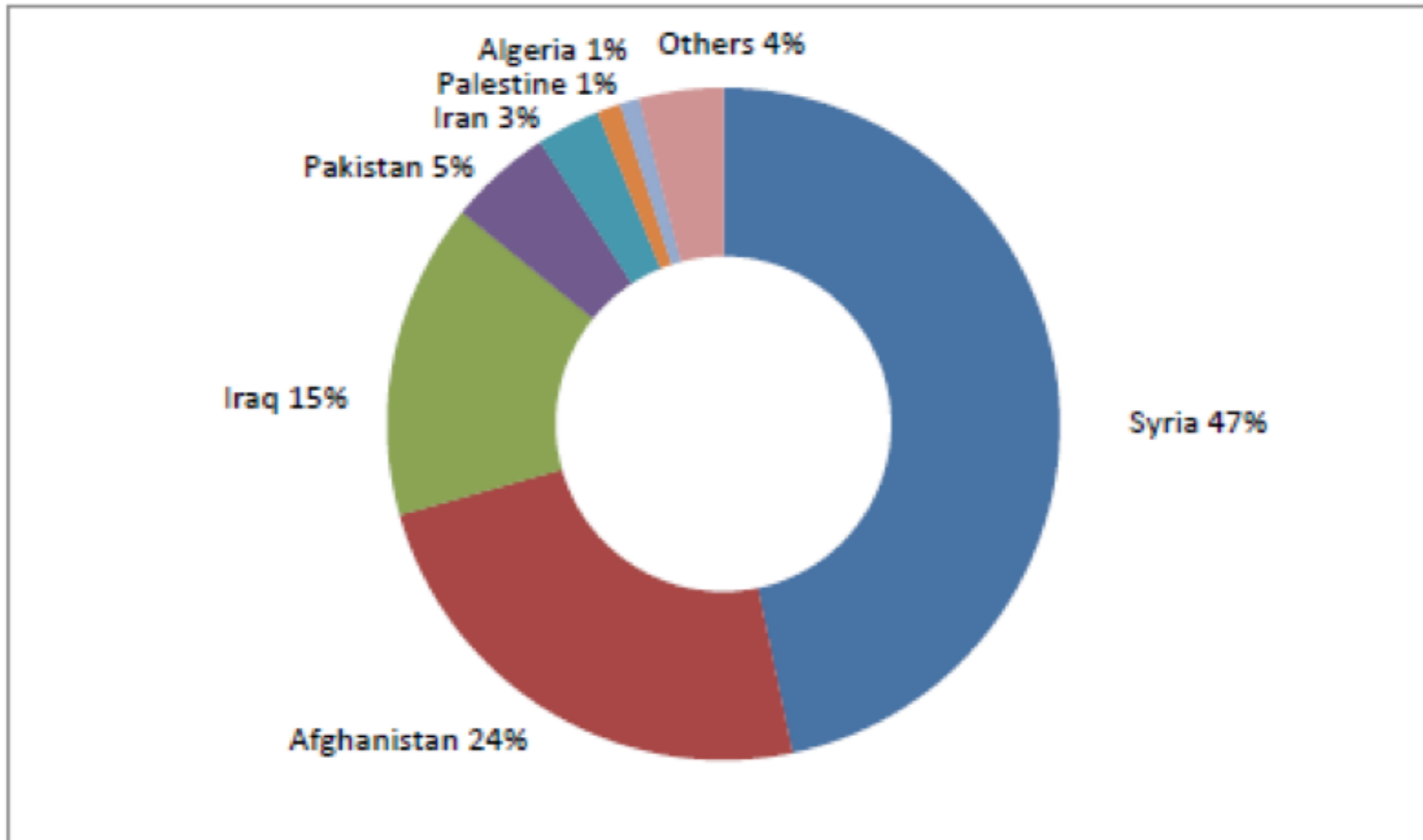
Source: ASNE Survey, 2017
At least 50 staff

<https://polygraph-cool.github.io/asne/dev/>

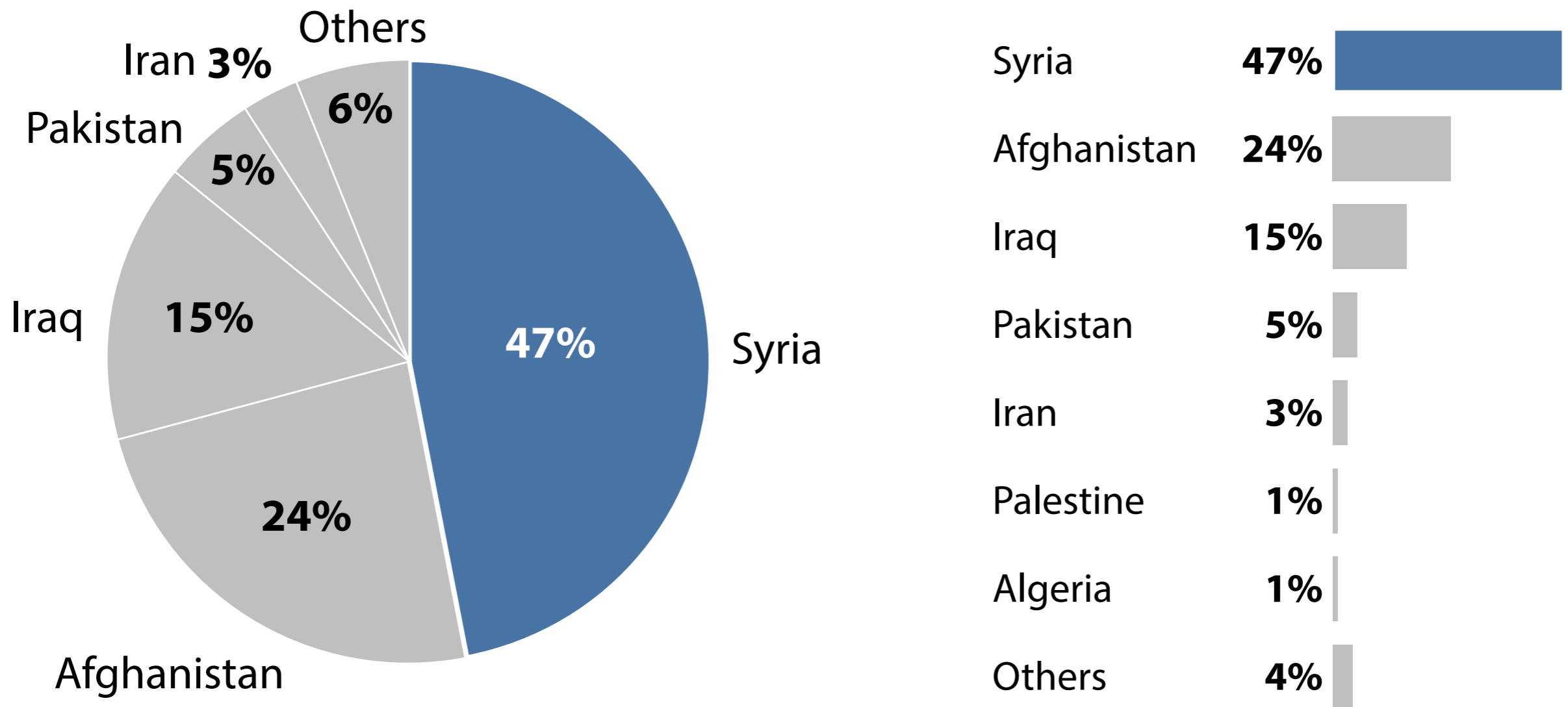
Always think about the purpose of a graphic

Figure 2 - Main nationalities of arriving migrants – 2016

Greece



Always think about the purpose of a graphic



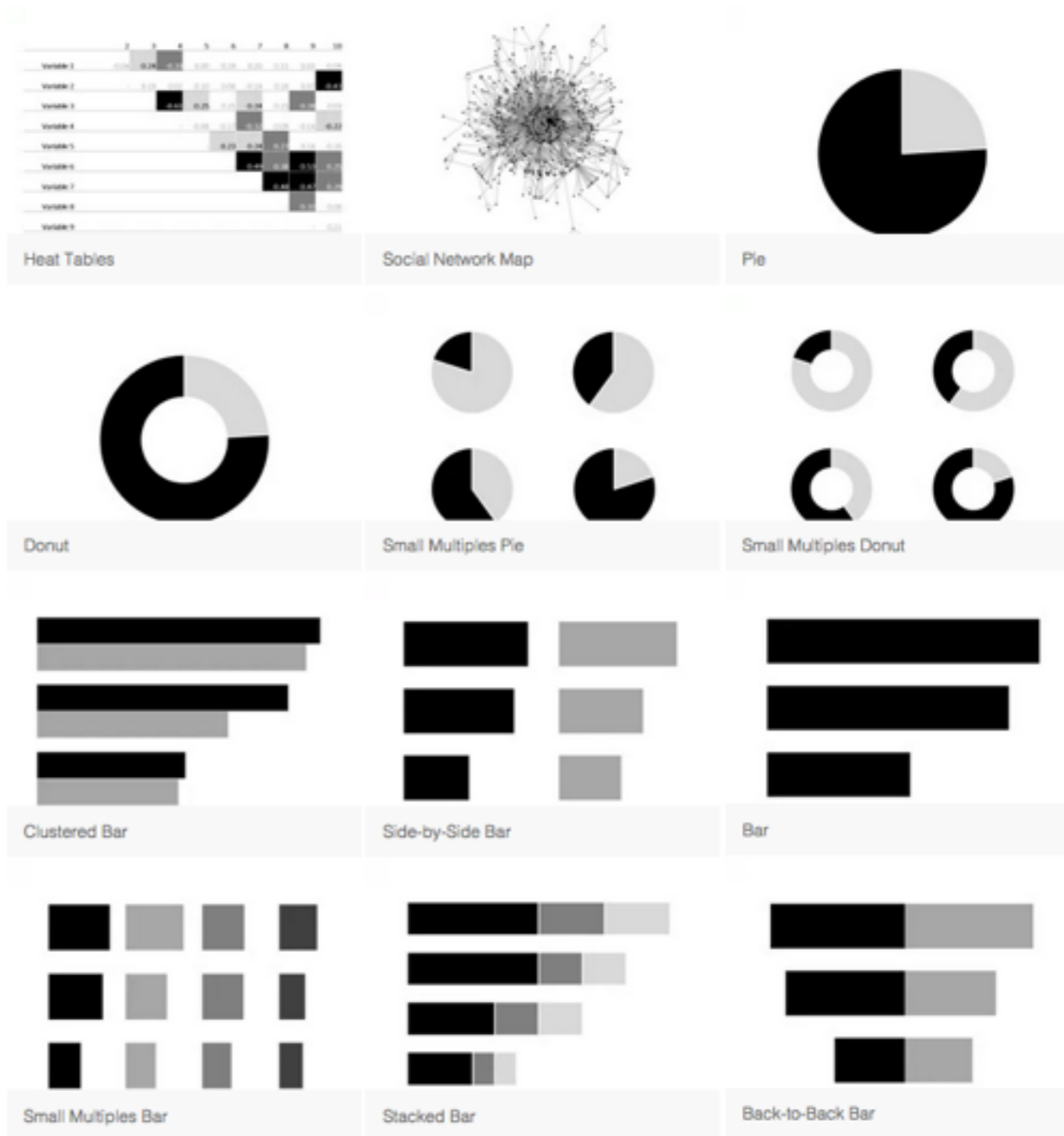
Search by Function

View by List



EMERY'S ESSENTIALS Chart Choosing Tool

ALL / SMALL MULTIPLES / COMPARING 2 OR MORE CATEGORIES / RANGES OR DISPERSION / PART TO WHOLE / DO-ABLE IN EXCEL / GEOGRAPHIC MAPS / RELATIONSHIPS / COLLAGES / QUALITATIVE / EXPLORATORY / CORRELATION / 1 POINT IN TIME / 2 POINTS IN TIME / 3+ POINTS IN TIME



<http://www.datavizcatalogue.com/>

<http://annkemery.com/essentials/>

Deviation	Correlation	Ranking	Distribution	Change over Time	Part-to-whole	Magnitude	Spatial	Flow	
<p>Deviation</p> <p>Emphasize variations (or show a fixed reference point). Usually the reference point is zero but it can also be a large or a long term average. Can also be used to show sentiment (positive/negative/neutral).</p> <p>Example FT uses</p> <p>Trade capture/loss, share change</p> <p>Emerging bar</p> <p>A single standard bar chart that can handle both negative and positive magnitude values.</p> <p>Emerging stacked bar</p> <p>Perfect for presenting turning points which involve sentiment (eg. diagnostic/medical agents).</p> <p>Spline chart</p> <p>Splits a single value into 2 connecting components (eg. mechanical agents).</p> <p>Sankey/stacked filled bar</p> <p>The stacked area of these charts allows a better view of changes in a series or a balance between two series.</p>	<p>Correlation</p> <p>Show the relationship between two or more variables. Be careful that unless you tell them otherwise, many readers will assume the relationships you show them to be causal (ie. one causes the other).</p> <p>Example FT uses</p> <p>Inflation & unemployment, income & life expectancy</p> <p>Scatterplot</p> <p>The standard way to show the relationship between two continuous variables, each of which has its own axis.</p> <p>Line + column</p> <p>A good way of showing the relationship between an amount (columns) and a rate (line).</p> <p>Connected scatterplot</p> <p>Usually used to show the relationship between 2 variables along a single axis.</p> <p>Bubble</p> <p>Use a scatterplot but add additional detail by using the circles according to a third variable.</p> <p>FT heatmap</p> <p>A good way of showing the performance between 2 categories of data, but good at showing the differences in amounts.</p>	<p>Ranking</p> <p>Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the items of interest.</p> <p>Example FT uses</p> <p>Health, education, league tables, sustainability election results</p> <p>Ordered bar</p> <p>Standard bar charts display the rates of values much more easily when sorted into order.</p> <p>Ordered column</p> <p>See above.</p> <p>Ordered proportional symbol</p> <p>Use when there are big variations between values and/or using two different measures (columns) and a rate (line).</p> <p>Dot strip plot</p> <p>Used when in order on a strip and a space-efficient method of displaying multiple categories.</p> <p>Flow</p> <p>Perfect for showing how values have changed over time or vary between categories.</p> <p>Leaflet chart</p> <p>Useful when there are more than 20 data points and you want to show the distribution of values.</p>	<p>Distribution</p> <p>Show values in a dataset and how often they occur. These can be absolute or relative values. The latter is a distribution. It can be a histogram or a bar chart. The latter is a distribution. It can be a histogram or a bar chart. The latter is a distribution. It can be a histogram or a bar chart.</p> <p>Example FT uses</p> <p>Income distribution, population (aged) distribution</p> <p>Histogram</p> <p>The standard way to show a statistical distribution. Using the gaps between columns can help to highlight the shape of the data.</p> <p>Boxplot</p> <p>Summarize multiple distributions by showing the median, quartiles and range of the data.</p> <p>Violin plot</p> <p>Similar to a box plot but more effective with complex distributions. It also shows the density of the data.</p> <p>Population pyramid</p> <p>A standard way of showing the age and sex breakdown of a population. It can be used to show the distribution of values across multiple categories.</p> <p>Dot strip plot</p> <p>Good for showing individual values in a distribution. Can be a problem when there are many data points in the same value.</p> <p>Dot plot</p> <p>A simple way of showing the change of value (horizontal) and categories (vertical).</p> <p>Barcode plot</p> <p>Use dot strip plots, good for showing the distribution of the data in a way that works best when highlighting individual values.</p> <p>Cumulative curve</p> <p>A good way of showing how a distribution is built up. It is a smooth curve that shows the cumulative distribution function.</p>	<p>Change over Time</p> <p>Use to show changes in values over time. These can be absolute or relative values. The latter is a distribution. It can be a histogram or a bar chart. The latter is a distribution. It can be a histogram or a bar chart.</p> <p>Example FT uses</p> <p>Share price movements, economic time series</p> <p>Line</p> <p>The standard way to show a changing time series. If data are complex, consider markers to represent data points.</p> <p>Column</p> <p>Columns work well for showing change over time, but usually best with only one series of data at a time.</p> <p>Line + column</p> <p>A good way of showing the relationship over time between two variables (columns) and a rate (line).</p> <p>Stacked area</p> <p>Usually focused on showing the change in value over time. These charts show the composition and follow points of each data.</p> <p>Area chart</p> <p>Use with care - these are good at showing changes to total, but can be difficult to interpret when there are many data series.</p> <p>Bar chart (grouped)</p> <p>Use to show the composition of a total. Usually the further the bars are from the baseline, the more important they are.</p> <p>Connected scatterplot</p> <p>A good way of showing changing data for two variables whenever there is a primary clear pattern of progression.</p> <p>Calendar heatmap</p> <p>A good way of showing temporal patterns. Usually, months, quarters, or years are on the x-axis and the y-axis is the value of the data.</p> <p>Priority heatmap</p> <p>Good when data and duration are key elements of the data in the data.</p> <p>Circle heatmap</p> <p>Good for showing discrete values of varying size across multiple categories. Can be used to show the composition of a total.</p> <p>Sankey</p> <p>Another alternative to the circle heatmap for showing series where there are big variations in the data.</p>	<p>Change over Time</p> <p>Use to show changes in values over time. These can be absolute or relative values. The latter is a distribution. It can be a histogram or a bar chart. The latter is a distribution. It can be a histogram or a bar chart.</p> <p>Example FT uses</p> <p>Share price movements, economic time series</p> <p>Line</p> <p>The standard way to show a changing time series. If data are complex, consider markers to represent data points.</p> <p>Column</p> <p>Columns work well for showing change over time, but usually best with only one series of data at a time.</p> <p>Line + column</p> <p>A good way of showing the relationship over time between two variables (columns) and a rate (line).</p> <p>Stacked area</p> <p>Usually focused on showing the change in value over time. These charts show the composition and follow points of each data.</p> <p>Area chart</p> <p>Use with care - these are good at showing changes to total, but can be difficult to interpret when there are many data series.</p> <p>Bar chart (grouped)</p> <p>Use to show the composition of a total. Usually the further the bars are from the baseline, the more important they are.</p> <p>Connected scatterplot</p> <p>A good way of showing changing data for two variables whenever there is a primary clear pattern of progression.</p> <p>Calendar heatmap</p> <p>A good way of showing temporal patterns. 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If the reader's interest is solely in the size of the components, consider a magnitude stacked chart.</p> <p>Example FT uses</p> <p>Plant budgets, company structures, national election results</p> <p>Stacked column</p> <p>A simple way of showing part-to-whole relationships that can be difficult to read with more than a few components.</p> <p>Proportional stacked bar</p> <p>A good way of showing the size and proportion of data at the same time - as long as the data are not too complicated.</p> <p>Pie</p> <p>A common way of showing part-to-whole data - but be aware that it's difficult to accurately compare the size of the segments.</p> <p>Donut</p> <p>Similar to a pie chart - but the center can be a good way of highlighting specific data points.</p> <p>Treemap</p> <p>Use for hierarchical data. Part-to-whole relationships can be difficult to read when there are many small segments.</p> <p>Waffle</p> <p>A way of forming part-to-whole relationships. The segments are each a square and the size is proportional to the value.</p> <p>Radial</p> <p>Another way of showing hierarchical part-to-whole relationships. Use sparingly if at all for data visualization.</p> <p>Arc</p> <p>A formula often used for visualizing part-to-whole relationships.</p> <p>Gridplot</p> <p>Good for showing & information. They work best when used in whole numbers and with only a few categories.</p> <p>Yarn</p> <p>Generally only used for categorical relationships.</p> <p>Waterfall</p> <p>Can be useful for showing part-to-whole relationships where some of the components are negative.</p>	<p>Magnitude</p> <p>Show size comparisons. These can be absolute or relative values. The latter is a distribution. It can be a histogram or a bar chart. The latter is a distribution. It can be a histogram or a bar chart.</p> <p>Example FT uses</p> <p>Company sales, market capitalization</p> <p>Column</p> <p>The standard way to compare the size of things. Their exact value is not as important as the relative size of the bars.</p> <p>Bar</p> <p>See above. Good when the data are not too complex and there are few categories.</p> <p>Point column</p> <p>A common standard column but allows for multiple series. Can be used to compare data with more than 2 series.</p> <p>Point bar</p> <p>See above.</p> <p>Proportional stacked bar</p> <p>A good way of showing the size and proportion of data at the same time - as long as the data are not too complicated.</p> <p>Proportional symbol</p> <p>Use when there are big variations between values and/or using two different measures (columns) and a rate (line).</p> <p>Large (grouped)</p> <p>Excellent solution in some instances - use only with whole numbers. Do not use if at all to represent a dataset.</p> <p>Leaflet chart</p> <p>Leaflet charts show more attention to the data value than standard bar charts - does not hide or split at zero (but preferred).</p> <p>Water chart</p> <p>A space-efficient way of showing value of multiple variables, but make sure they are organized in a way that makes sense to read.</p> <p>Partial coordinates</p> <p>An alternative to water charts - again, the organization of the variables is important. Usually benefits from highlighting values.</p>	<p>Spatial</p> <p>Used only when precise locations or geographical patterns in data are more important to the reader than anything else.</p> <p>Example FT uses</p> <p>Location maps, population density, natural resource locations, natural resource distribution, settlement areas, variation in election results</p> <p>Basic choropleth (contour)</p> <p>The standard approach for putting data on a map - colour or shading values rather than lines and can be made more geographic.</p> <p>Proportional symbol (contour)</p> <p>Use for totals rather than rates - for rates, the size of the symbol will be proportional to the value.</p> <p>Flow map</p> <p>For showing movement between areas.</p> <p>Contour map</p> <p>For showing areas of equal value on a map. Can use different colors/shades for showing 10 values.</p> <p>Equalized choropleth</p> <p>Smoothing each cell in a map to a regular and equal-sized shape - good for representing values ranging with most values.</p> <p>Equalized choropleth (dot)</p> <p>Smoothing and printing a map so that each area is equal according to a particular value.</p> <p>Dot density</p> <p>Used to show the location of individual manufacturing - make sure to present the data in a way that makes sense.</p> <p>Heat map</p> <p>Good for showing areas of high value. Use sparingly with an irregular shape. Use sparingly with an irregular shape.</p>	<p>Flow</p> <p>Show the order, volume or intensity of movement between two or more states or conditions. These might be logical resources or geographical locations.</p> <p>Example FT uses</p> <p>Movement of funds, trade, migration, security, information, relationship graphs</p> <p>Sankey</p> <p>Shows changes in flows from one condition to another. Good for tracing the overall outcome of a complex process.</p> <p>Waterfall</p> <p>Designed to show the sequencing of data through a series of steps. Usually, budgets, forecasts, cumulative or components.</p> <p>Chord</p> <p>A complex but powerful diagram which can illustrate relationships between nodes in a network.</p> <p>Network</p> <p>Used for showing the strength and other characteristics of relationships between nodes.</p>

Visual vocabulary

Designing with data

There are so many ways to visualise data - how do we know which one to pick? Use the categories across the top to decide which data relationship is most important in your story, then look at the different types of chart within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

FT graphic: Alan Watts (Creative Commons), Ian Tomlin (Creative Commons), Tomlin (Creative Commons), Paul McCullough (Creative Commons), Tomlin (Creative Commons), Tomlin (Creative Commons)

ft.com/vocabulary



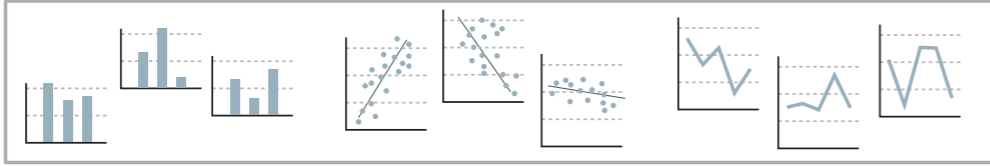
Based on Cleveland and Robert McGill (1984)

Enable accurate estimates

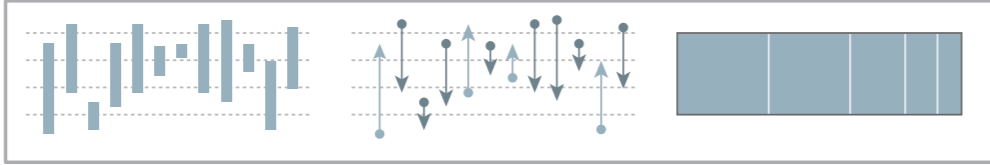
Position along a common scale



Position along identical, nonaligned scales



Length



Direction/slope



Angle



Area

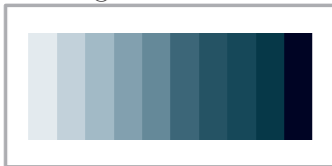


Volume



May enable general estimates

Shading and saturation



Color hue



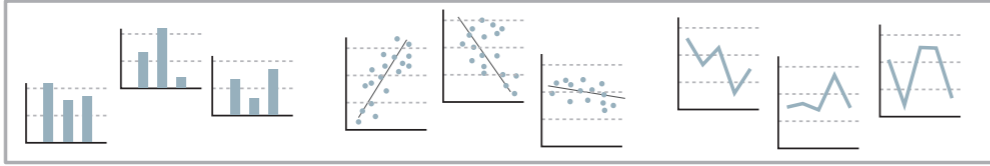
Based on Cleveland and Robert McGill (1984)

Enable accurate estimates

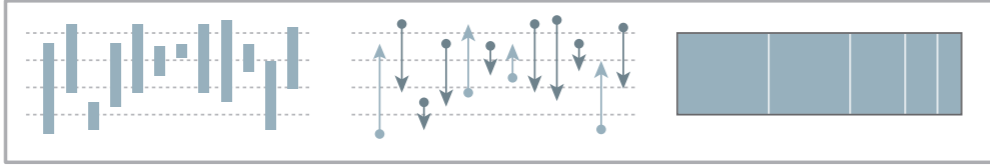
Position along a common scale



Position along identical, nonaligned scales



Length



Direction/slope



Angle



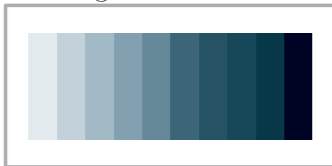
Area



Volume



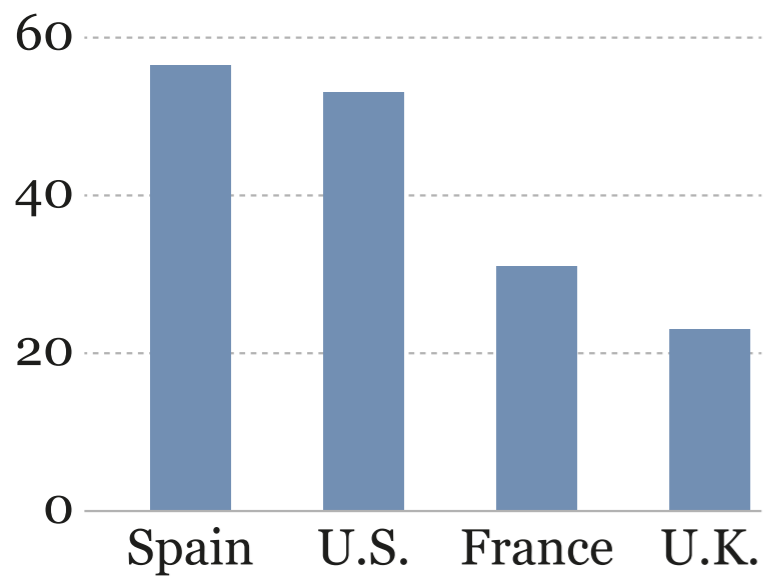
Shading and saturation



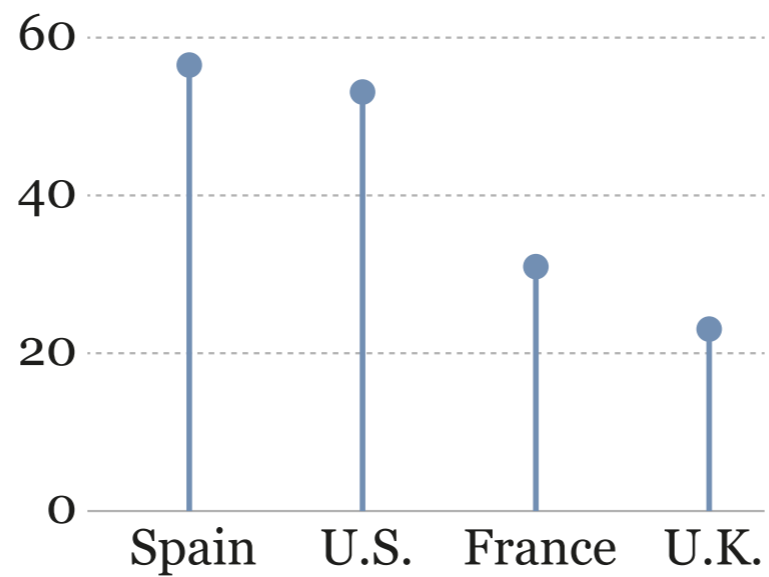
Color hue



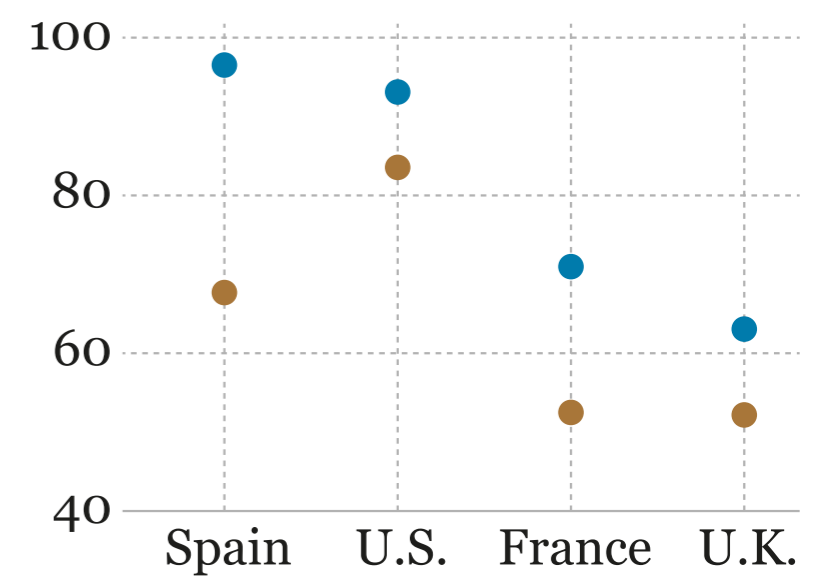
May enable general estimates



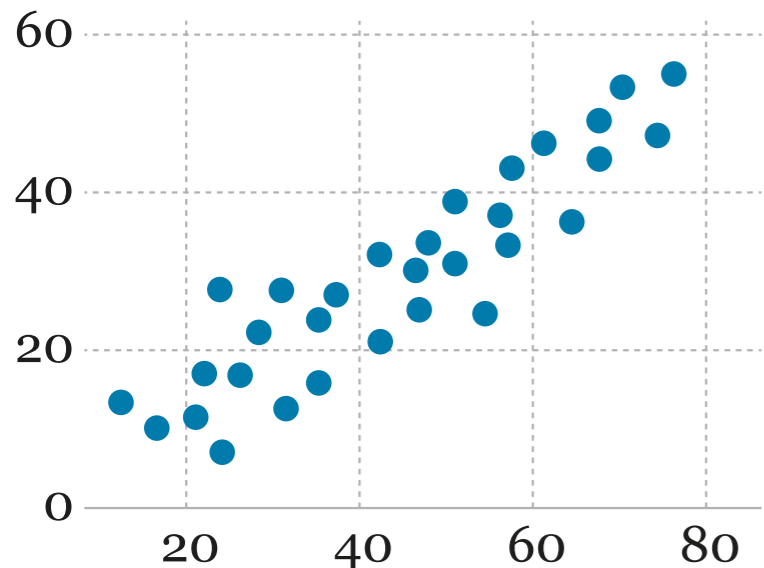
BAR CHART



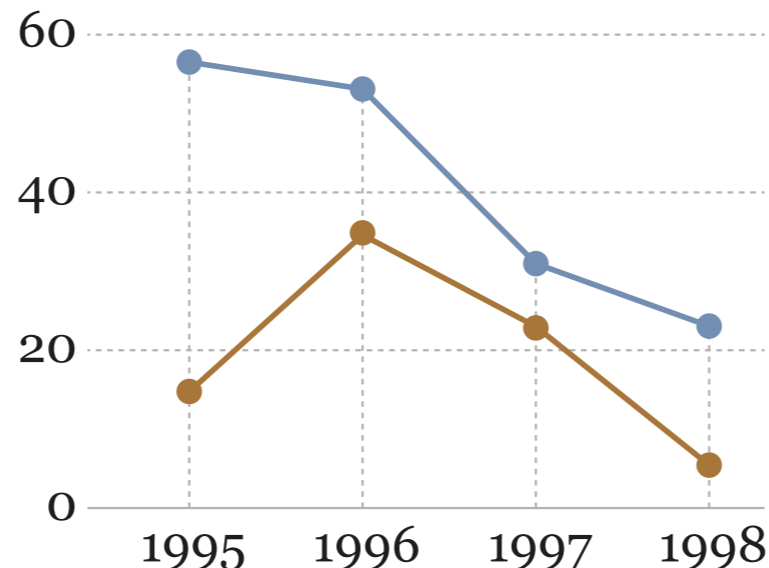
LOLLIPOP CHART



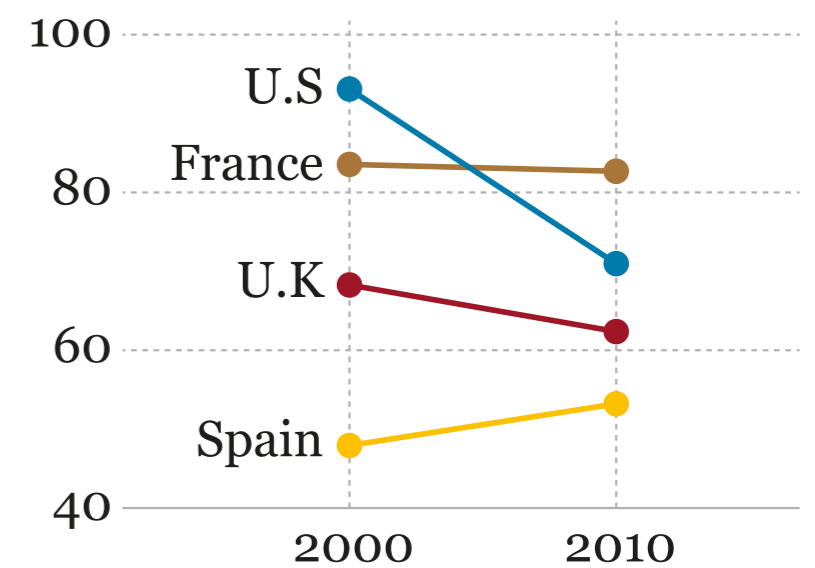
**DOT CHART
(or dot plot)**



**SCATTER CHART
(or scatter plot)**



**LINE CHART
(or time series chart)**



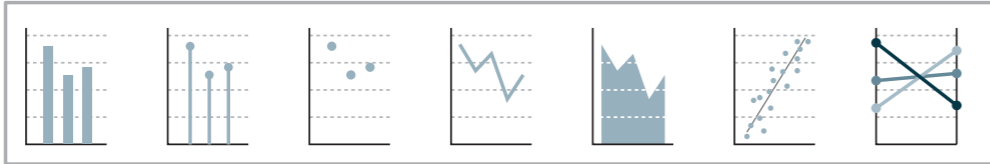
SLOPE CHART

Great for accurate judgments:
Comparisons, relationships, etc.

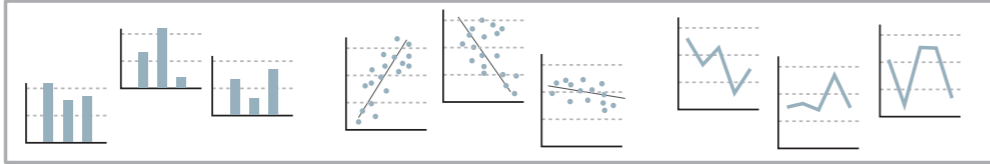
Based on Cleveland and Robert McGill (1984)

Enable accurate estimates

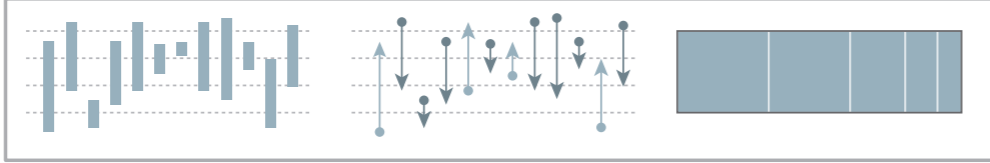
Position along a common scale



Position along identical, nonaligned scales



Length



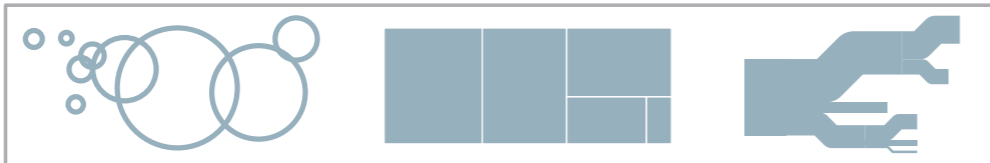
Direction/slope



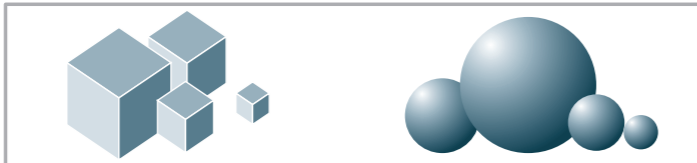
Angle



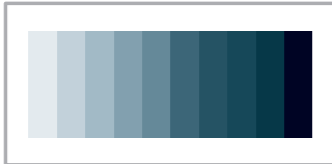
Area



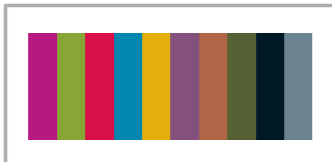
Volume



Shading and saturation



Color hue



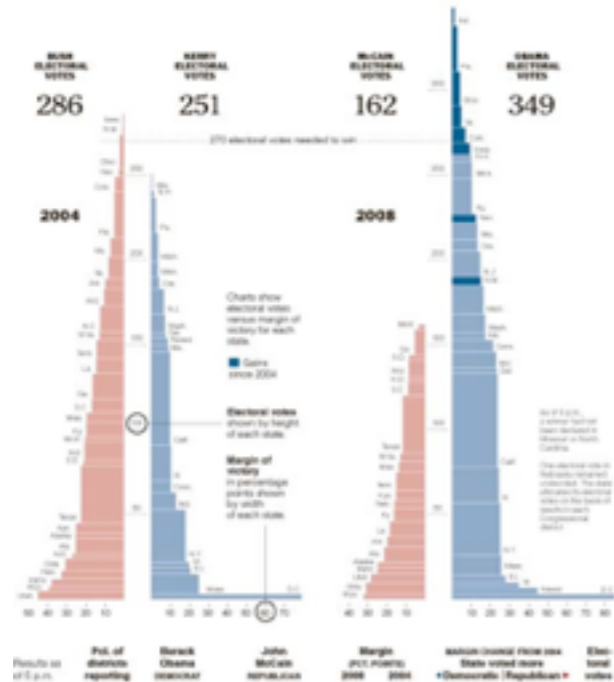
May enable general estimates

In a Decisive Victory, Obama Reshapes the Electoral Map

Barack Obama's historic win, with at least 349 electoral votes to John McCain's 162, can be attributed to his victories in several high-population states, like Florida, Virginia and Ohio, that George W. Bush won handily in 2004. The struggling economy, especially in more

industrial states, and high numbers of new voters helped flip key areas from red to blue. Even where Mr. McCain beat Mr. Obama, he won by slimmer margins, as much of the electorate — across age, race and income lines — swung toward the Democratic Party.

By Erin Aigner, Joe Berges, Braden Copeland, Matthew Ericson, Hannah Fairfield, Ford Fausen, Haegwon Park and Archie Tan



States won by Obama

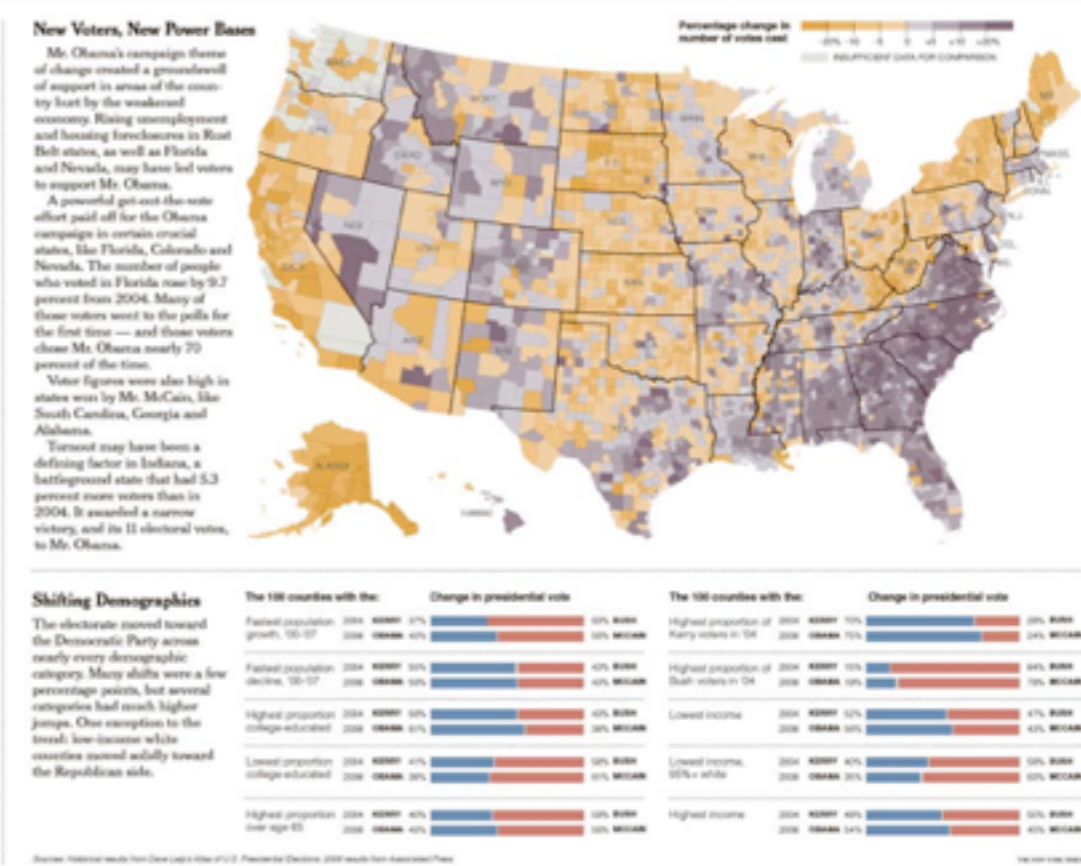
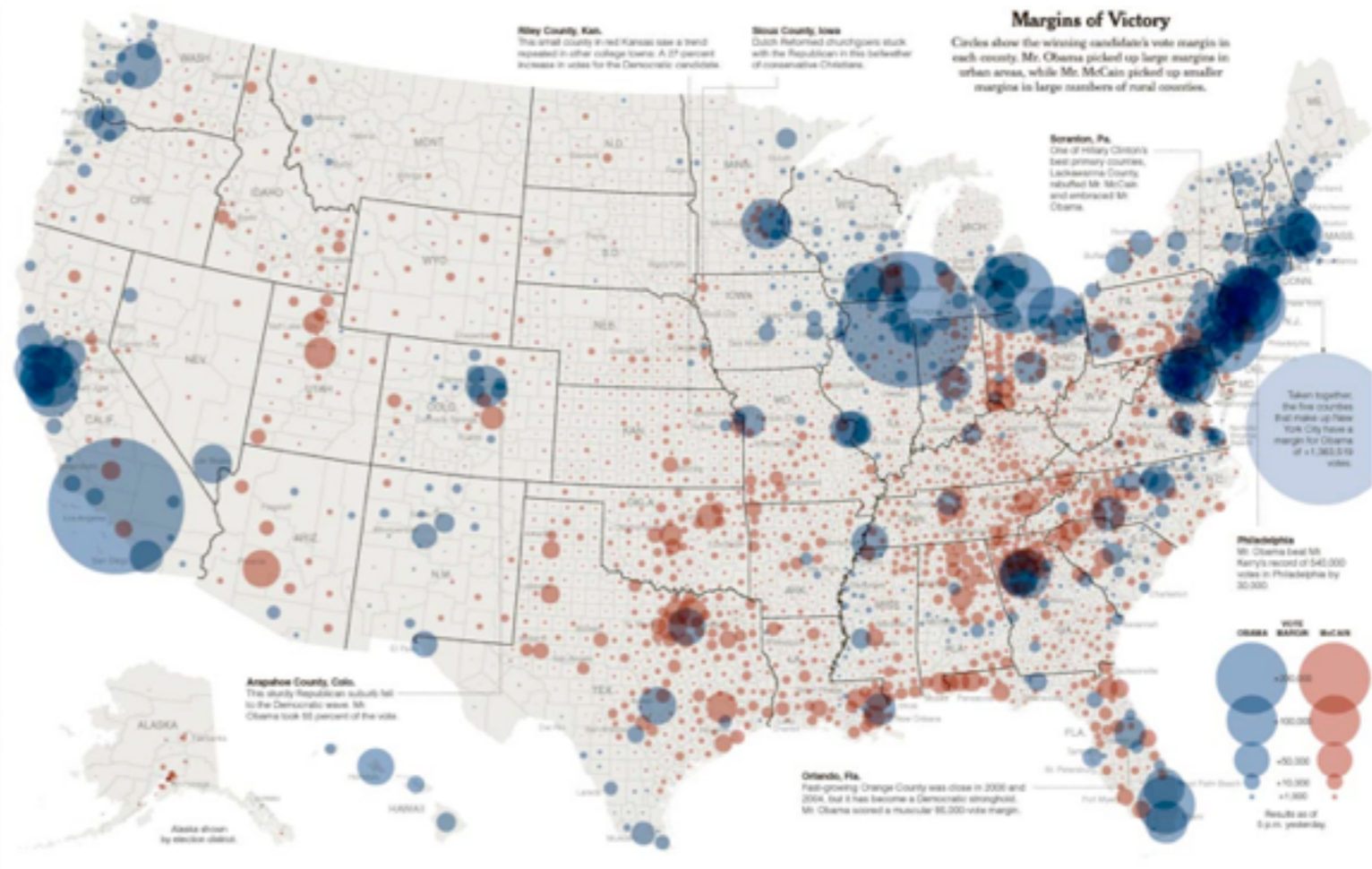
State	Obama %	Obama Elect. Votes	McCain %	McCain Elect. Votes	Change
Alaska	100%	3	0%	0	+3
Alabama	100%	9	0%	0	+9
Alaska	100%	3	0%	0	+3
Arizona	100%	6	0%	0	+6
Arkansas	100%	6	0%	0	+6
California	100%	55	0%	0	+55
Colorado	100%	9	0%	0	+9
Connecticut	100%	7	0%	0	+7
Delaware	100%	3	0%	0	+3
D.C.	100%	3	0%	0	+3
Florida	100%	27	0%	0	+27
Georgia	100%	15	0%	0	+15
Hawaii	100%	3	0%	0	+3
Idaho	100%	6	0%	0	+6
Illinois	100%	21	0%	0	+21
Indiana	100%	11	0%	0	+11
Iowa	100%	7	0%	0	+7
Kansas	100%	6	0%	0	+6
Kentucky	100%	8	0%	0	+8
Louisiana	100%	9	0%	0	+9
Maine	100%	3	0%	0	+3
Maryland	100%	10	0%	0	+10
Massachusetts	100%	11	0%	0	+11
Michigan	100%	17	0%	0	+17
Minnesota	100%	10	0%	0	+10
Mississippi	100%	6	0%	0	+6
Missouri	100%	10	0%	0	+10
Montana	100%	3	0%	0	+3
Nebraska	100%	5	0%	0	+5
Nevada	100%	6	0%	0	+6
New Hampshire	100%	3	0%	0	+3
New Jersey	100%	14	0%	0	+14
New Mexico	100%	5	0%	0	+5
New York	100%	21	0%	0	+21
North Carolina	100%	15	0%	0	+15
North Dakota	100%	3	0%	0	+3
Ohio	100%	21	0%	0	+21
Oklahoma	100%	7	0%	0	+7
Oregon	100%	7	0%	0	+7
Pennsylvania	100%	21	0%	0	+21
Rhode Island	100%	4	0%	0	+4
South Carolina	100%	7	0%	0	+7
South Dakota	100%	3	0%	0	+3
Tennessee	100%	6	0%	0	+6
Texas	100%	34	0%	0	+34
Utah	100%	5	0%	0	+5
Vermont	100%	3	0%	0	+3
Virginia	100%	13	0%	0	+13
Washington	100%	9	0%	0	+9
West Virginia	100%	5	0%	0	+5
Wisconsin	100%	10	0%	0	+10
Wyoming	100%	3	0%	0	+3
TOTAL	94%	349	6%	162	+187

States won by McCain

State	McCain %	McCain Elect. Votes	Obama %	Obama Elect. Votes	Change
North Dakota	100%	3	0%	0	+3
Nebraska	100%	5	0%	0	+5
Montana	100%	3	0%	0	+3
Utah	100%	5	0%	0	+5
South Dakota	100%	3	0%	0	+3
Idaho	100%	6	0%	0	+6
Georgia	99%	15	1%	0	+15
Texas	100%	34	0%	0	+34
Kansas	100%	6	0%	0	+6
South Carolina	100%	7	0%	0	+7
Wyoming	100%	3	0%	0	+3
Mississippi	100%	6	0%	0	+6
Alabama	100%	9	0%	0	+9
Kentucky	100%	8	0%	0	+8
Arizona	99%	5	1%	0	+5
Alaska	99%	3	1%	0	+3
Oklahoma	100%	7	0%	0	+7
West Virginia	100%	5	0%	0	+5
Tennessee	100%	6	0%	0	+6
Louisiana	100%	9	0%	0	+9
Arkansas	99%	6	1%	0	+6
Missouri	100%	10	0%	0	+10
North Carolina	100%	15	0%	0	+15
TOTAL	96%	162	4%	349	-187

No winner called

State	Obama %	Obama Elect. Votes	McCain %	McCain Elect. Votes	Change
Missouri	100%	11	0%	0	+11
North Carolina	100%	15	0%	0	+15
TOTAL	94%	26	6%	0	+26



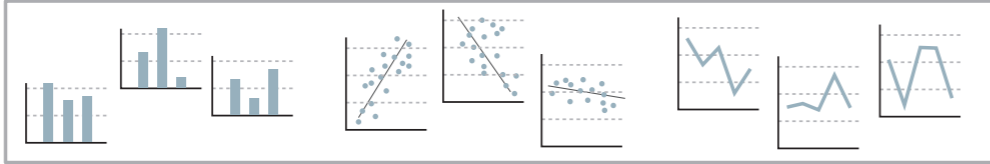
Using graphic forms erroneously

Enable accurate estimates

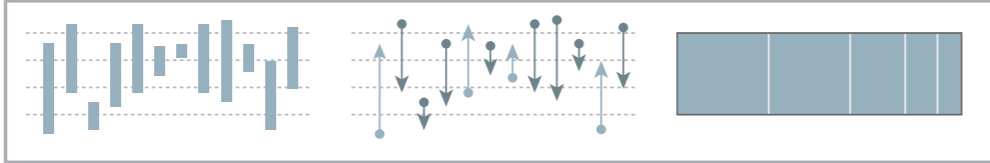
Position along a common scale



Position along identical, nonaligned scales



Length



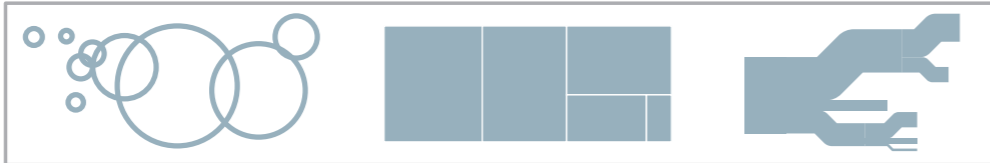
Direction/slope



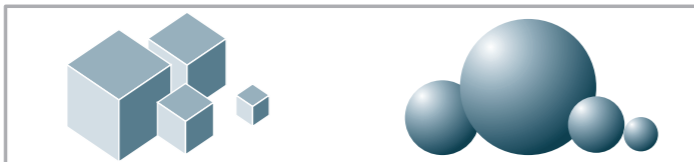
Angle



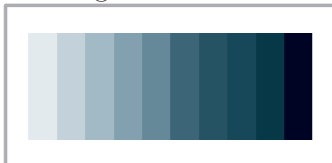
Area



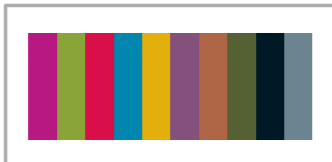
Volume



Shading and saturation



Color hue

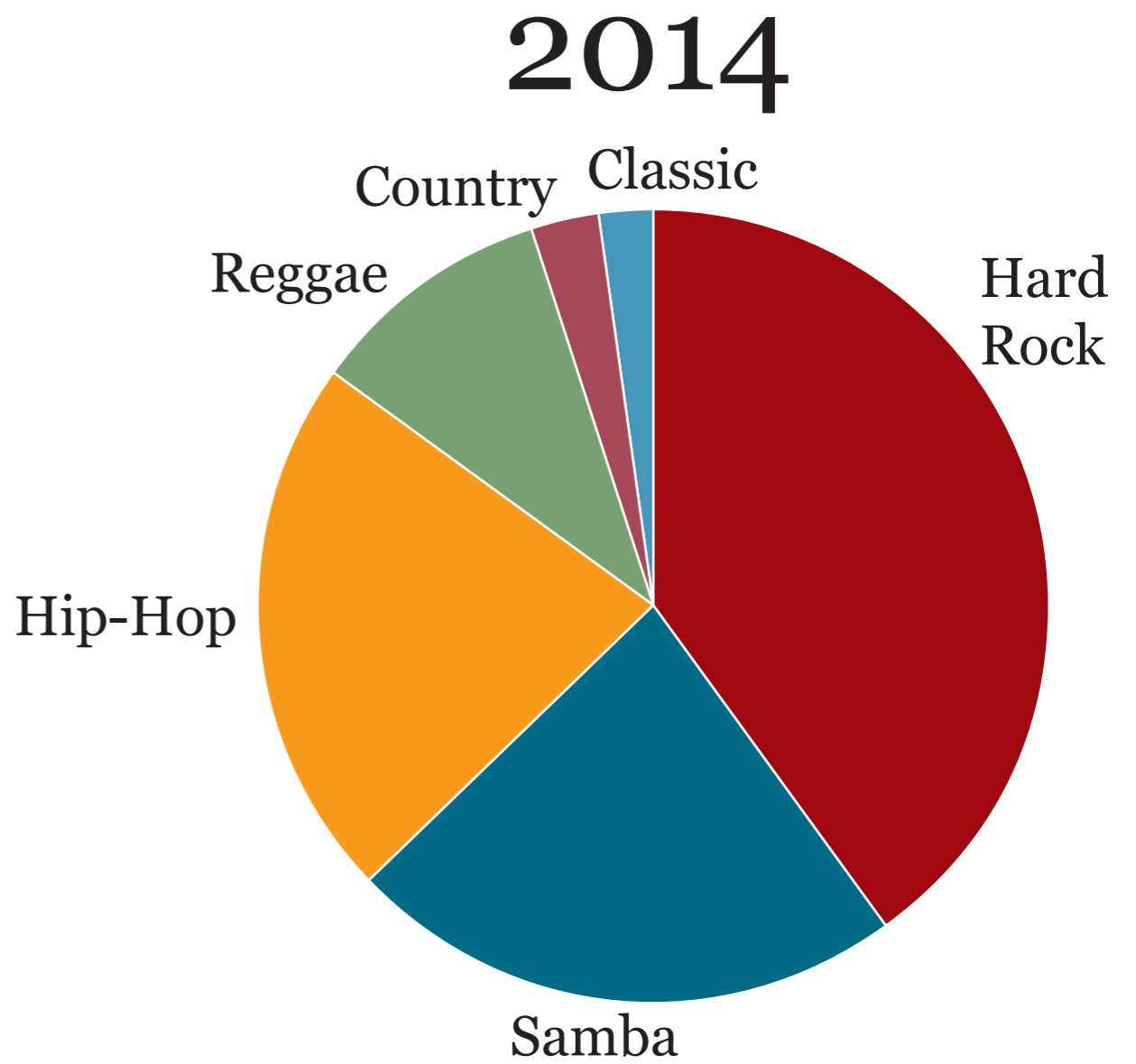
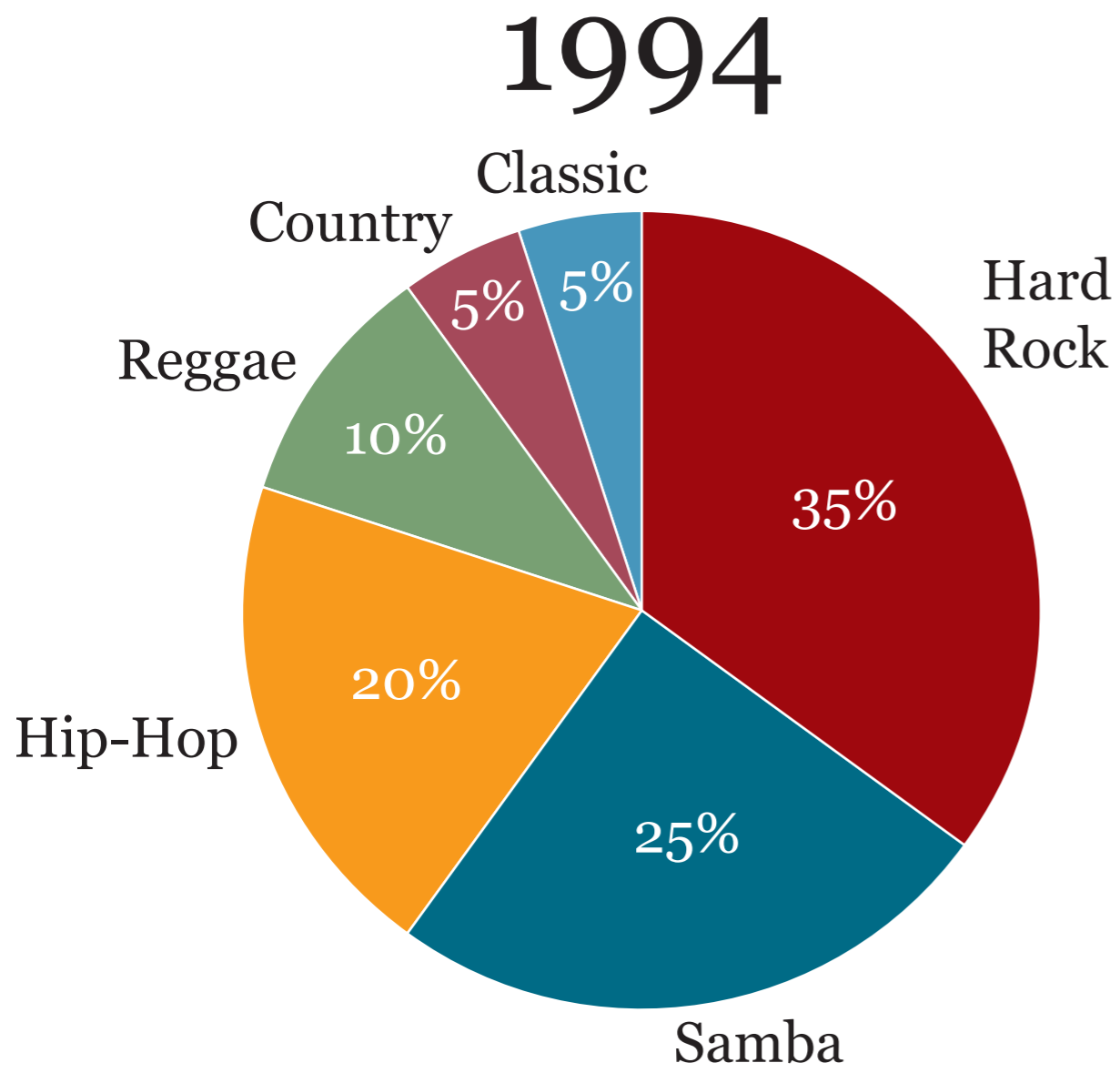


May enable general estimates

How Music Preferences Have Changed in Two Decades

Music styles preferred by University of Miami students. Survey based on interviews with 1,000 students.

SOURCE: WishfulThinkingData Inc.



How Music Preferences Have Changed in Two Decades

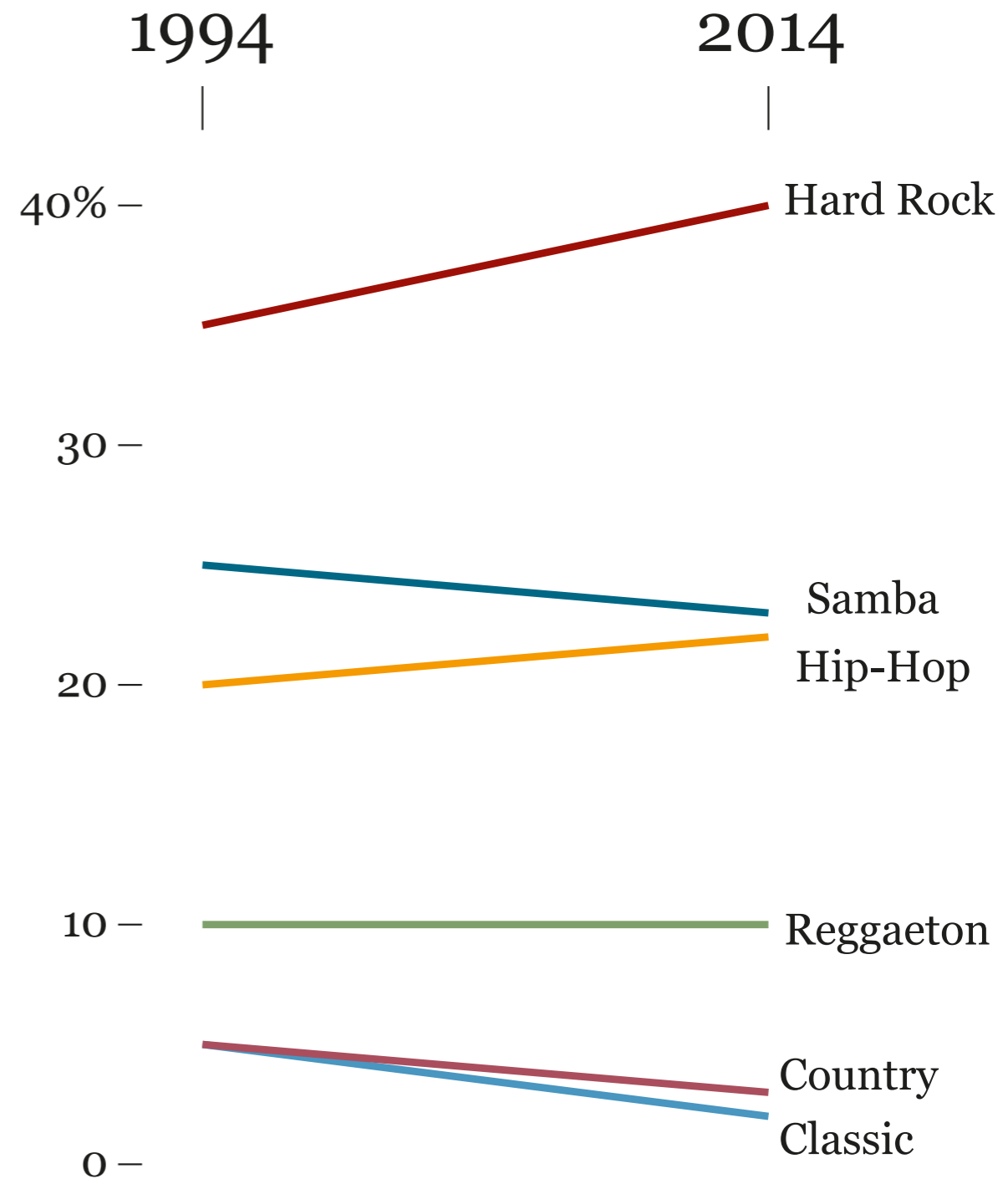
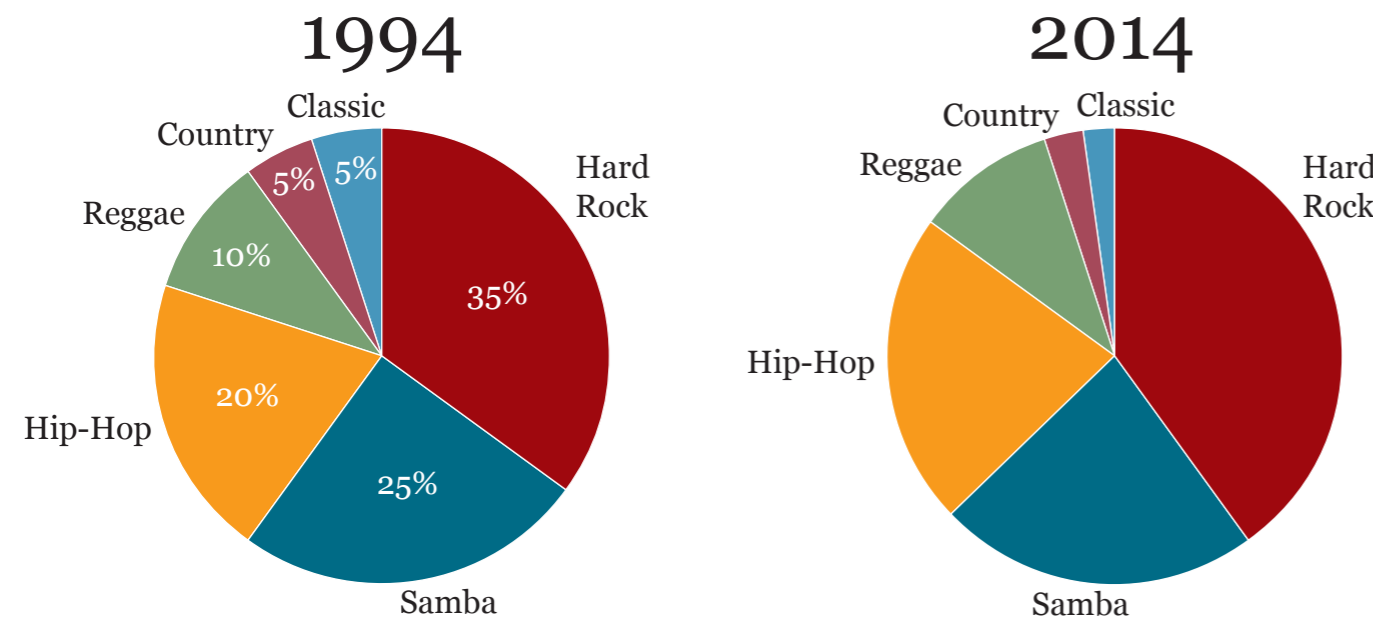
Music styles preferred by University of Miami students. Survey based on interviews with 1,000 students.

SOURCE: WishfulThinkingData Inc.

Lesson: Choice of encoding depends on tasks you want to enable

How Music Preferences Have Changed in Two Decades

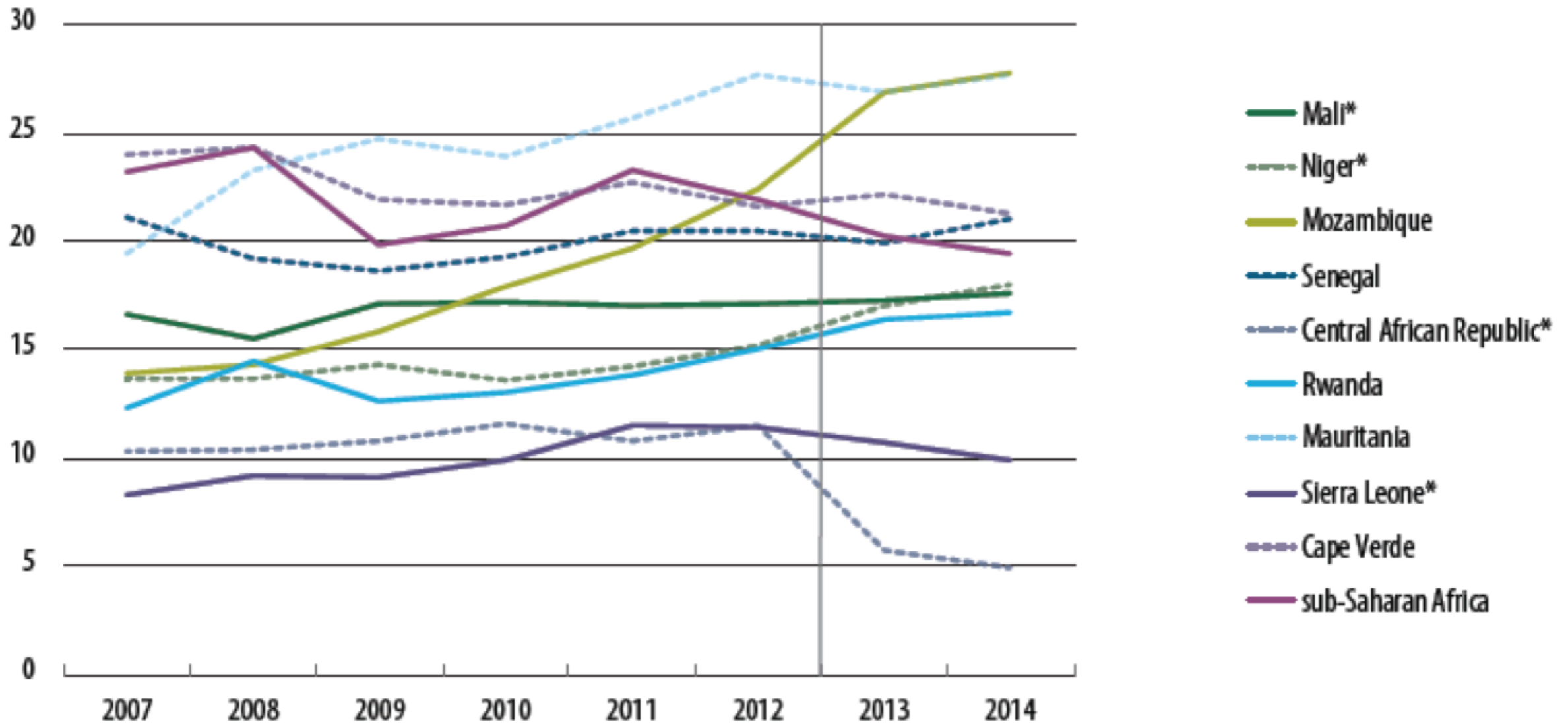
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Sorting, integrating, separating

Figure 2

Revenue-to-GDP ratio evolution 2007-2014



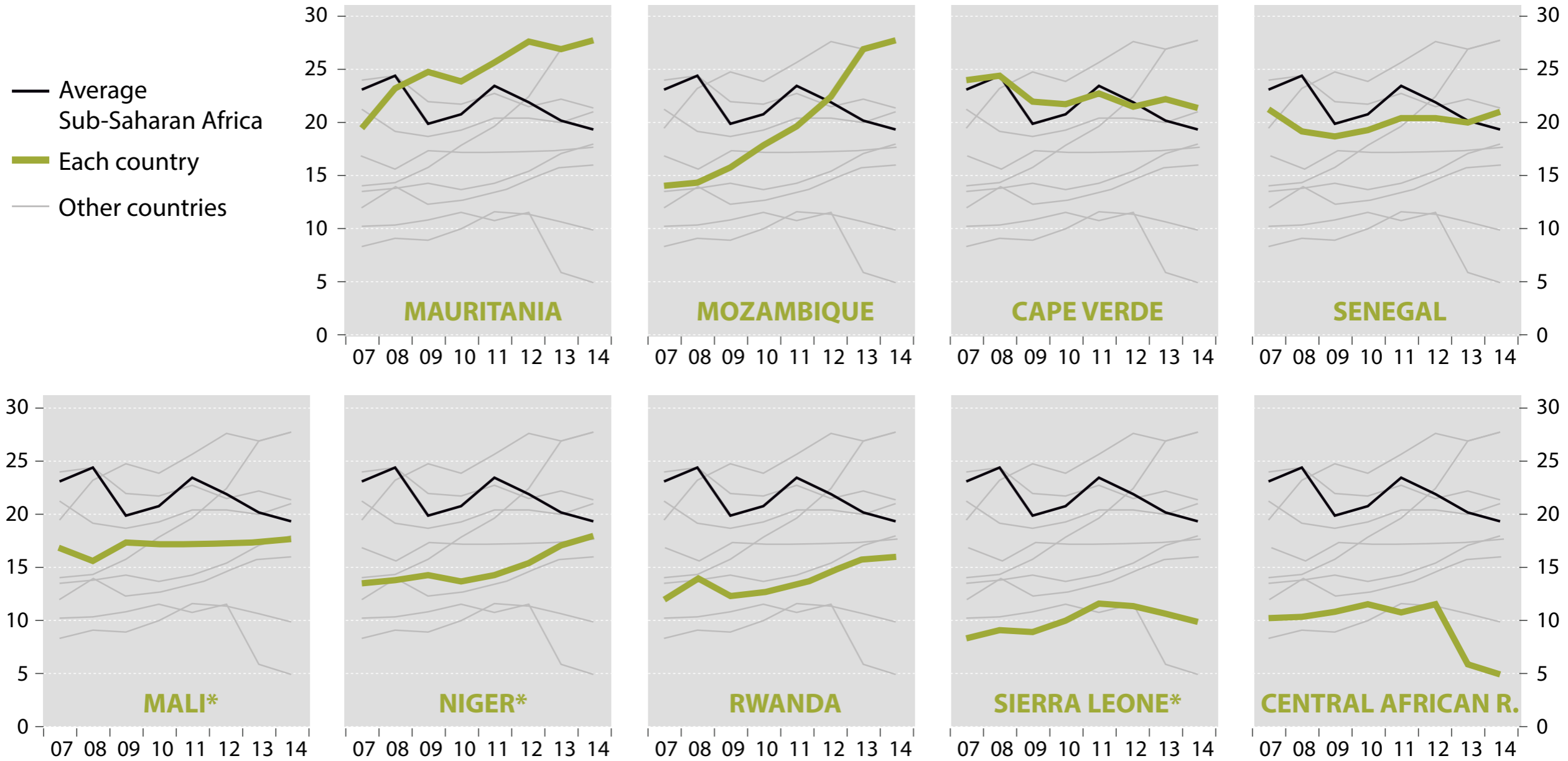
* Countries with DRM indicators.

Source: IMF Regional Economic Outlook, October 2015. Mauritania figures from African Economic Outlook 2012, 2014 and 2016 / European Court of Auditors (calculation).

Sorting, integrating, separating

Figure 2

Revenue-to-GDP ratio evolution 2007-2014



* Countries with DRM indicators.

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Whenever possible, integrate words and visuals

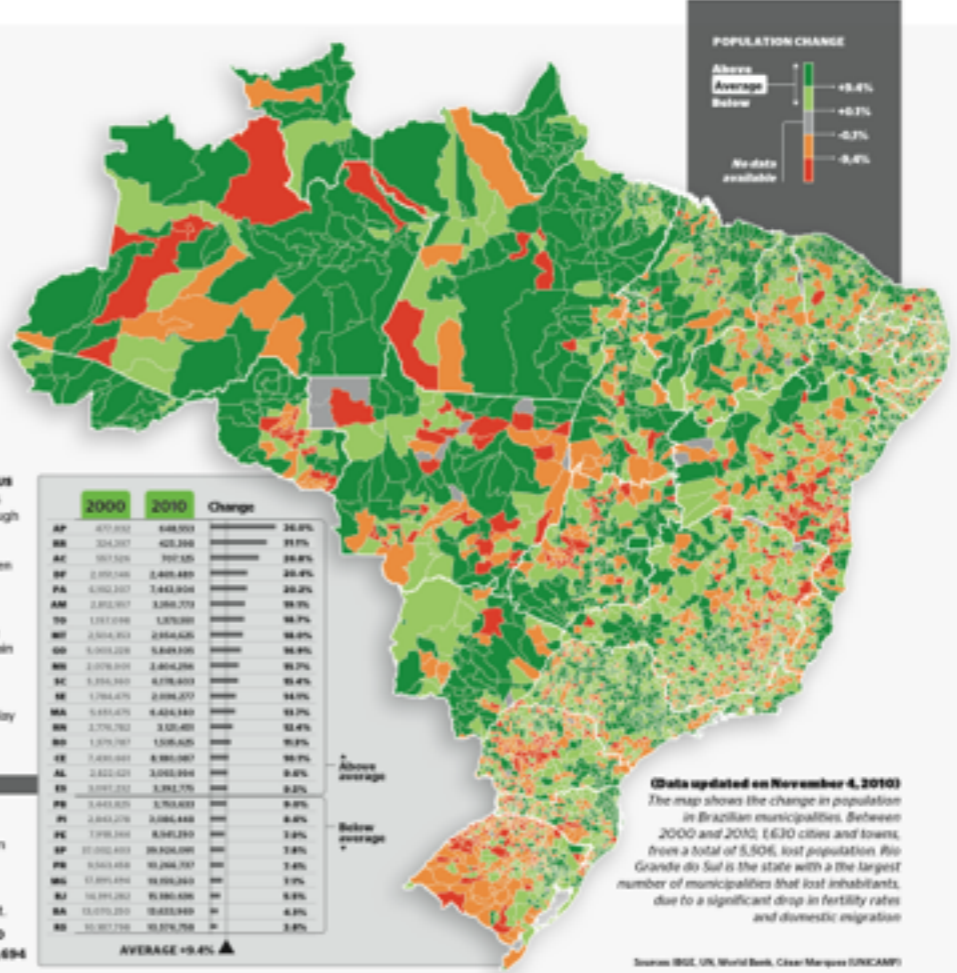
DIAGRAM
NEWS IN PERSPECTIVE

Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

Alberto Cairo, Francine Lima, Marco Vergatti

PRELIMINARY DATA FROM THE 2010 CENSUS create an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew, on average, 10% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy Social Security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables at play in this story.



	2000	2010	Change
AP	471,432	648,703	36.8%
RR	324,267	423,236	31.8%
AC	593,526	797,525	33.8%
DF	2,793,246	3,443,440	23.4%
PA	4,082,267	5,443,854	33.2%
AM	2,892,967	3,889,279	34.2%
TO	1,151,076	1,376,069	19.5%
MT	2,564,352	3,494,626	36.6%
GO	5,093,028	5,849,106	14.8%
MS	2,078,910	2,404,204	15.2%
SC	3,294,340	4,178,403	27.0%
CE	1,784,476	2,098,077	17.6%
MA	3,443,476	4,424,840	28.5%
RN	2,776,782	3,520,400	26.8%
RO	1,079,787	1,508,626	39.7%
PR	7,430,443	8,991,067	20.2%
AL	2,422,421	3,043,834	25.6%
ES	3,597,232	3,941,706	9.6%
PB	3,443,620	3,703,633	7.6%
PI	2,843,276	3,064,448	7.8%
PE	7,098,244	8,442,230	19.1%
SP	37,002,433	39,928,090	7.9%
MG	9,543,434	10,248,787	7.4%
MS	17,494,424	18,928,240	8.5%
RJ	14,494,282	15,860,406	10.4%
BA	13,079,230	14,433,949	10.3%
SE	3,937,230	4,378,706	11.2%
AVERAGE			+9.4%

(Data updated on November 4, 2010)
The map shows the change in population in Brazilian municipalities, between 2000 and 2010; 1,630 cities and towns, from a total of 5,506, lost population. Rio Grande do Sul is the state with the largest number of municipalities that lost inhabitants, due to a significant drop in fertility rates and domestic migration.

Sources: IBGE, UN, World Bank, César Marques (UNICAMP)

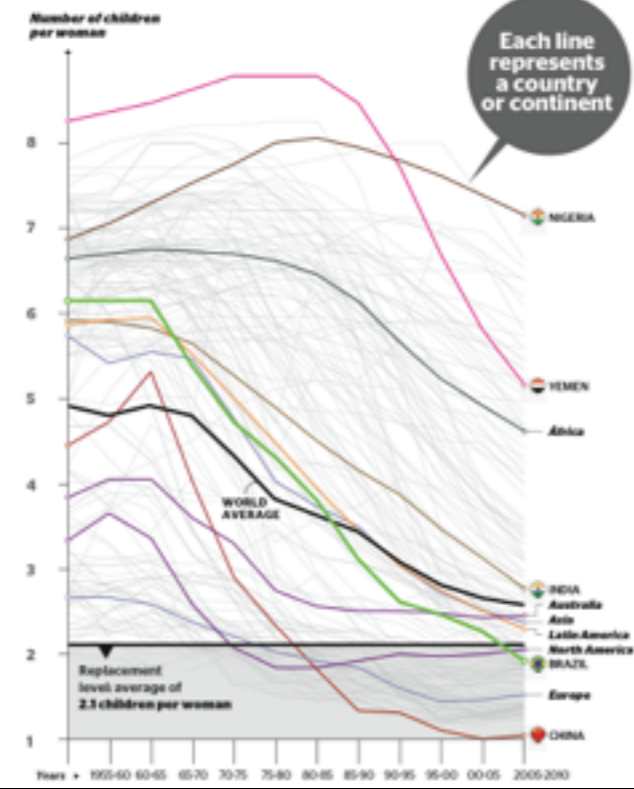
1 — BRAZIL'S POPULATION IS BIGGER

The 2010 Census has revealed a 9.4% population increase between 2000 and 2010. The differences between states, as you can see on the chart on the right, are noticeable. Most rich states, such as São Paulo and Rio, didn't grow as fast as the ones in the north east.



2 — BUT THE FERTILITY RATE IS MUCH LOWER THAN EXPECTED

A study in 2004 estimated that in 2010, the fertility rate would be 2.4 children per woman, on average. But new data collected by the IBGE prove that the fertility rate is already 1.9, below the threshold called "replacement rate". When the fertility rate drops below this number, the population of a country will eventually start to shrink and grow older.



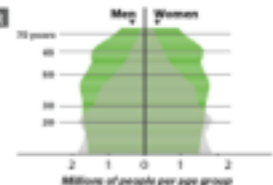
3 — AS A CONSEQUENCE, POPULATION WILL STOP GROWING—

Forecasts made in 2004 anticipated that Brazil's population would stop growing in 2040. But the most recent data from the IBGE suggests that this could happen much earlier, in 2030.



4 — AND IT WILL BECOME OLDER

Comparing the current population pyramid with the one predicted for 2050.



How Brazil can transform the population challenge into an opportunity

- As the population ages, the proportion of people of working age increases. The country will therefore have more people producing wealth (if the labor market can absorb them) and fewer children to consume investments. It is a window of opportunity, because in some cases the number of people of working age to fall back when older people are leaving the market.
- The population under 15 years of age is falling today. A smaller number of student in public schools will facilitate the quality of teaching, if the amount invested in education stays the same.
- Educational policy focused on low-income youth favors the formation of more skilled workforce and greater social mobility.
- In the future, Brazil will reach the stage of Europe and Japan, which struggle to support their elders. This is why it's so important to prepare a more balanced retirement system, which will include retirement at a later age.

DIAGRAM
NEWS IN PERSPECTIVE

Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

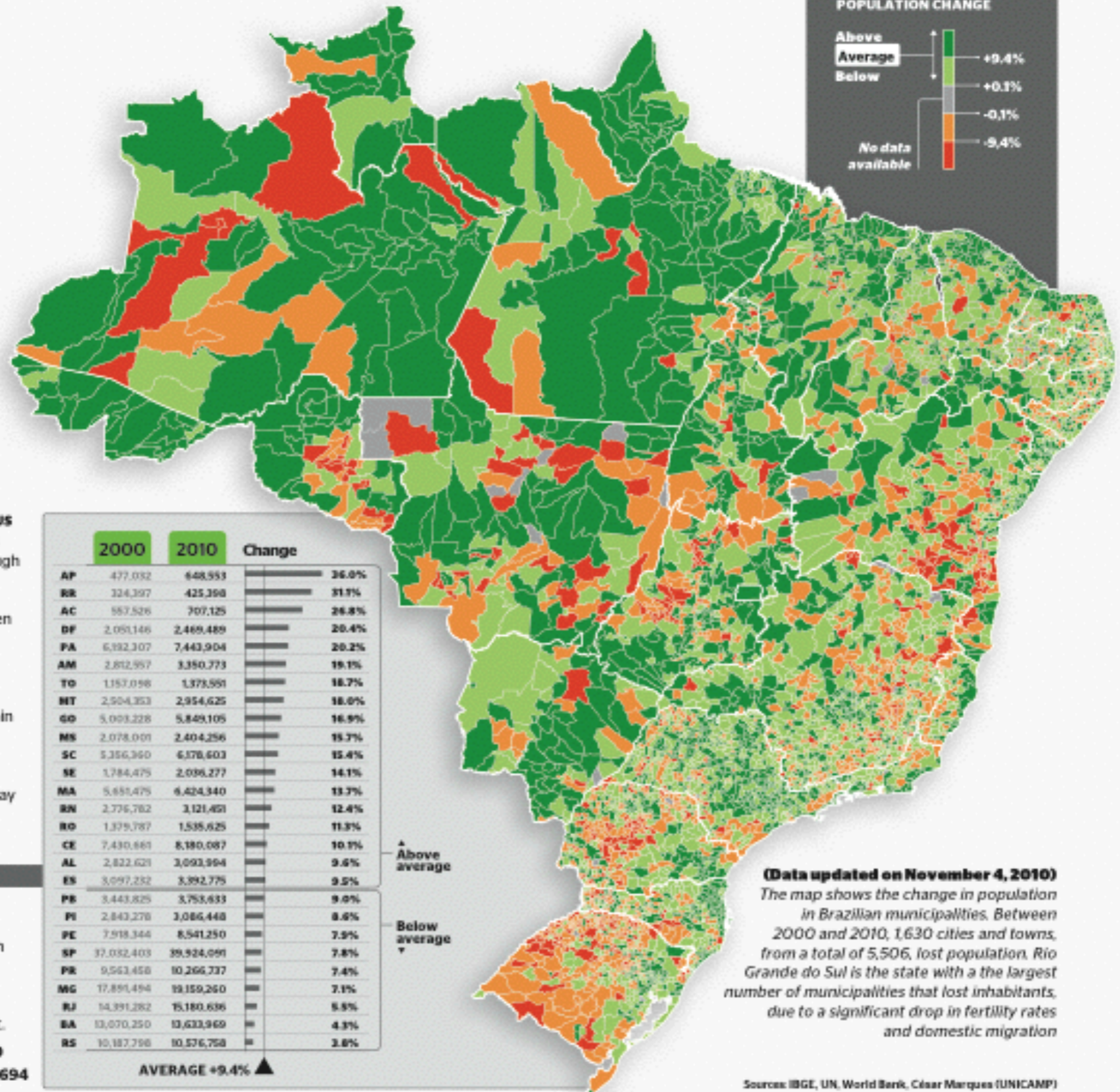
Alberto Cairo, Francine Lima, Marco Vergotti

PRELIMINARY DATA FROM THE 2010 CENSUS create an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew, on average, 10% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy Social Security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables at play in this story.

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2000 169,799,170
2010 190,732,694

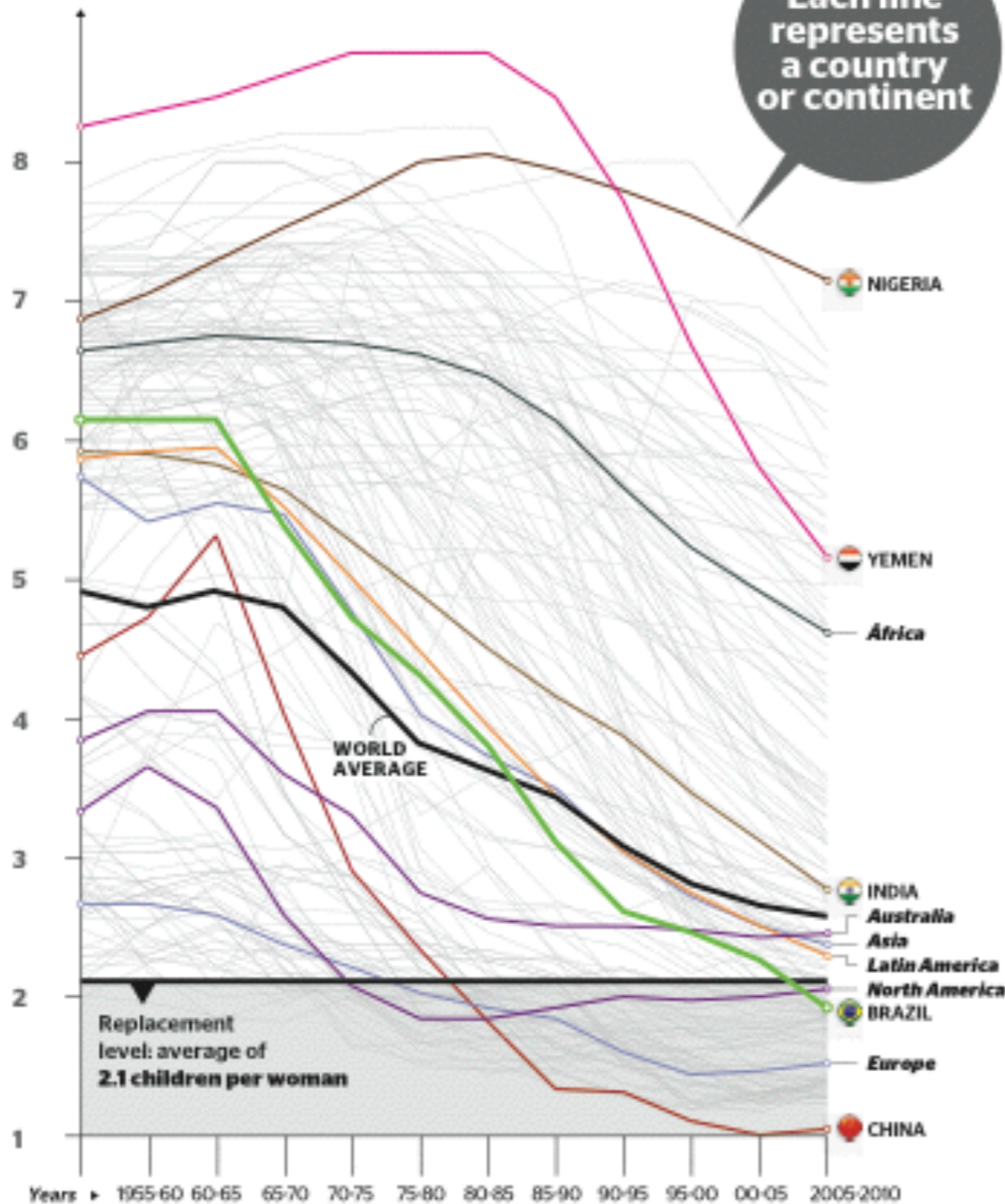


Sources: IBGE, UN, World Bank, César Marques (UNICAMP)

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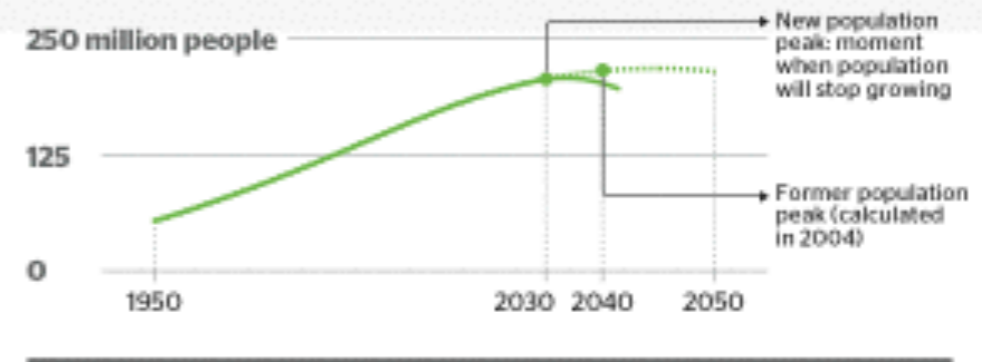
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Number of children per woman



3 AS A CONSEQUENCE, POPULATION WILL STOP GROWING—

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4 —AND IT WILL BECOME OLDER

Comparing the current population pyramid with the one predicted for 2050

2005
Forecast for 2050

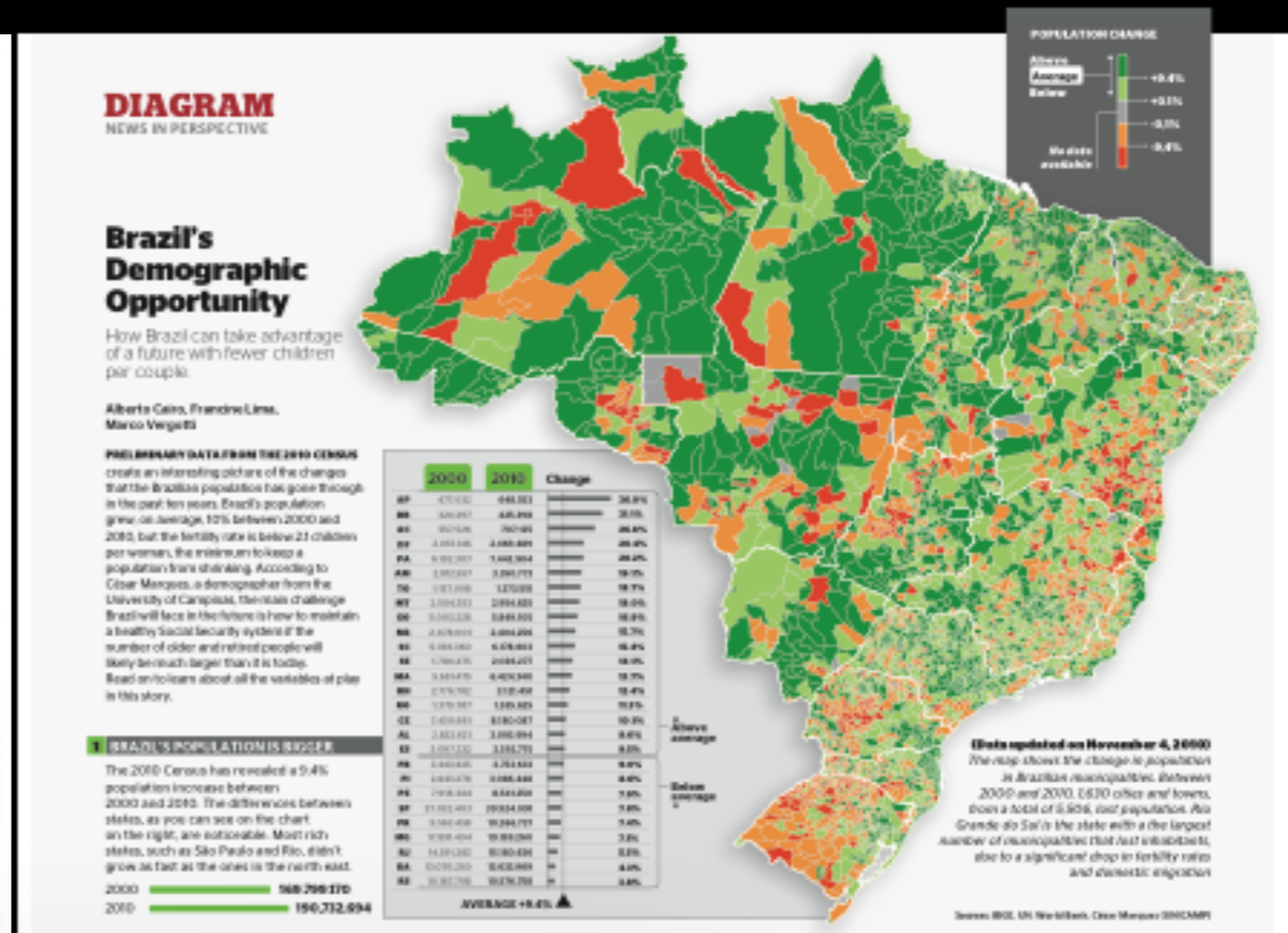
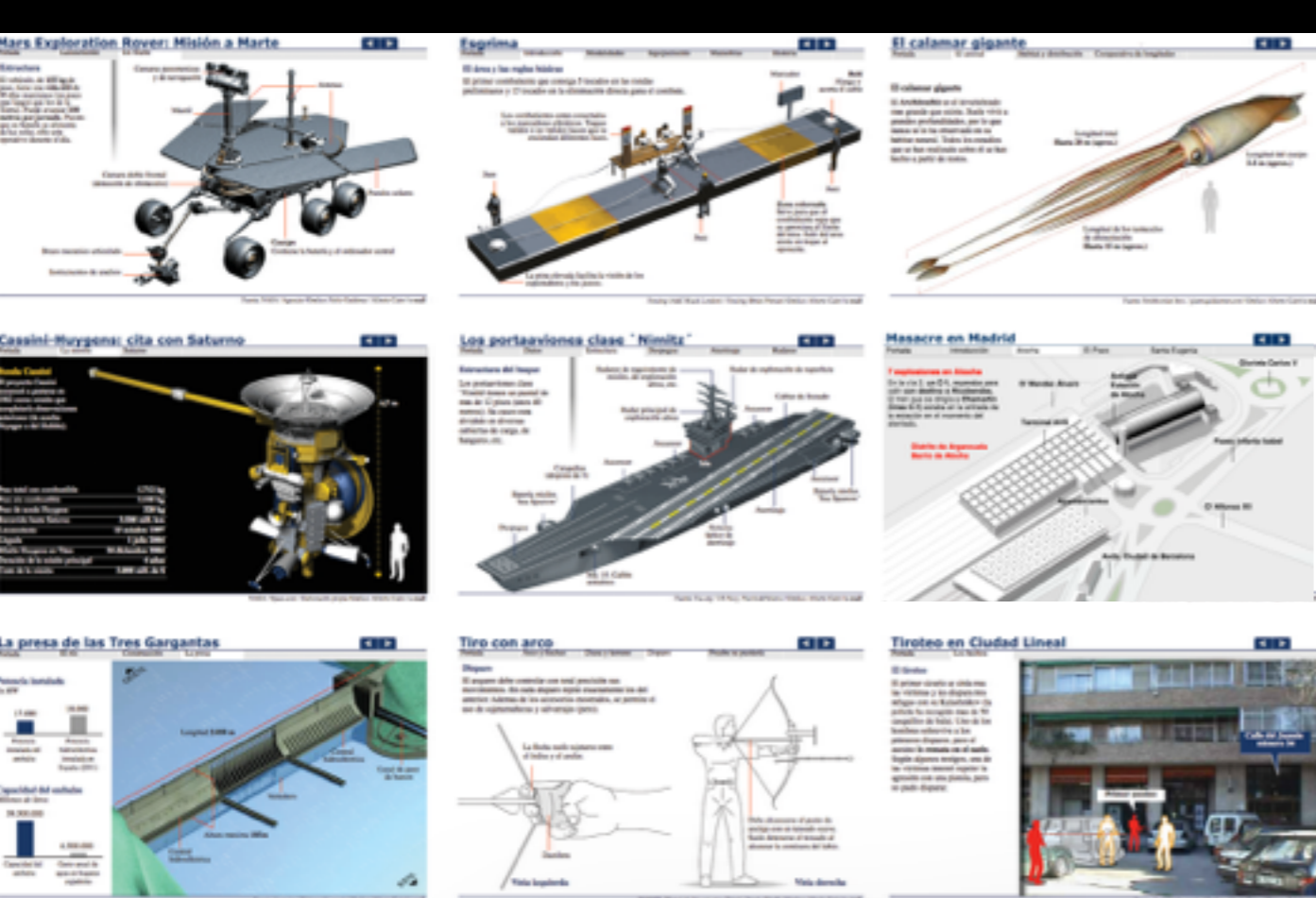


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Turning the Tide

New Directions in Health Communication



EXERCISE



LIFE EXPECTANCY AT BIRTH (YEARS)



Male



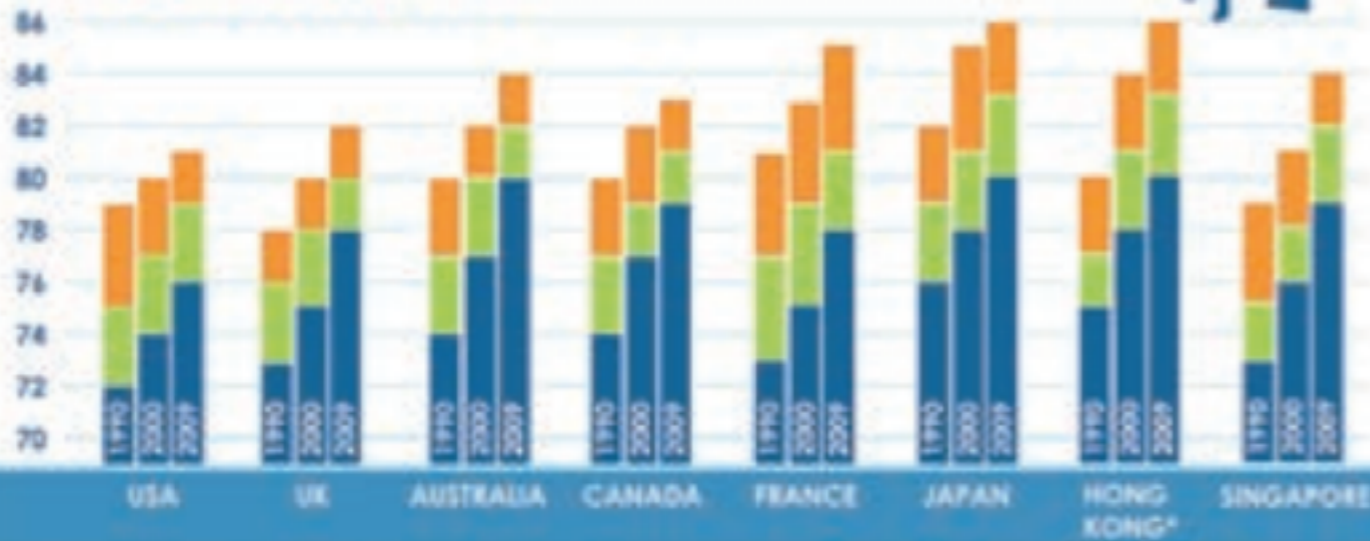
Female



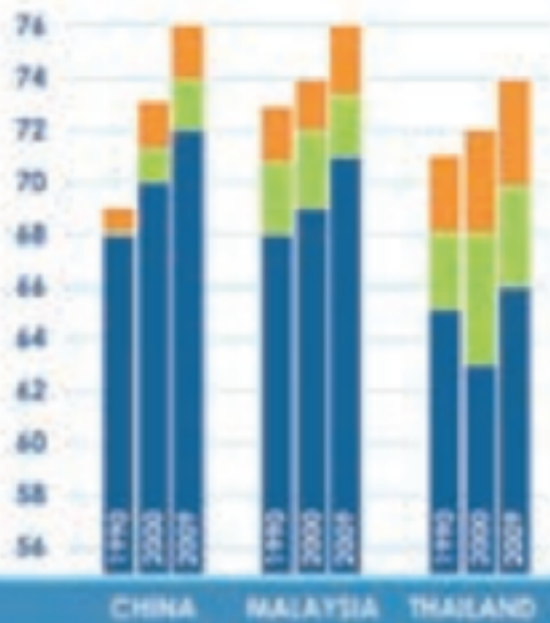
Both Sexes



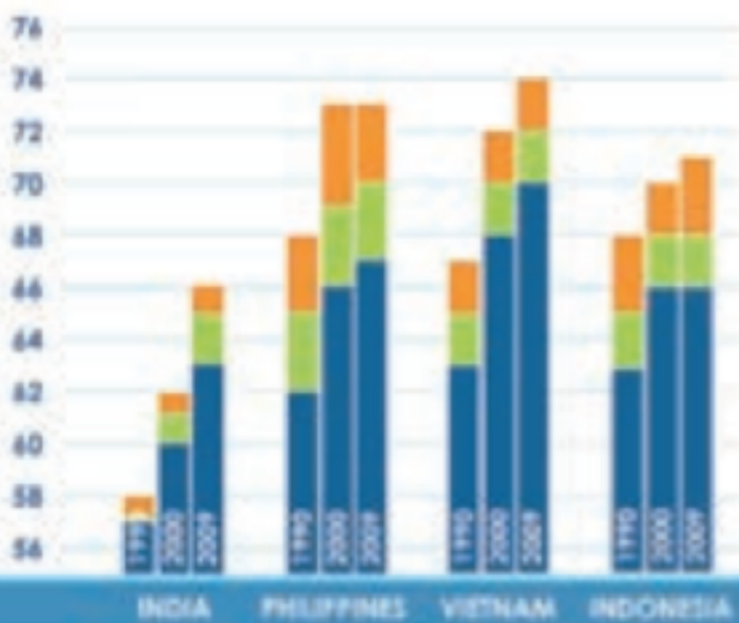
HIGH INCOME ECONOMIES



UPPER MIDDLE INCOME ECONOMIES



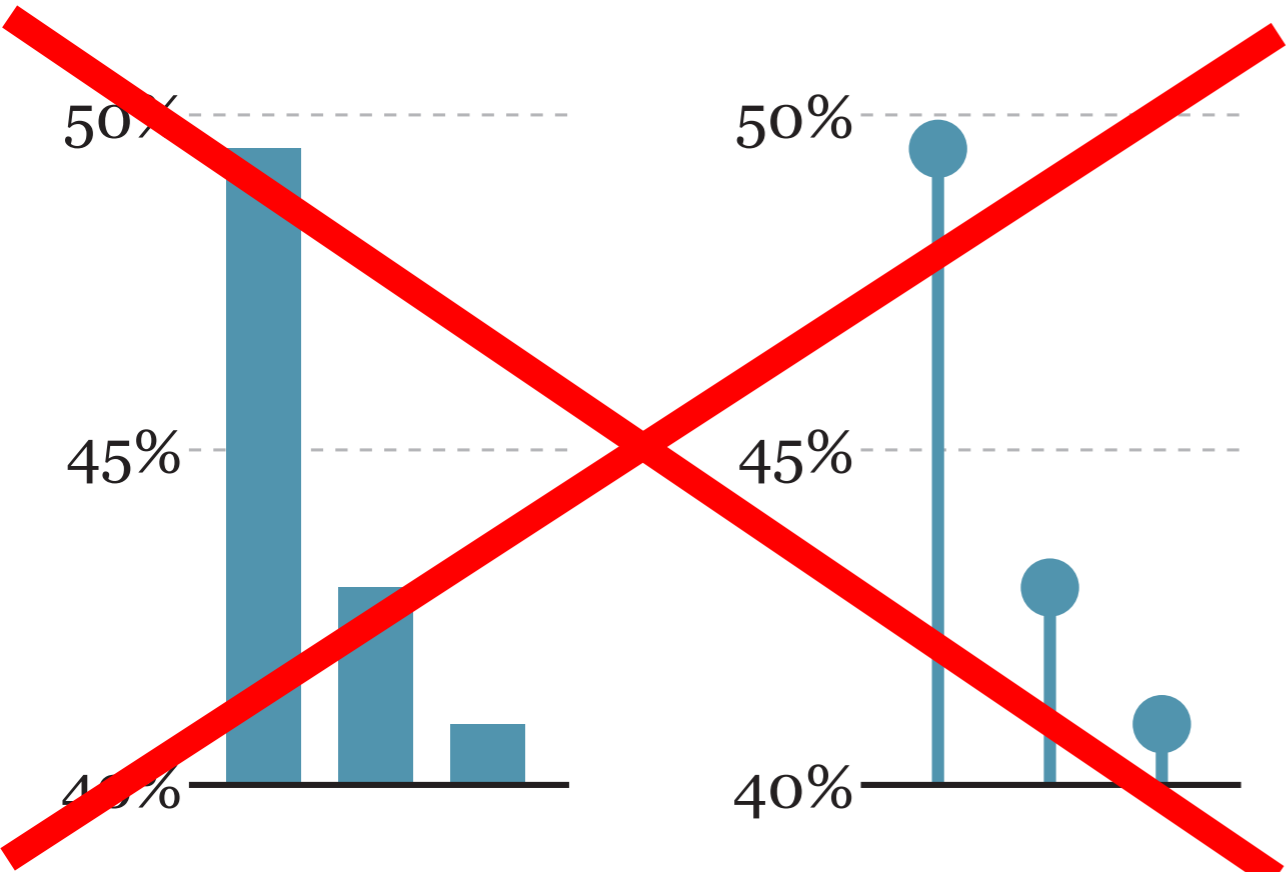
LOWER MIDDLE INCOME ECONOMIES



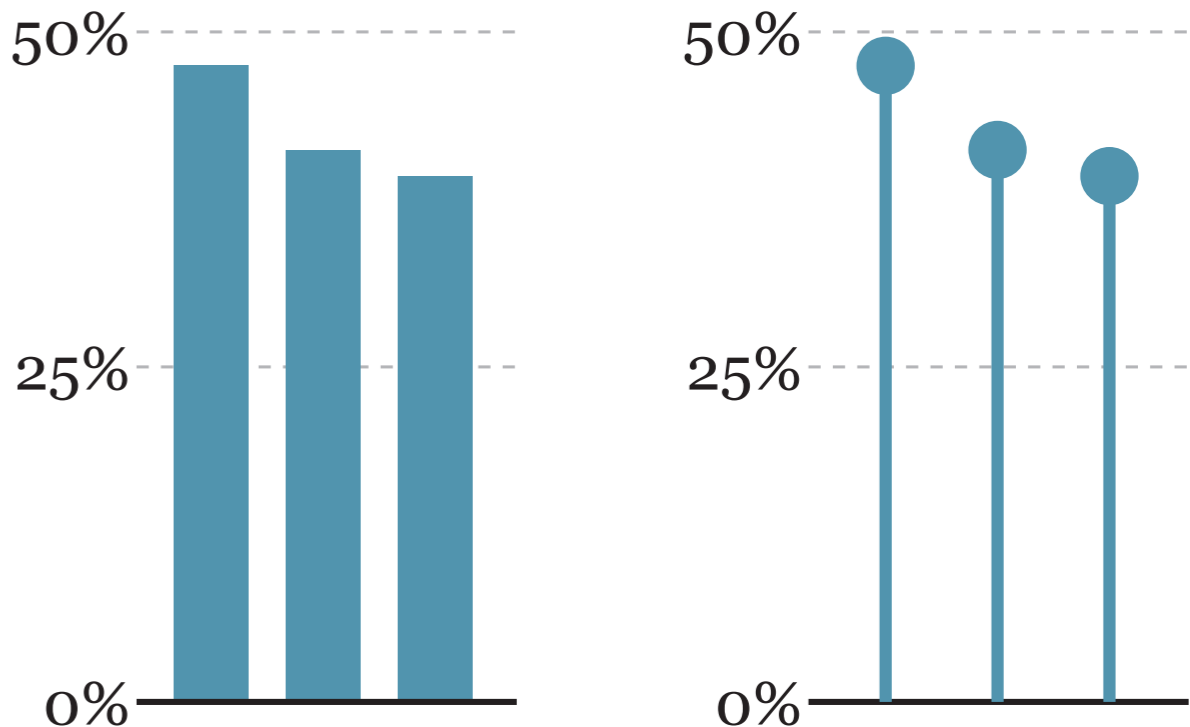
SOURCE: WHO DE WORLD BANK (1)

<http://www.brookings.edu/~media/press/books/2013/affordableexcellence/affordableexcellencepdf.pdf>

Scales



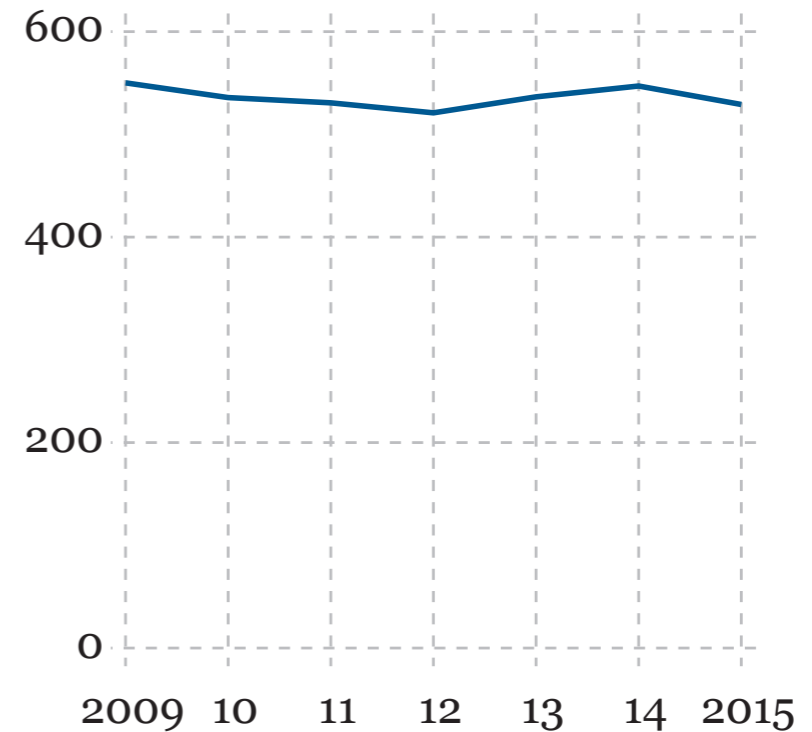
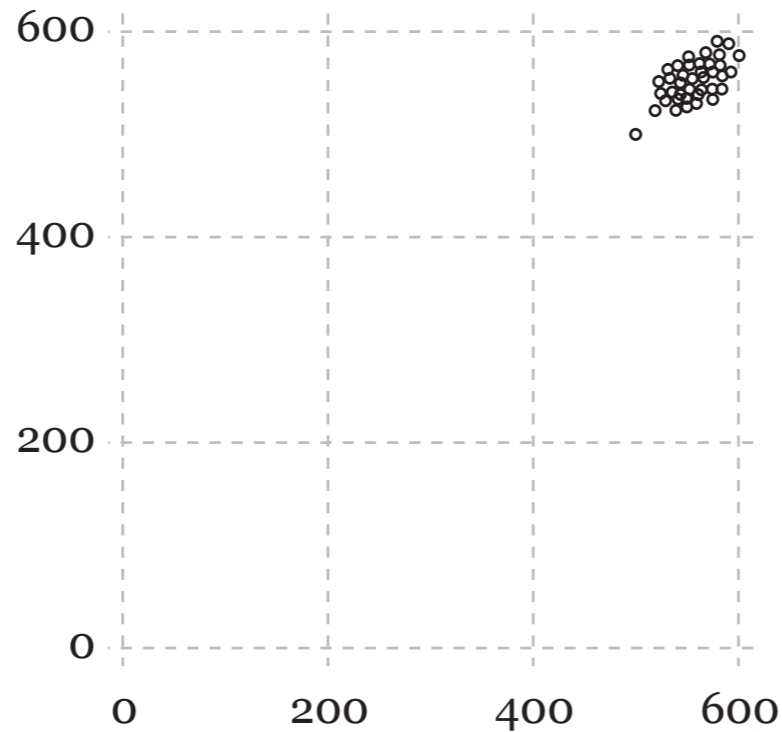
Non-zero baseline



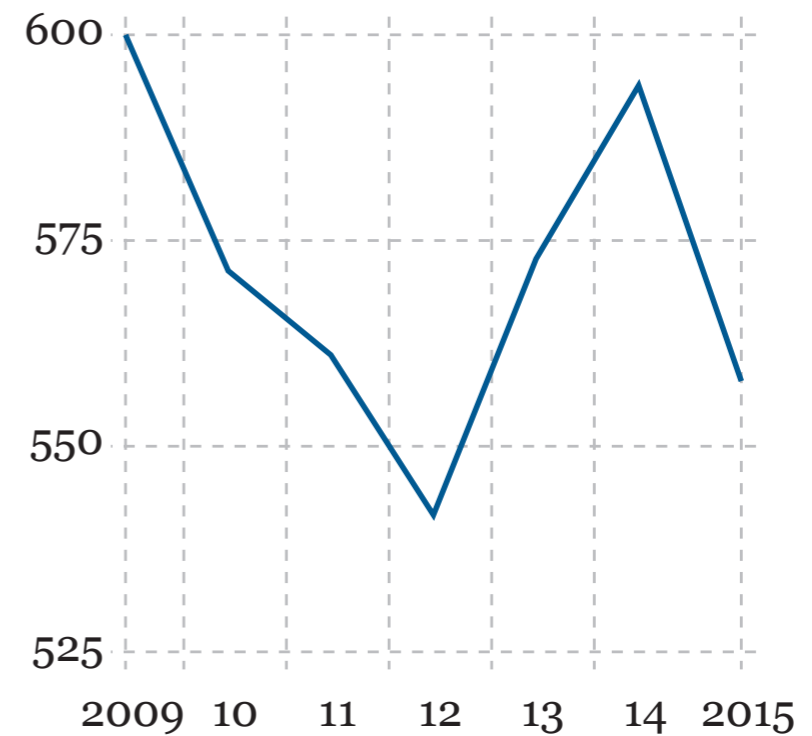
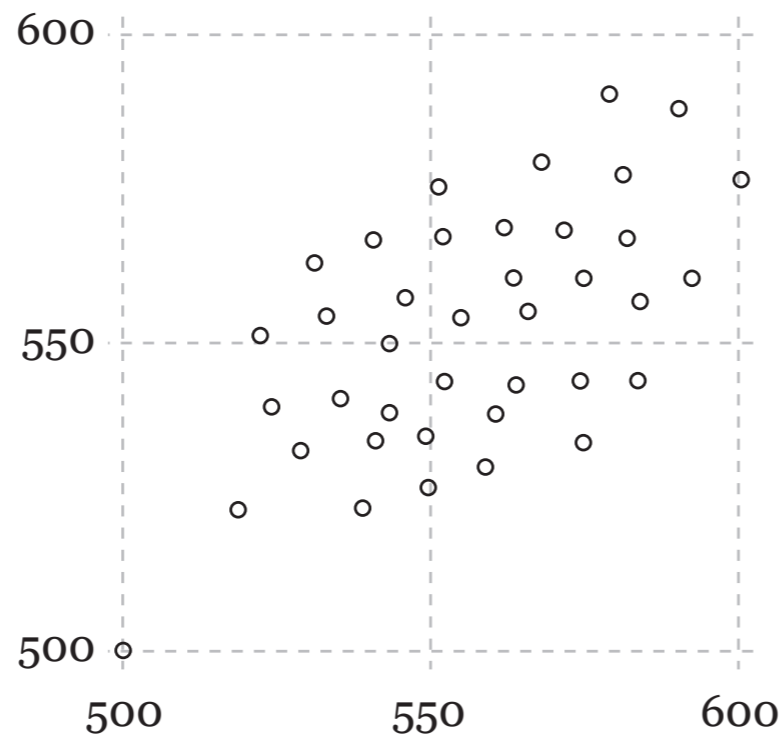
Zero baseline

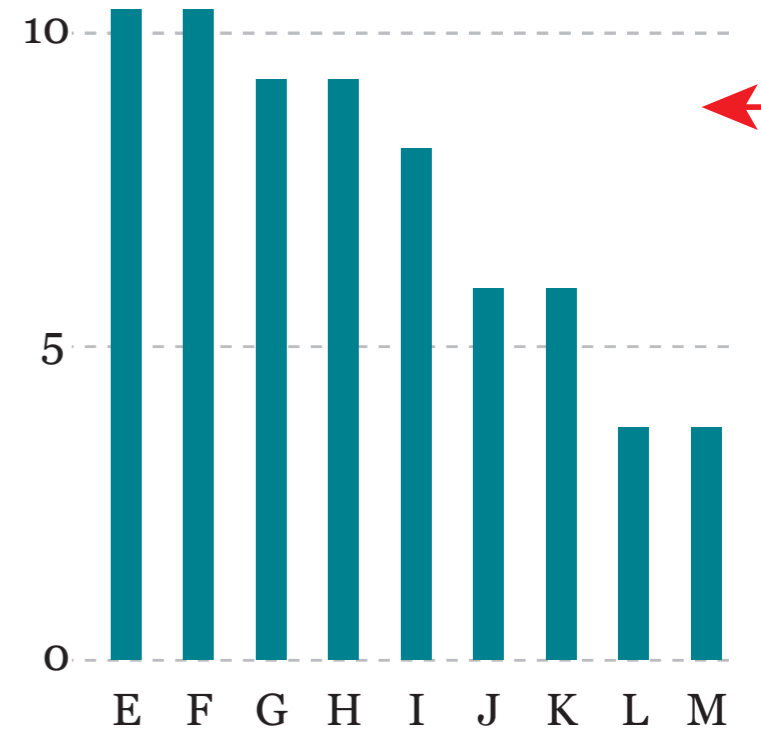
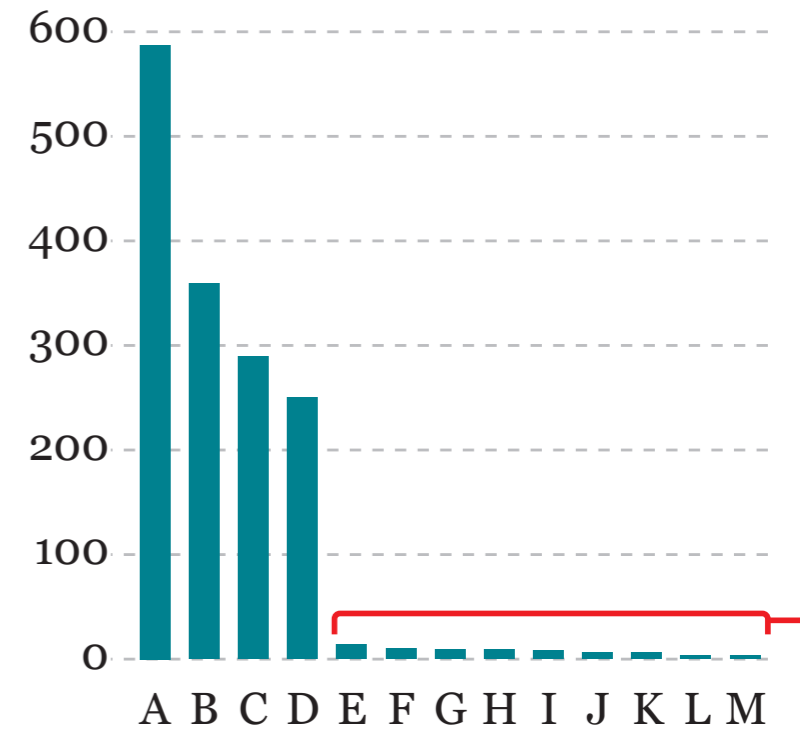
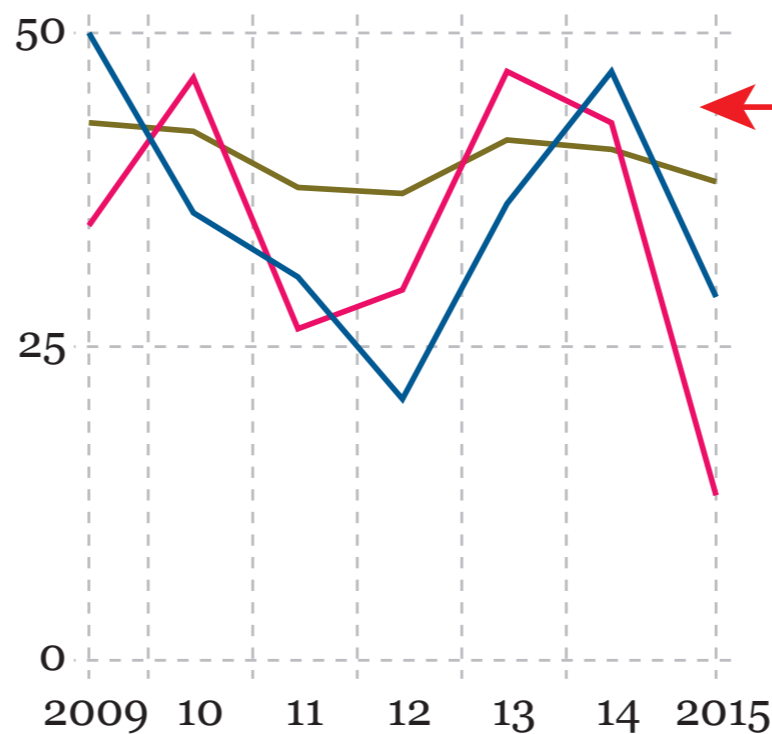
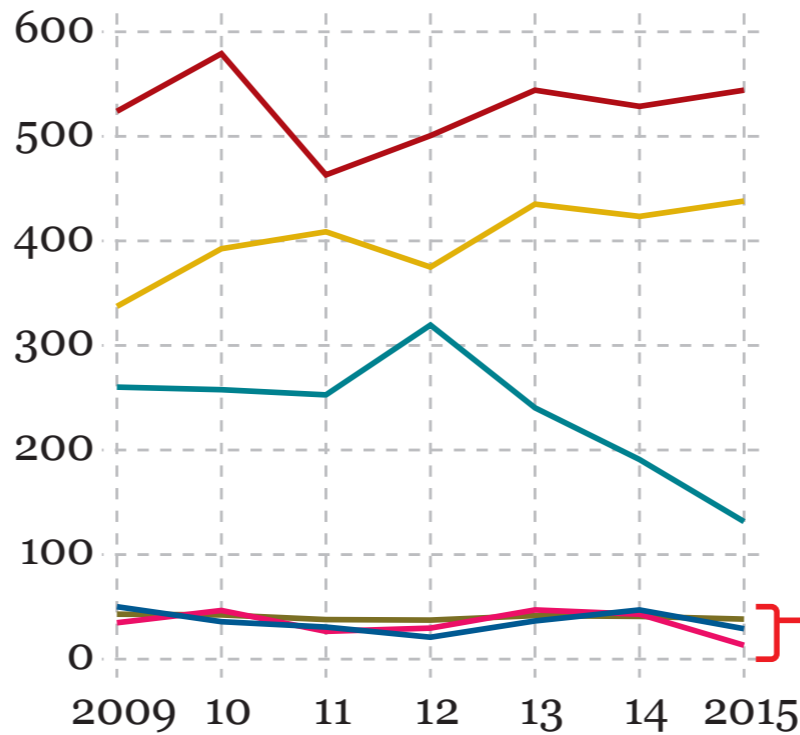
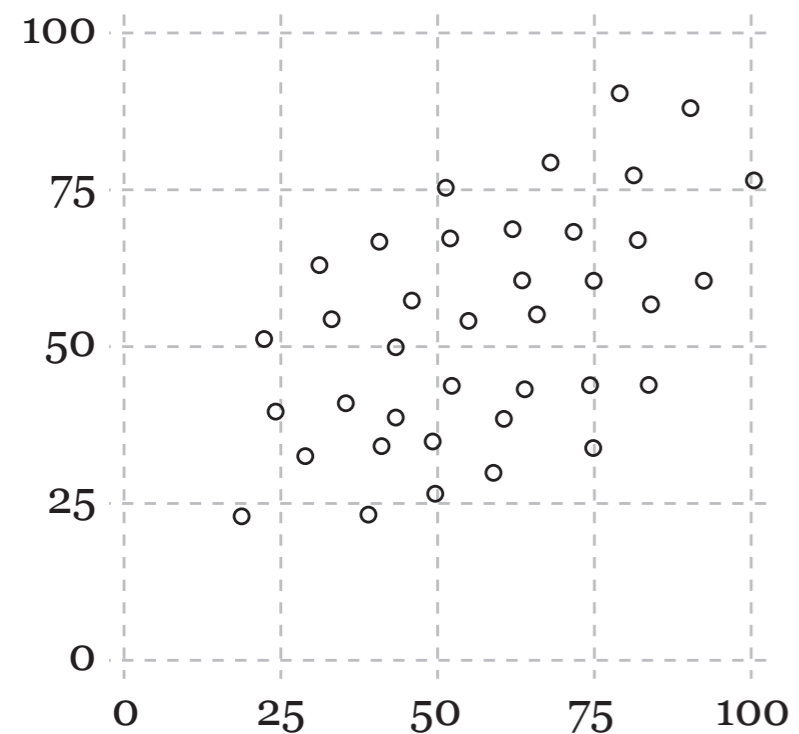
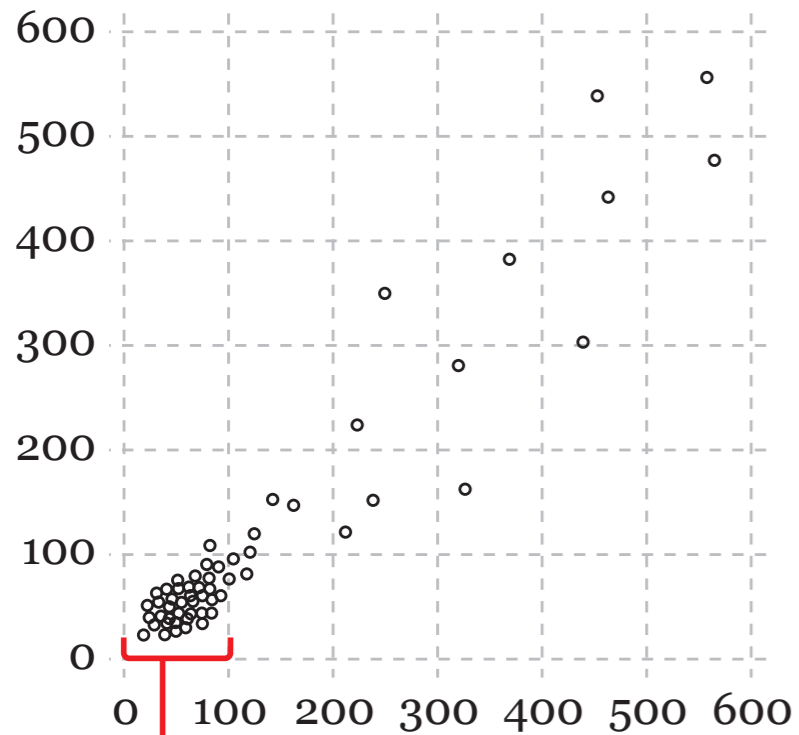
Scales

These two
may be
problematic



These two
may be
better





Possible solution to those cases when you have data that diverge a lot



LIFE EXPECTANCY AT BIRTH (YEARS)



Male



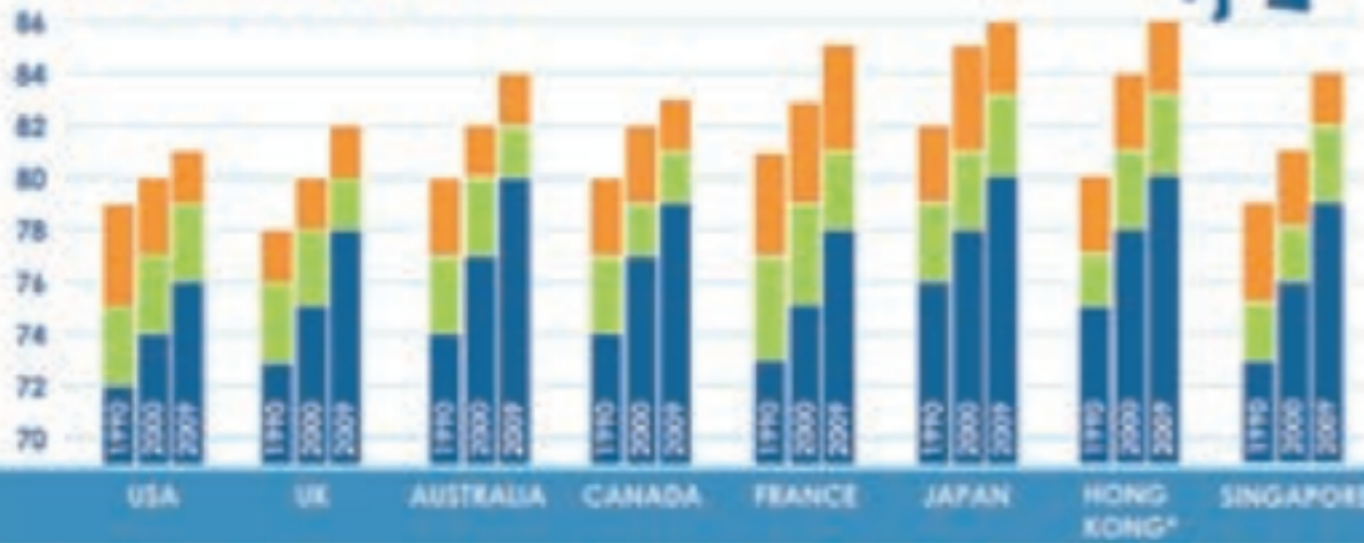
Female



Both Sexes



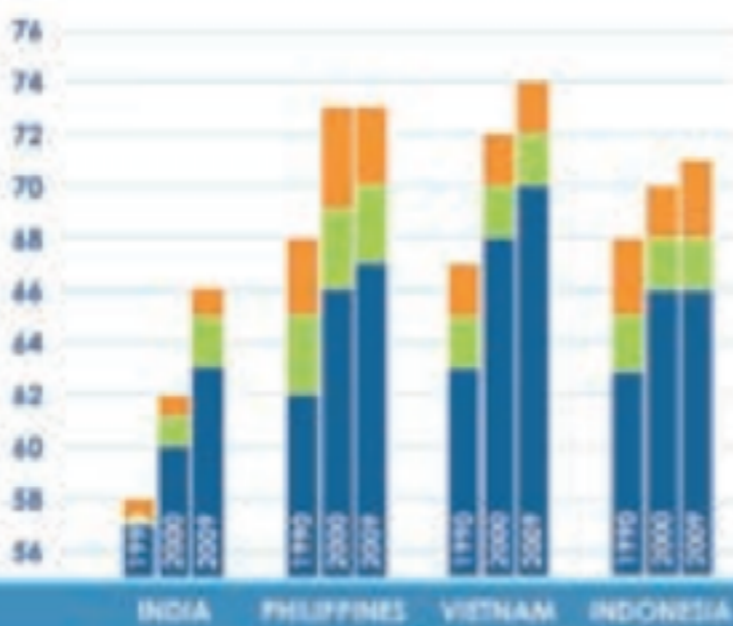
HIGH INCOME ECONOMIES



UPPER MIDDLE INCOME ECONOMIES



LOWER MIDDLE INCOME ECONOMIES

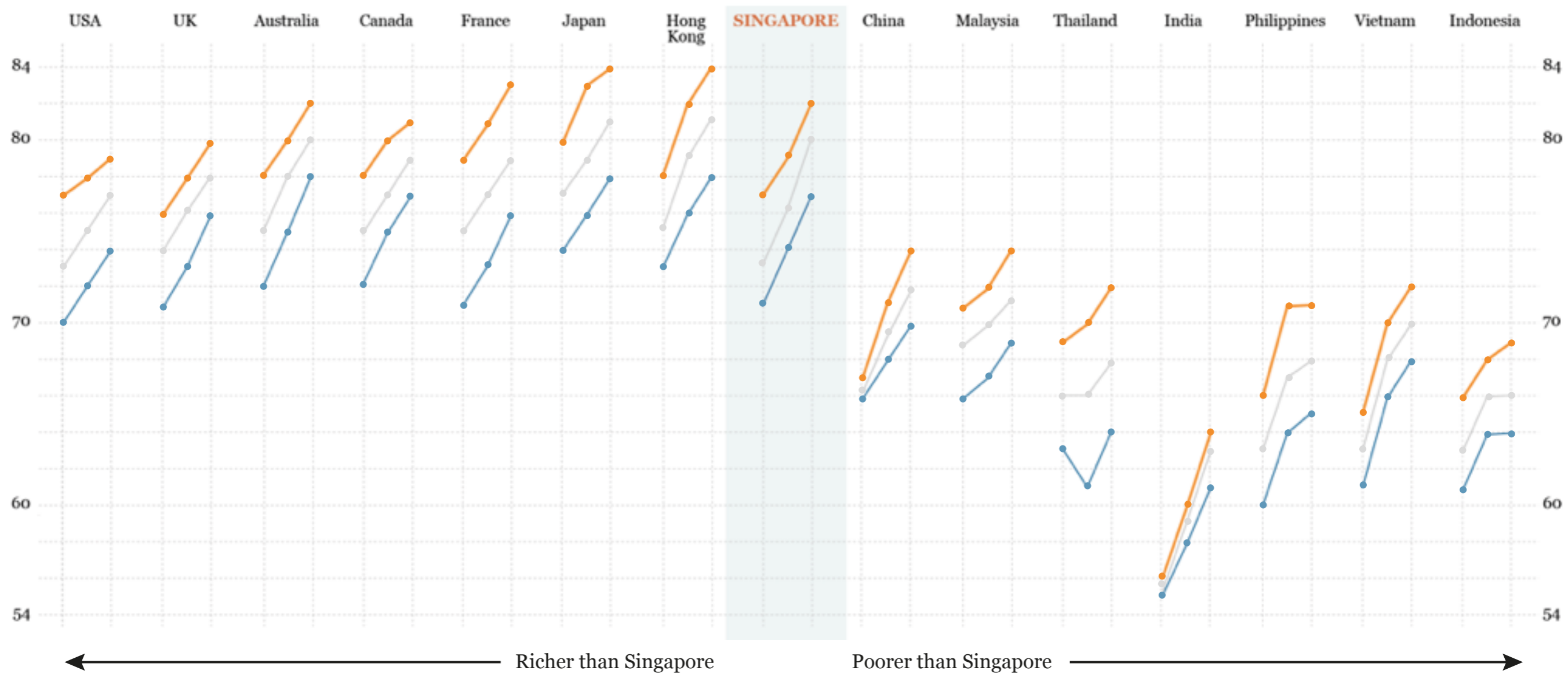


SOURCE: WHO DE * WORLD BANK (1)

<http://www.brookings.edu/~media/press/books/2013/affordableexcellence/affordableexcellencepdf.pdf>

LIFE EXPECTANCY AT BIRTH IN 1990, 2000, and 2010

●— Women
 ●— Men
 ●— Both sexes



Turning the Tide

New Directions in Health Communication

Mars Exploration Rover: Misión a Marte

Fegrima

El calamar gigante

DIAGRAM

NEWS IN PERSPECTIVE

Brazil's Demographic Opportunity

How Brazil can take advantage of a future with fewer children per couple.

Alberto Cairo, Francisco Lima, Marco Vergatti

PRELIMINARY DATA FROM THE 2010 CENSUS creates an interesting picture of the changes that the Brazilian population has gone through in the past ten years. Brazil's population grew, on average, 12% between 2000 and 2010, but the fertility rate is below 2.1 children per woman, the minimum to keep a population from shrinking. According to César Marques, a demographer from the University of Campinas, the main challenge Brazil will face in the future is how to maintain a healthy social security system if the number of older and retired people will likely be much larger than it is today. Read on to learn about all the variables of play in this story.

1 BRAZIL'S POPULATION IS BIGGER

The 2010 Census has revealed a 9.4% population increase between 2000 and 2010. The differences between states, as you can see on the chart on the right, are noticeable. Most rich states, such as São Paulo and Rio, didn't grow as fast as the ones in the north east.

2000: 168,708,170
2010: 182,732,694

State	2000	2010	Change
AP	475,110	441,811	-7.0%
MS	2,661,957	2,824,404	6.0%
MT	2,927,026	2,907,481	-0.7%
DF	2,454,446	2,488,449	1.4%
PA	3,352,287	3,448,304	2.8%
AM	3,352,287	3,391,713	1.2%
TO	1,383,448	1,270,838	-8.0%
MT	1,383,448	2,094,421	50.6%
GO	3,242,228	3,244,421	0.1%
RR	2,479,019	2,484,421	0.2%
SE	3,242,228	3,244,421	0.1%
SC	3,242,228	3,244,421	0.1%
MA	3,242,228	3,244,421	0.1%
AC	2,479,019	2,484,421	0.2%
CE	3,242,228	3,244,421	0.1%
PE	3,242,228	3,244,421	0.1%
PI	3,242,228	3,244,421	0.1%
RN	3,242,228	3,244,421	0.1%
AP	3,242,228	3,244,421	0.1%
MS	3,242,228	3,244,421	0.1%
MT	3,242,228	3,244,421	0.1%
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PI	3,242,228	3,244,421	0.1%
RN	3,242,228	3,244,421	0.1%

Cassini-Huygens cita con Saturno

Los portaaviones clase 'Nimitz'

Mesacre en Madrid

Tiro con arco

Tiroleo en Ciudad Lineal

La presa de las Tres Gargantas

THANKS!

Alberto Cairo, School of Communication, University of Miami