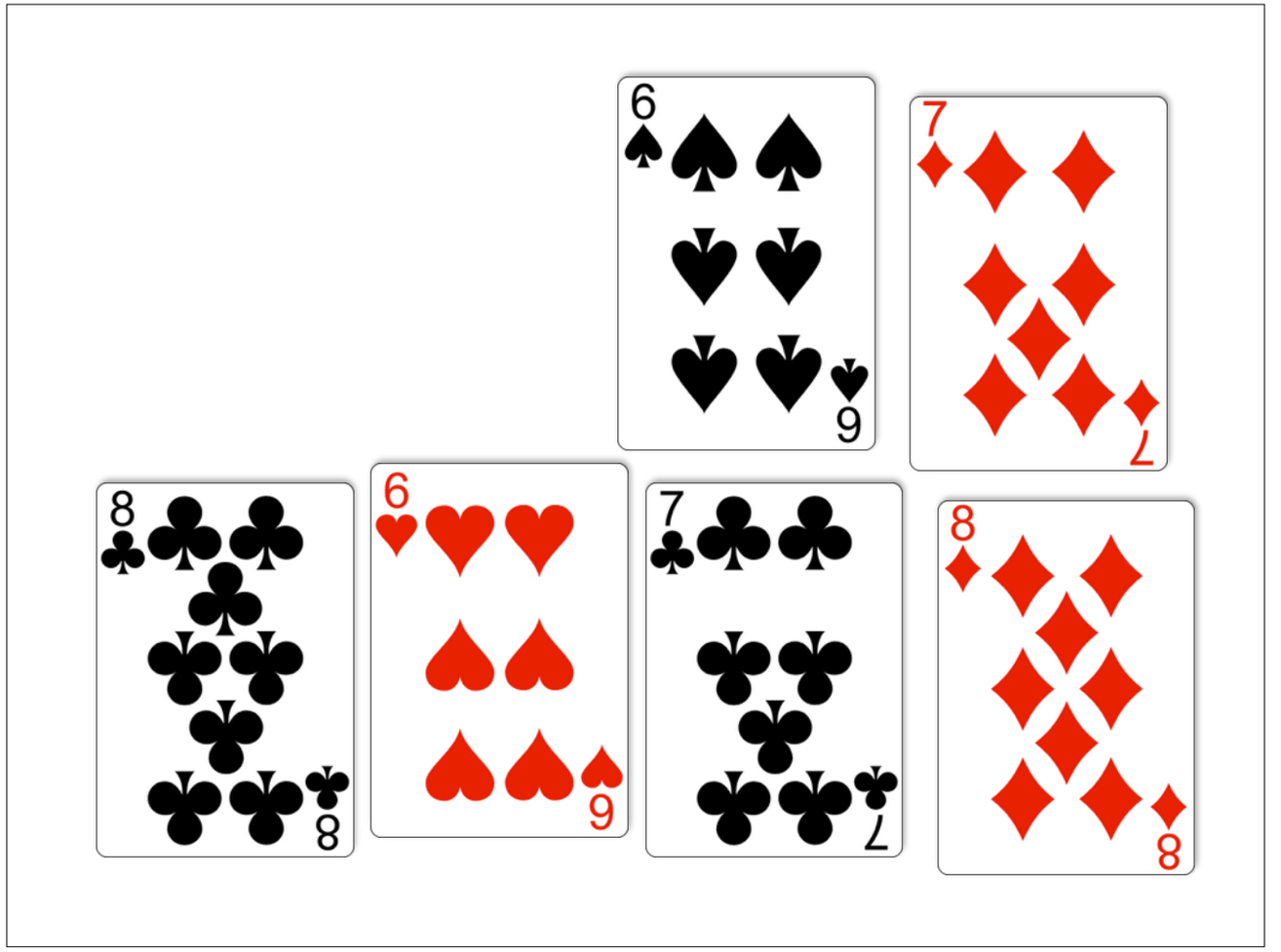
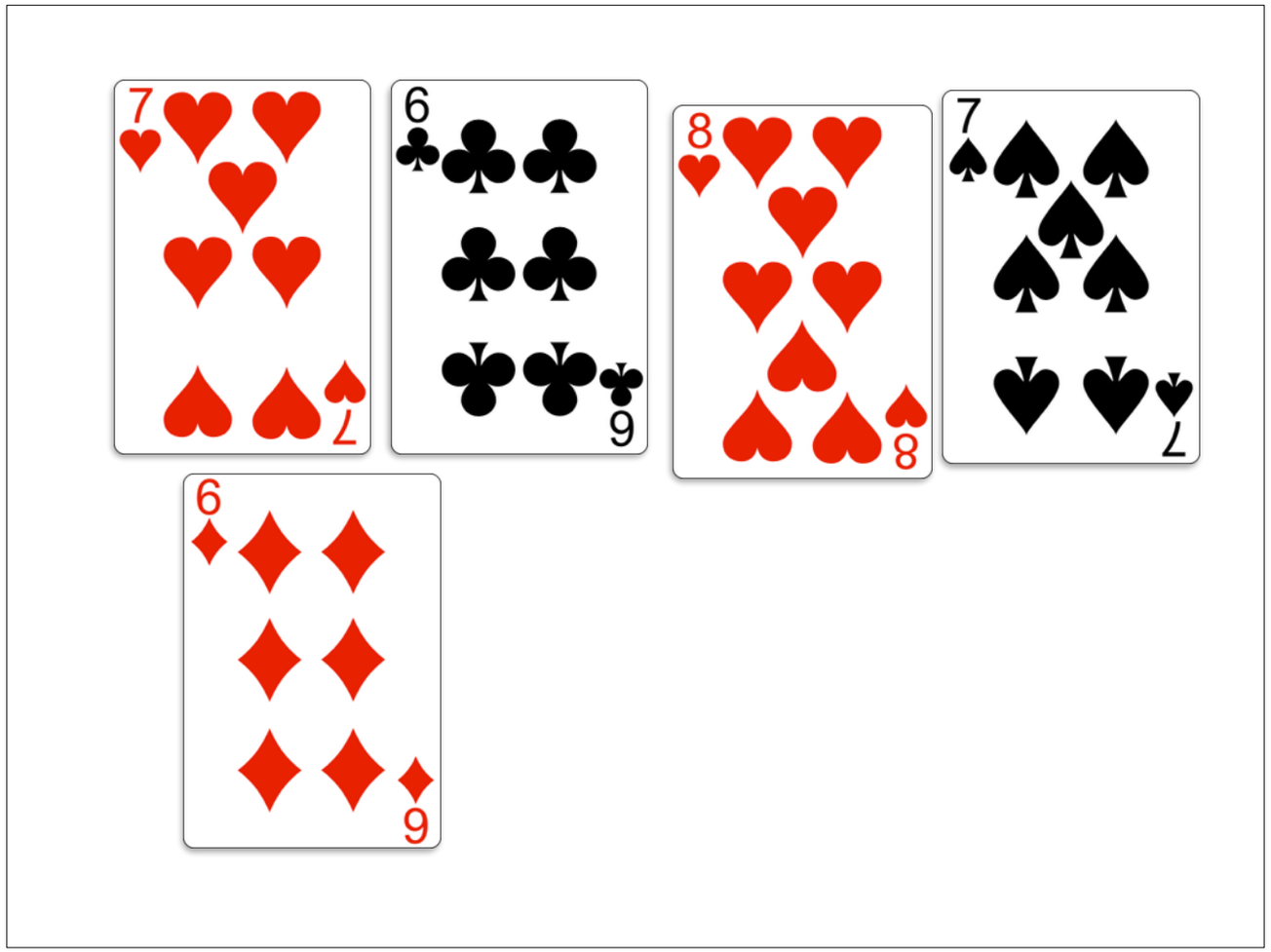
First… let's play





Challenge! Try to count how many different balls are juggled.

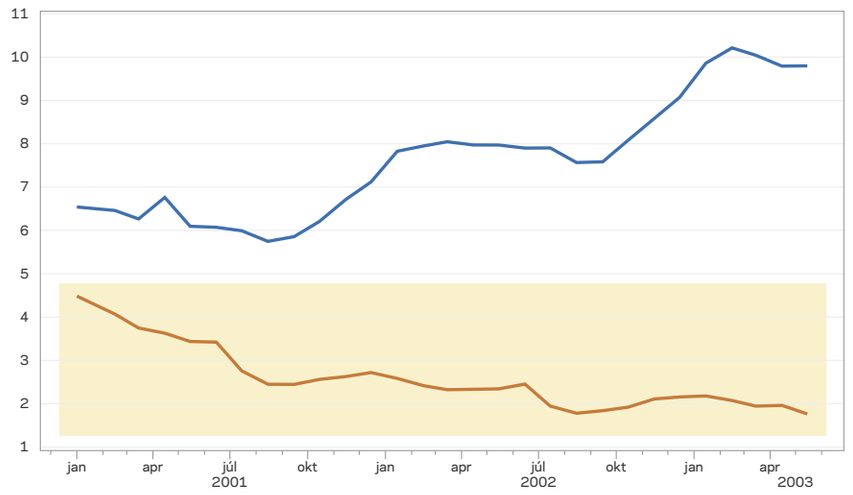
"Ever saw a magic show and wondered just how the magician took your watch without you even noticing? Ever wonder why is it that you can search for a set of misplaced keys for a long time, only to later find them sitting in the exact place where you were looking? Research has shown that we don't always see everything we're looking at, and that attention plays a big part in what consciously registers to us. The effect where we're blind to things we don't attend to is known as 'Inattentional Blindness.'"

(Source: http://psyclab1.psych.ubc.ca/~viscoglab/demonstrations/)

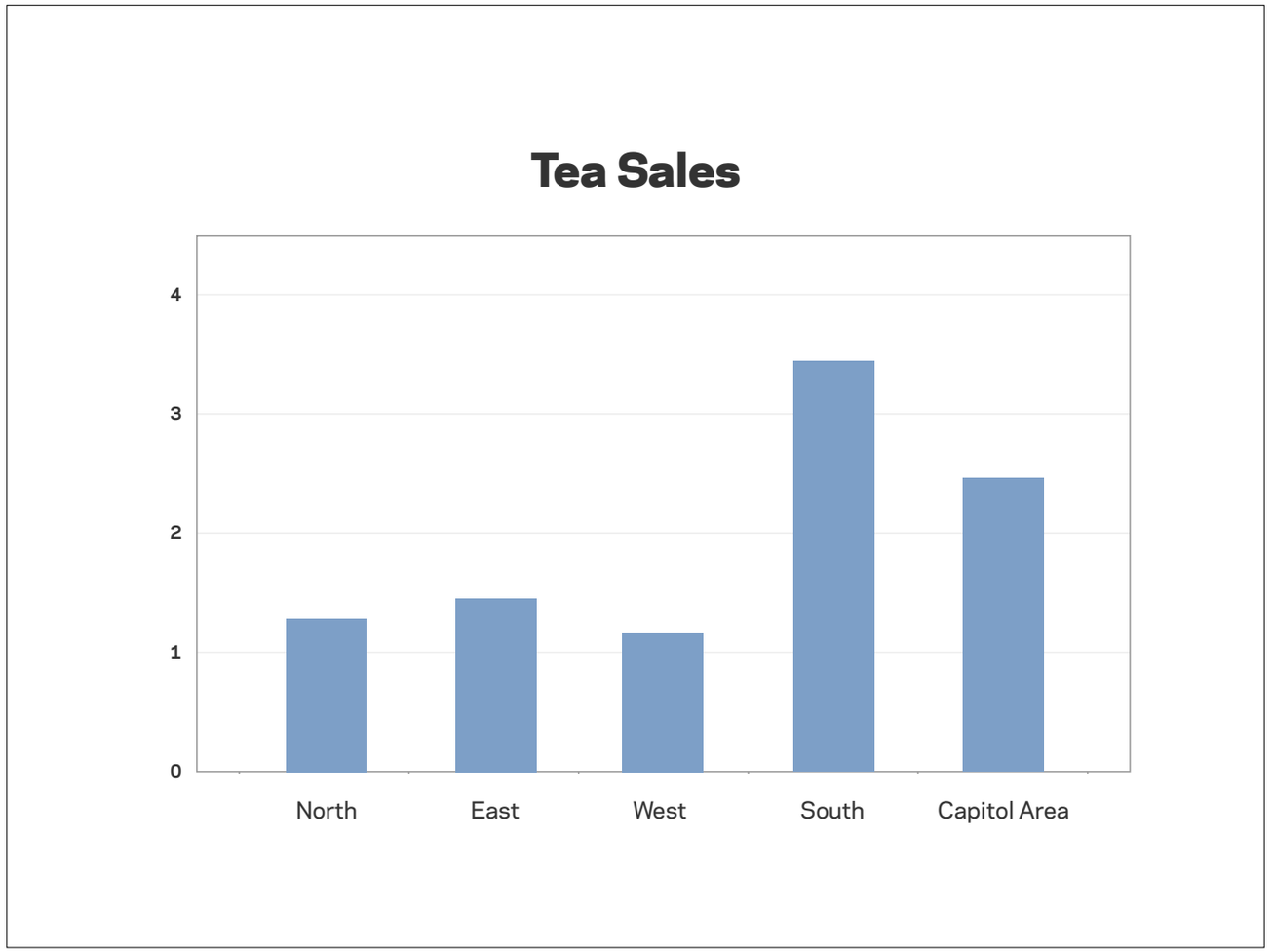
(Source: http://psyclab1.psych.ubc.ca/~viscoglab/demonstrations/)

One chunk of memory

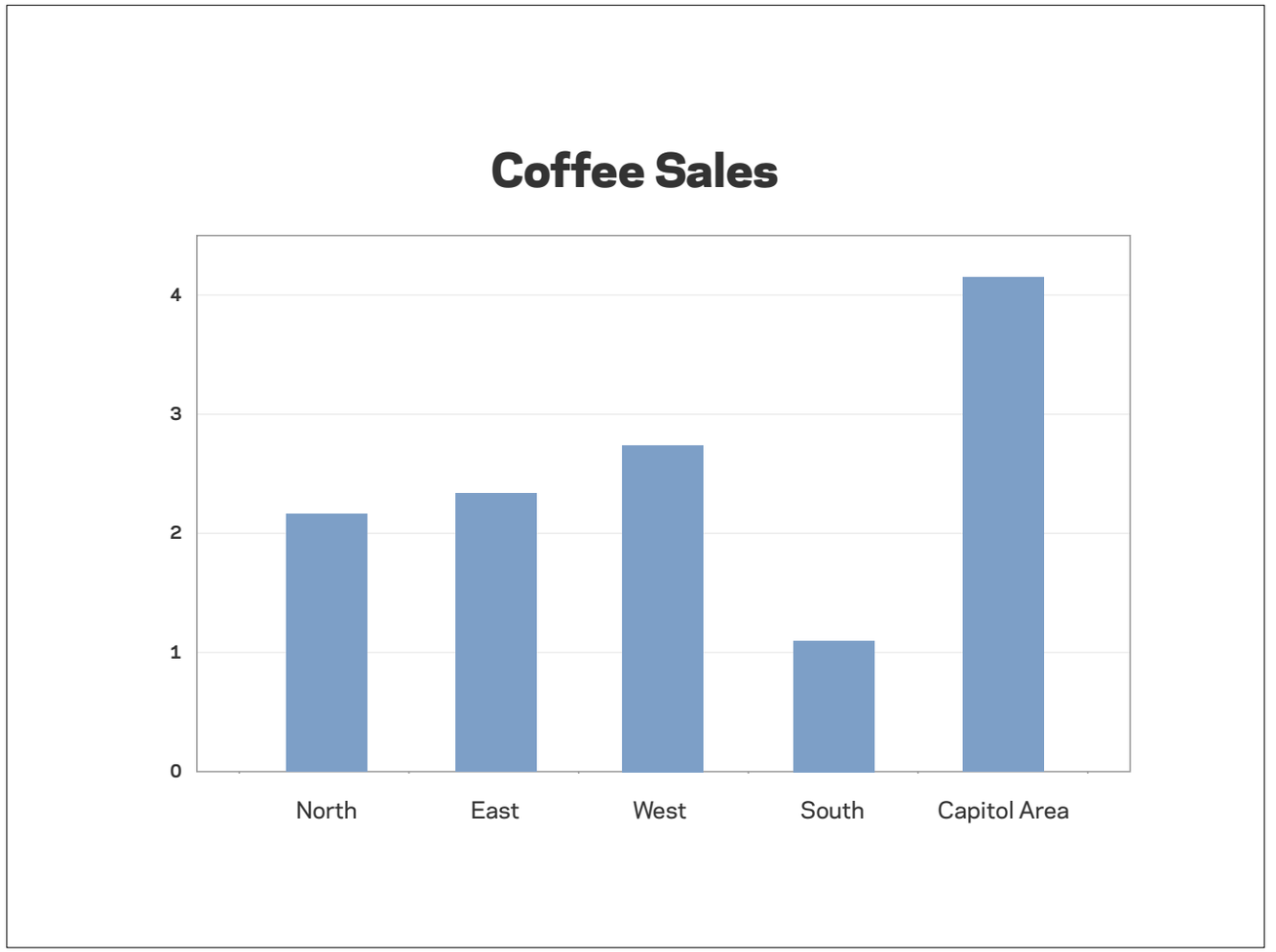
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14



Memories are stored as chunks of information. A chunk can be as small as a single tiny fact or a larger set of facts that you've learned to think about as a single complex unit. The better you get at seeing and understanding meaningful patterns and relationships in data, the better able you are to store more data as a single chunk. Working memory is where information is stored while we are thinking about something. It is like the working memory, or RAM, in a computer. Our brains are constantly swapping chunks of information in and out of working memory from either what we perceive in the outside world or from the more permanent storage of long-term memory. There is a limit to the amount of information that can be held in working memory at any one time, which is estimated by researchers to be about four chunks.



It is very difficult with most software to combine all of the information that you want to see together on a single screen without needing to scroll.



You often end up bouncing from screen to screen to see separately what you would ideally like to see together in order to make comparisons and get a sense of the big picture.

You can go even further than this. Showing many small charts where the only thing that changes between charts is the data (they all use the same axis' and value labels) will give you the ability to compare a greater amount of data.

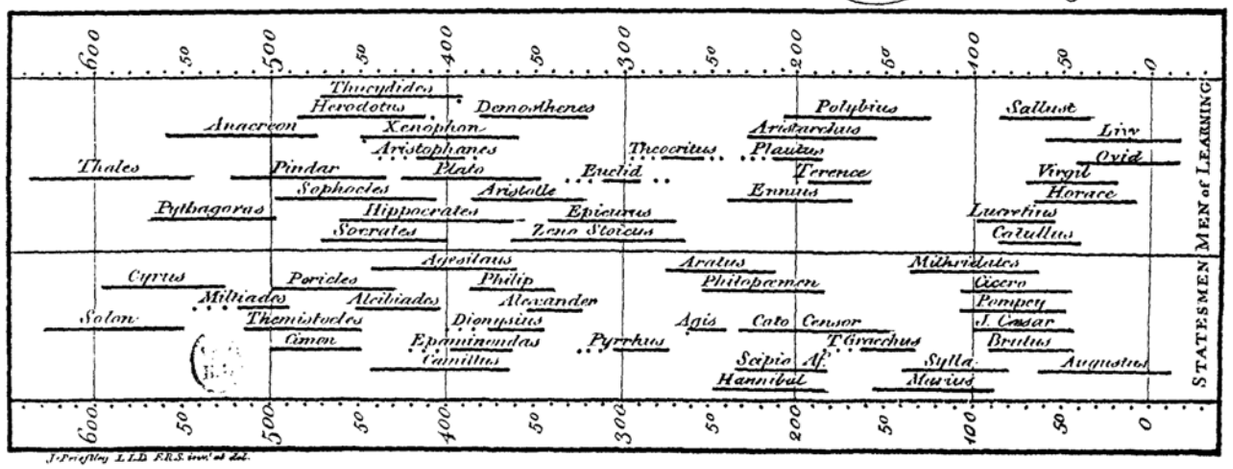
When exploring and examining data, it is important to place as much as possible within eye span. If you see patterns in a graph and then try to compare them to patterns in another graph on a different screen, you won't remember everything that you were looking at previously. You'll end up bouncing back and forth between displays, wasting time and getting very frustrated in the process.

Historical masterpieces

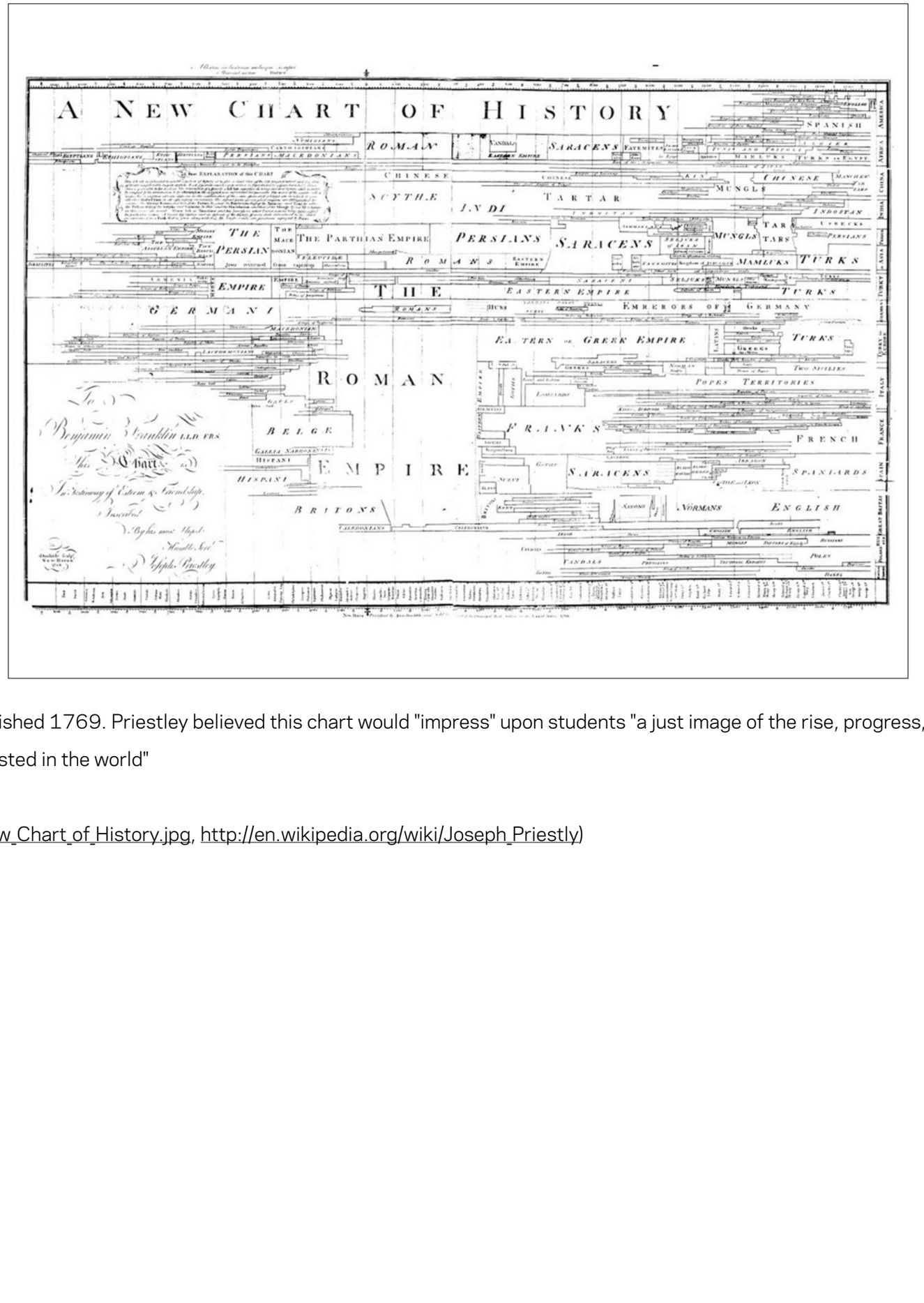
„Graphical elegance is often found
in simplicity of design
and complexity of data.“

— Edward Tufte

A Specimen of a Chart of Biography.

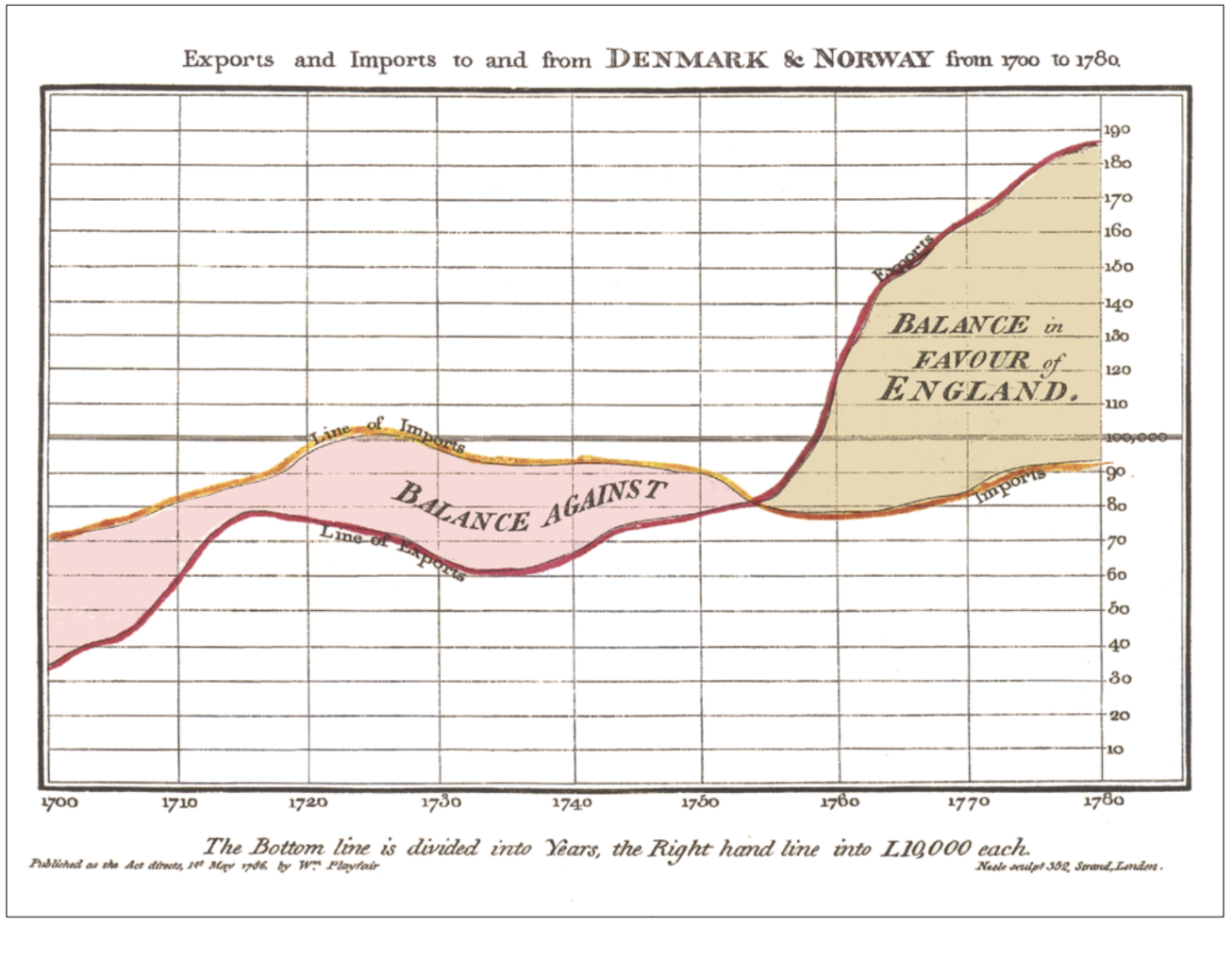


This is a historical timeline by it's inventor, Joseph Priestly. It was created in 1765 and shows the lifespan of historical figures in old Greece. Note the dots where the time of death or birth isn't known.



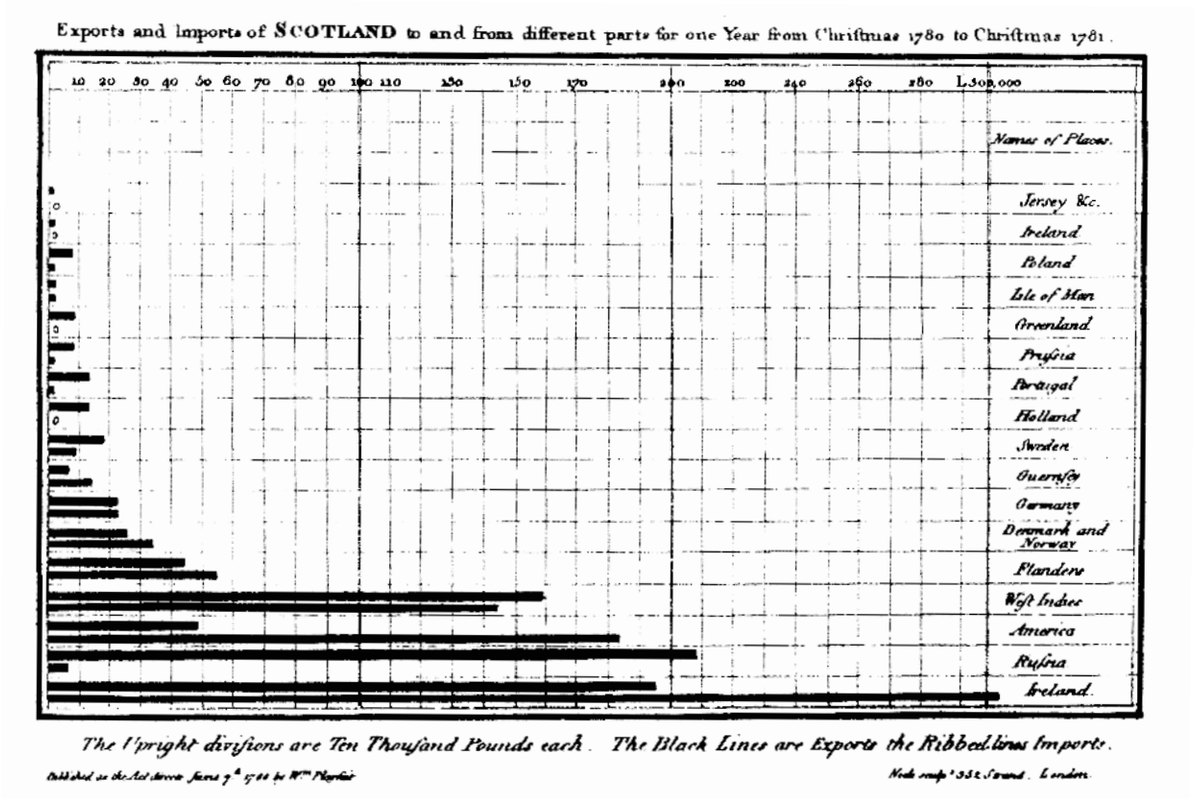
A New Chart of History: Joseph Priestley, published 1769. Priestley believed this chart would "impress" upon students "a just image of the rise, progress, extent, duration, and contemporary state of all the considerable empires that have ever existed in the world"

(Source: http://en.wikipedia.org/wiki/File:A_New_Chart_of_History.jpg, http://en.wikipedia.org/wiki/Joseph_Priestly)



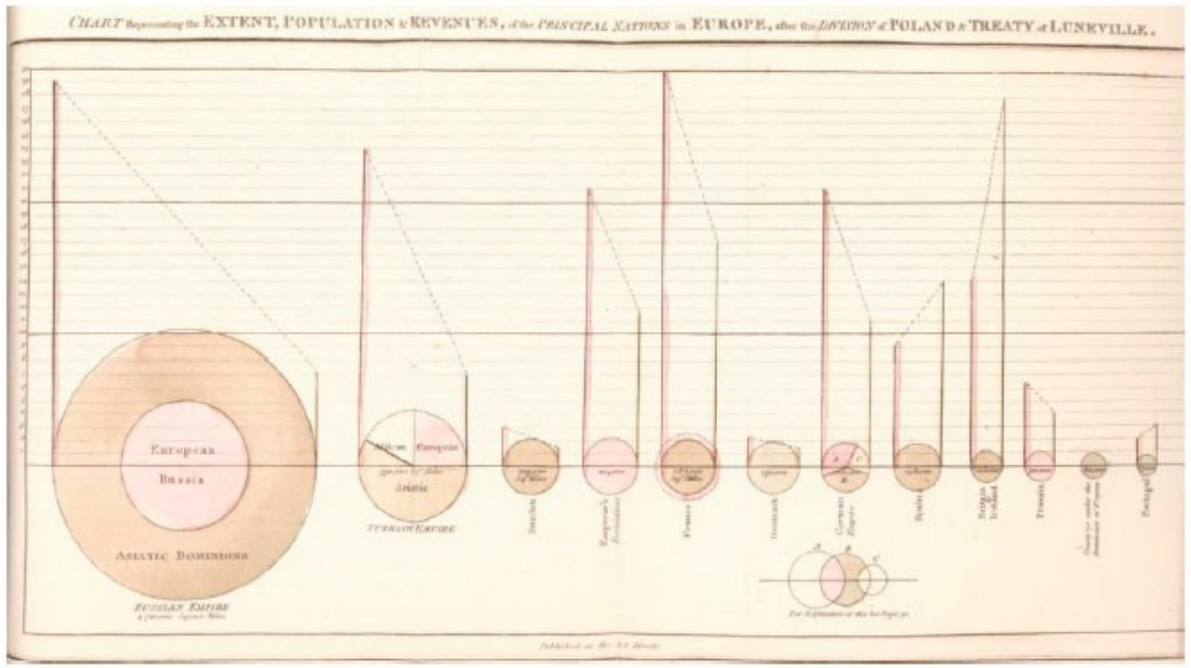
The Scottish "engineer, political economist and scoundrel" William Playfair is credited with inventing the line, bar and pie charts. This chart is from his book "Commercial and political atlas" from 1786. While gathering data for these time-series he could only get data for Scotland for a single year. This led him to invent the bar chart.

(Sources: http://en.wikipedia.org/wiki/File:Playfair_TimeSeries-2.png, http://en.wikipedia.org/wiki/William_Playfair)



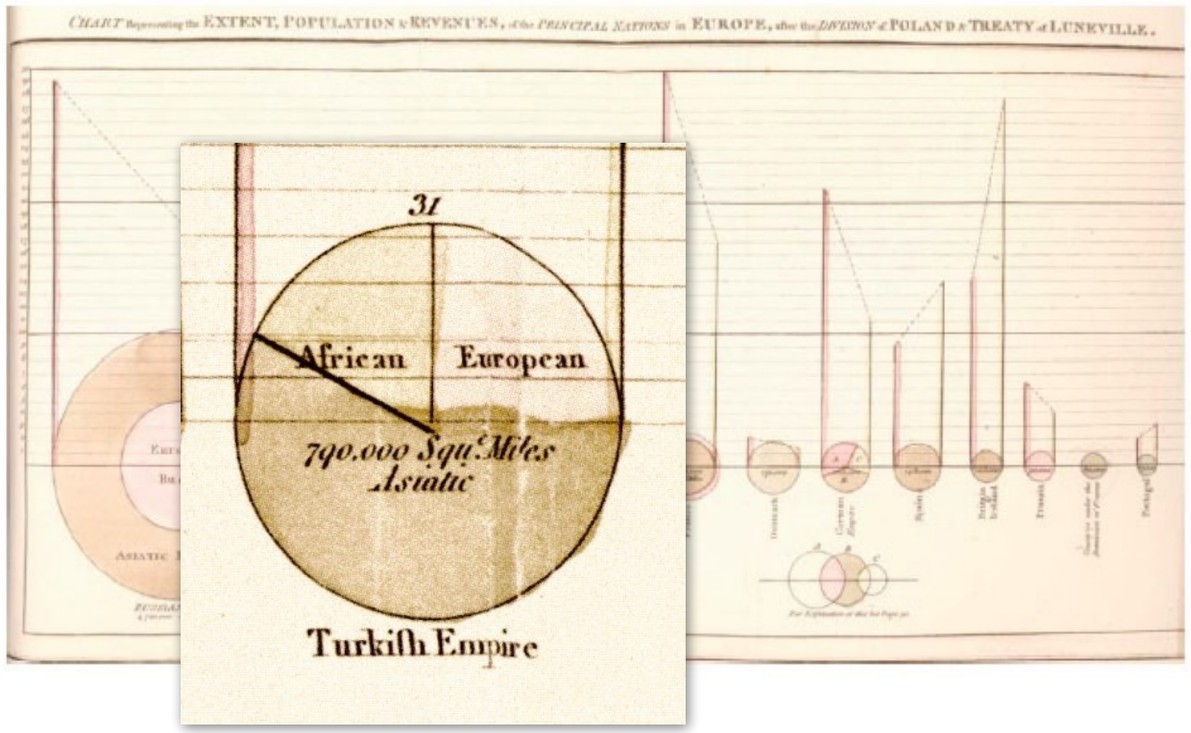
This bar chart, the first ever drawn, shows the "Exports and Imports of Scotland to and from different parts for one Year from Christmas 1780 to Christmas 1781".

(Source: http://en.wikipedia.org/wiki/File:Playfair_Barchart.gif)



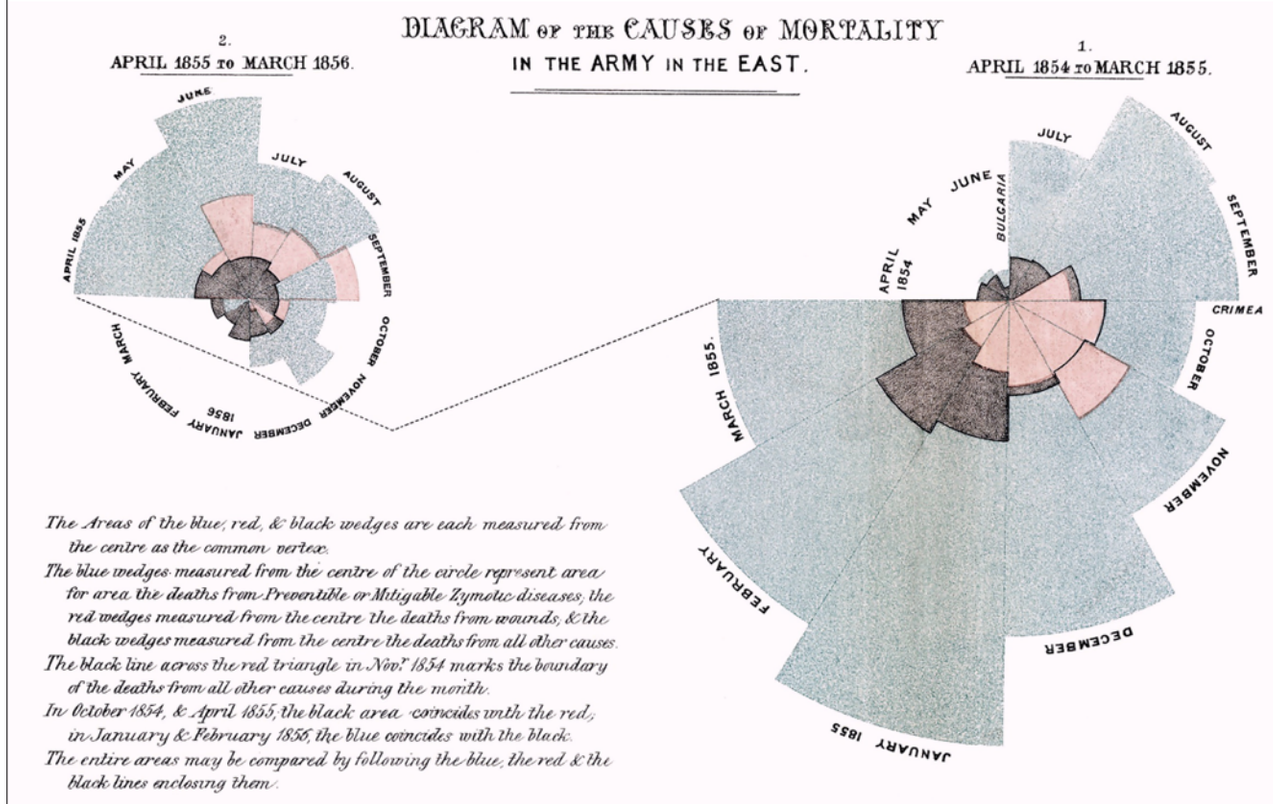
Playfair's invention, the pie charts (1801, The statistical breviary), still causes heated debates in the circles of data visualization and infographers. The pie has been proven to be less effective in carrying the message of exact values. But it's pleasing to the eye and is carries some feeling that seems to be hard to shake off.

(Source: http://dashboardspy.com/dashboards/31/the-first-pie-chart/)



Playfair's invention, the pie charts (1801, The statistical breviary), still causes heated debates in the circles of data visualization and infographers. The pie has been proven to be less effective in carrying the message of exact values. But it's pleasing to the eye and is carries some feeling that seems to be hard to shake off.

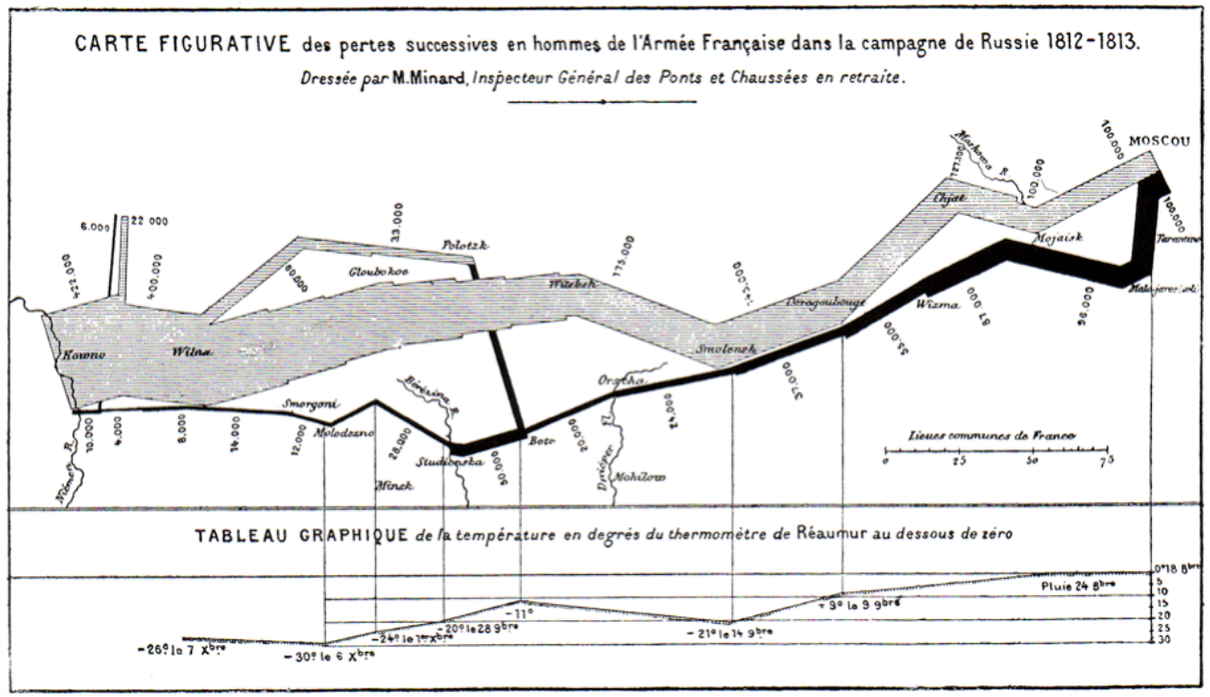
(Source: http://dashboardspy.com/dashboards/31/the-first-pie-chart/)



The "loss of an army", 1858. Florence Nightingale was among the first ever to apply statistics to healthcare and undoubtedly the first to change the conditions based on such data. Nightingale had to get a large amount of numbers to the Queen whom she could not expect to have much (or any) knowledge of statistics) — so she used graphical representations. She is said to have created the coxcomb chart realising that a bar chart is less exciting.

This may have been the first use of a data visualization to persuade people of the need for change.

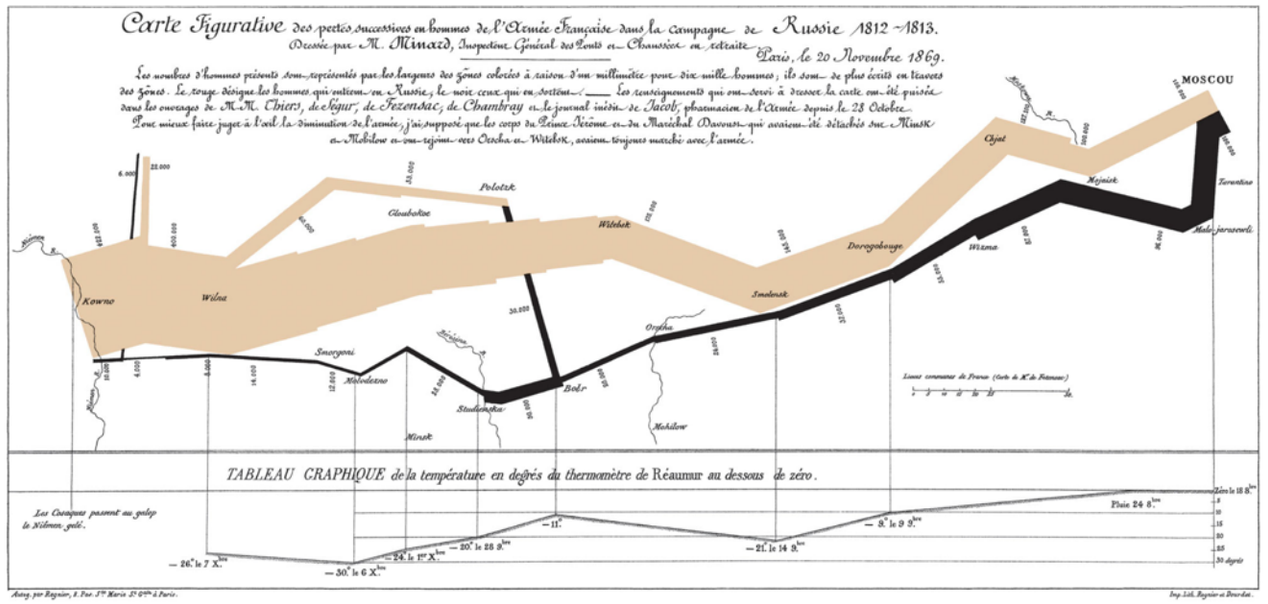
(Source: http://eagereyes.org/blog/2009/shining-a-light-on-data-florence-nightingale.html)



Xbre = December 9bre = November 8bre = October

This is a poster created in 1869 by Charles Joseph Minard. It describes the **French invasion of Russia of 1812**, an event that triggered a major shift in European politics. This chart has been described as it "defies the pen of the historian in its brutal eloquence" (Marey), and that it "may well be the best statistical graphic ever drawn" (Tufte).

(Source: http://en.wikipedia.org/wiki/File:Minard.png, http://en.wikipedia.org/wiki/Charles_Joseph_Minard)

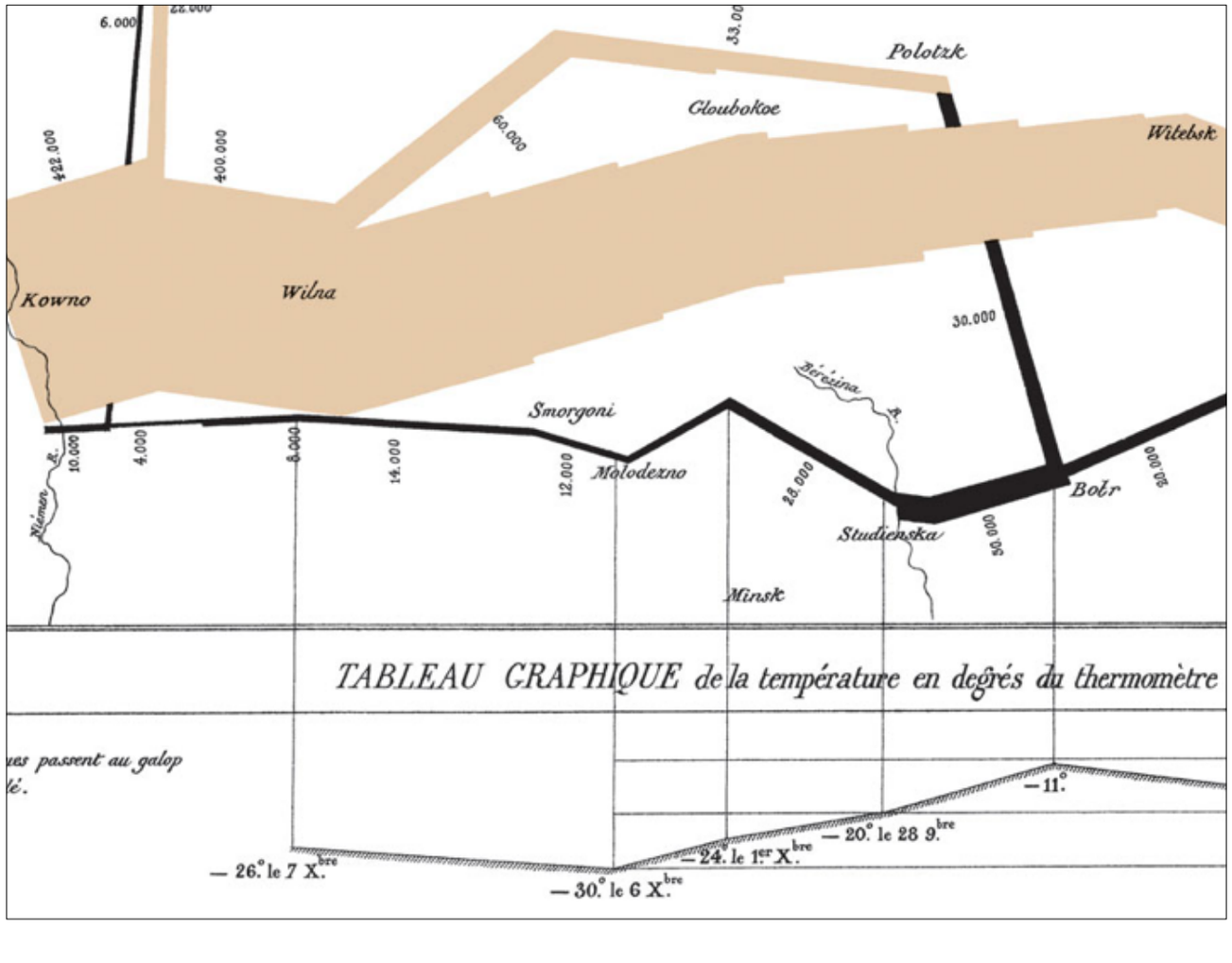


Here's a cleaned up version I found on the Wikipedia.

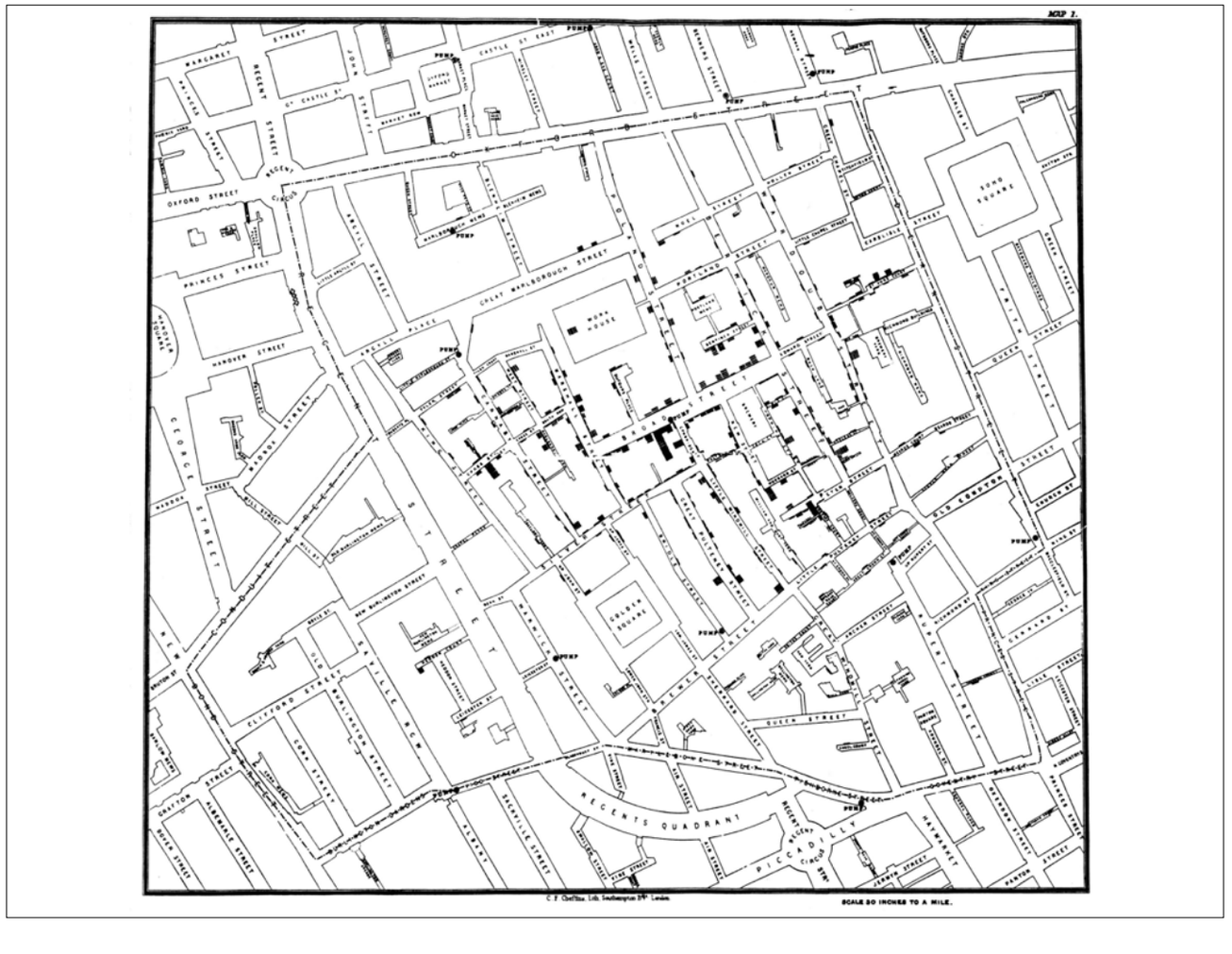
The poster was created as an anti-war poster. It shows the French army's march from the river Niemen in Polland to Moscow and back. On it you can see:

- Geographical entities and the route marched.
- How many soldiers were a part of the campaign at any point. A very impressive count-down from 400.000 to 100.000 and ending in only 10.000.
- The tempereature on the way back (Multiply Réaumur temperatures by 1¼ to get Celsius, e.g. −30°R = −37.5 °C)
- The time it took to retreat back to Polland.

(Source: http://en.wikipedia.org/wiki/File:Minard.png, http://en.wikipedia.org/wiki/Charles_Joseph_Minard)

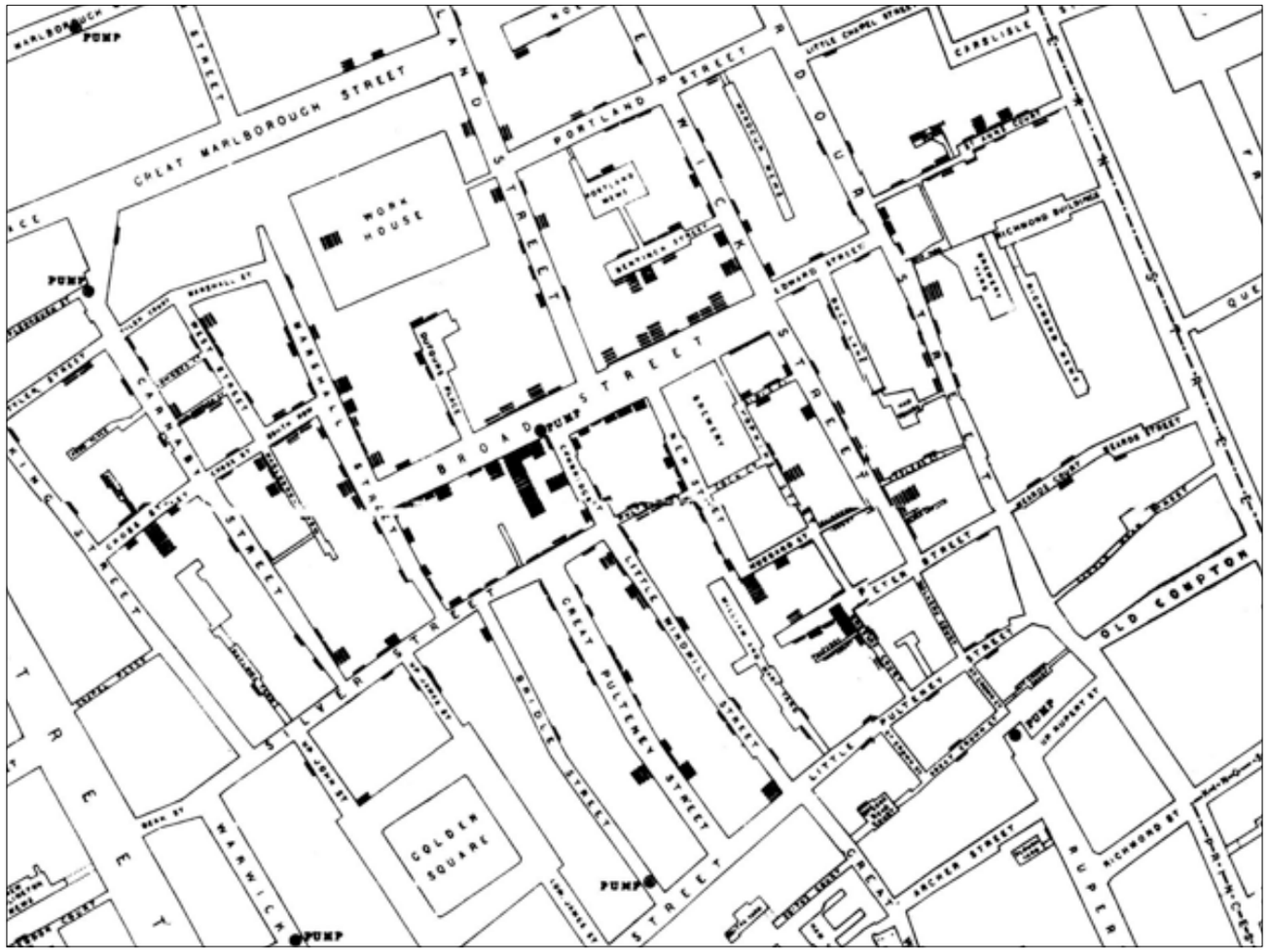


You can see where a fraction of the army that had split from the main body rejoines them at Botr. Also how crossing the river Studienska in -25°C halved the retreating army.



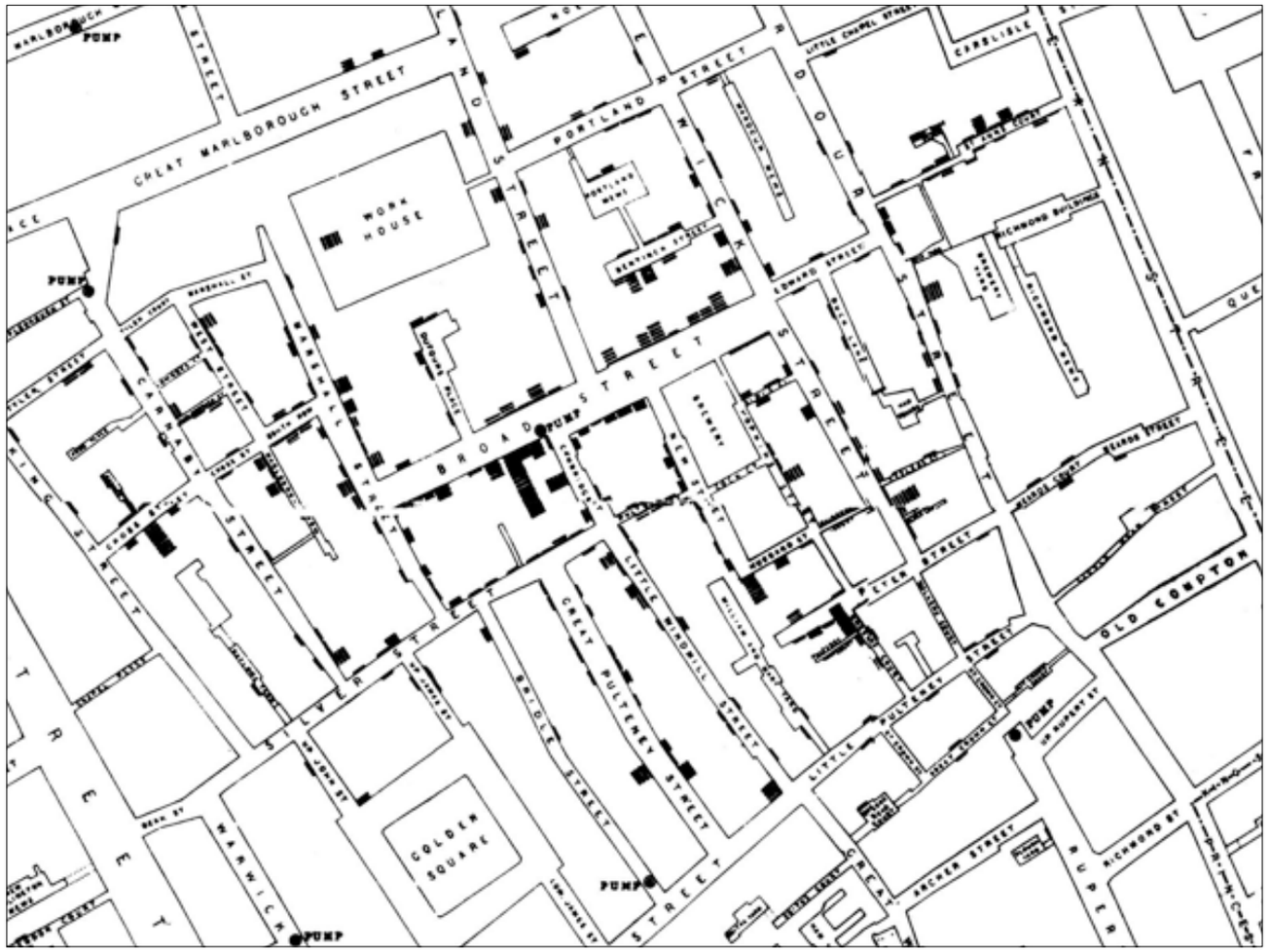
This is a chart created by dr. John Snow in 1854. In this time the belief was that the spreading of diseases such as cholera and black death was caused by pollution or a nauxious form of “bad air”, called the miasma theory.

(Sources: http://en.wikipedia.org/wiki/John_Snow_(physician), http://upload.wikimedia.org/wikipedia/commons/2/27/Snow-cholera-map-1.jpg)



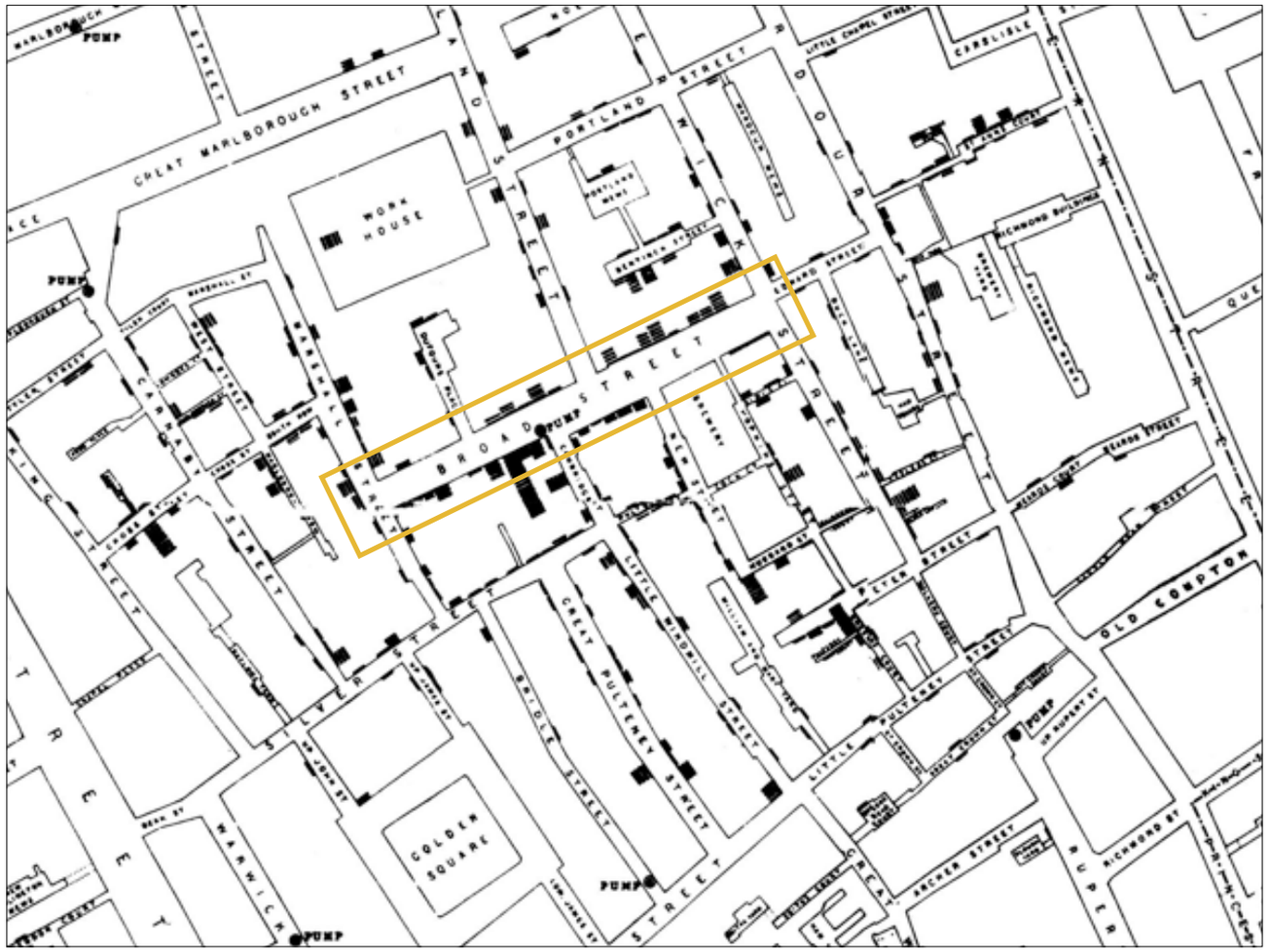
Dr. Snow was a sceptic of this theory and after gathering data from the local residents, identified the source of the outbreak as the waterpump on Broad Streed (now Broadwick Street). “Snow's study was a major event in the history of public health, and geography, and can be regarded as the founding event of the science of epidemiology.”

(Sources: http://en.wikipedia.org/wiki/John_Snow_(physician), http://upload.wikimedia.org/wikipedia/commons/2/27/Snow-cholera-map-1.jpg)



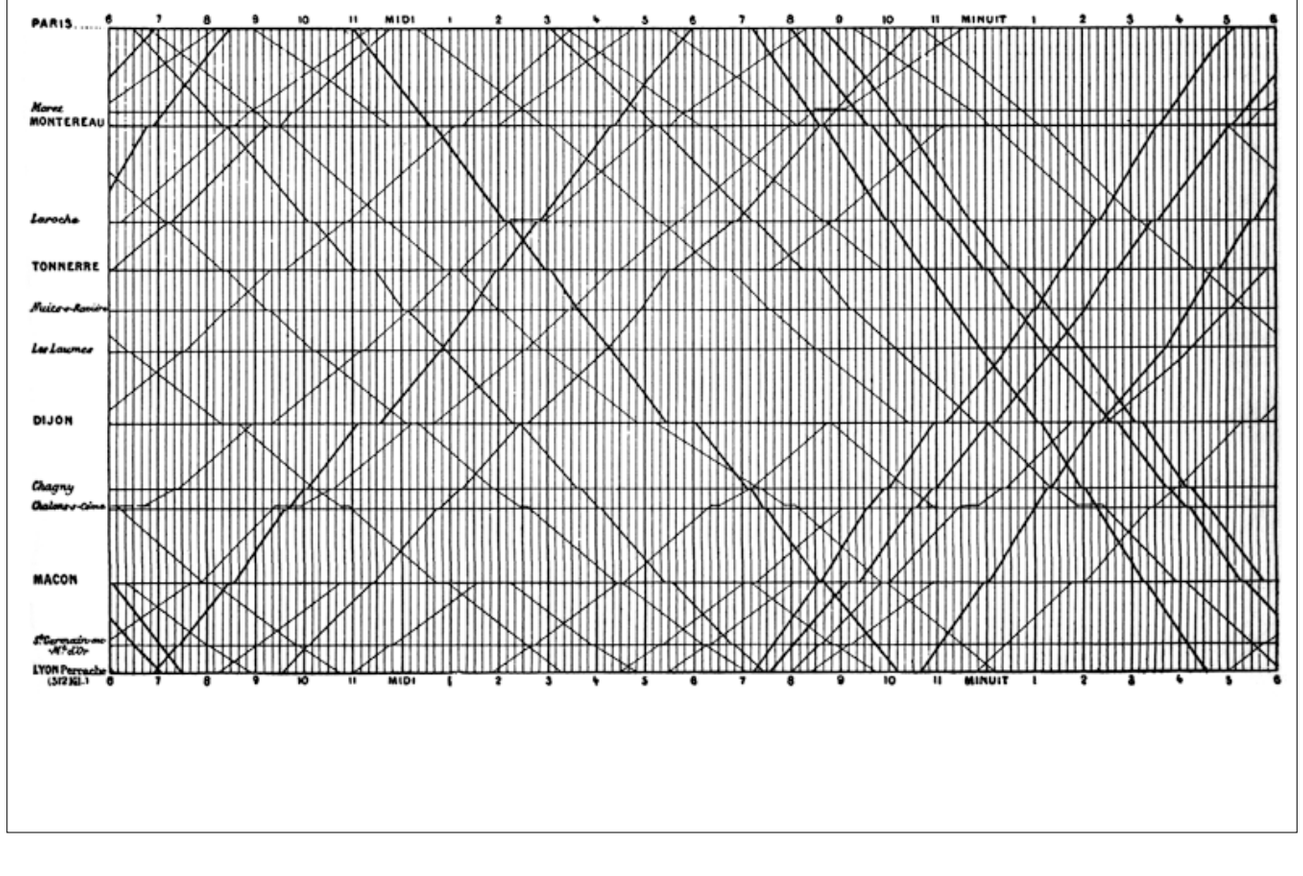
Dr. Snow was a sceptic of this theory and after gathering data from the local residents, identified the source of the outbreak as the waterpump on Broad Streed (now Broadwick Street). “Snow's study was a major event in the history of public health, and geography, and can be regarded as the founding event of the science of epidemiology.”

(Sources: http://en.wikipedia.org/wiki/John_Snow_(physician), http://upload.wikimedia.org/wikipedia/commons/2/27/Snow-cholera-map-1.jpg)

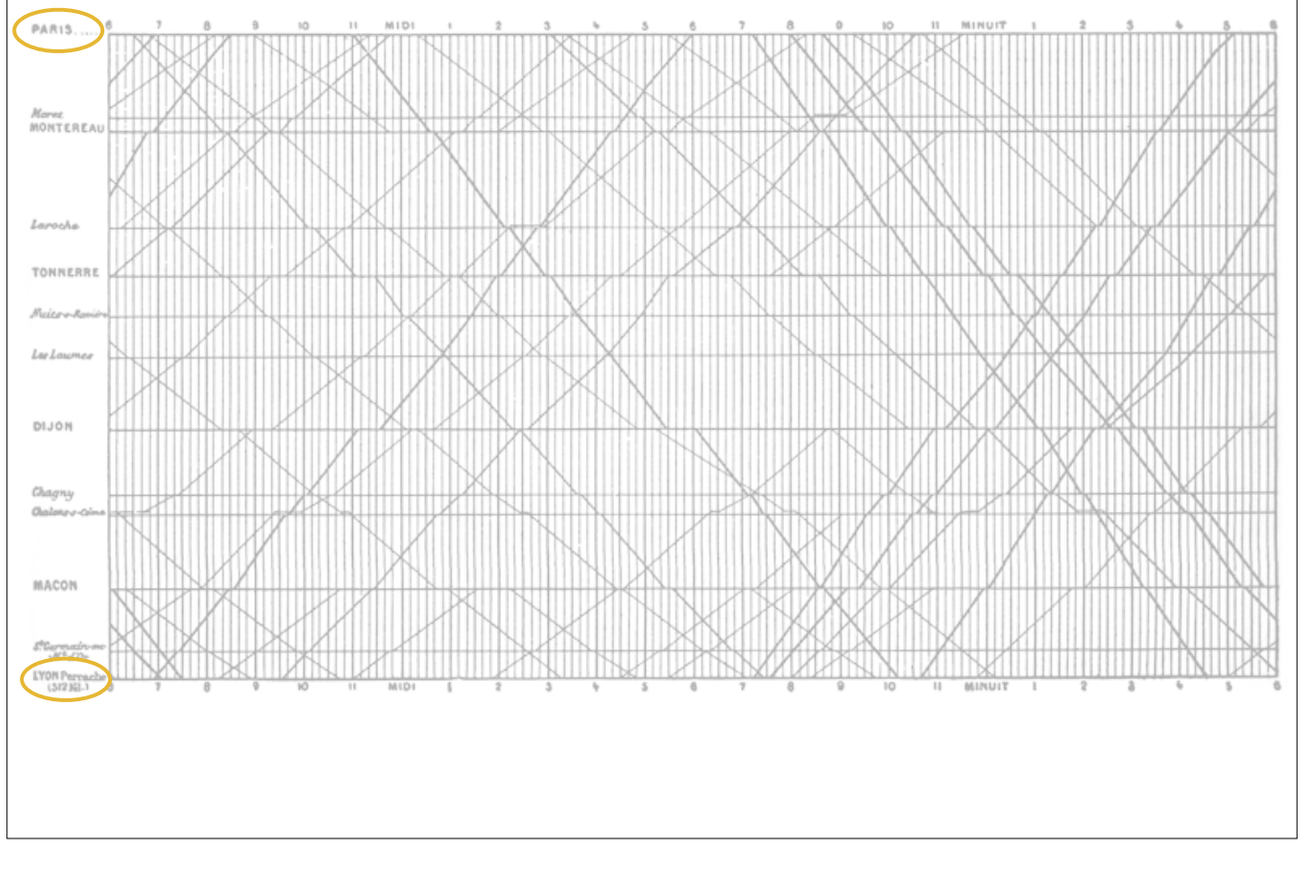


Dr. Snow was a sceptic of this theory and after gathering data from the local residents, identified the source of the outbreak as the waterpump on Broad Streed (now Broadwick Street). “Snow's study was a major event in the history of public health, and geography, and can be regarded as the founding event of the science of epidemiology.”

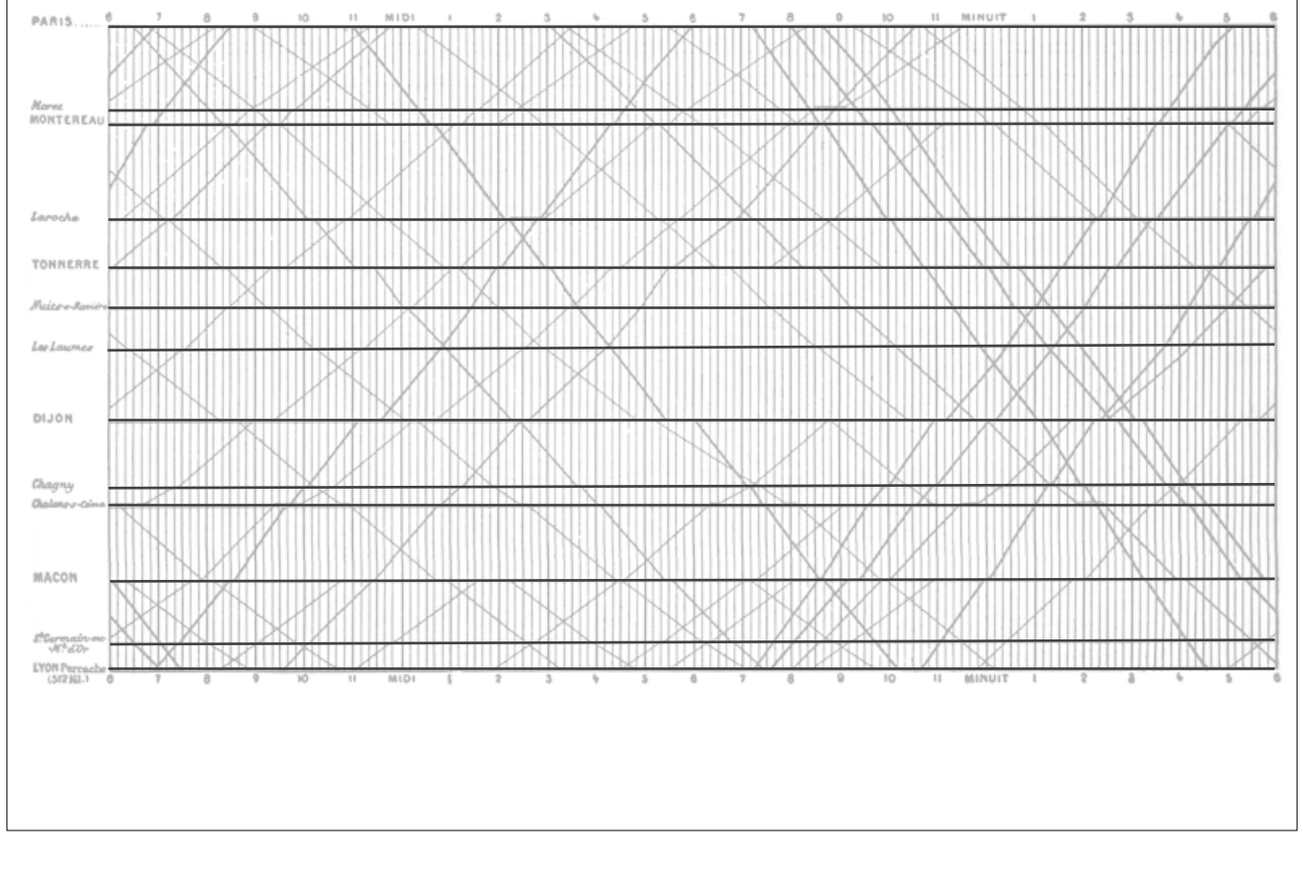
(Sources: http://en.wikipedia.org/wiki/John_Snow_(physician), http://upload.wikimedia.org/wikipedia/commons/2/27/Snow-cholera-map-1.jpg)



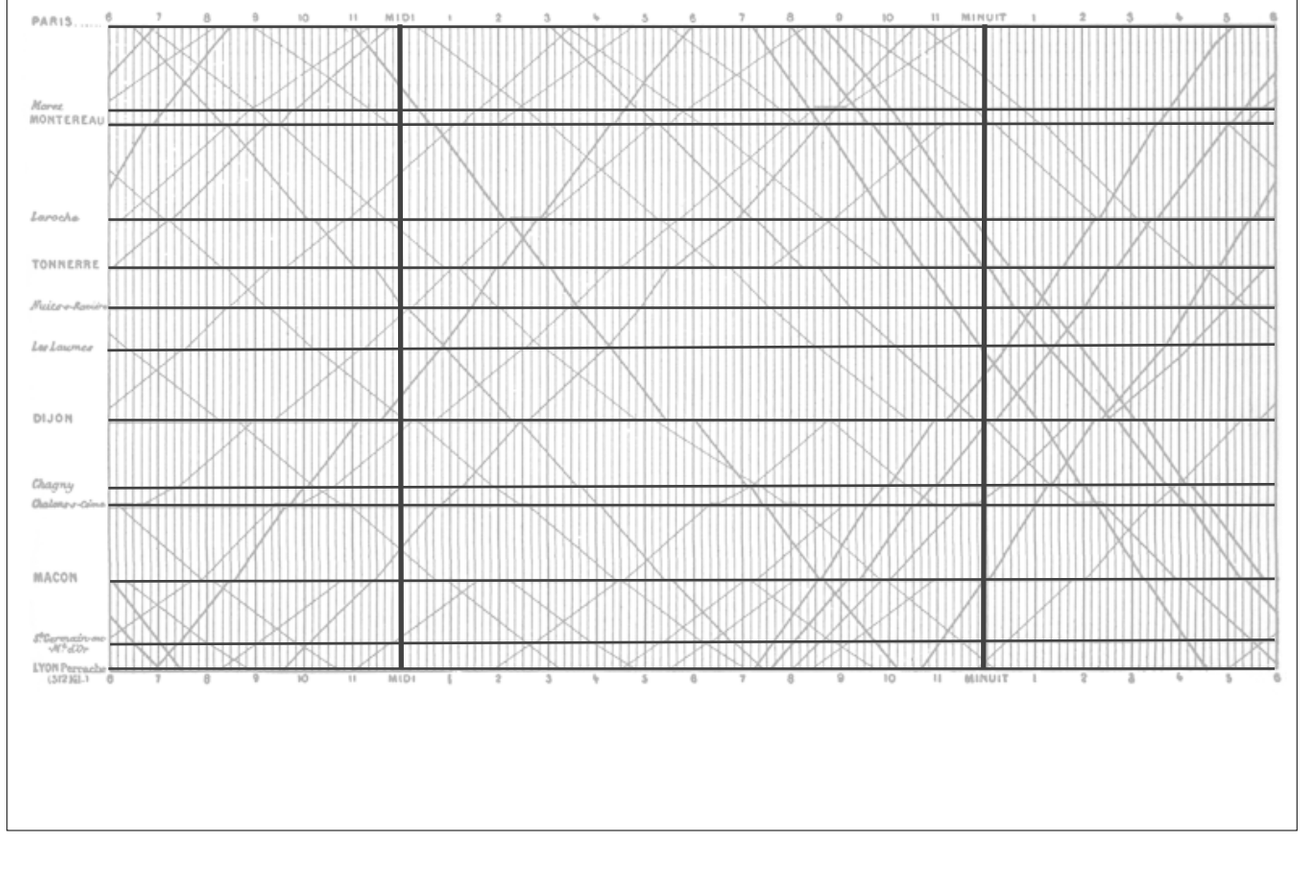
Train Schedule, Paris - Lyon (1885) Étienne Jules Marey. A graphic representation of a train schedule showing rate of travel along the route from Paris to Lyon. (The method is attributed to the French engineer Ibry).



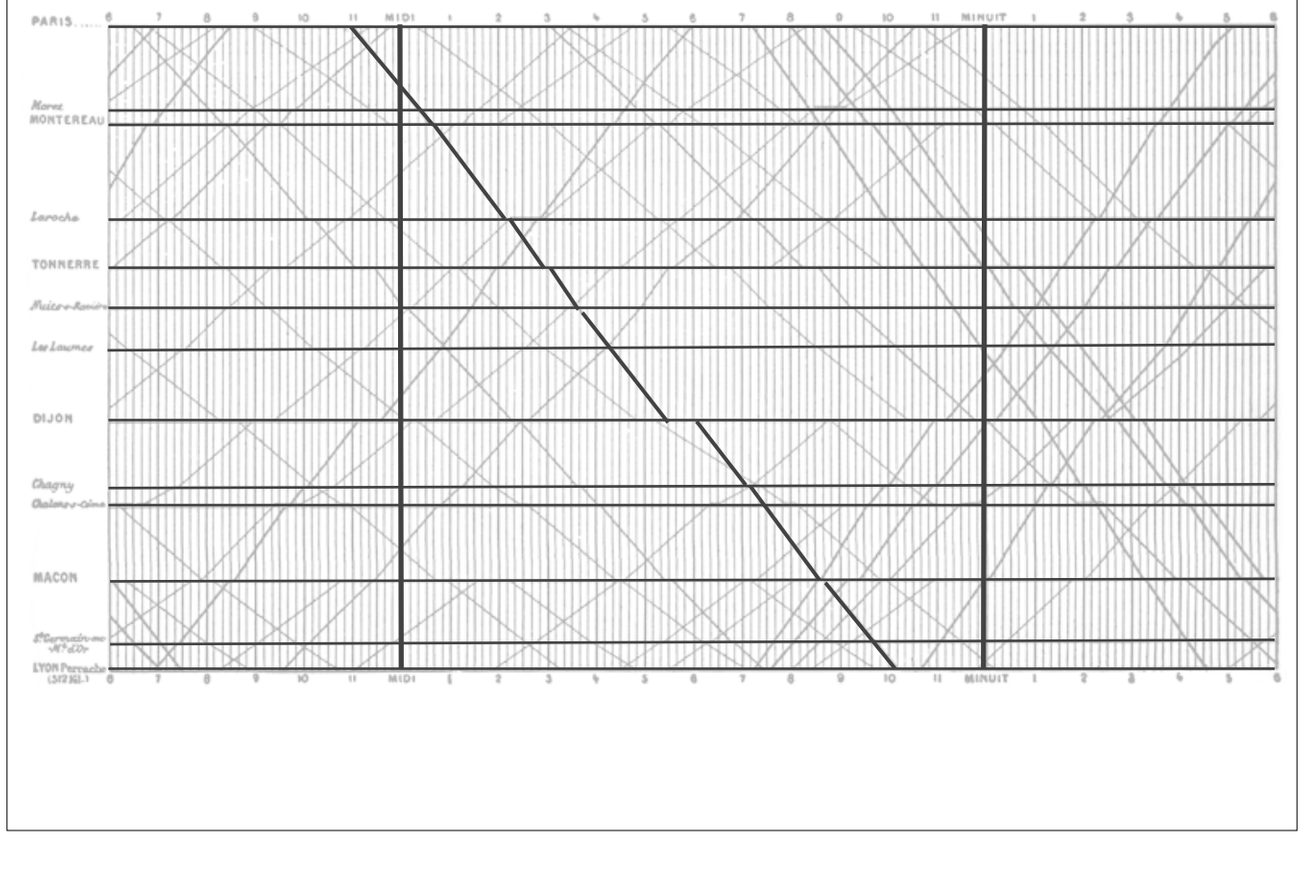
The horizontal lines show the stops with geographically proportional gaps. The vertical lines show the time with ten minute intervals. The cris-crosses are trains, travelling from one place to another, up and down the chart (from left to right). The slope of their lines shows the speed.



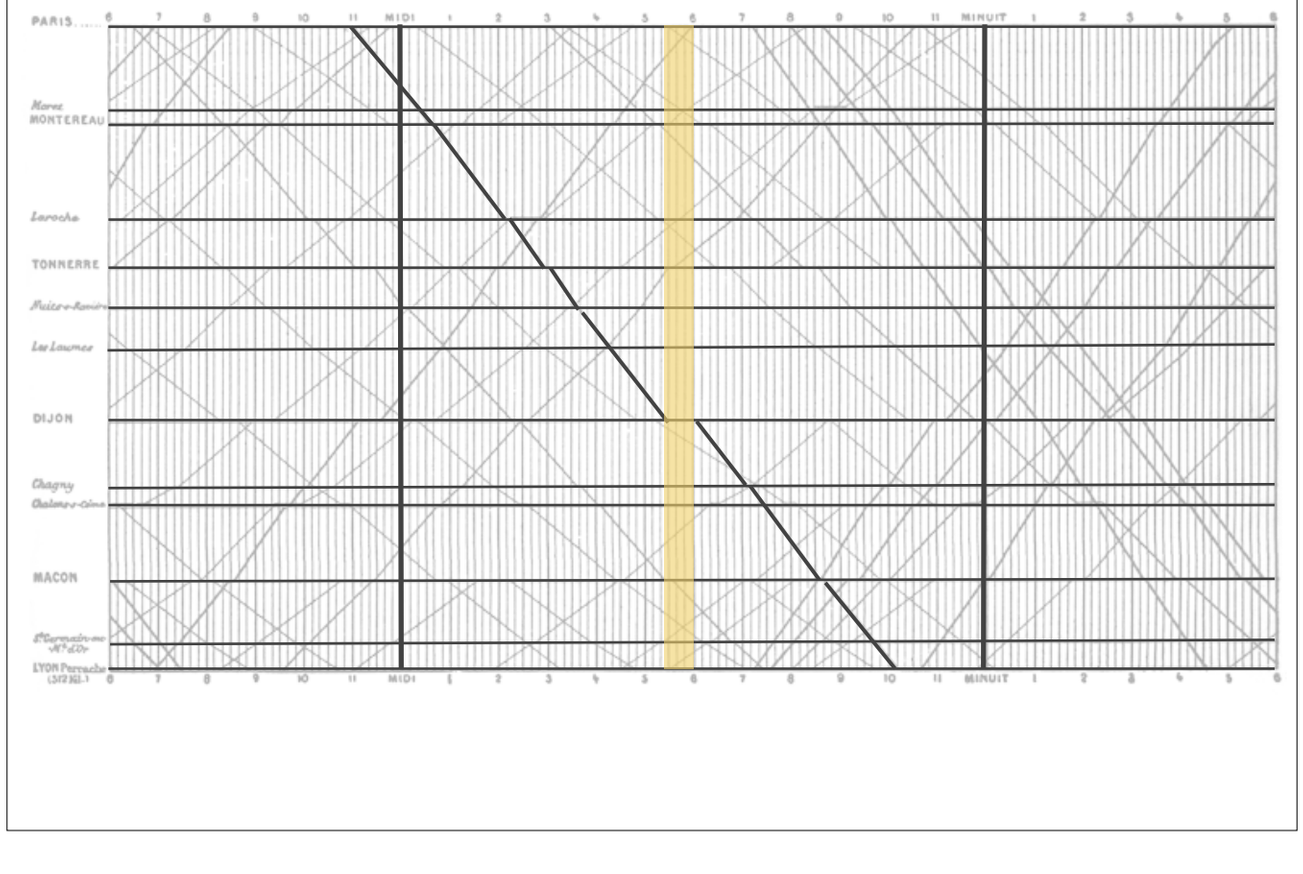
The horizontal lines show the stops with geographically proportional gaps. The vertical lines show the time with ten minute intervals. The cris-crosses are trains, travelling from one place to another, up and down the chart (from left to right). The slope of their lines shows the speed.



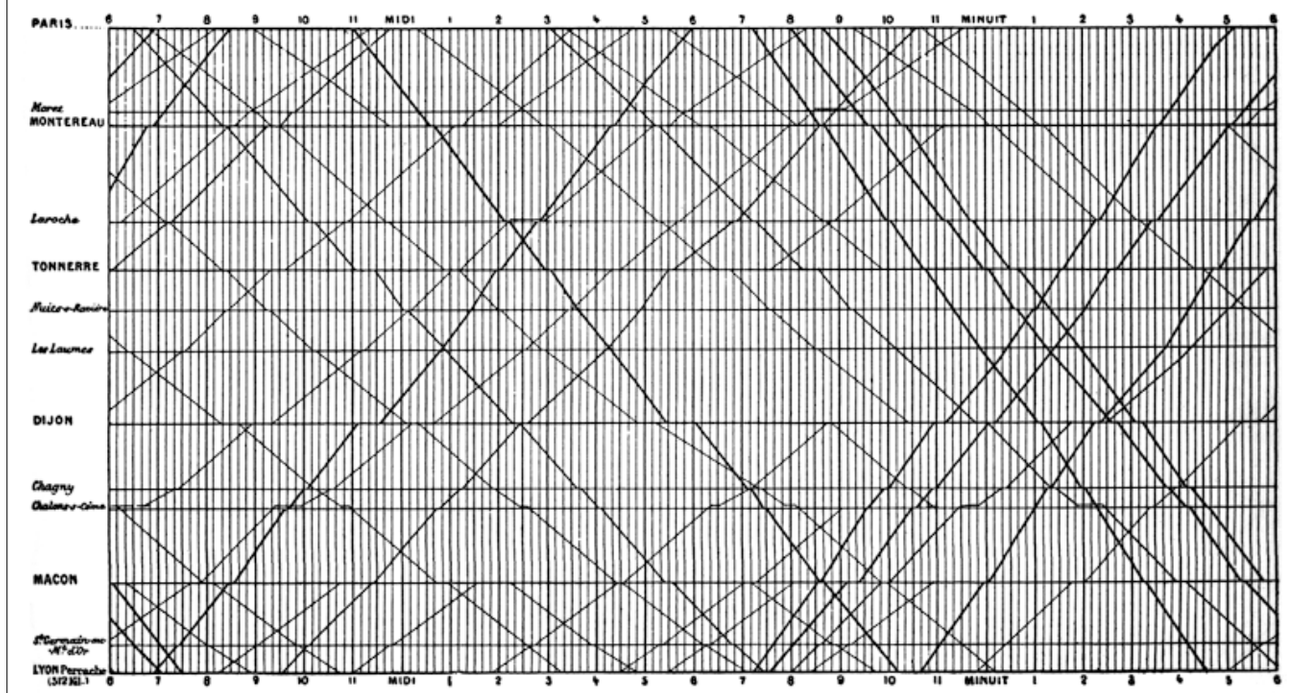
The horizontal lines show the stops with geographically proportional gaps. The vertical lines show the time with ten minute intervals. The cris-crosses are trains, travelling from one place to another, up and down the chart (from left to right). The slope of their lines shows the speed.



The horizontal lines show the stops with geographically proportional gaps. The vertical lines show the time with ten minute intervals. The cris-crosses are trains, travelling from one place to another, up and down the chart (from left to right). The slope of their lines shows the speed.



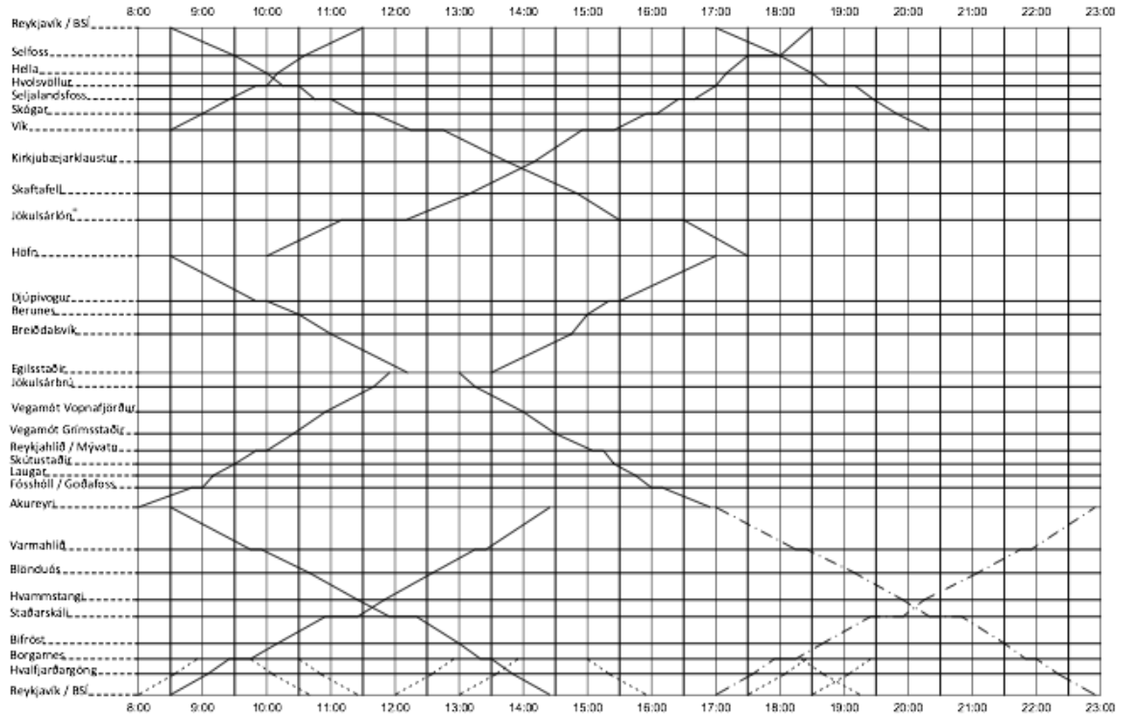
The horizontal lines show the stops with geographically proportional gaps. The vertical lines show the time with ten minute intervals. The cris-crosses are trains, travelling from one place to another, up and down the chart (from left to right). The slope of their lines shows the speed.



Here it is again.

Tímatafla fyrir áætlunarferðir á hringveginum

tímabil 15.05.- 15.09.2011



Leiðbeiningar

daglegar ferðir

fös, sun 15.05. - 19.06.
og 01.09. - 15.09.
daglega 20.06. - 31.08.

sjá töflu hér til hliðar

*Jökulsárlón: möguleiki að fara í bátsferð á lóninu

BSÍ Reykjavík- Borgarnes

frá Reykjavík	vikudagur	tímabil
08:00	daglega	20.06. - 31.08.
12:00	þri, fös	01.06. - 31.08.
13:00	sun - fös	15.05. - 15.09.
17:30	mán, þri, fim, fös	15.05. - 15.09.
18:30	sun	15.05. - 15.09.

Borgarnes - BSÍ Reykjavík

frá Borgarnes	vikudagur	tímabil
09:45	mán, þri, fim, fös	15.05. - 15.09.
10:30	þri, fös	01.06. - 31.08.
15:00	sun - fös	15.05. - 15.09.
18:20	mán - lau	20.06. - 31.08.

Heimild: www.sterna.is

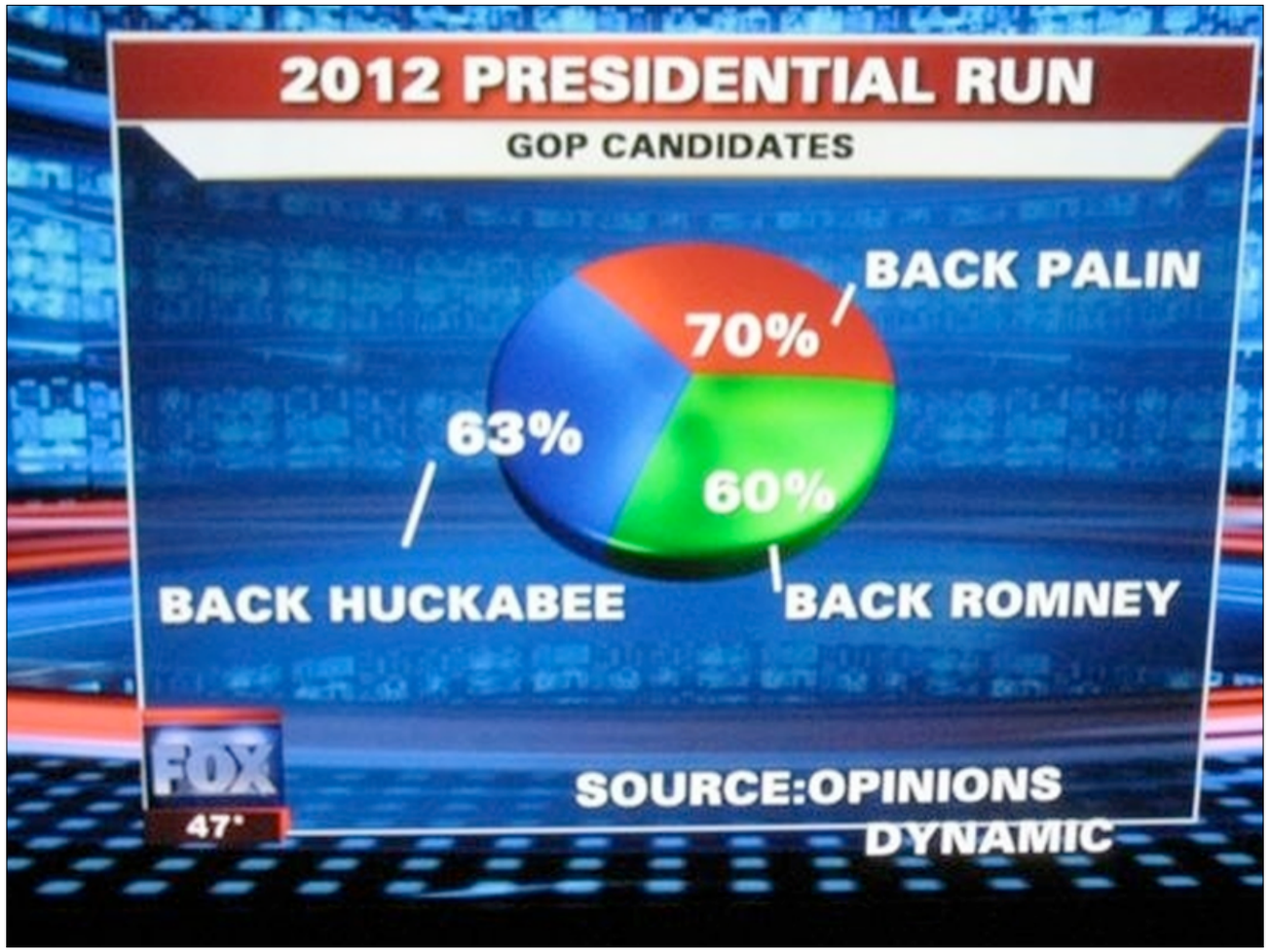
Hall of shame

“There's an old saying in Tennessee — I know it's in Texas, probably in Tennessee — that says, fool me once — shame on — shame on you. You fool me, you can't get fooled again.“

— George W. Bush

“In the two centuries since [the invention of the first graphs], ...charts have become commonplace. With the advent of modern computer tools, creating graphs from data involves trivial effort. In fact, it has probably become too easy. Graphs are often produced without thought for their main purpose: to enlighten and inform the reader.”

— Jonathan G. Koomey, Turning Numbers into Knowledge, Analytics Press, 2001



This is an actual screen grab from Fox.

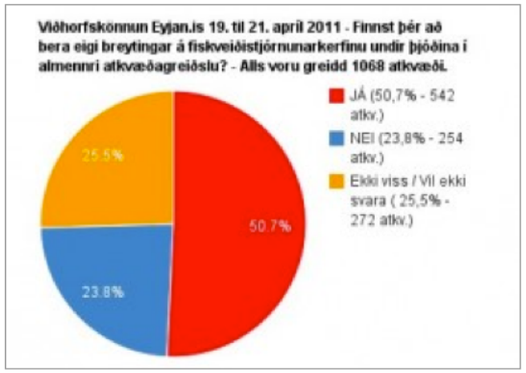

HEAD TO HEAD
PREMIER LEAGUE
QPR
3
ASTON VILLA
4
DRAWN
1
skysports.com/skygo


HEAD TO HEAD
AT LOFTUS ROAD
QPR
3
ASTON VILLA
0
DRAWN
1
skysports.com/skygo


HEAD TO HEAD
AT LOFTUS ROAD
QPR
3
ASTON VILLA
0
DRAWN
1
skysports.com/skygo

Innlent, Viðskipti - fimmtudagur - 21.4 2011 - 13:24 - 39 ummæli

Könnun: Tveir þriðju vilja kvótann í þjóðaratkvæði



Rúmlega tveir þriðjuhlutar þeirra sem afstöðu tóku í viðhorfskönnun Eyjunnar vilja að hugsanlegar breytingar á fiskveiðistjórnunarkerfinu verði bornar undir þjóðina í almennri atkvæðagreiðslu. Rúmlega 30 prósent eru andvíg.

Eyjan spurði viðhorfshóp sinn: „Finnst þér að bera eigi breytingar á fiskveiðistjórnunarkerfinu undir þjóðina í almennri atkvæðagreiðslu?“ Alls greiddu 1.068 atkvæði.

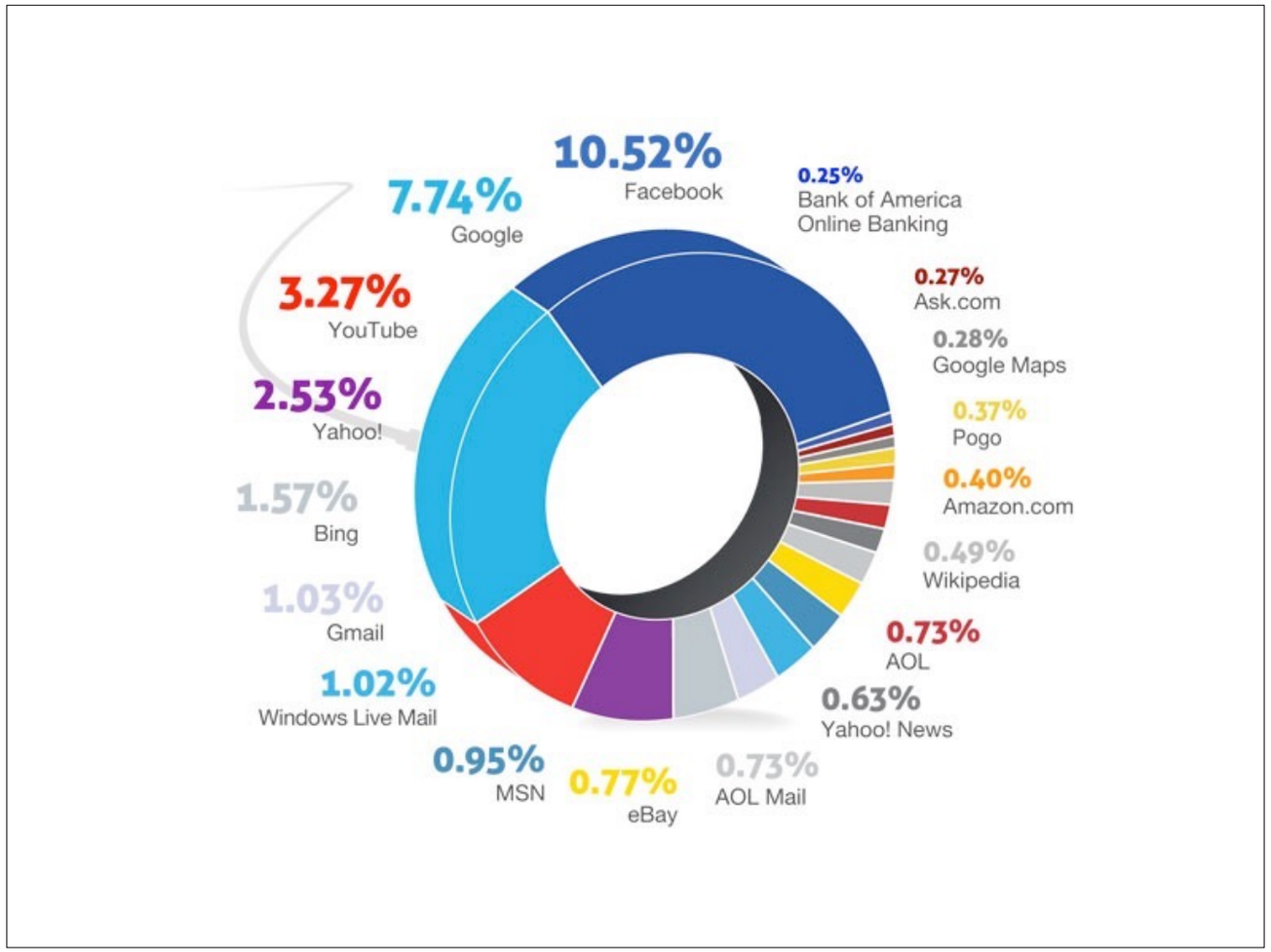
Af þeim sögðu 542 já eða 50,7 prósent. Nei sögðu 254 eða 23,8 prósent. Aðrir voru ekki vissir eða vildu ekki svara spurningunni.

Ef aðeins eru reiknaðir þeir sem tóku afstöðu eru því um 68 prósent fylgjandi almennri atkvæðagreiðslu um breytingar á kvótakerfinu.

Rétt er að taka fram að viðhorfskönnun sem þessi stenst ekki kröfur sem félagsvísindin gera til skoðanakannana, en getur verið mjög sterk vísbending ef niðurstaðan er afgerandi.

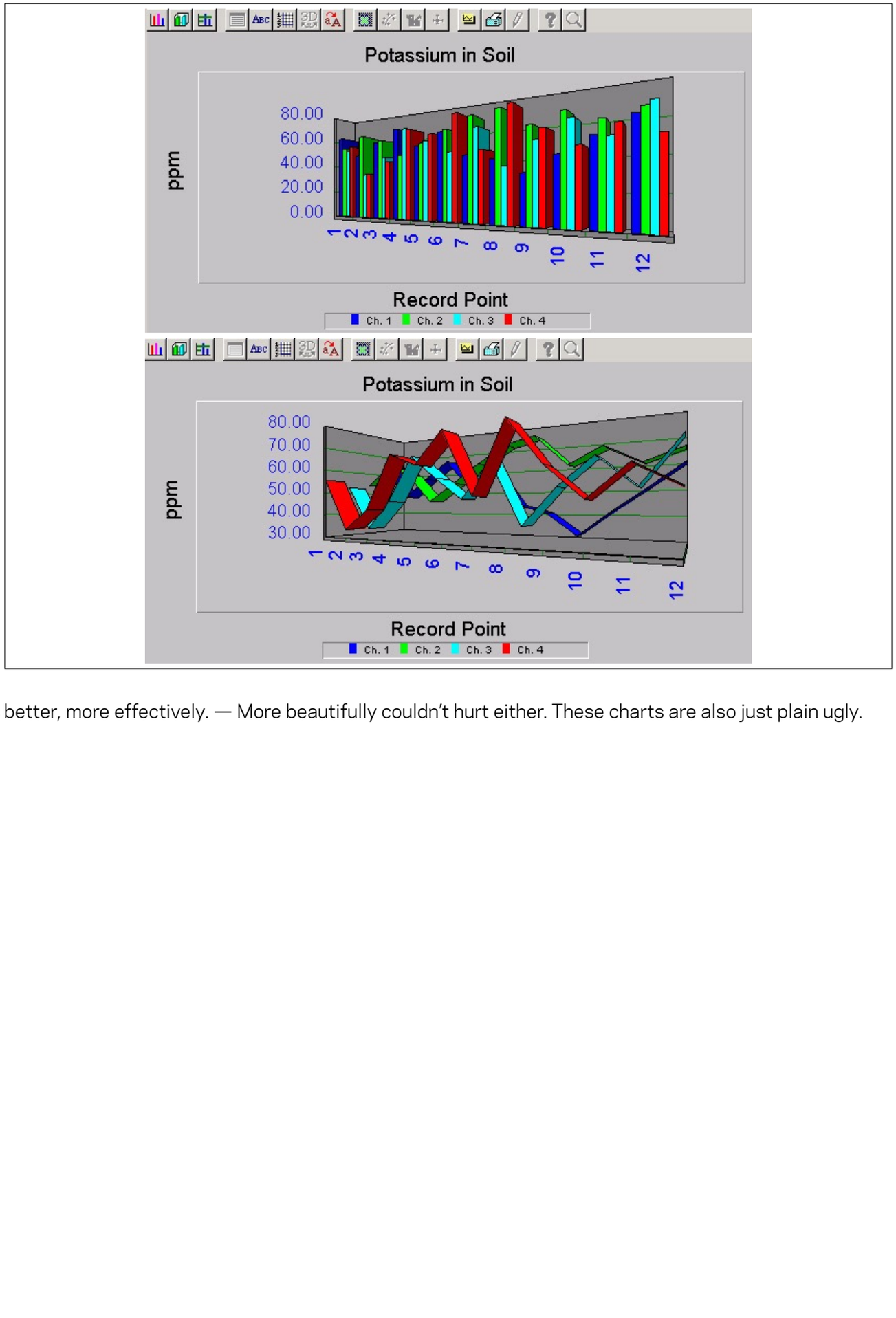
While the pie chart is correctly labeled in this image, the article's headline and first paragraph seem to be talking about some other data.

(Source: http://eyjan.is/2011/04/21/konnun-tveir-thridju-vilja-kvotann-i-thjodaratkvaedi/)

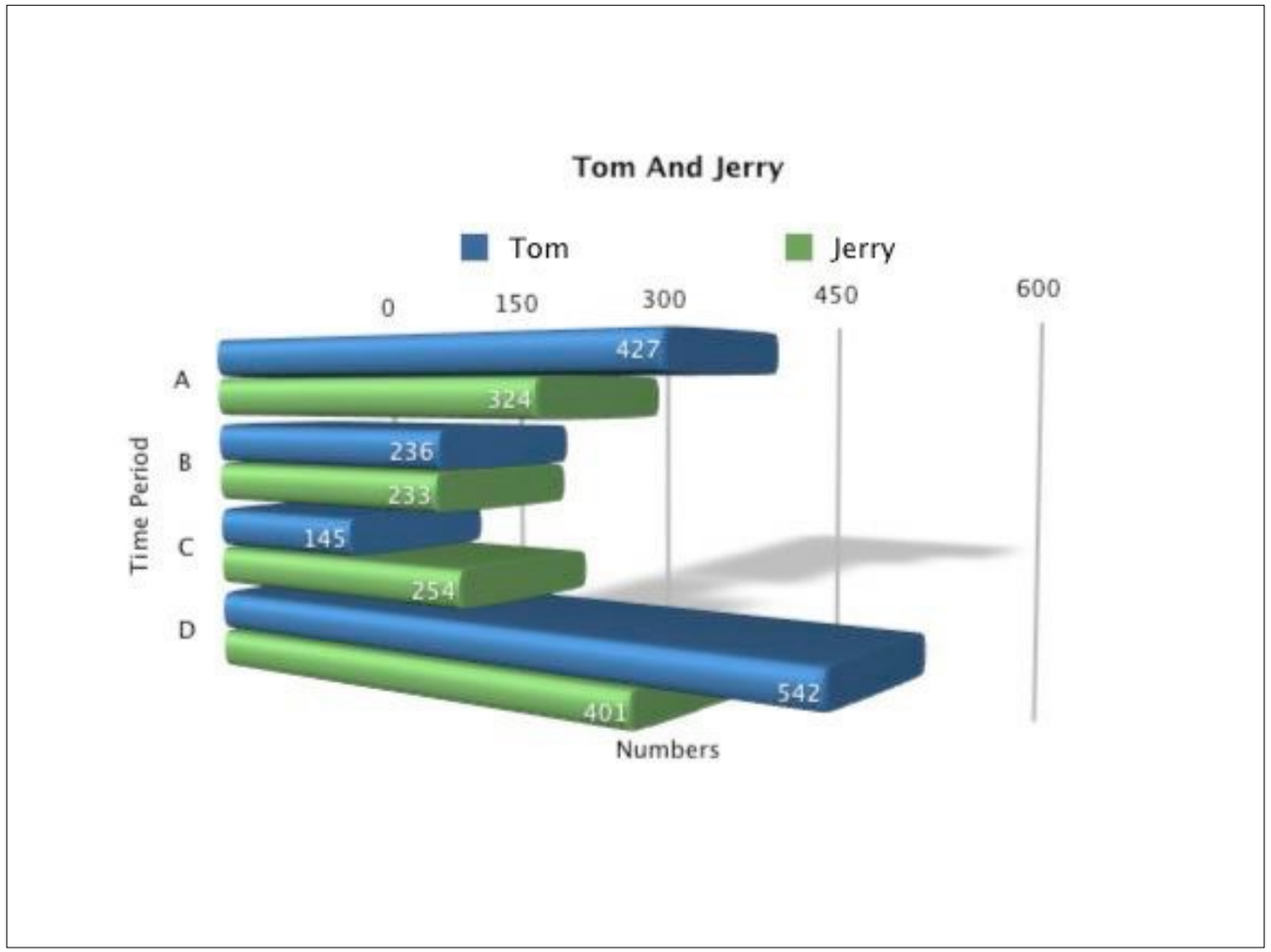


This I saw recently on Boing Boing. I can see no relation between the wedge sizes and the numbers around the polo candy.

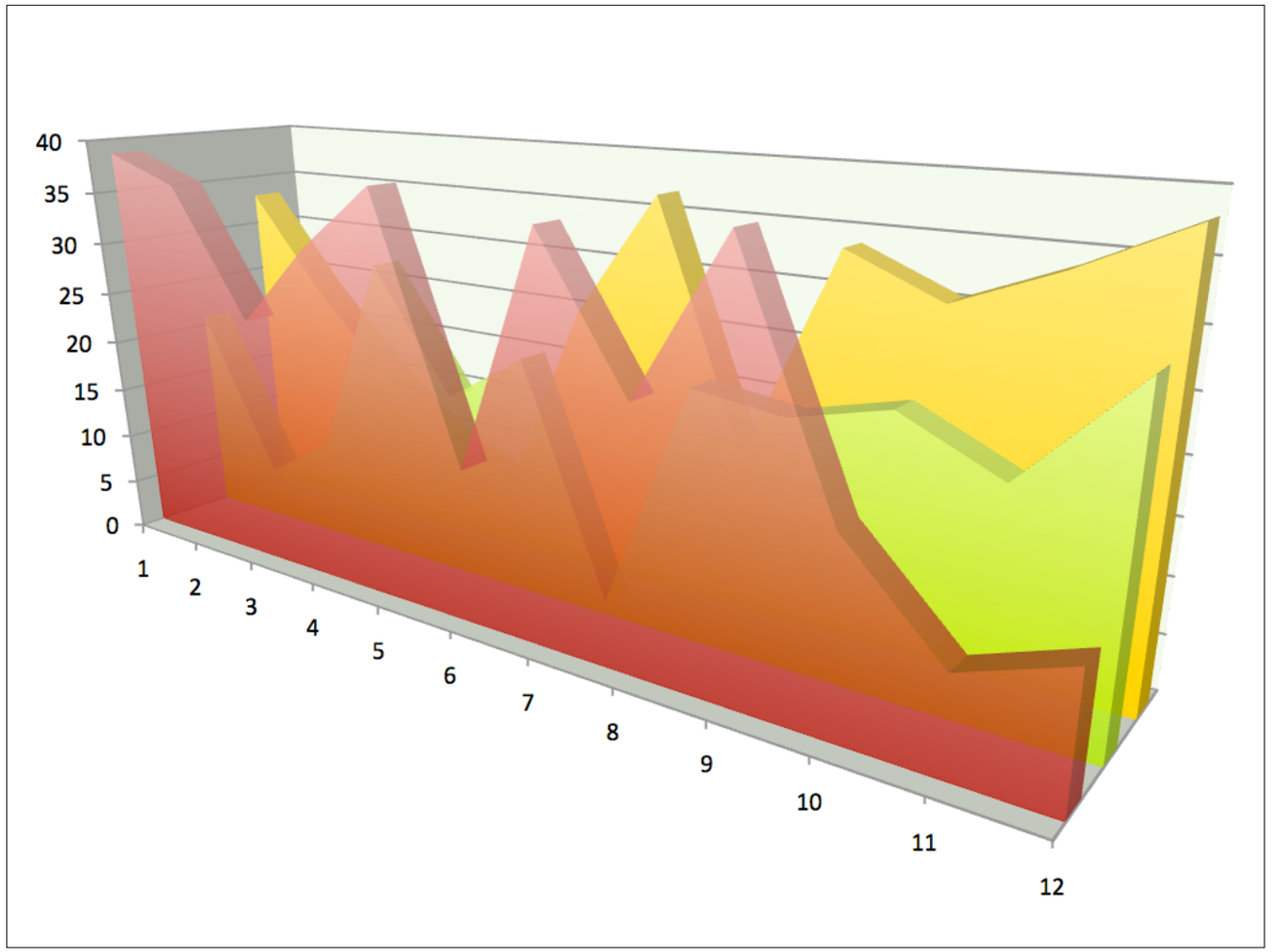
(Source: http://www.boingboing.net/2011/04/25/power.html)



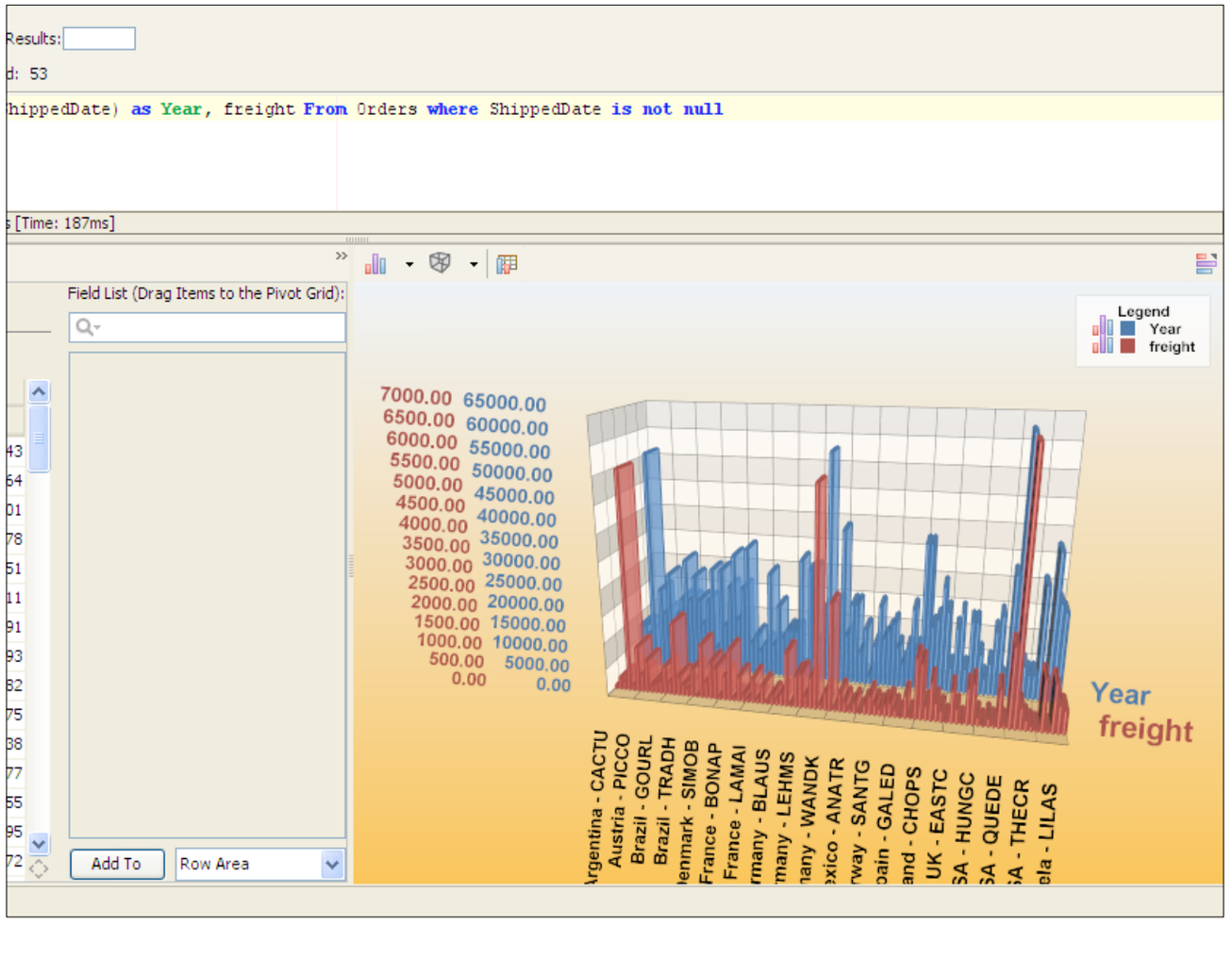
Using computers should enable us to do things better, more effectively. — More beautifully couldn't hurt either. These charts are also just plain ugly.



This chart isn't ugly, but just as uneffective and unhelpful as the ones you just saw. This example is from iWork '08's Numbers.



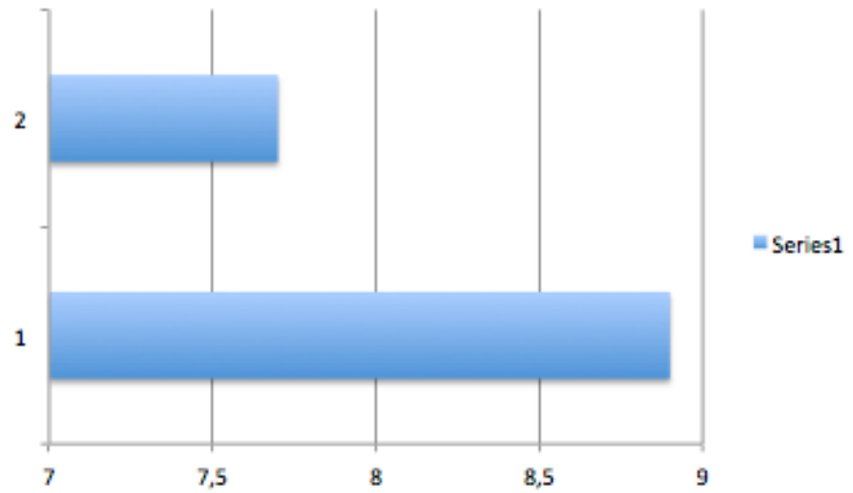
Another shiny, happy and uneffective chart. — What's the value of yellow between 3-5? What's the value of red/maroon in 4? What's the value of green in 6?



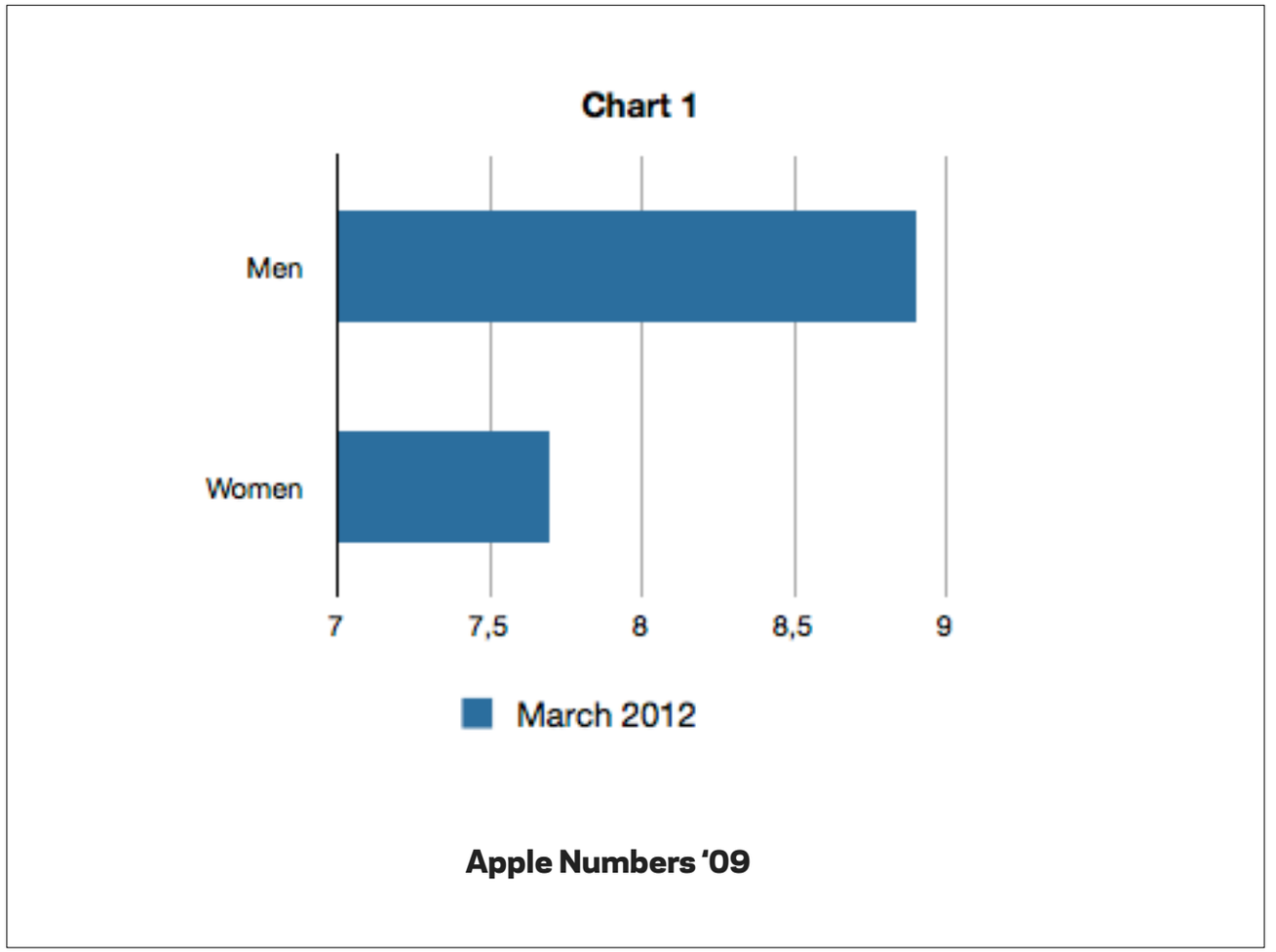
This screenshot is from the vendor's web site. It's supposed to show you how cool this piece of software is. But this is not the software's fault. We've been doing stuff like this for quite a while. Dare to guess for how long?

Well, at least since 1911. — The computers have just made it easier to draw bad charts. But also easier to draw good charts. — Emil Eugen Roesle, published in 1911 for the first International Hygiene Exhibition in Dresden.

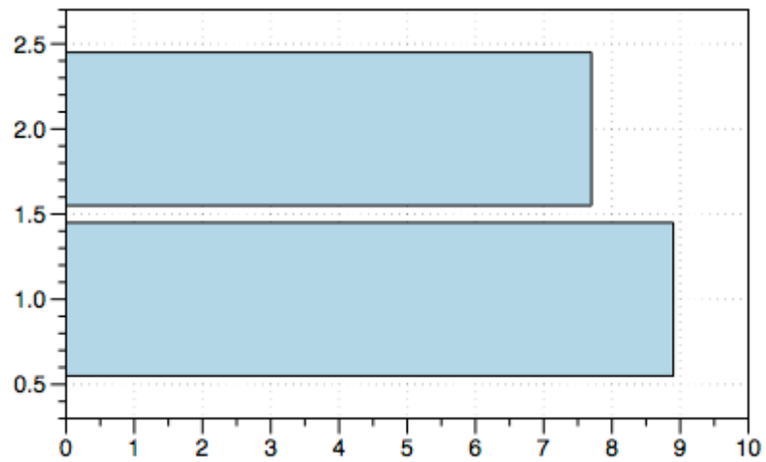
(Source: http://datavis.ca/milestones/index.php?group=1900%2B&mid=ms181)



Microsoft Excel 2011 (OS X)

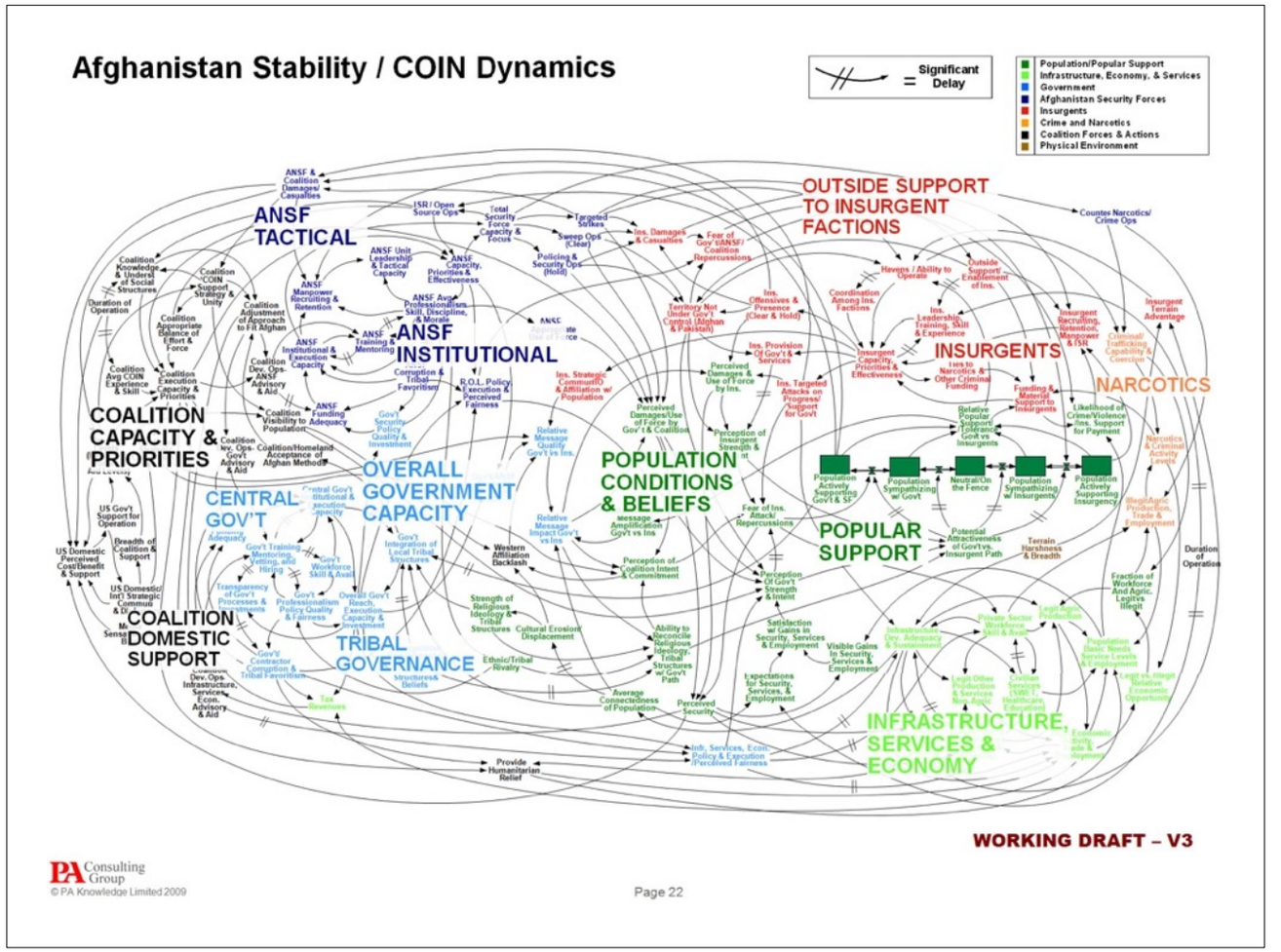


Apple Numbers ‘09



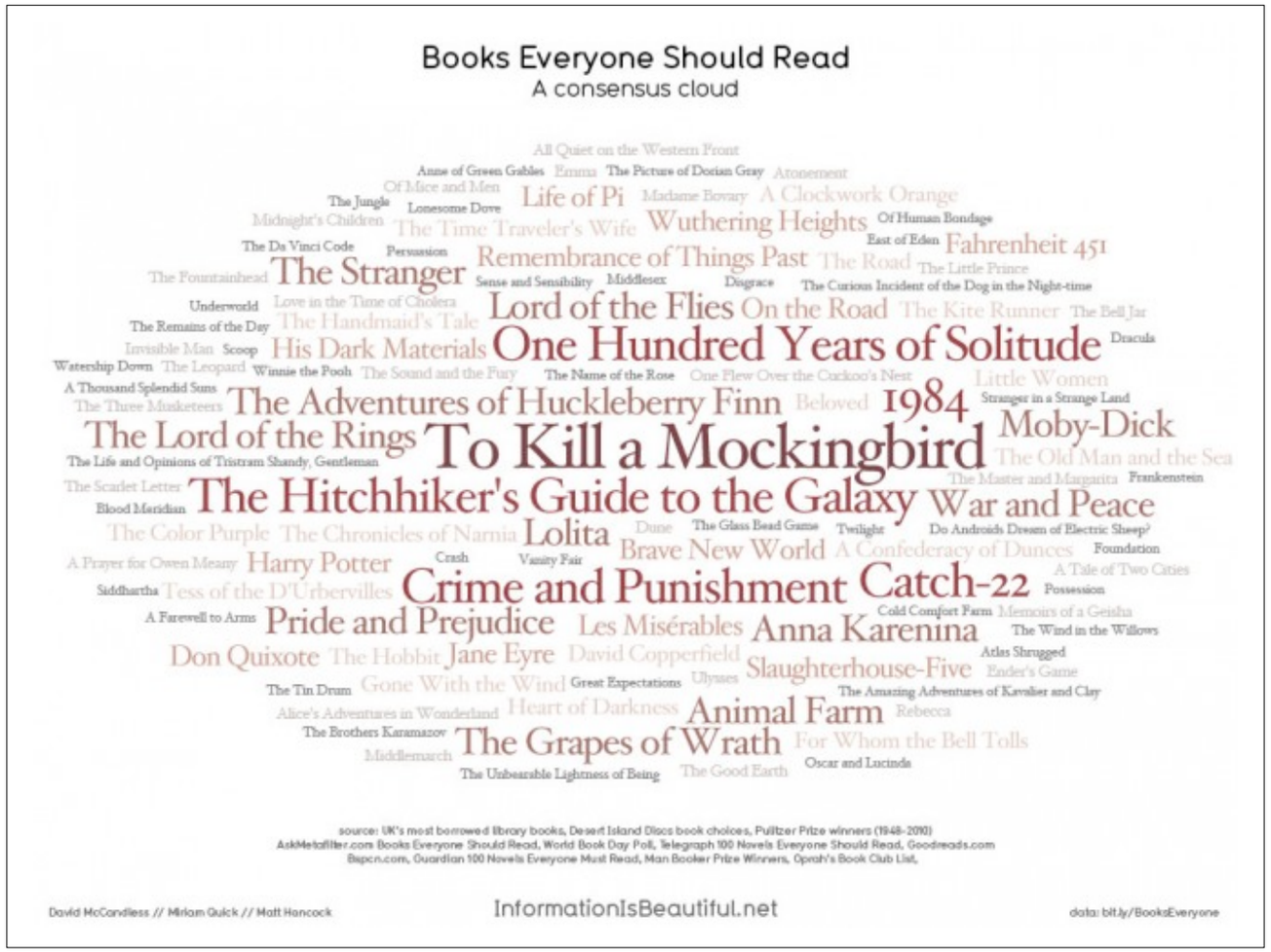
VisualDataTools' DataGraph

http://www.visualdatatools.com/DataGraph/



This slide is so bad that for a while I thought it was a parody. Sadly it isn't. Here is the NYT story from 2010.

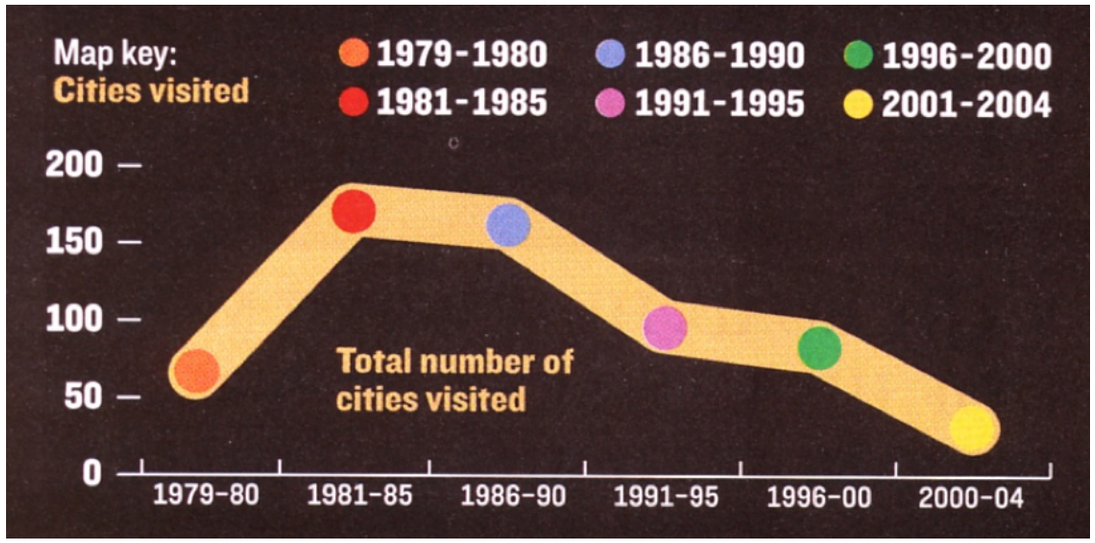
"When we understand that slide, we'll have won the war," General McChrystal dryly remarked, one of his advisers recalled, as the room erupted in laughter.



This here is a version of the graph as a puzzle. It's fun to watch and read through. But there is a lot it's not telling us. I'm guessing "To kill a mockingbird is number one in the common consensus. So what book is number two? Can you decipher the top ten list out of this?

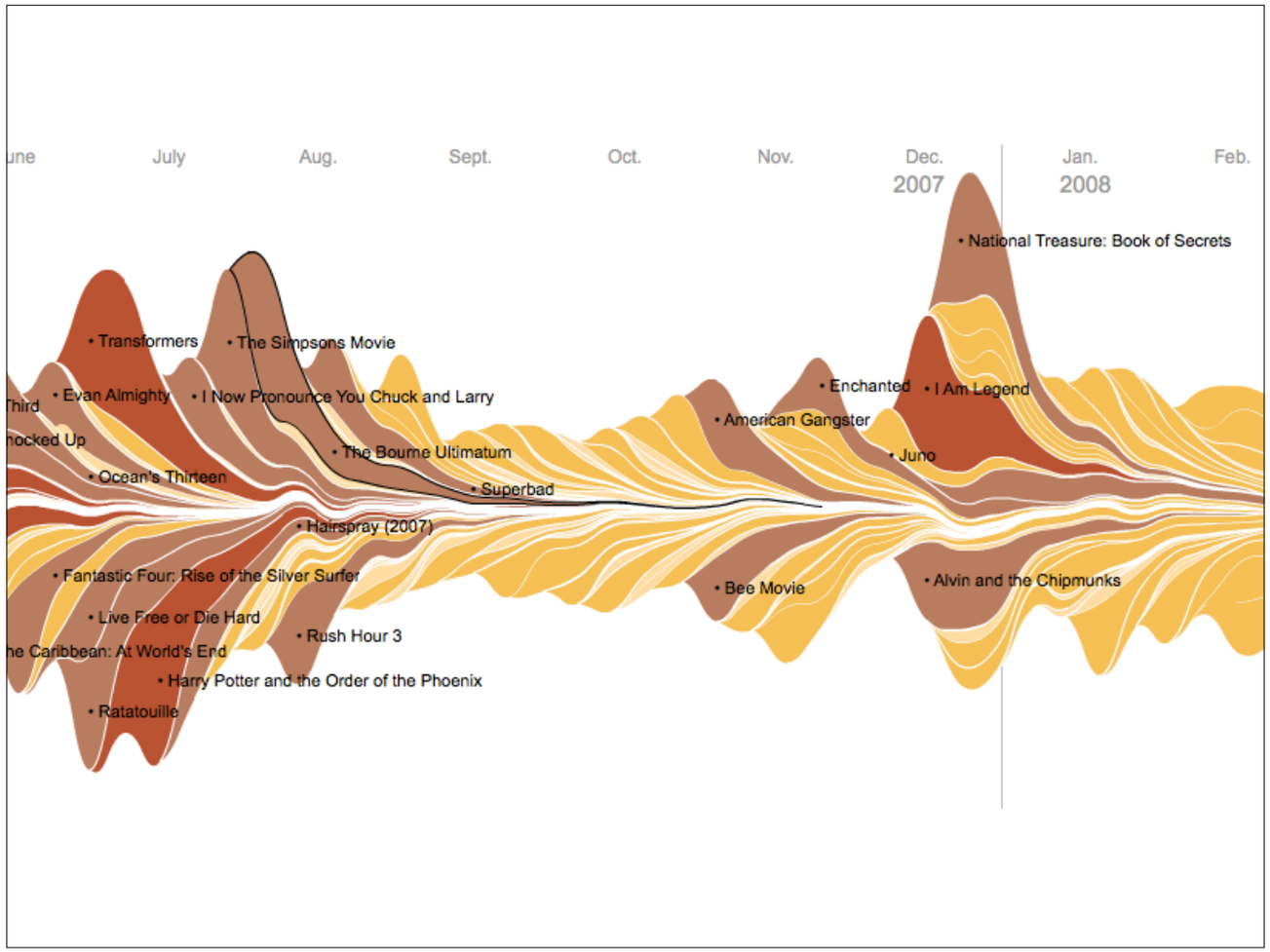
The question we're left with is: What is the purpose of this chart? Is it to enlighten or entertain?

(Source: http://informationisbeautiful.net/)



This graph appeared in the November 11, 2005 issue of Newsweek magazine. It displays the frequency of travel done by Pope John Paul II during his many years of service. The scale along the horizontal axis is an interval scale, but it has a problem: the intervals aren't equal.

Notice that the first interval only covers two years, while each of the others covers five years. This causes the distribution to look as if the pope traveled relatively little during the first few years and then increase his travels dramatically in the next few. Another problem in this graph is the unnecessary dual labeling of the intervals, both along the horizontal axis and in the legend using color coding. This is not only unnecessary, it is also distracting.

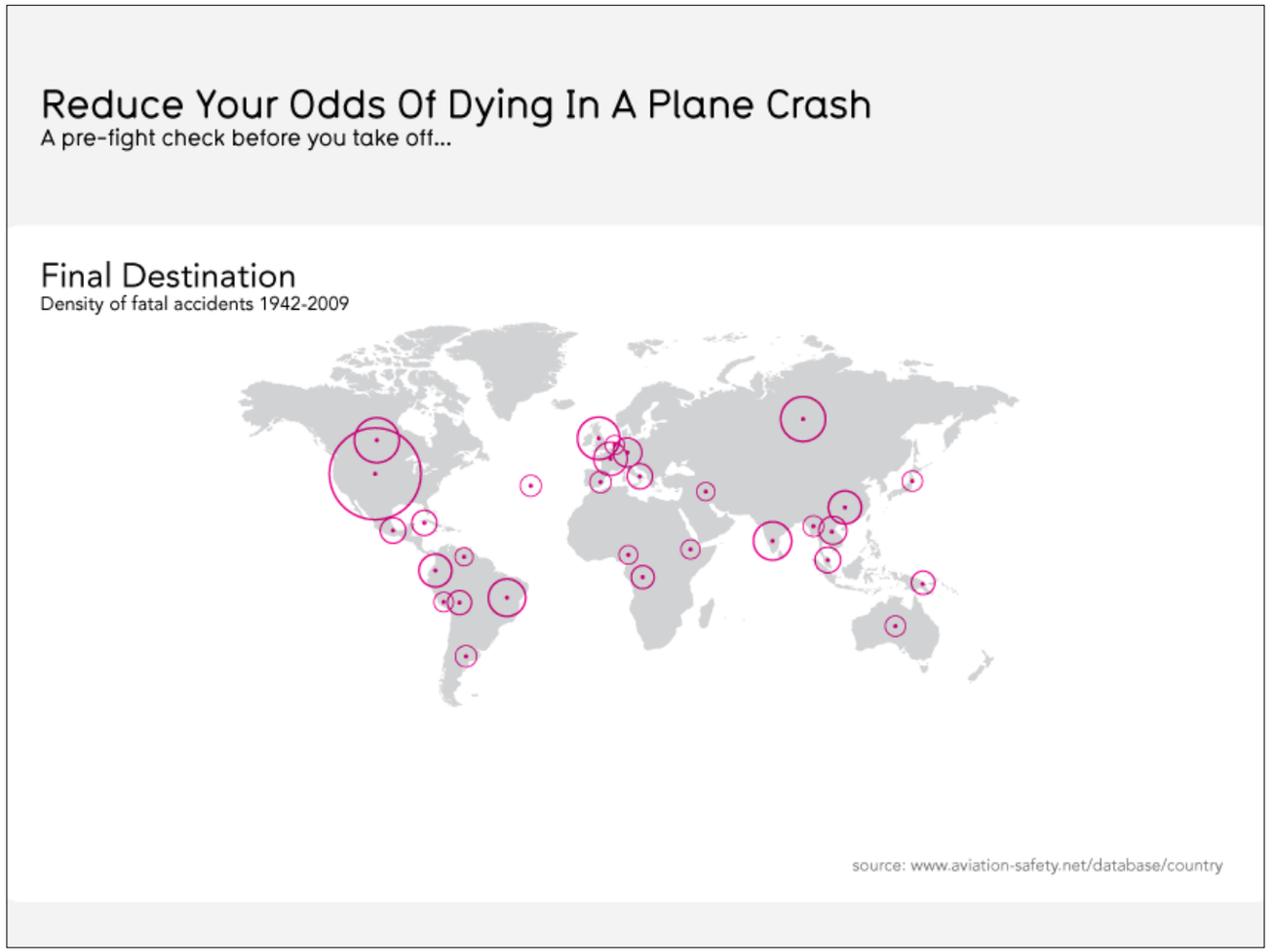


These eye-catching charts are admired, even rewarded, but still very hard to read. This is “The ebb and flow of movies” from one of the best visualization teams in the world, The New York Times.

Which made more money in a single day: American Gangster or Alvin and the Chipmunks? Which made more money overall: The Simpsons Movie or The Bourne Ultimatum? By how much?

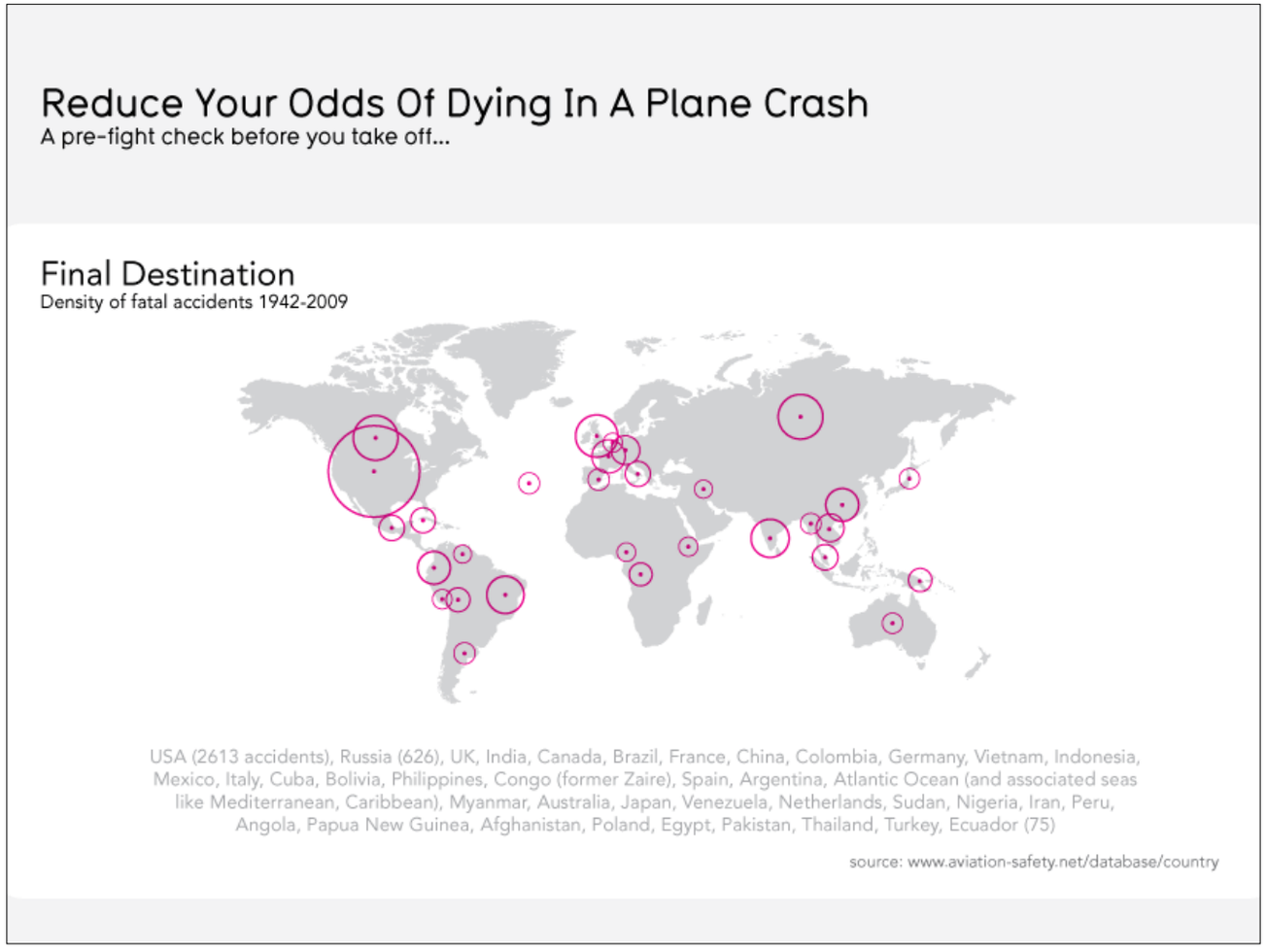
Again, what is the purpose of this chart? To enlighten or entertain?

(Source: http://www.nytimes.com/interactive/2008/02/23/movies/20080223_REVENUE_GRAPHIC.html)



This is the top part of a poster by David McCandless. Can you sort out the top 5 countries? Below the map is a paragraph of text, which looks like it's ordered by size. — But even with the text, at least one question is left un-answered. Are these bare-bones numbers of accidents? Have the numbers been divided by the number of flights?

(Source: http://www.informationisbeautiful.net/visualizations/reduce-your-chances-of-dying-in-a-plane-crash/)



This is the top part of a poster by David McCandless. Can you sort out the top 5 countries? Below the map is a paragraph of text, which looks like it's ordered by size. — But even with the text, at least one question is left un-answered. Are these bare-bones numbers of accidents? Have the numbers been divided by the number of flights?

(Source: http://www.informationisbeautiful.net/visualizations/reduce-your-chances-of-dying-in-a-plane-crash/)

Further down the poster is a wordle with the names of airlines drawn relative to fatal accidents by airline.

Bad Flights?

Statistically speaking

AIRLINE	FROM	TO	DATE	PLANE	
AEROFLOT	USA	Russia	August		DC-9
TURKISH	Turkey	India	September		Airbus A300
UNITED	Canada	UK	November		Boeing 747

source: this data

And below that, an absurd summary.

Ógnir steðja að

Sláandi tölur

Vikuspegill

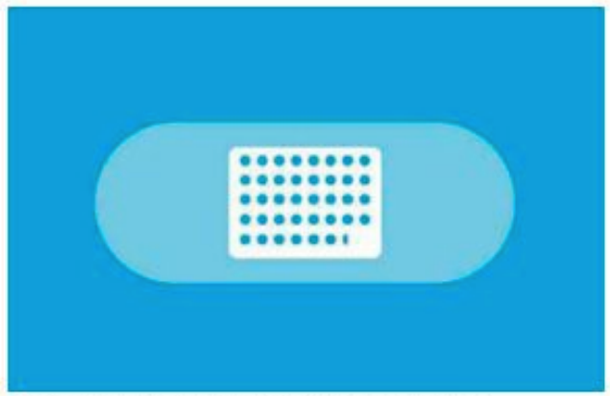
Skapti Hallgrímsson
skapti@mbl.is

Staða barna á Íslandi er almennt góð en margar ógnir steðja að, vegna ofbeldis, áfengis og eineltis og allir þessir þættir tengjast," segir Lovísa Arnardóttir stjórnmálafræðingur, höfundur skýrslu um stöðu barna á Íslandi sem Unicef á Íslandi gaf út nýverið.

Í skýrslunni eru ýmis ófögur dæmi nefnd og áhersla lögð á að vekja athygli á þeim með frábærri grafík Þorbjörns Ingasonar, sem sjá má dæmi um hér á opnunni. Fram kemur að þúsundir barna verði fyrir ýmiss

íslenskra drengja horfa á klám daglega skv. skýrslunni.

Hvorki meira né minna en íslenskra barna á aldrinum 0-17 ára fóru ekki til tannlæknis árið 2010.



Á Íslandi verða slys að meðaltali þar sem börn koma við sögu, áhverjum einasta degi ársins,

Ógnir steðja að

Sláandi tölur

Vikuspegill

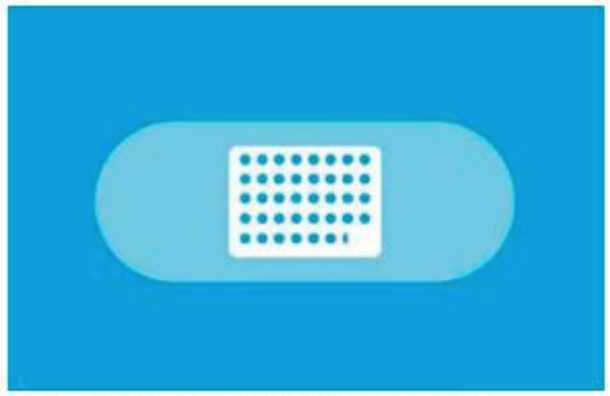
Skapti Hallgrímsson
skapti@mbl.is

Staða barna á Íslandi er almennt góð en margar ógnir steðja að, vegna ofbeldis, áfengis og einelitis og allir þessir þættir tengjast," segir Lovísa Arnardóttir stjórnmálafræðingur, höfundur skýrslu um stöðu barna á Íslandi sem Unicef á Íslandi gaf út nýverið.

Í skýrslunni eru ýmis ófögur dæmi nefnd og áhersla lögð á að vekja athygli á þeim með frábærri grafík Þorbjörns Ingasonar, sem sjá má dæmi um hér á opnunni. Fram kemur að þúsundir barna verði fyrir ýmiss

20% íslenskra drengja horfa á klám daglega skv. skýrslunni.

Hvorki meira né minna en íslenskra barna á aldrinum 0-17 ára fóru ekki til tannlæknis árið 2010.



Á Íslandi verða slys að meðaltali þar sem börn koma við sögu, áhverjum einasta degi ársins.

Ógnir steðja að

Sláandi tölur

Vikuspegill

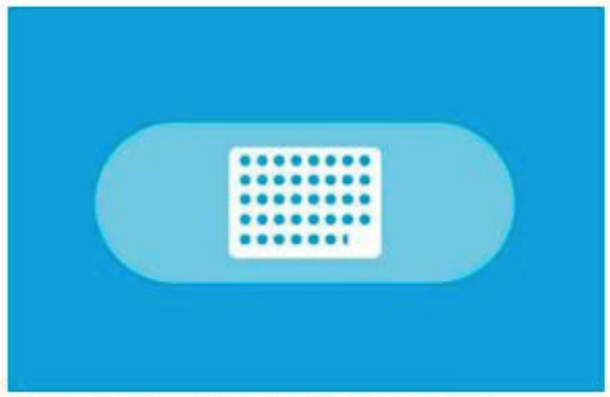
Skapti Hallgrímsson
skapti@mbl.is

Staða barna á Íslandi er almennt góð en margar ógnir steðja að, vegna ofbeldis, áfengis og einelitis og allir þessir þættir tengjast," segir Lovísa Arnardóttir stjórnmálafræðingur, höfundur skýrslu um stöðu barna á Íslandi sem Unicef á Íslandi gaf út nýverið.

Í skýrslunni eru ýmis ófögur dæmi nefnd og áhersla lögð á að vekja athygli á þeim með frábærri grafík Þorbjörns Ingasonar, sem sjá má dæmi um hér á opnunni. Fram kemur að þúsundir barna verði fyrir ýmiss

20% íslenskra drengja horfa á klám daglega skv. skýrslunni.

Hvorki meira né minna en 42% íslenskra barna á aldrinum 0-17 ára fóru ekki til tannlæknis árið 2010.



Á Íslandi verða slys að meðaltali þar sem börn koma við sögu, áhverjum einasta degi ársins.

Ógnir steðja að

Sláandi tölur

Vikuspegill

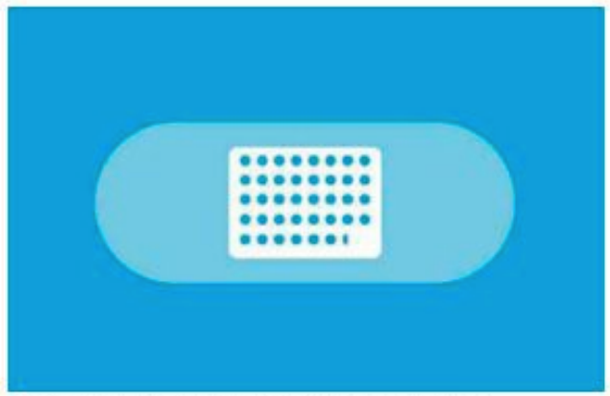
Skapti Hallgrímsson
skapti@mbl.is

Staða barna á Íslandi er almennt góð en margar ógnir steðja að, vegna ofbeldis, áfengis og einelti og allir þessir þættir tengjast," segir Lovísa Arnardóttir stjórnmálafræðingur, höfundur skýrslu um stöðu barna á Íslandi sem Unicef á Íslandi gaf út nýverið.

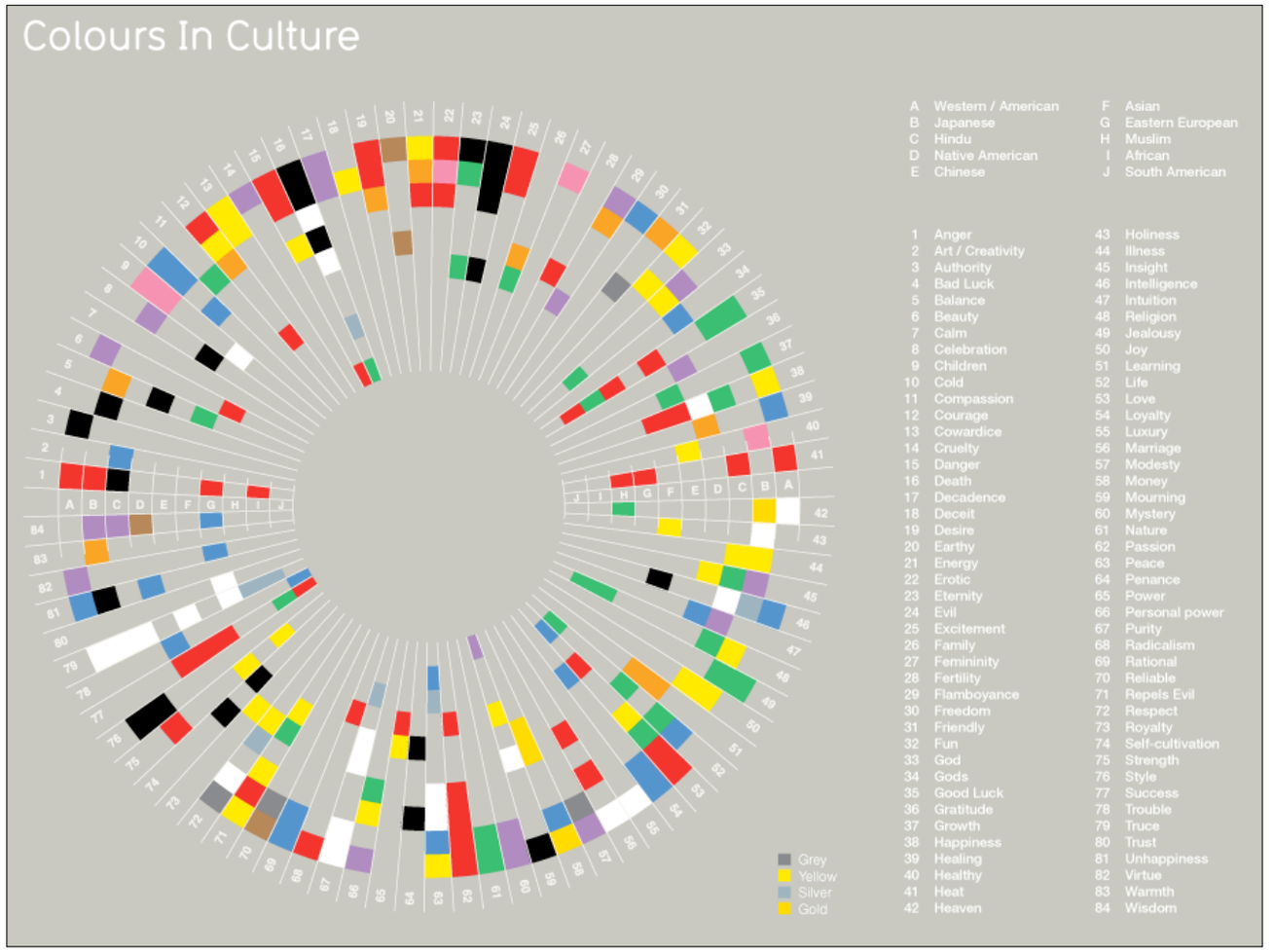
Í skýrslunni eru ýmis ófögur dæmi nefnd og áhersla lögð á að vekja athygli á þeim með frábærri grafík Þorbjörns Ingasonar, sem sjá má dæmi um hér á opnunni. Fram kemur að þúsundir barna verði fyrir ýmiss

20% íslenskra drengja horfa á klám daglega skv. skýrslunni.

Hvorki meira né minna en 42% íslenskra barna á aldrinum 0-17 ára fóru ekki til tannlæknis árið 2010.



Á Íslandi verða 38,5 slys að meðaltali þar sem börn koma við sögu, áhverjum einasta degi ársins.



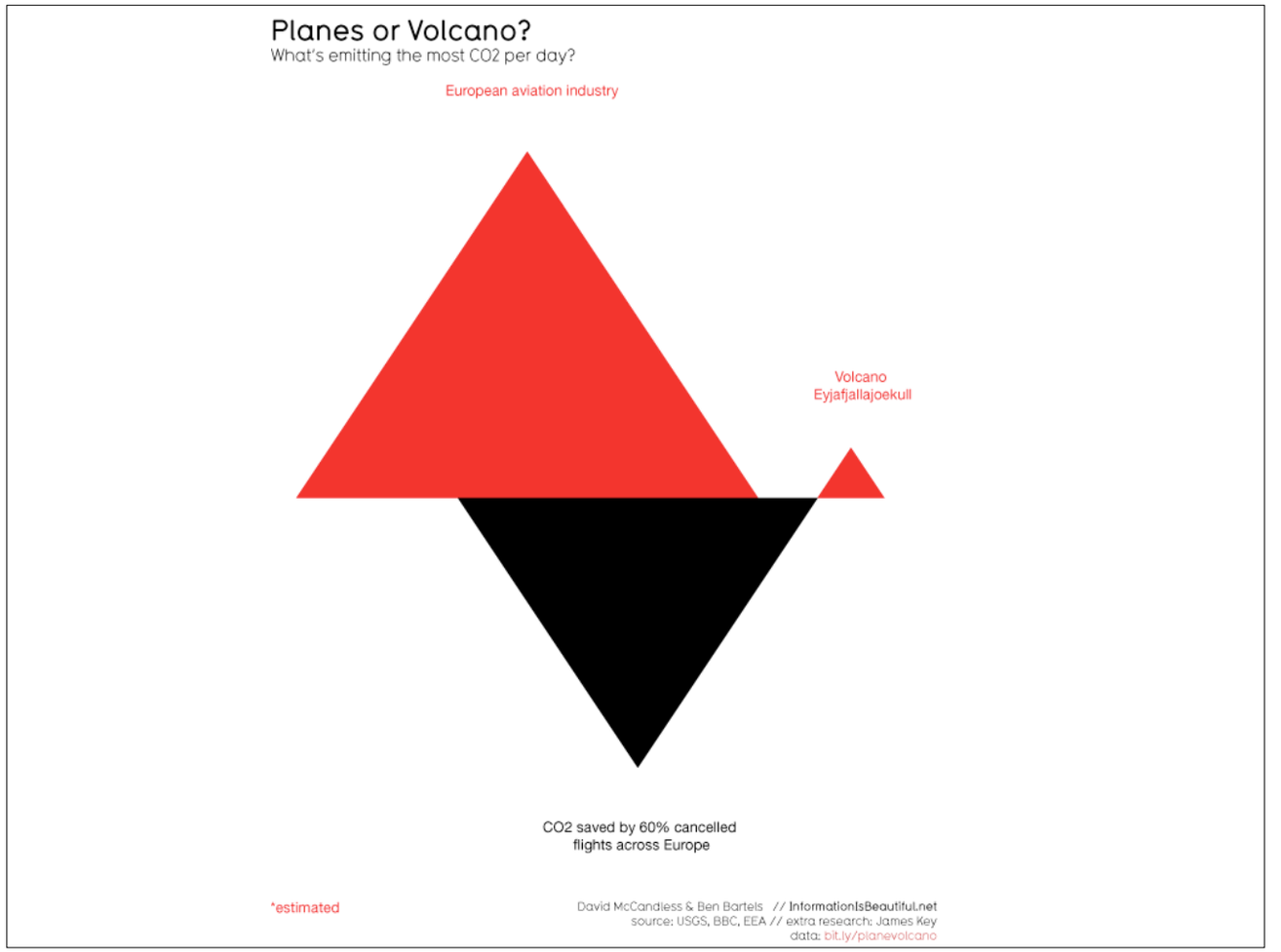
Here McCandless invites you to wonder about the colors in cultures. What does McCandless himself have to say about his work?

"A passion of mine is visualizing information – facts, data, ideas, subjects, issues, statistics, questions – all with the minimum of words.

I'm interested in how designed information can help us understand the world, cut through BS and reveal the hidden connections, patterns and stories underneath. Or, failing that, it can just look cool!"

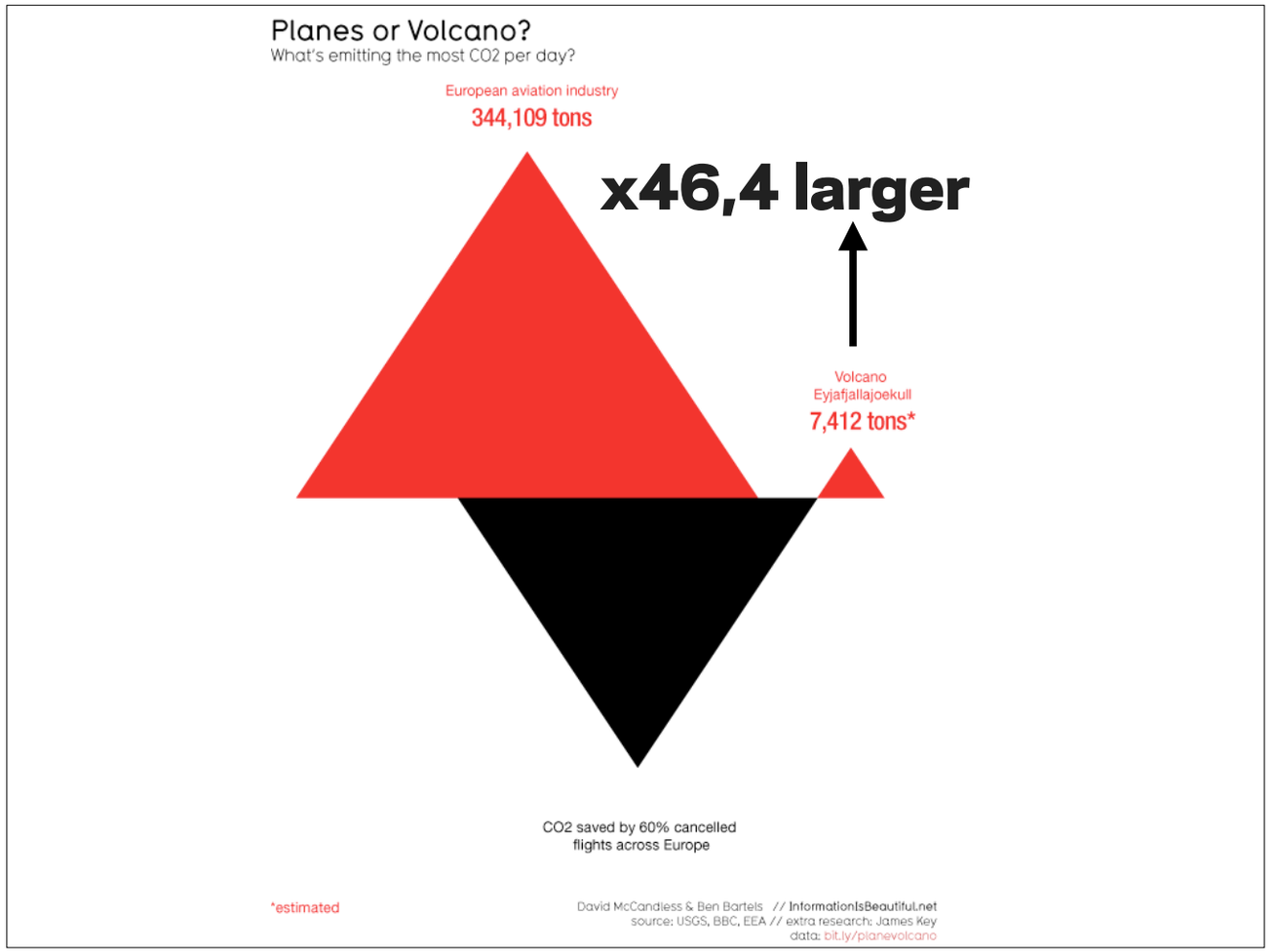
I argue that looking cool comes first for McCandless.

(Source: http://www.informationisbeautiful.net/visualizations/colours-in-cultures/, http://www.informationisbeautiful.net/about/)



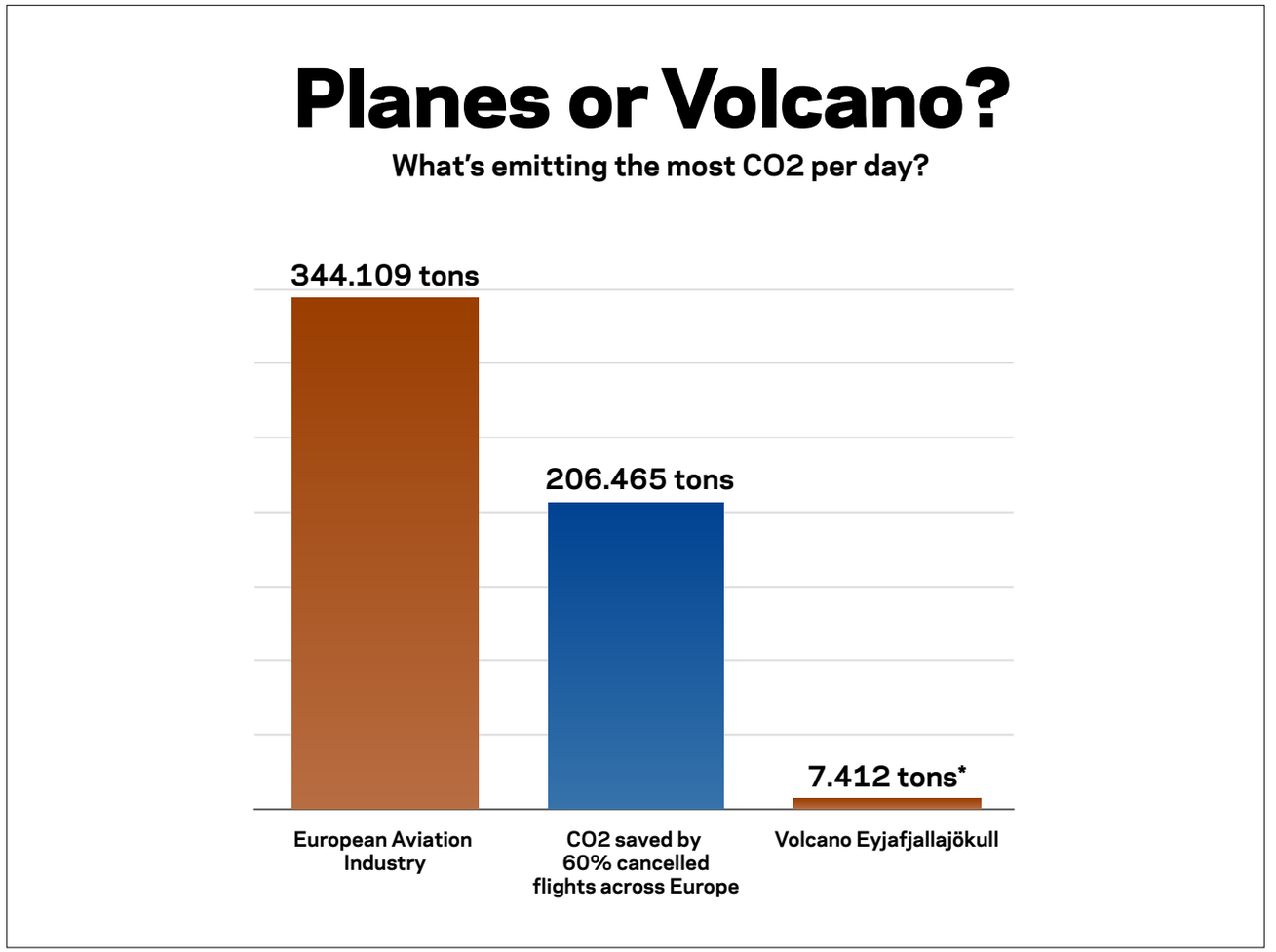
When Eyjafjallajökull was spewing it's stuff, McCandless drew this poster. How many units is the large triangle larger than the small red one or the black one?

(Source: http://www.informationisbeautiful.net/2010/planes-or-volcano/)

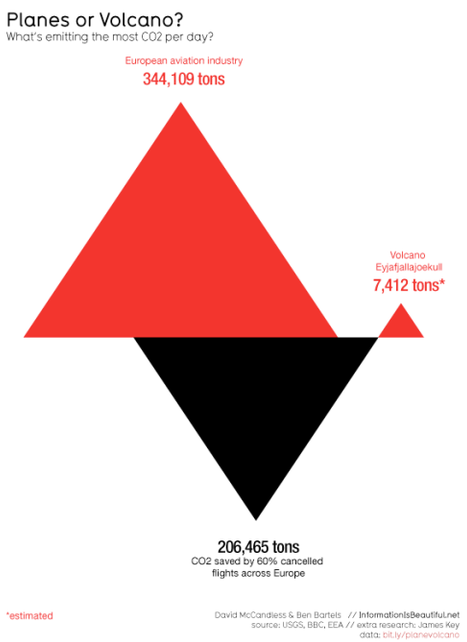


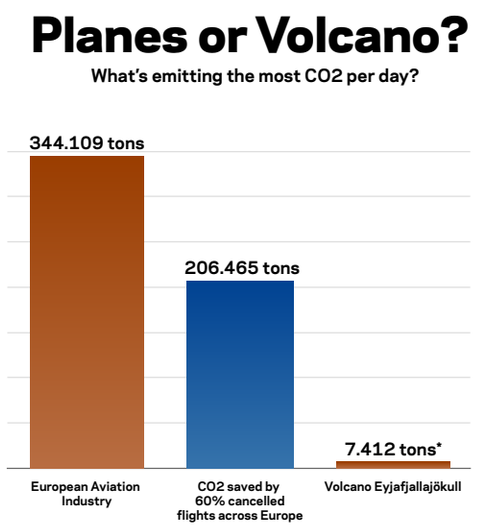
Was your guess correct? “Planes or Volcano?” can be viewed as a nice poster, but by no means a good data visualization.

(Source: http://www.informationisbeautiful.net/2010/planes-or-volcano/)

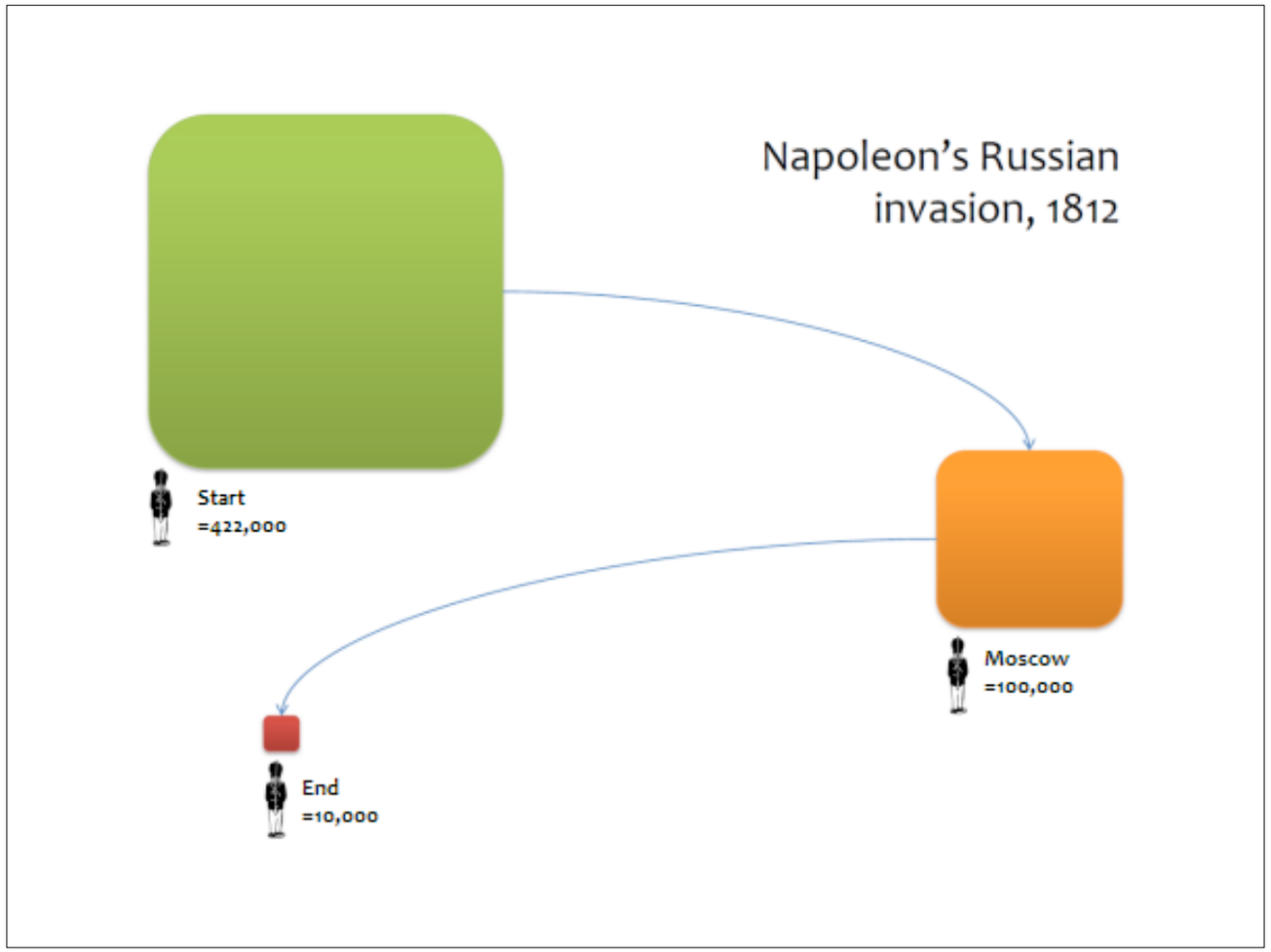


When this is redesigned to accurately depict the data, two things become very clear. One is how the bars are much more effective as a visualization. The other is how little data actually is in the poster.

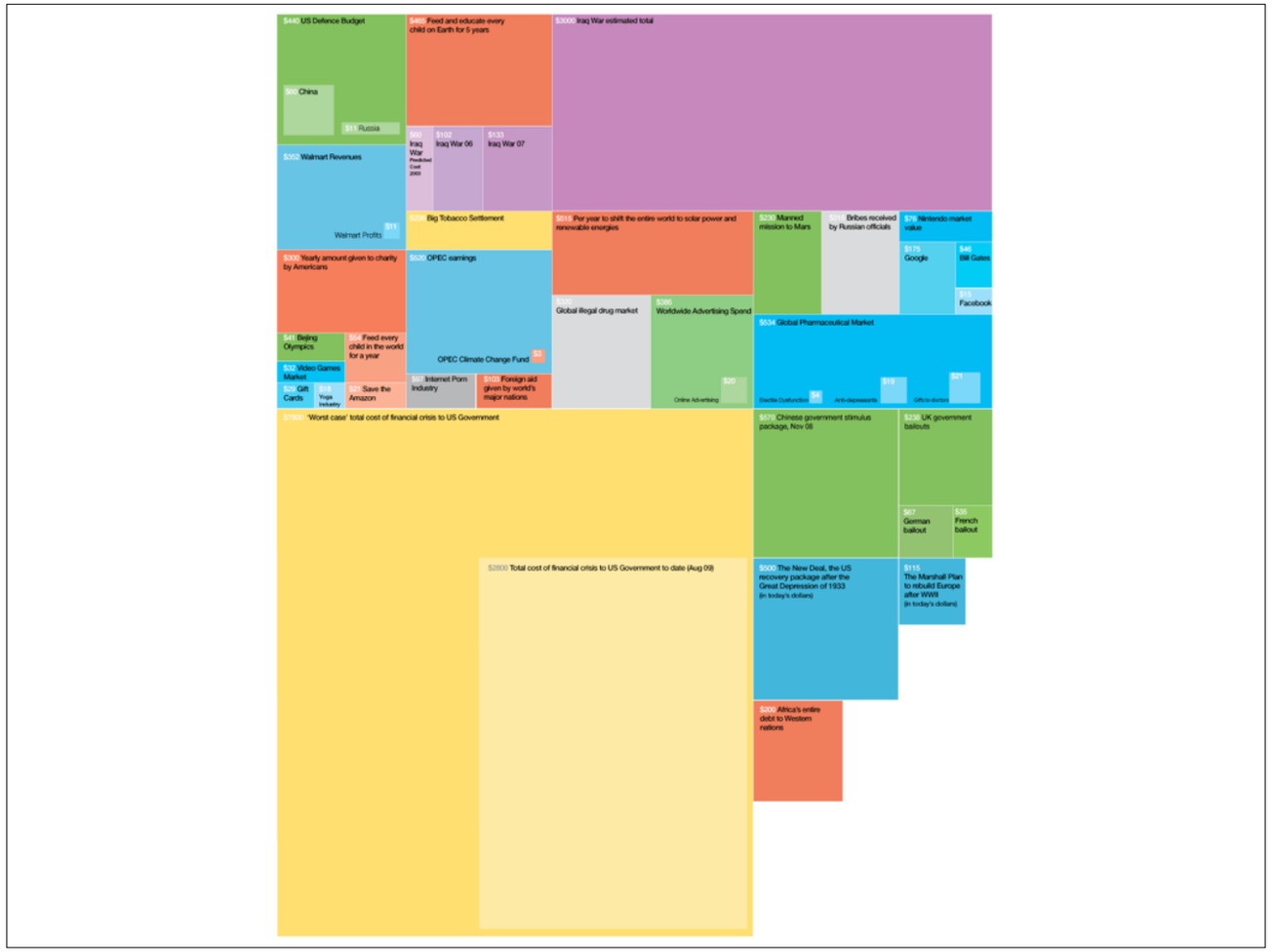




When this is redesigned to accurately depict the data, two things become very clear. One is how the bars are much more effective as a visualization. The other is how little data actually is in the poster.



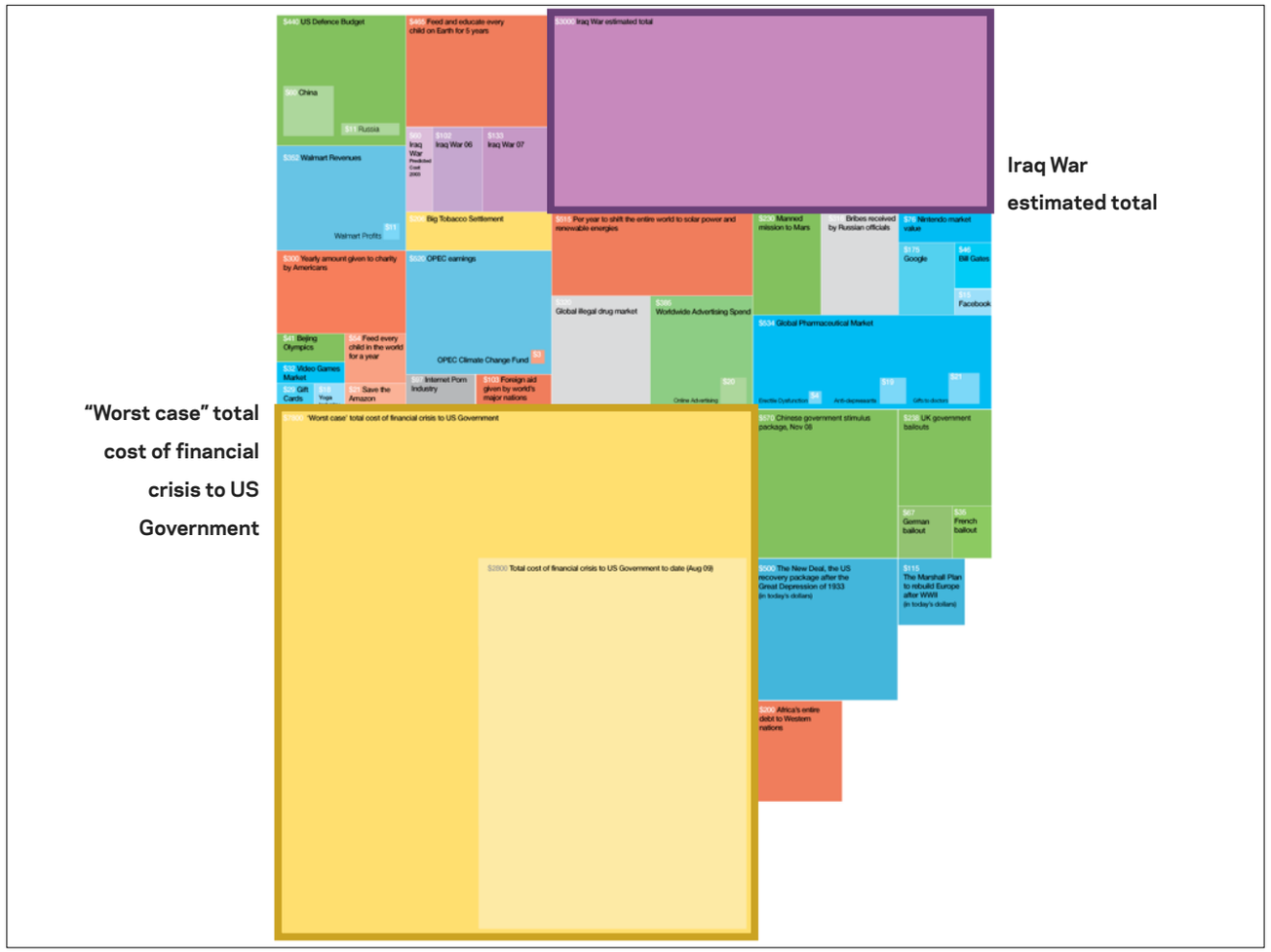
Andy Cotgreave, www.thedatastudio.co.uk drew this parody of McCandless redesigning Minard's Napoleon's March.



To finish off here's a chart by McCandless that's actually quite effective in one aspect. The Billion Dollar Gram. It does succeed of showing the insane amounts of money spent on the Iraq war and the total cost of the financial crisis to the US government as of August 2009 within the large yellow Worst case total cost scenario compared to other known monetary sizes, ie. Africa's entire debt to Western nations ($200B).

The message of insanity in spending is pretty clear, but this chart suffers from the same problem as the one with the triangles. Comparing the size of the squares is not something our brains are optimized to do. The chart tells the story well. Could it be told better?

(Source: http://www.informationisbeautiful.net/visualizations/the-billion-dollar-gram/)



To finish off here's a chart by McCandless that's actually quite effective in one aspect. The Billion Dollar Gram. It does succeed of showing the insane amounts of money spent on the Iraq war and the total cost of the financial crisis to the US government as of August 2009 within the large yellow Worst case total cost scenario compared to other known monetary sizes, ie. Africa's entire debt to Western nations ($200B).

The message of insanity in spending is pretty clear, but this chart suffers from the same problem as the one with the triangles. Comparing the size of the squares is not something our brains are optimized to do. The chart tells the story well. Could it be told better?

(Source: http://www.informationisbeautiful.net/visualizations/the-billion-dollar-gram/)

To finish off here's a chart by McCandless that's actually quite effective in one aspect. The Billion Dollar Gram. It does succeed of showing the insane amounts of money spent on the Iraq war and the total cost of the financial crisis to the US government as of August 2009 within the large yellow Worst case total cost scenario compared to other known monetary sizes, ie. Africa's entire debt to Western nations ($200B).

The message of insanity in spending is pretty clear, but this chart suffers from the same problem as the one with the triangles. Comparing the size of the squares is not something our brains are optimized to do. The chart tells the story well. Could it be told better?

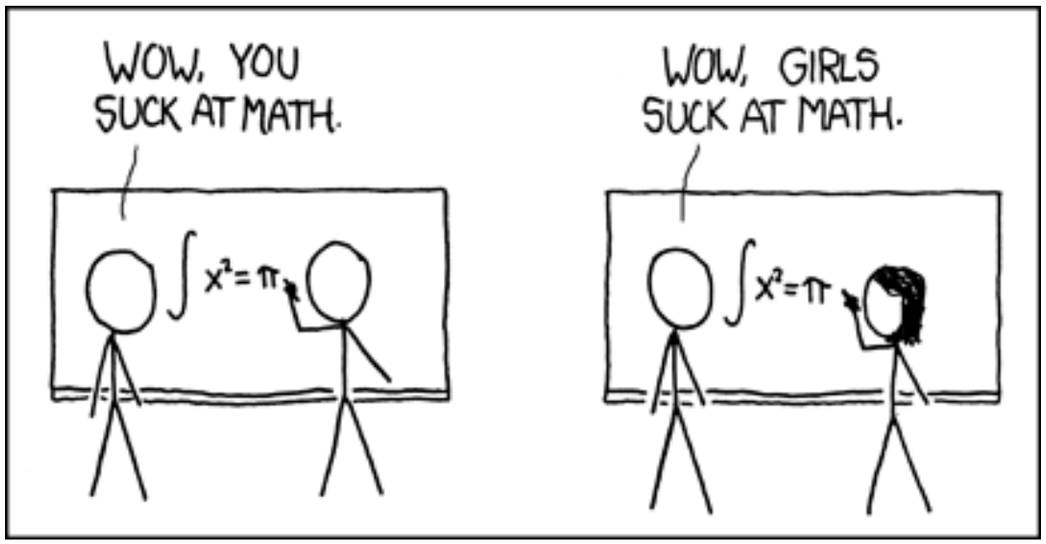
(Source: http://www.informationisbeautiful.net/visualizations/the-billion-dollar-gram/)

Telling the story, the whole story and nothing but.

„If you've heard this story before, don't stop me, because I'd like to hear it again.“

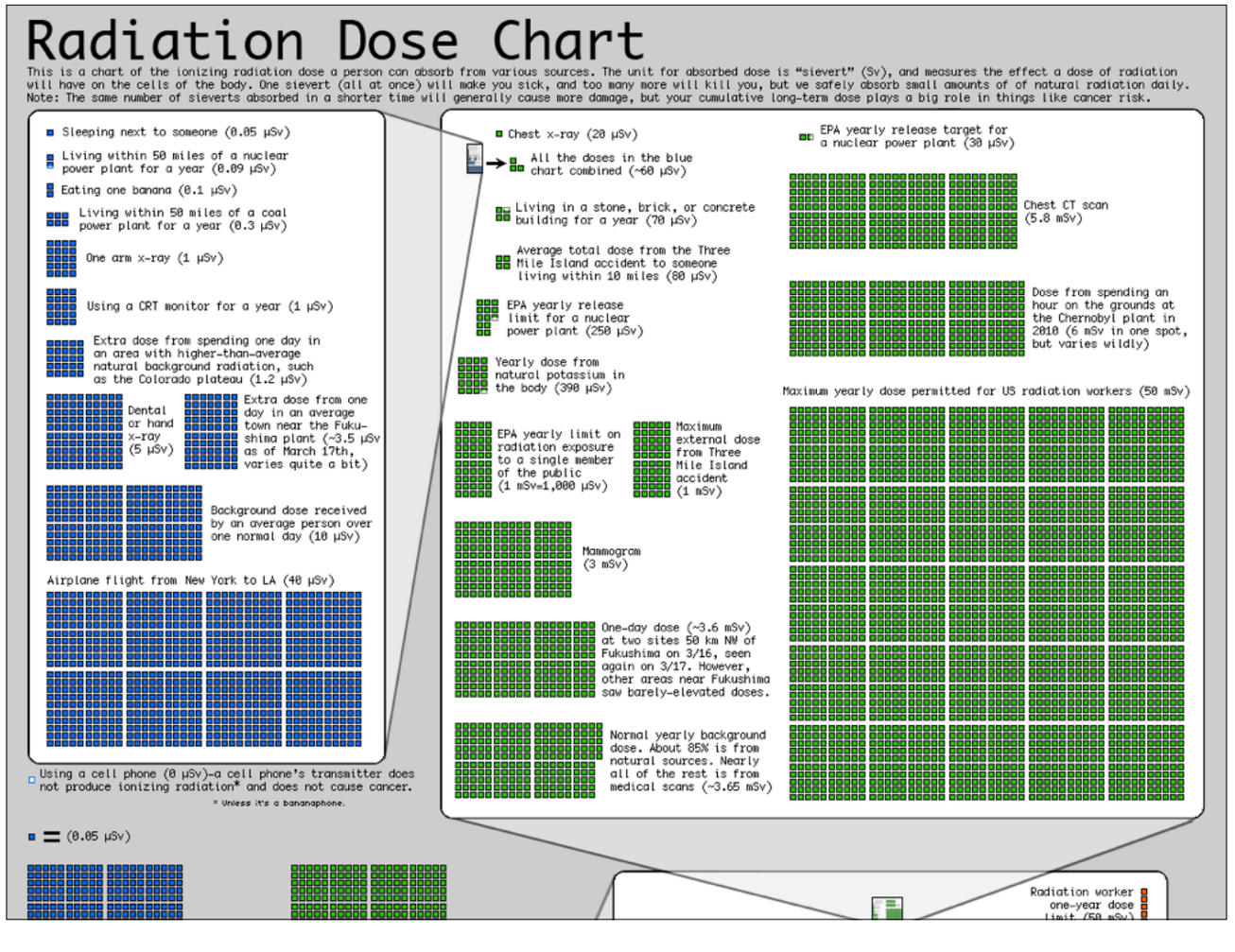
– Groucho Marx

Which takes me to my next point, one which is very much discussed in my office. The story-telling abilities of a chart.



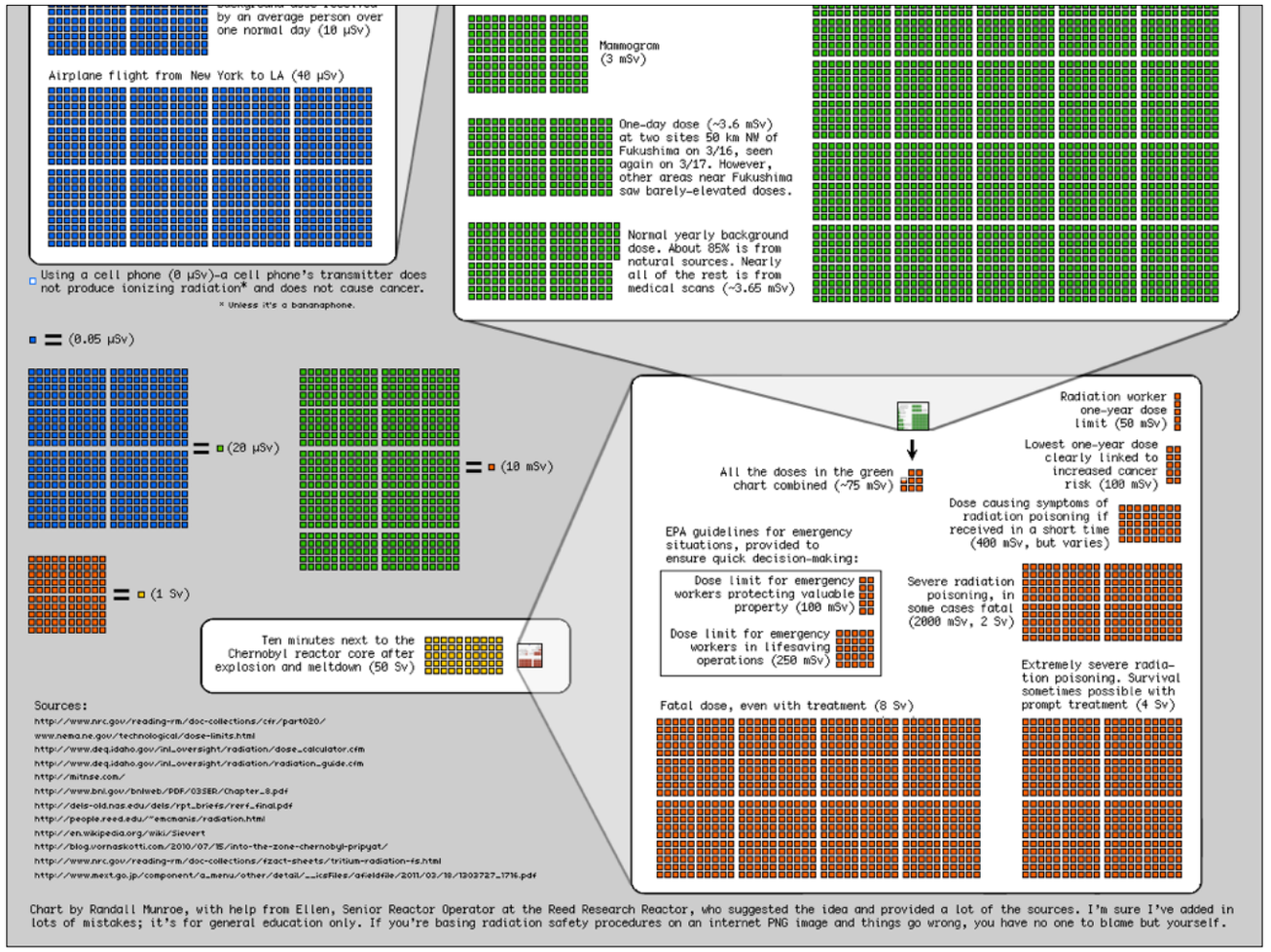
Randall Munroe, the creator of XKCD.com has a friend who had spent a lot of time answering questions about radiation as a part of her work. She suggested a chart might help put different amounts of radiation in perspective. With her help, he put one together.

(Source: http://blog.xkcd.com/2011/03/19/radiation-chart/, http://xkcd.com/149/)



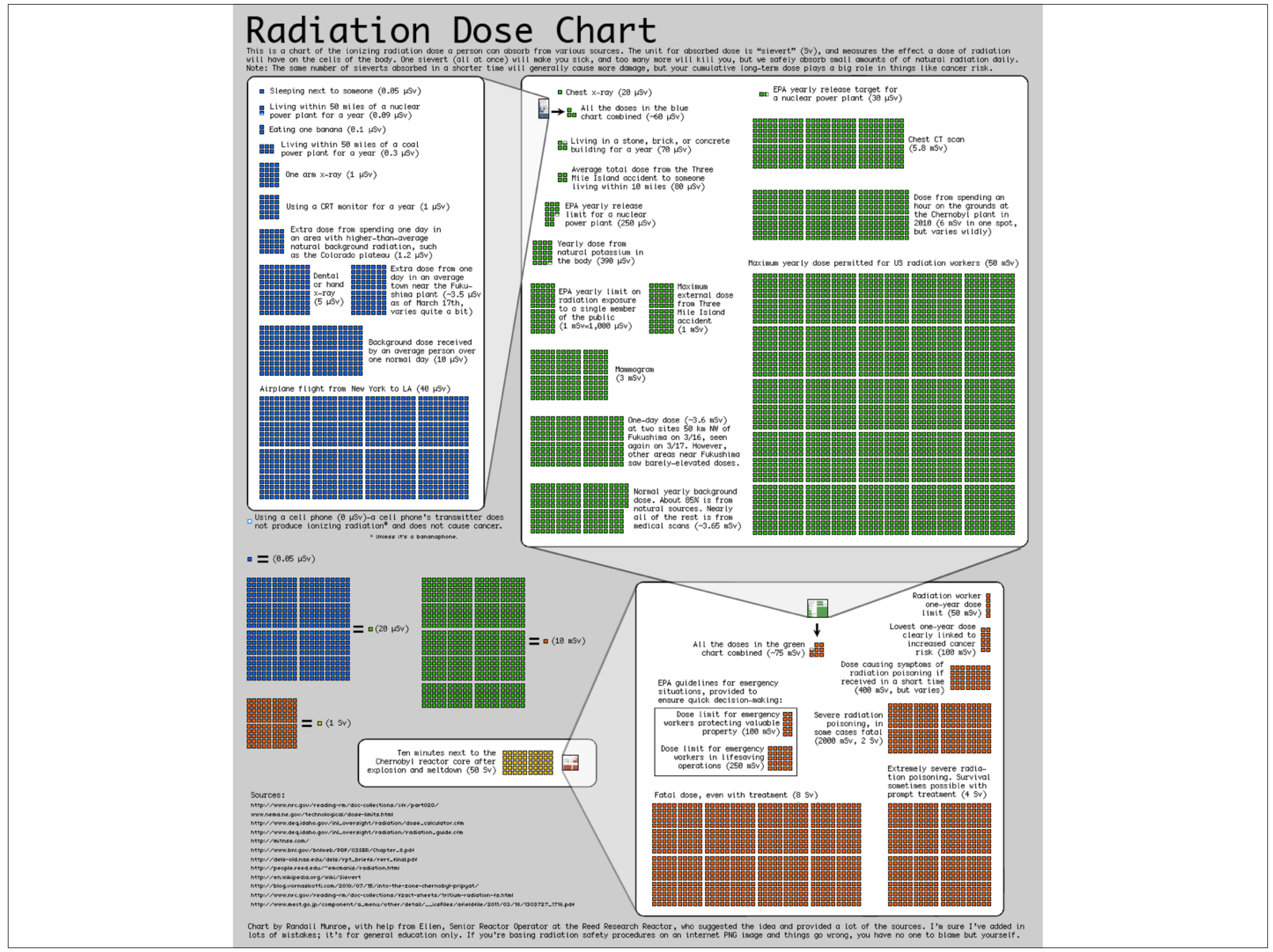
This is their creation, "Radiation Dose Chart". It did it's job quite well, outting radiation in perspective.

(Source: http://xkcd.com/radiation/)

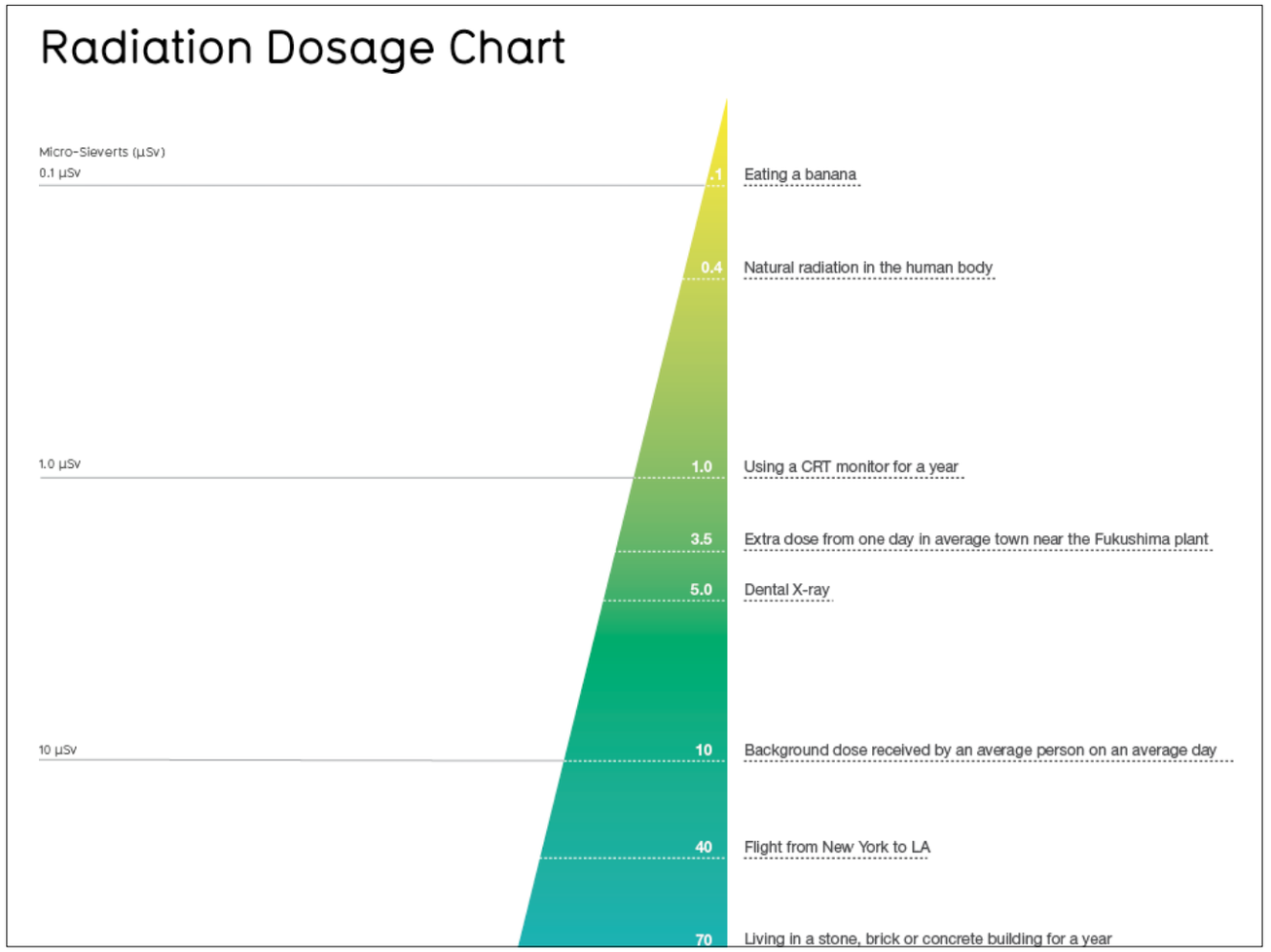


This is their creation, "Radiation Dose Chart". It did it's job quite well, outting radiation in perspective.

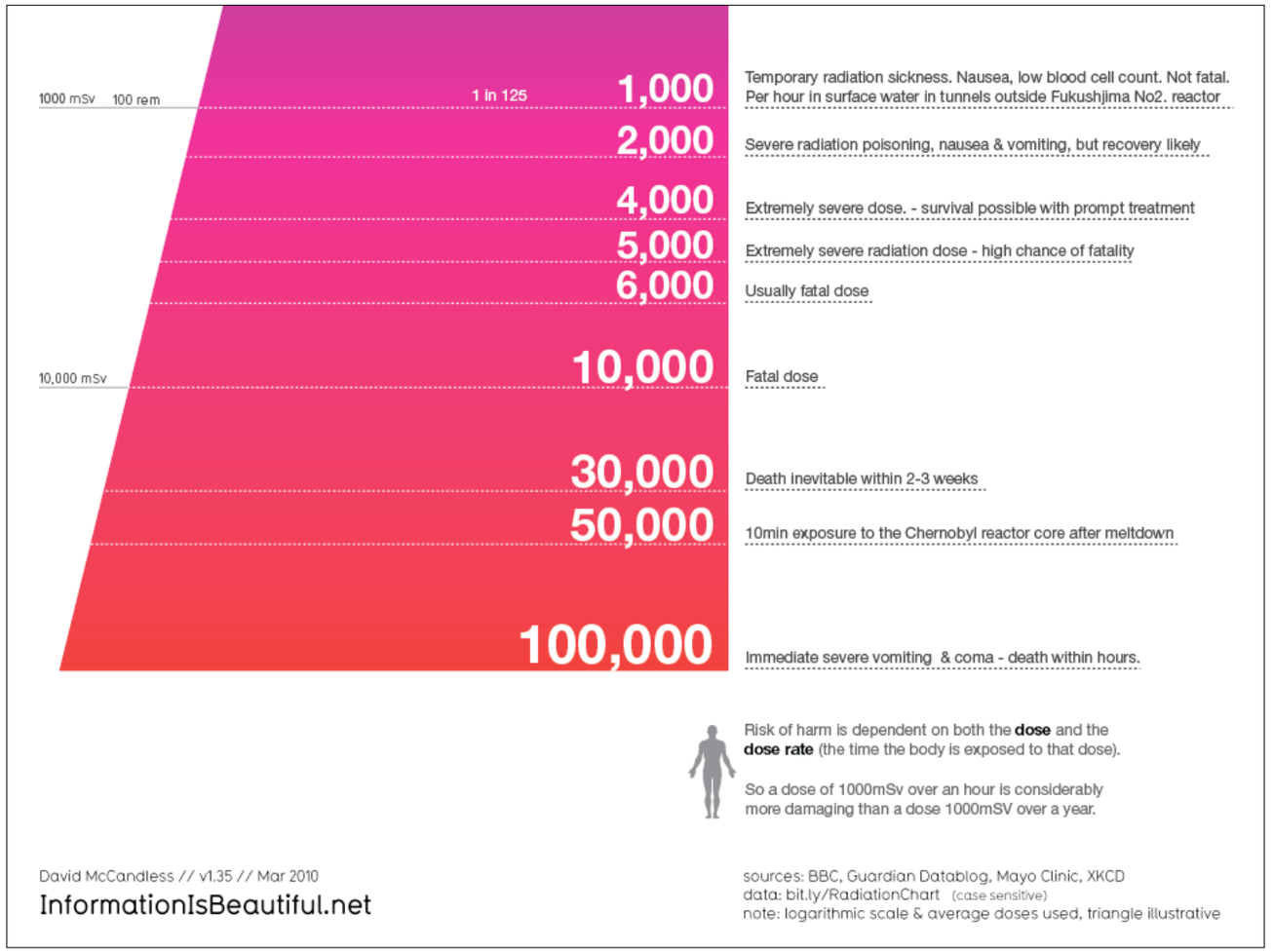
(Source: http://xkcd.com/radiation/)



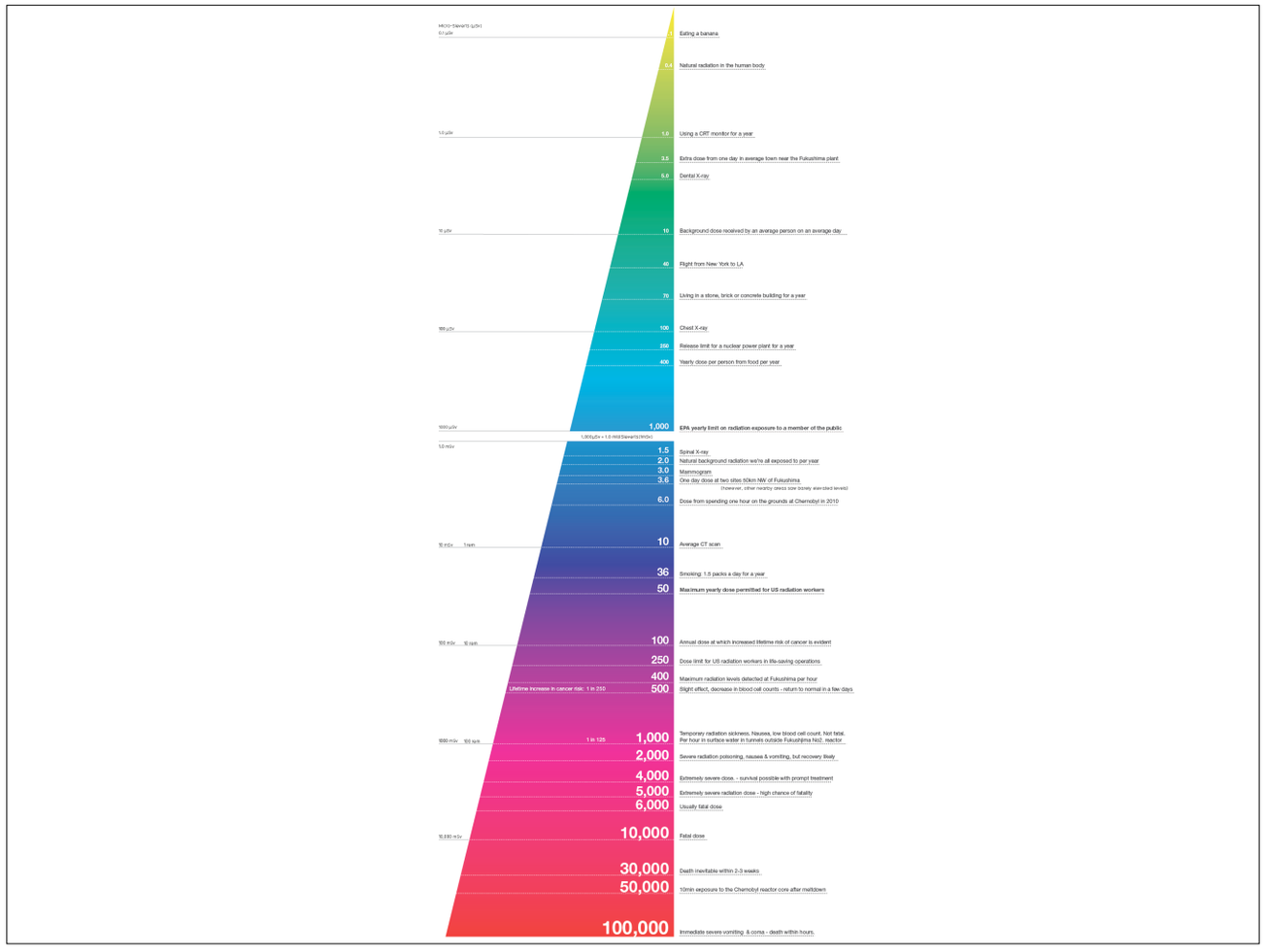
This type of chart is called a unit chart. Some think, mistakenly, that it can be used to replace the pie chart. The problem with a unit chart is twofold. First, it is very hard to count the units to figure out it's value. So you have to rely on the number. Second, it is very hard to estimate the value from the area size. You have to do a number of Tetris-like gymnastics to compare two parts. — Finally the units change in the middle of the story, making it hard to follow the numbers.



David McCandless also had a go, using a logarytmic scale to fit everything in. He kept the unit changes and wrote two very concice and clear sentences to explain dose and dose rate. Strangely, he also added labels like: “5,000 = High chance of fatality” and “6,000 = Usually fatal dose”, which look like a fill-in.



David McCandless also had a go, using a logarytmic scale to fit everything in. He kept the unit changes and wrote two very concice and clear sentences to explain dose and dose rate. Strangely, he also added labels like: “5,000 = High chance of fatality” and “6,000 = Usually fatal dose”, which look like a fill-in.

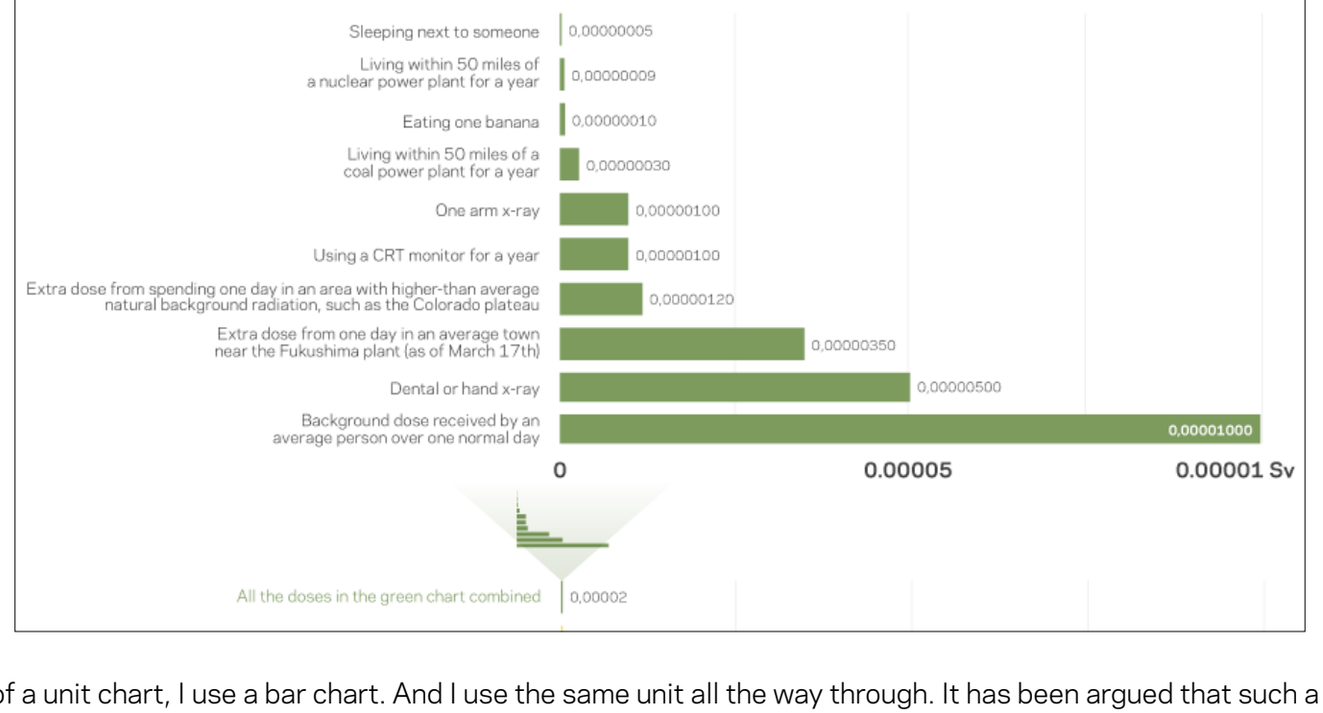


Here you can see McCandless' full chart.

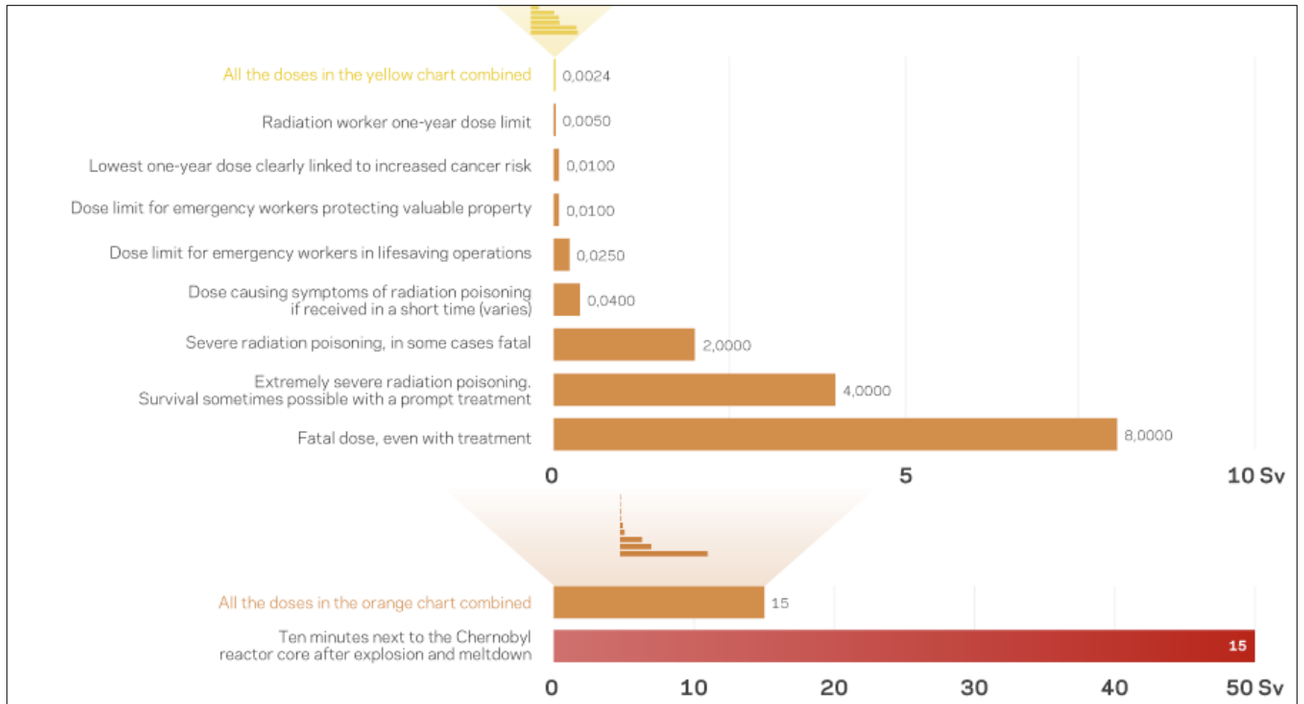
Radiation Dose Chart

DataMarket
FIND AND UNDERSTAND DATA

This is a chart of the ionizing radiation dose a person can absorb from various sources. The unit for absorbed dose is "sievert" (Sv), and measures the effect a dose of radiation will have on the cells of the body. One sievert (all at once) will make you sick, and too many will kill you, but we safely absorb small amounts of natural radiation daily. Note: The same number of sieverts absorbed in a shorter time will generally cause more damage, but your cumulative long term dose plays a big role in things like cancer risk.



So I thought I should try to do better. Instead of a unit chart, I use a bar chart. And I use the same unit all the way through. It has been argued that such a number with so many zeroes in front of it doesn't make sense to people, but I believe it makes more sense than having people remember the value of mSv or μSv.

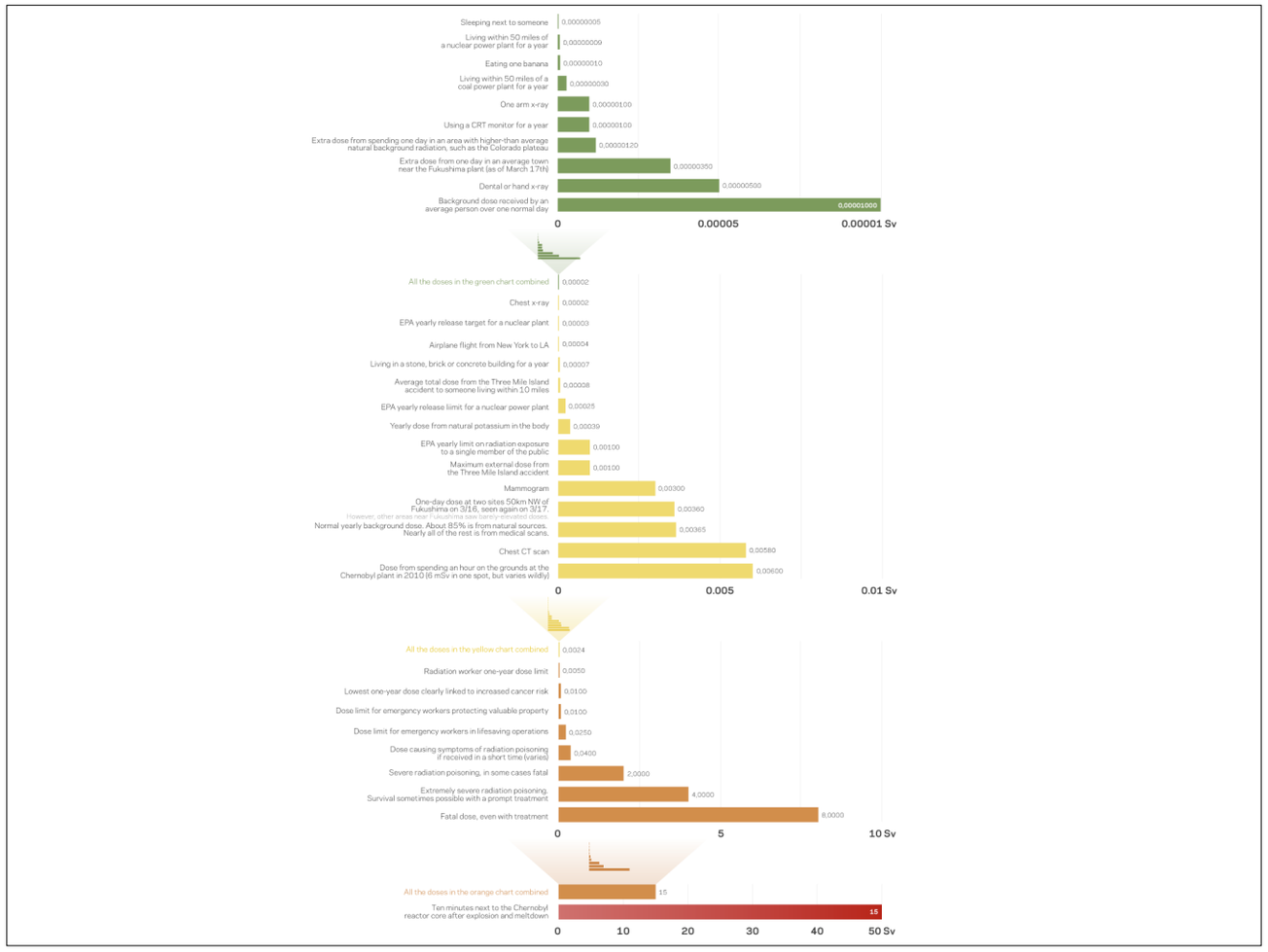


This chart is created by Thorlakur Ludviksson at DataMarket.com and is based on "Radiation Dose Chart" by Randall Munroe (xkcd.com), who received help from Ellen, Senior Reactor Operator at Reed Research Reactor. This redesigned chart's purpose is to increase the readability of the data while holding on to the great story telling ability of the original . This chart (as well as the original) is, as Murray also says, "for educational purposes only. If you're basing radiation safety procedures on an internet PNG or PDF image and things go wrong, you have no one to blame byt yourself".

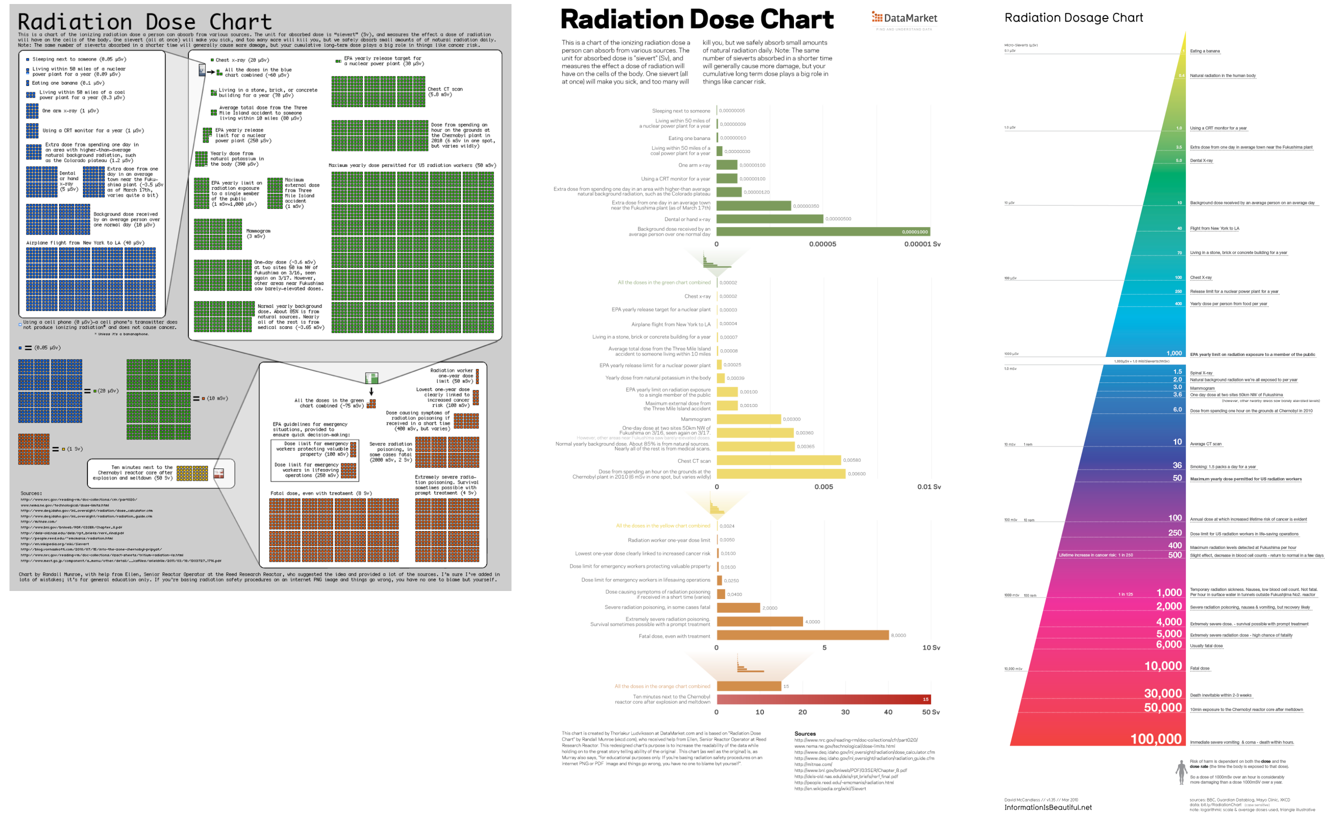
Sources

http://www.nrc.gov/reading-rm/doc-collections/cfr/part020/
www.nema.ne.gov/technological/dose-limits.html
http://www.deq.idaho.gov/inl_oversight/radiation/dose_calculator.cfm
http://www.deq.idaho.gov/inl_oversight/radiation/radiation_guide.cfm
http://mitnse.com/
http://www.bnl.gov/bnlweb/PDF/03SER/Chapter_8.pdf
http://dels-old.nas.edu/dels/rpt_briefs/rerf_final.pdf
http://people.reed.edu/~emcmanis/radiation.html
http://en.wikipedia.org/wiki/Sievert

So I thought I should try to do better. Instead of a unit chart, I use a bar chart. And I use the same unit all the way through. It has been argued that such a number with so many zeroes in front of it doesn't make sense to people, but I believe it makes more sense than having people remember the value of mSv or μSv.



Here you can see my full chart.



When visualizing data, a lot of choises have to be made: Chart type, colors, fonts, labels and more. You’re not only serving the data, but also serving the story — telling the story. The easy way, the lazy way, is to choose one over the other, the data or the story. Creating a visualization that tells the story well and uses data to give depth to the story, that’s work.

Challenger, January 28, 1986

Challenger, January 28, 1986

Blow By History

SRM-15 worst Blow-By

- 2 case joints (30°), (110°) arc
- Much worse visually than SRM-22

SRM 22 Blow-By

- 2 case joints (30-40°)

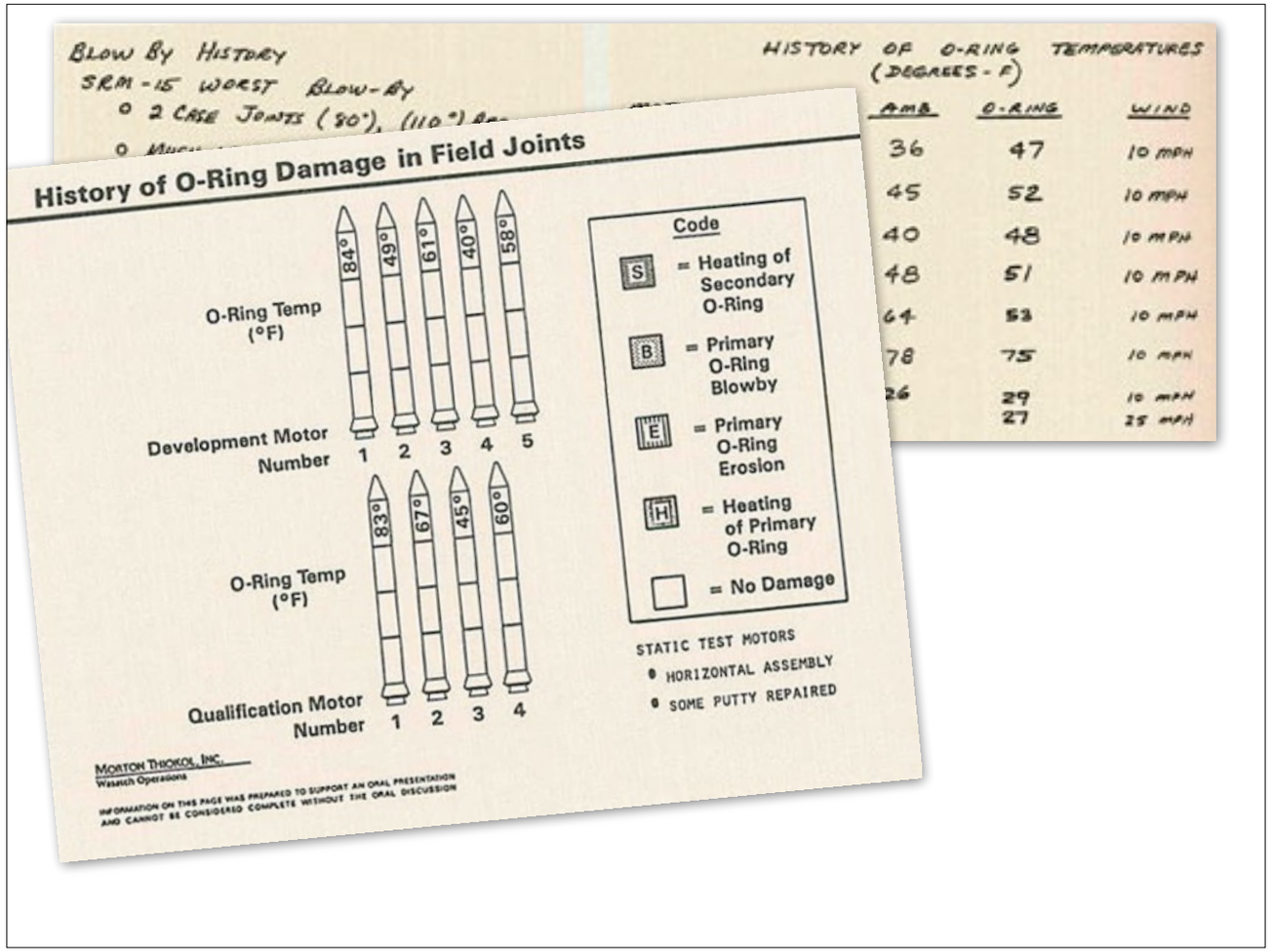
SRM-13A, 15, 16A, 18, 23A 24A

- Nozzle Blow-By

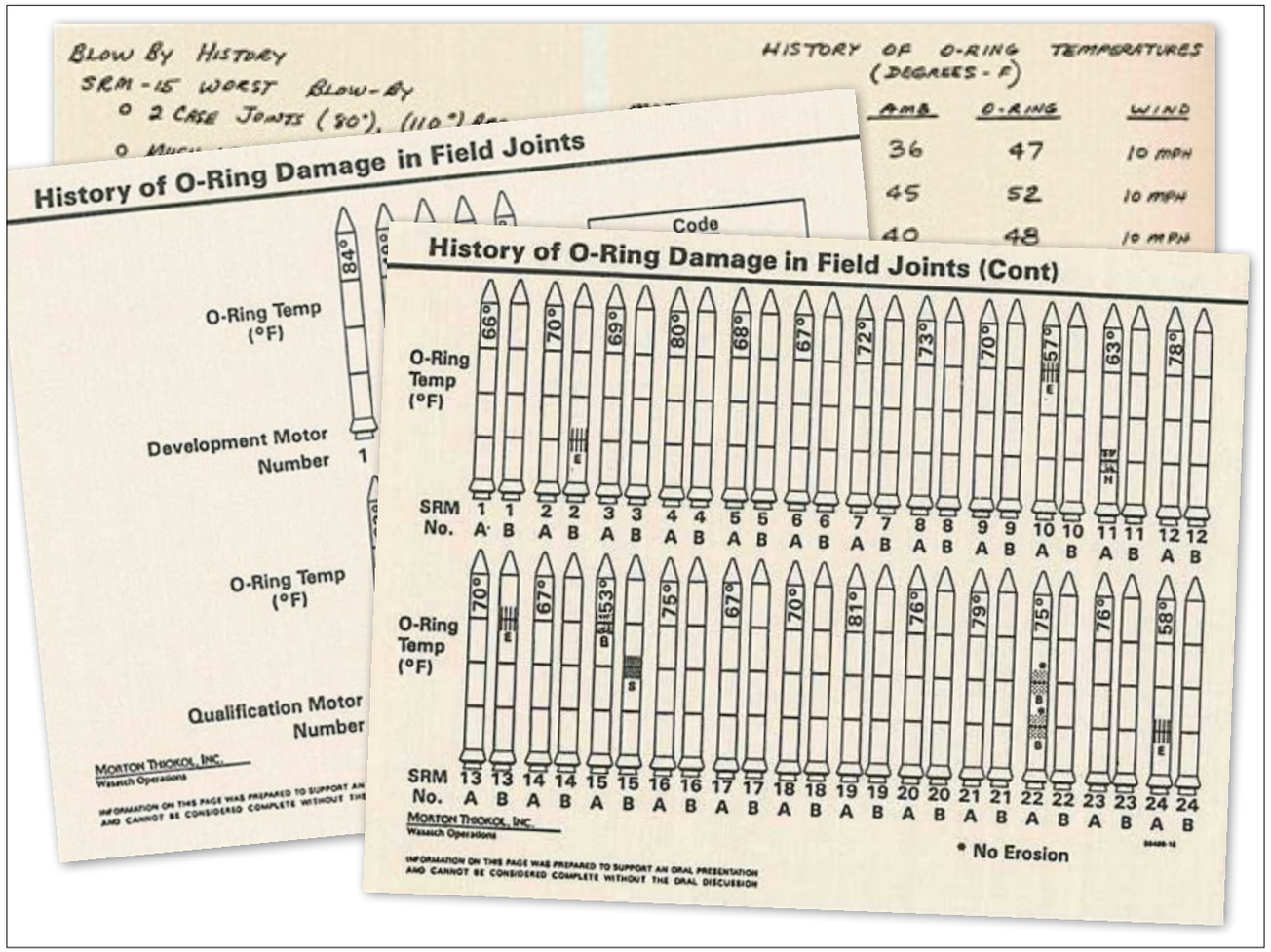
History of O-ring Temperatures (Degrees-F)

Motor	M&T	Amb	O-ring	Wind
DM-4	68	36	47	10 mph
DM-2	76	45	52	10 mph
QM-3	72.5	40	48	10 mph
QM-4	76	48	51	10 mph
SRM-15	52	64	53	10 mph
SRM-22	77	78	75	10 mph
SRM-25	55	26	29 27	10 mph 25 mph

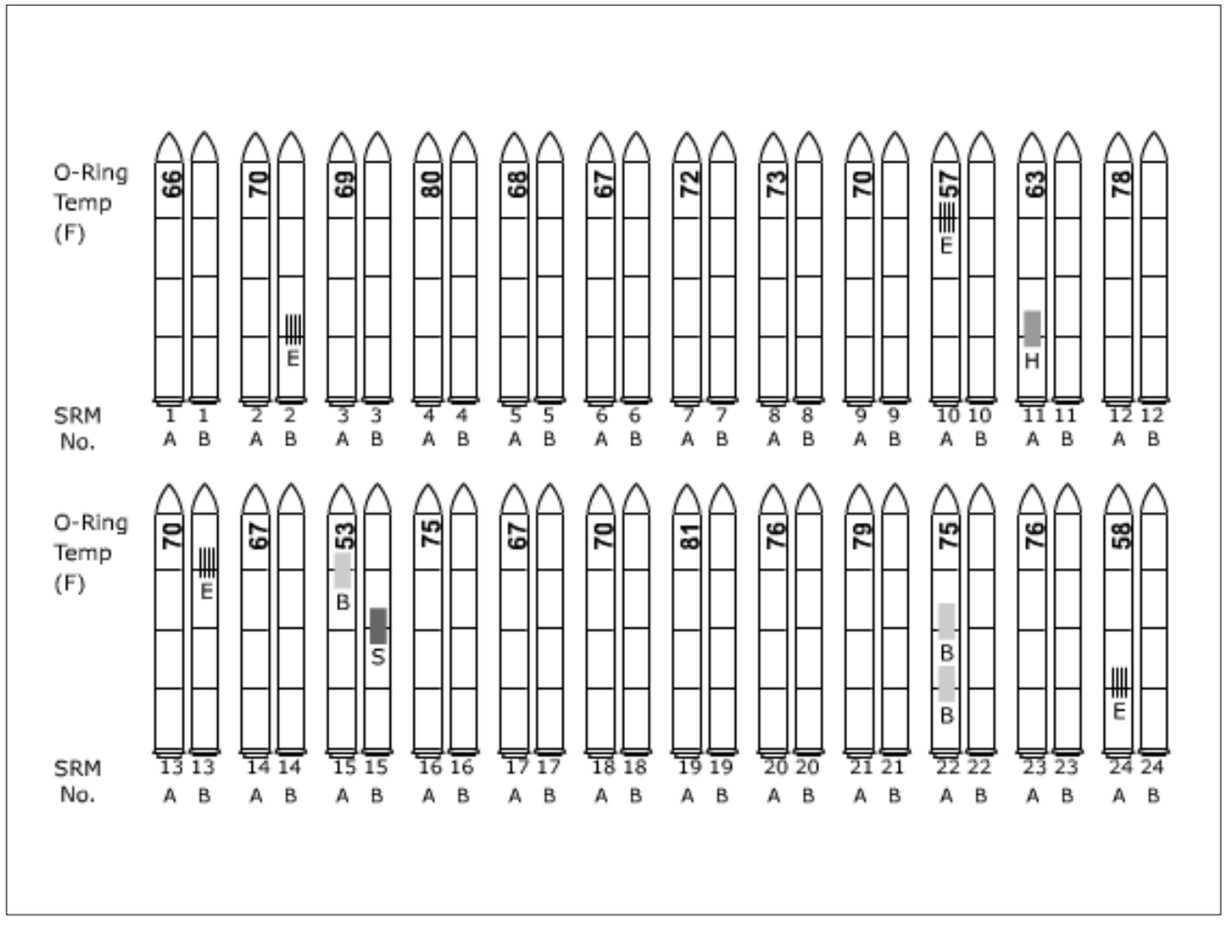
This is a cautionary tale about oversimplifying arguments.



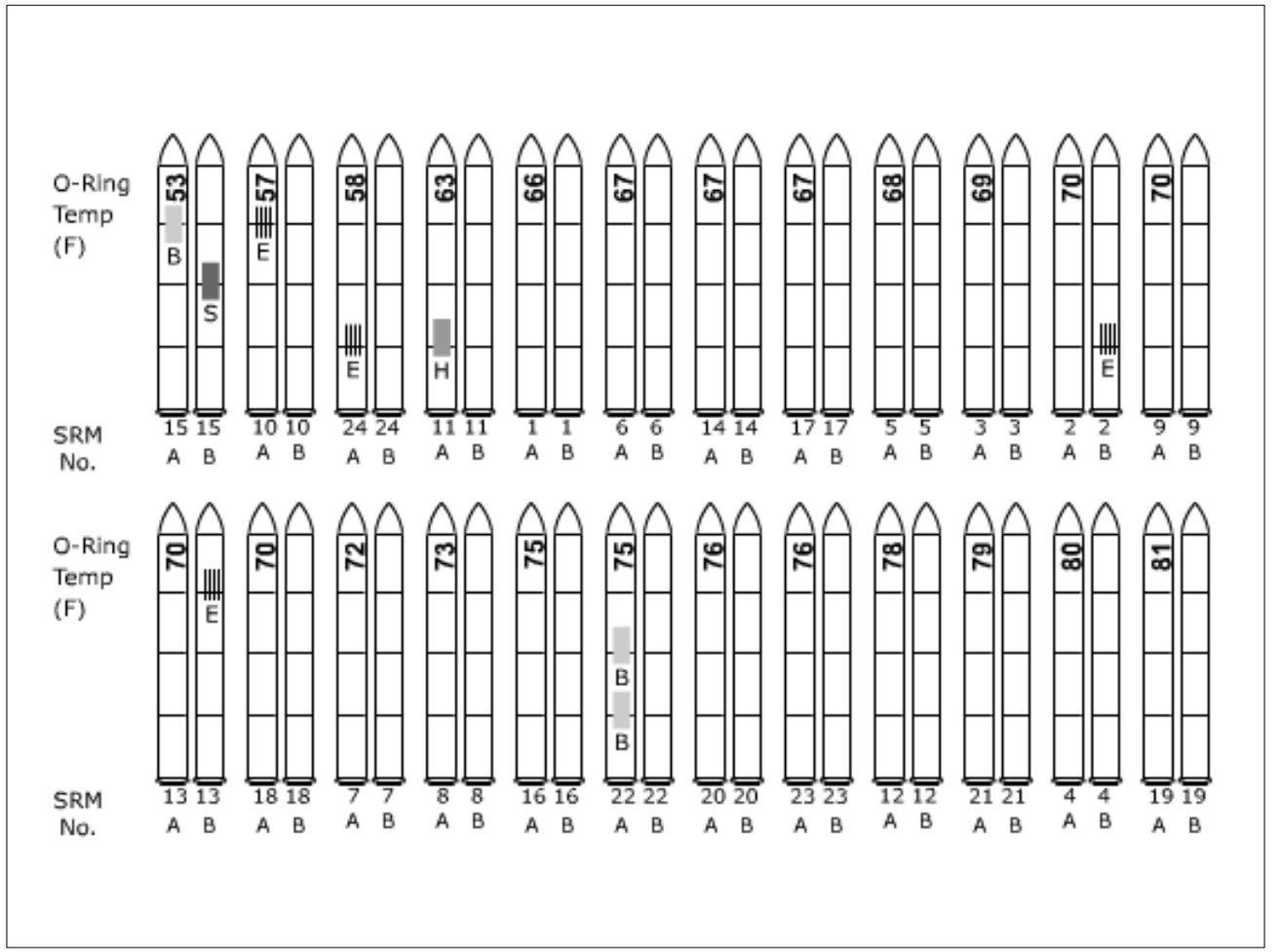
This is a cautionary tale about oversimplifying arguments.



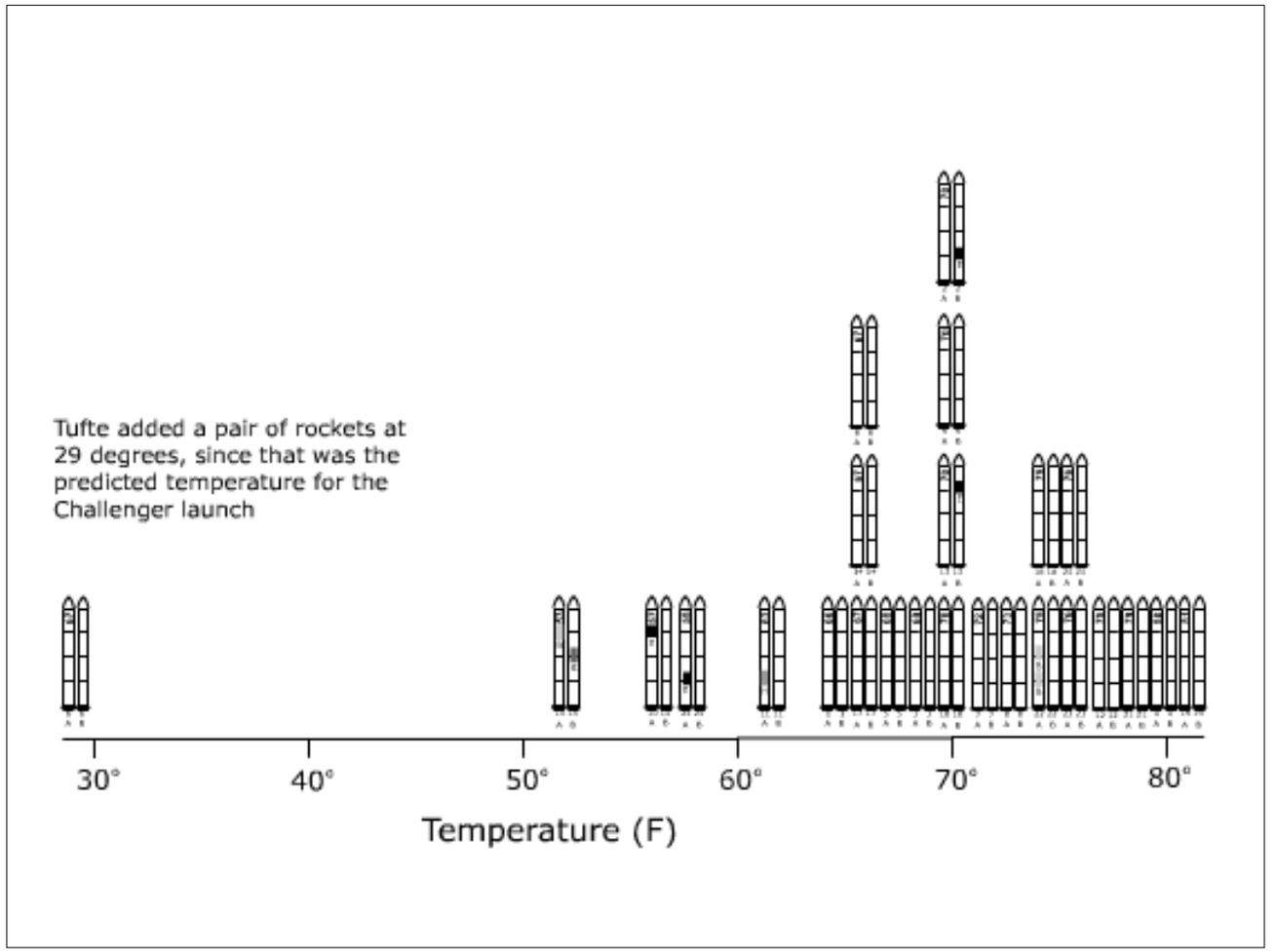
This is a cautionary tale about oversimplifying arguments.



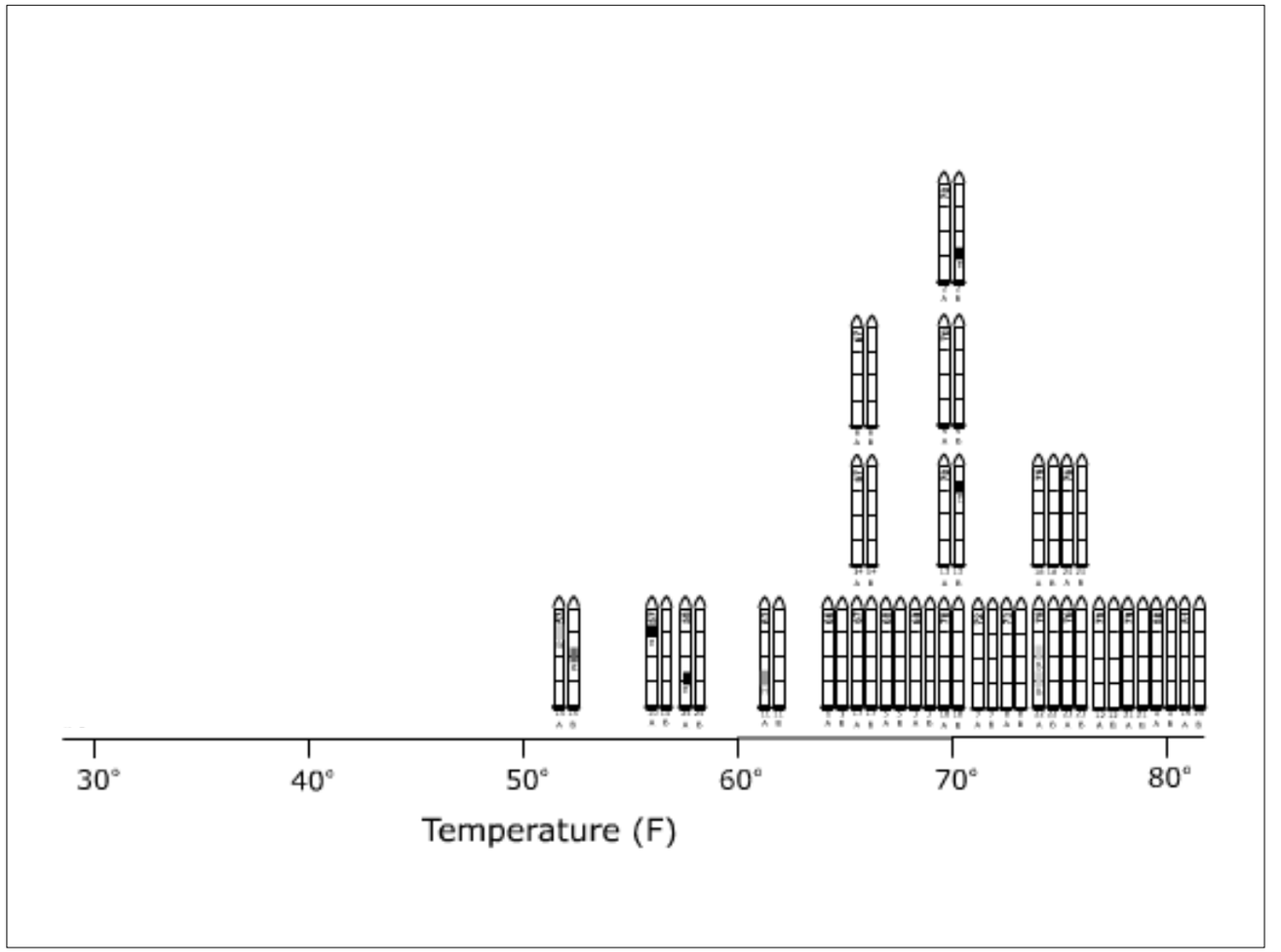
History of O-ring damage as presented by Morton-Thiokol after the explosion



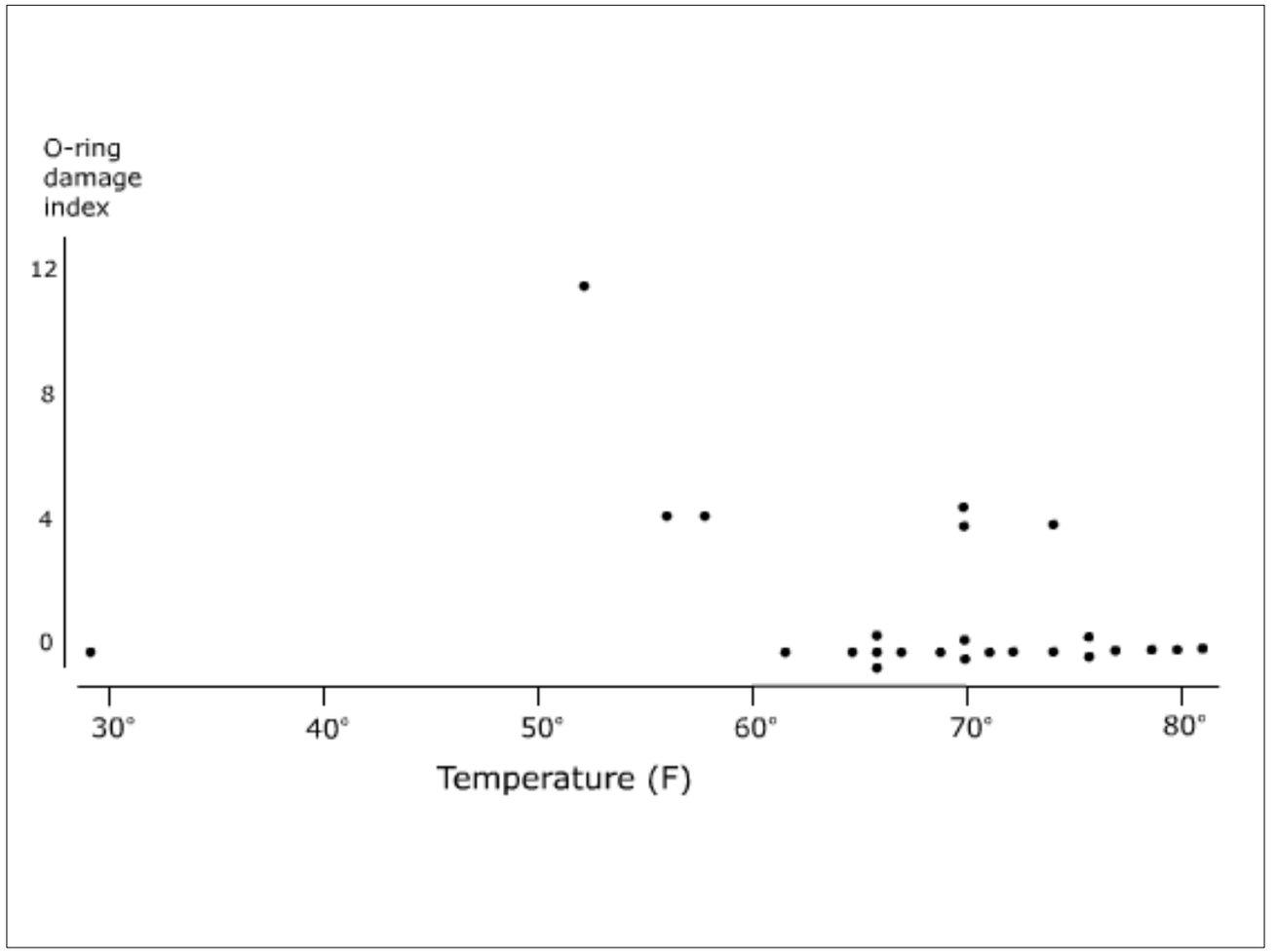
In Tufte's first revision, Tufte sorts these rockets by temperature



In his second revision, Tufte plots the rockets on an x-axis.



In his second revision, Tufte plots the rockets on an x-axis.

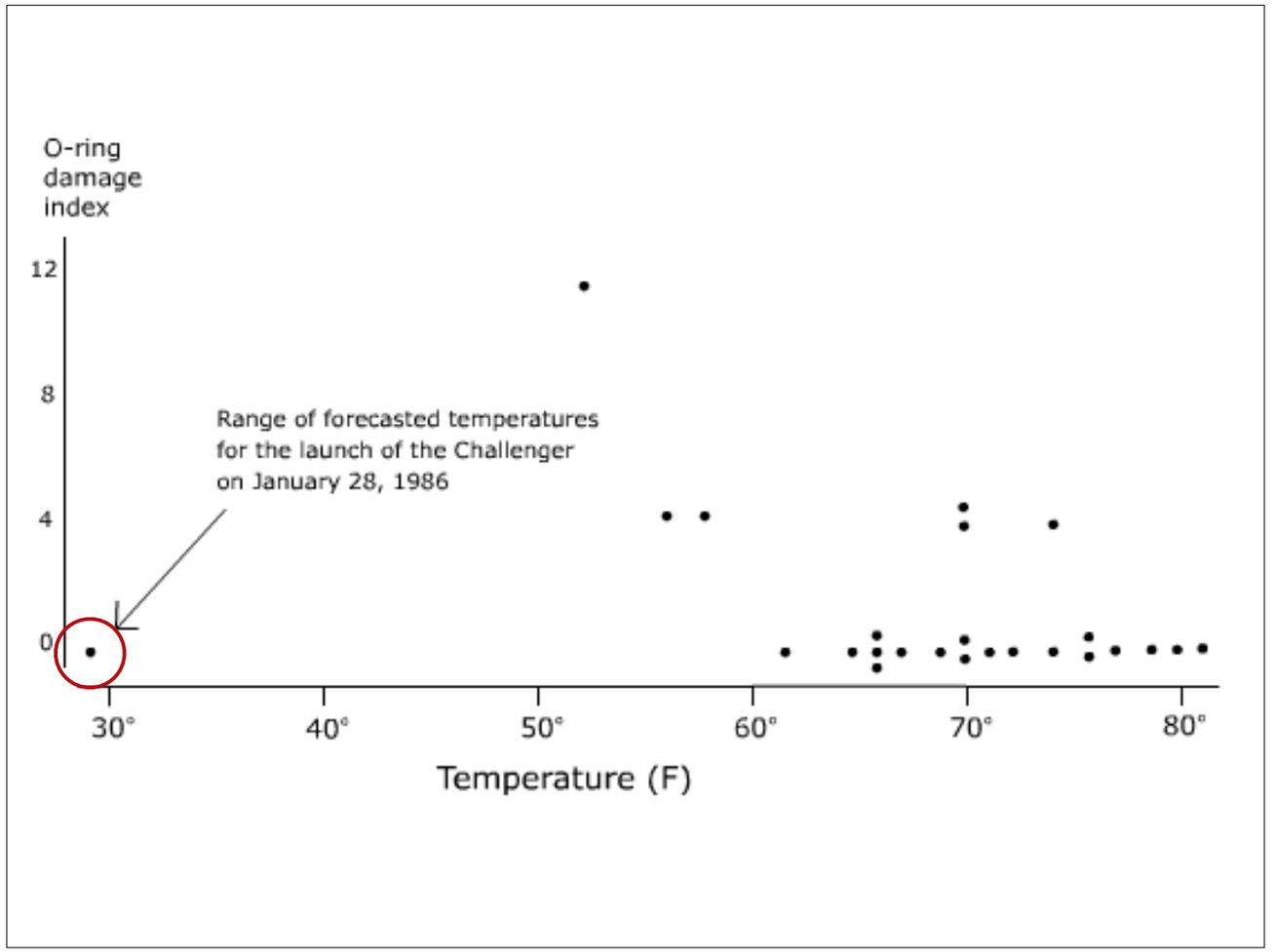


In his third revision, Tufte removes the chart junk and then adds a y-axis, on which he plots the o-ring damage index. I've put a red circle around the Challenger.

This is a much cited story of the importance of effective data visualization. Sadly it seems that "Tufte both misunderstood and misrepresented the argument and the true cause of the failure. What is more, Tufte keeps making the case that it was the engineers's fault, despite the fact that information is readily available that shows what really happened. … Understanding the statistics and visualization is one thing, … [but] what is equally important though, and easily ignored, is that the context of the data also must be understood to create the correct representation."

Still a good cleanup of a terrible way to present data.

(Source: http://people.rit.edu/wlrgsh/FINRobison.pdf, http://eagereyes.org/criticism/tufte-and-the-truth-about-the-challenger)



In his third revision, Tufte removes the chart junk and then adds a y-axis, on which he plots the o-ring damage index. I've put a red circle around the Challenger.

This is a much cited story of the importance of effective data visualization. Sadly it seems that "Tufte both misunderstood and misrepresented the argument and the true cause of the failure. What is more, Tufte keeps making the case that it was the engineers's fault, despite the fact that information is readily available that shows what really happened. … Understanding the statistics and visualization is one thing, … [but] what is equally important though, and easily ignored, is that the context of the data also must be understood to create the correct representation."

Still a good cleanup of a terrible way to present data.

(Source: http://people.rit.edu/wlrgsh/FINRobison.pdf, http://eagereyes.org/criticism/tufte-and-the-truth-about-the-challenger)

Chart junk

„A scientific theory should be as simple as possible, but no simpler“

— Albert Einstein

"Above all else show the data"

"A large share of ink on a graphic should present data-information, the ink changing as the data change. Data-ink is the non-erasable core of a graphic, the non-redundant ink arranged in response to variation in the numbers represented."

Edward Tufte (1983)

NEWSPAPERS Ca. 50 data points per cm^2

Venjulegar skáldsögur eru með allt frá 5.000 til 15.000 stafi á síðu.

Símaskrár eru með milli 10.000 og 18.000 stafi per síðu

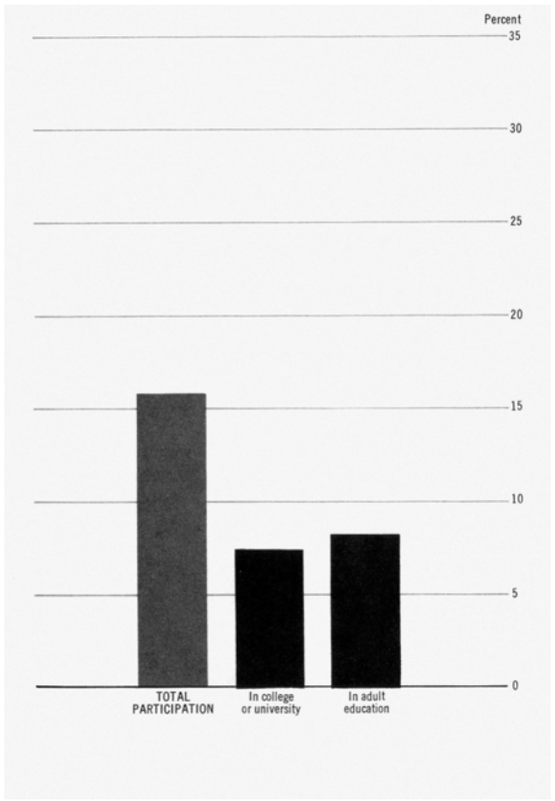
Gröf og aðrar upplýsingamyndir ættu ekki að vera eftirbátar þeirra.

MAPS 40.000 data points per cm^2

Seigla augans gerir því kleift að gera greinarmun á 0,1 millimetra þar sem því er ögrað að gera svo.

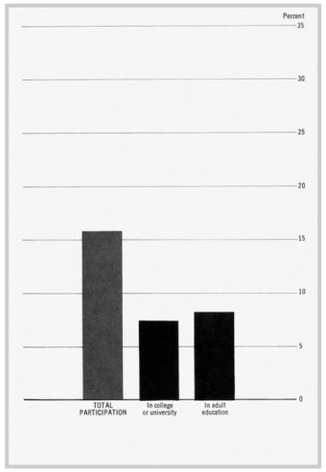
*"The Relevance of Cartography" 1975.

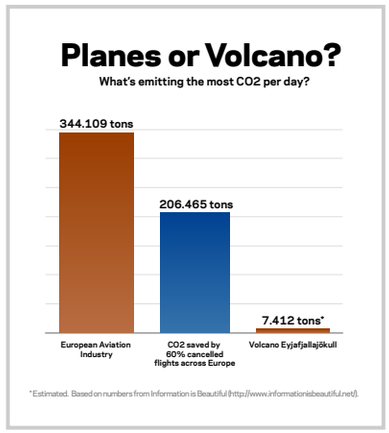
SOME CHARTS... 0,02 data points per cm^2

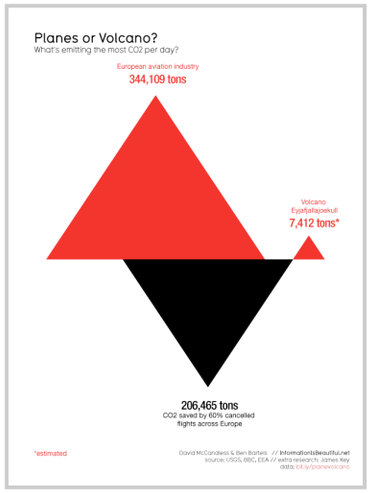


This bar chart was printed in five colors (t'was before the days of laser printing) and was around the size of a postcard. Edward Tufte uses this chart in his book "Cisualizing Quantative Information" to show how much ink (and space) can be used to show very little data indeed.

Does this remind you of anything?







Indeed! And rightly so.

To be fair, there is a place for this kind of chart. I'll get to that later.

$$\text{Data-ink ratio} = \frac{\text{Data-ink}}{\text{Total ink used to print the graphic}}$$

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

= 1.0 - proportion of a graphic that can be erased

Tufte refers to data-ink as the non-erasable ink used for the presentation of data. If data-ink would be removed from the image, the graphic would lose the content. Non-Data-Ink is accordingly the ink that does not transport the information but it is used for scales, labels and edges. The data-ink ratio is the proportion of Ink that is used to present actual data compared to the total amount of ink (or pixels) used in the entire display. (Ratio of Data-Ink to non-Data-Ink).

Criticism of Tufte's principles

Inbar, et al, evaluated in 2007 the people's acceptance of the minimalist approach to visualize information. They asked 87 students to rate their preference for two different graphs displaying identical information - a standard bar-graph and a minimalist version. Both versions were taken from [Tufte, 1983]. [Inbar, 2007]

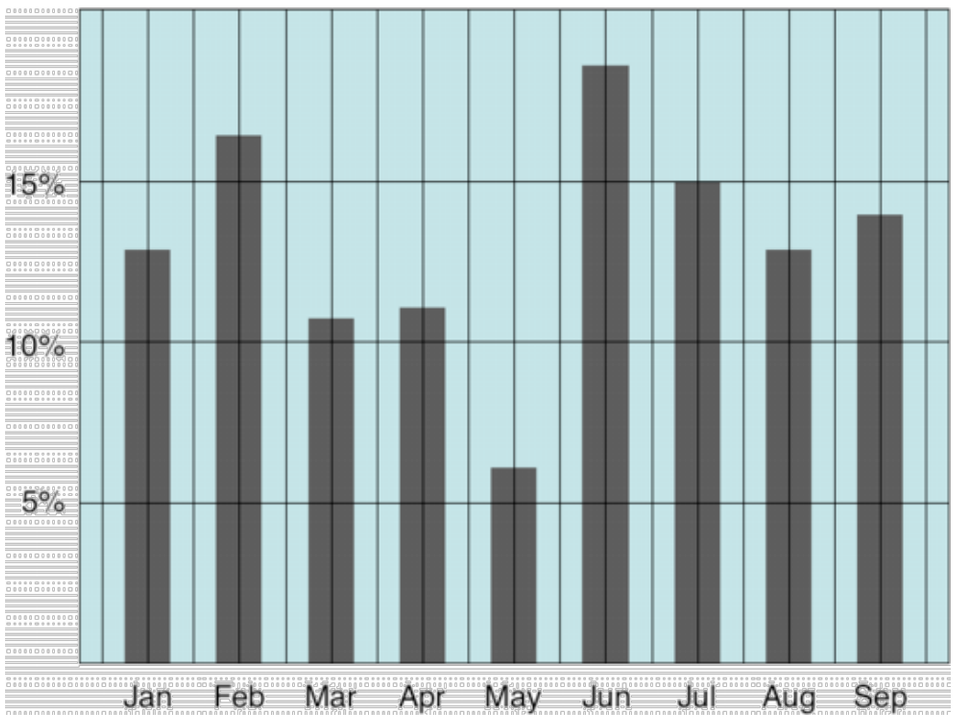
The results showed that the majority students did not like Tufte's minimalist design of bar-graphs - instead they seem to prefer "chartjunk". [Inbar, 2007]

In the example shown above, increasing the data-ink ratio made it harder to read most of the data. For example, removing the top border of the chart removed an implied 20% line. It also made it harder to see how much the graph lies (in that it does not show a range from 0% to 100%, and/or does not show the domain from January through December). How to Lie with Statistics discusses this flaw in the example charts.

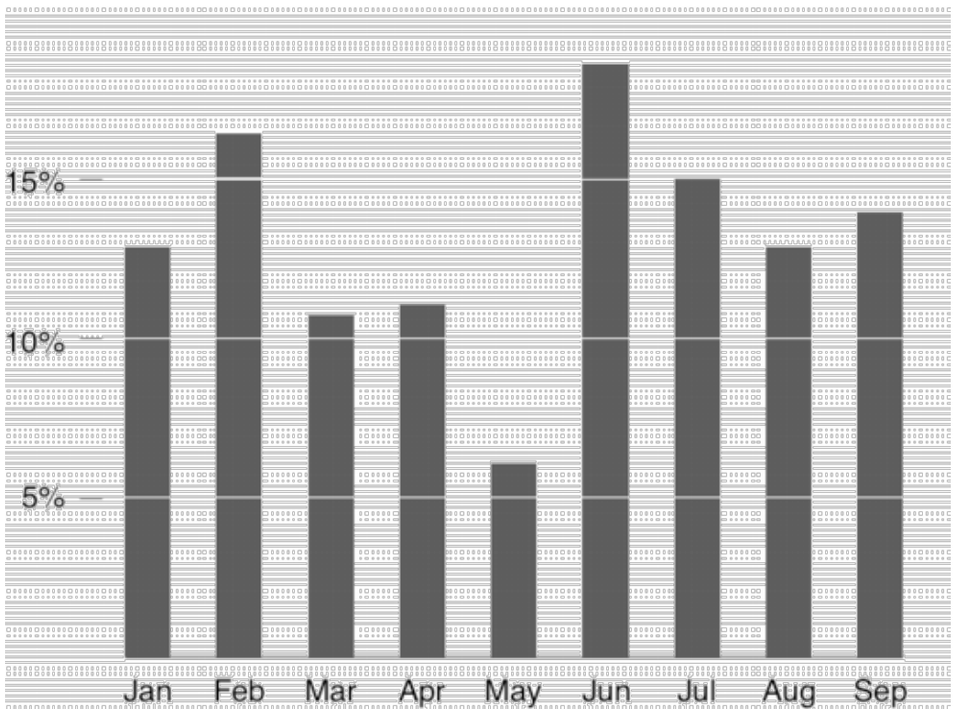
1. Reduce the non-data ink.

2. Enhance the data ink.

All this controversy and debate can easily be boiled down to these two simple points.

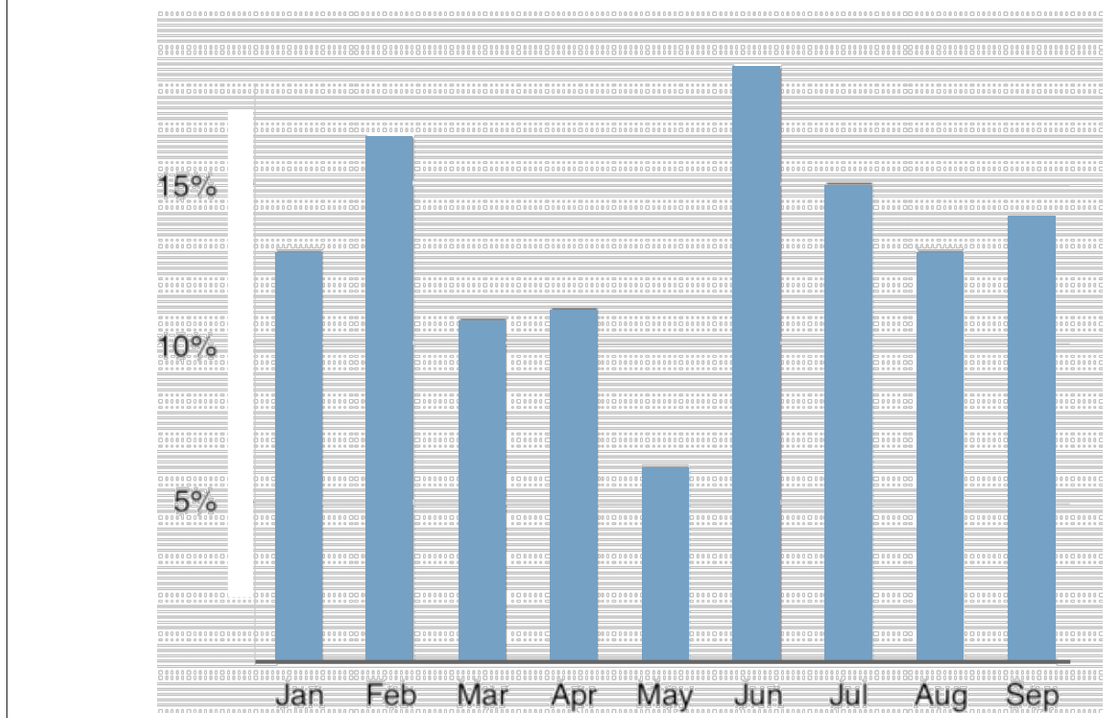


This bar chart has too heavy gridlines, unnecessary vertical gridlines and an unnecessary color for the background.

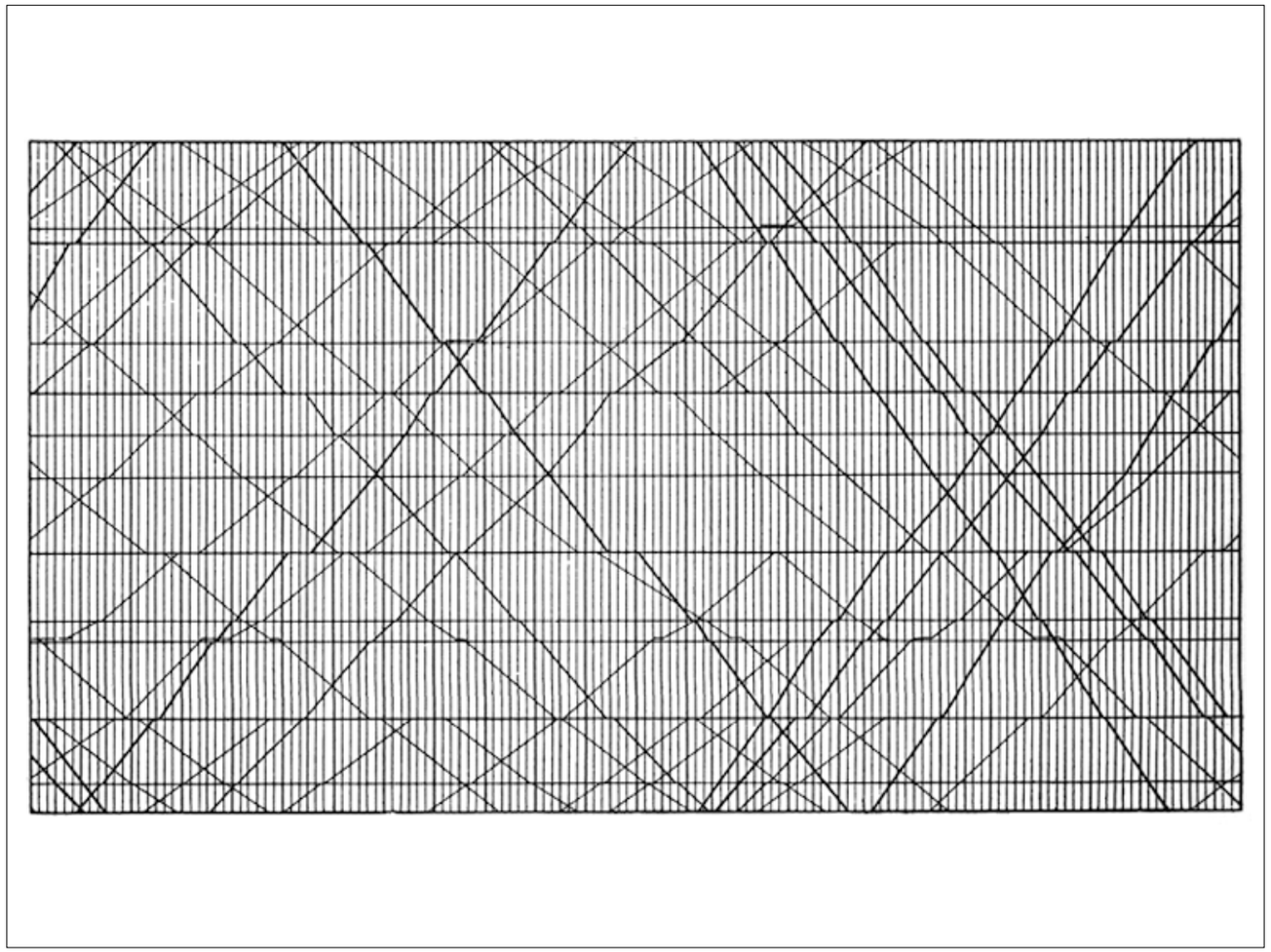


Now the chart is totally stripped of all chart junk. As mentioned before, some people argue that too much has been taken away; that while this may increase the data-ink ratio, it does not actually increase legibility.

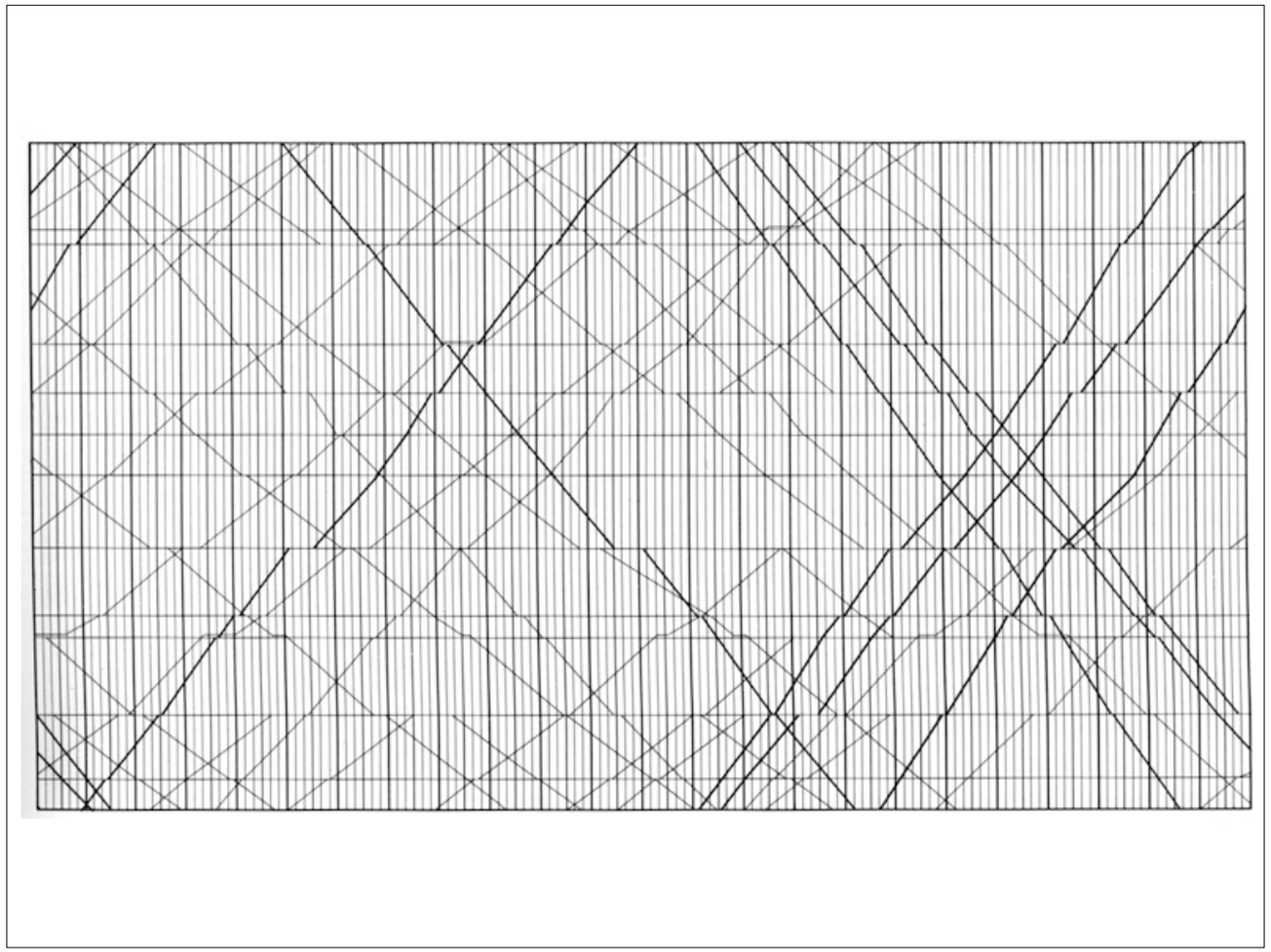
(Source: http://www.infovis-wiki.net/index.php/Data-Ink_Ratio)



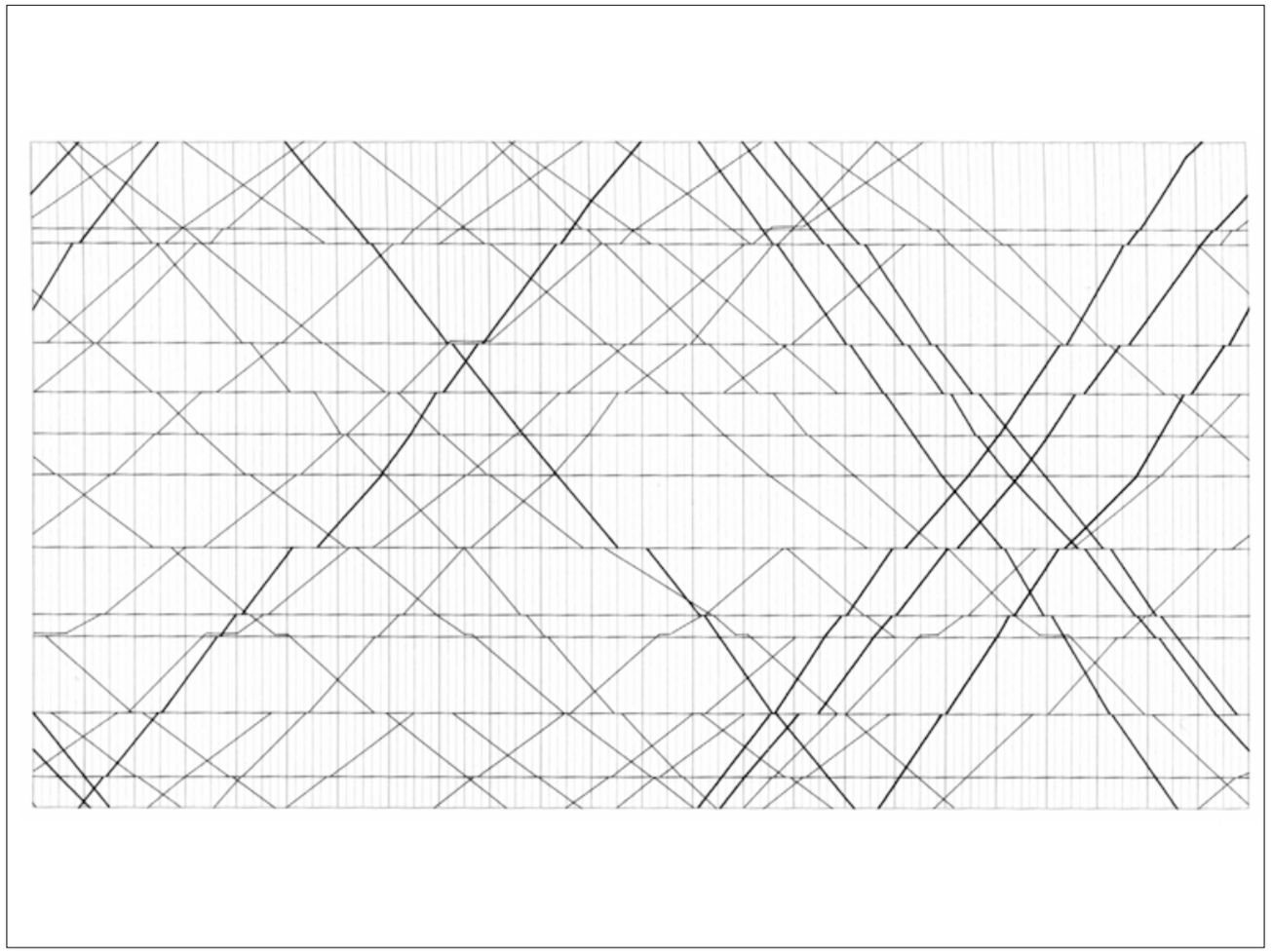
I think adding a stronger base for the zero and using actual gridlines actually makes this chart more legible. Also, a bit of coulour doesn't hurt.



A simple trick like reducing the intensity of the grid can improve even the classics like Marey's train schedule.



A simple trick like reducing the intensity of the grid can improve even the classics like Marey's train schedule.

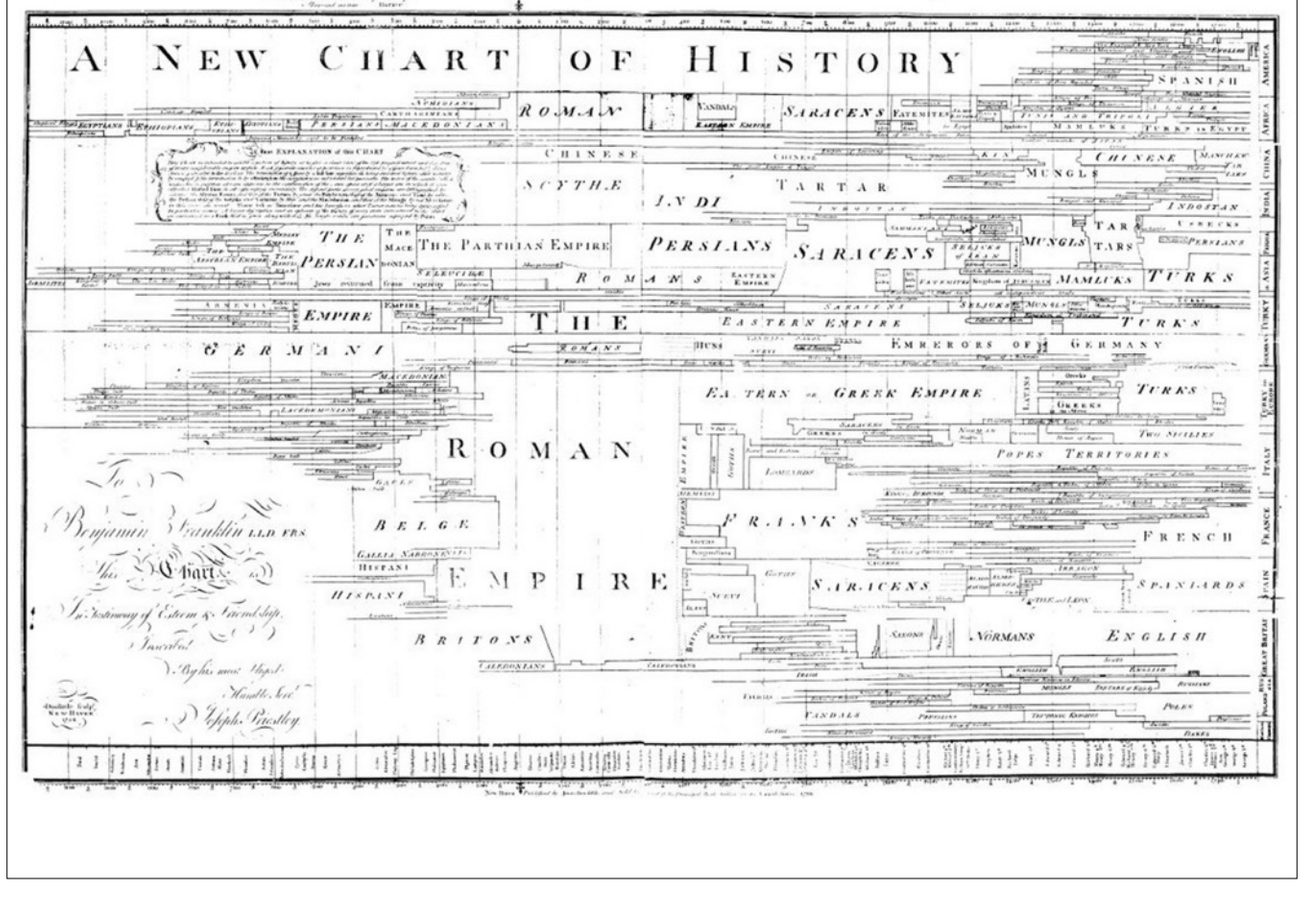


A simple trick like reducing the intensity of the grid can improve even the classics like Marey's train schedule.

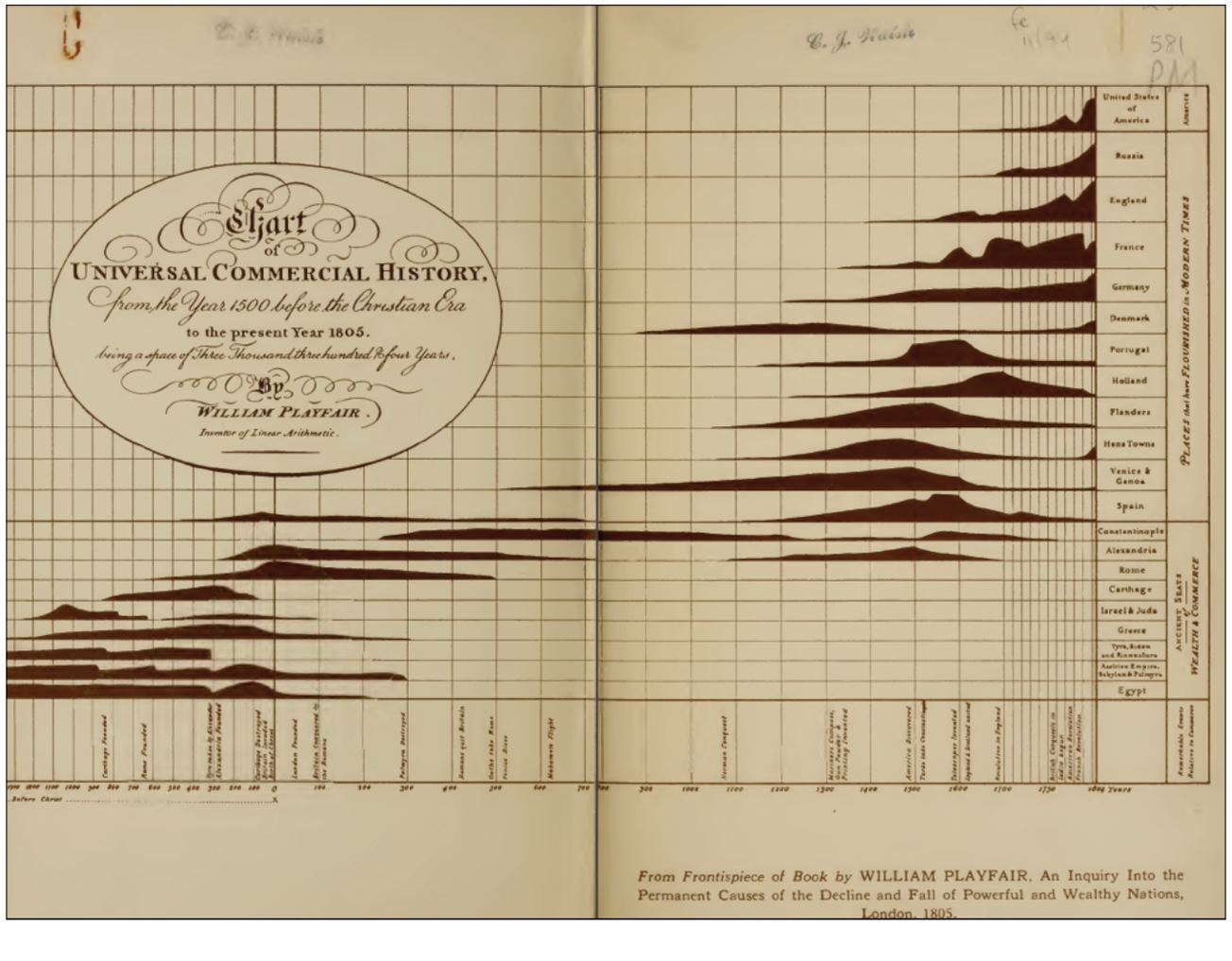
Transforming a poor graph

"Every time you are tempted to react in the same old way,
ask if you want to be a prisoner
of the past or a pioneer of the future."

— Deepak Chopra



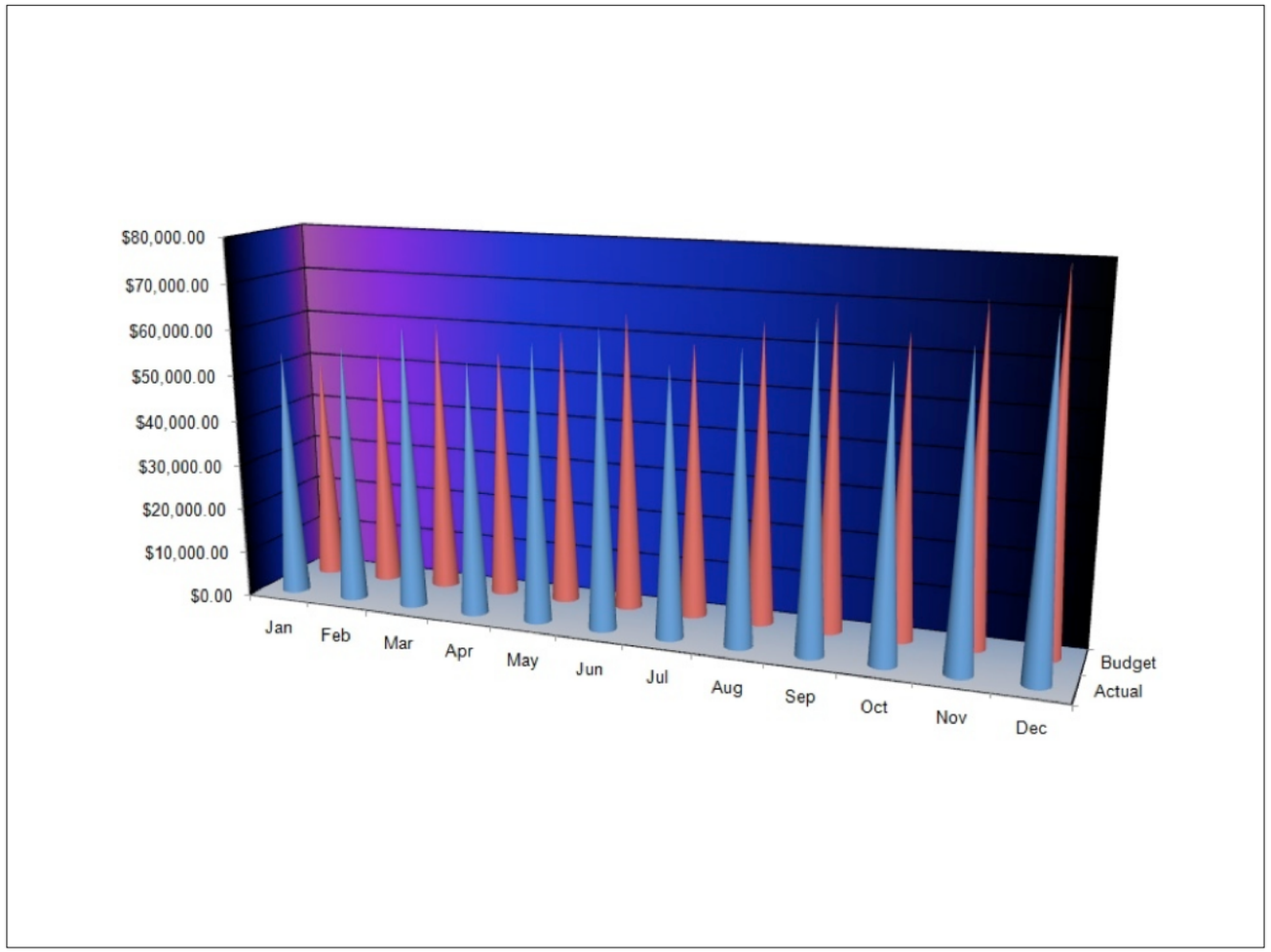
Taking a chart and redesigning it to something more efficient is a challenge that data visualizers love to take on. Joseph Priestly's "A New Chart of History", was later redesigned by Playfair.



From Frontispiece of Book by WILLIAM PLAYFAIR, An Inquiry Into the Permanent Causes of the Decline and Fall of Powerful and Wealthy Nations, London, 1805.

The rise and fall of each empire is much easier to spot in this chart. I find the chart also implies that all empires come and go, which is a comforting thought.

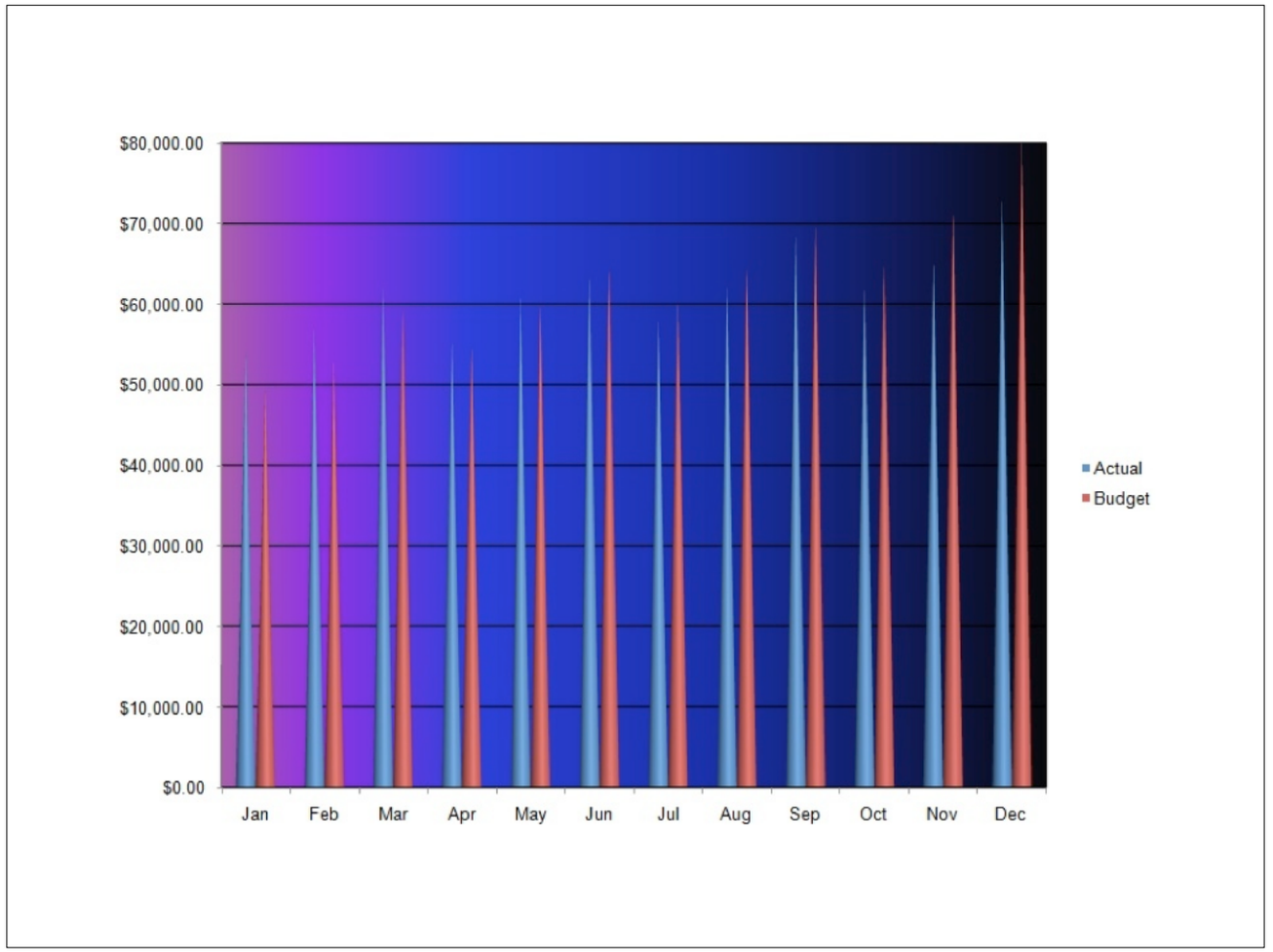
(Source: http://seeingcomplexity.wordpress.com/2011/02/03/a-short-visual-history-of-charts-and-graphs/ > http://www.archive.org/stream/graphicpresentat00brinrich#page/n0/mode/2up)



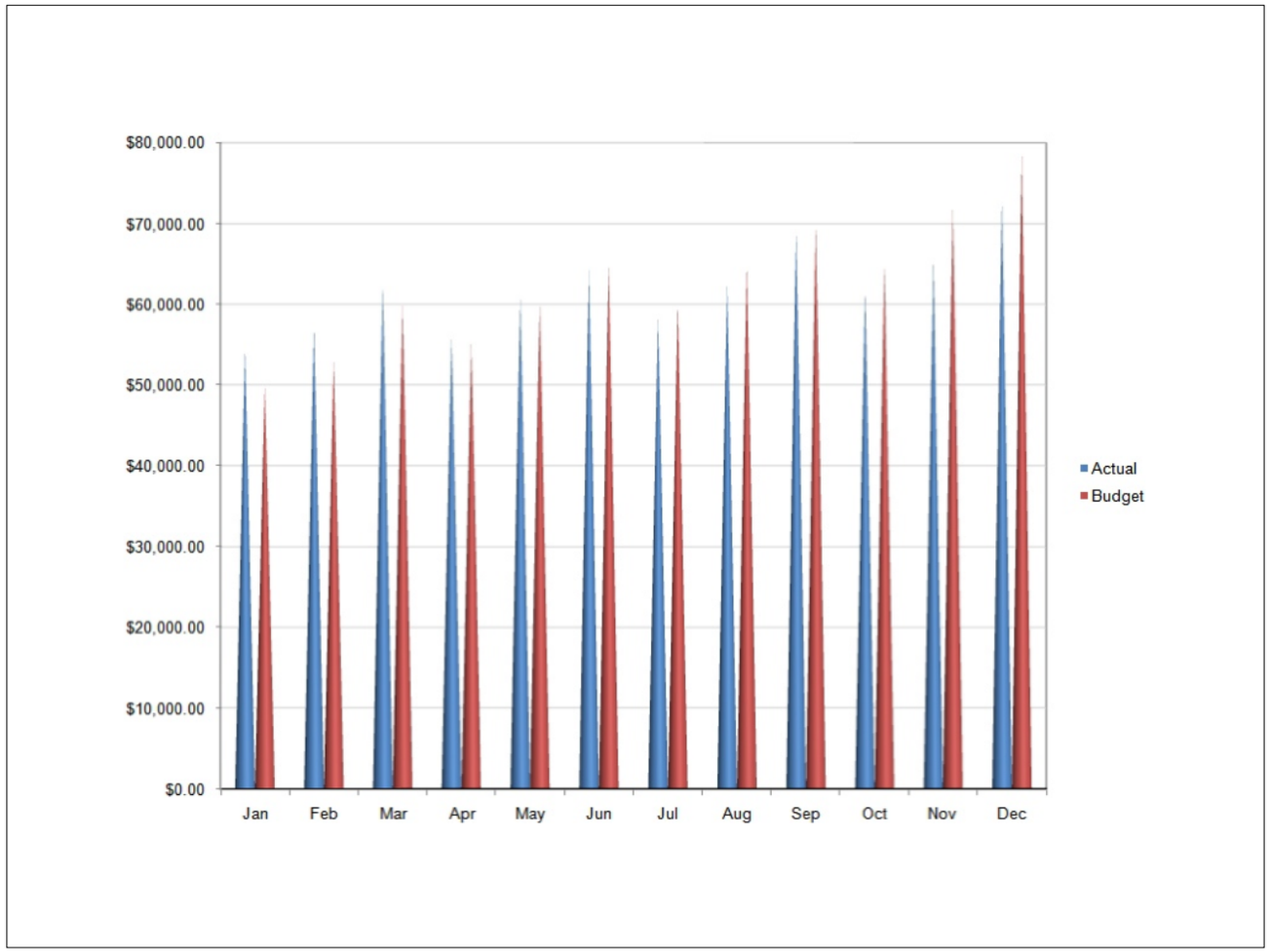
This is the kind of graph that software products, including Excel, encourage us to create. They give us an infinite selection of poorly-designed graphs from which to choose. What we really need, however, is a small selection of graphs that really work. Using this graph, try to see the pattern of change across the months in actual expenses. Try to determine one of the actual values. Try to compare actual expenses to the budget across time.

Let's transform this graph into one that communicates.

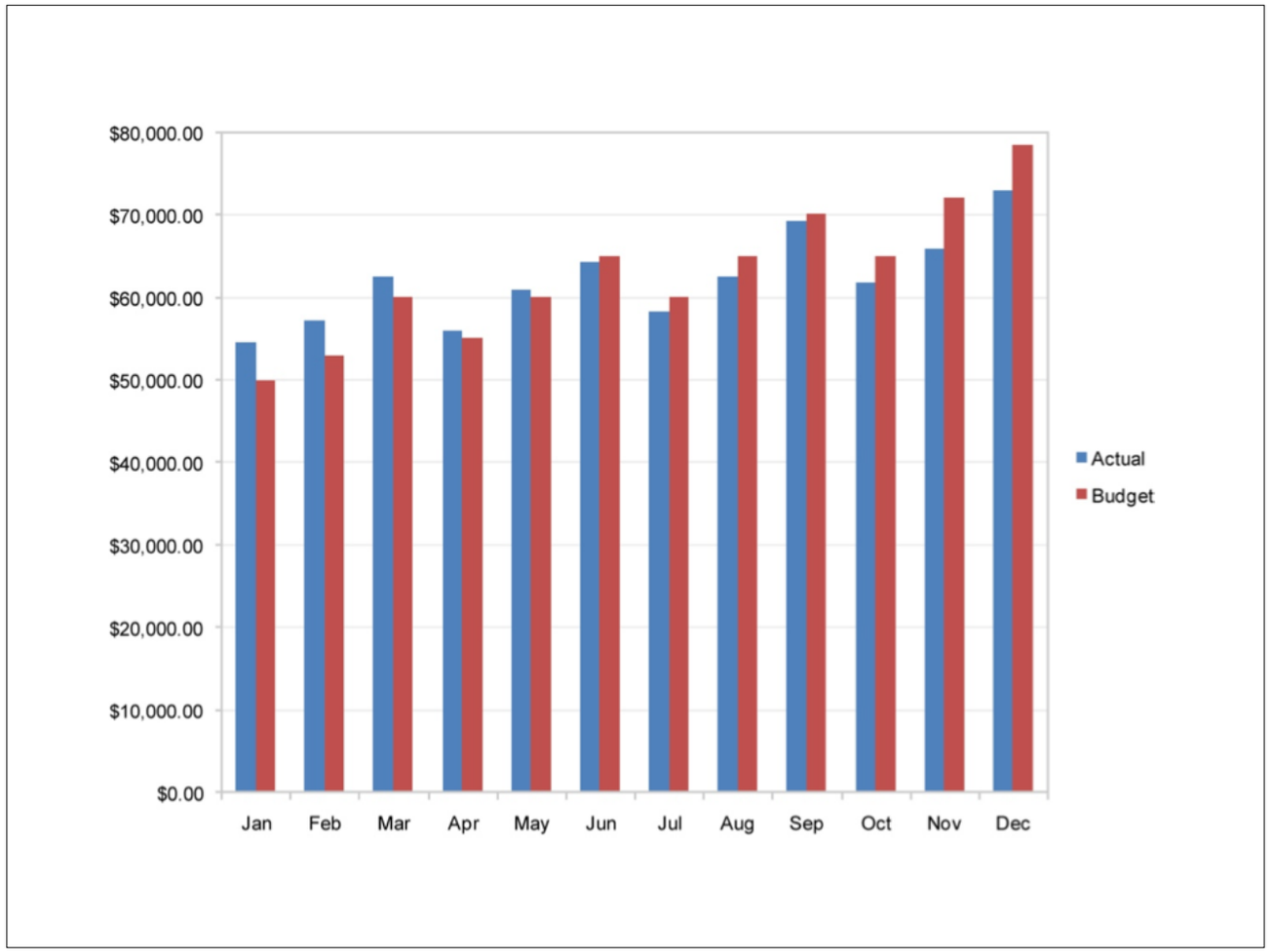
(Source: Text and slides by Stephen Few for his course *Show me the numbers*, used with permissinon)



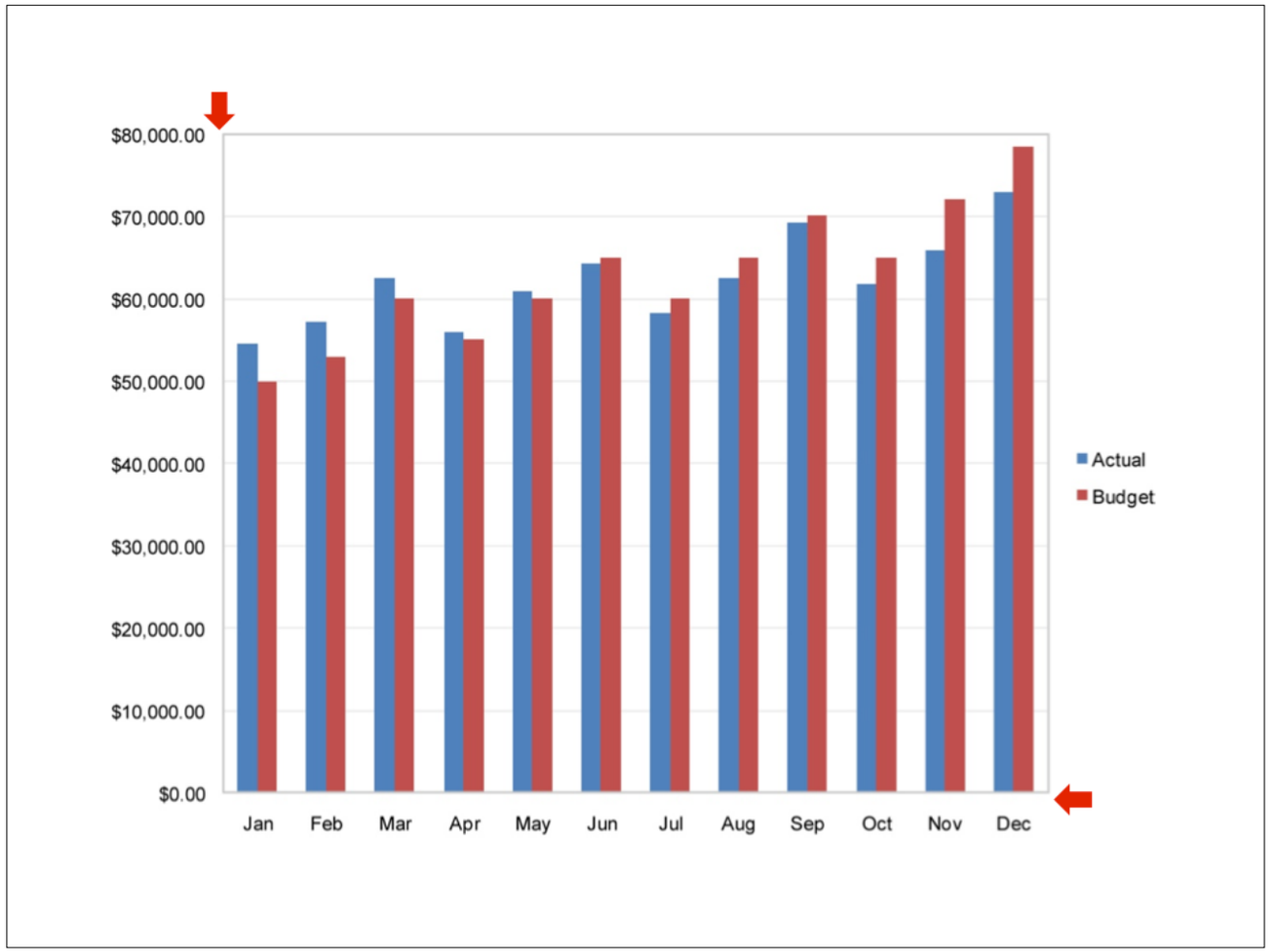
We have now removed the useless 3-D effects and angle, which makes the data easier to read.



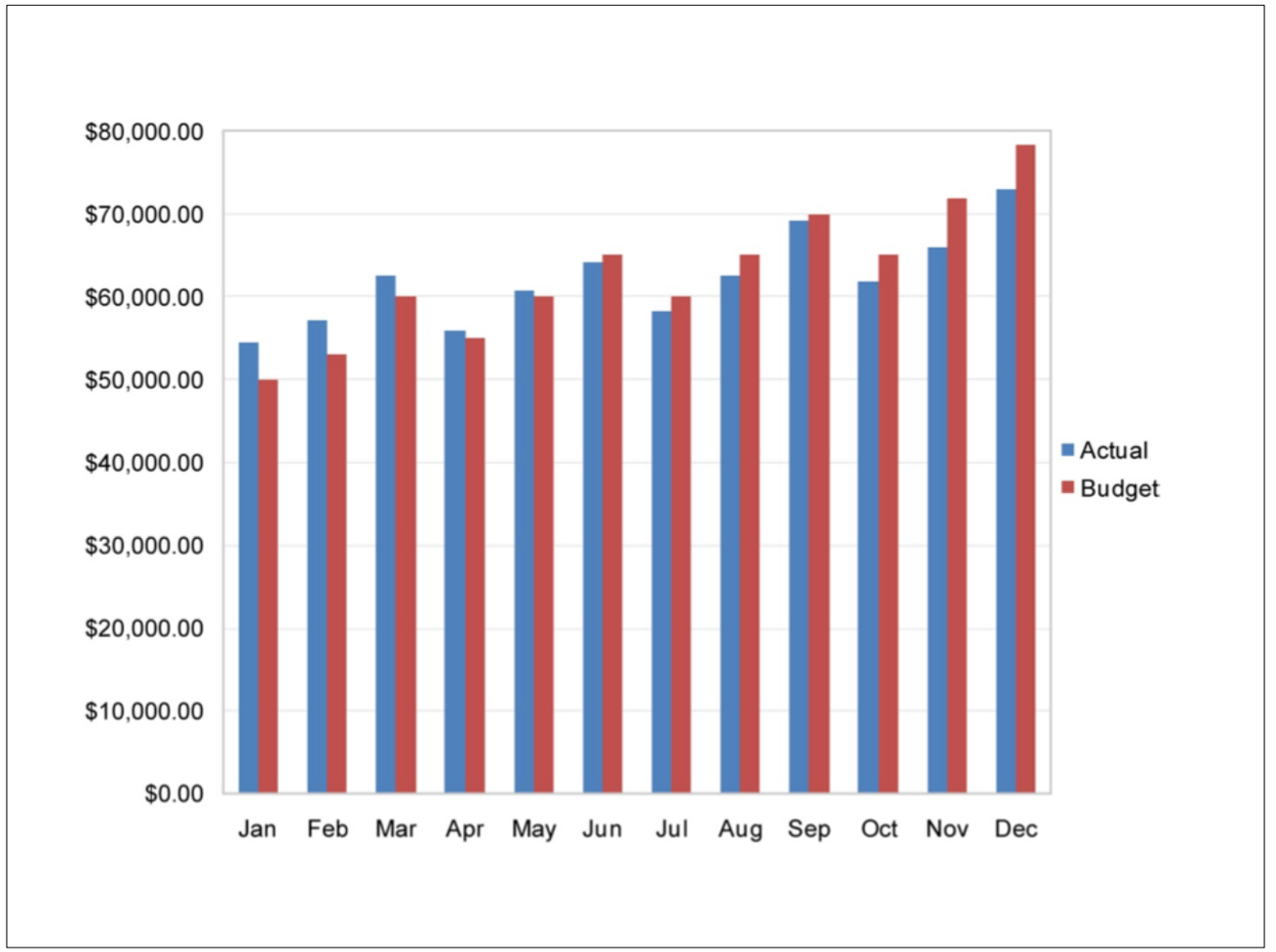
We have now removed the background fill color.



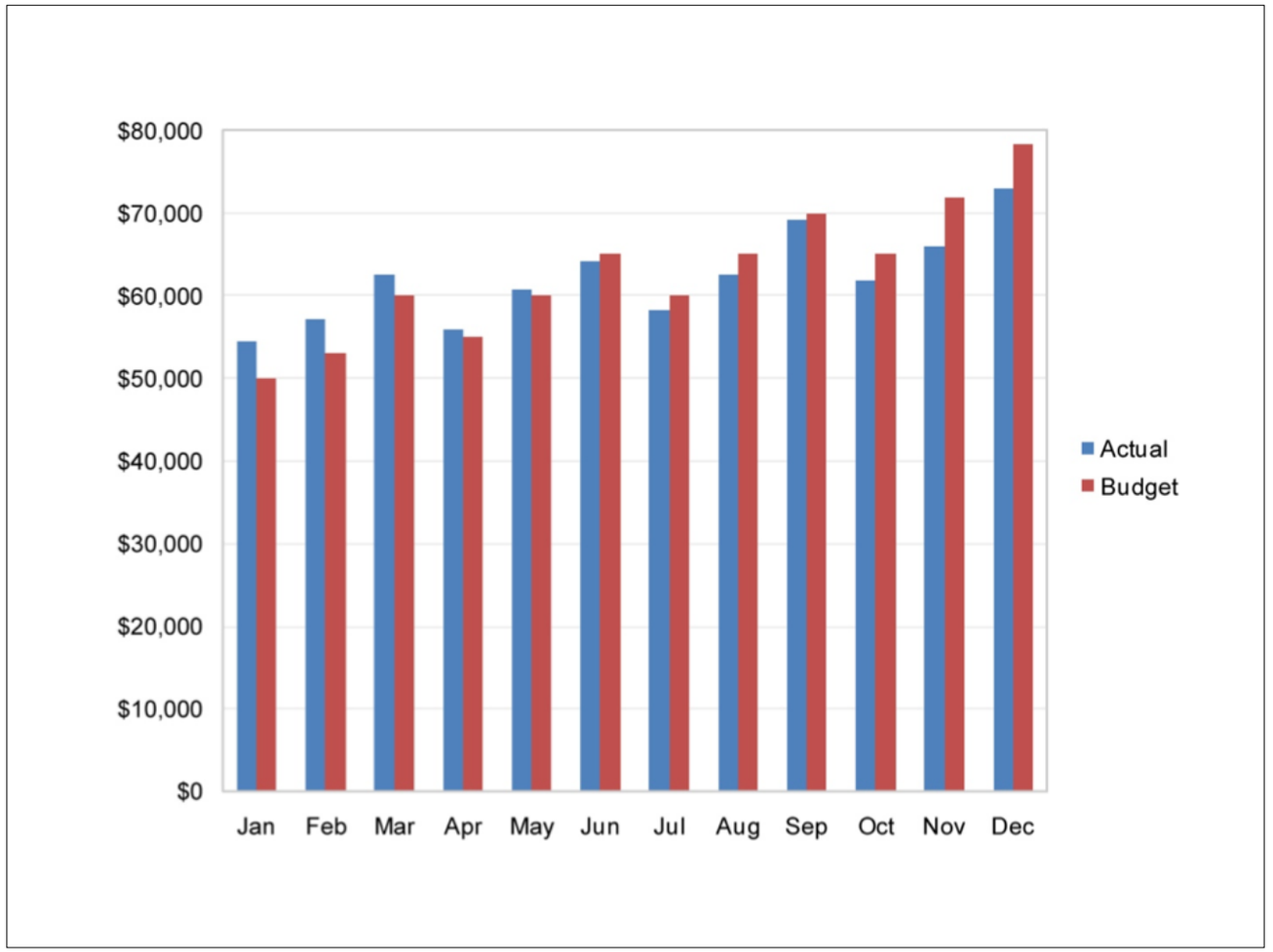
We have now replaced the silly cones with regular bars.



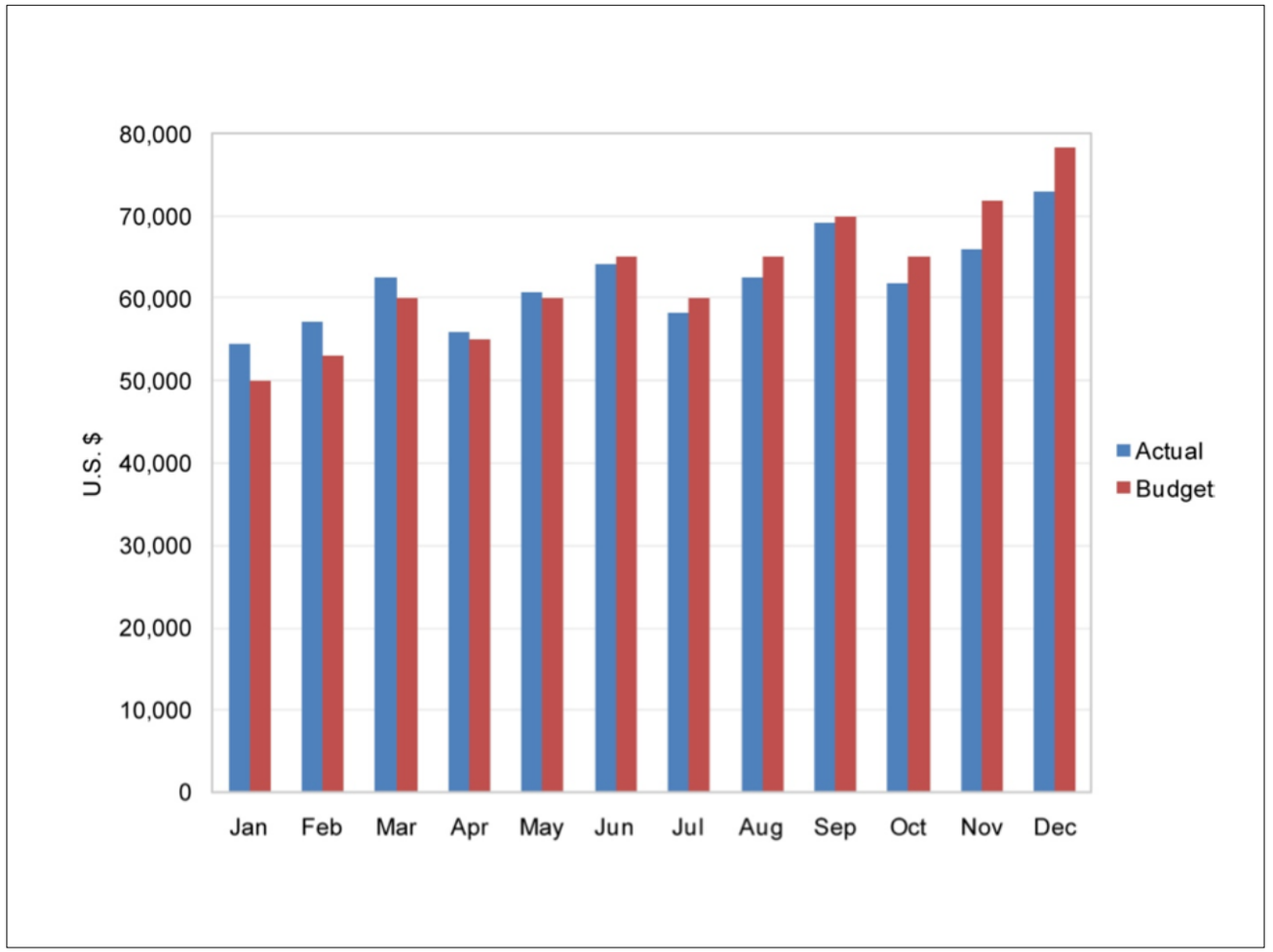
We have now removed the tick marks, which aren't necessary. Tick marks are not needed to separate the months along the X-axis and because horizontal grid lines are being displayed, there is no need for tick marks on the Y-axis either.



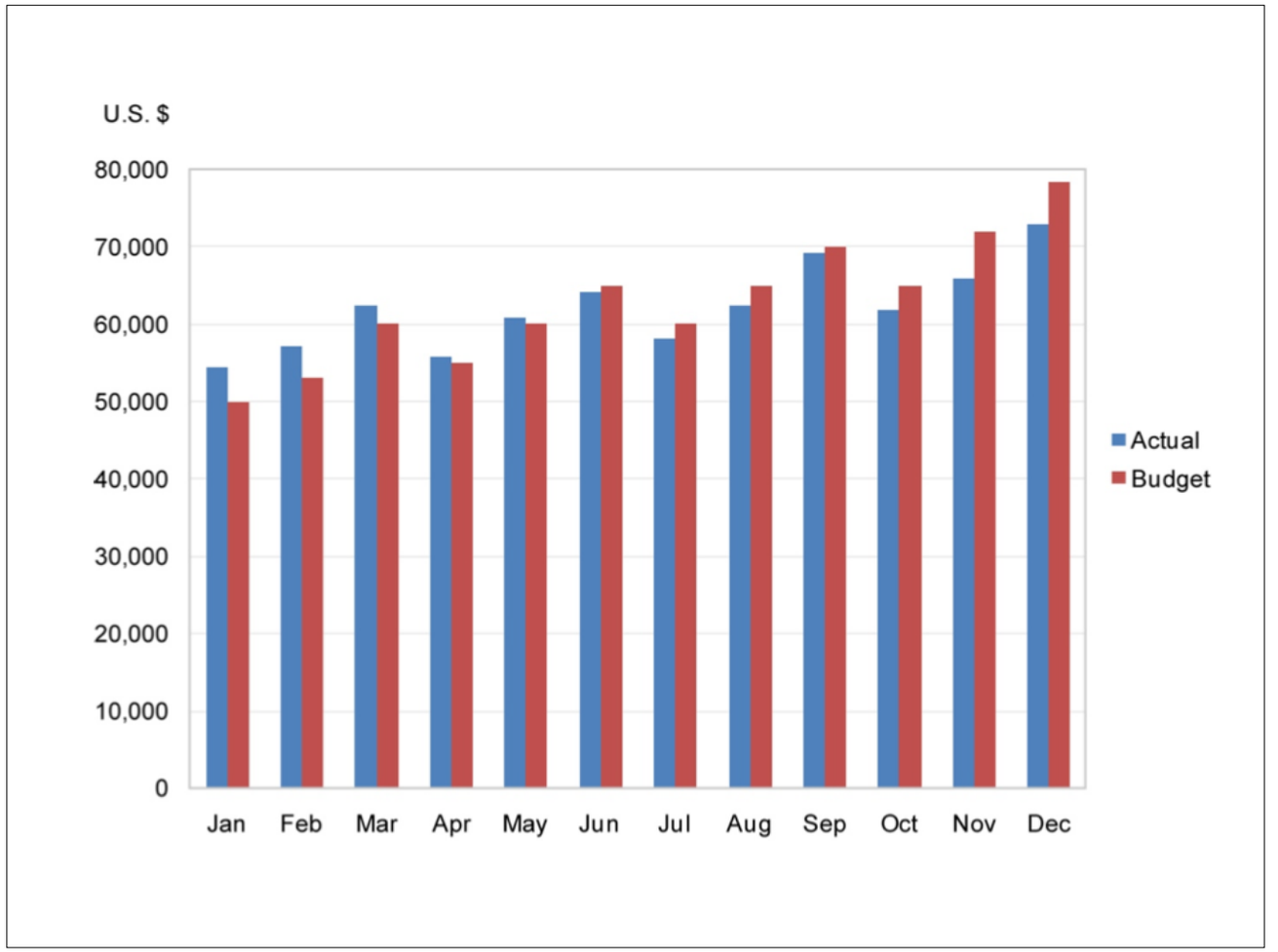
We have now enlarged the text, making it easier to read.



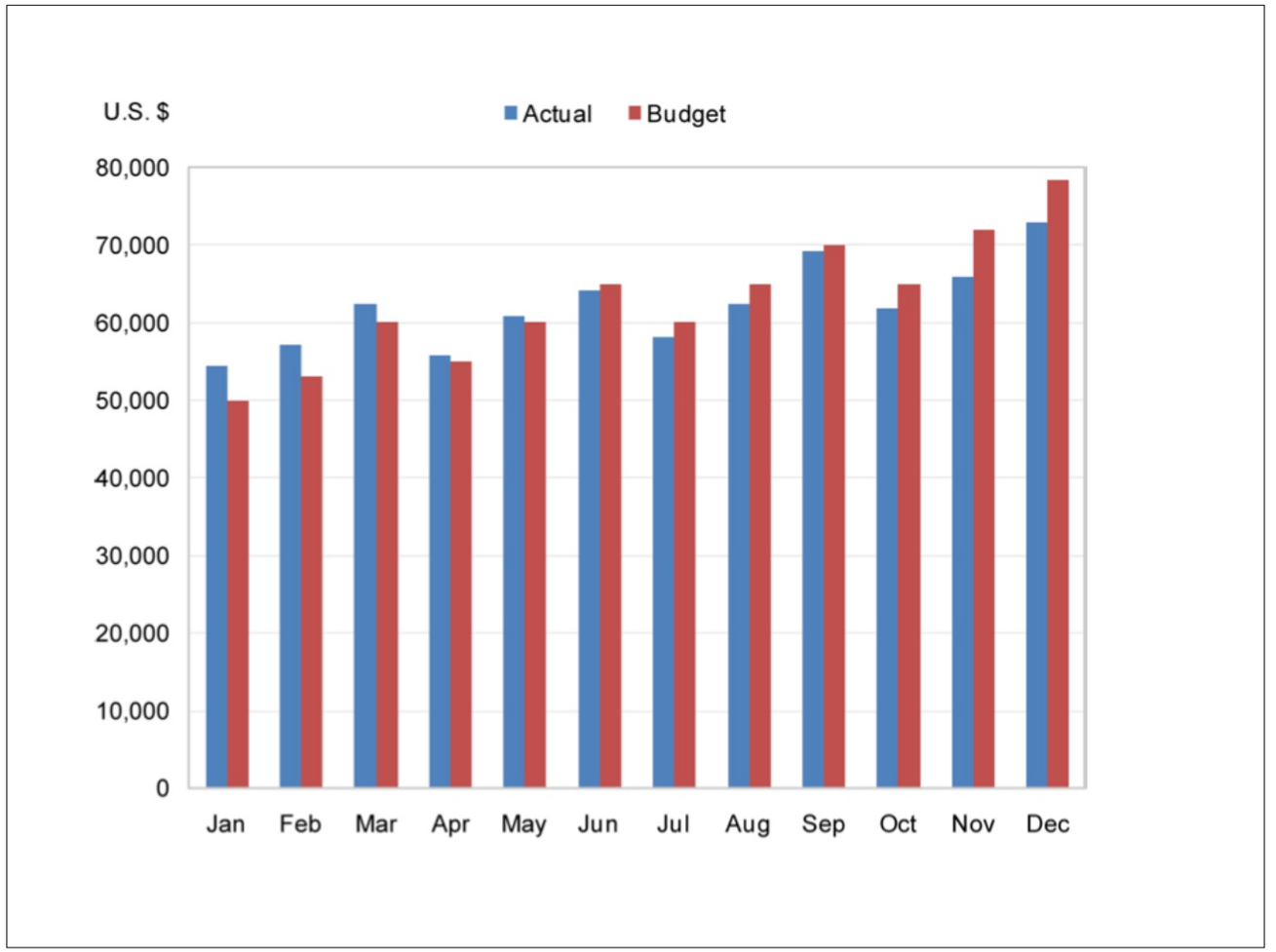
We have now removed the unnecessary decimal places in the dollar amounts along the Y-axis.



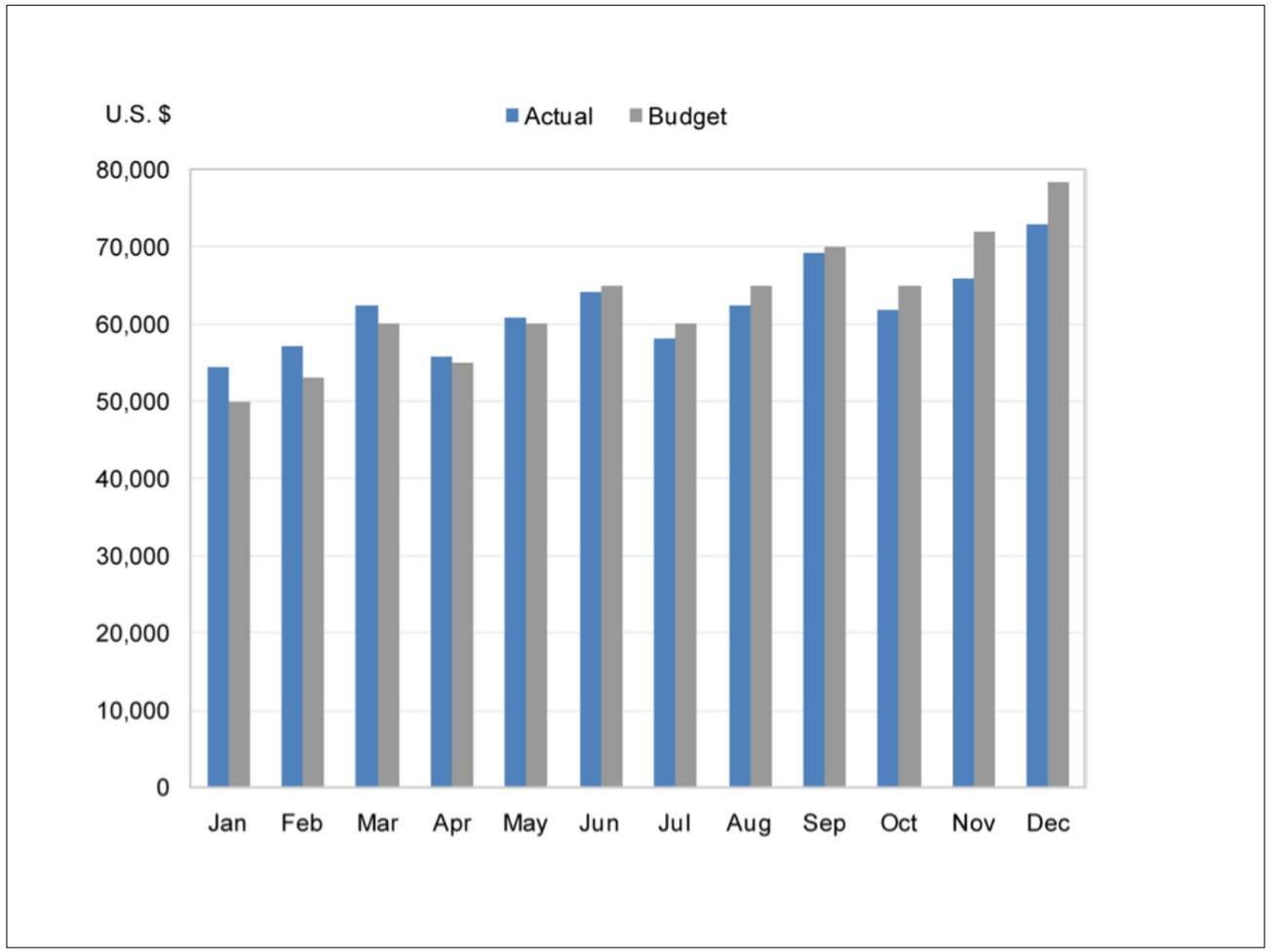
We have now removed the redundant dollar signs and labeled the unit of measure (U.S. $) clearly.



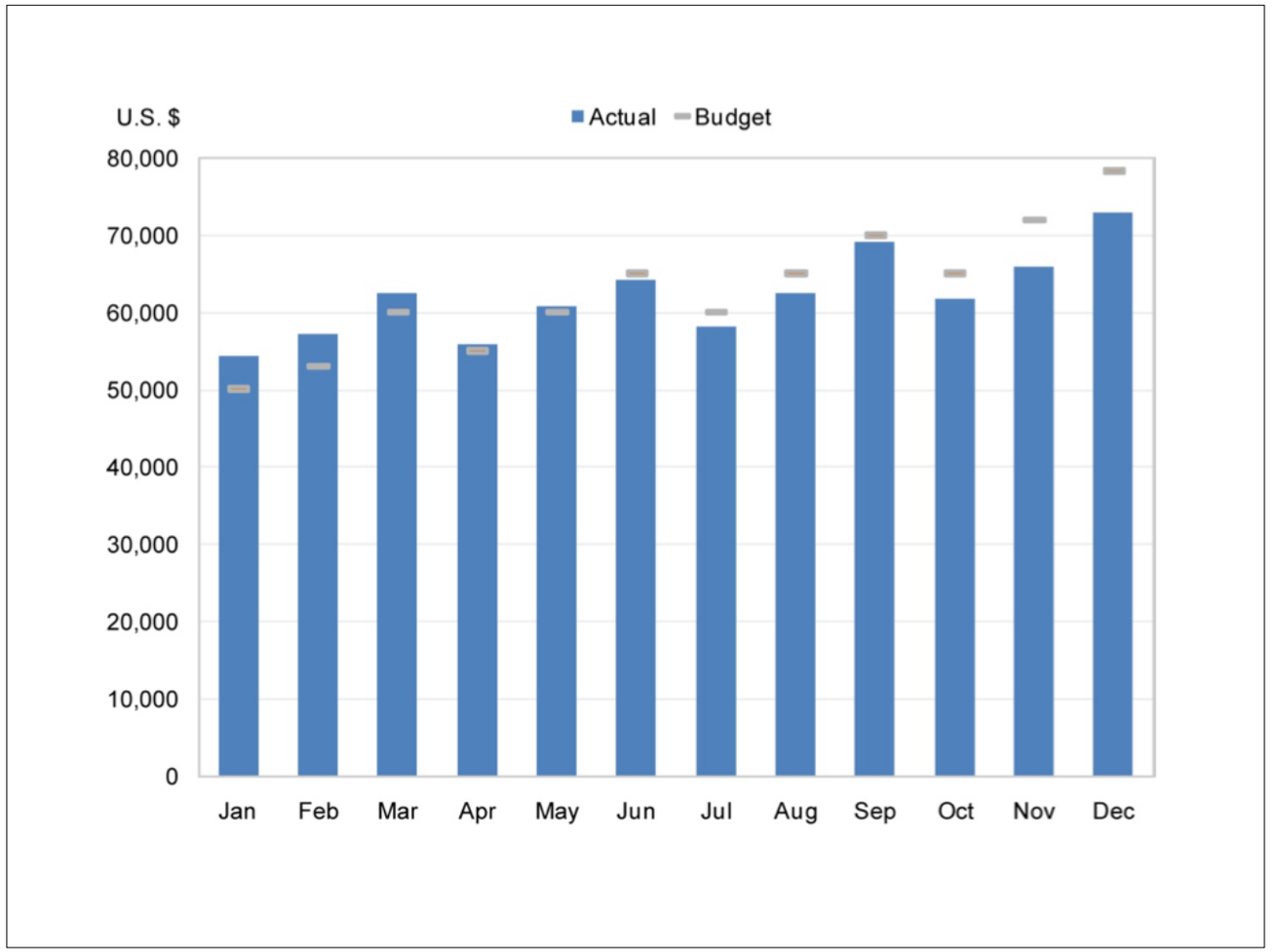
We have now reoriented the Y-axis label to the horizontal and placed it above the axis to make it easier to read.



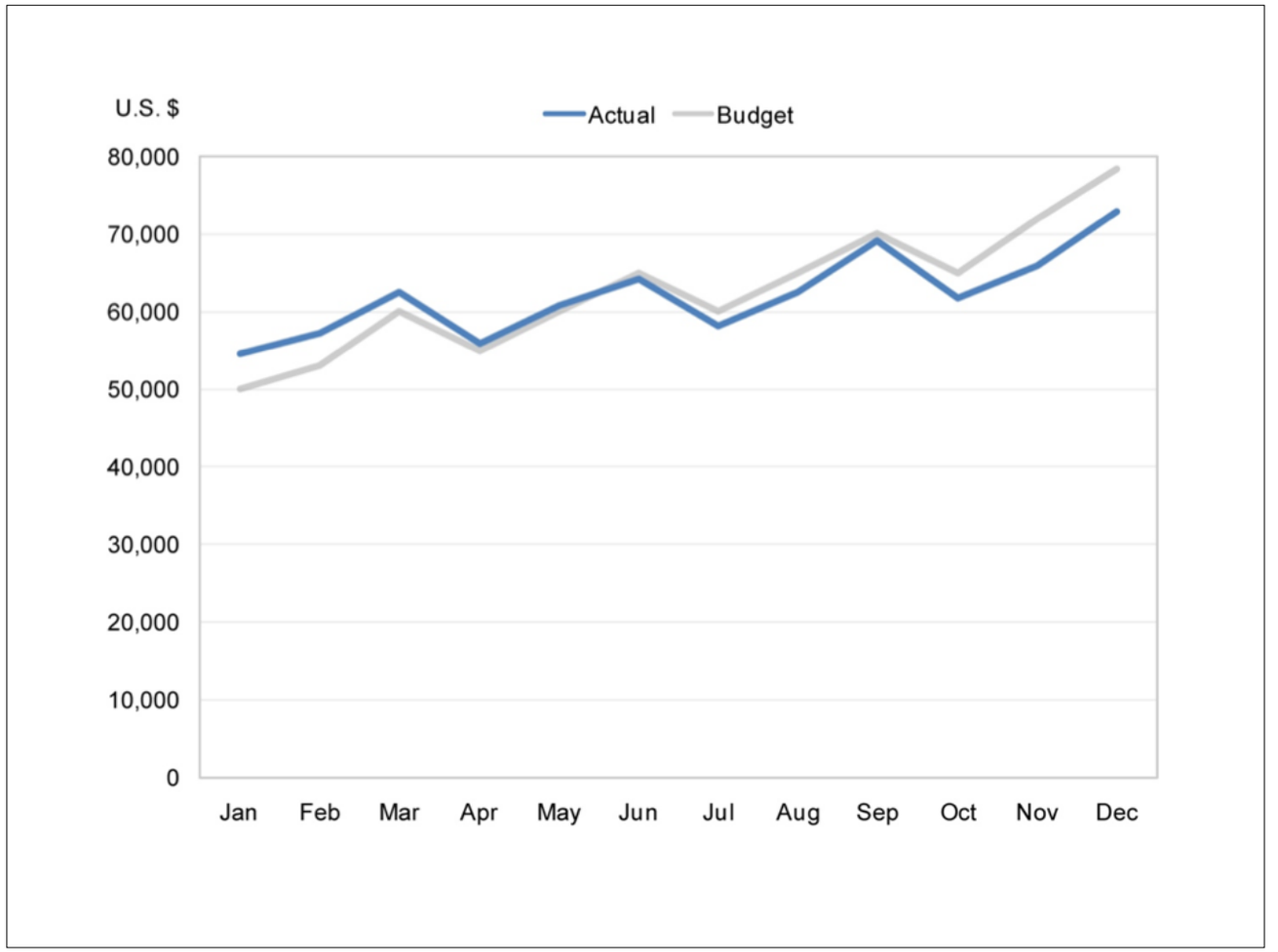
We have now reoriented and repositioned the legend to make it easier to associate it with the data bars.



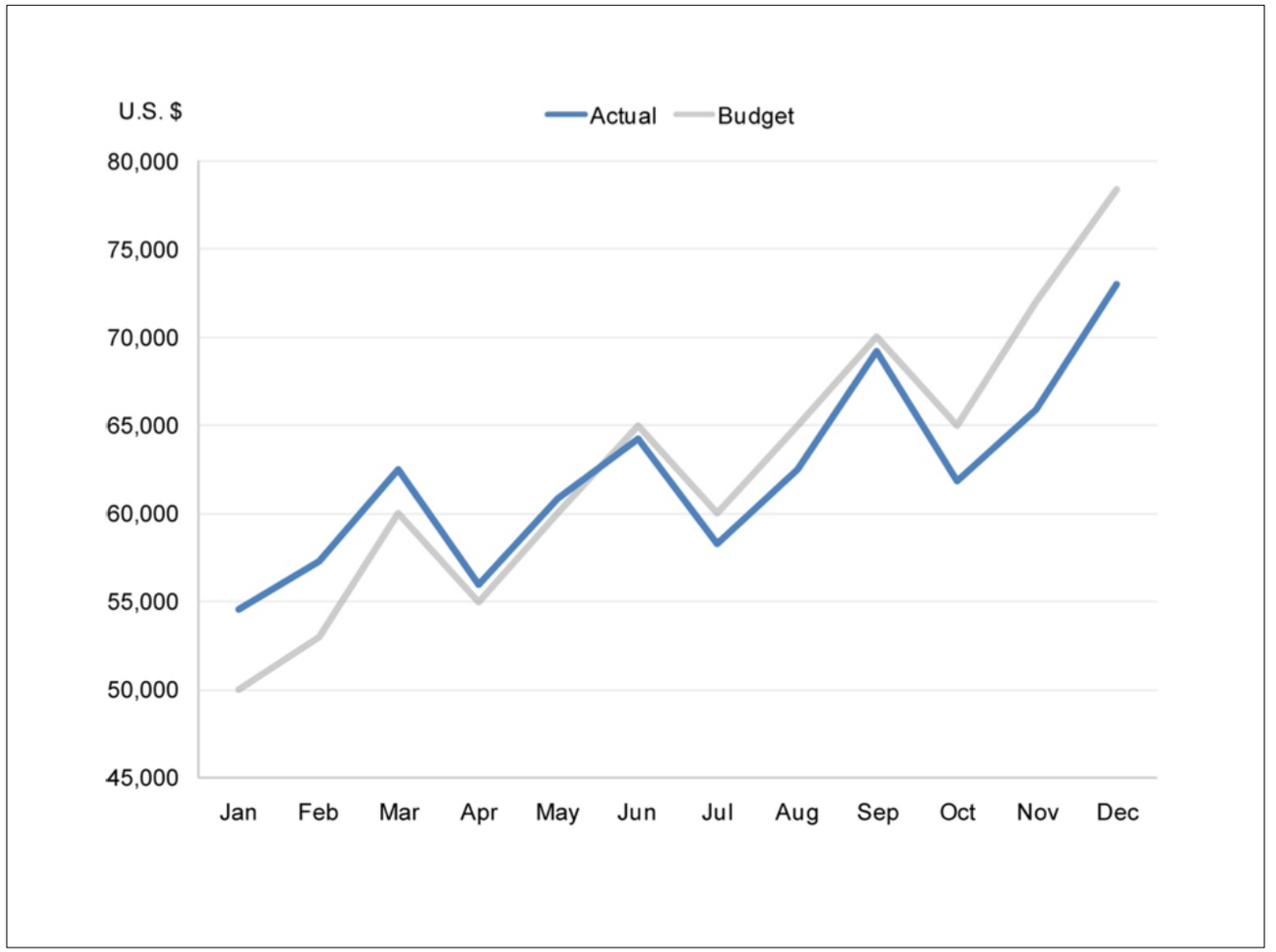
We have now changed the color of the Budget bar to be more visually pleasing in relation to the blue Actual bars. Changing from the color red also removed the possibility people interpreting the data as something bad or a warning, which red is often used to represent.



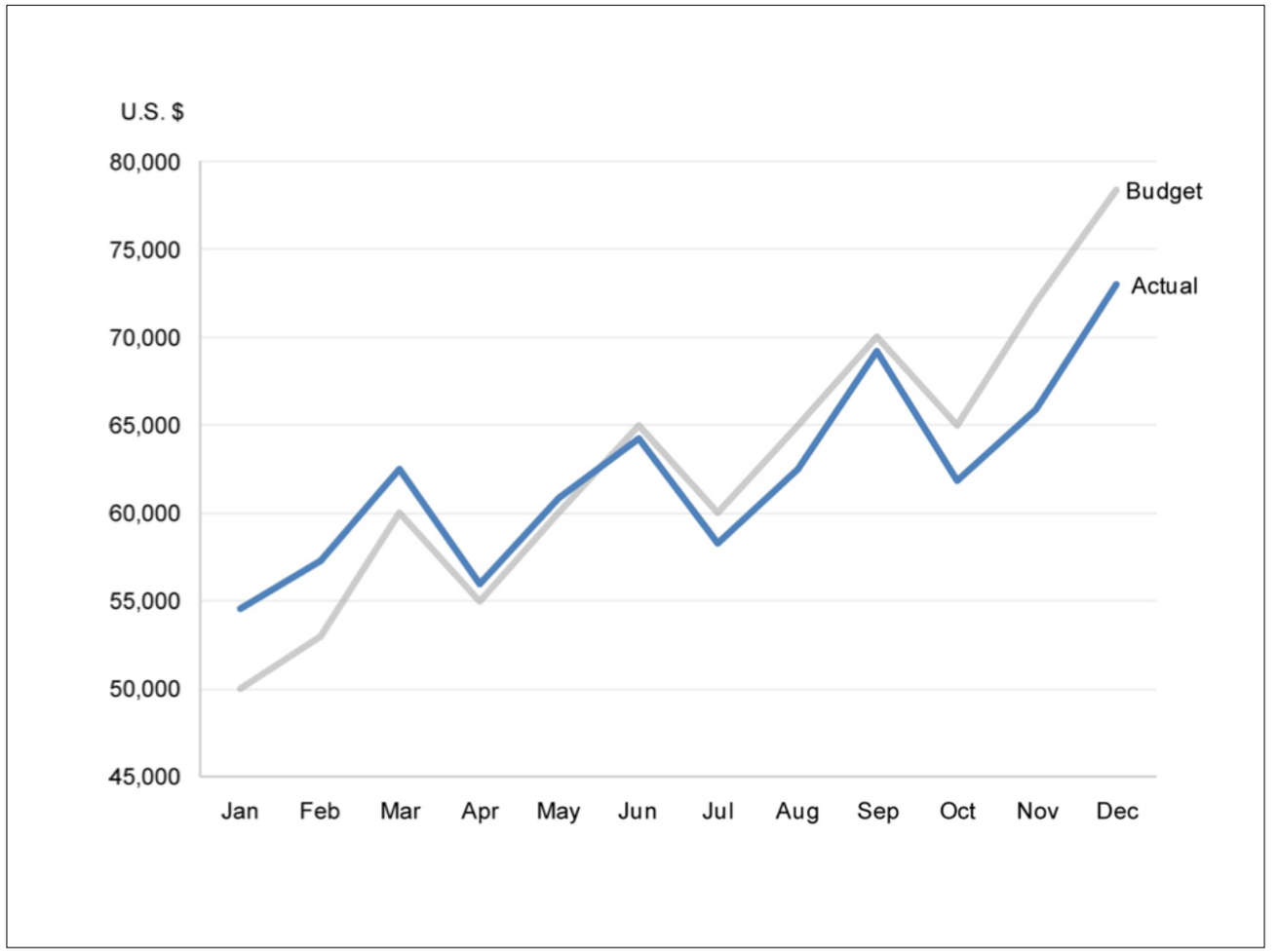
We have now reduced the visual salience of the Budget values, because they are less important that the Actual values, and have done so in a way that reduced clutter.



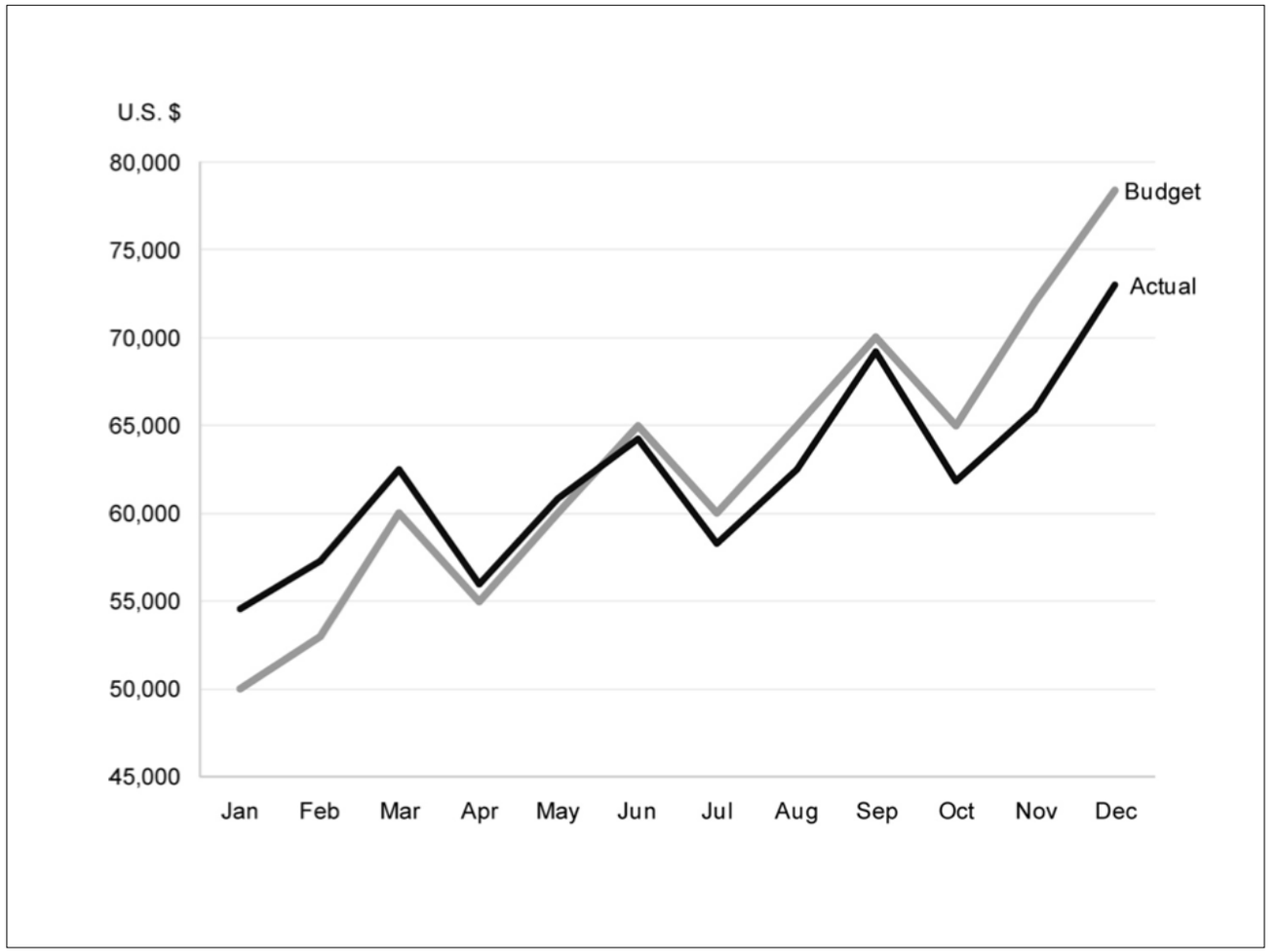
We have now made it much easier to see the pattern of change through time by using lines rather than bars to represent the data.



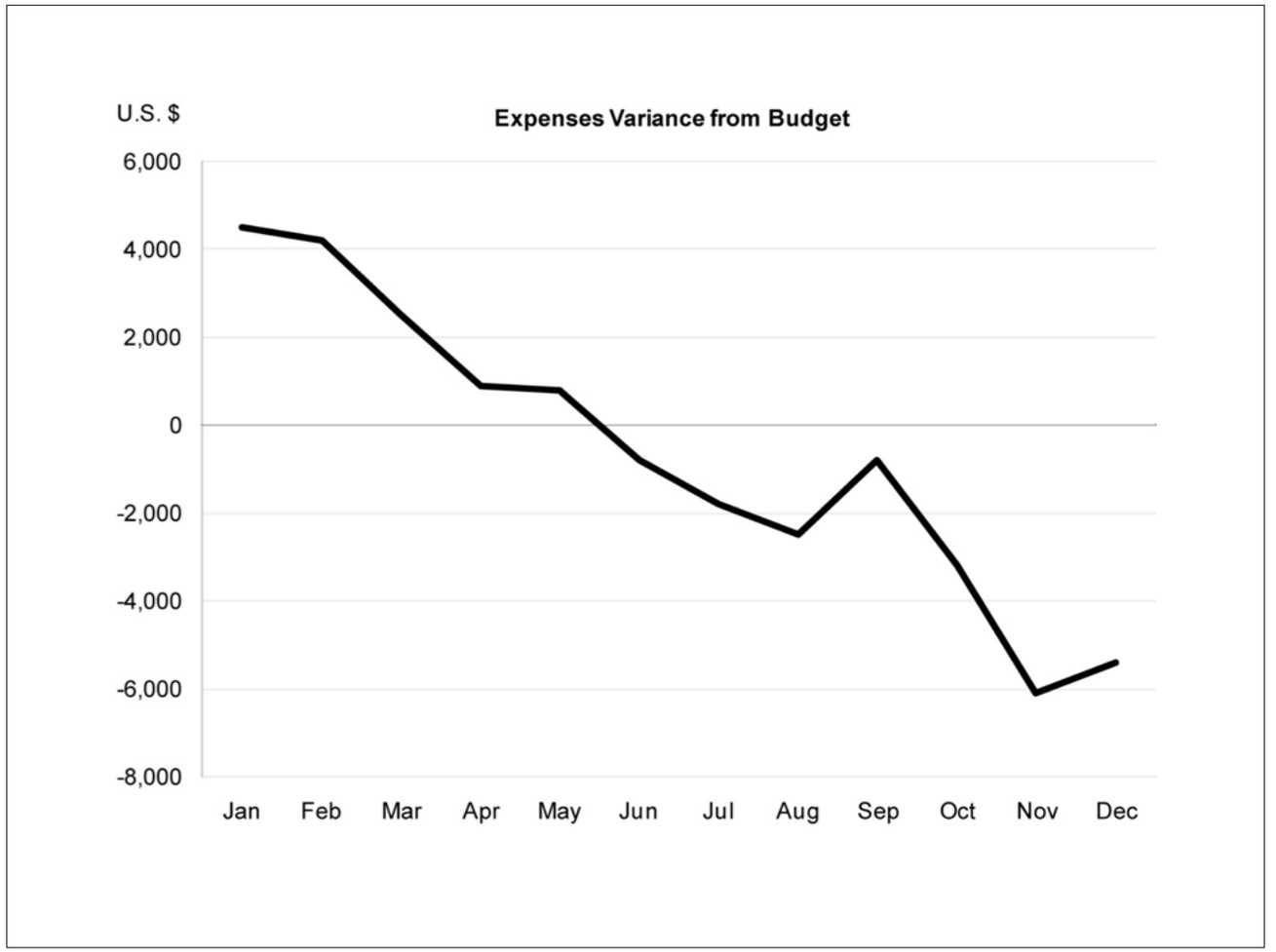
We have now made it much easier to examine the differences between actual expenses and the budget by spreading them across more space.



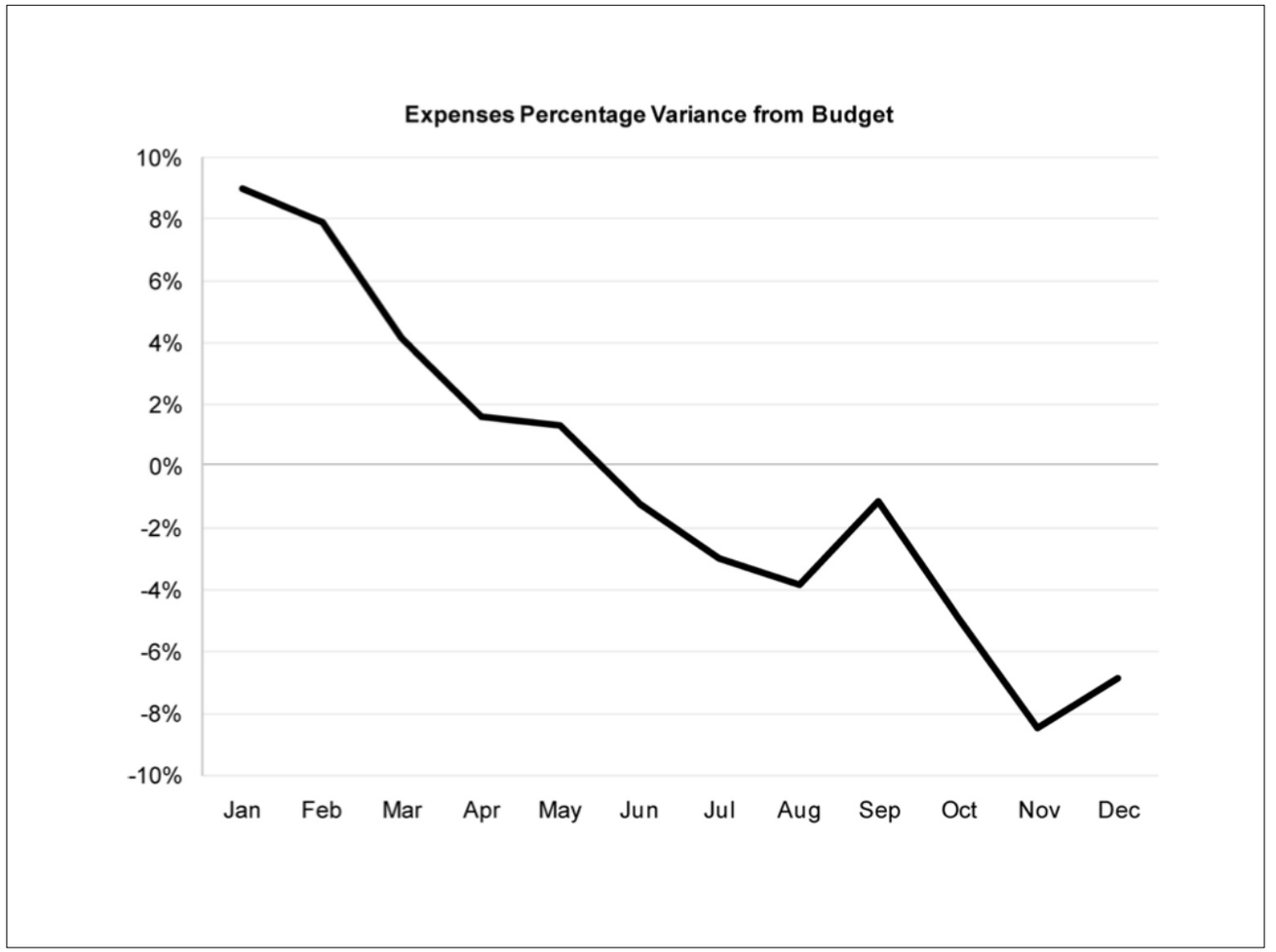
We have now labeled the lines directly, removing the need for a legend.



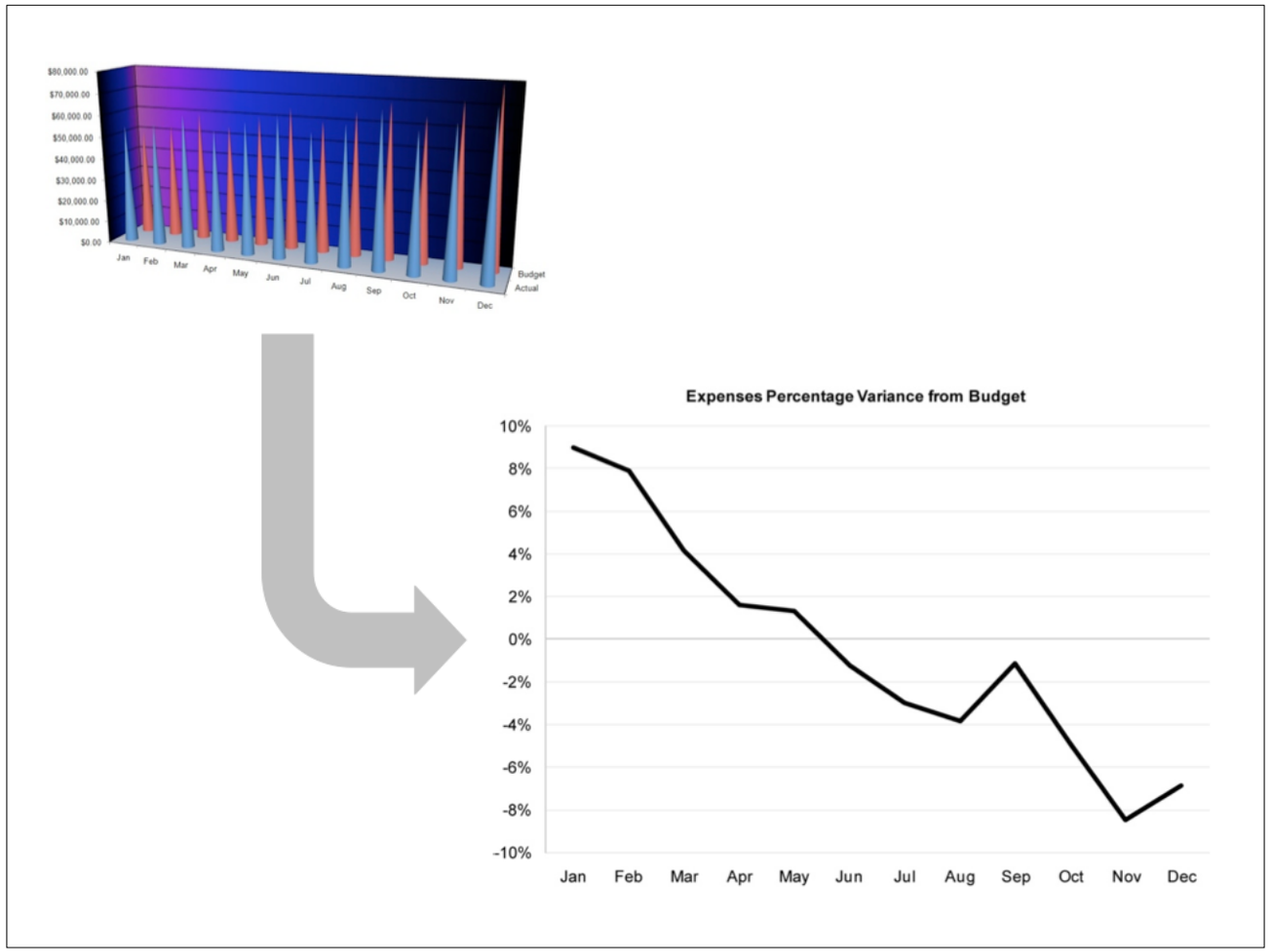
We have now changed the lines to two shades of gray to guaranty that even if the graph is printed on a black- and-white printer or photocopier, they will still look distinctly different from one another.



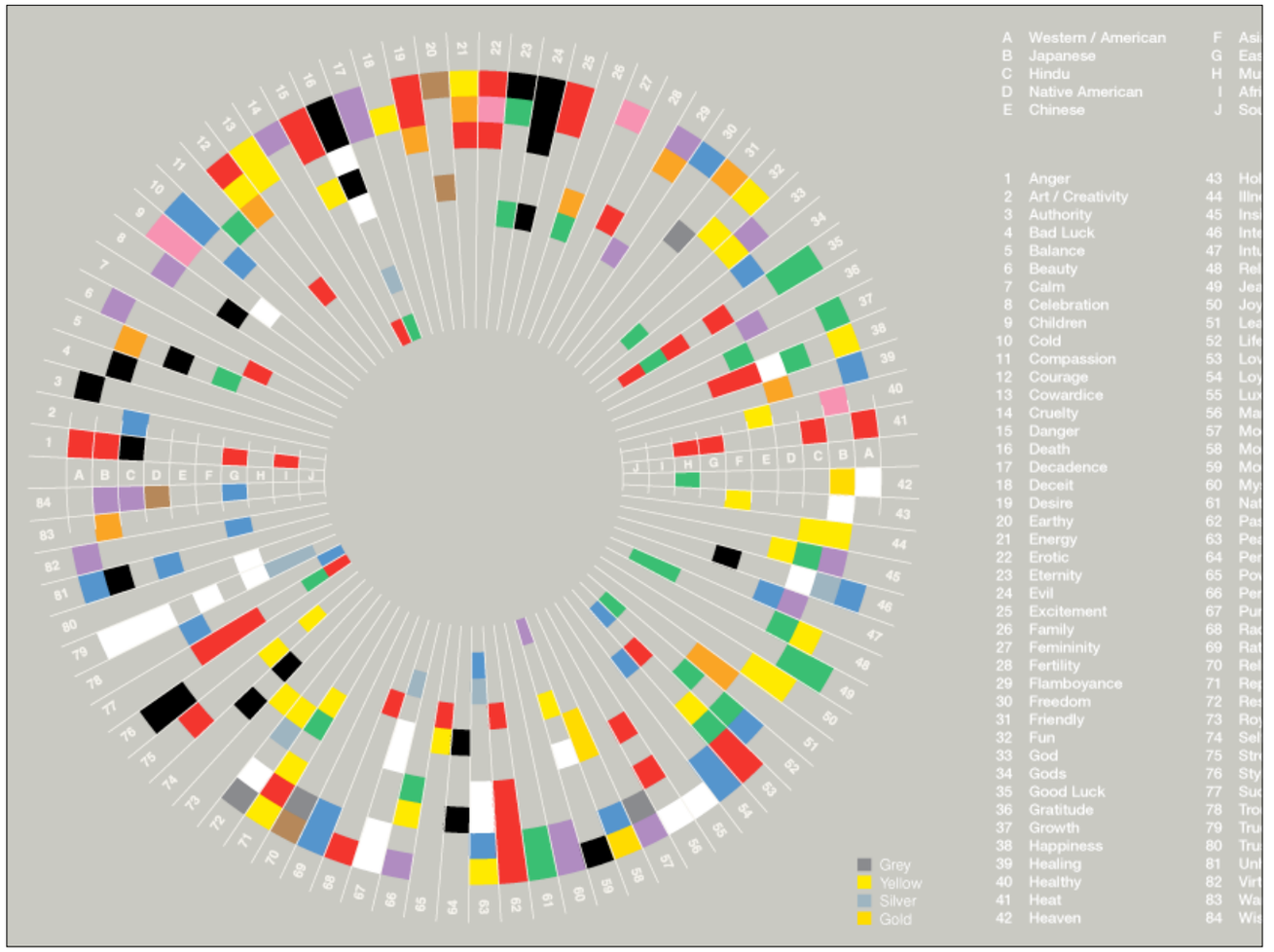
We have now represented the variance of actual expenses from the budget directly, as a single line.



As our final step, we have expressed variance as a percentage, to provide a better measure of performance.

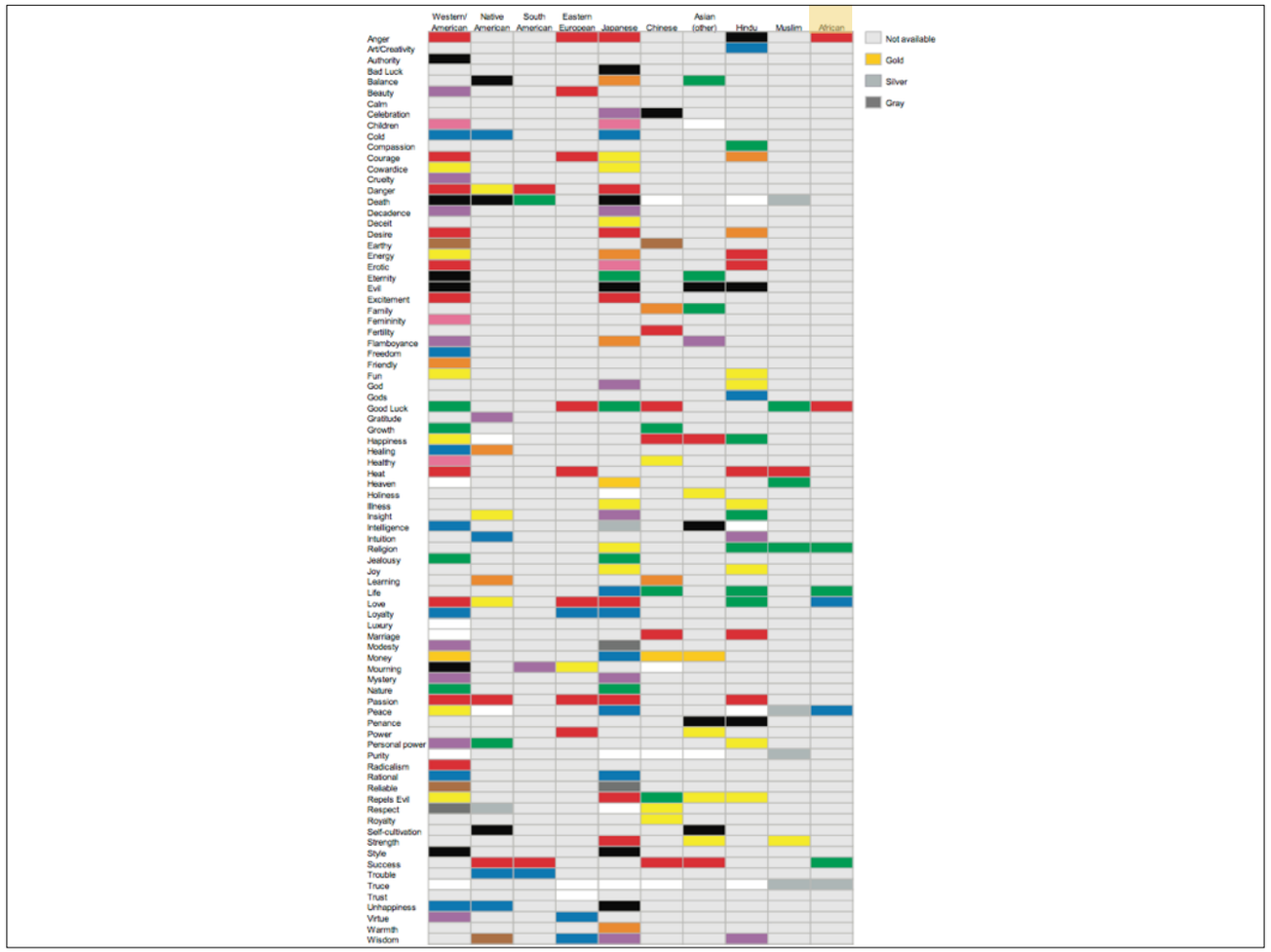


Our final solution, which we produced in sixteen steps, could have easily been our original solution. It usually takes no longer to design effective graphs than those that communicate poorly, if at all.



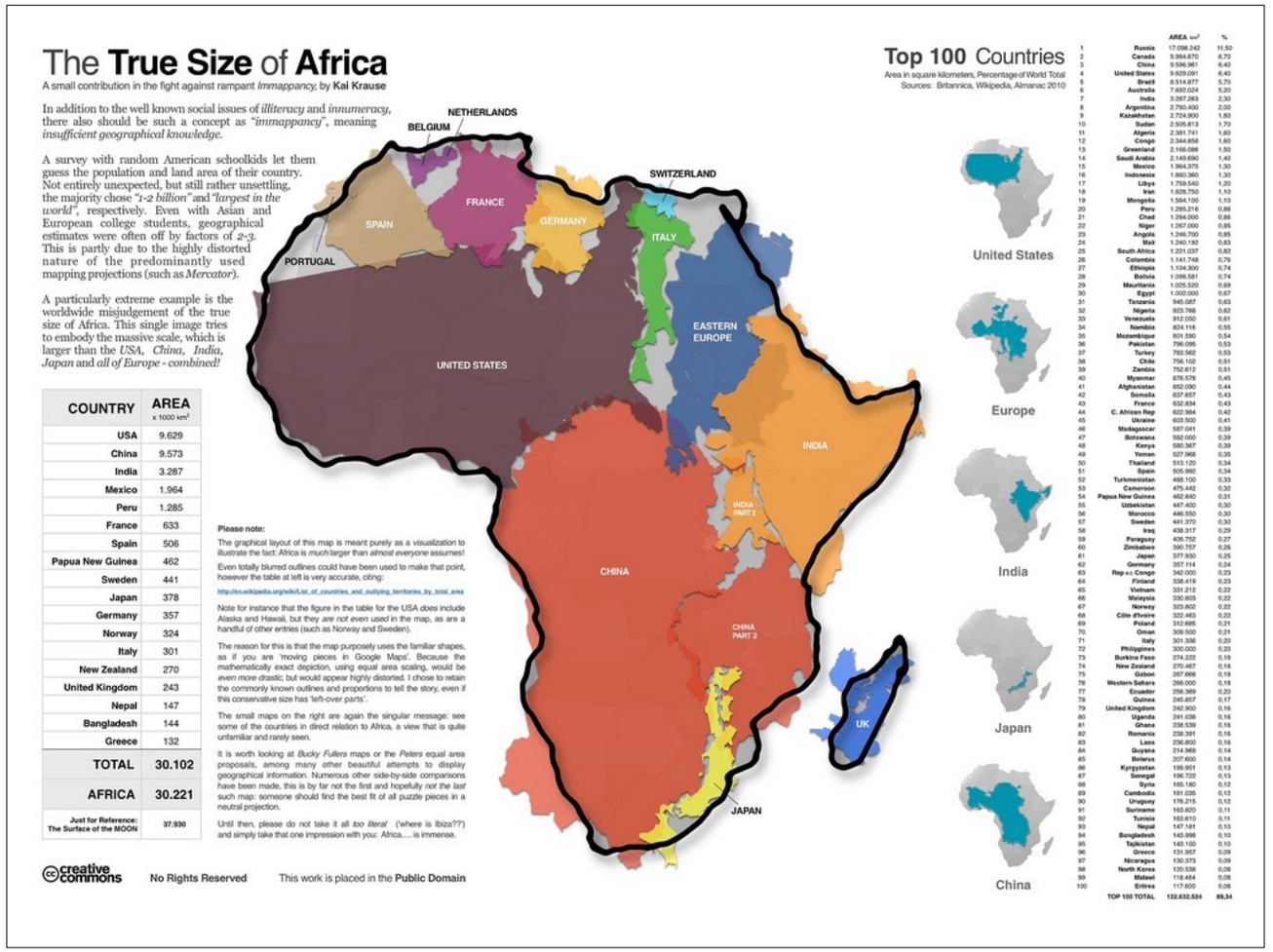
Here's McCandless "Colours in Culture" again. Let's imagine that the purpose for which this chart might be to find the different meanings that a culture associates with a particular color. Let's attempt an investigation of this type. Using McCandless' version of the chart, find the color that has more meanings than any other in Africa (labeled with "I").

Take your time. Then let's see Stephen Few's redesign.



How about now? (Africa is on the far right). It was incredibly easy this time, wasn't it? That's because a linear, tabular arrangement of the data into columns and rows is a form that effectively supports this lookup task. You might have noticed that Stephen has changed the order of the cultures to group them geographically. This makes it easier to see similarities that are perhaps influenced by location.

It has been argued that Stephen Few's redesign of McCandless "Colours in Culture" is less sexy, less cool than McCandless' original. I agree. But so what? If the purpose of the original was to enlighten, it totally fails. If Stephen's purpose was to create a cool chart (which I know it wasn't), he'd have failed. The take-away from this is to identify the purpose of the chart. Is it a headline, designed to grab the readers attention or is it a paragraph, designed to inform?



COUNTRY	AREA x 1000 km²
USA	9.629
China	9.573
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221
Just for Reference: The Surface of the MOON	37.930

		AREA km²	%
1	Russia	17.098.242	11,50
2	Canada	9.984.670	6,70
3	China	9.596.961	6,40
4	United States	9.629.091	6,40
5	Brazil	8.514.877	5,70
6	Australia	7.692.024	5,20
7	India	3.287.263	2,30
8	Argentina	2.780.400	2,00
9	Kazakhstan	2.724.900	1,80
10	Sudan	2.505.813	1,70
11	Algeria	2.381.741	1,60
12	Congo	2.344.858	1,60
13	Greenland	2.166.086	1,50
14	Saudi Arabia	2.149.690	1,40
15	Mexico	1.964.375	1,30
16	Indonesia	1.860.360	1,30
17	Libya	1.759.540	1,20
18	Iran	1.628.750	1,10
19	Mongolia	1.564.100	1,10
20	Peru	1.285.216	0,86
21	Chad	1.284.000	0,86
22	Niger	1.267.000	0,85
23	Angola	1.246.700	0,85
24	Mali	1.240.192	0,83
25	South Africa	1.221.037	0,82
26	Colombia	1.141.748	0,76
27	Ethiopia	1.104.300	0,74
28	Bolivia	1.098.581	0,74
29	Mauritania	1.025.520	0,69
30	Egypt	1.002.000	0,67
31	Tanzania	945.087	0,63
32	Nigeria	923.768	0,62
33	Venezuela	912.050	0,61
34	Namibia	824.116	0,55
35	Mozambique	801.590	0,54
36	Pakistan	796.095	0,53
37	Turkey	783.562	0,53
38	Chile	756.102	0,51
39	Zambia	752.612	0,51
40	Myanmar	676.578	0,45
41	Afghanistan	652.090	0,44
42	Somalia	637.657	0,43
43	France	632.834	0,43
44	C. African Rep	622.984	0,42
45	Ukraine	603.500	0,41
46	Madagascar	587.041	0,39
47	Botswana	582.000	0,39
48	Kenya	580.367	0,39
49	Yemen	527.968	0,35
50	Thailand	513.120	0,34
51	Spain	505.992	0,34
52	Turkmenistan	488.100	0,33
53	Cameroon	475.442	0,32
54	Papua New Guinea	462.840	0,31
55	Uzbekistan	447.400	0,30
56	Morocco	446.550	0,30
57	Sweden	441.370	0,30
58	Iraq	438.317	0,29
59	Paraguay	406.752	0,27
60	Zimbabwe	390.757	0,26
61	Japan	377.930	0,25
62	Germany	357.114	0,24
63	Rep o.t. Congo	342.000	0,23
64	Finland	338.419	0,23
65	Vietnam	331.212	0,22
66	Malaysia	330.803	0,22
67	Norway	323.802	0,22
68	Côte d'Ivoire	322.463	0,22
69	Poland	312.685	0,21
70	Oman	309.500	0,21
71	Italy	301.336	0,20
72	Philippines	300.000	0,20
73	Burkina Faso	274.222	0,18
74	New Zealand	270.467	0,18
75	Gabon	267.668	0,18
76	Western Sahara	266.000	0,18
77	Ecuador	256.369	0,20
78	Guinea	245.857	0,17
79	United Kingdom	242.900	0,16
80	Uganda	241.038	0,16
81	Ghana	238.539	0,16
82	Romania	238.391	0,16
83	Laos	236.800	0,16
84	Guyana	214.969	0,14
85	Belarus	207.600	0,14
86	Kyrgyzstan	199.951	0,13
87	Senegal	196.722	0,13
88	Syria	185.180	0,12
89	Cambodia	181.035	0,12
90	Uruguay	176.215	0,12
91	Suriname	163.820	0,11
92	Tunisia	163.610	0,11
93	Nepal	147.181	0,10
94	Bangladesh	143.998	0,10
95	Tajikistan	143.100	0,10
96	Greece	131.957	0,09
97	Nicaragua	130.373	0,09
98	North Korea	120.538	0,08
99	Malawi	118.484	0,08
100	Eritrea	117.600	0,08
	TOP 100 TOTAL	132.632.524	89,34

On another note, isn't it a bit unlikely that in 52 countries, in a continent the size of Africa, there are only 8 known colours associated with the 84 feelings listed in McCandless' chart? Could it be that a plain table would be more interesting if McCandless had provided more data?

— This is "The true size of Africa" by Kai Krause. A really good chart which tells a very simple story with lot's of data.

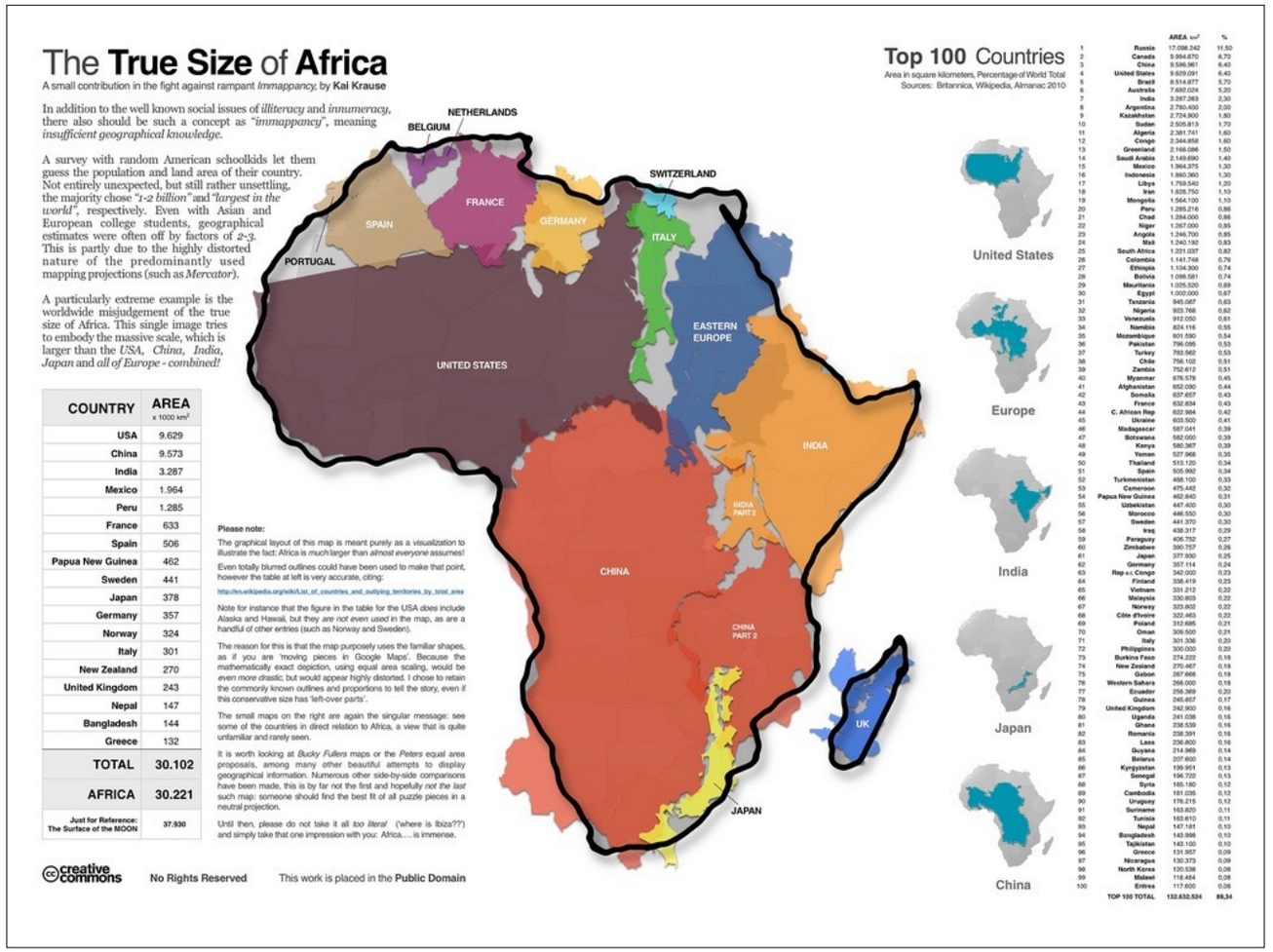
(Source: http://www.flickr.com/photos/24919077@N02/5084279349/in/photostream)

Compared to what?

„You can compare me with Greta Garbo.
I have big feet, too.“

— Lee Remick

Everything is relative. We've all heard that. The real question is: Relative to what?



COUNTRY	AREA x 1000 km²
USA	9.629
China	9.573
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221
Just for Reference: The Surface of the MOON	37.930

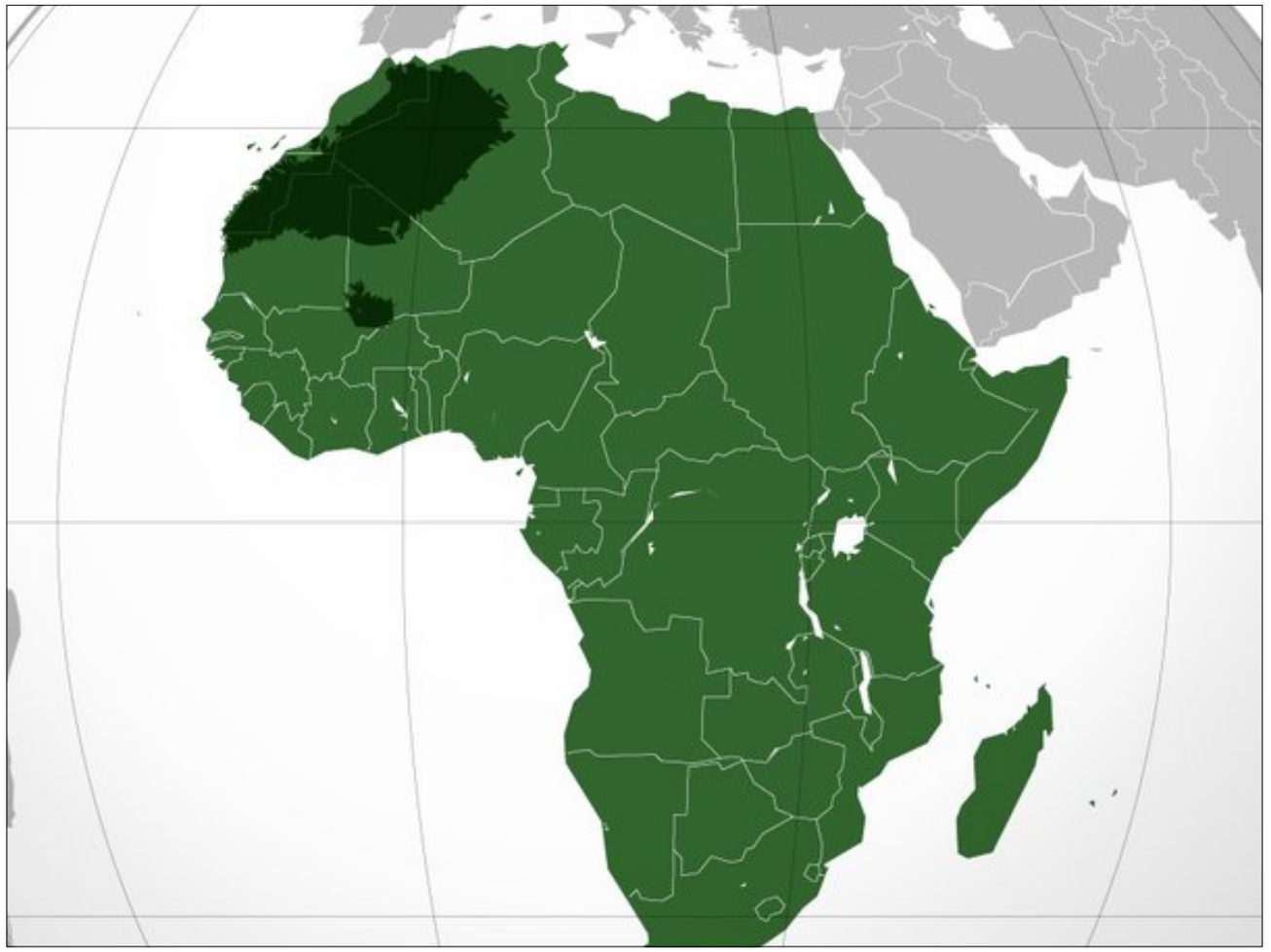
		AREA km²	%
1	Russia	17.098.242	11,50
2	Canada	9.984.670	6,70
3	China	9.596.961	6,40
4	United States	9.629.091	6,40
5	Brazil	8.514.877	5,70
6	Australia	7.692.024	5,20
7	India	3.287.263	2,30
8	Argentina	2.780.400	2,00
9	Kazakhstan	2.724.900	1,80
10	Sudan	2.505.813	1,70
11	Algeria	2.381.741	1,60
12	Congo	2.344.858	1,60
13	Greenland	2.166.086	1,50
14	Saudi Arabia	2.149.690	1,40
15	Mexico	1.964.375	1,30
16	Indonesia	1.860.360	1,30
17	Libya	1.759.540	1,20
18	Iran	1.628.750	1,10
19	Mongolia	1.564.100	1,10
20	Peru	1.285.216	0,86
21	Chad	1.284.000	0,86
22	Niger	1.267.000	0,85
23	Angola	1.246.700	0,85
24	Mali	1.240.192	0,83
25	South Africa	1.221.037	0,82
26	Colombia	1.141.748	0,76
27	Ethiopia	1.104.300	0,74
28	Bolivia	1.098.581	0,74
29	Mauritania	1.025.520	0,69
30	Egypt	1.002.000	0,67
31	Tanzania	945.087	0,63
32	Nigeria	923.768	0,62
33	Venezuela	912.050	0,61
34	Namibia	824.116	0,55
35	Mozambique	801.590	0,54
36	Pakistan	796.095	0,53
37	Turkey	783.562	0,53
38	Chile	756.102	0,51
39	Zambia	752.612	0,51
40	Myanmar	676.578	0,45
41	Afghanistan	652.090	0,44
42	Somalia	637.657	0,43
43	France	632.834	0,43
44	C. African Rep	622.984	0,42
45	Ukraine	603.500	0,41
46	Madagascar	587.041	0,39
47	Botswana	582.000	0,39
48	Kenya	580.367	0,39
49	Yemen	527.968	0,35
50	Thailand	513.120	0,34
51	Spain	505.992	0,34
52	Turkmenistan	488.100	0,33
53	Cameroon	475.442	0,32
54	Papua New Guinea	462.840	0,31
55	Uzbekistan	447.400	0,30
56	Morocco	446.550	0,30
57	Sweden	441.370	0,30
58	Iraq	438.317	0,29
59	Paraguay	406.752	0,27
60	Zimbabwe	390.757	0,26
61	Japan	377.930	0,25
62	Germany	357.114	0,24
63	Rep o.t. Congo	342.000	0,23
64	Finland	338.419	0,23
65	Vietnam	331.212	0,22
66	Malaysia	330.803	0,22
67	Norway	323.802	0,22
68	Côte d'Ivoire	322.463	0,22
69	Poland	312.685	0,21
70	Oman	309.500	0,21
71	Italy	301.336	0,20
72	Philippines	300.000	0,20
73	Burkina Faso	274.222	0,18
74	New Zealand	270.467	0,18
75	Gabon	267.668	0,18
76	Western Sahara	266.000	0,18
77	Ecuador	256.369	0,20
78	Guinea	245.857	0,17
79	United Kingdom	242.900	0,16
80	Uganda	241.038	0,16
81	Ghana	238.539	0,16
82	Romania	238.391	0,16
83	Laos	236.800	0,16
84	Guyana	214.969	0,14
85	Belarus	207.600	0,14
86	Kyrgyzstan	199.951	0,13
87	Senegal	196.722	0,13
88	Syria	185.180	0,12
89	Cambodia	181.035	0,12
90	Uruguay	176.215	0,12
91	Suriname	163.820	0,11
92	Tunisia	163.610	0,11
93	Nepal	147.181	0,10
94	Bangladesh	143.998	0,10
95	Tajikistan	143.100	0,10
96	Greece	131.957	0,09
97	Nicaragua	130.373	0,09
98	North Korea	120.538	0,08
99	Malawi	118.484	0,08
100	Eritrea	117.600	0,08
	TOP 100 TOTAL	132.632.524	89,34

Back to the true size of Africa. What it does extremely well is to compare the sizes of countries well known to the western hemisphere to the continent of Africa. With a glance anyone can see how extremely large Africa is; hopefully to change the viewers mindset, to let go of prejudices.

Do you dare to guess how many times Greenland will fit into Africa? Do you need a world map?

Here's the world map we usually see.

(Source: http://upload.wikimedia.org/wikipedia/commons/thumb/4/44/World_map_blank_shorelines_semiwikimapia.svg/1440px-World_map_blank_shorelines_semiwikimapia.svg.png)



And here is Greenland placed on top of Africa (and Iceland too). Greenland is 14 times smaller than Africa. — Not quite the feeling we get from the usual projection, is it?

So not only does it matter that we have relative sizes correct in our heads (and visualizations), we also need to make sure that our projections are appropriate.

Implanon: 600 pregnancies despite contraceptive implant

It is disappointing that an established news agency like BBC throw out headlines like this (January 5, 2011). This is saying: “X is a large number!” Our first question should be: “Compared to what?”

Upon reading the article I found this sentence in the 4th paragraph: “1.4 million women have used Implanon, according to the Department of Health.” Changes things a bit, doesn’t it?

(Source: http://www.bbc.co.uk/news/health-12117299)

Implanon: 600 pregnancies despite contraceptive implant

1.4 million women have used Implanon, according to the Department of Health.

It is disappointing that an established news agency like BBC throw out headlines like this (January 5, 2011). This is saying: “X is a large number!” Our first question should be: “Compared to what?”

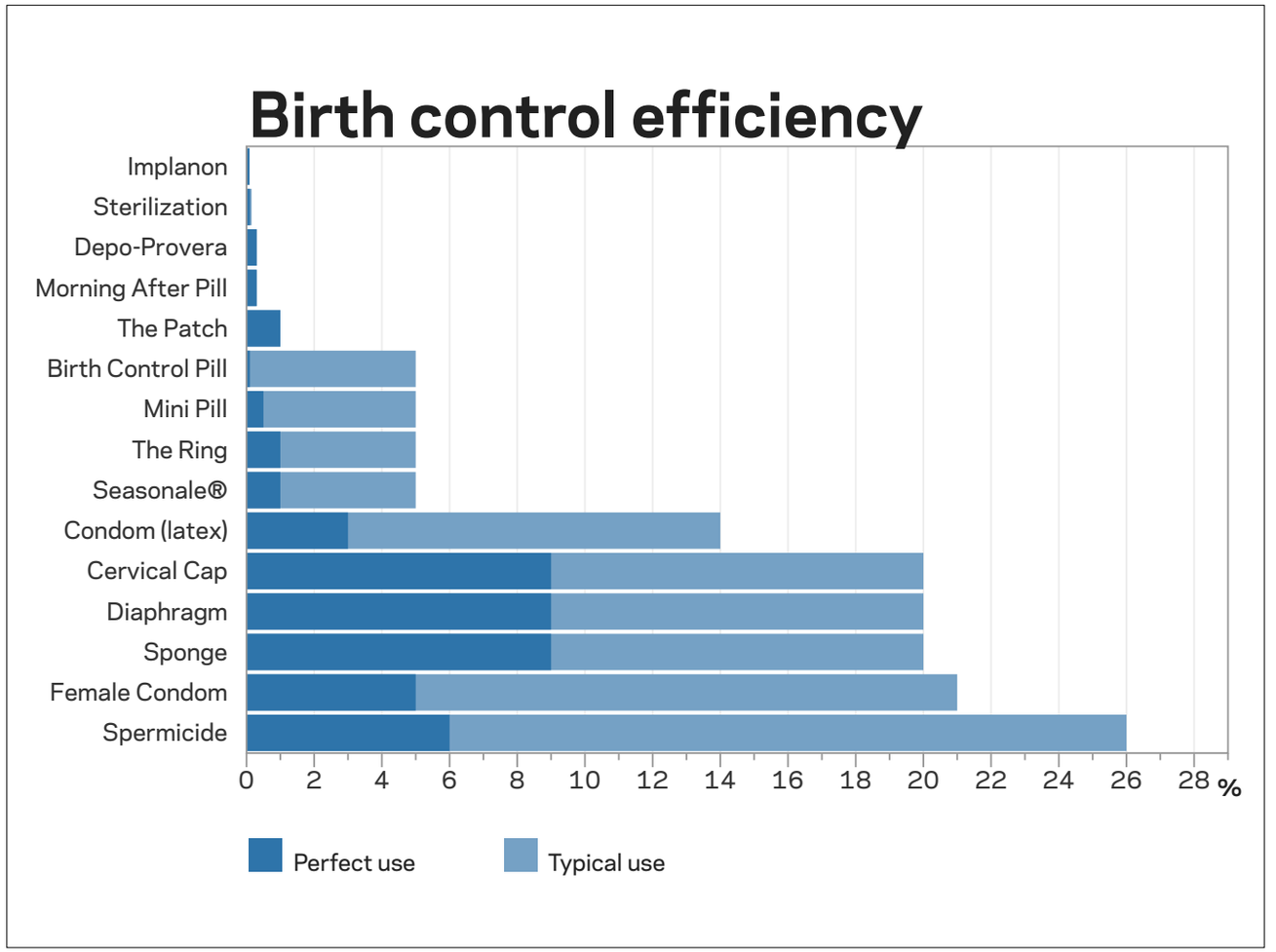
Upon reading the article I found this sentence in the 4th paragraph: “1.4 million women have used Implanon, according to the Department of Health.” Changes things a bit, doesn’t it?

(Source: http://www.bbc.co.uk/news/health-12117299)

Implanon: 0,04% pregnancies despite contraceptive implant

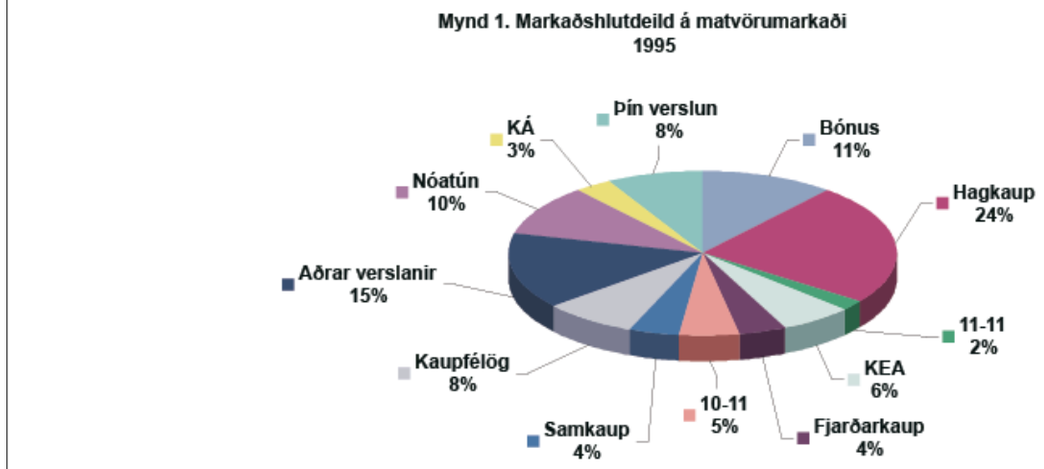
1.4 million women have used Implanon, according to the Department of Health.

So let's calculate how many women have gotten pregnant despite using Implanon: 0,04%. Doesn't look as large now, does it? But what if we compare it to other contraceptives?



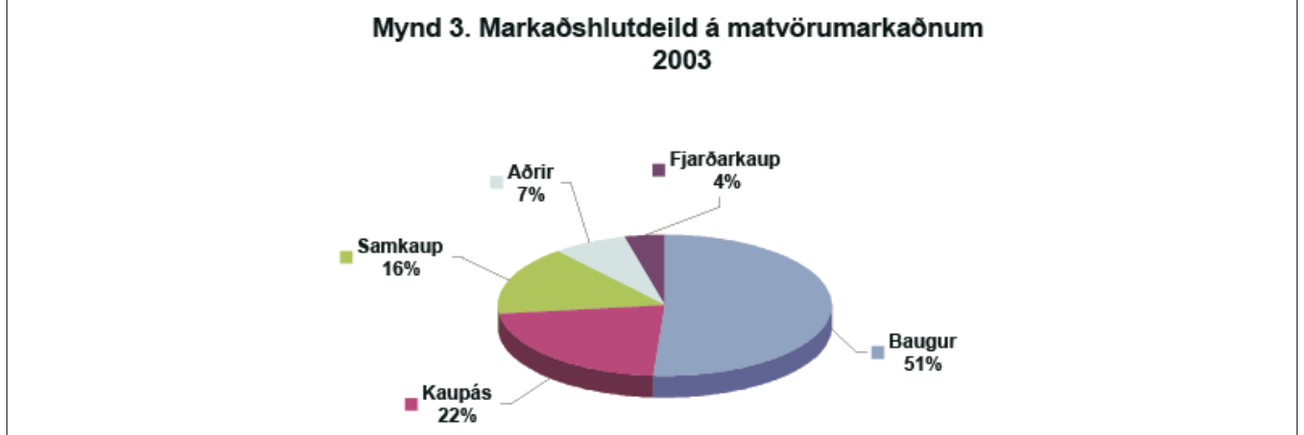
This information is readily available to anybody who's interested in sober reporting.

(Source: http://www.pamf.org/teen/sex/birthcontrol/)



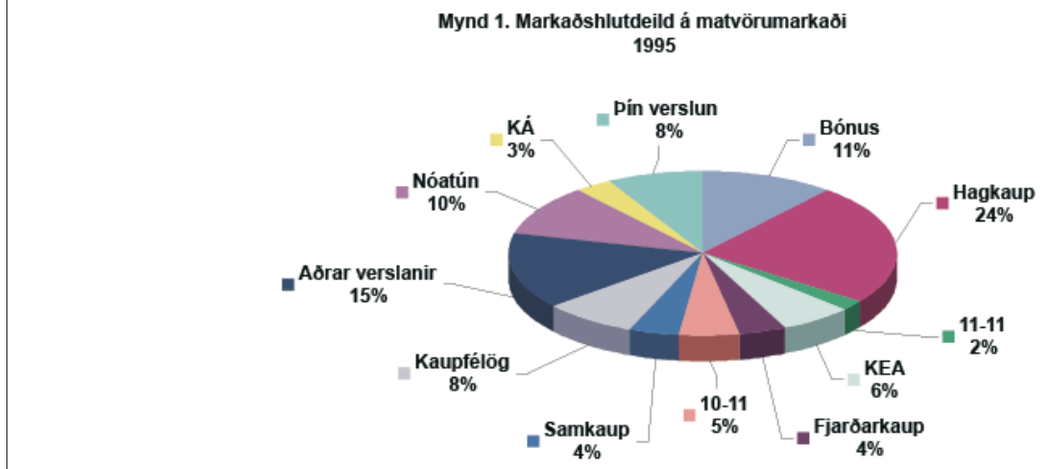
This is a pie from a report I was assigned to visualize for Viðskiptablaðið, an Icelandic business newspaper in 2003. It is the first of two pies used to make the point of how Baugur has grown in the grocery market. This pie uses 12 colours to depict 12 grocery stores/chains.

Here is the other pie, which was located a couple of pages later. The first faux pas. If you want to invite the reader to compare anything, place it in the same visual space.



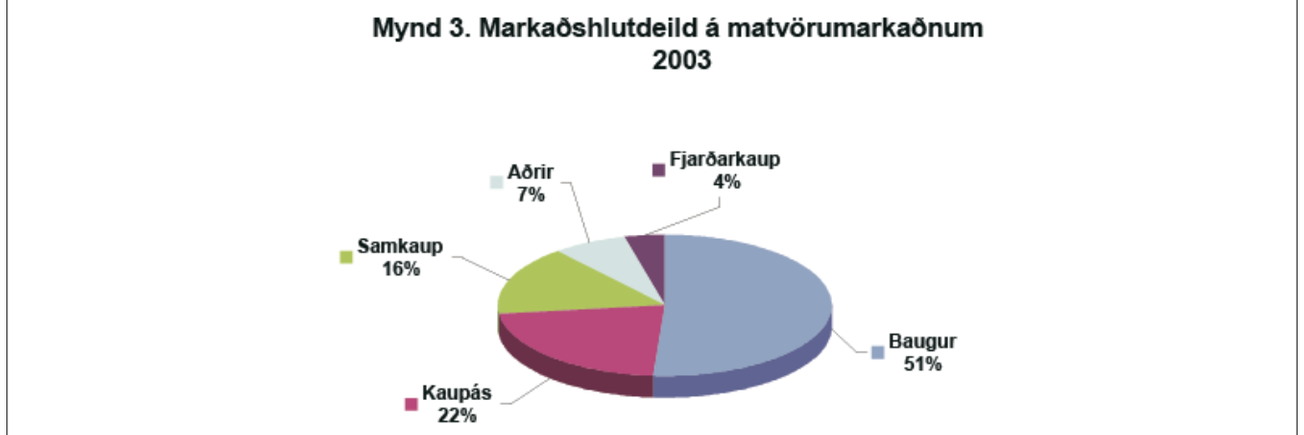
This is a pie from a report I was assigned to visualize for Viðskiptablaðið, an Icelandic business newspaper in 2003. It is the first of two pies used to make the point of how Baugur has grown in the grocery market. This pie uses 12 colours to depict 12 grocery stores/chains.

Here is the other pie, which was located a couple of pages later. The first faux pas. If you want to invite the reader to compare anything, place it in the same visual space.



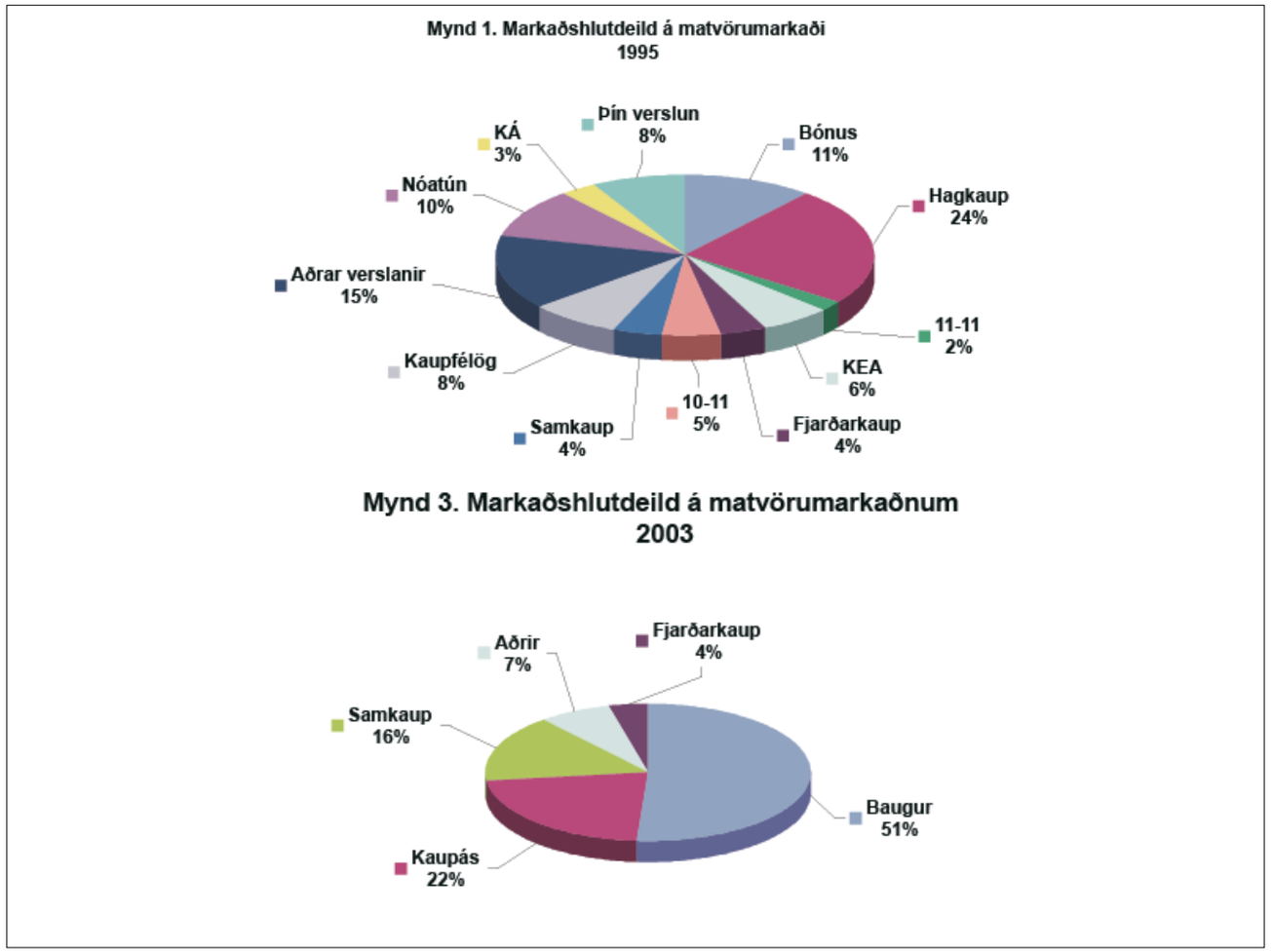
This is a pie from a report I was assigned to visualize for Viðskiptablaðið, an Icelandic business newspaper in 2003. It is the first of two pies used to make the point of how Baugur has grown in the grocery market. This pie uses 12 colours to depict 12 grocery stores/chains.

Here is the other pie, which was located a couple of pages later. The first faux pas. If you want to invite the reader to compare anything, place it in the same visual space.



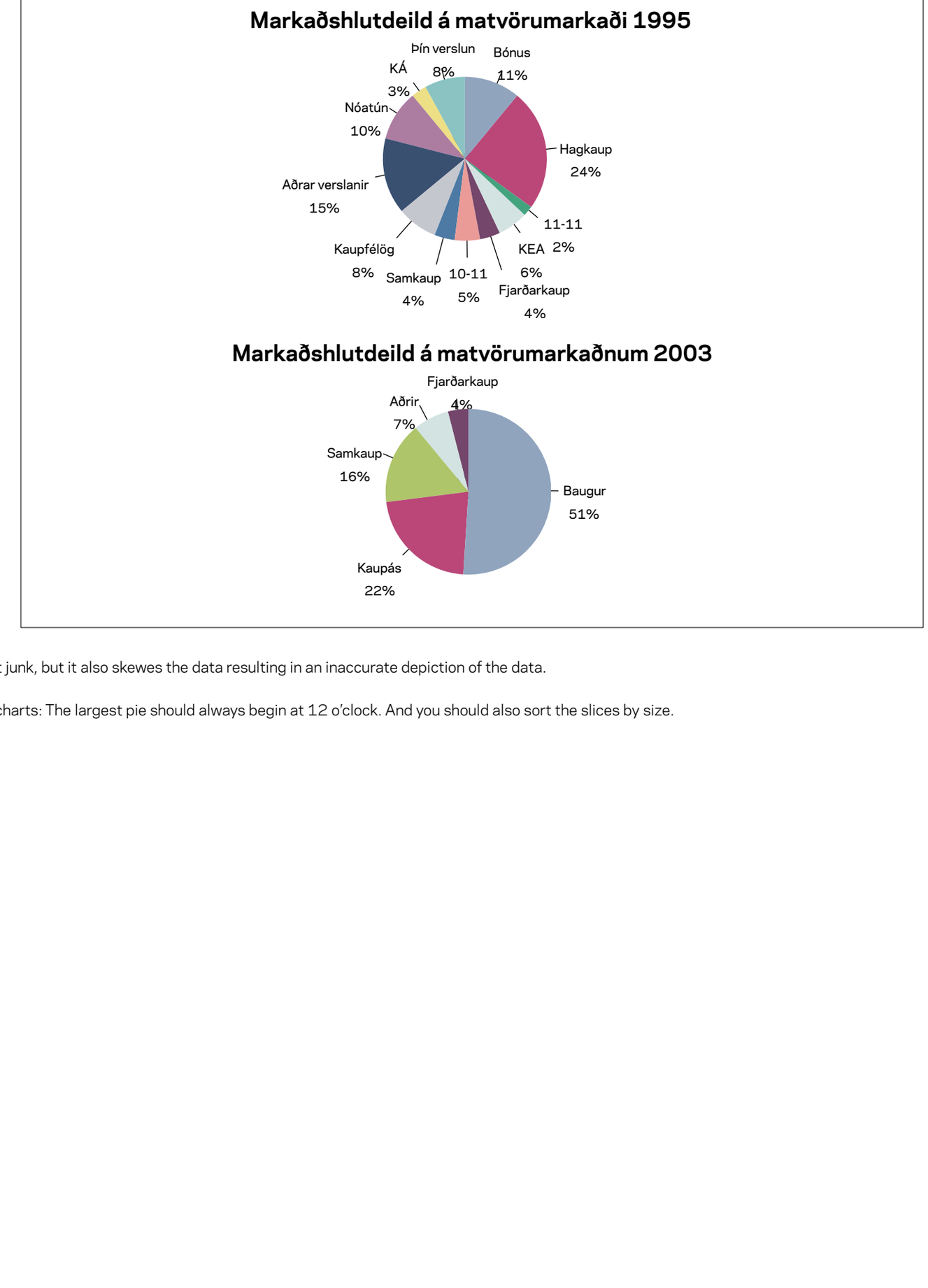
This is a pie from a report I was assigned to visualize for Viðskiptablaðið, an Icelandic business newspaper in 2003. It is the first of two pies used to make the point of how Baugur has grown in the grocery market. This pie uses 12 colours to depict 12 grocery stores/chains.

Here is the other pie, which was located a couple of pages later. The first faux pas. If you want to invite the reader to compare anything, place it in the same visual space.



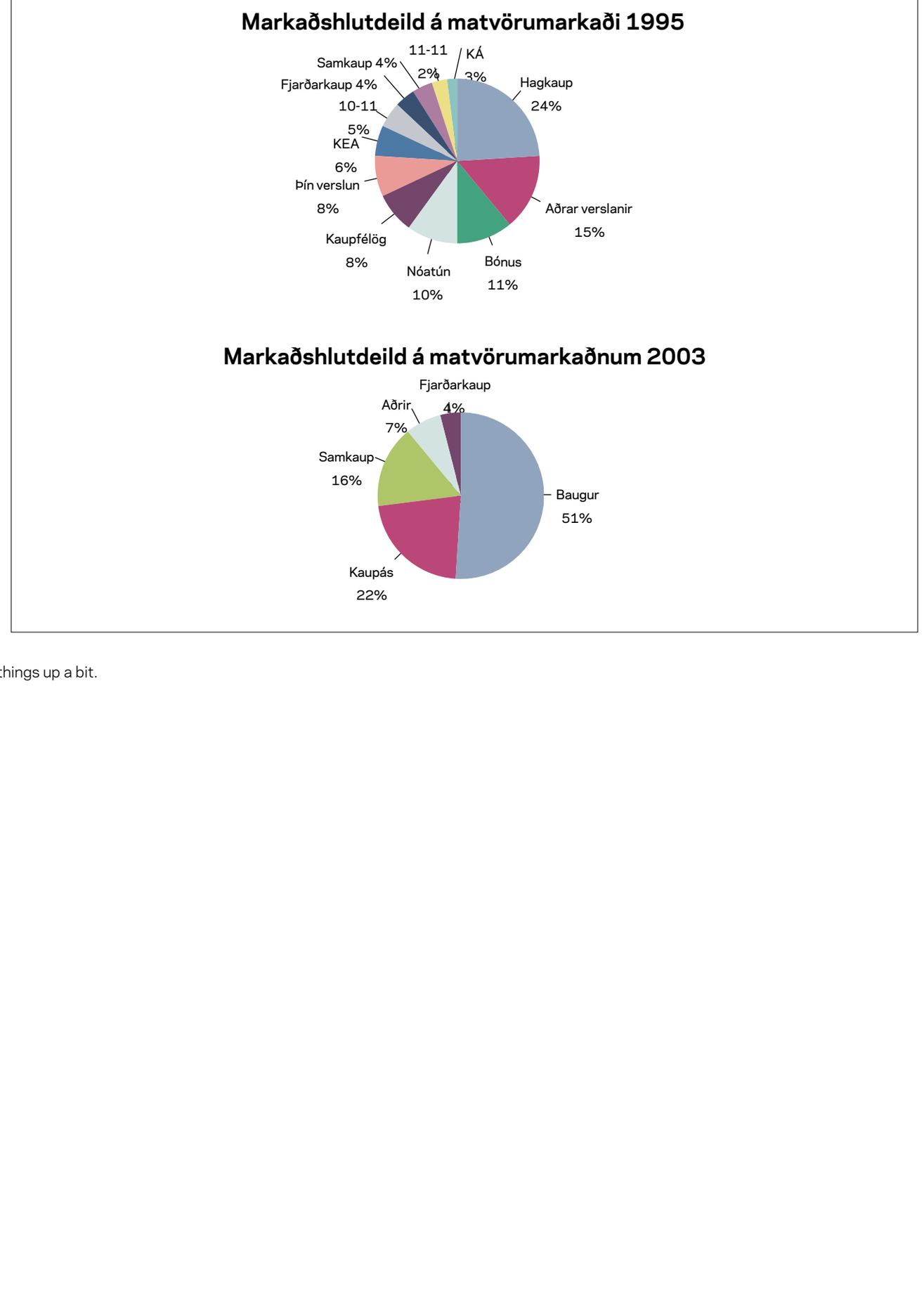
Even with the pies in the same visual space you're none the wiser. There is no indicator of which slices were combined to create the large slices in the latter pie. Also you have no idea if which slices shrunk into the "Aðrir" (other) slice.

This can obviously be improved.



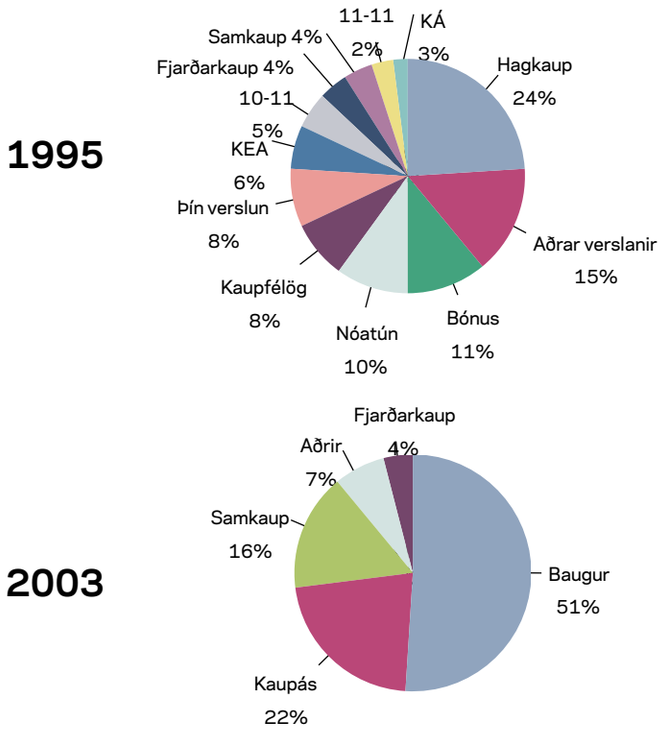
First, let's get rid of the 3D. Not only is gratitiuos 3D chart junk, but it also skewes the data resulting in an inaccurate depiction of the data.

As pies go, the one on top breaks two ground rules of pie charts: The largest pie should always begin at 12 o'clock. And you should also sort the slices by size.

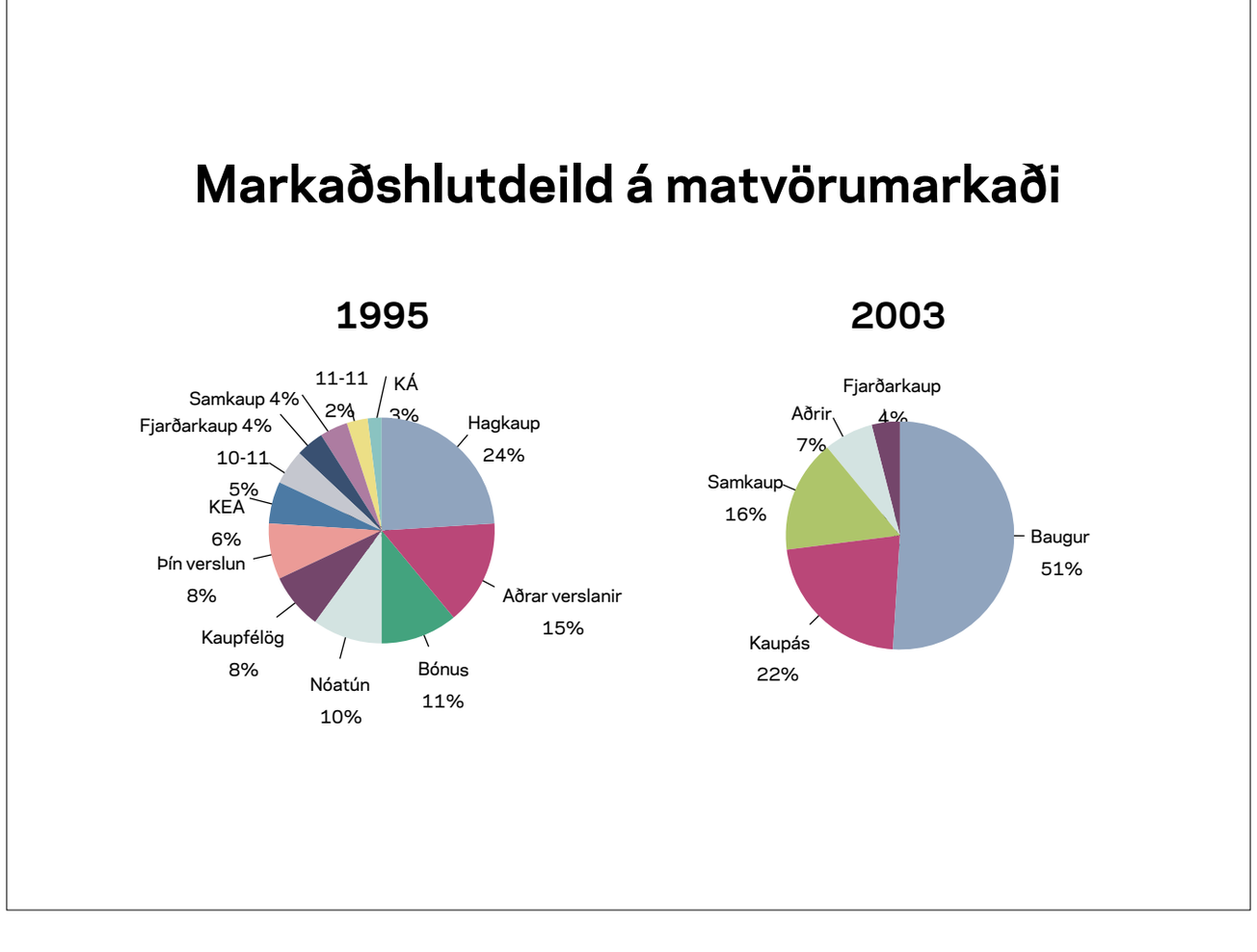


Now we have sorted the top pie's slices by size. Let's clean things up a bit.

Markaðshlutdeild á matvörumarkaði



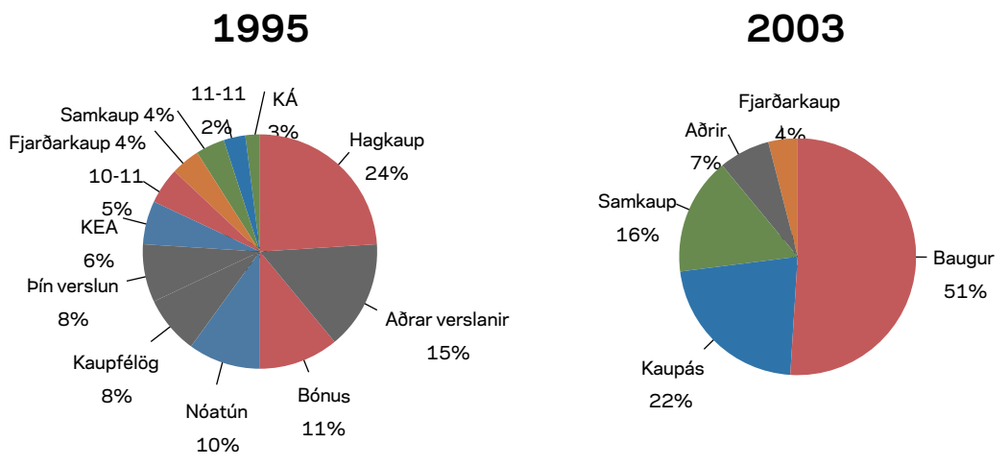
We can merge the headers into one and label the pies with the year instead.



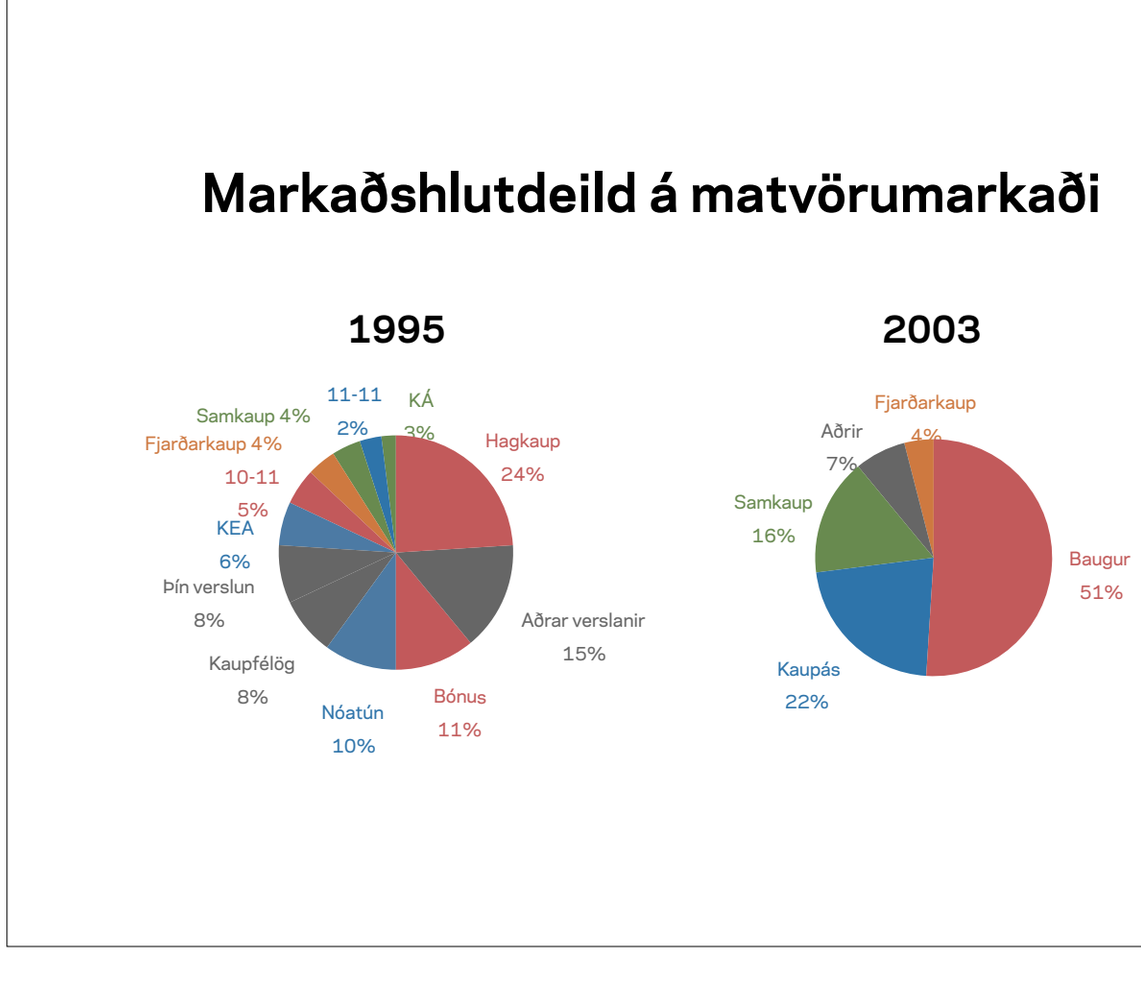
Placing the pies side by side with the older one on the left fits better into this space.

The question that pops to my mind now is that we still have no idea which slices combined into “Baugur” or “Kaupás”. To find this out I had to do some research, as this information is not included in the original charts.

Markaðshlutdeild á matvörumarkaði

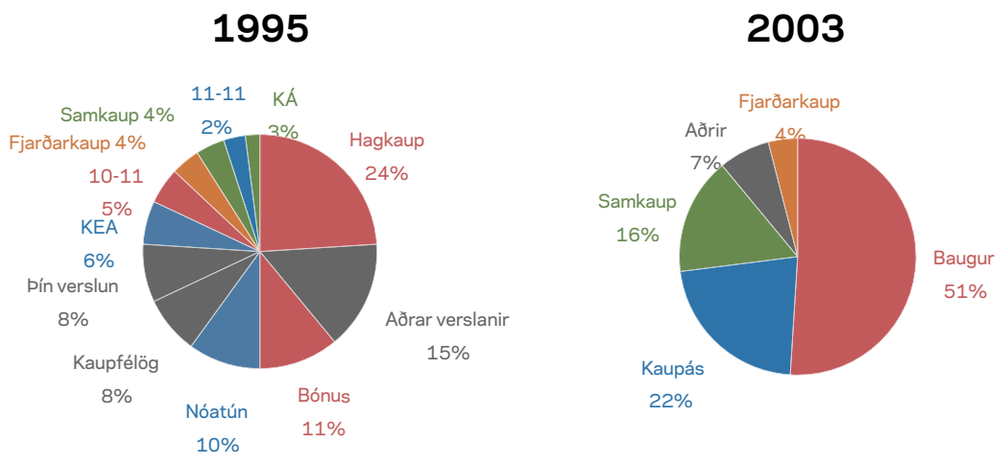


Now all slices that later combined into a larger (or smaller) one have been colored the same

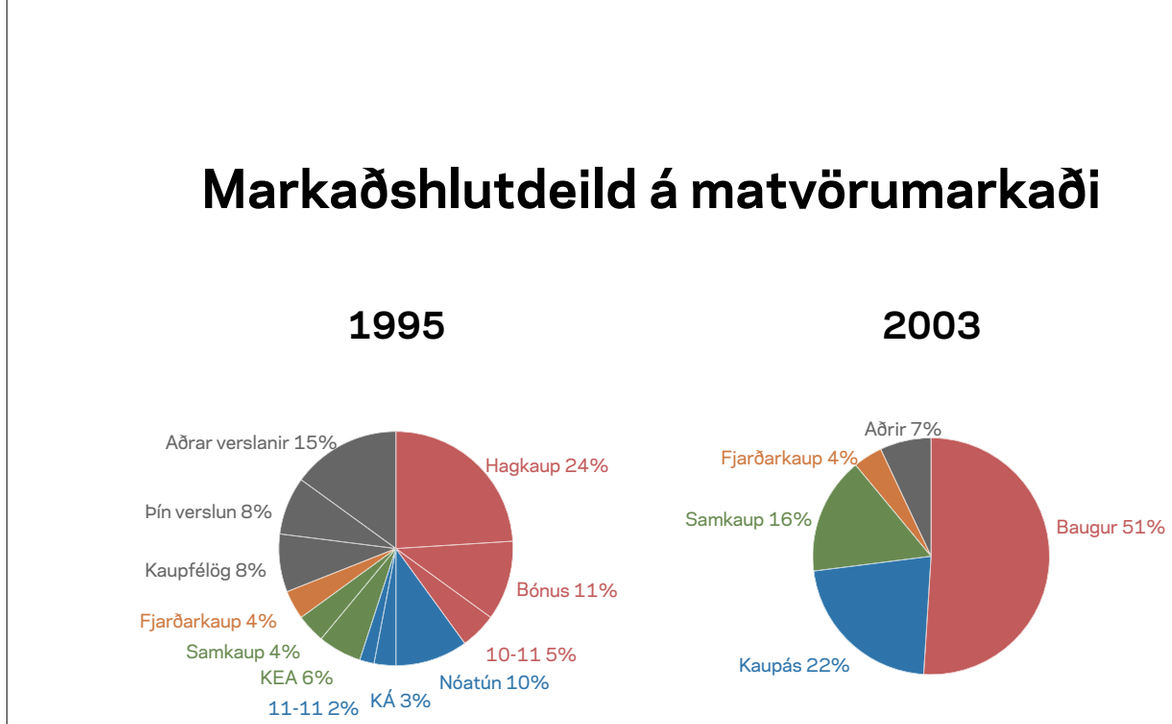


Now I've deleted the connector lines and colored the labels accordingly.

Markaðshlutdeild á matvörumarkaði

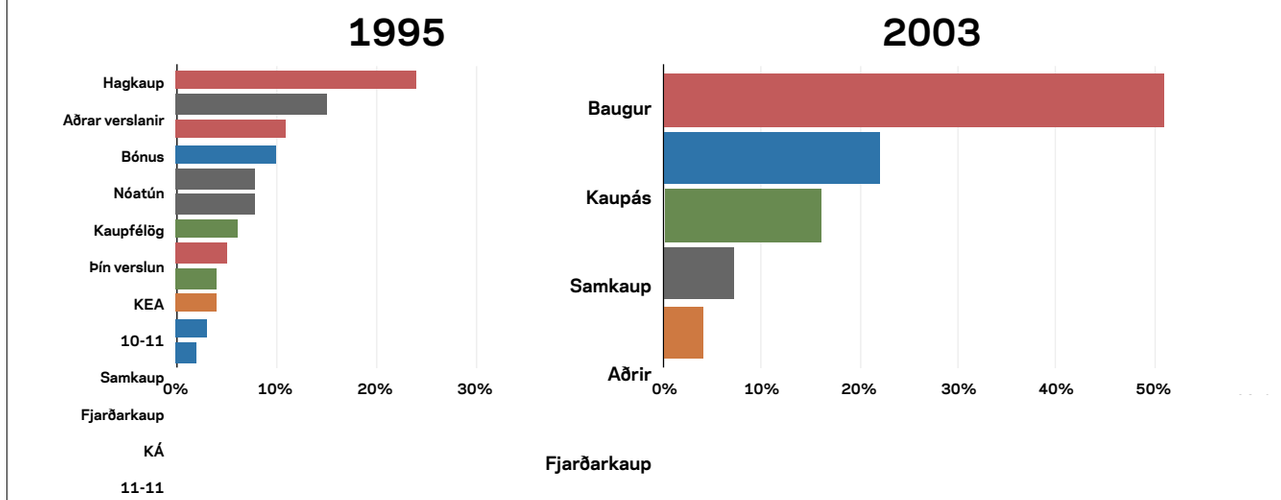


A thin line will seperate the same colored that lie side by side.



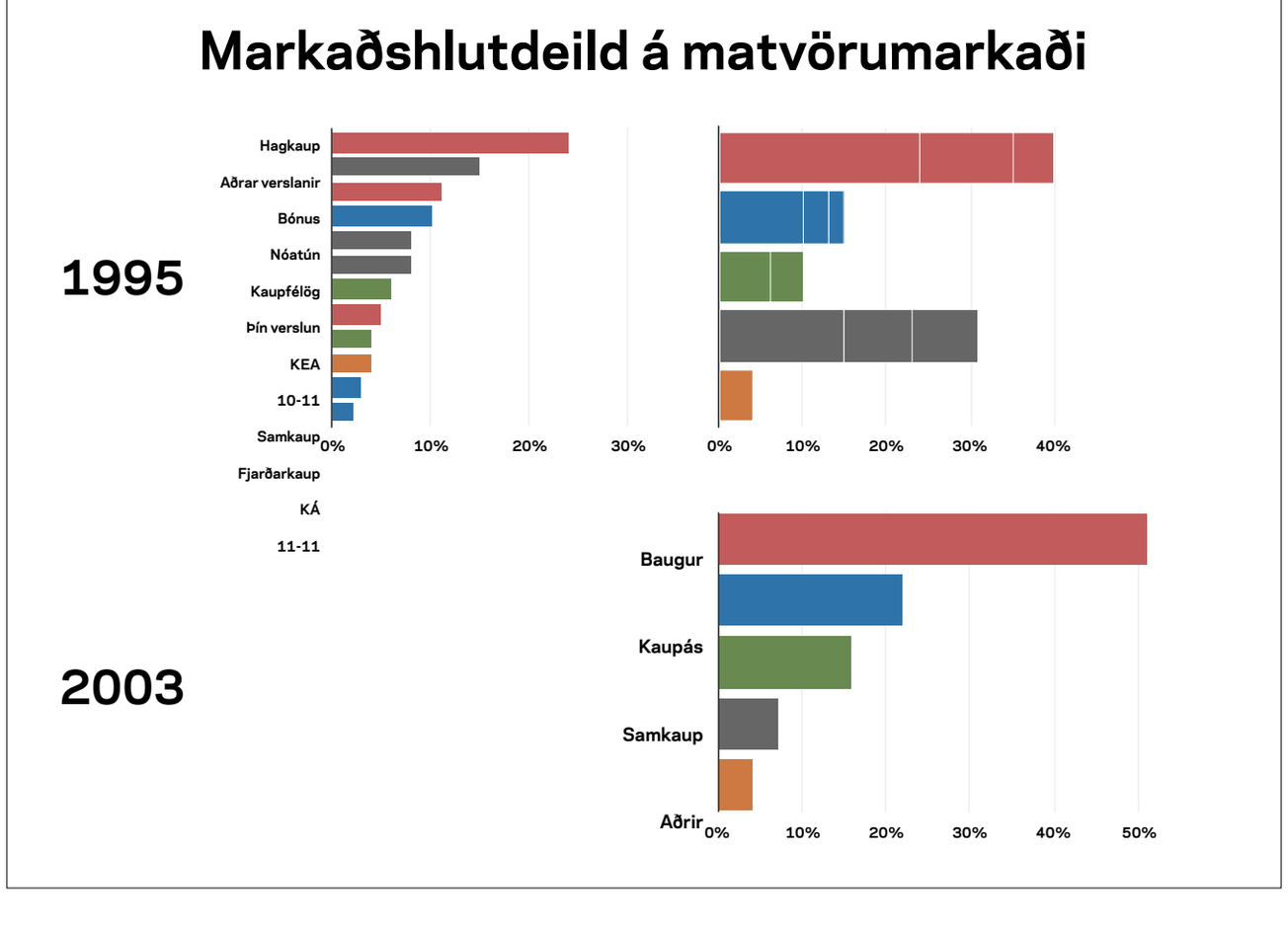
Finally I re-arrange same colored slices together and by size, tidy up the location of the labels, and relocated “Aðrir” (others) to the back.

I think we can get no further using a pie chart. And pie charts are renowned for their inaccuracy and label dependency.

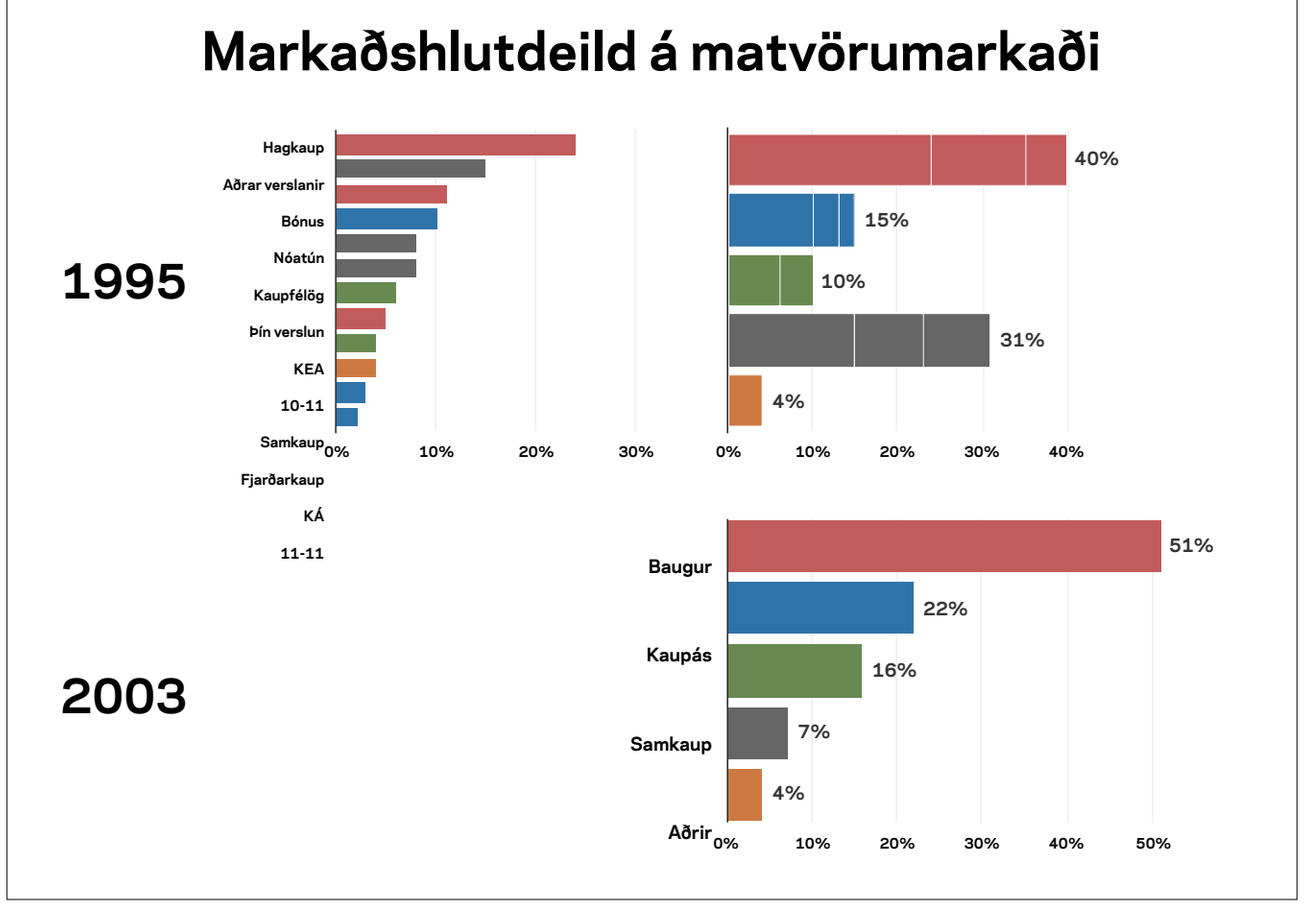


So let's try a bar chart.

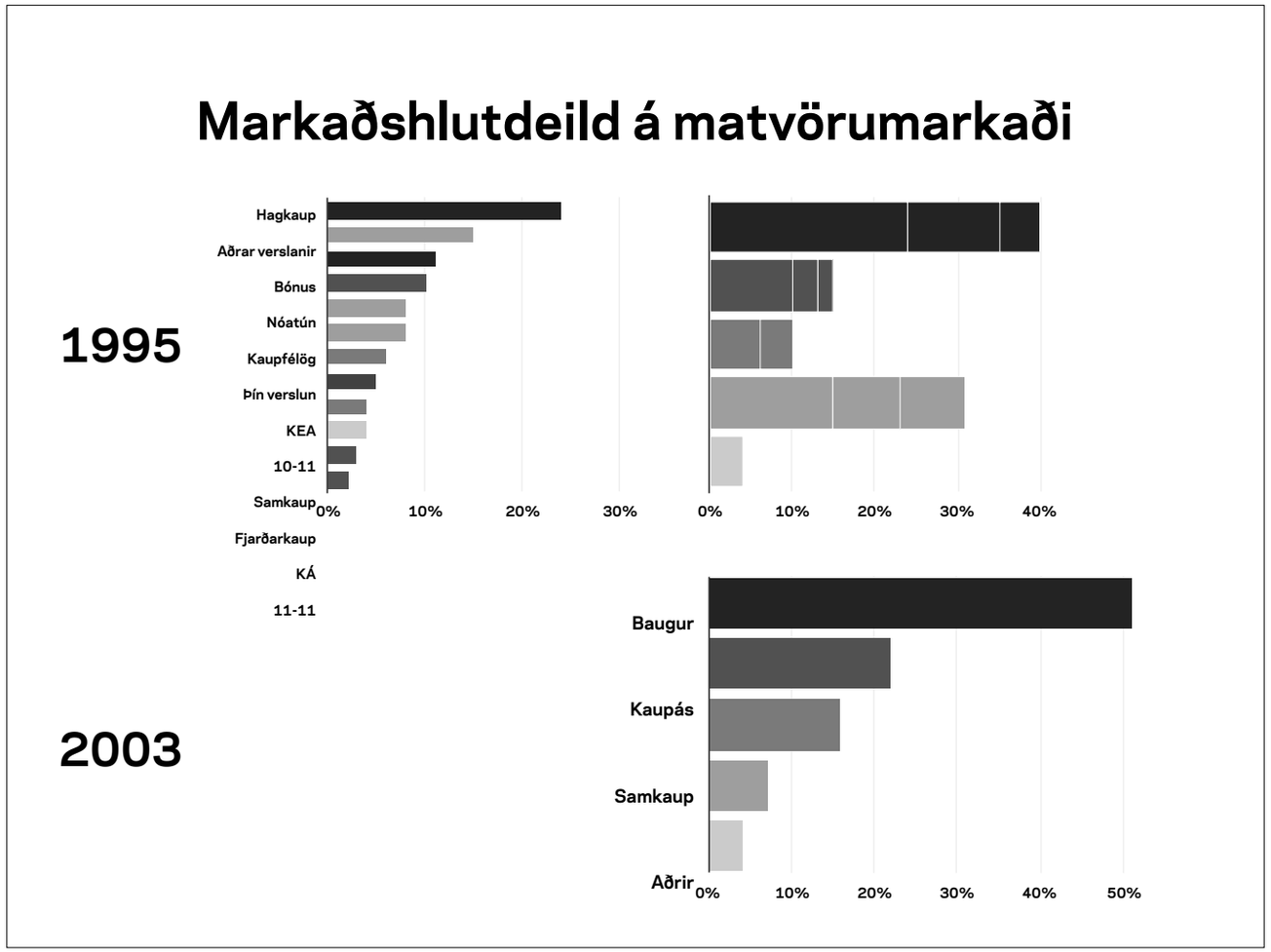
What I miss from this visualization, which was pretty clear in the pies, is the change in the size of color groups — the total for 1995 groups.



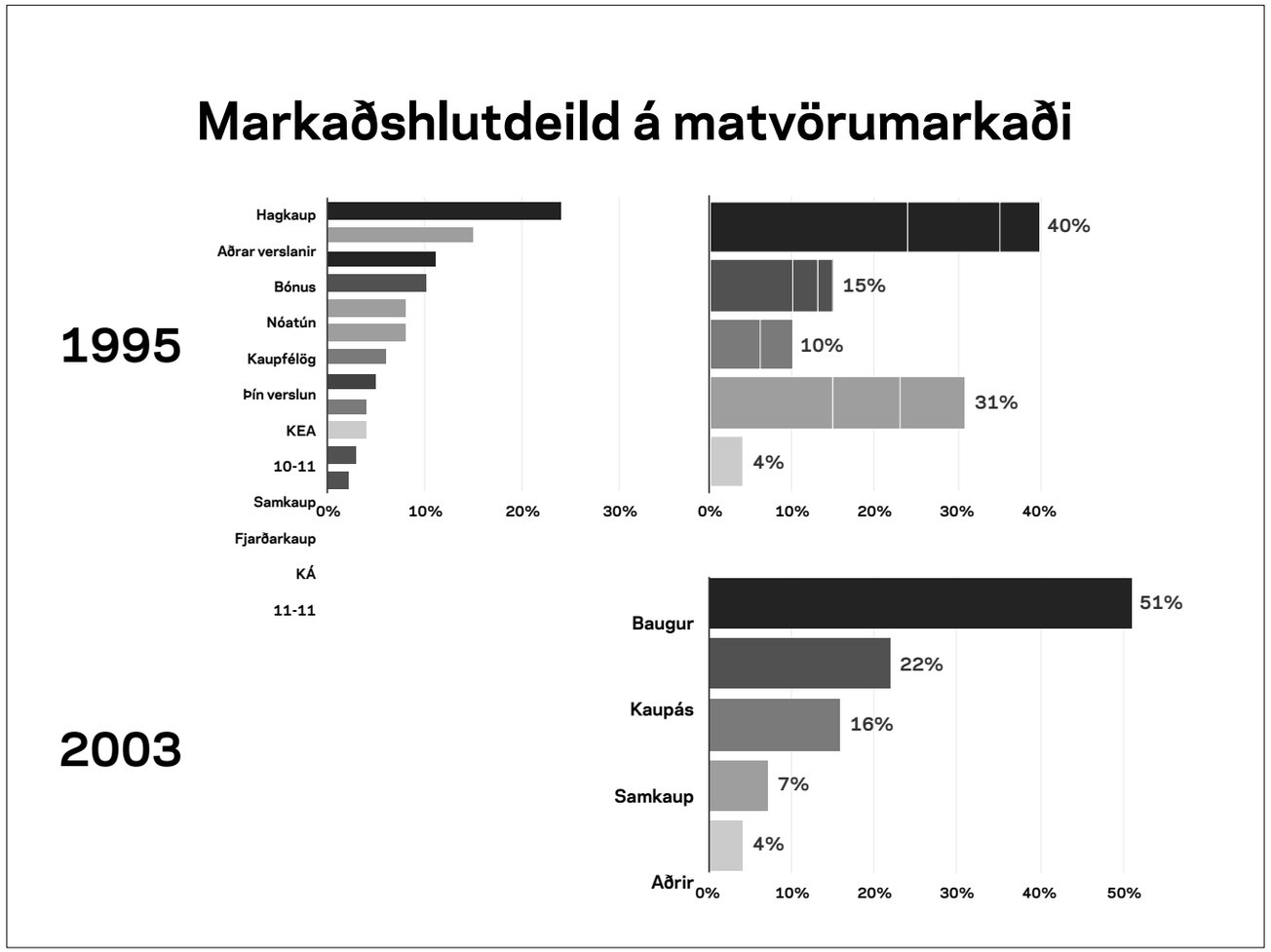
Here I've added a third chart which shows the totals for 1995.



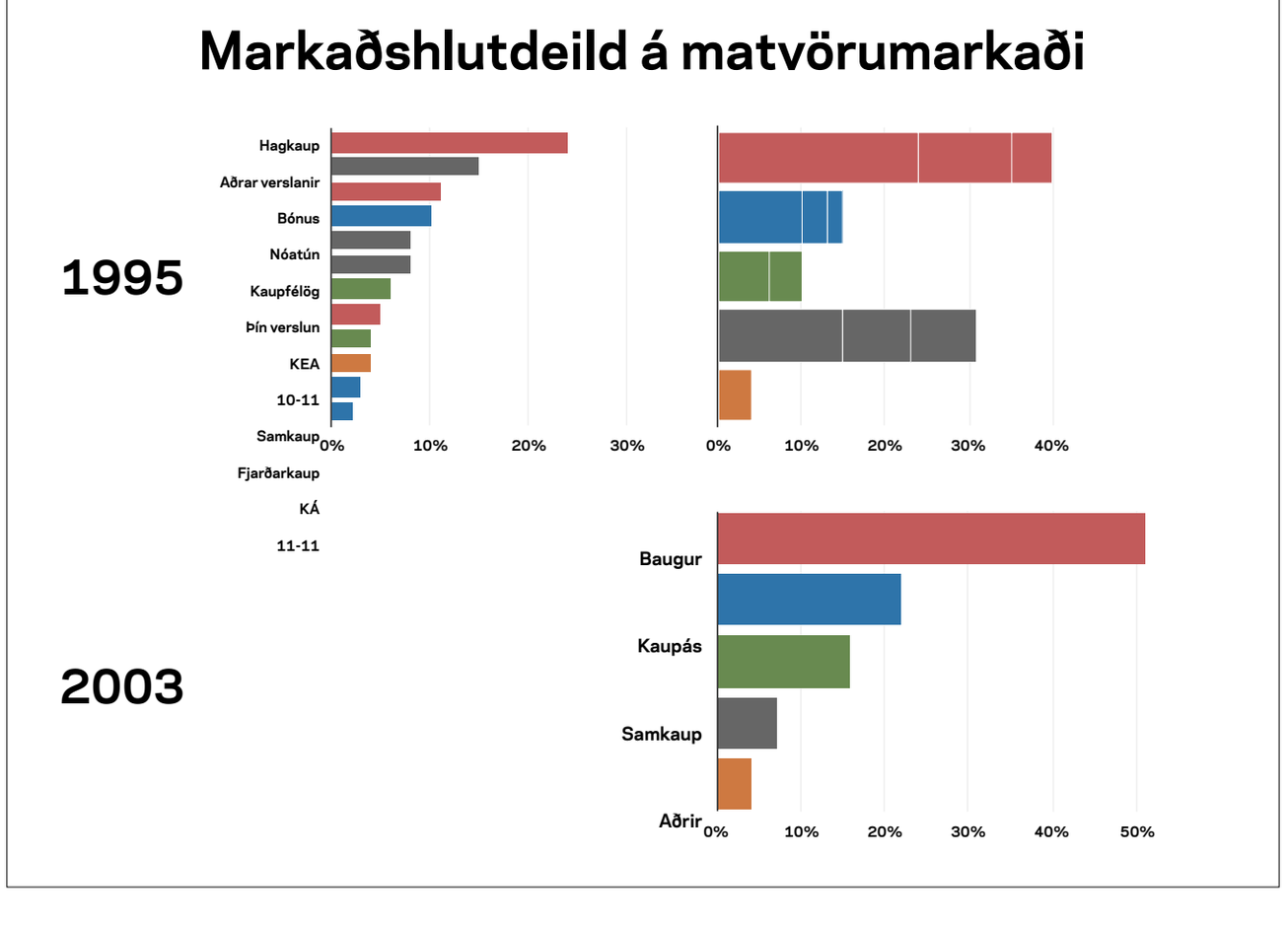
Here I've added a third chart which shows the totals for 1995.



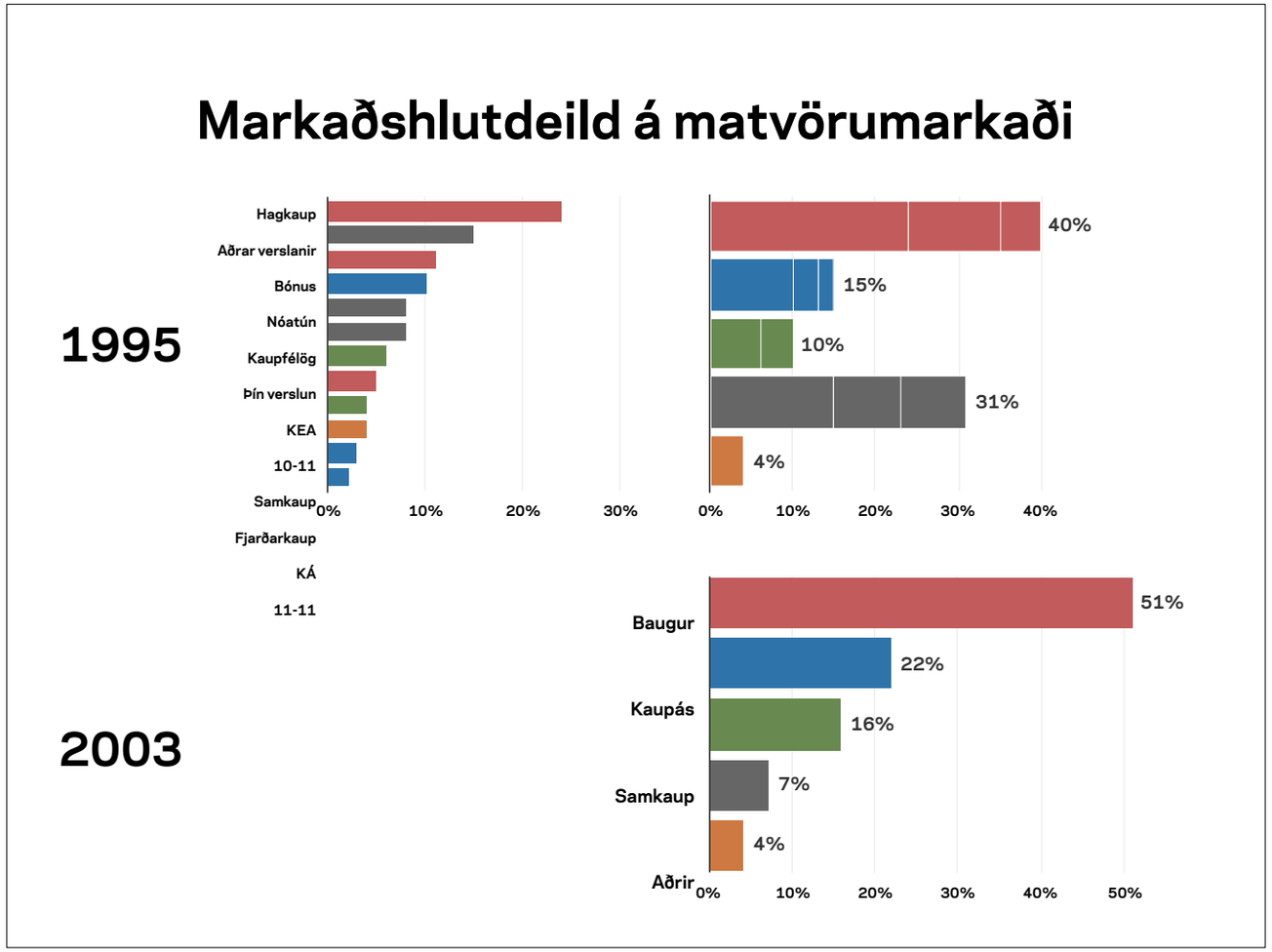
Does color help or one color enough? I think the color helps in this case.



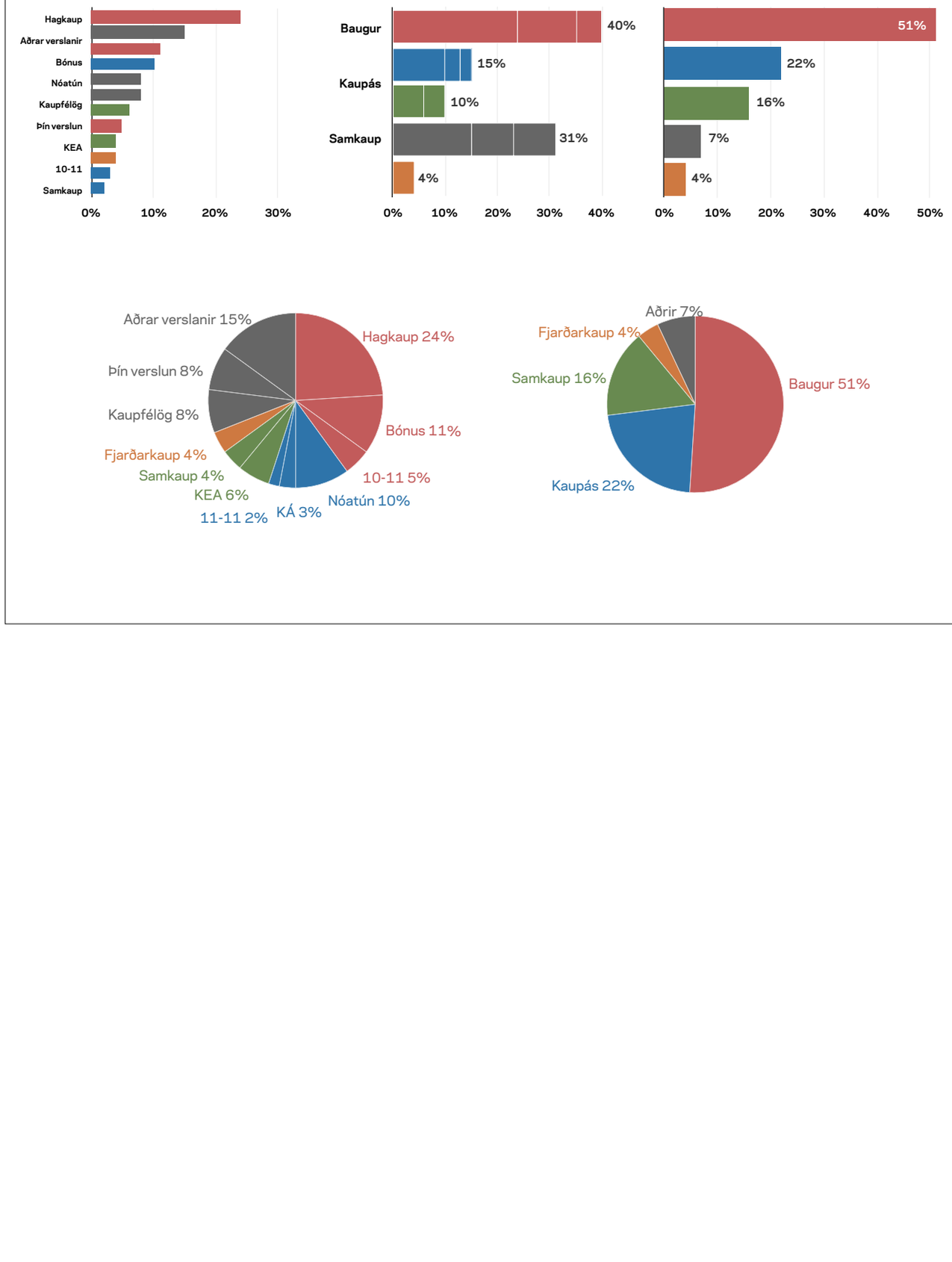
Does color help or one color enough? I think the color helps in this case.



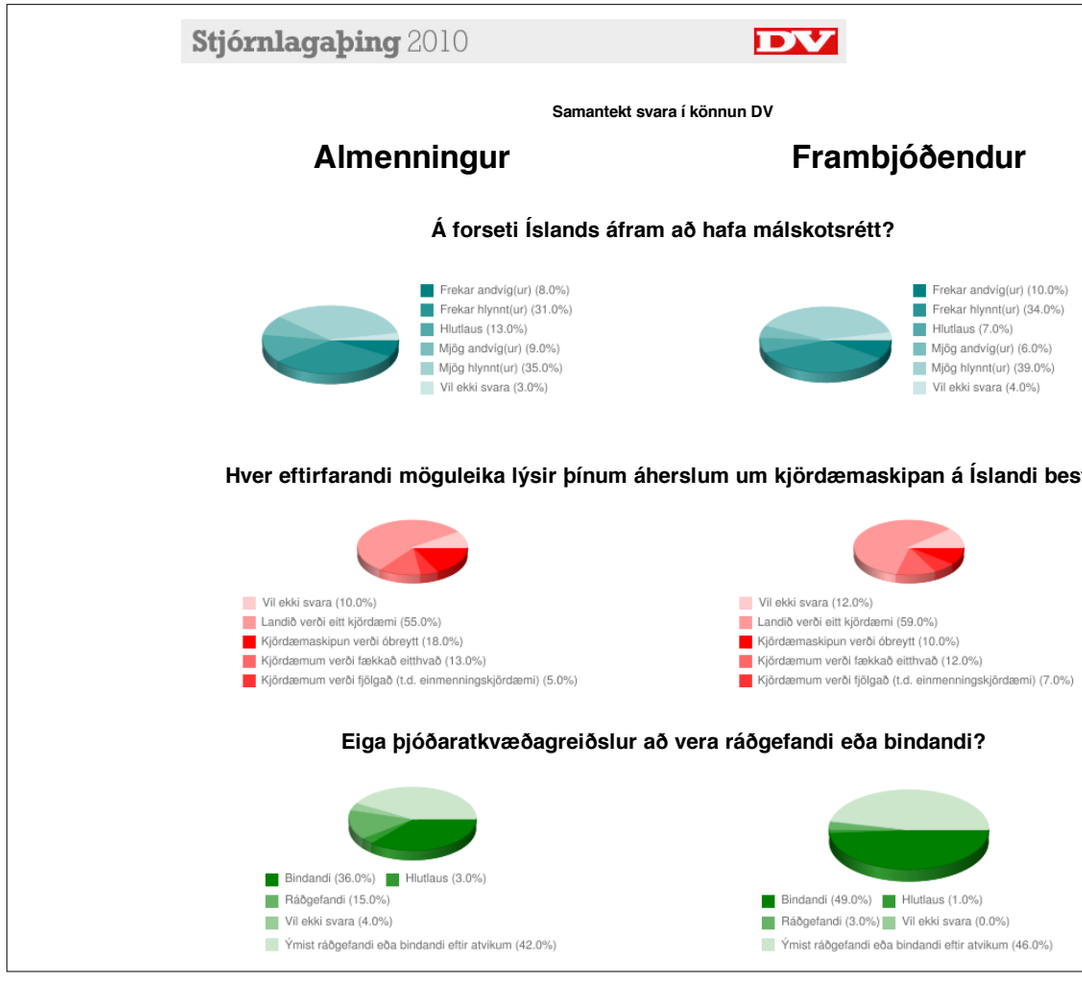
I find the color helpful to see which stores were combined in 1995. It's harder to decipher with intensity of a single color.



I find the color helpful to see which stores were combined in 1995. It's harder to decipher with intensity of a single color.



So, pies or bars? Or can we maybe do this even better?



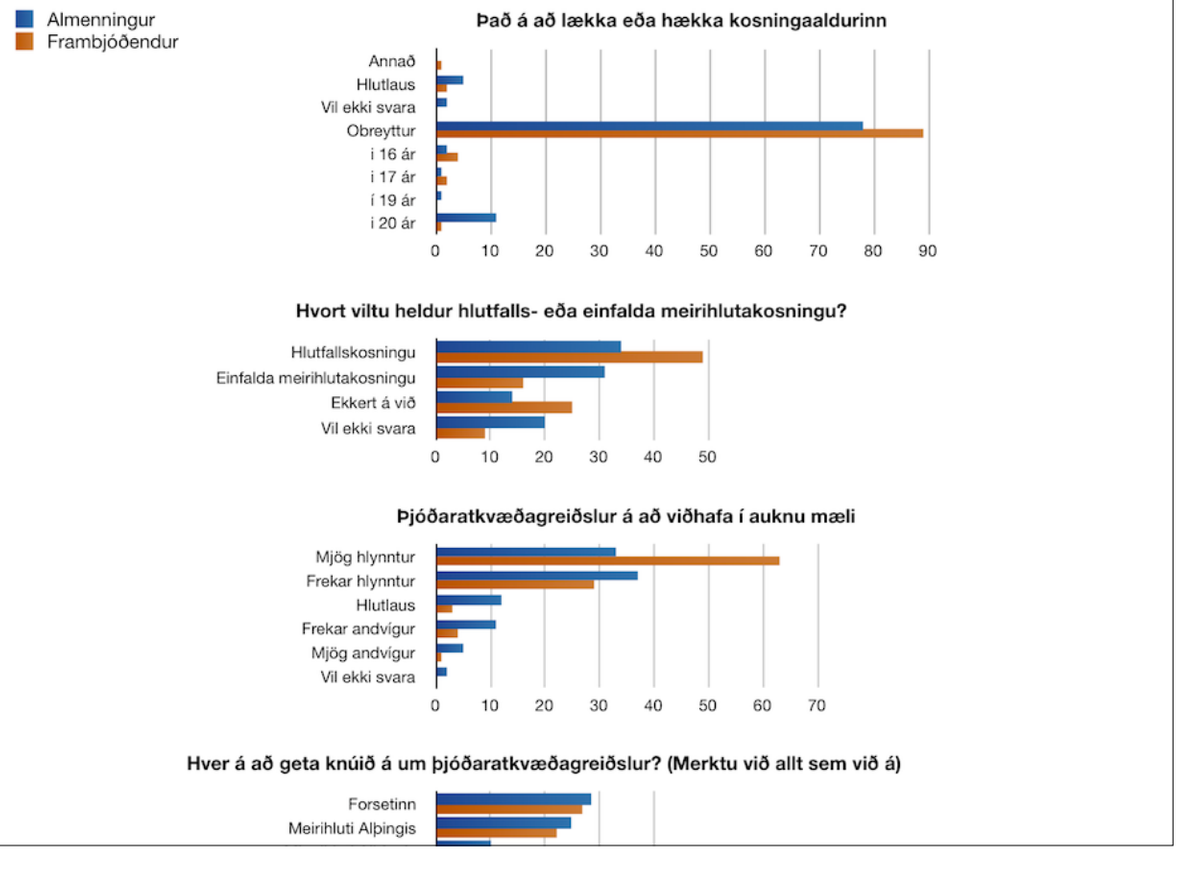
Here's another more recent example from the newspaper DV (dv.is). The idea is to compare the views of the public to the views of candidates for the assembly to re-examinate the Icelandic constitution.

Here's a list of what's wrong with this:

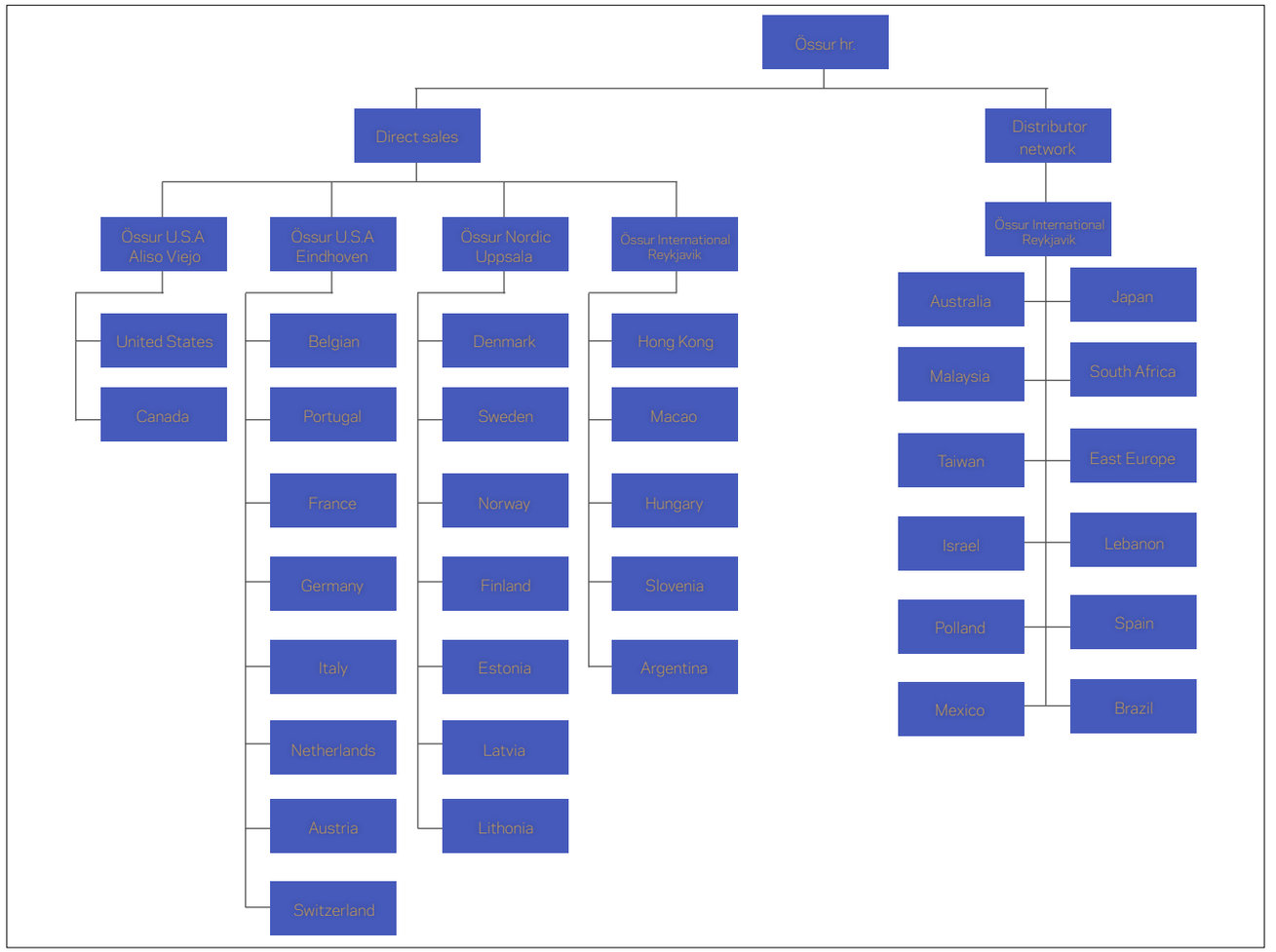
- Pies are not optimal for comparing two datasets. Bar charts are more effective.
- The pies are not equally sized, not even within the same question!
- The pies are 3D, which makes them even harder to compare than 2D pies.
- Gratitious color usage with no context.
- The legend is alphabetized!
- The legend is duplicated for each question.
- The questions are not ordered or grouped in any context.
- The questions published are unnecessarily complex (the full questions asked can be printed in the small print).

(Source: http://www.dv.is/stjornlagathing/nidurstodur/)

Þjóðaratkvæðisgreiðslur

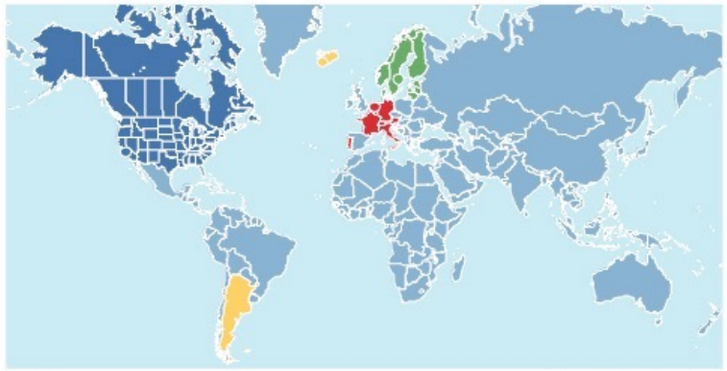


Changing the pies into bar charts and combining the answers of the public and the candidates into one chart per question makes comparison much easier



This flow chart was a part of a report I designed a couple of years ago. It shows Össur hf.'s Direct Sales and their headquarters for individual countries, and the Distributor Network. If we try to ignore the horrible clashing yellow letters on the purple background, could this be improved — beyond a simple color change?

Well, the chart is mostly talking about geographical locations, so how about a map?



Direct Sales

Ossur Europe
Eindhoven

Ossur Nordic
Uppsala

Ossur International
Reykjavik

Ossur USA
Aliso Viejo

Belgium
Portugal
France
Germany

Italy
Netherlands
Austria
Switzerland

Denmark
Sweden
Norway
Finland

Estonia
Latvia
Lithuania

Hong Kong
Macao
Argentina

United States
Canada

Figure 4.5.1a Direct Sales

Distribution Network - Ossur International Reykjavik

Australia
Chech-
Republic

Croatia
Hungary
Israel

Japan
Malaysia
Mexico

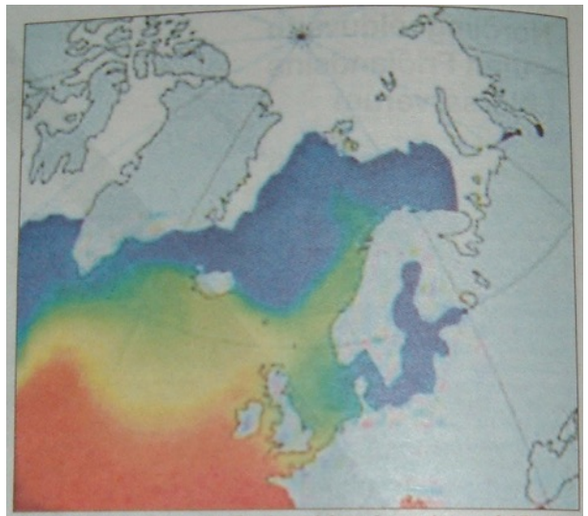
Poland
Slovakia
Slovenia

South Africa
Taiwan

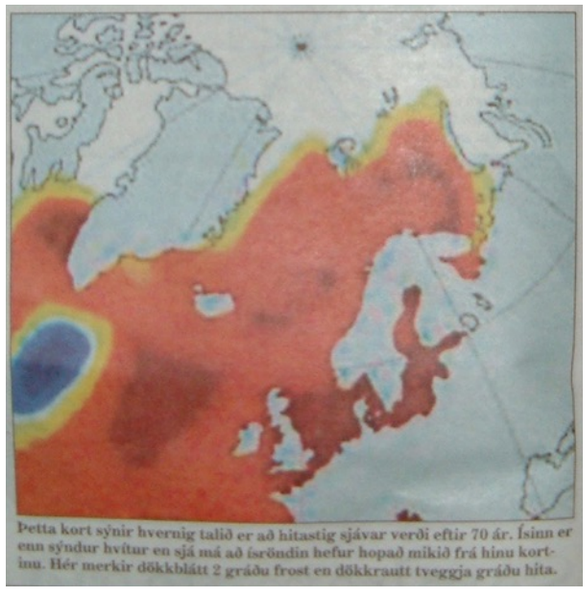
Figure 4.5.1b Distribution Network

How about a map? The map above shows the Direct Sales with a circle in the country with the headquarters, the map below shows the Distribution Network.

Although it's more clear on the printed version, I think the headquarters should be contrasted more, to better pop up from the chart. Overall, I'm still pleased with the outcome.

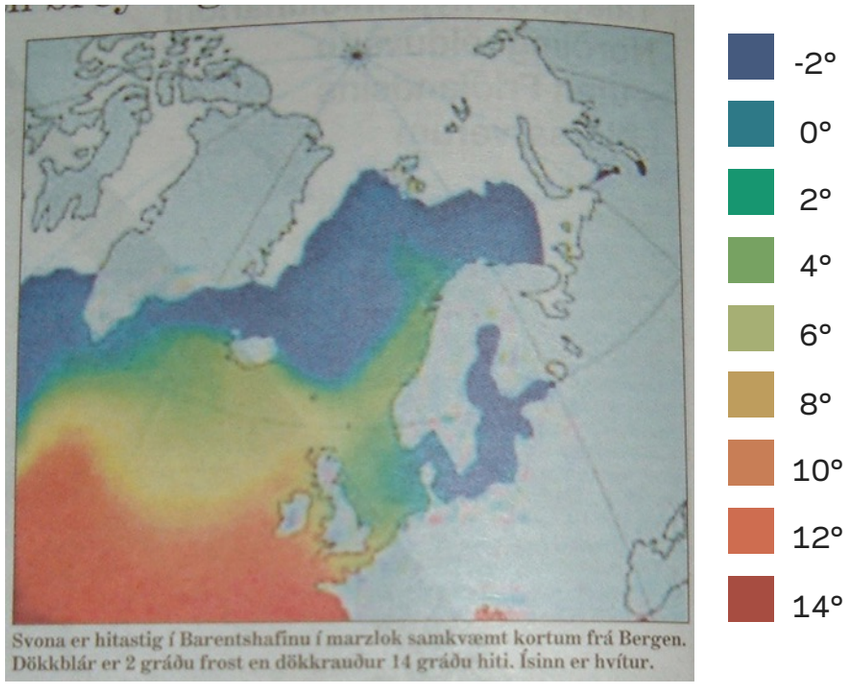


Svona er hitastig í Barentshafinu í marzlok samkvæmt kortum frá Bergen. Dökkblár er 2 gráðu frost en dökkrauður 14 gráðu hiti. Ísinn er hvítur.



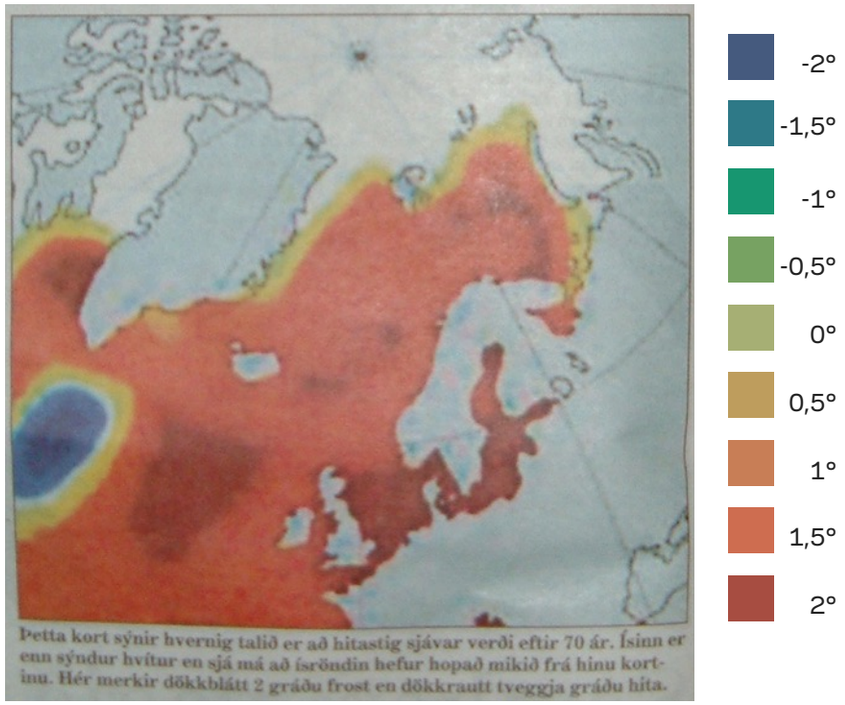
Þetta kort sýnir hvernig talið er að hitastig sjávar verði eftir 70 ár. Ísinn er enn sýndur hvítur en sjá má að ísröndin hefur hopað mikið frá hinu kortinu. Hér merkir dökkblátt 2 gráðu frost en dökkrautt tveggja gráðu hita.

I stumbled upon these amazing charts in Morgunblaðið (e. The Morning Paper) showing temperature changes in the Barents sea. At first I was horrified by the incredible changes that the chart prophesizes. After a short while, I started having some doubts. Something was wrong.



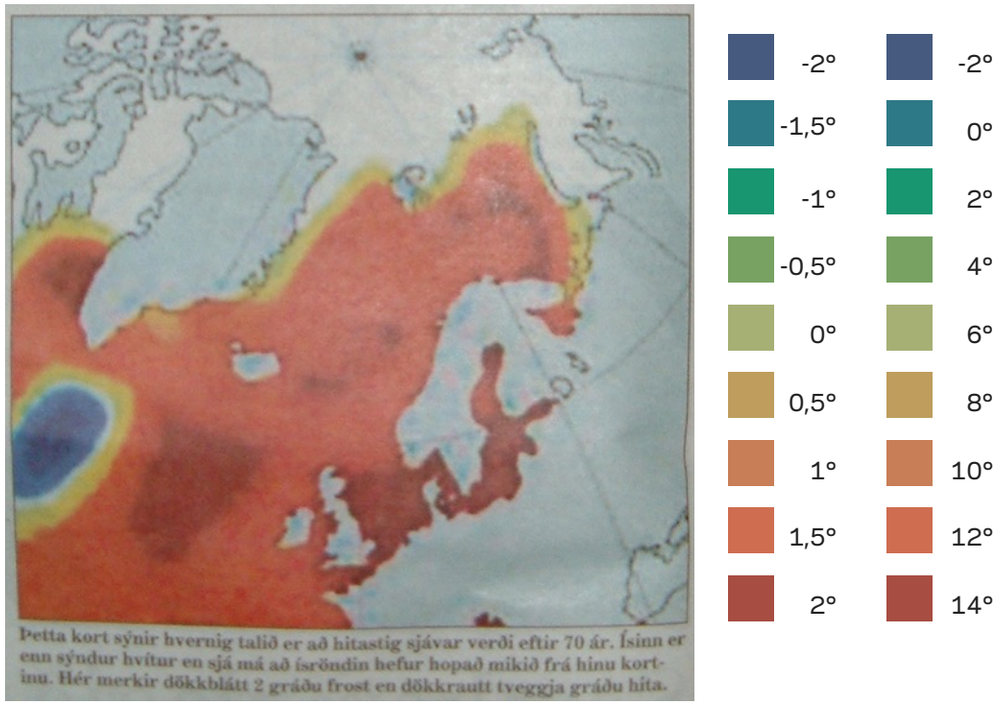
Svona er hitastig í Barentshafinu í marzlok samkvæmt kortum frá Bergen. Dökkblár er 2 gráðu frost en dökkrauður 14 gráðu hiti. Ísinn er hvítur.

Here is the first chart. I've grabbed the colors from it to create the labels to the right. Now let's do the same for the other chart.



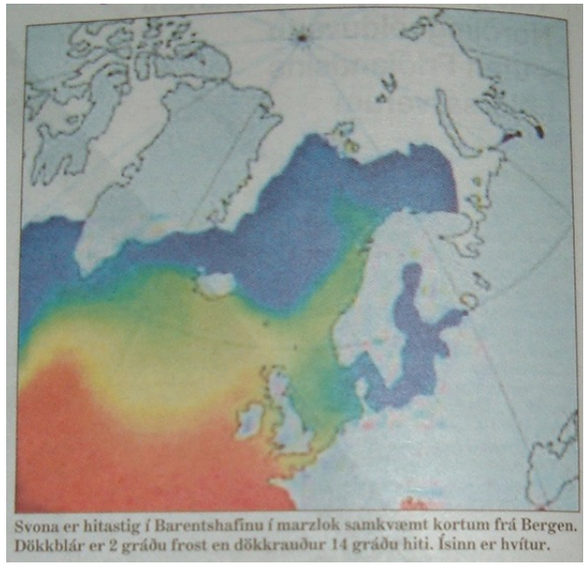
Petta kort sýnir hvernig talið er að hitastig sjávar verði eftir 70 ár. Ísinn er enn sýndur hvítur en sjá má að ísröndin hefur hopað mikið frá hinu kortinu. Hér merkir dökkblátt 2 gráðu frost en dökkrautt tveggja gráðu hita.

Do you notice the change? What if I put the other's scale next to this one's?

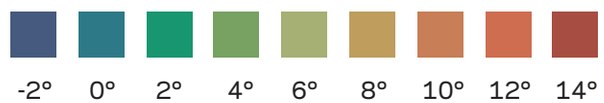


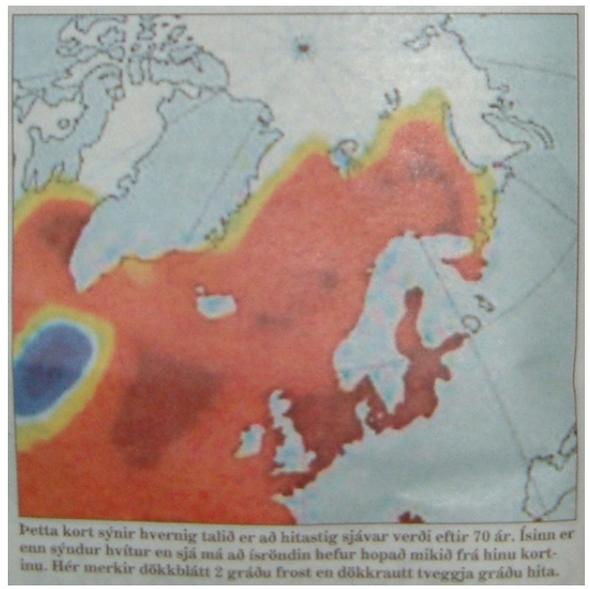
Petta kort sýnir hvernig talið er að hitastig sjávar verði eftir 70 ár. Ísinn er enn sýndur hvítur en sjá má að ísröndin hefur hopað mikið frá hinu kortinu. Hér merkir dökkblátt 2 gráðu frost en dökkrautt tveggja gráðu hita.

Do you notice the change? What if I put the other's scale next to this one's?



Svona er hitastig í Barentshafinu í marzlok samkvæmt kortum frá Bergen. Dökkblár er 2 gráðu frost en dökkrauður 14 gráðu hiti. Ísinn er hvítur.



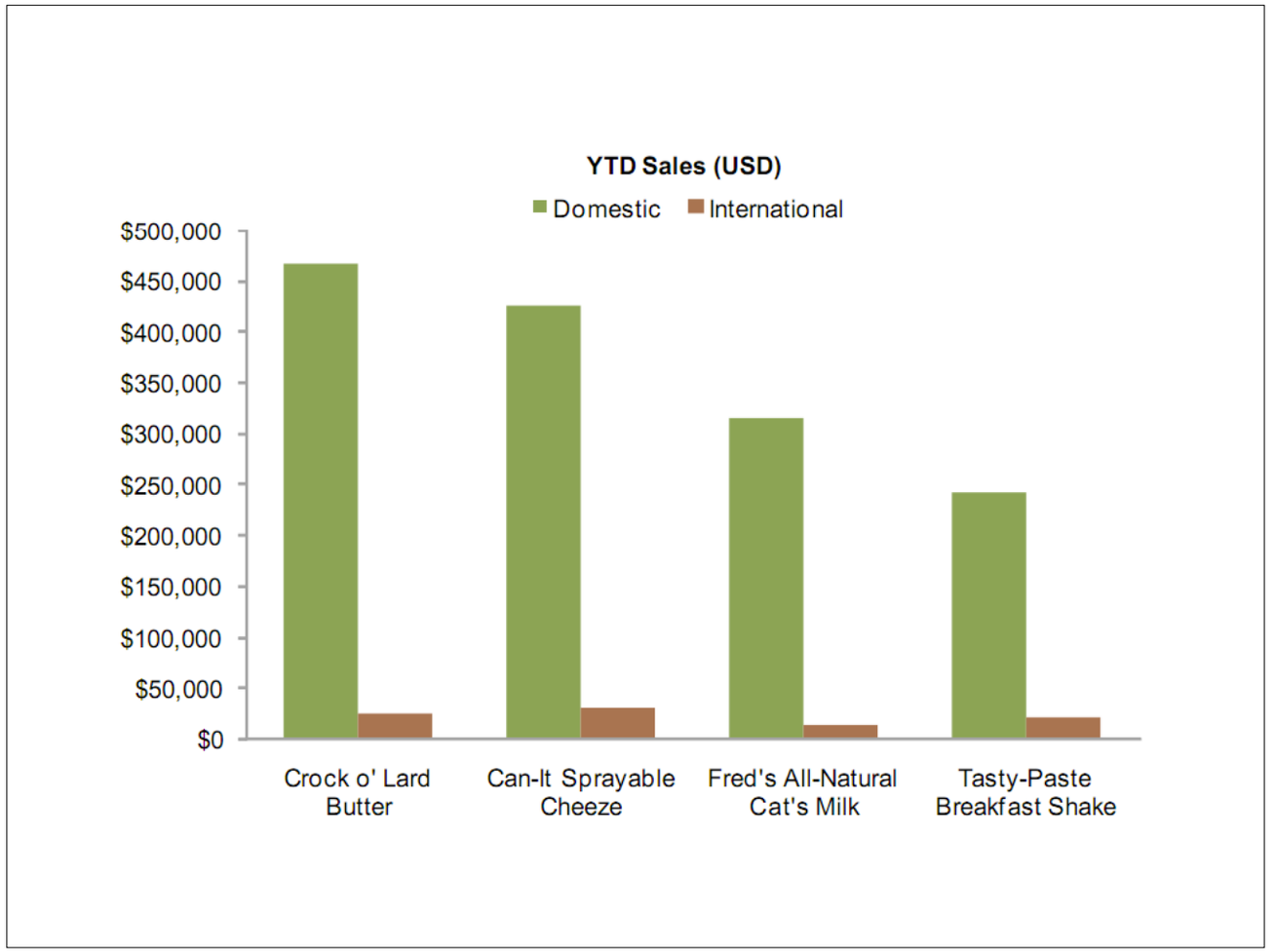


Þetta kort sýnir hvernig talið er að hitastig sjávar verði eftir 70 ár. Ísinn er enn sýndur hvítur en sjá má að ísröndin hefur hopað mikið frá hinu kortinu. Hér merkir dökkblátt 2 gráðu frost en dökkrautt tveggja gráðu hita.

Here are both charts and scales side by side. There is nothing in the caption that makes sense of this.

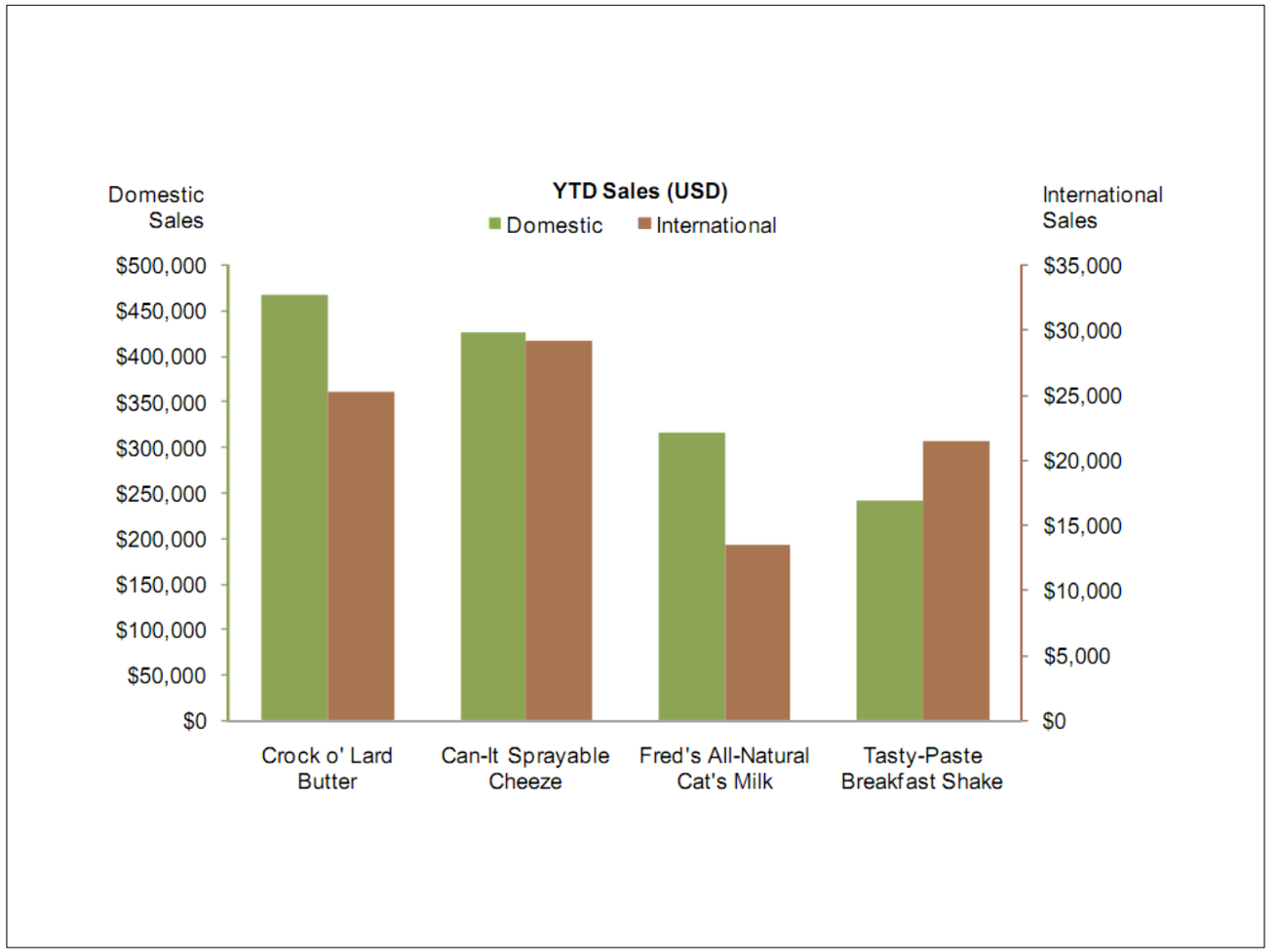
We spent a bit of time deciphering this in the office, and have come to the conclusion that the reporter misunderstood the charts. One shows the ocean temperature while the other shows **by how much** the temperature is to have risen or fallen in 70 years.

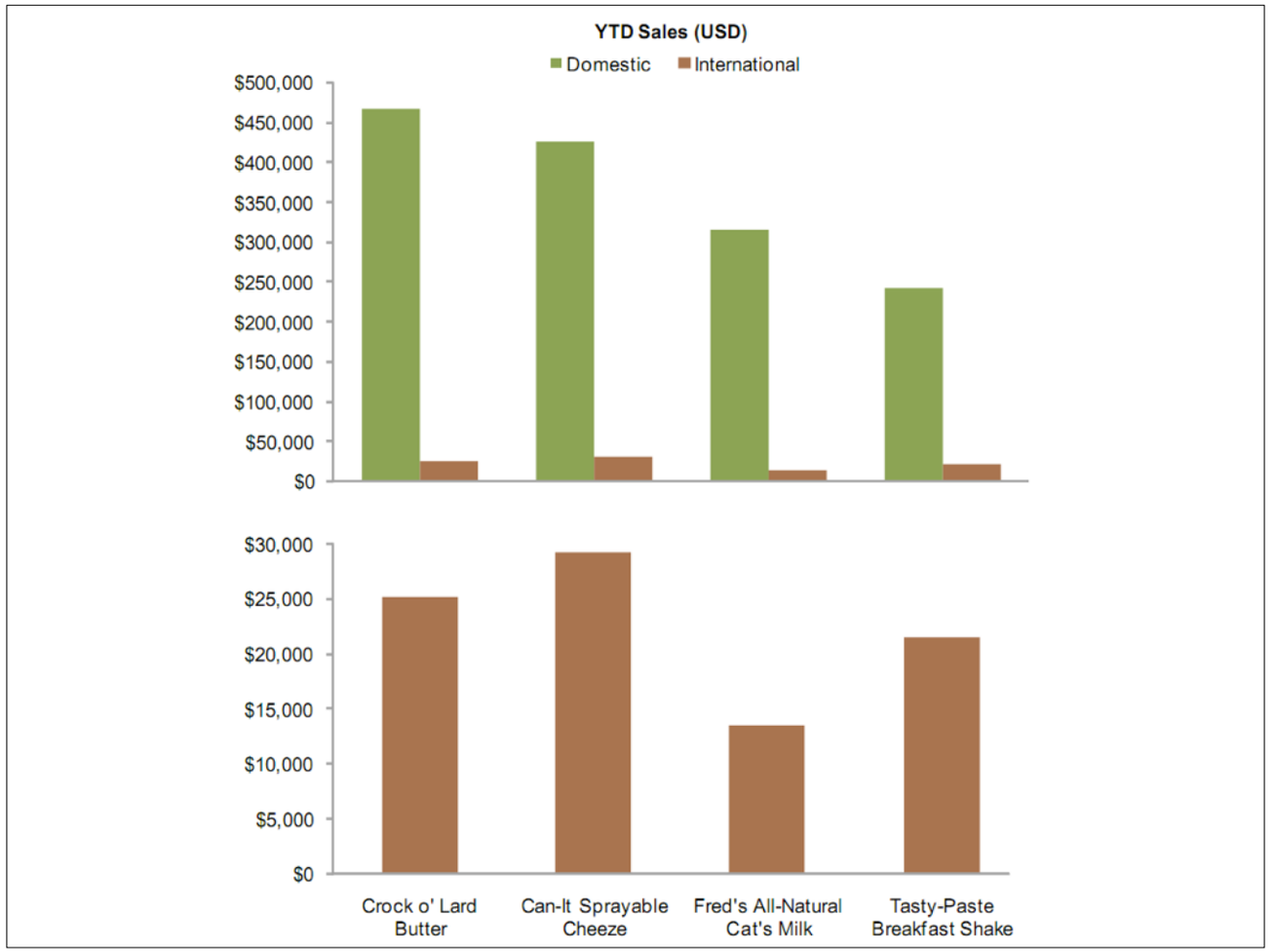
Of course showing these charts side by side, even with correct captions is a huge design mistake. First, I think it is safe to assume that the readers of Morgunblaðið do not have a clear image of what the ocean's temperature is supposed to be, nor what implications a slight tempreature change can have. Trying to teach both in a small (1/4 of a page) article would be a bad idea. Choose one scale and one story. If you want to tell both stories, do it in tomorrows paper.

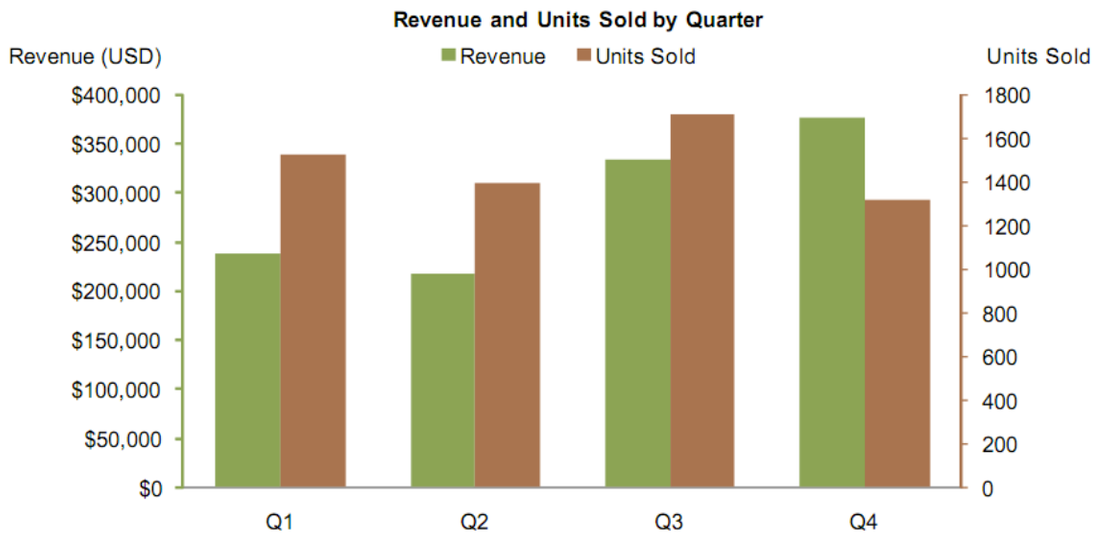


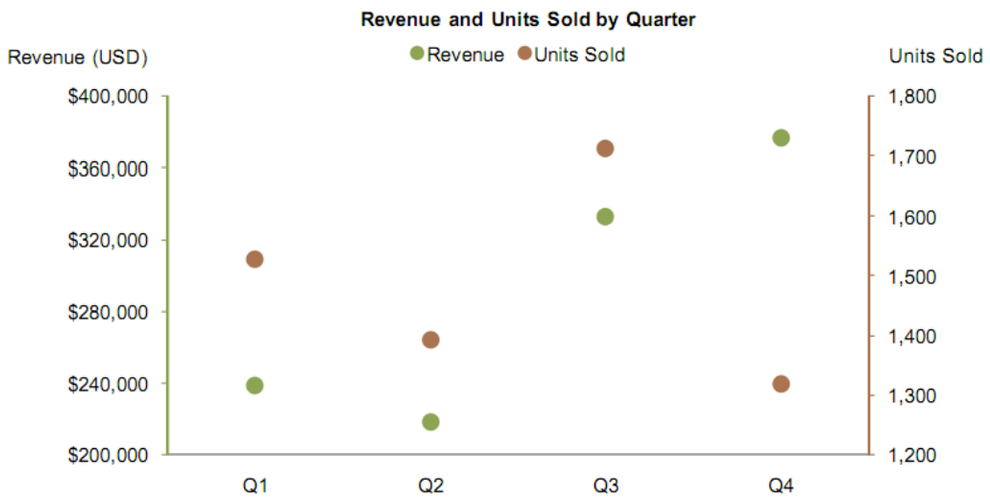
I'm going to take you through a PDF from Stephen Few, where he is investigation the usefulness of a double axes. It's an interesting journey about comparing two datasets. What to think about and what to beware of.

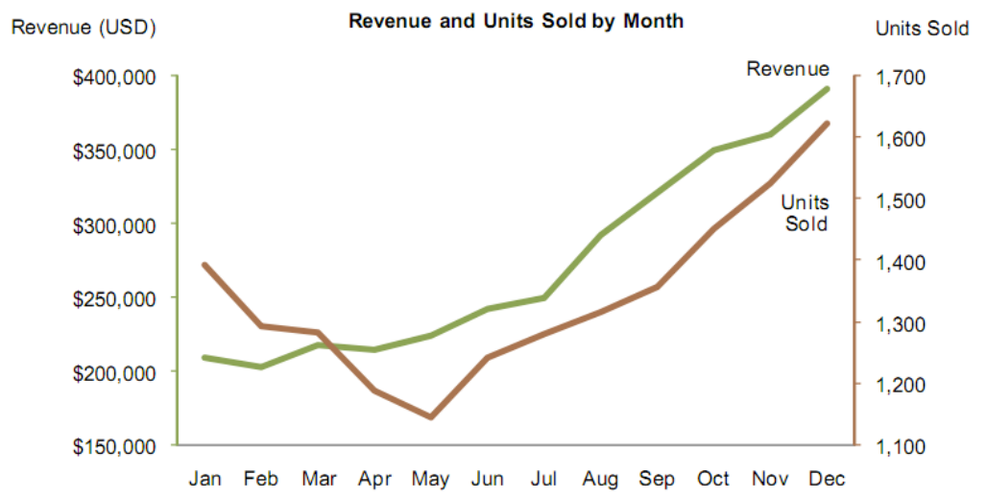
(Source: http://www.perceptualedge.com/articles/visual_business_intelligence/dual-scaled_axes.pdf)

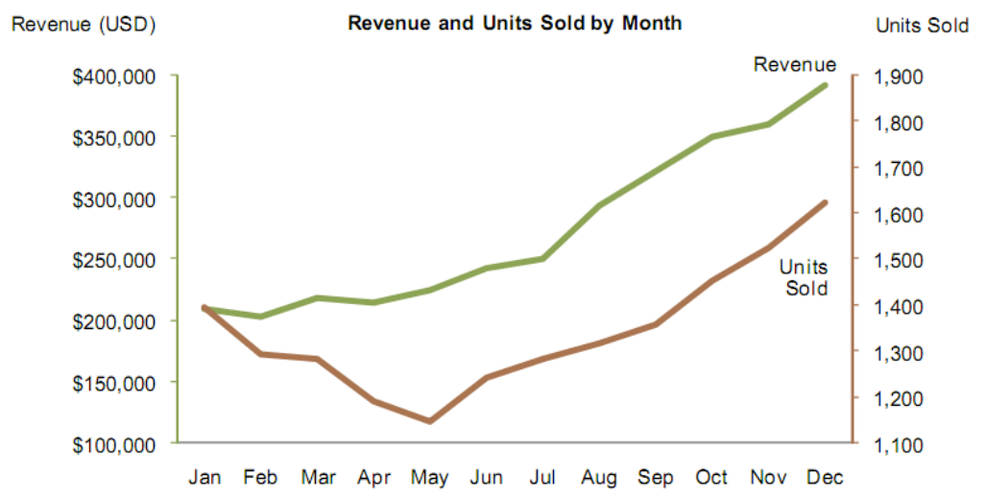

YTD Sales (USD)
Domestic
International
Domestic Sales
International Sales
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
$35,000
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$0
Crock o' Lard Butter
Can-It Sprayable Cheeze
Fred's All-Natural Cat's Milk
Tasty-Paste Breakfast Shake

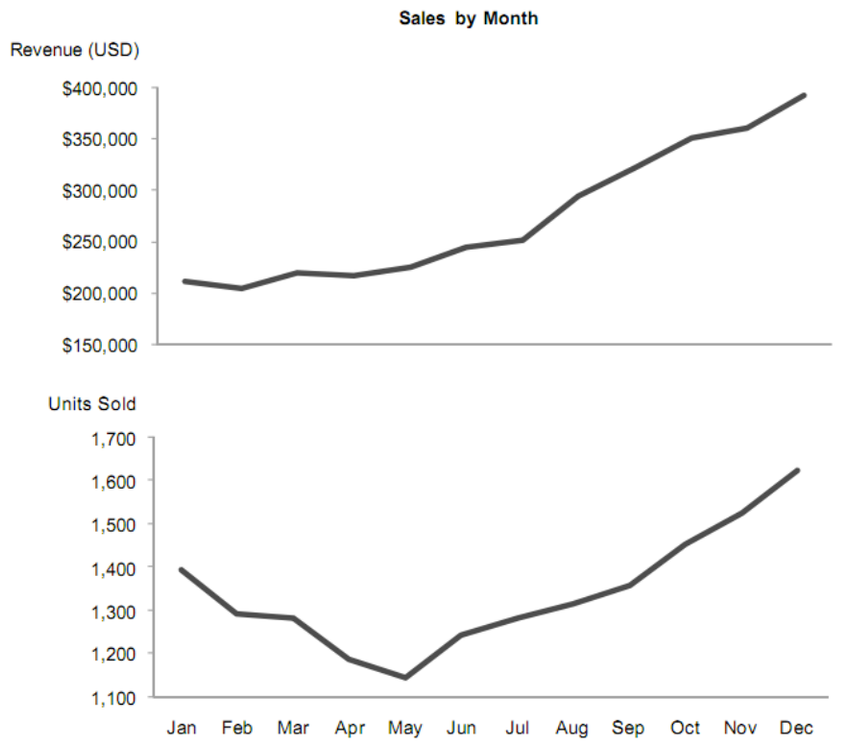

YTD Sales (USD)
Domestic
International
$500,000
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$0
Crock o' Lard Butter
Can-It Sprayable Cheeze
Fred's All-Natural Cat's Milk
Tasty-Paste Breakfast Shake

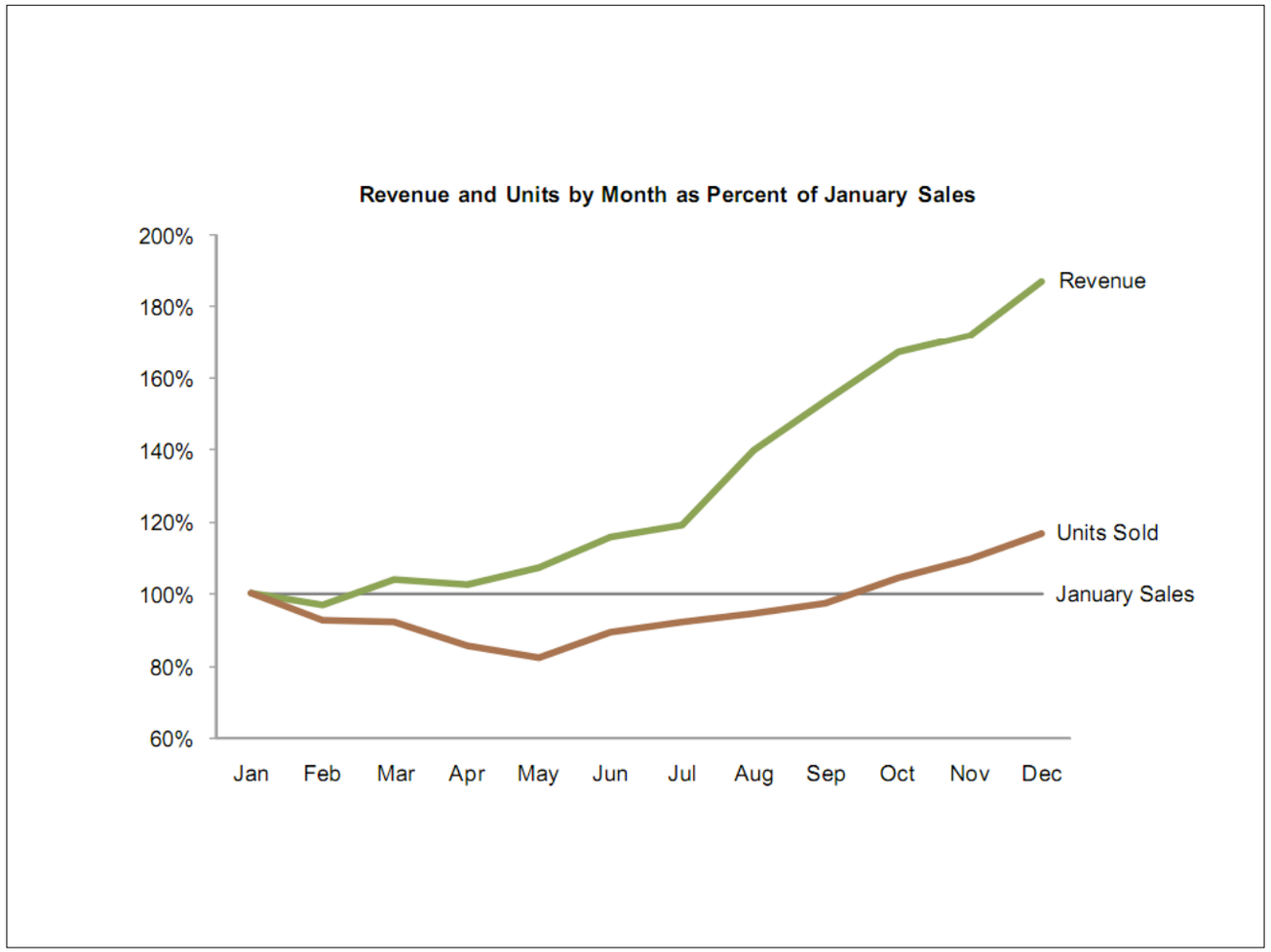

Revenue and Units Sold by Quarter
Revenue (USD)
Revenue
Units Sold
Units Sold
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
1800
1600
1400
1200
1000
800
600
400
200
0
Q1
Q2
Q3
Q4


Revenue and Units Sold by Quarter
Revenue (USD)
Revenue
Units Sold
Units Sold
$400,000
$360,000
$320,000
$280,000
$240,000
$200,000
1,800
1,700
1,600
1,500
1,400
1,300
1,200
Q1
Q2
Q3
Q4


Revenue and Units Sold by Month
Revenue (USD)
Units Sold
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
1,700
1,600
1,500
1,400
1,300
1,200
1,100
Revenue
Units Sold
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Revenue and Units Sold by Month
Revenue (USD)
Units Sold
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
Revenue
Units Sold
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Sales by Month
Revenue (USD)
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
Units Sold
1,700
1,600
1,500
1,400
1,300
1,200
1,100
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Revenue and Units by Month as Percent of January Sales
200%
180%
160%
140%
120%
100%
80%
60%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Revenue
Units Sold
January Sales

Pre-attentive processing

“Pre-attentive processingis the early stage of visual perception that occurs below the level of conciousness at an extremely high speed and is tuned to detect a specific set of visual attributes. Attendive processing is concious, sequential, and much slower.” (Show me the numbers, Stephen Few, p 98)

Perception is sometimes serial and slow and sometimes parallel and immediate.

Text, the written form of verbal language, must be processed serially. Because the top list above consists of digits without spaces to group them into separate multi-digit numbers, you must read them one digit at a time.

In the bottom list, however, the fives pop out immediately. The bottom list is exactly the same as the top, except for one simple visual difference: they are a darker color. This single distinction made them immediately perceptible.

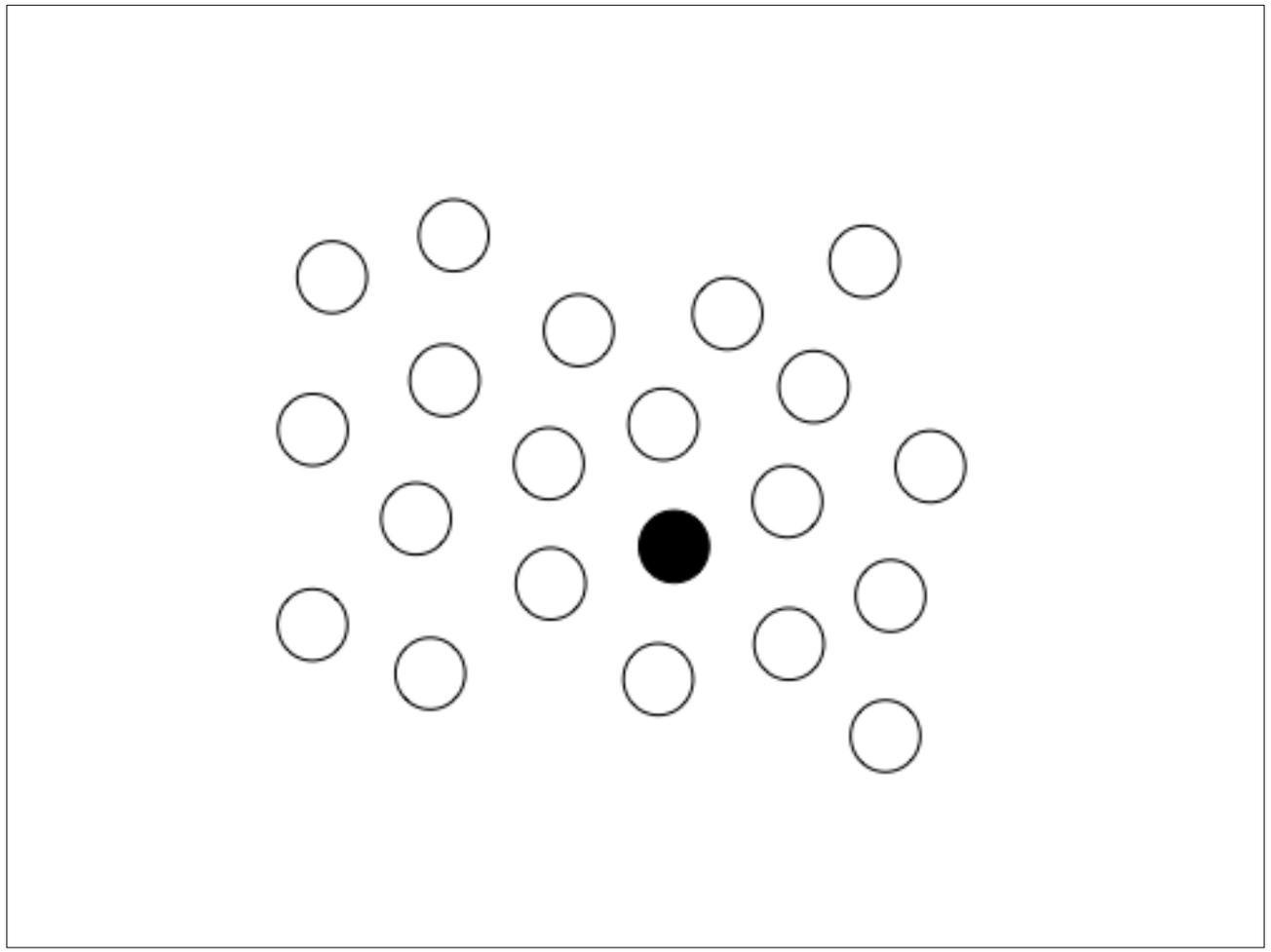
Some visual attributes are easier to see and distinguish than others. The most powerful of these are called pre- attentive attributes because we perceive them immediately, without conscious thought.

987349702756479021947286240924060370804702890727
803208029007305901270238008374082078720272008083
247802602703793715709701379706674620970941027806
927979709123097230919592750927309272197873497260

9873497027**5**6479021947286240924060370804702890727
80320802900730**5**901270238008374082078720272008083
24780260270379371**5**709701379706674620970941027806
927979709123097230919**5**927**5**0927309272197873497260

“Pre-attentive processingis the early stage of visual perception that occurs below the level of conciousness at an extremely high speed and is tuned to detect a specific set of visual attributes. Attendive processing is concious, sequential, and much slower.” (Show me the numbers, Stephen Few, p 98)

Perception is sometimes serial and slow and sometimes parallel and immediate.
Text, the written form of verbal language, must be processed serially. Because the top list above consists of digits without spaces to group them into separate multi-digit numbers, you must read them one digit at a time.
In the bottom list, however, the fives pop out immediately. The bottom list is exactly the same as the top, except for one simple visual difference: they are a darker color. This single distinction made them immediately perceptible.
Some visual attributes are easier to see and distinguish than others. The most powerful of these are called pre- attentive attributes because we perceive them immediately, without conscious thought.

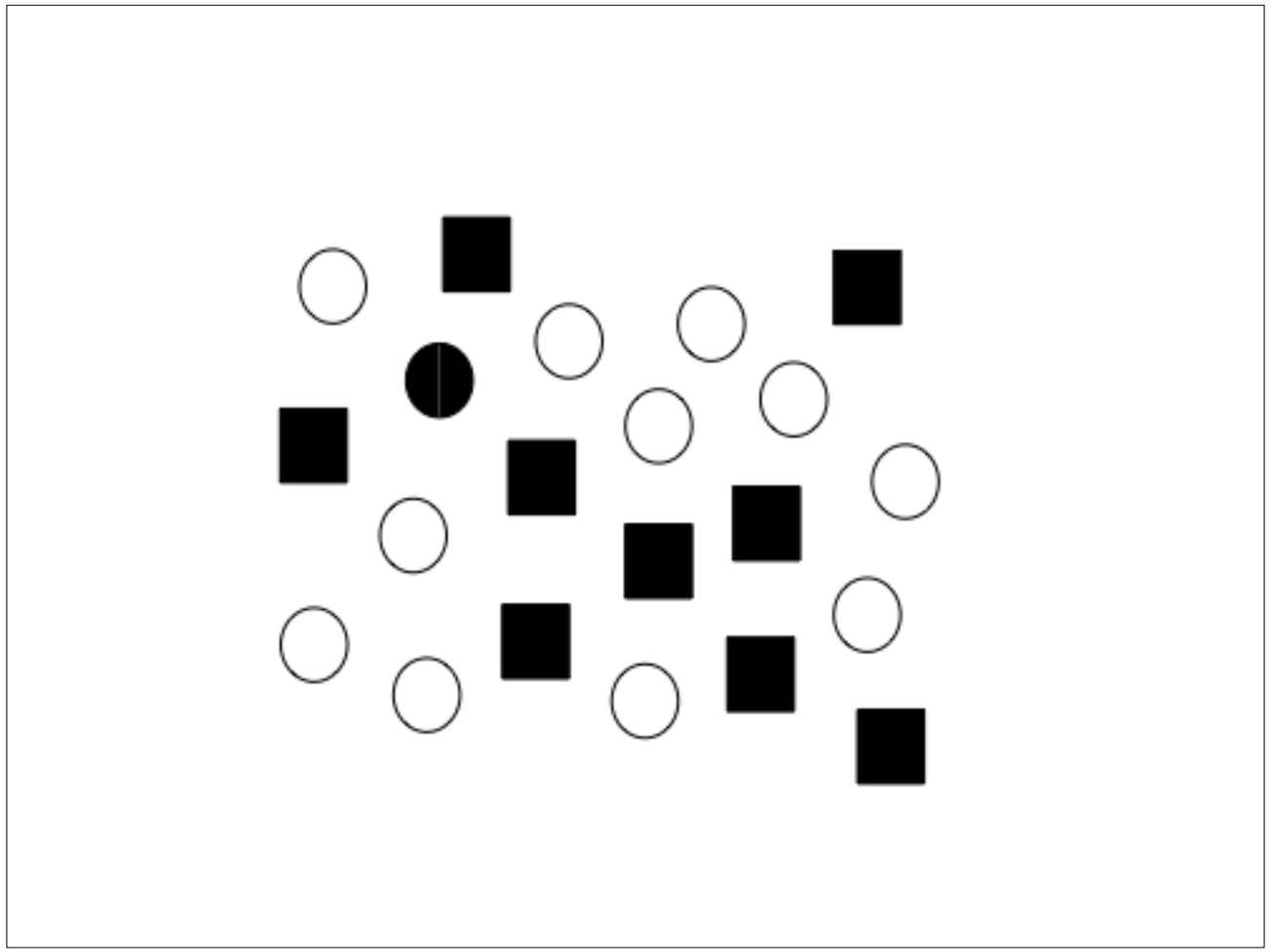


One very interesting result of vision research over the past 20 years has been the discovery of a limited set of visual properties that are processed preattentively (i.e. without the need for focused attention).

Typically, **tasks that can be performed on large multi-element displays in 200 milliseconds or less are considered preattentive**. This is because eye movements take at least 200 milliseconds to initiate. Any perception that is possible within this time frame involves only the information available in a single glimpse. Random placement of the elements in the displays ensures that attention cannot be prefocused on any particular location. Observers report that these tasks can be completed with very little effort.

A simple example of a preattentive task is the detection of a filled circle in a group of empty circles (Figure 1a). The target object has the visual feature “filled” but the empty distractor objects do not (all non-target objects are considered dis- tractors). A viewer can tell at a glance whether the target is present or absent.

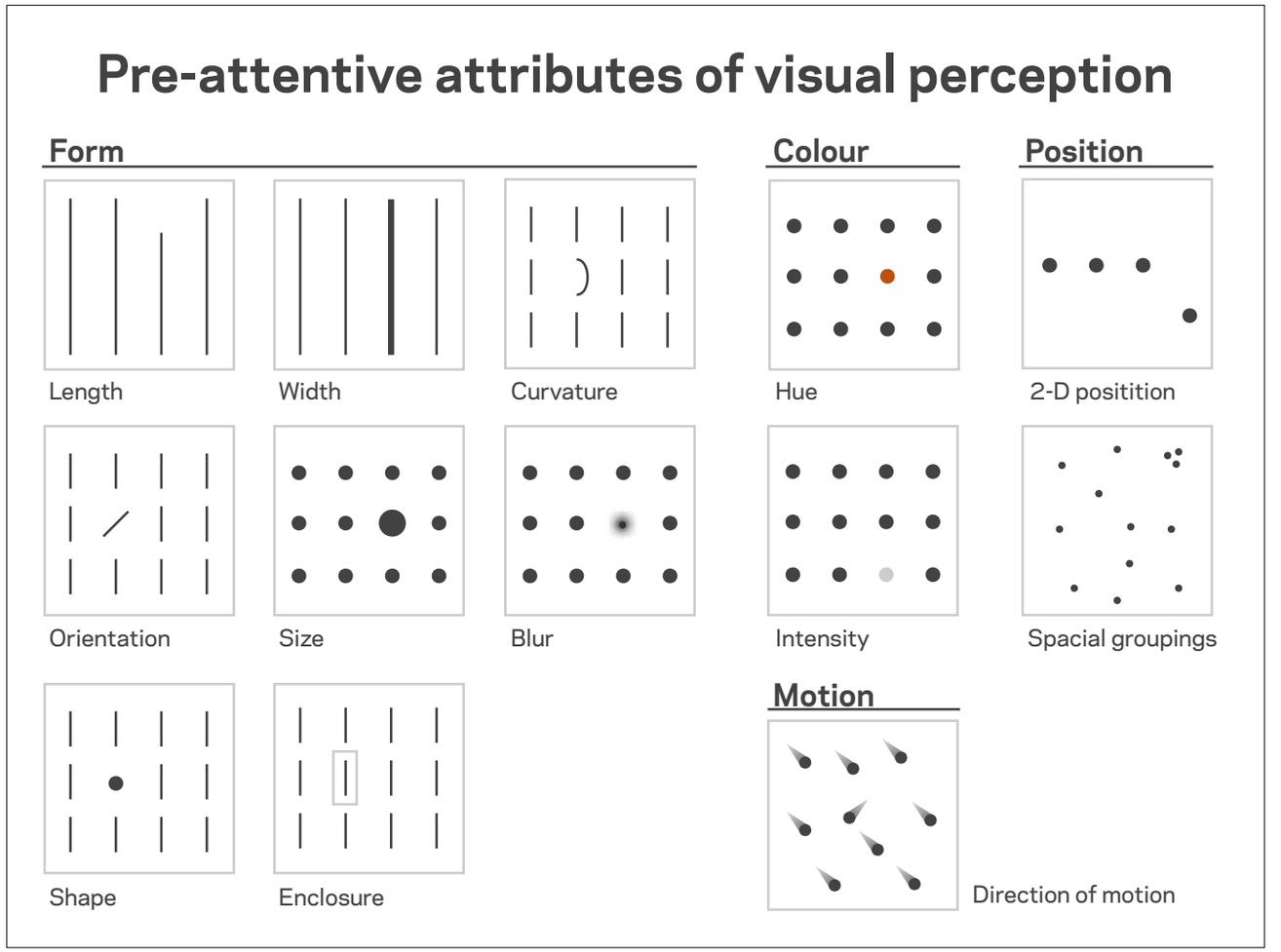
(Source: High-Speed Visual Estimation Using Preattentive Processing, p. 3)



A conjunction target item is one that is made up of two or more features, only one of which is contained in each of the distractors [Triesman, 1985].

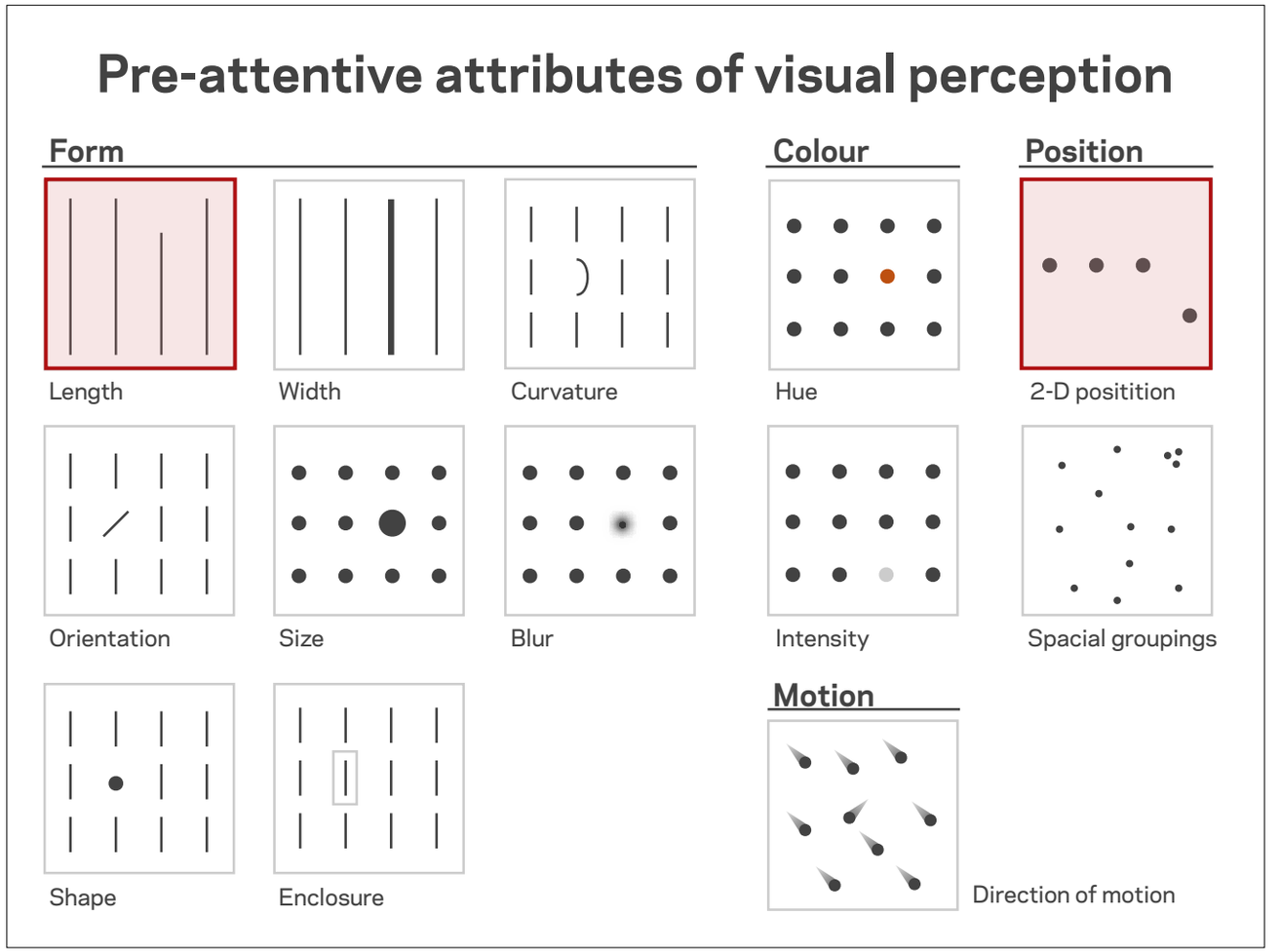
Figure 1b shows an example of conjunction search. The target is made up of two features, filled and circular. One of these features is present in each of the distractor objects (filled squares and empty circles). Numerous studies show that the target cannot be preattentively detected, forcing subjects to search serially through the display to find it.

(Source: High-Speed Visual Estimation Using Preattentive Processing, p. 3)



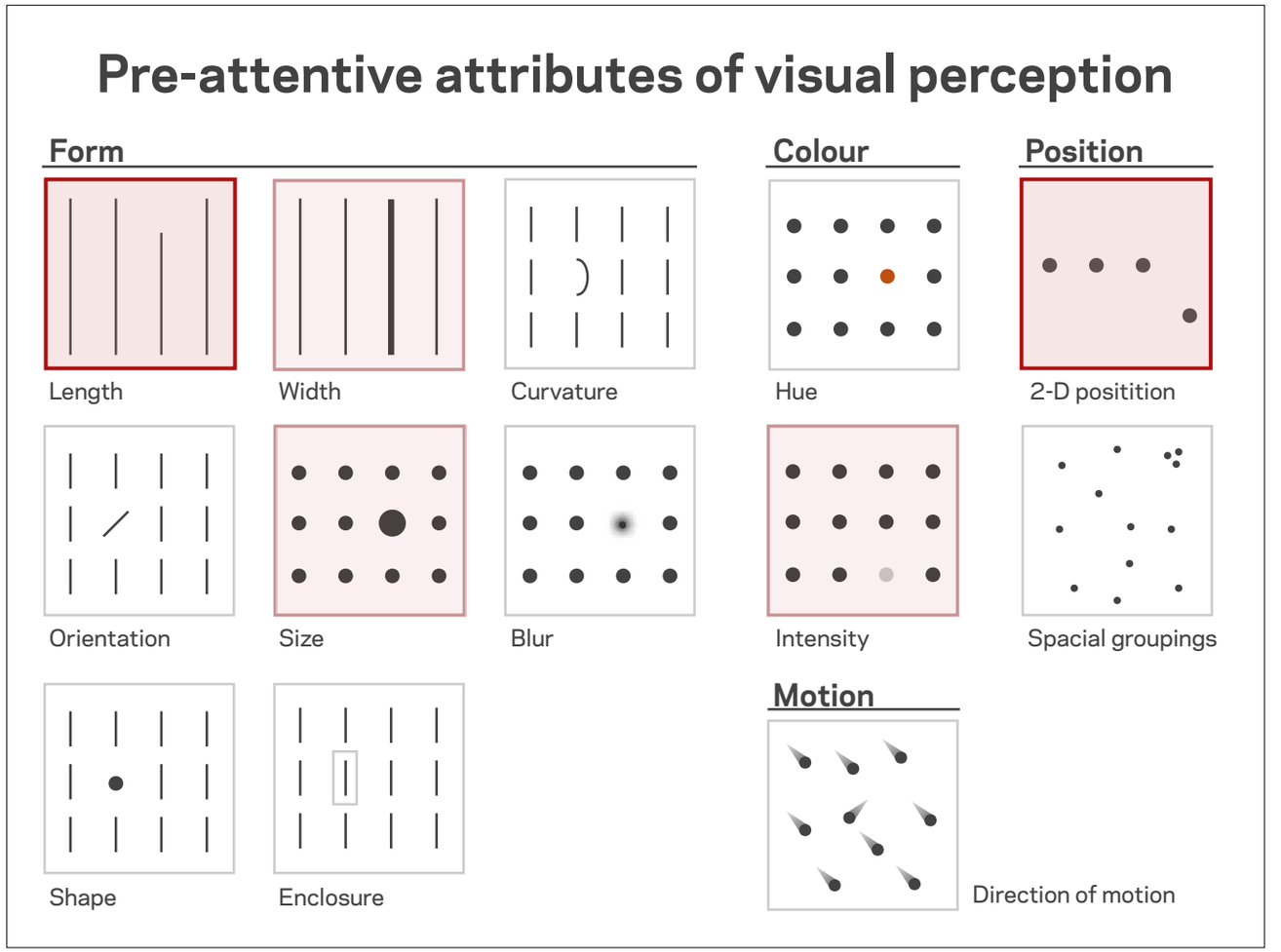
The full list of visual attributes that we perceive pre-attentively is larger than the list above. These pre-attentive attributes, however, are the ones that are most useful to us when presenting data visually.

Some of these visual attributes are perceived quantitatively (i.e., some values are greater than others), which are marked with red border. The visual attributes that are marked with a pale red border are perceived quantitatively but not as powerfully as those with the bright red arrow.



The full list of visual attributes that we perceive pre-attentively is larger than the list above. These pre-attentive attributes, however, are the ones that are most useful to us when presenting data visually.

Some of these visual attributes are perceived quantitatively (i.e., some values are greater than others), which are marked with red border. The visual attributes that are marked with a pale red border are perceived quantitatively but not as powerfully as those with the bright red arrow.



The full list of visual attributes that we perceive pre-attentively is larger than the list above. These pre-attentive attributes, however, are the ones that are most useful to us when presenting data visually.

Some of these visual attributes are perceived quantitatively (i.e., some values are greater than others), which are marked with red border. The visual attributes that are marked with a pale red border are perceived quantitatively but not as powerfully as those with the bright red arrow.

The shape of things to come

“The future ain't what it used to be.“

— Yogi Berra

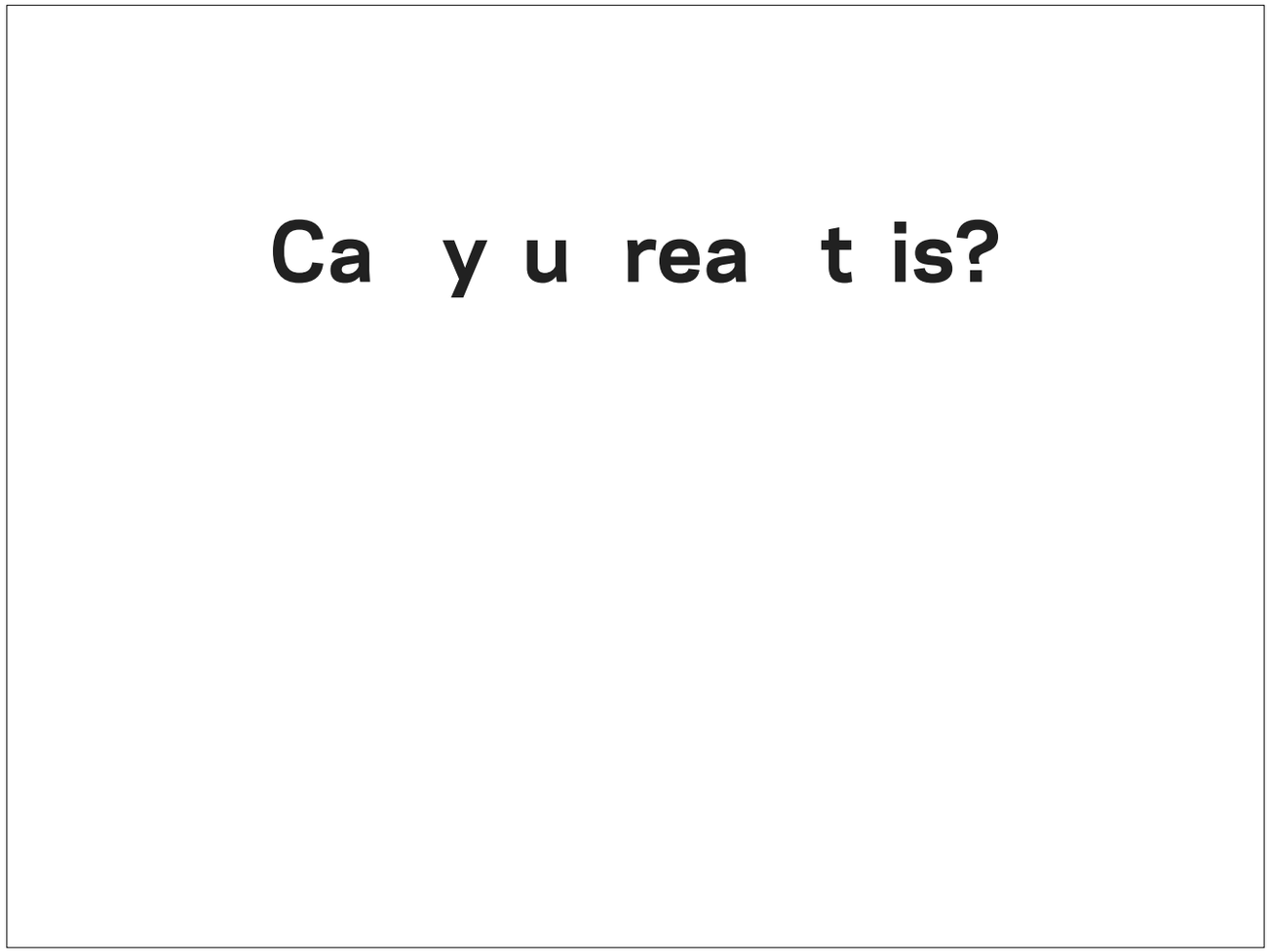
The whole is greater than the sum of its parts

As humans we appear to be "hard-wired" to respond to what we see in predictable ways. These instinctual reactions date back thousands of years and are related to basic survival needs like recognizing potential threats (predators) and opportunities (food). One of the most useful explanations for how we perceive things is based in psychological theory called Gestalt, the German word for shape.

Gestalt theory began around 1910 with three psychologists. Artists like Paul Klee, Wassily Kandinsky and Josef Albers were influenced by Gestalt theory, as were others at the famous Bauhaus design school.

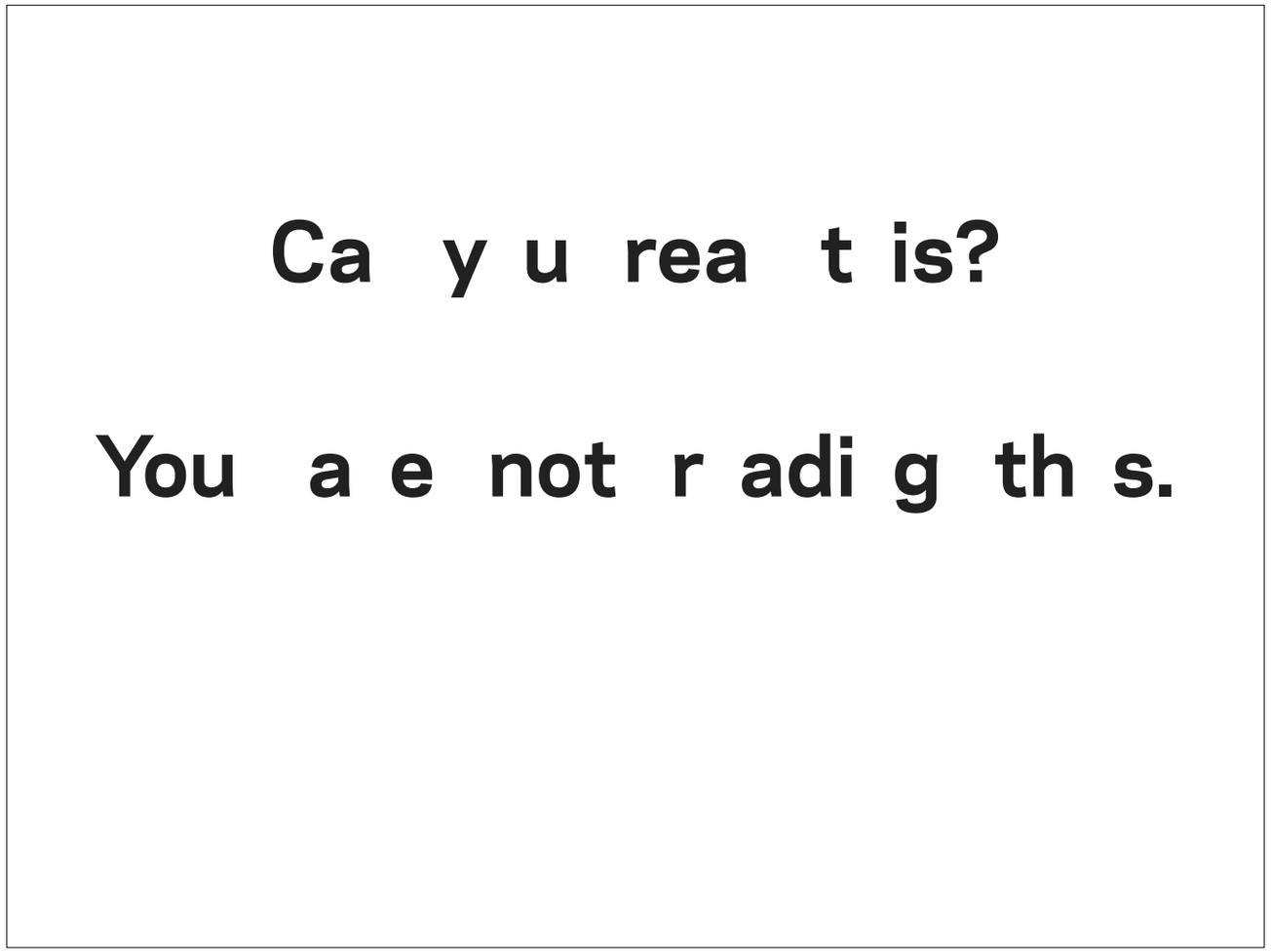
According to Gestalt theory, when we look at anything we immediately organize it into a pattern or shape rather than seeing it as a bunch of individual smaller shapes. Depending on who you talk to, there are five to ten Gestalt principles.

(Sources: http://www.britannica.com/EBchecked/topic/232098/Gestalt-psychology, http://www.awdsgn.com/classes/spr04/introvc/wk4/introvc-wk4.html, http://www.awdsgn.com/classes/spr04/introvc/wk4/GestaltPrinciplesForWeb.html, http://graphicdesign.spokanefalls.edu/tutorials/process/gestaltprinciples/gestaltprinc.htm)



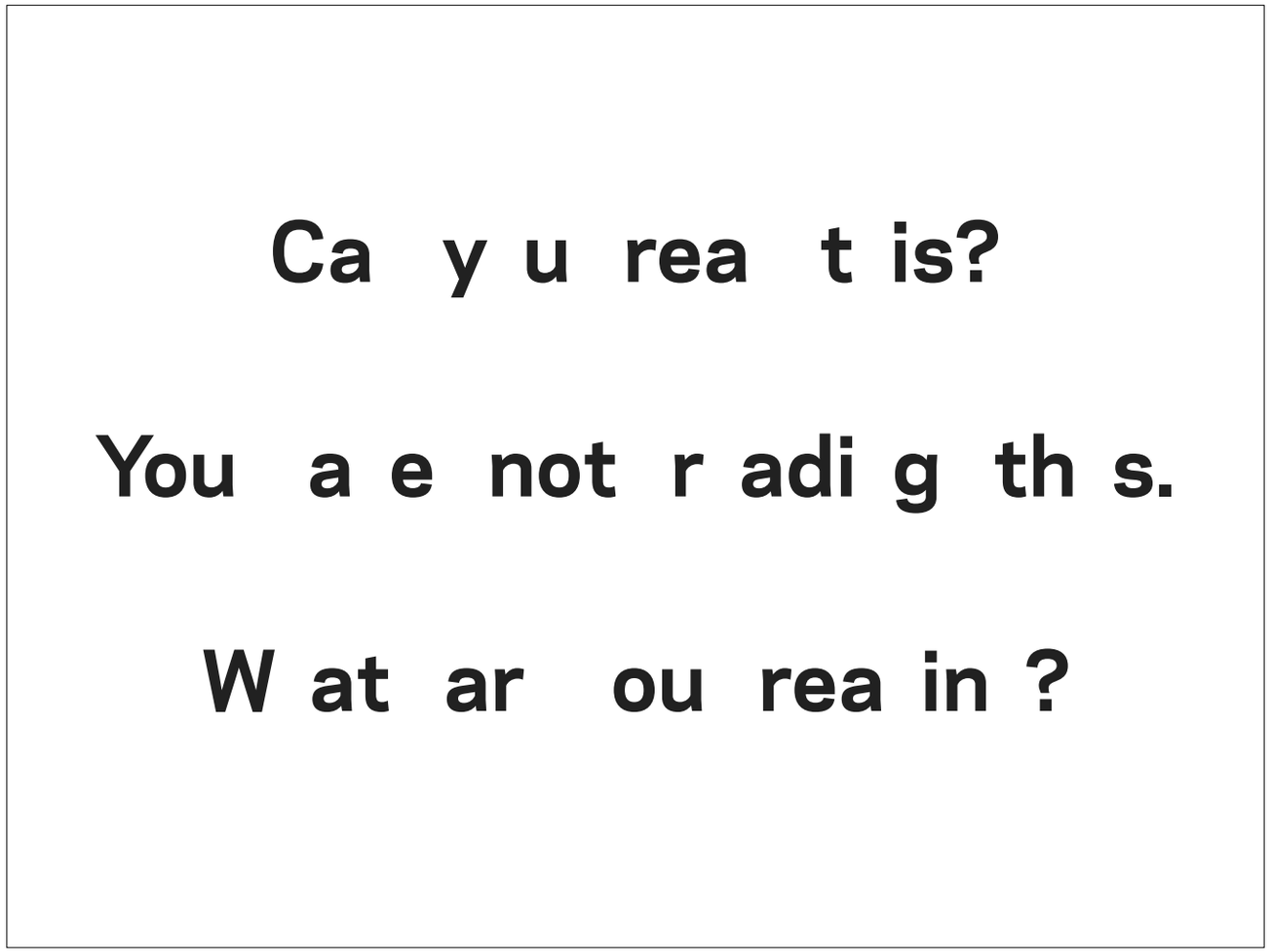
“The light that falls onto your eye is literally meaningless, it’s what we do with that information that matters.” — Beau Lotto: Optical illusions show how we see (http://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see.html)

Half the letters are missing! There is no a priori reason an “h” has to be between “W” and “a” but you put one there. Why? Because in the statistics of your past experience it is useful to do so, so you do so again.



“The light that falls onto your eye is literally meaningless, it’s what we do with that information that matters.” — Beau Lotto: Optical illusions show how we see (http://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see.html)

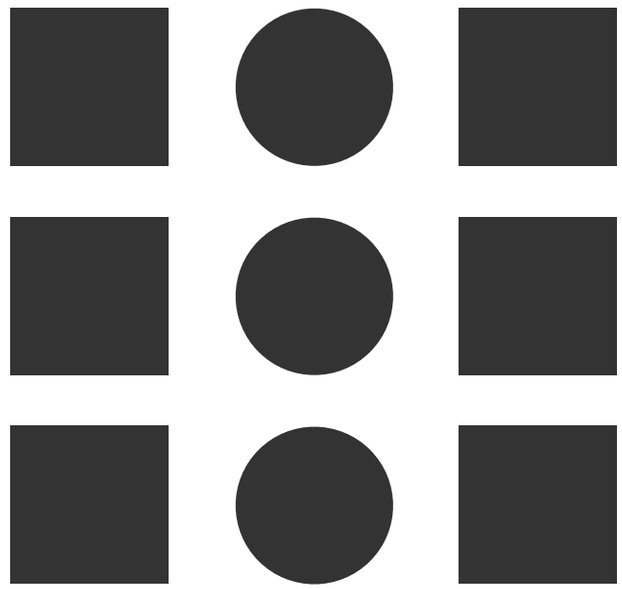
Half the letters are missing! There is no a priori reason an “h” has to be between “W” and “a” but you put one there. Why? Because in the statistics of your past experience it is useful to do so, so you do so again.



“The light that falls onto your eye is literally meaningless, it’s what we do with that information that matters.” — Beau Lotto: Optical illusions show how we see (http://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see.html)

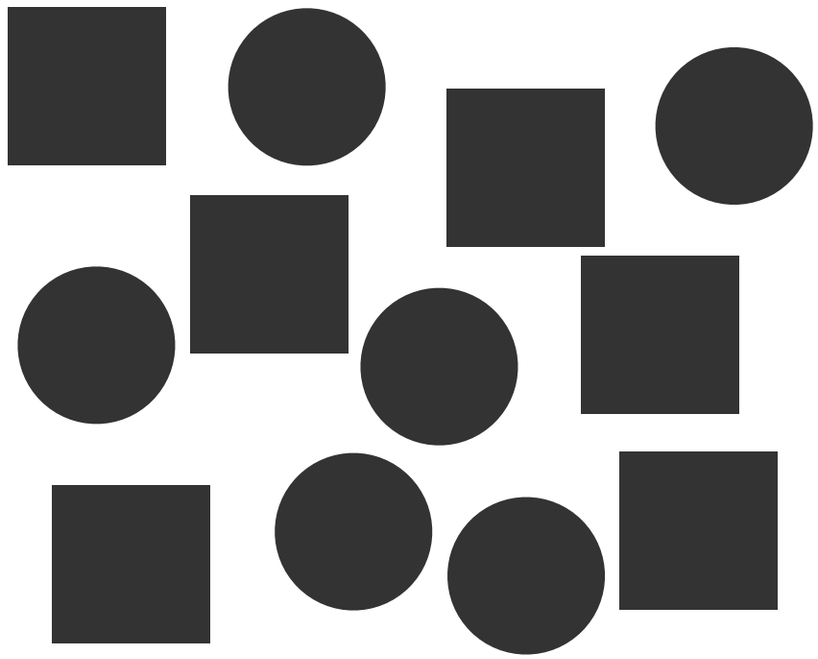
Half the letters are missing! There is no a priori reason an “h” has to be between “W” and “a” but you put one there. Why? Because in the statistics of your past experience it is useful to do so, so you do so again.

Similarity

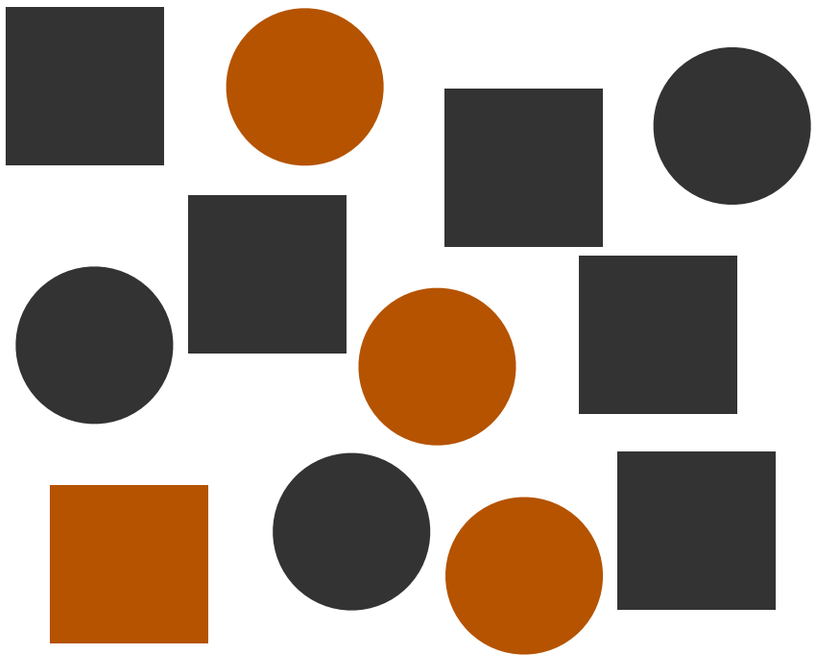


Similarity: Similarity occurs when objects look similar to one another. People often perceive them as a group or pattern. When similarity occurs, an object can be emphasised if it is dissimilar to the others. This is called anomally.

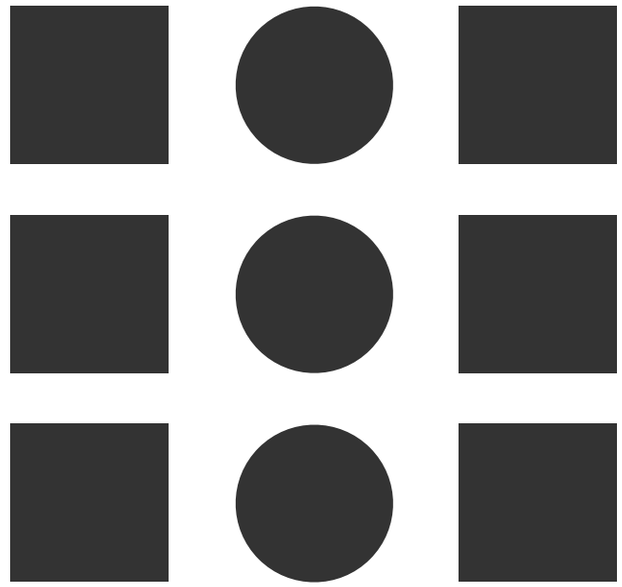
Similarity



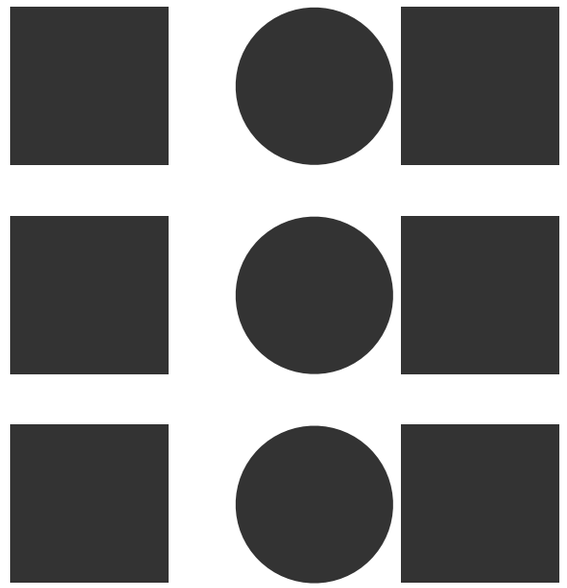
Similarity



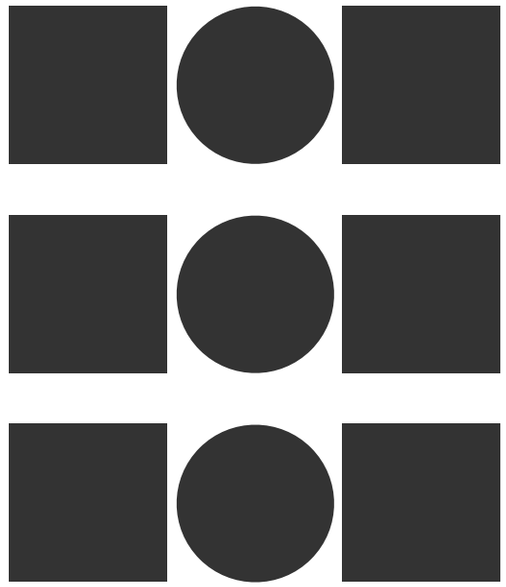
Similarity & proximity



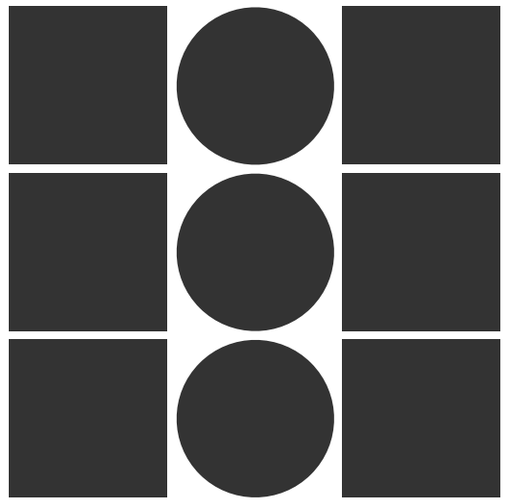
Proximity



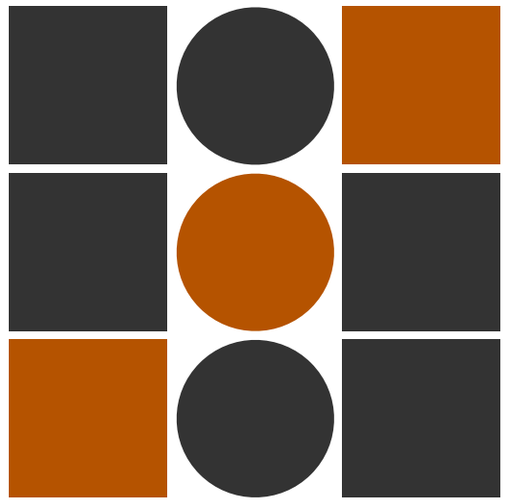
Proximity



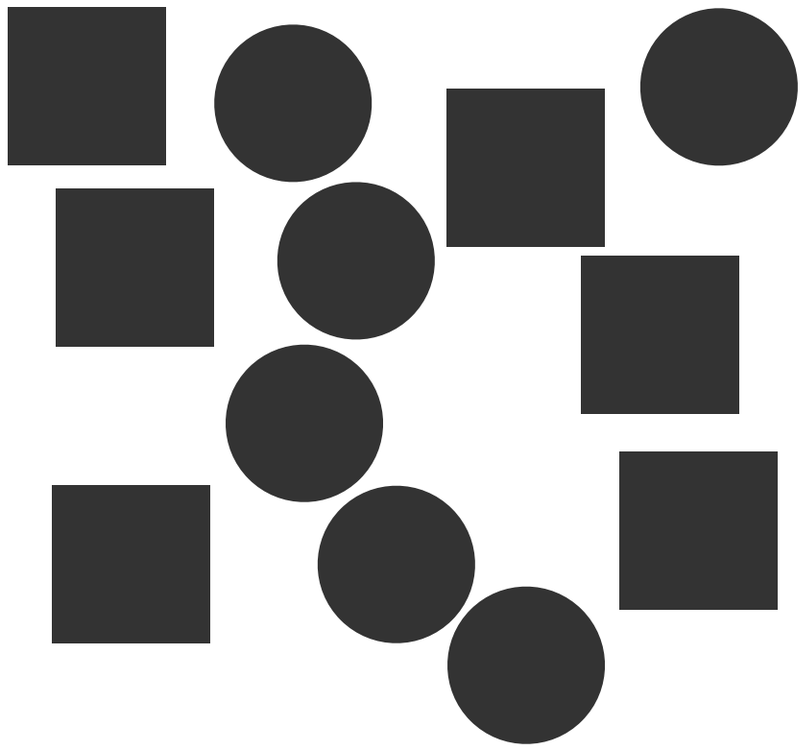
Proximity



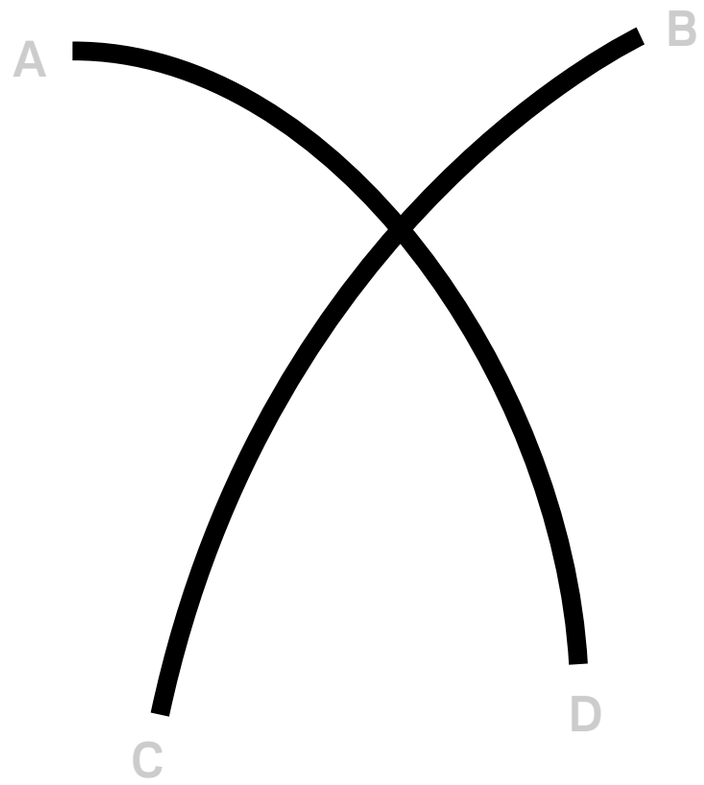
Proximity & similarity



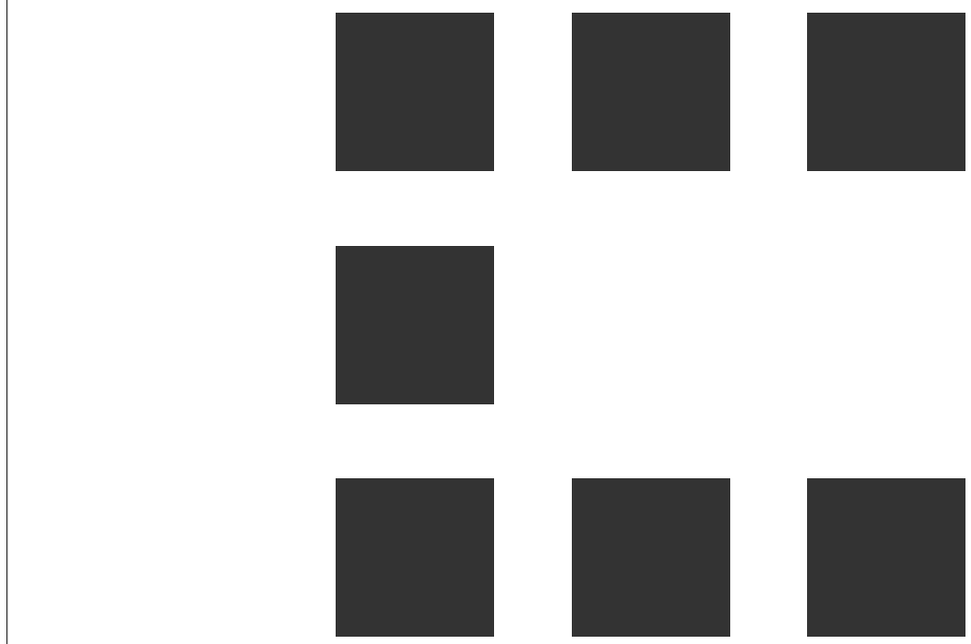
Continuation



Continuation

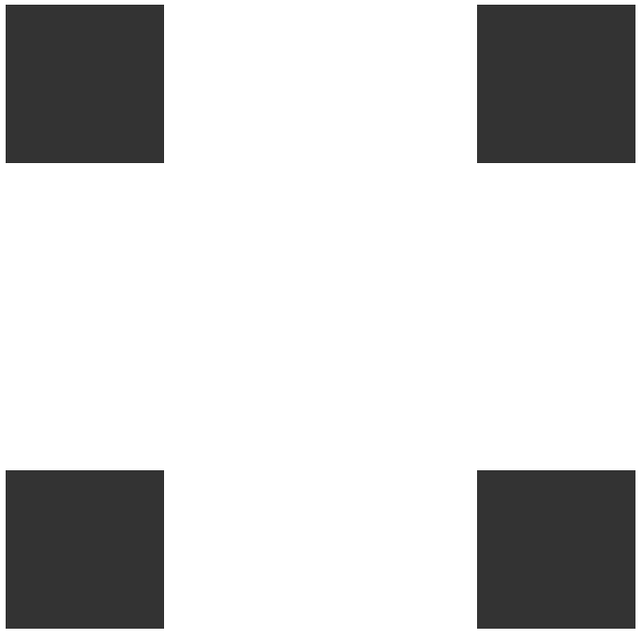


Closure



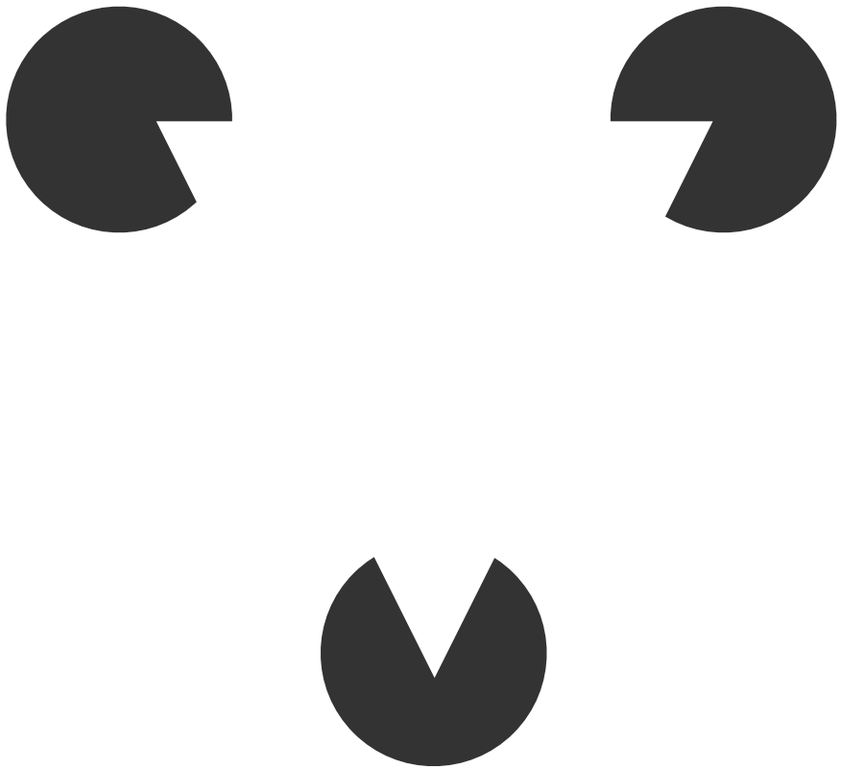
Closure occurs when an object is incomplete or a space is not completely enclosed. If enough of the shape is indicated, people percieve the whole by filling in the missing infomation. Our mind fills in missing information to complete the shape. (1+1=3)

Closure & pragnantz

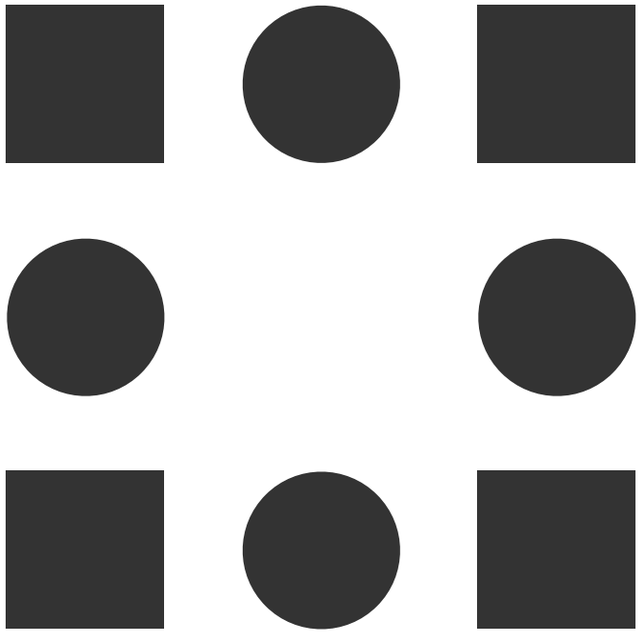


We prefer the simplest interpretation of shapes, referred to as "goodness" or "Pragnantz."

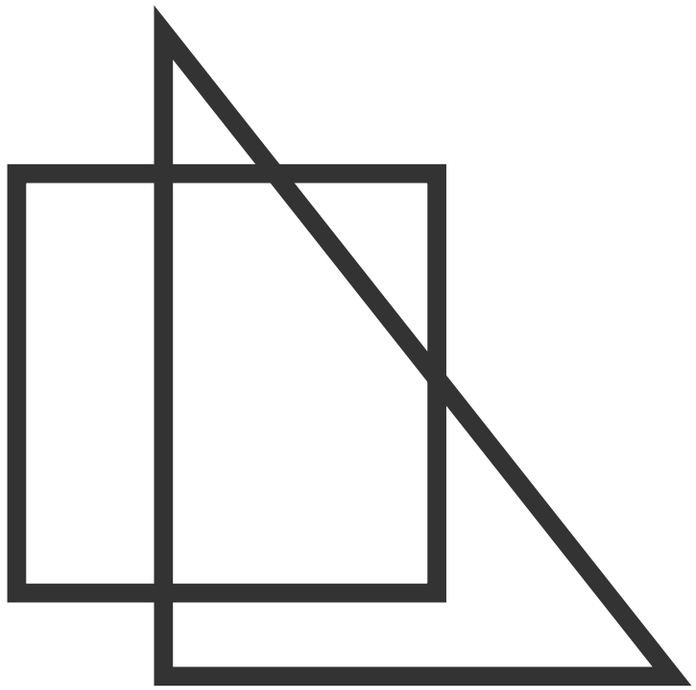
Pragnantz



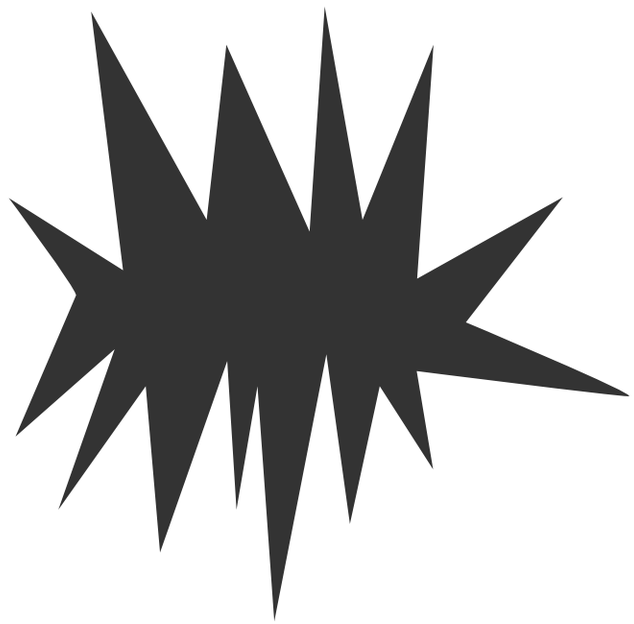
Closure & pragnantz



Pragnantz & continuation

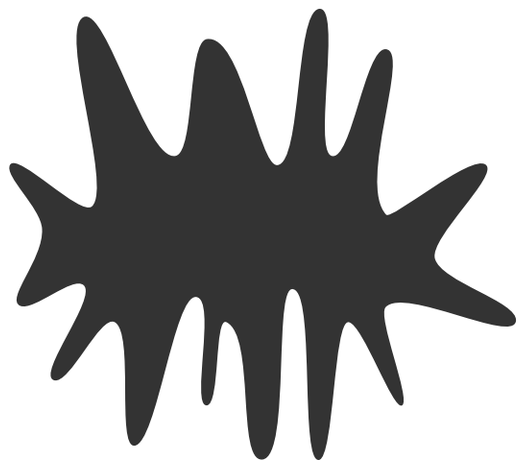


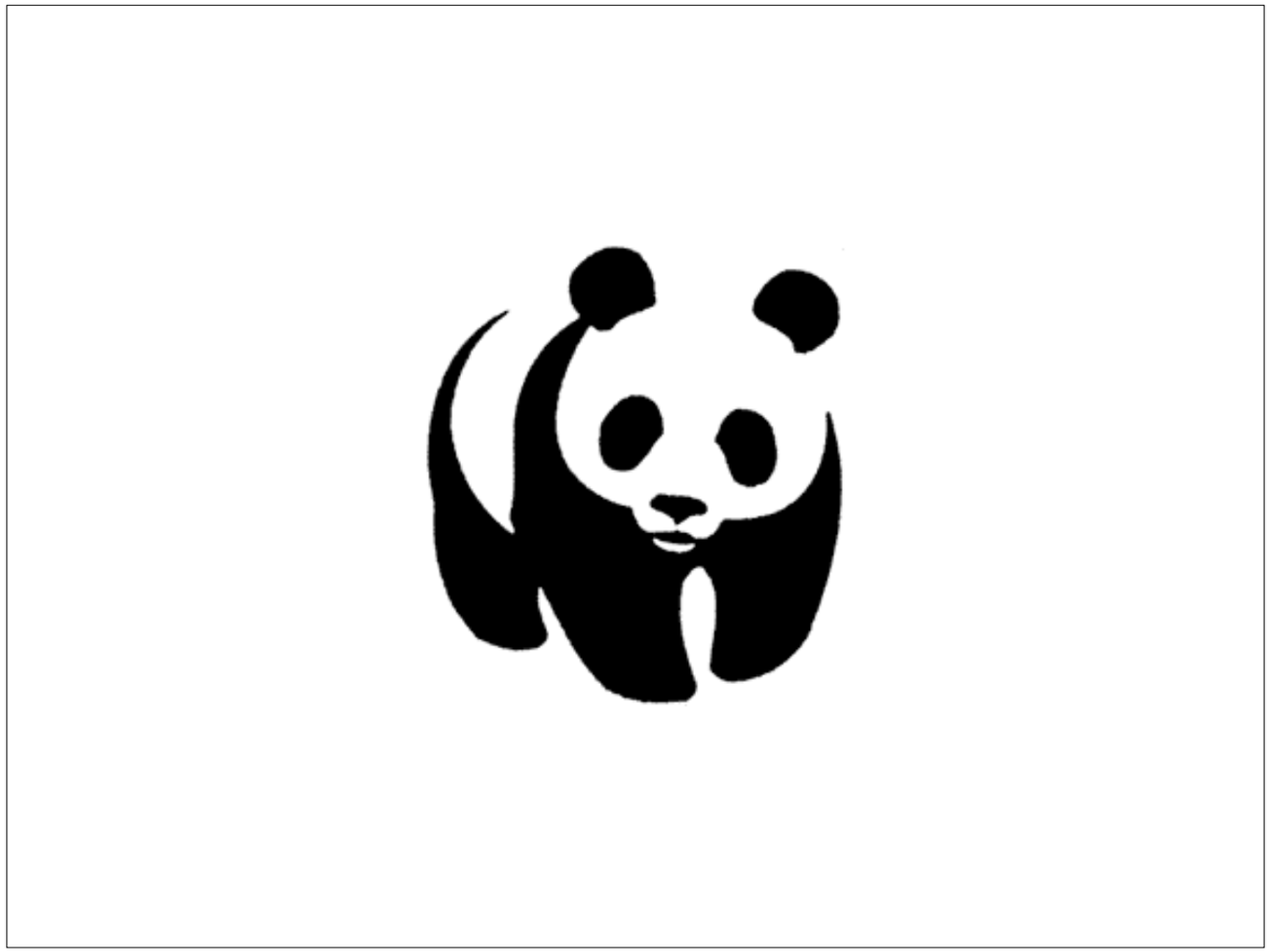
Isomorphic correspondence



We respond to some shapes, based on our experiences in the physical world. Sharp, pointed shapes communicate danger or pain because we've felt the pain of thorns, broken glass, etc. A picture of a Thanksgiving turkey may stir memories of warm, happy family dinners. We're responding to the meaning of the image, associating it with memories we have.

Isomorphic correspondence

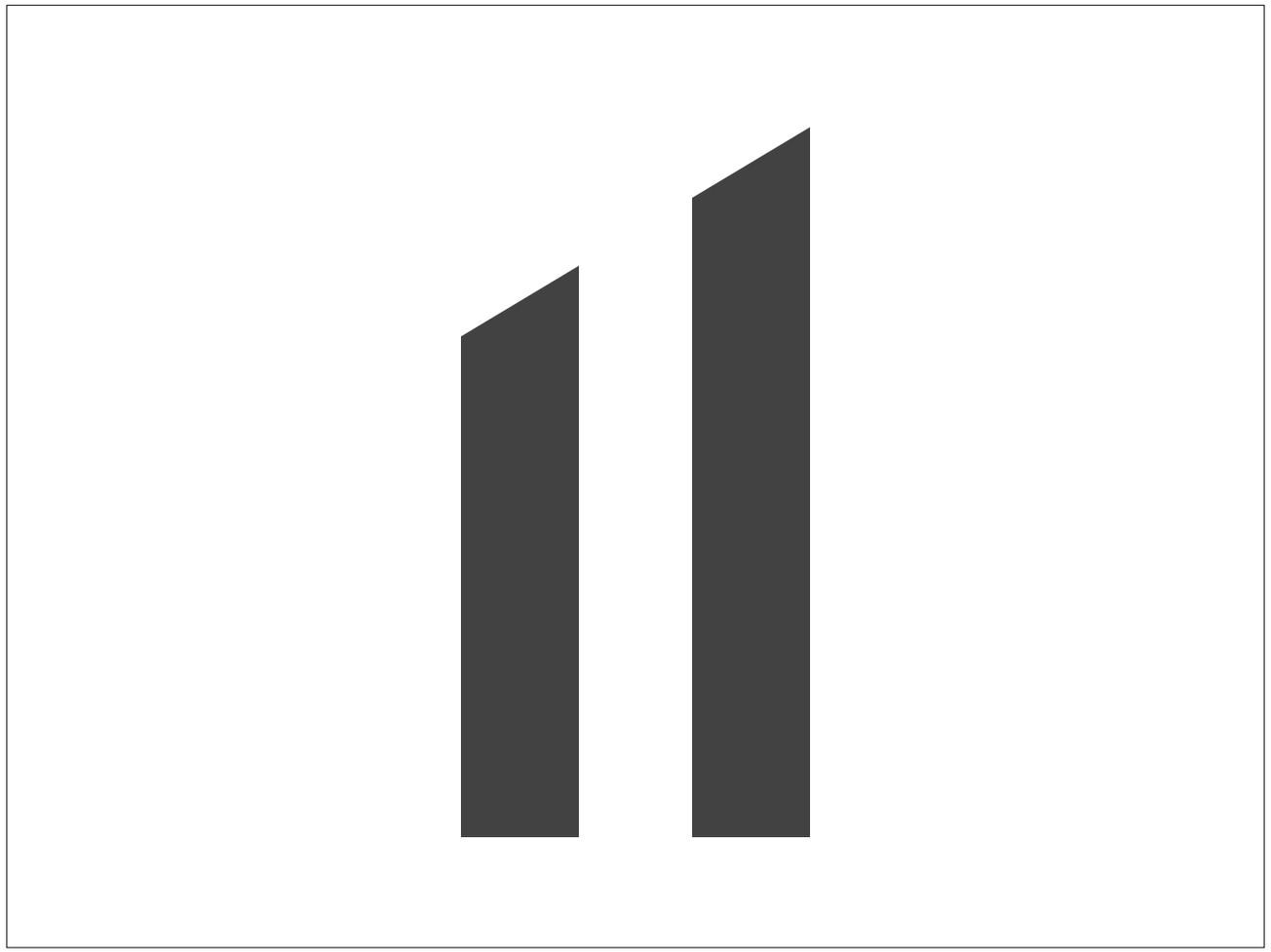




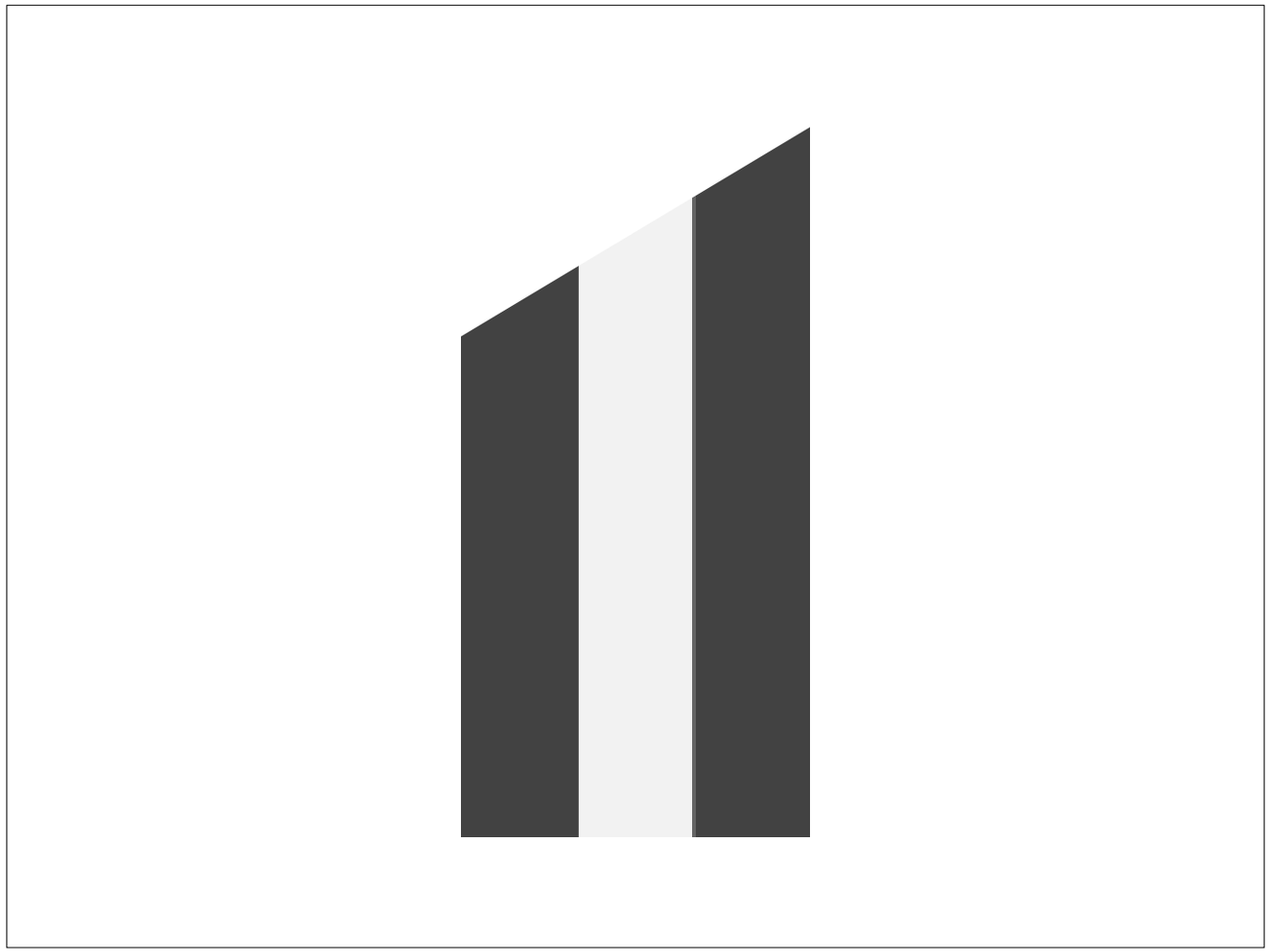
Which principle is at work here?

(Closure)

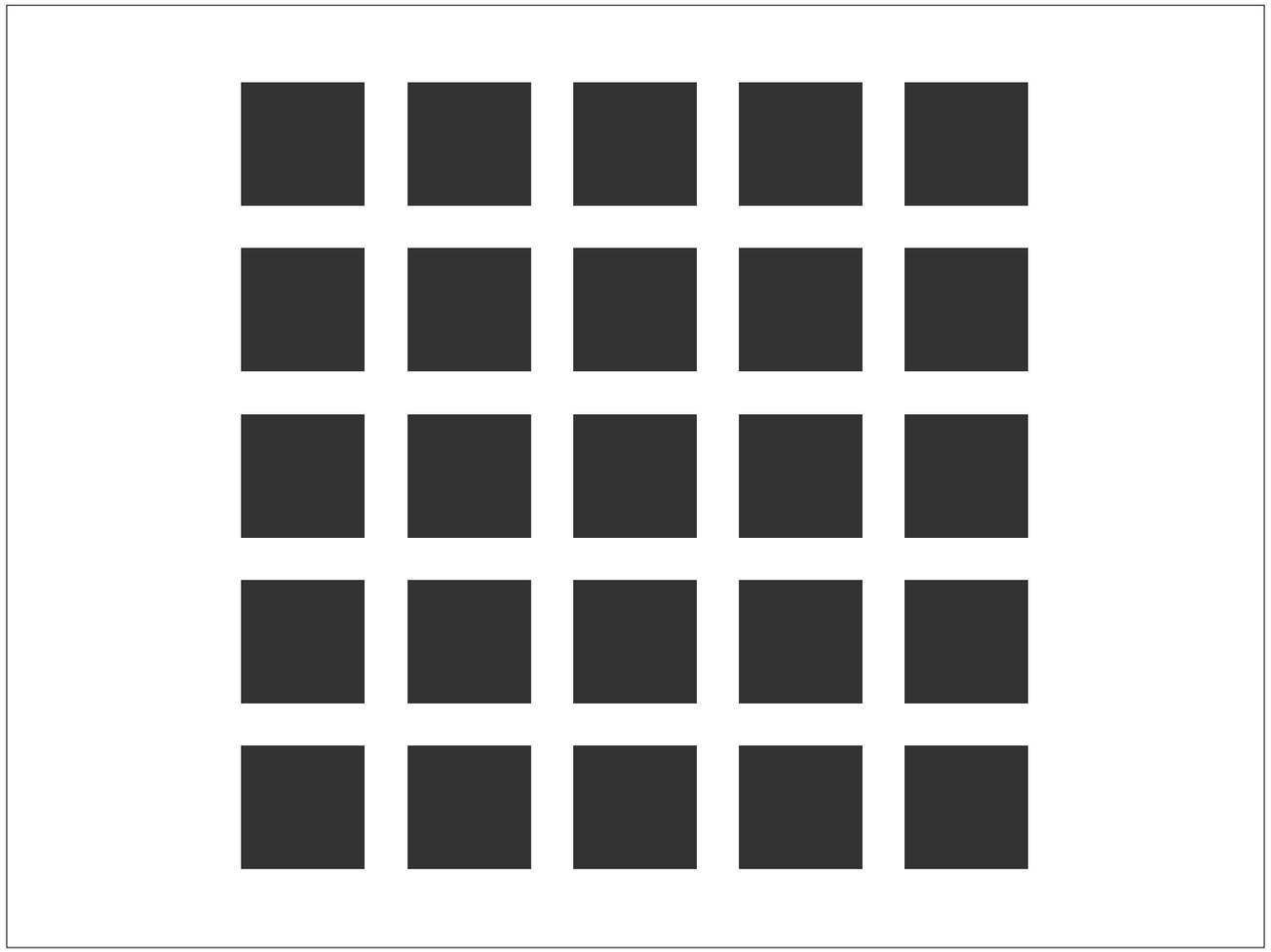
(Source: http://graphicdesign.spokanefalls.edu/tutorials/process/gestaltprinciples/gestaltprinc.htm)



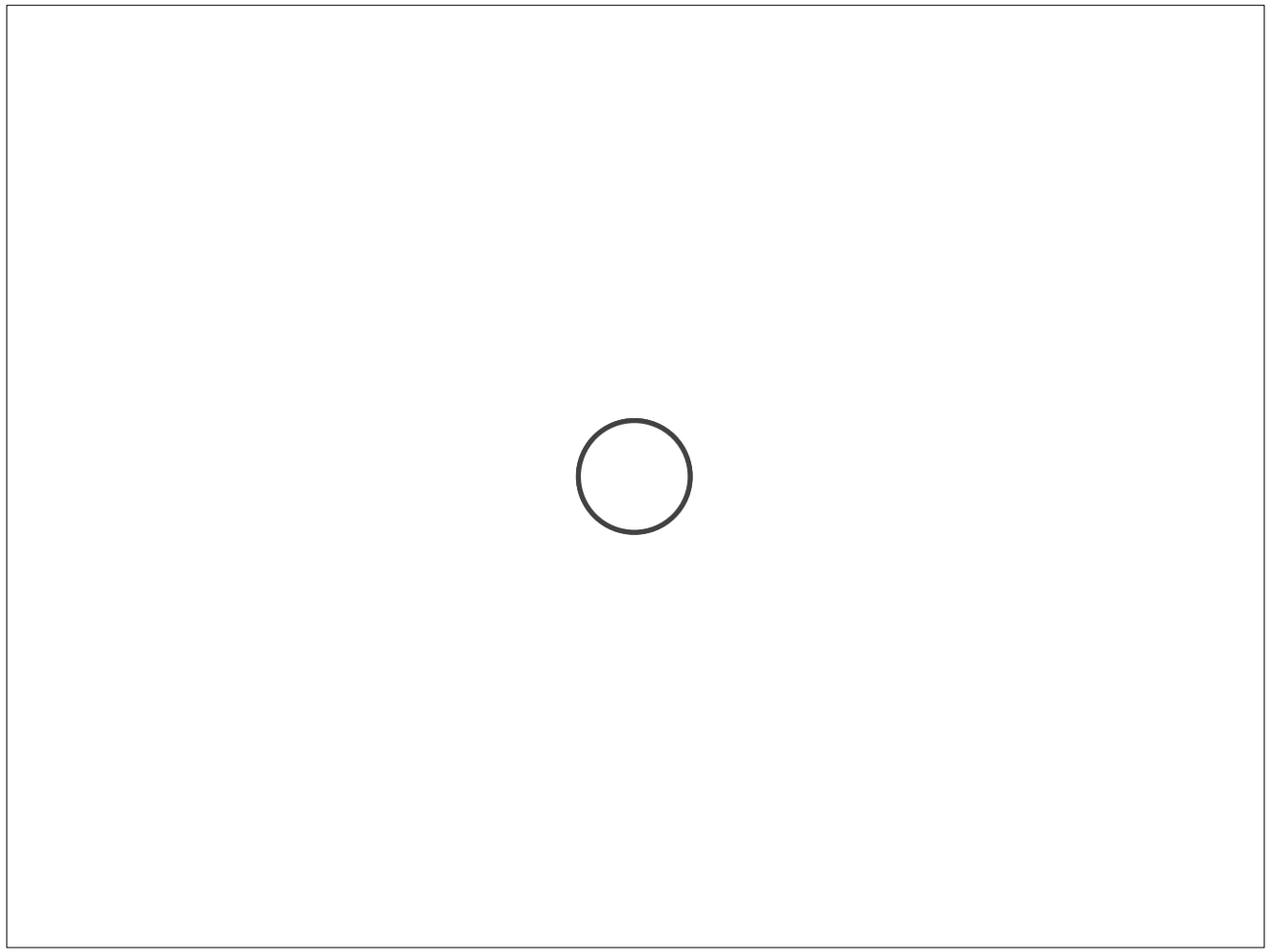
Notice that the space between the lines seems to be cut diagonally, as the lines are.



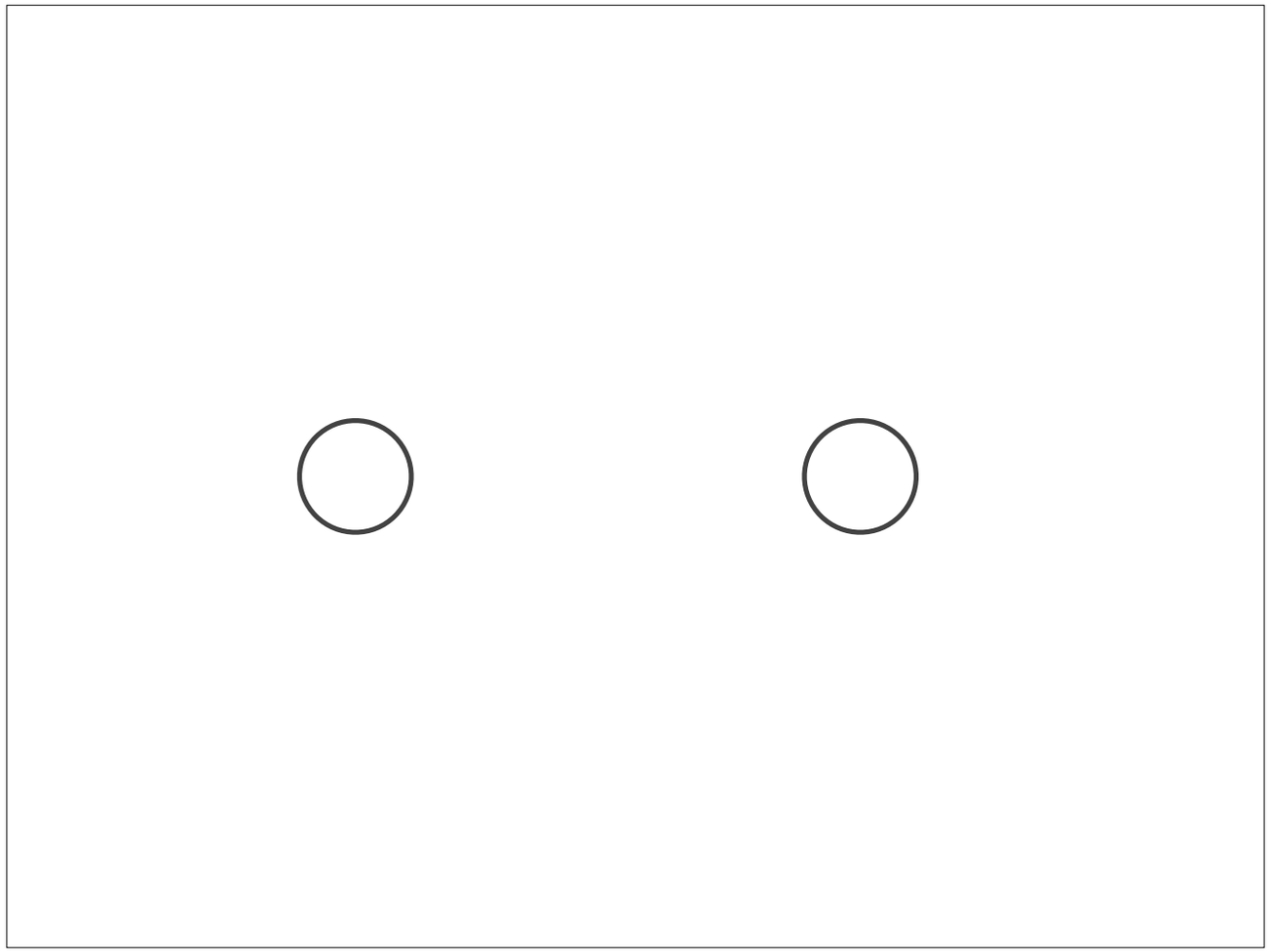
Notice that the space between the lines seems to be cut diagonally, as the lines are.



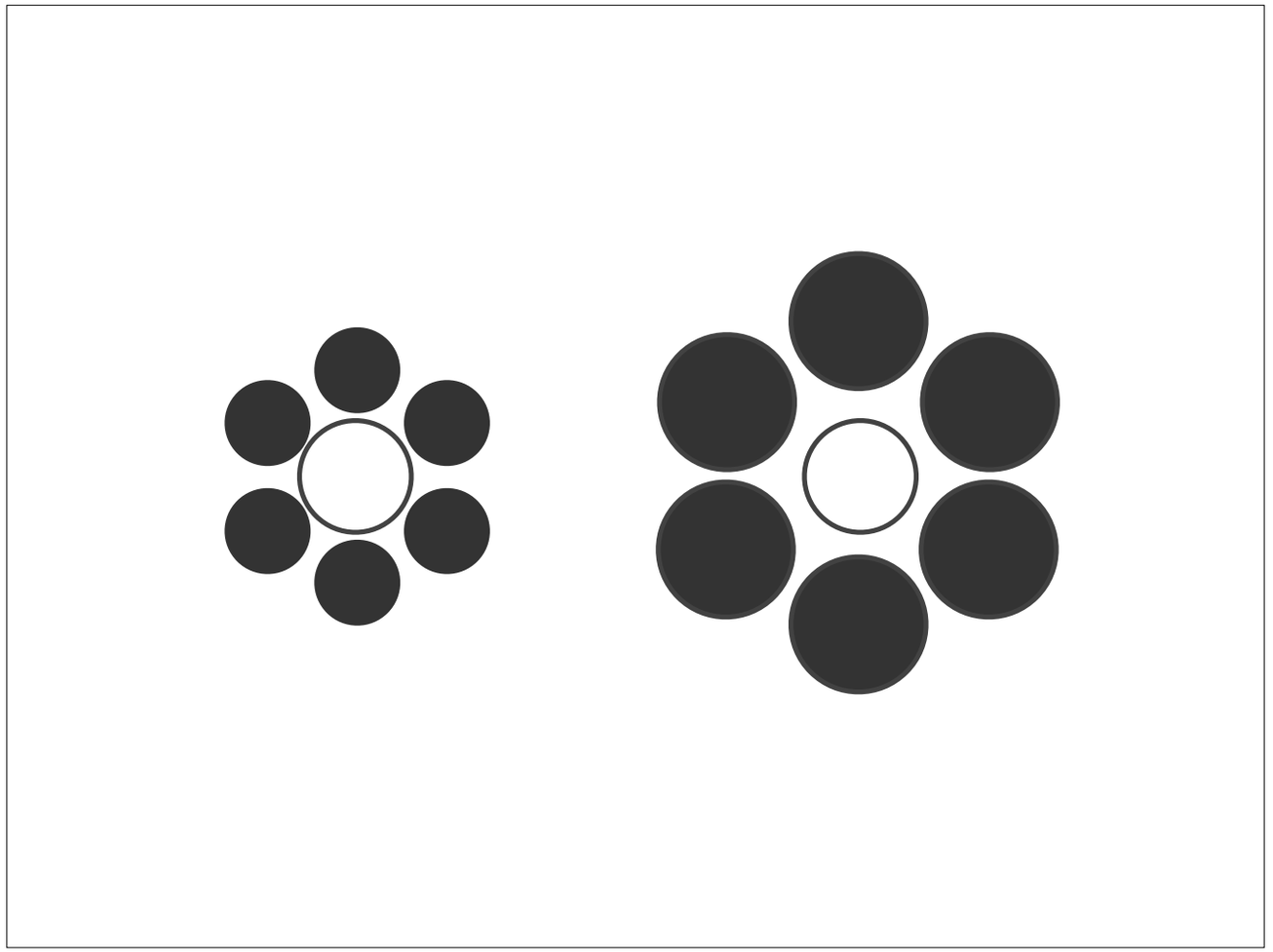
While he was reading a book on sound by John Tyndall, L. Hermann (1870) saw gray spots in the intersections of spaces among the figures that Tyndall had arranged in a matrix. The same intensity light is reflected/transmitted all the way along the white spaces in the grid and yet the intersections appear gray. What occurs in your visual system that could account for the illusory experience of gray spots?



How we perceive size is relative. The outlined circles are the same size!



How we perceive size is relative. The outlined circles are the same size!



How we perceive size is relative. The outlined circles are the same size!

Designing tables

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8

Fill colour
Contrasting hue

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8

Border
Enclosure

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	**5**	4	4	3
Blackpool	2	4	16	9	12	**10**	12	15	17
Aston Villa	3	6	8	14	16	**16**	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	**20**	19	18	19
Blackburn Rovers	5	14	12	18	8	**11**	8	14	14
Birmingham City	6	8	15	15	14	**19**	17	16	15
Sunderland	7	10	10	12	9	**6**	6	8	11
Bolton Wanderers	8	12	11	11	6	**7**	11	7	8

Boldfaced text
Greater line width

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8

Colored text
Contrasting hue

Sales	Sales	Sales
98.382,95	98.382,95	98.382,95
5,432,751.42	5,432,751.42	5,432,751.42
457,43	457,43	457,43
6.547.335,93	6.547.335,93	6.547.335,93
542,87	542,87	542,87
2.936,03	2.936,03	2.936,03

Numbers should always be right aligned to the decimal point or to the right-most digit when there is no decimal point. When parentheses are used to identify negative numbers, the numbers should still be right aligned to the decimal point or to the right-most digit when there is no decimal point. When displaying percentages, it is best to always include the percentage sign (%) and to make the number of decimal places consistent for all the numbers in a given column so that the decimal points are right aligned.

Sales	Sales	Sales
98.382,95	98.382,95	98.382,95
5,432,751.42	5,432,751.42	5,432,751.42
457,43	457,43	457,43
6.547.335,93	6.547.335,93	6.547.335,93
542,87	542,87	542,87
2.936,03	2.936,03	2.936,03

Numbers should always be right aligned to the decimal point or to the right-most digit when there is no decimal point. When parentheses are used to identify negative numbers, the numbers should still be right aligned to the decimal point or to the right-most digit when there is no decimal point. When displaying percentages, it is best to always include the percentage sign (%) and to make the number of decimal places consistent for all the numbers in a given column so that the decimal points are right aligned.

Team	Team	Team
Chelsea	Chelsea	Chelsea
Blackpool	Blackpool	Blackpool
Aston Villa	Aston Villa	Aston Villa
Wolverhampton	Wolverhampton	Wolverhampton
Blackburn Rovers	Blackburn Rovers	Blackburn Rovers
Birmingham City	Birmingham City	Birmingham City

Text should be left aligned. Text includes numbers that do not represent quantitative data, such as the product and customer codes in these examples.

Team	Team	Team
Chelsea	Chelsea	Chelsea
Blackpool	Blackpool	Blackpool
Aston Villa	Aston Villa	Aston Villa
Wolverhampton	Wolverhampton	Wolverhampton
Blackburn Rovers	Blackburn Rovers	Blackburn Rovers
Birmingham City	Birmingham City	Birmingham City

Text should be left aligned. Text includes numbers that do not represent quantitative data, such as the product and customer codes in these examples.

Cust code	Preferred
1896648	Y
7749320	N
3840628	Y
4023821	N
7922094	N
8993211	Y

Cust code	Preferred
1896648	Y
7749320	N
3840628	Y
4023821	N
7922094	N
8993211	Y

The only exception to the left-alignment rule is when the text values in a given column all contain the same number of characters and that number of characters is considerably less than the number of characters in that column's label. In this case it works best to center the text, which causes it to be separated from the column to its left by more white space.

Cust code	Preferred
1896648	Y
7749320	N
3840628	Y
4023821	N
7922094	N
8993211	Y

Cust code	Preferred
1896648	Y
7749320	N
3840628	Y
4023821	N
7922094	N
8993211	Y

The only exception to the left-alignment rule is when the text values in a given column all contain the same number of characters and that number of characters is considerably less than the number of characters in that column's label. In this case it works best to center the text, which causes it to be separated from the column to its left by more white space.

Date	Date	Date	Date
12/17/10	12/17/10	12/17/10	12/17/10
1/7/10	10/07/10	1/7/10	10/07/10
2/17/10	02/17/10	2/17/10	02/17/10
9/2/10	09/02/10	9/2/10	09/02/10
10/29/10	10/29/10	10/29/10	10/29/10
7/15/10	07/15/10	7/15/10	07/15/10

Whether dates are aligned to the left, right, or center is not important. What is important is that all date that appear in the same column contain a consistent number of digits to express the month (that is, two), a consistent number of digits to express the day (that is, two), and a consistent number of digits to express the year (that is, either two or four). This will cause the same parts of each date (that is, the month, day, or year parts) to be aligned with one another from one row to the next.

Date	Date	Date	Date
12/17/10	12/17/10	12/17/10	12/17/10
1/7/10	10/07/10	1/7/10	10/07/10
2/17/10	02/17/10	2/17/10	02/17/10
9/2/10	09/02/10	9/2/10	09/02/10
10/29/10	10/29/10	10/29/10	10/29/10
7/15/10	07/15/10	7/15/10	07/15/10

Whether dates are aligned to the left, right, or center is not important. What is important is that all date that appear in the same column contain a consistent number of digits to express the month (that is, two), a consistent number of digits to express the day (that is, two), and a consistent number of digits to express the year (that is, either two or four). This will cause the same parts of each date (that is, the month, day, or year parts) to be aligned with one another from one row to the next.

Date	Date	Date	Date
12/17/10	12/17/10	12/17/10	12/17/10
1/7/10	10/07/10	1/7/10	10/07/10
2/17/10	02/17/10	2/17/10	02/17/10
9/2/10	09/02/10	9/2/10	09/02/10
10/29/10	10/29/10	10/29/10	10/29/10
7/15/10	07/15/10	7/15/10	07/15/10

Whether dates are aligned to the left, right, or center is not important. What is important is that all date that appear in the same column contain a consistent number of digits to express the month (that is, two), a consistent number of digits to express the day (that is, two), and a consistent number of digits to express the year (that is, either two or four). This will cause the same parts of each date (that is, the month, day, or year parts) to be aligned with one another from one row to the next.

Inflation

1996-2003

Denmark	16,2%
Finland	13,0%
Germany	9,7%
Holland	20,2%
Iceland	25,8%
Italy	17,3%
Norway	16,6%
Sweden	12,0%
U.K.	11,4%

Ordering by name is only helpful for looking things up. Like a phone book. — Ordering by size, makes it easier to compare sizes by simply going up or down the column.

Make sure the way you order the data makes sense for the intended purpose of the chart.

Inflation

1996-2003

Denmark	16,2%
Finland	13,0%
Germany	9,7%
Holland	20,2%
Iceland	25,8%
Italy	17,3%
Norway	16,6%
Sweden	12,0%
U.K.	11,4%

Inflation

1996-2003

Iceland	25,8%
Holland	20,2%
Italy	17,3%
Norway	16,6%
Denmark	16,2%
Finland	13,0%
Sweden	12,0%
U.K.	11,4%
Germany	9,7%

Ordering by name is only helpful for looking things up. Like a phone book. — Ordering by size, makes it easier to compare sizes by simply going up or down the column.

Make sure the way you order the data makes sense for the intended purpose of the chart.

2003 Bookings Revenue by Product
as of July 1, 2003
(U.S. Dollars)

Product	Jan	Feb	Mar	Q1 Mo Avg	Apr	May	Jun	Q2 Mo Avg
Product 01	93,993	84,773	88,833	89,200	95,838	93,874	83,994	91,235
Product 02	87,413	78,839	82,615	82,956	89,129	87,303	78,114	84,849
Product 03	90,036	81,204	85,093	85,444	91,803	89,922	80,458	87,394
Product 04	92,737	83,640	87,646	88,008	94,557	92,620	82,872	90,016
Product 05	86,245	77,785	81,511	81,847	87,938	86,136	77,071	83,715
Product 06	88,833	80,119	83,956	84,303	90,576	88,720	79,383	86,226
Product 07	82,614	74,511	78,079	78,401	84,236	82,510	73,826	80,191
Product 08	85,093	76,746	80,421	80,753	86,763	84,985	76,041	82,596
Product 09	87,646	79,048	82,834	83,176	89,366	87,535	78,322	85,074
Product 10	90,275	81,420	85,319	85,671	92,047	90,161	80,672	87,626
Total	$884,886	$798,085	$836,307	$839,759	$902,255	$883,765	$790,751	$858,924

Please note that the Q1 and Q2 columns display average monthly bookings revenue, not total revenue for the quarter.

(Source: This data was extracted from the Enterprise Data Warehouse and has not been altered, except for rounding the summary figures that appear in this table to whole dollars. Questions may be directed to the Enterprise Reporting Group by emailing erg@company.com or calling (888) 555-3923.)

A seemingly small point which deserves special mention is that one should get in the habit of making all charts, tables, reports, and problems complete in themselves. It should be possible to learn from the sheet, six months after its completion, what the problem was all about, who gathered the data and calculated it, who drew the graph, what were the important conditions at hand, what were the sample size and the units, the date, etc. Only in this way can we make sure that our records will not grow "cold." — I. W. Burr, Professor (1941 – 1974), Purdue Univer

	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Chelsea	1	1	1	1	3	5	4	4	3
Blackpool	2	4	16	9	12	10	12	15	17
Aston Villa	3	6	8	14	16	16	13	12	16
Wolverhampton Wndrs	4	9	19	19	20	20	19	18	19
Blackburn Rovers	5	14	12	18	8	11	8	14	14
Birmingham City	6	8	15	15	14	19	17	16	15
Sunderland	7	10	10	12	9	6	6	8	11
Bolton Wanderers	8	12	11	11	6	7	11	7	8
Fulham	9	5	9	10	17	18	15	13	13
Manchester City	10	7	4	4	4	2	3	3	4
Tottenham Hotspur	11	11	5	5	5	4	5	5	5
Arsenal	12	2	3	2	1	3	2	2	2
Liverpool	13	15	18	13	11	9	7	6	6
Manchester United	14	3	2	3	2	1	1	1	1
Newcastle United	15	13	14	7	10	12	9	9	9
Stoke City	16	19	7	16	7	8	10	10	10
Everton	17	18	17	8	15	13	14	11	7
West Ham United	18	20	20	20	19	15	20	19	18
Wigan Athletic	19	17	13	17	18	17	18	20	20
West Bromwich Albion	20	16	6	6	13	14	16	17	12

Tables work best when:

- Used to look up individual values
- Used to compare individual values
- Data must be precise
- You must include multiple units of measure
- You wish to show both details and their sums

Natural increments:

- 0,1,2,3,4,5
- 0,2,4,6,8,10
- 0,5,10,15,20
- 0,10,20,30,40,50
- 0,25,50,75,00
- 0, 0.2, 0.4, 0.6, 0.8, 1.0
- 0, 0.25, 0.50, 0.75, 1.00

Awkward increments:

- 0,3,6,9,12,15
- 0,4,8,12,16,20
- 0,6,12,18,24,30
- 0,8,16,24,32,40
- 0,12,24,36,48
- 0,15,30,45,60
- 0, 0.4, 0.8, 1.2, 1.6

(Source: The WSJ book, p. 52)

Fonts

“The only thing worse than being talked about is not being talked about.“

— Oscar Wilde

A few basic rules on chart typography

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

Don’t use bold and italic at the same time.

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

Don’t use bold and italic at the same time.

Don’t use all caps. They are hard to read.

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

Don’t use bold and italic at the same time.

Don’t use all caps. They are hard to read.

Avoid white on black or color.

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

Don’t use bold and italic at the same time.

Don’t use all caps. They are hard to read.

Avoid white on black or color.

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

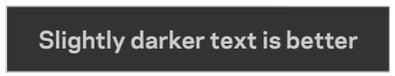
A few basic rules on chart typography

Don’t set type too small or too condensed.

Don’t use bold and italic at the same time.

Don’t use all caps. They are hard to read.

Avoid white on black or color.



These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

too small too condensed

Don’t use bold and italic at the same time.

Bold *Italic* ***Bold+italic***

Don’t use all caps. They are hard to read.

DON’T USE ALL CAPS!

Avoid white on black or color.

Slightly darker text is better

Don’t use stylized script.

Stylized is harder to read

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t set type too small or too condensed.

too small too condensed

Don’t use bold and italic at the same time.

Bold *Italic* ***Bold+italic***

Don’t use all caps. They are hard to read.

DON’T USE ALL CAPS!

Avoid white on black or color.

Slightly darker text is better

Don’t use stylized script.

Stylized is harder to read

Don’t track type.

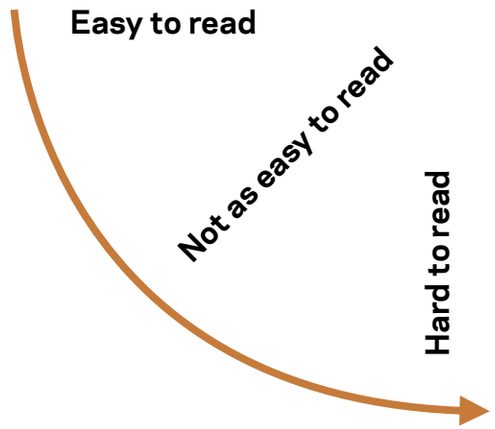
D o n ’ t d o t h i s

These are basic rules, that are easy to follow. Easily broken as well.

(Source: The WSJ Guide to Information Graphics, Dona M. Young, p.31)

A few basic rules on chart typography

Don’t turn the type

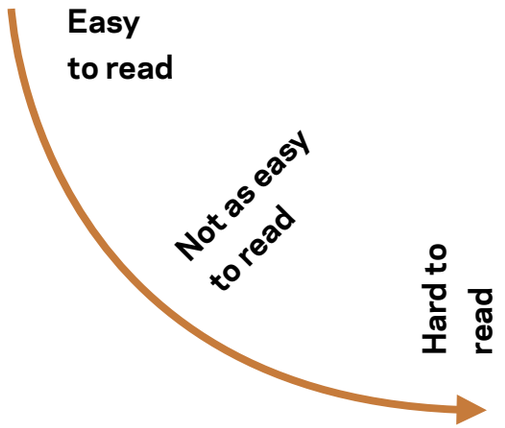


This one I see broken over and over again. Sometimes automatically by software.

Does this rule seem like an overstatement?

A few basic rules on chart typography

Don’t turn the type



How about now?

There are ways to work around long text on charts. The most obvious one is to split it on more lines. Using common acronyms is acceptable too. Turning the type is not the way.

A few basic rules on chart typography

	X	Y	Value
1	**-6.116**	1.462	**-5.788**
2	**6.589**	2.711	**-1.117**
3	**-3.058**	-3.894	**2.223**
4	**-7.417**	2.241	**-2.716**
5	**3.929**	1.082	**-1.023**
6	**-9.783**	-1.628	**1.433**
7	**8.466**	1.099	**-1.112**
8	**-1.376**	-1.096	**-1.874**
9	**1.922**	1.411	**1.369**

If you want to use bold to highlight text, nothing is gained by bolding to much. Emphasizing everything is emphasizing nothing.

A few basic rules on chart typography

	X	Y	Value
1	-6.116	1.462	**-5.788**
2	6.589	2.711	**-1.117**
3	-3.058	-3.894	**2.223**
4	-7.417	2.241	**-2.716**
5	3.929	1.082	**-1.023**
6	-9.783	-1.628	**1.433**
7	8.466	1.099	**-1.112**
8	-1.376	-1.096	**-1.874**
9	1.922	1.411	**1.369**

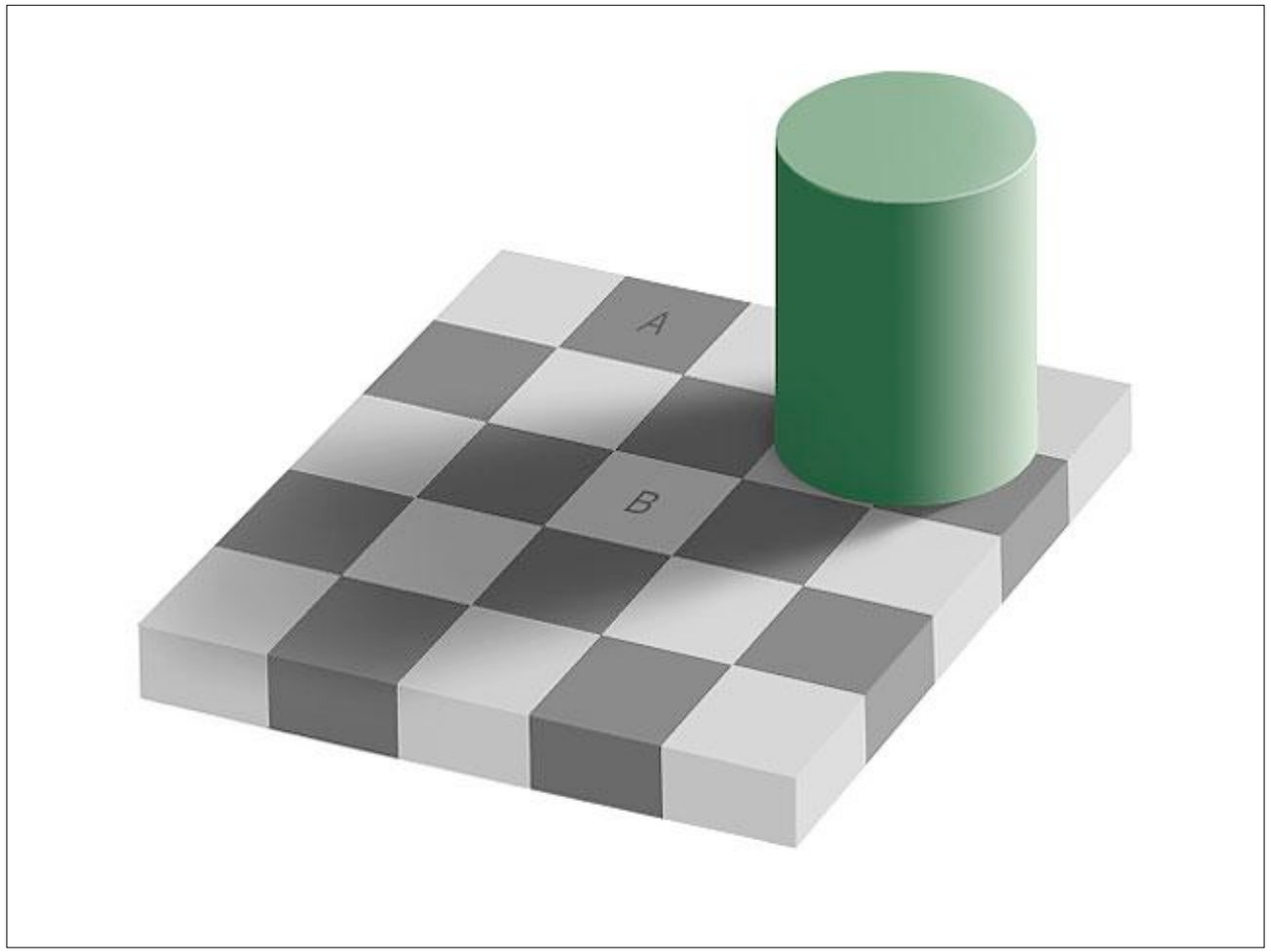
Use the tools you have to emphasize the point you're trying to make. Don't hesitate to create anothe table/chart to get another point across.

Colors

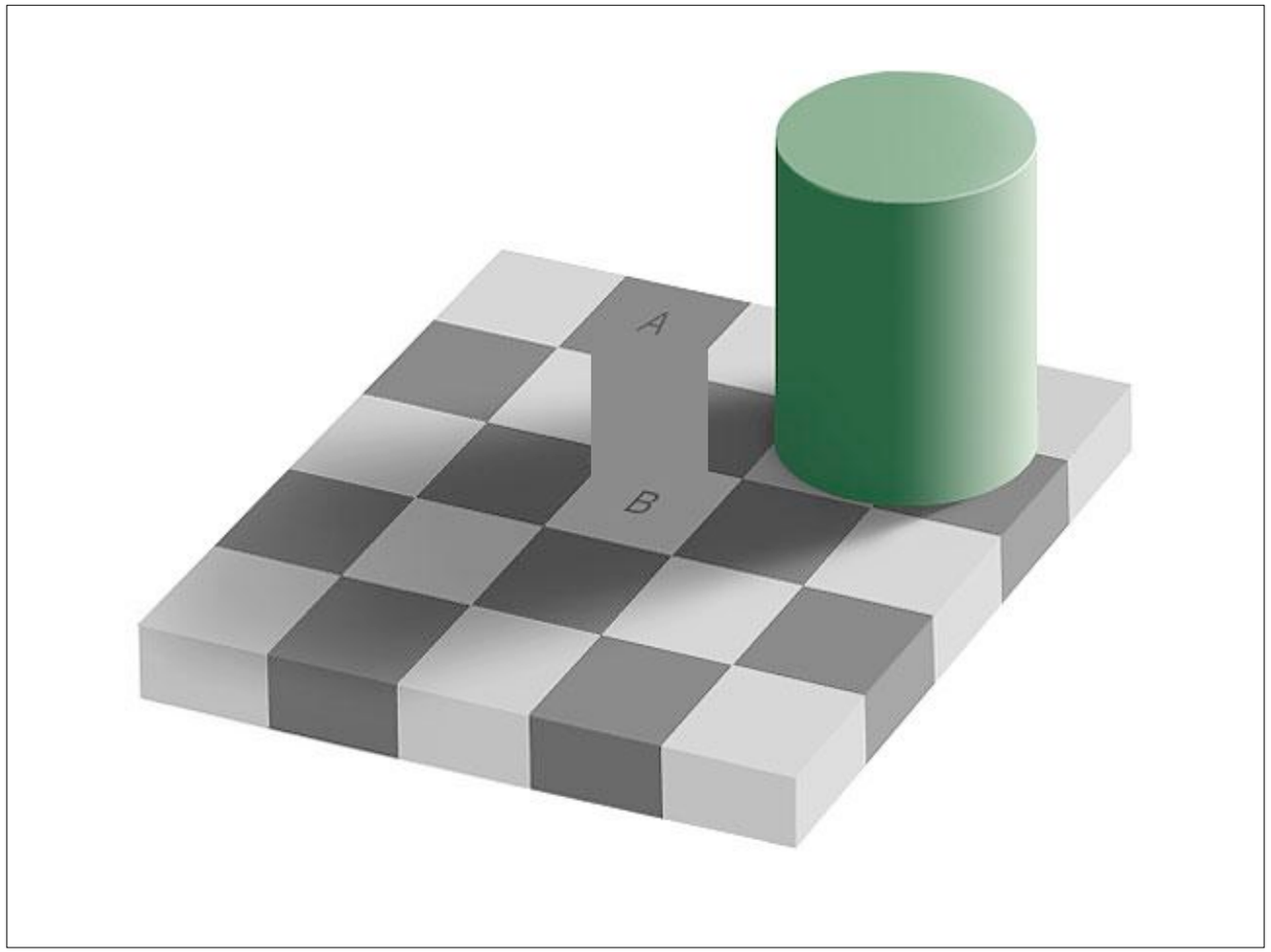
"…avoiding catastrophe becomes the first principle in bringing color to information: Above all, do no harm."

— Edward Tufte

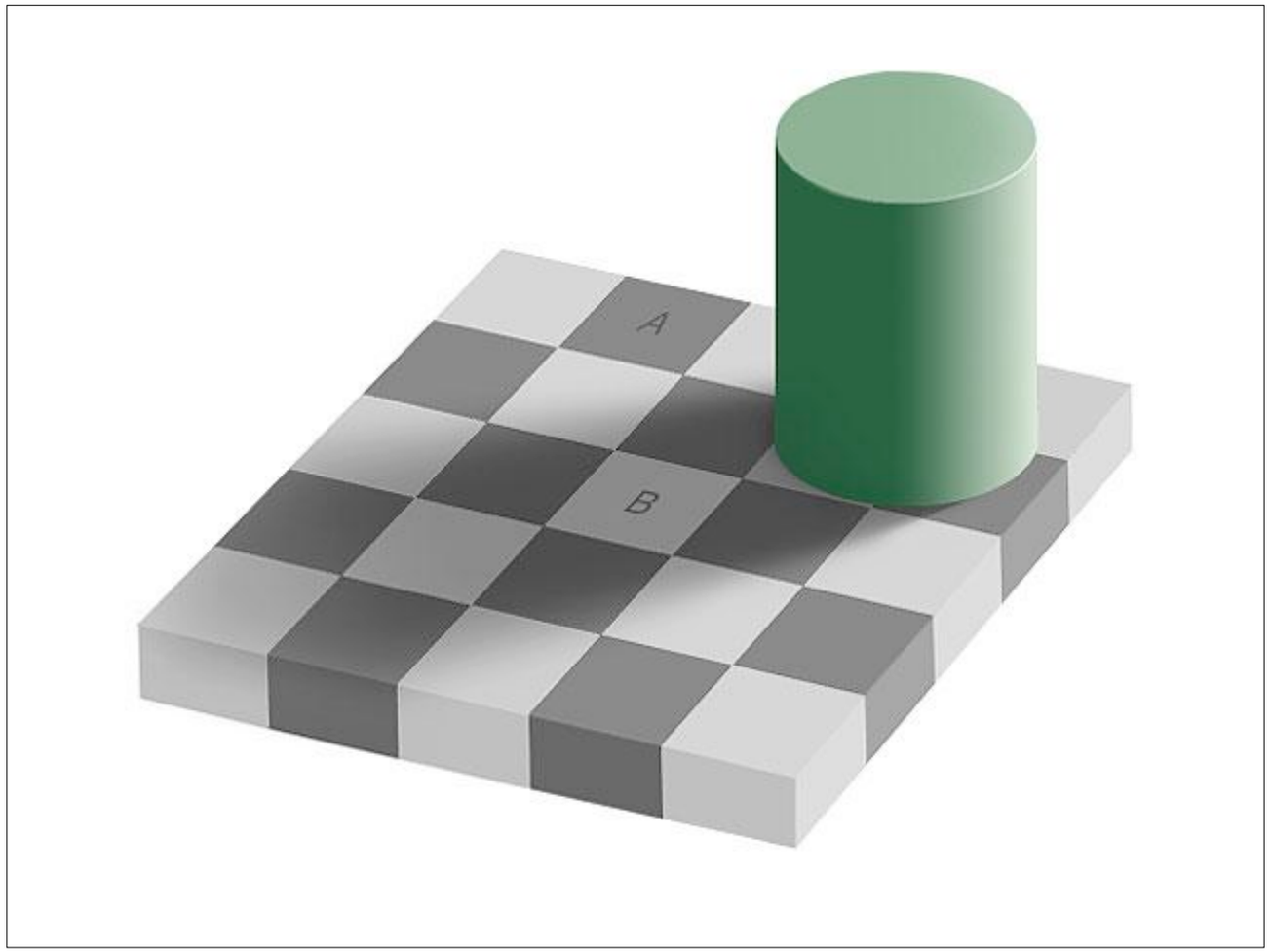

Timon: Gee. He looks blue.
Pumbaa: I'd say brownish-gold.



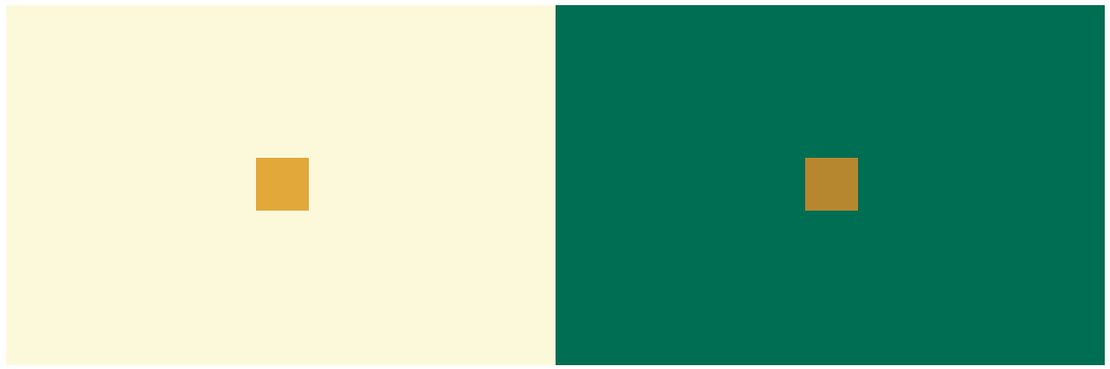
What is happening? You see it in the way of the laws of physics, your perceptional reality.

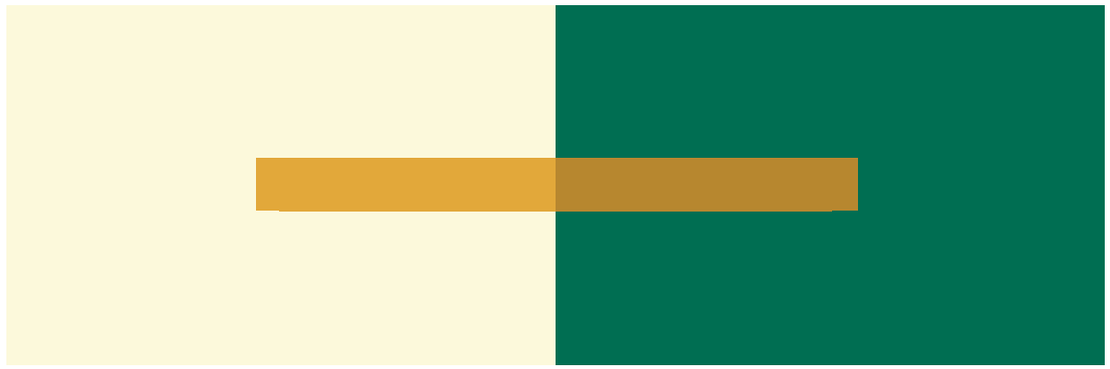


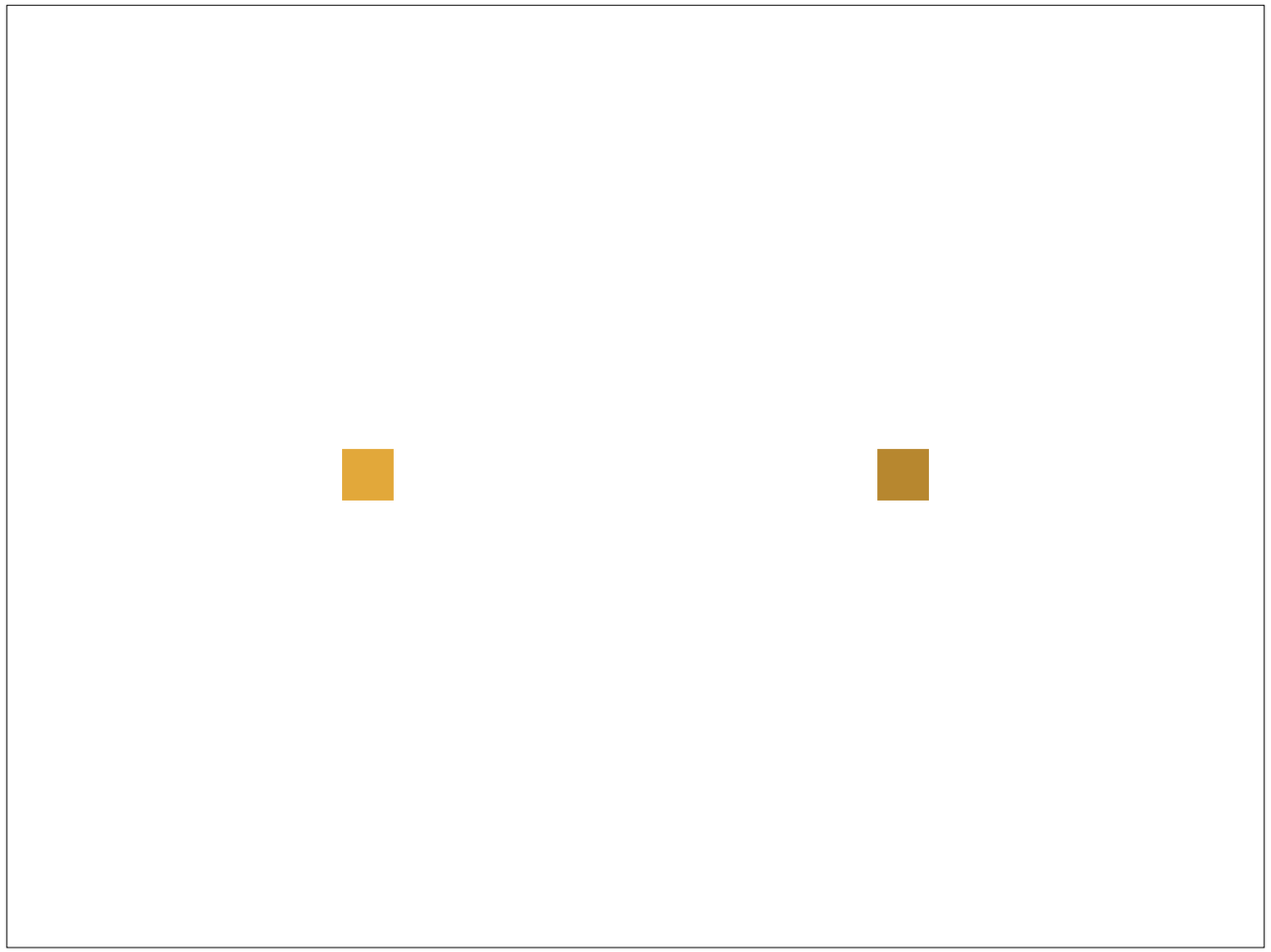
What is happening? You see it in the way of the laws of physics, your perceptional reality.

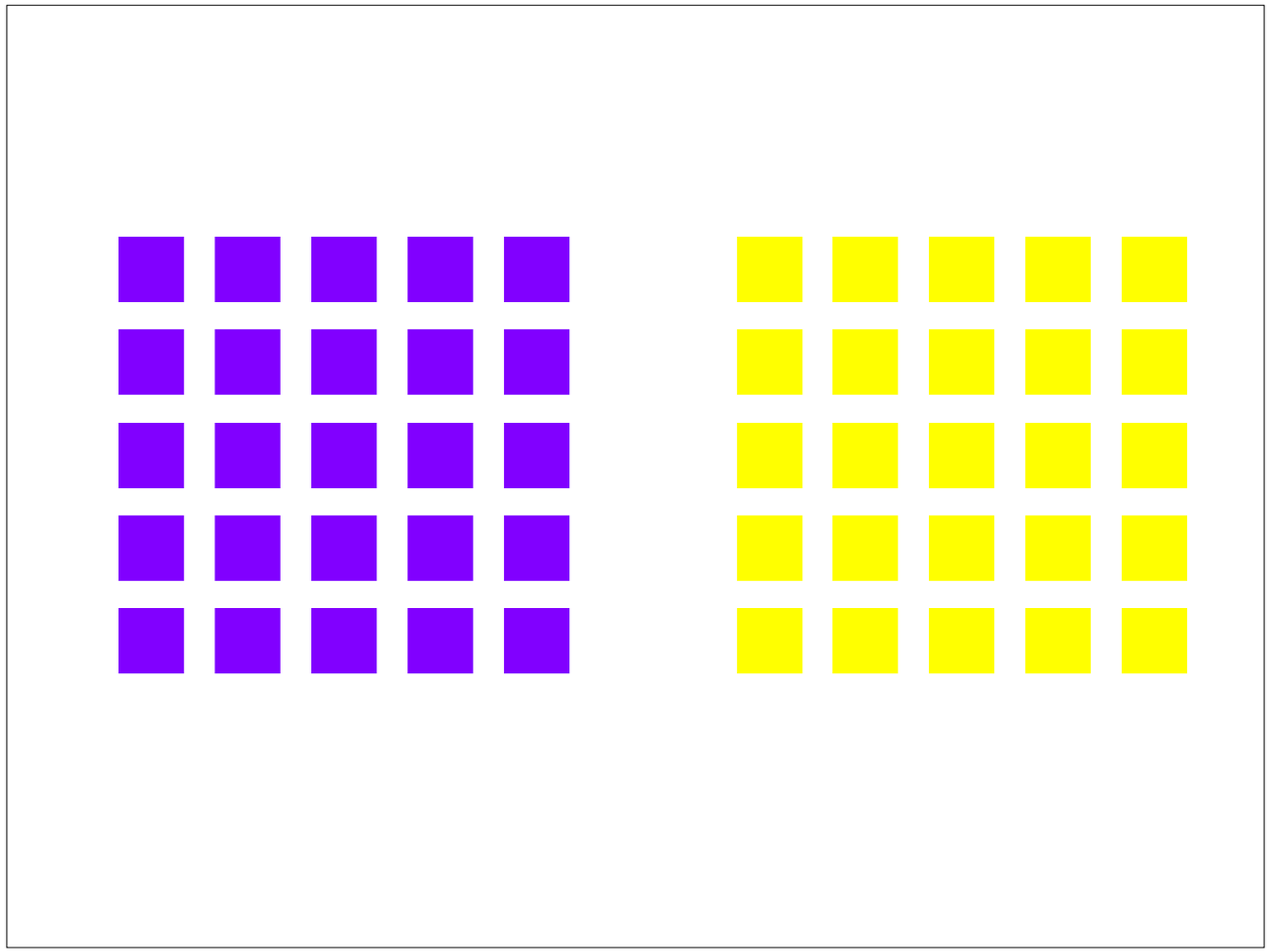


What is happening? You see it in the way of the laws of physics, your perceptional reality.

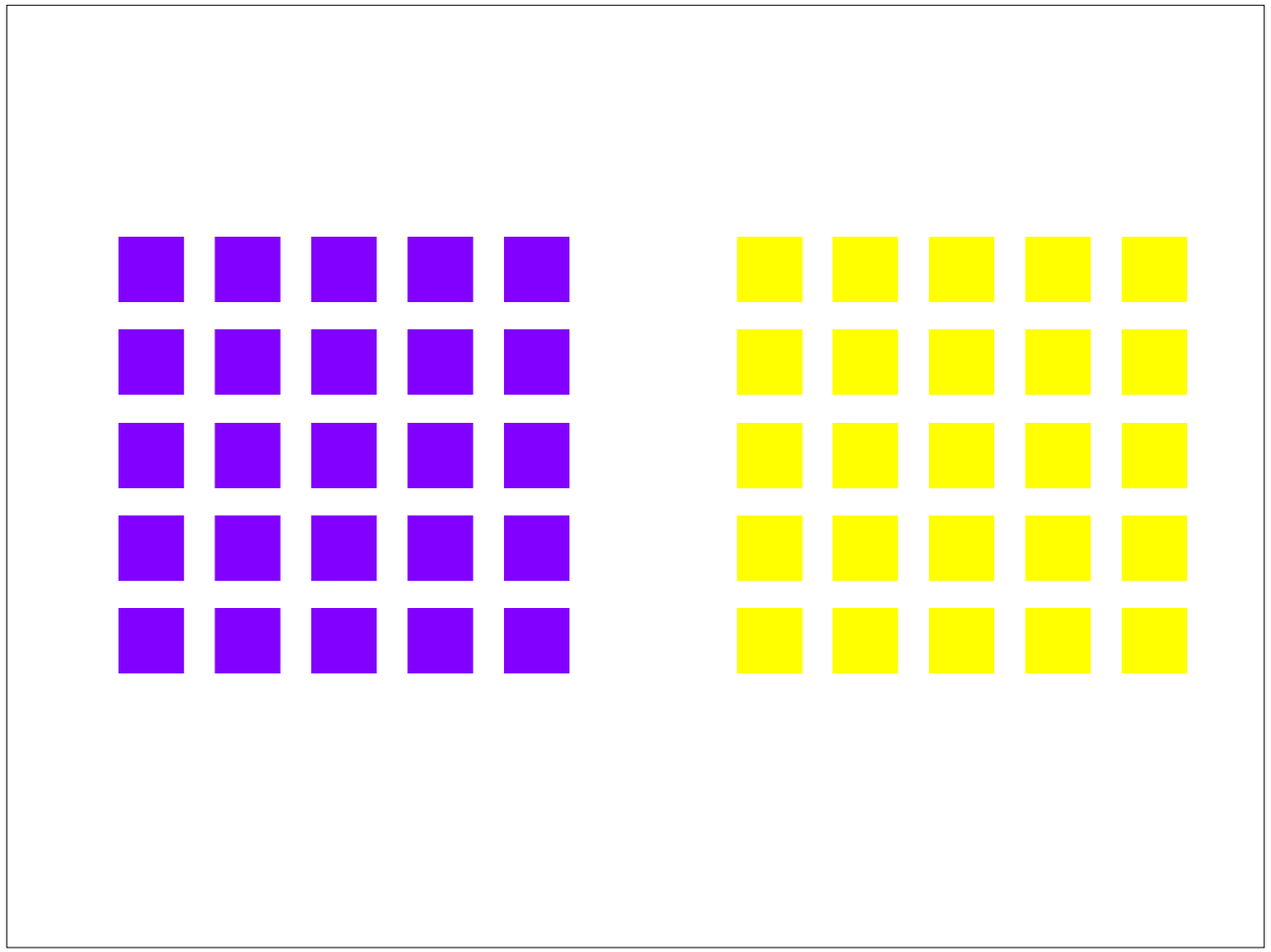


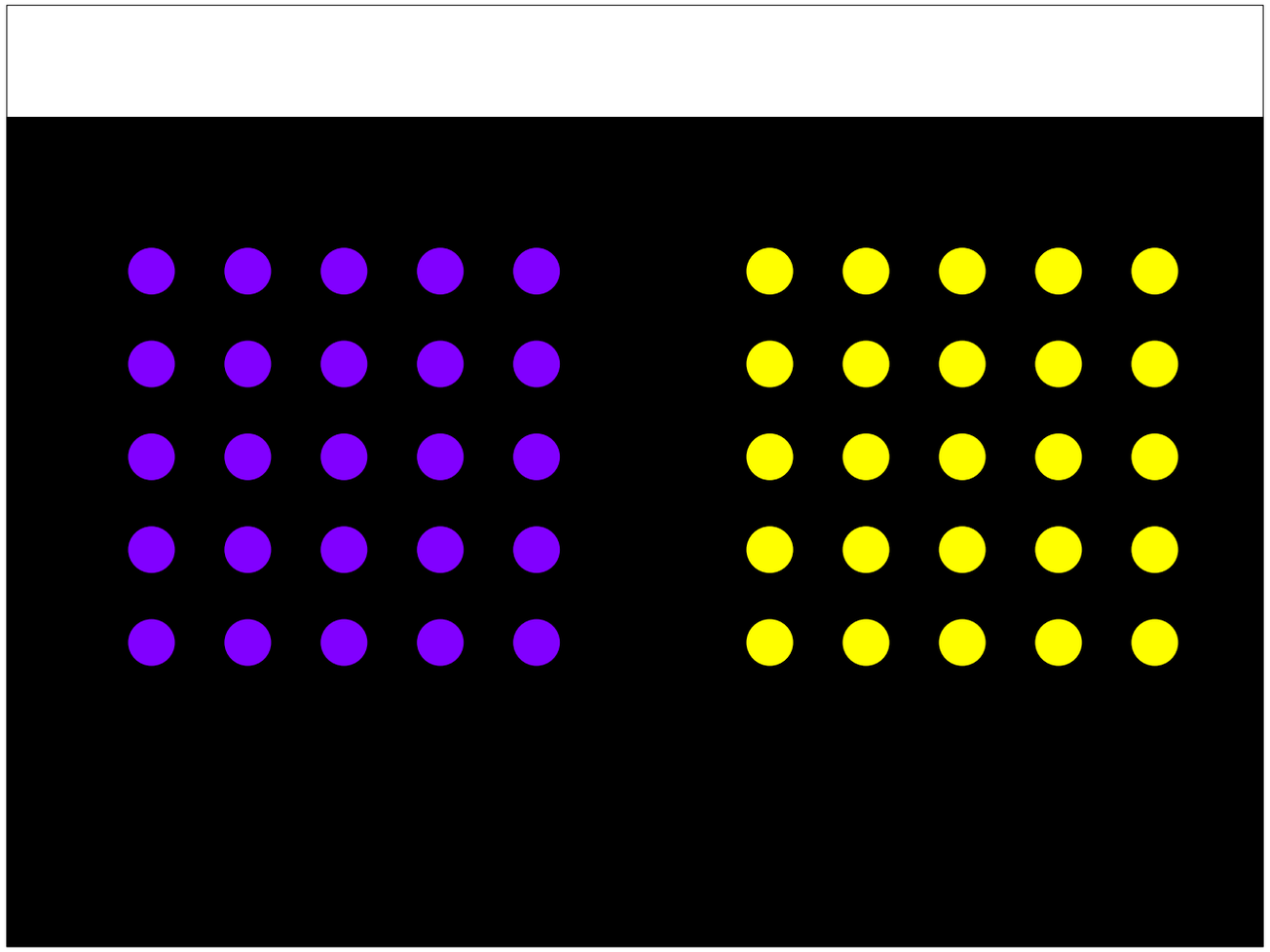


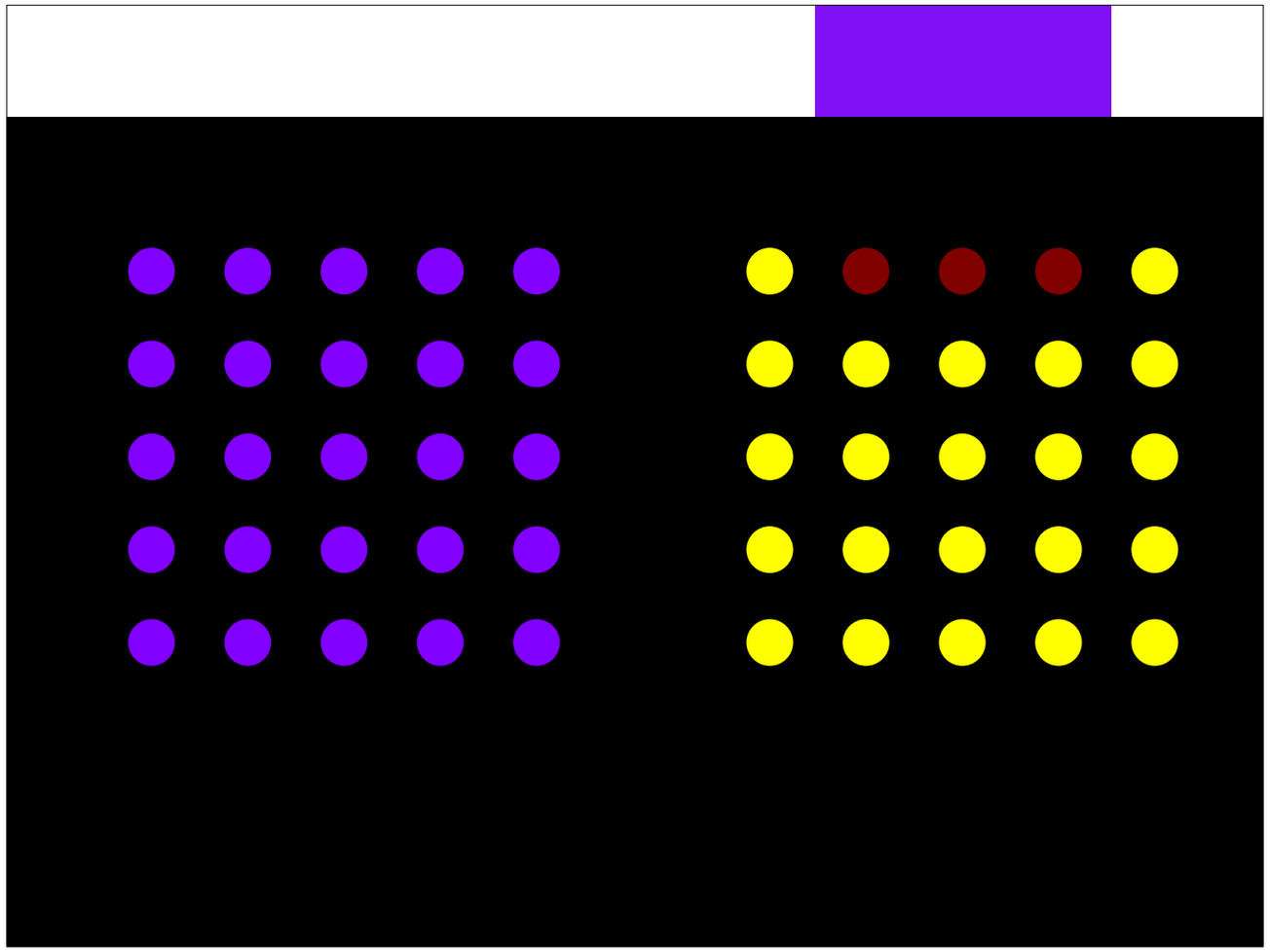


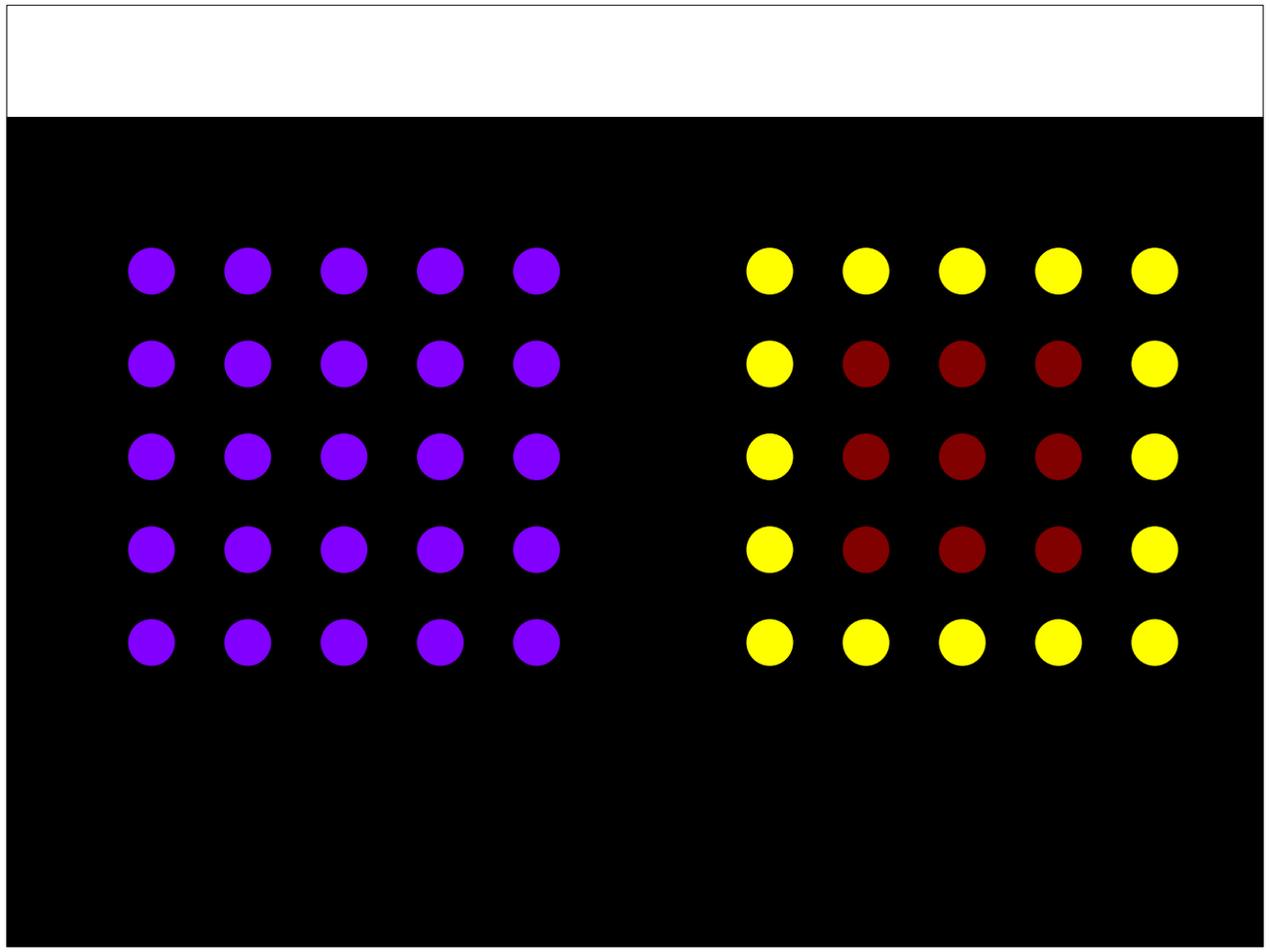


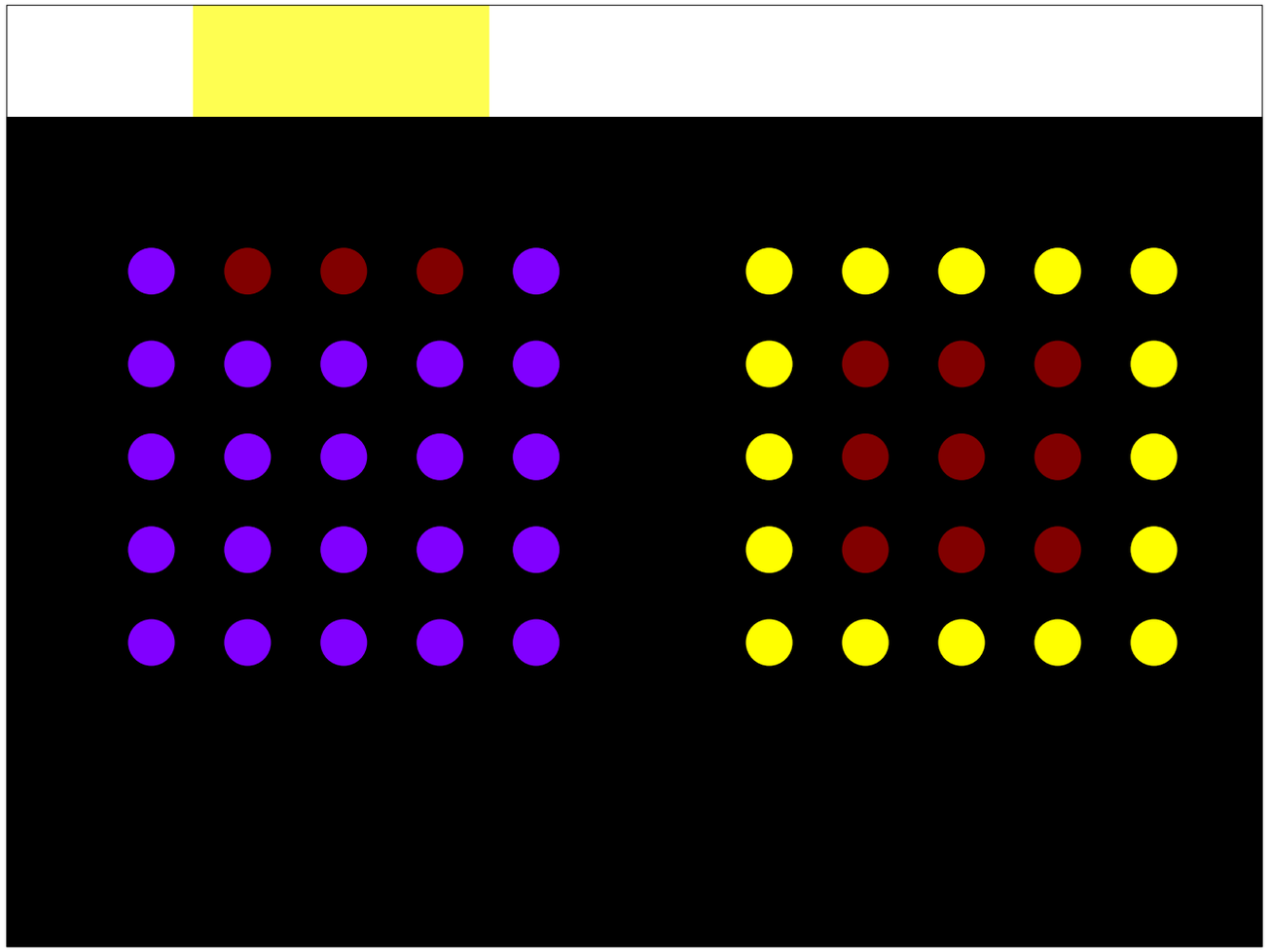
Based on Beau Lotto’s lecture on TED.
http://www.ted.com/talks/beau_lotto_optical_illusions_show_how_we_see.html

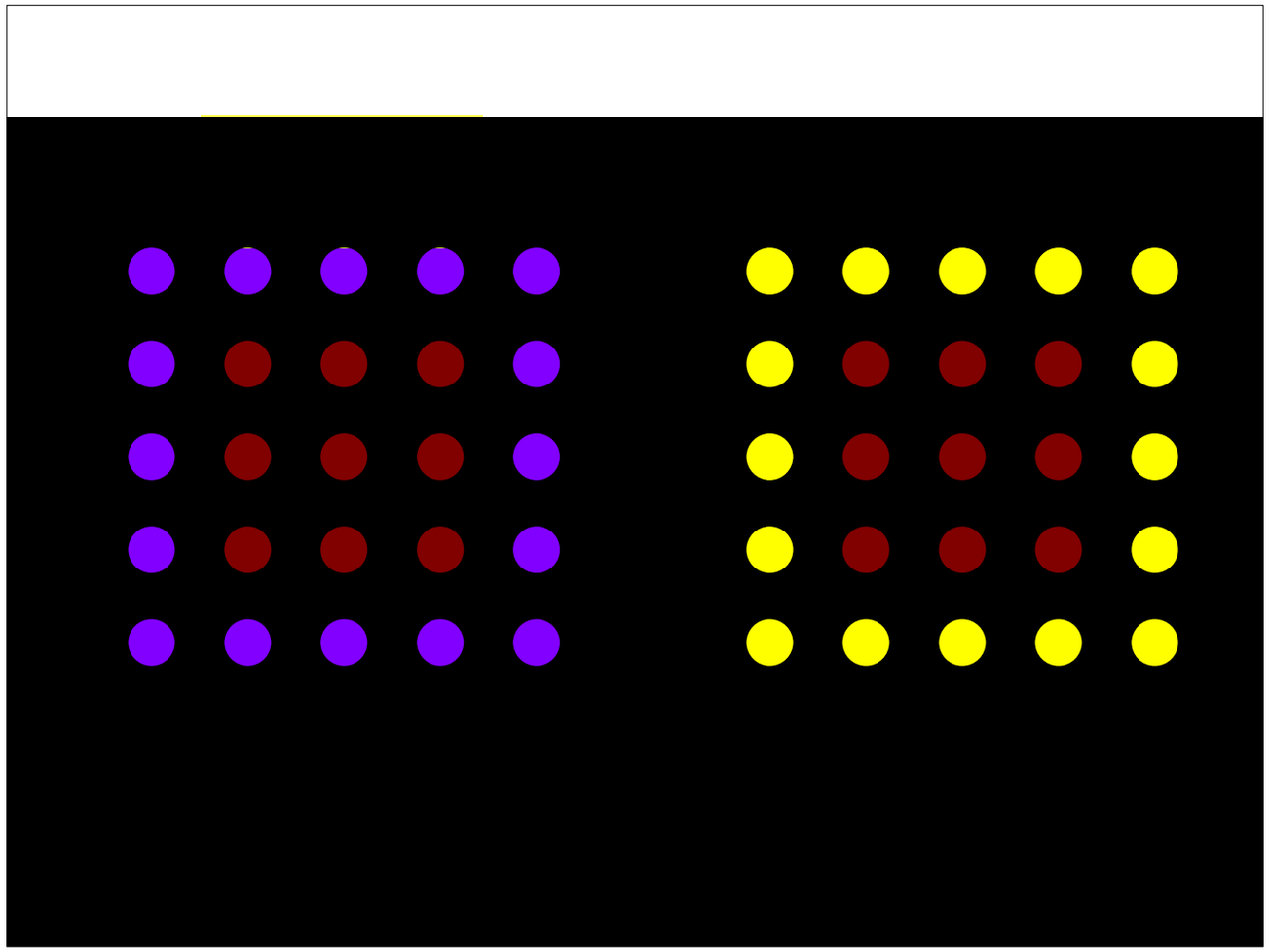


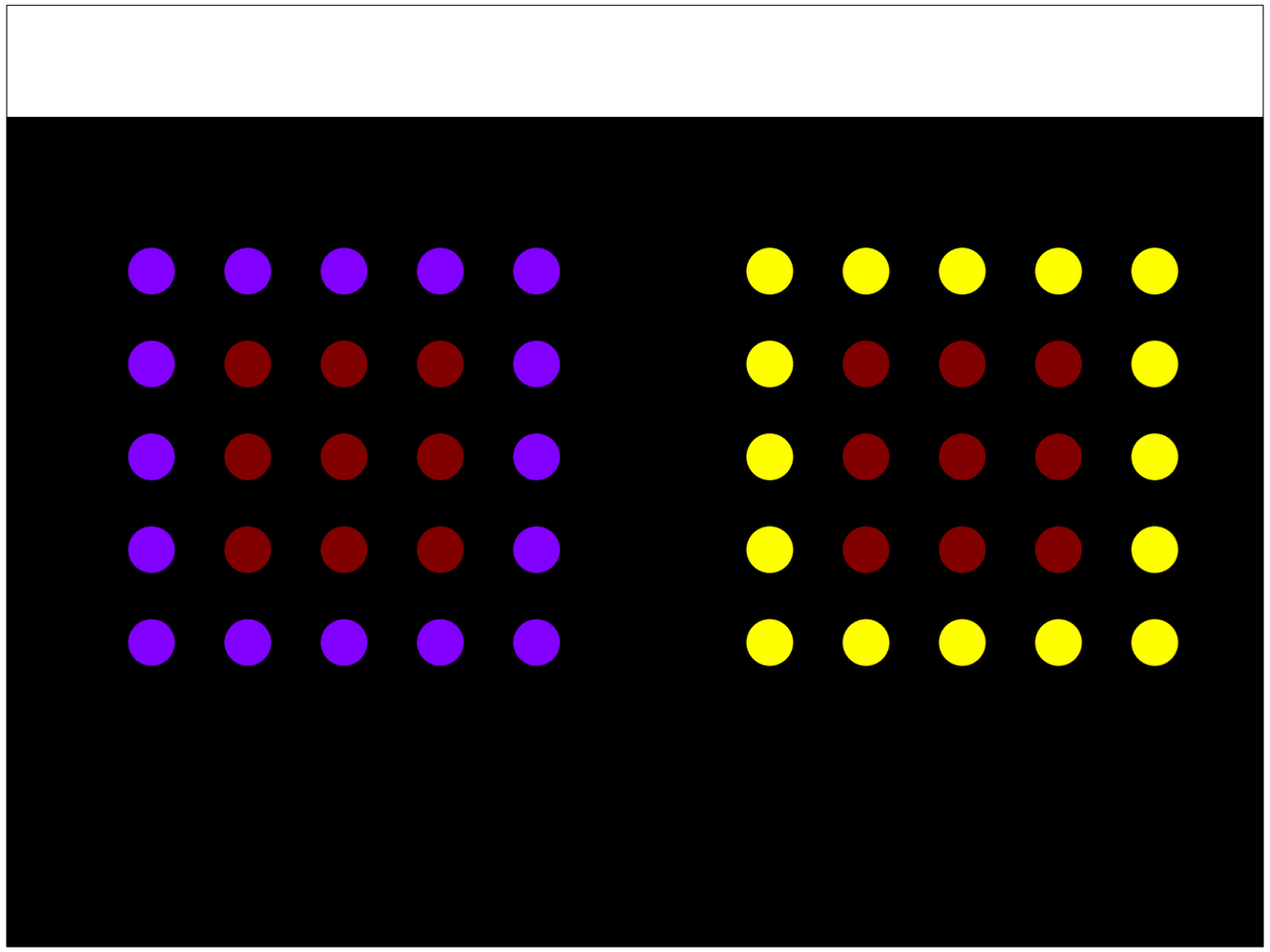


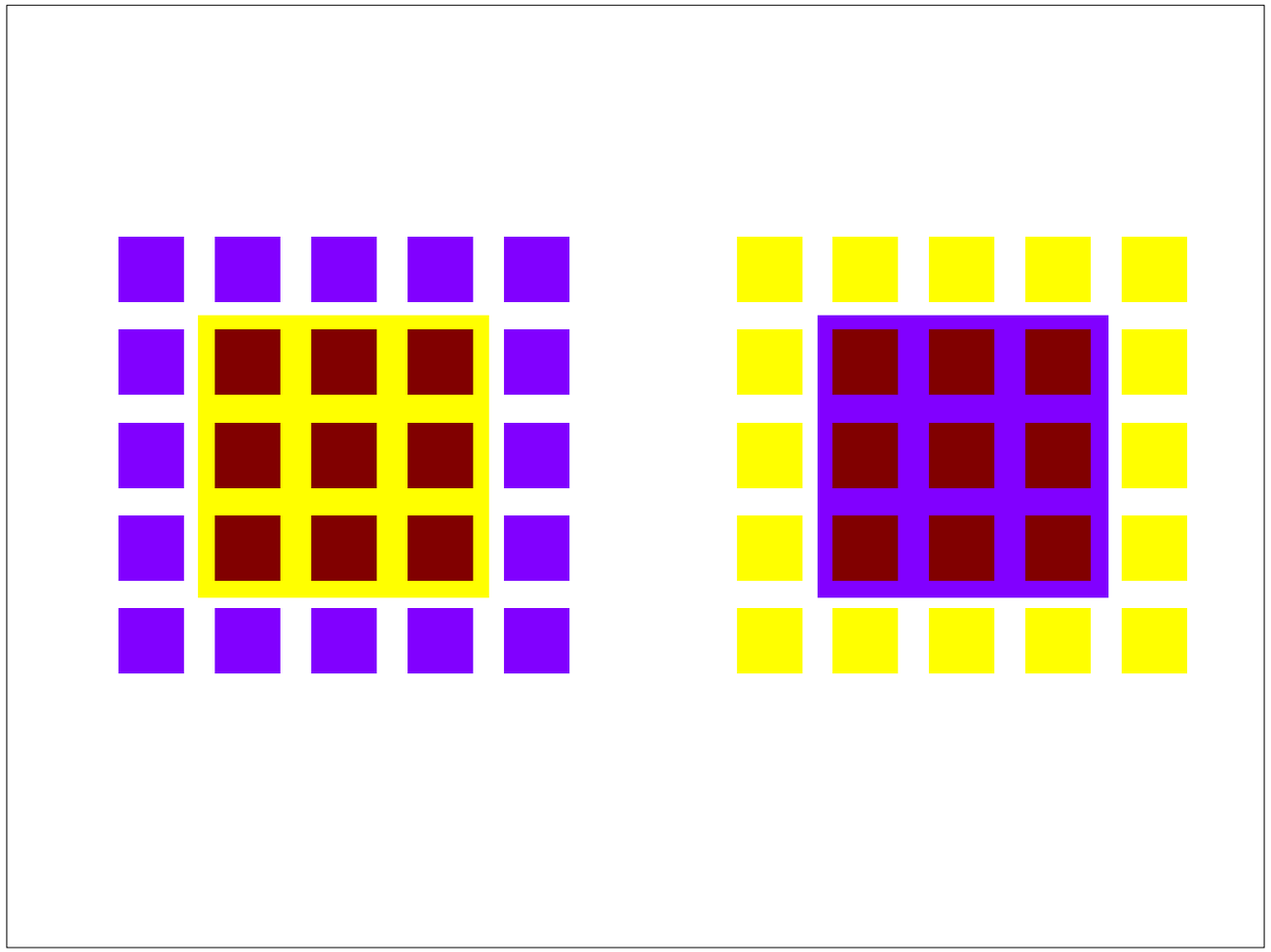


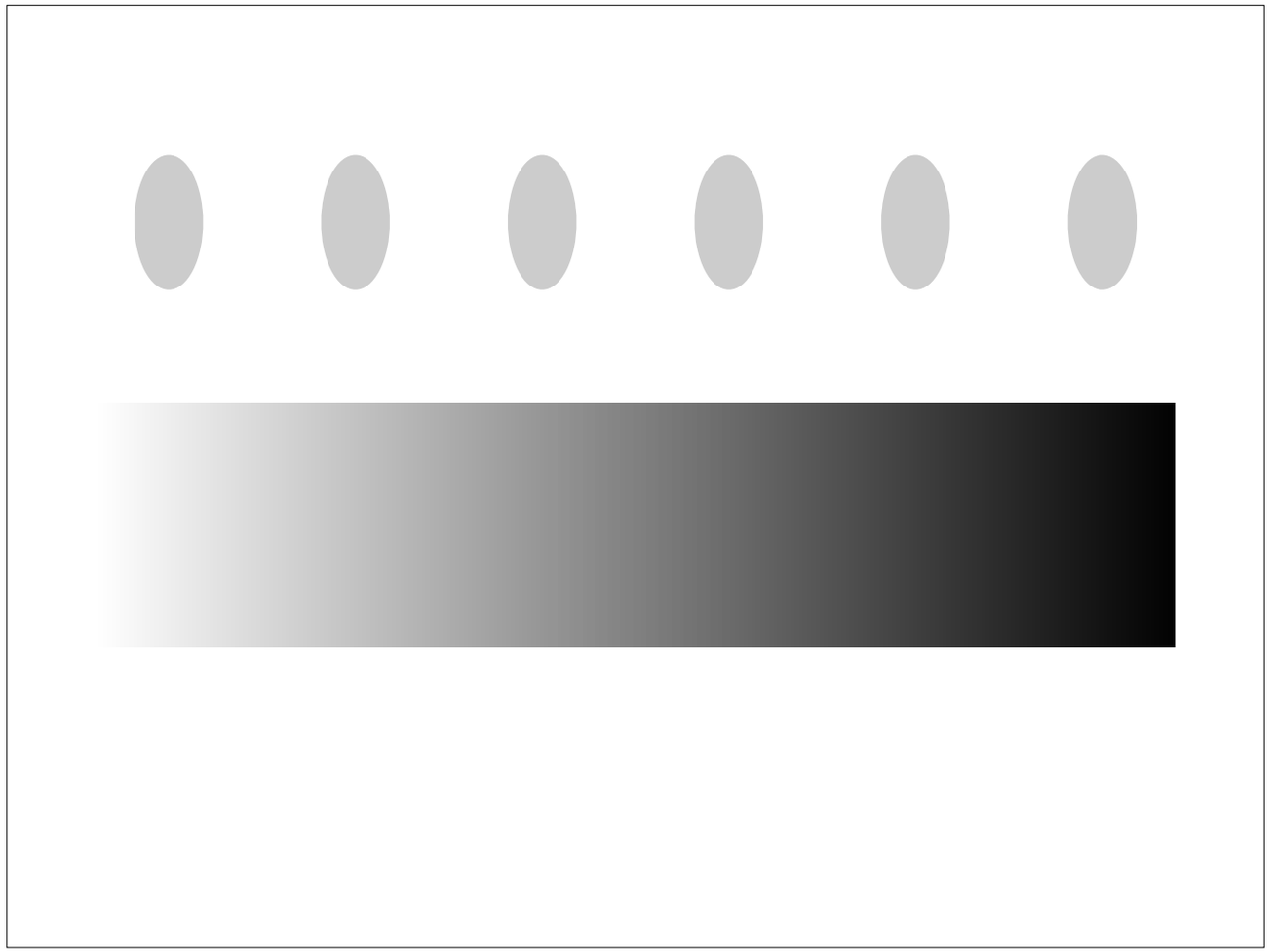




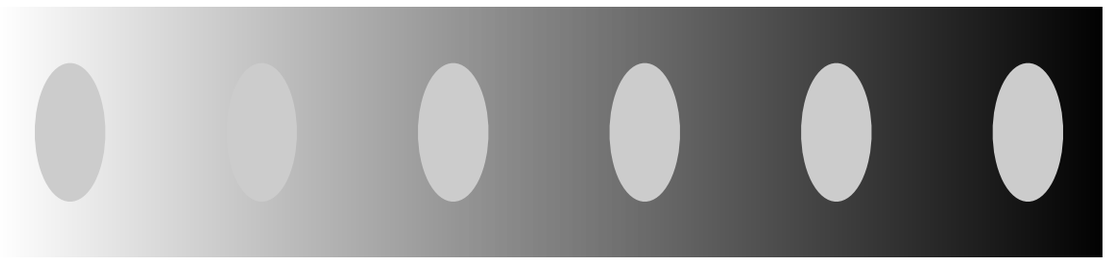




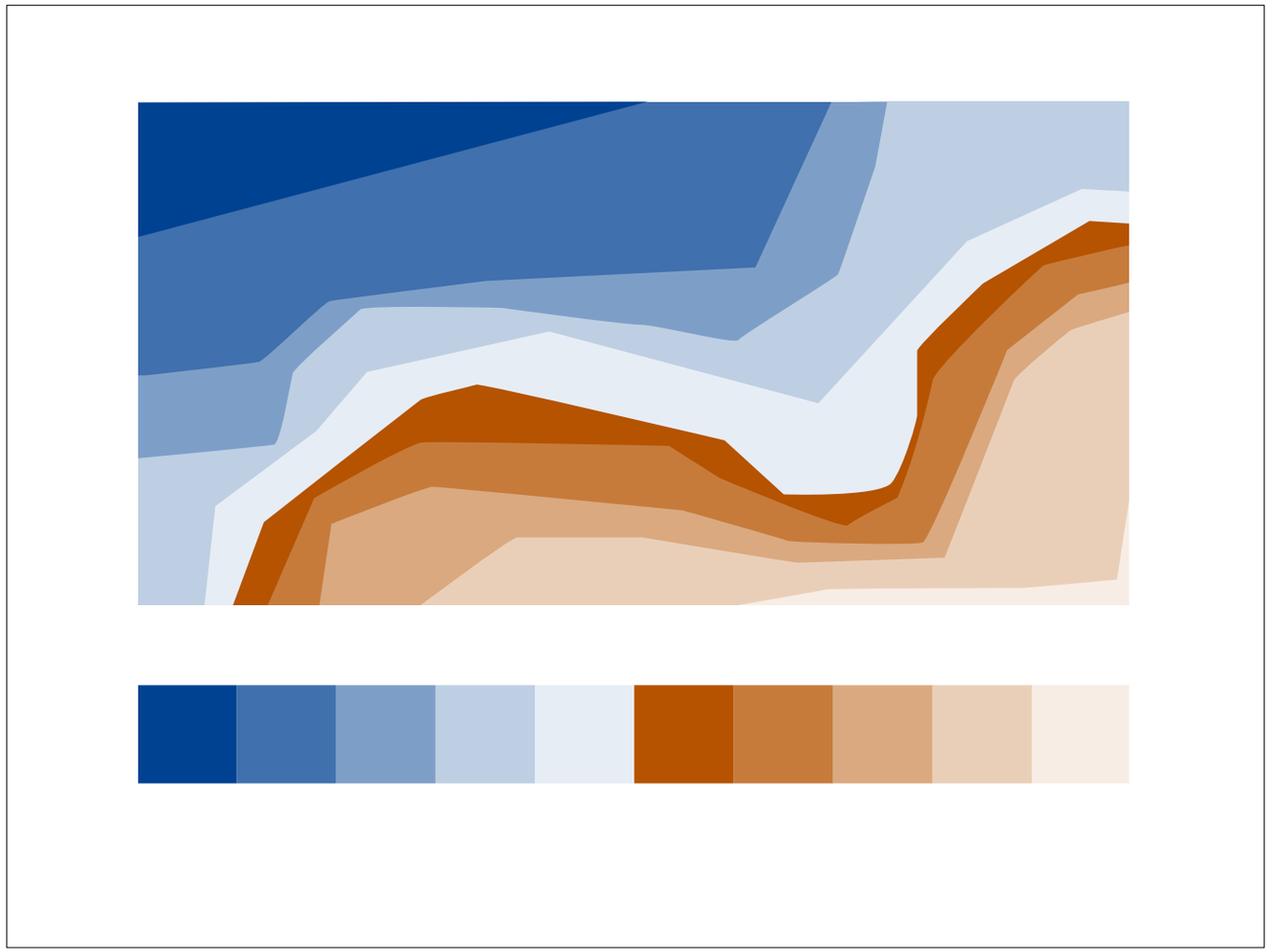




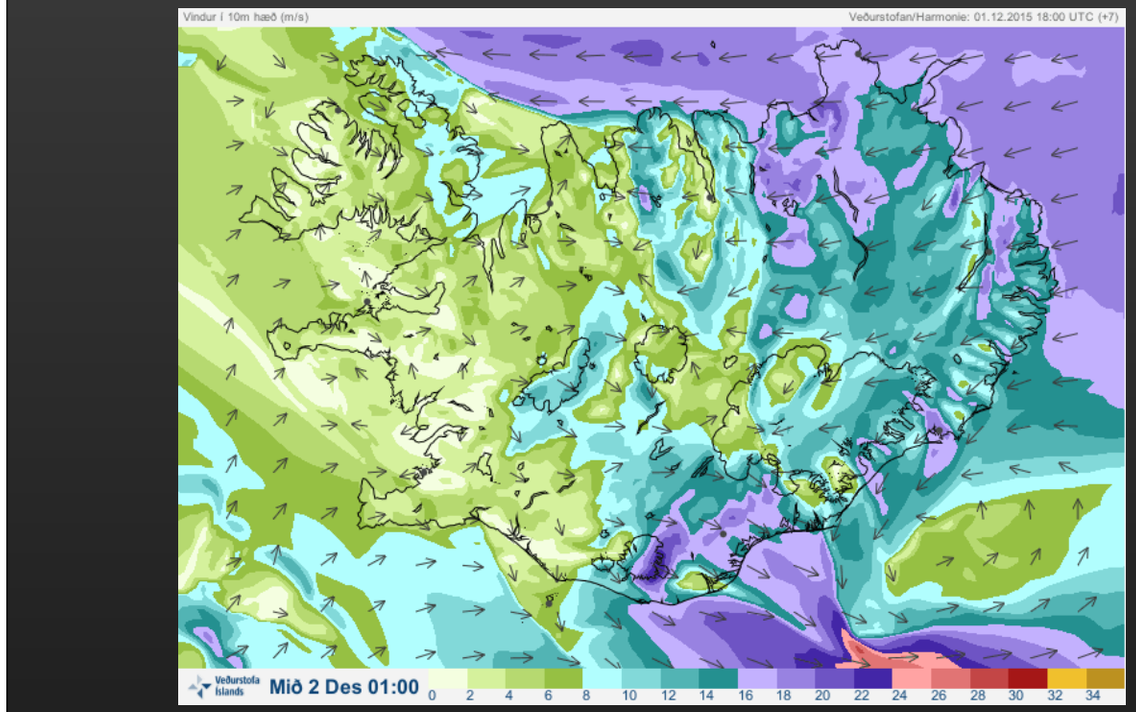
Here’s a picture that shows very well the relativity of colour with it’s surroundings. All the ovals are in the same gray shade, but when placed on the gradient background, they seem to have different color values. One even seems to be gradient.



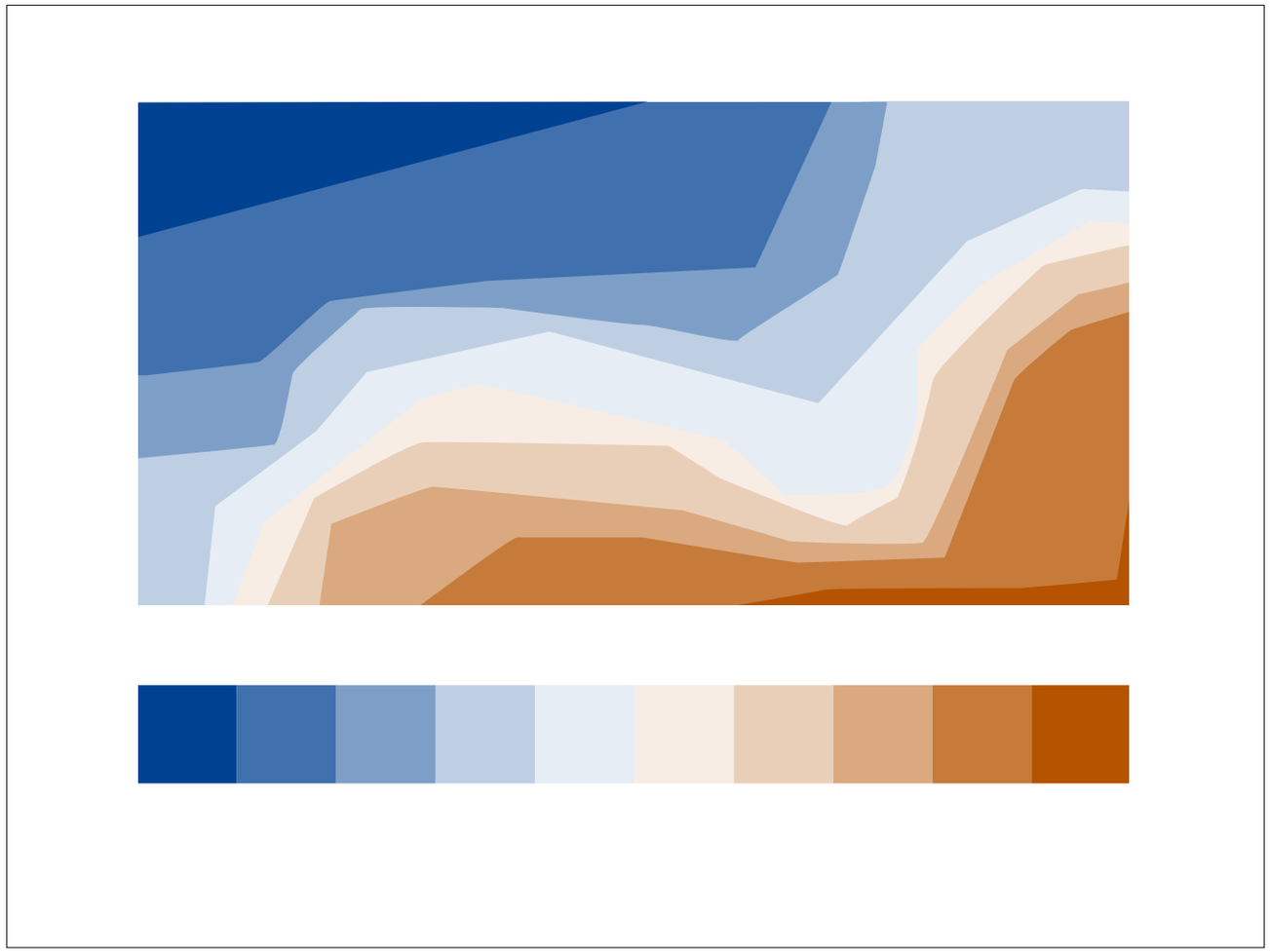
Here’s a picture that shows very well the relativity of colour with it’s surroundings. All the ovals are in the same gray shade, but when placed on the gradient background, they seem to have different color values. One even seems to be gradient.



Don’t set the scale with alternating light and dark colours in the middle of the scale. The eyes can’t draw a meaningful comparison jumping between light and dark shades. But, of course this is a very efficient way for a certain type of map.

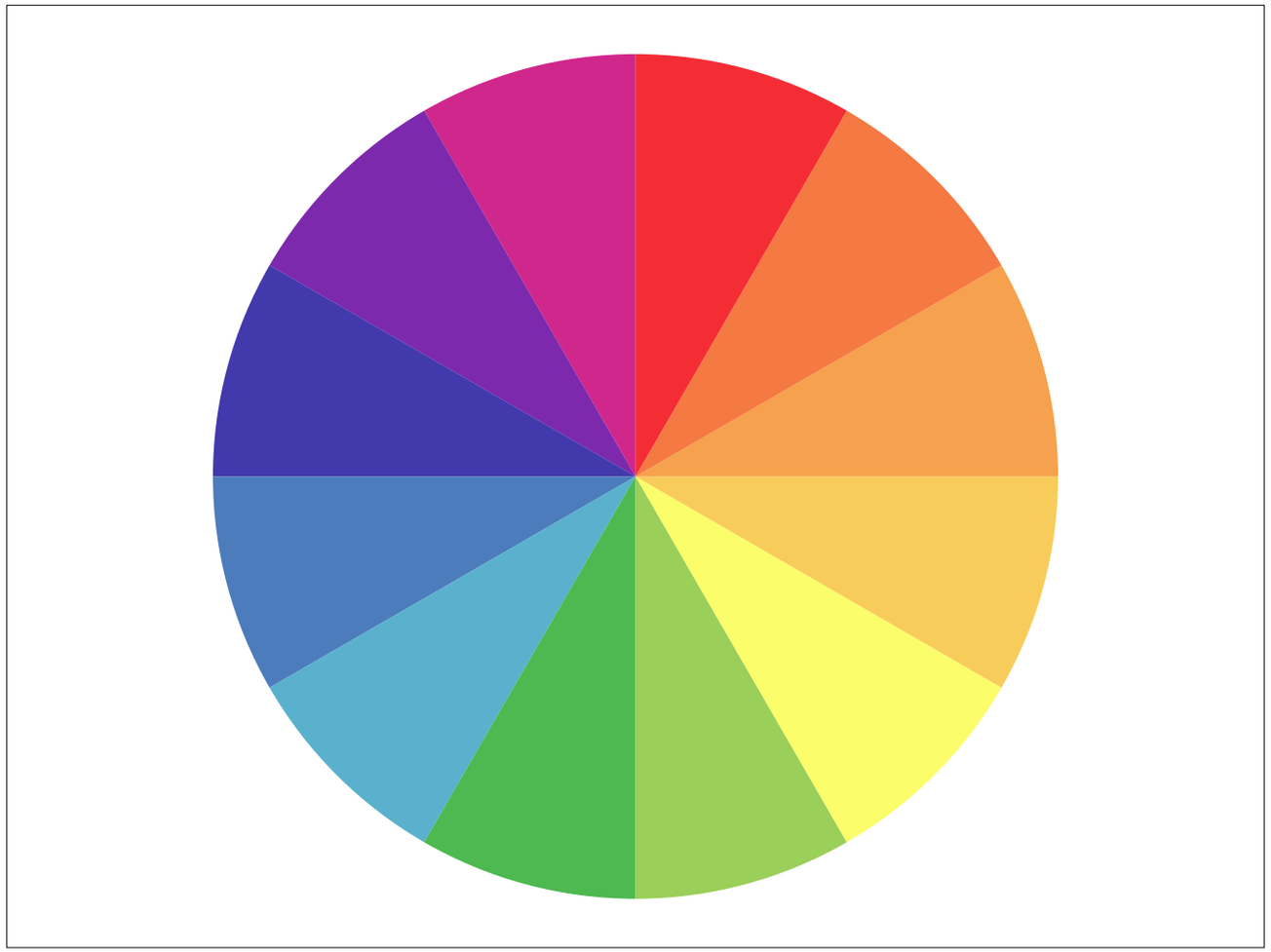


This kind of colour scale is very useful for bucketing values on a map. One example is wind measures where certain steps on the scale are important and need to be emphasized.

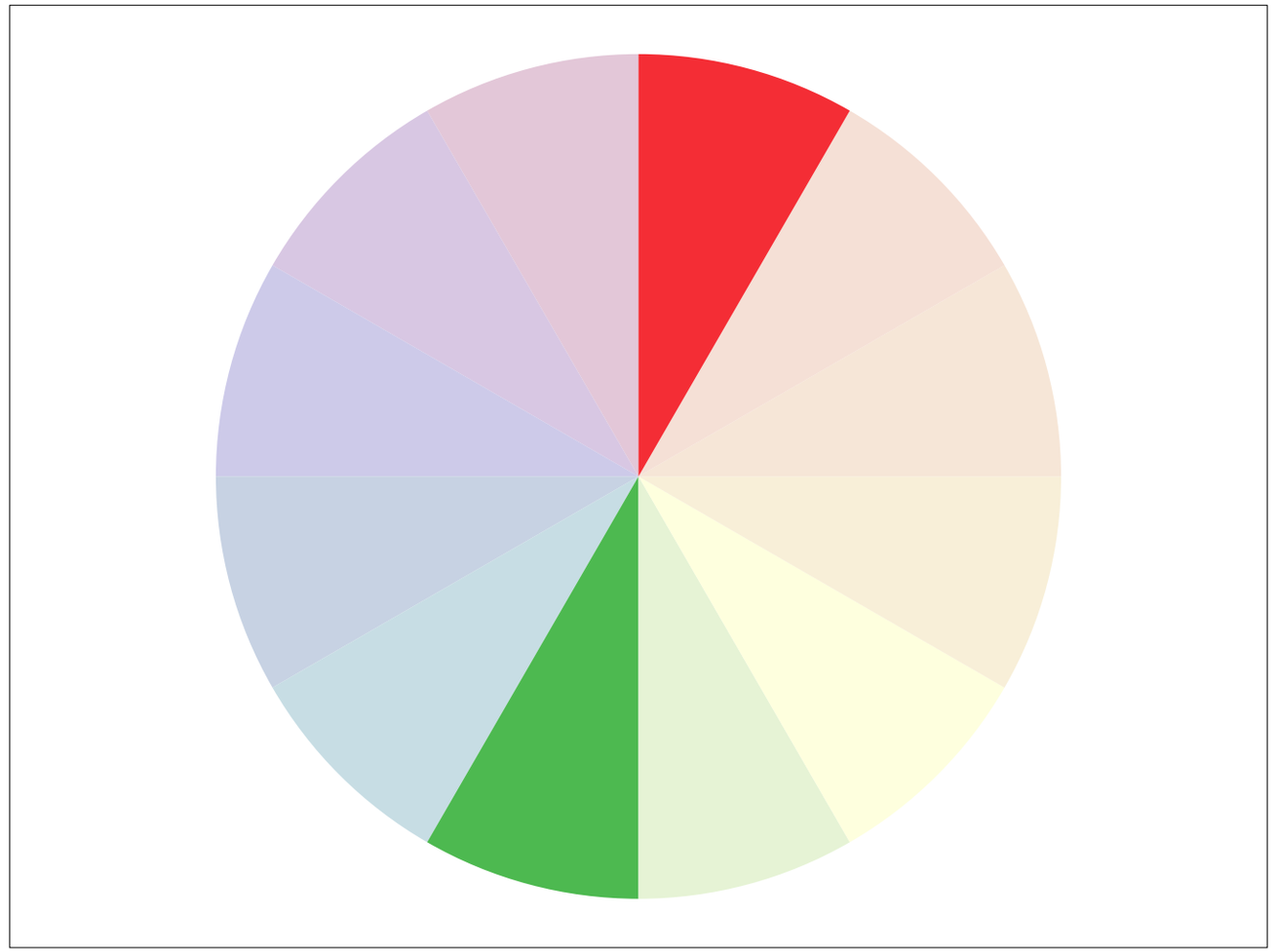


The colour should graduate from lightest to darkest or vice versa, regardless of color. This is a divergent scale.

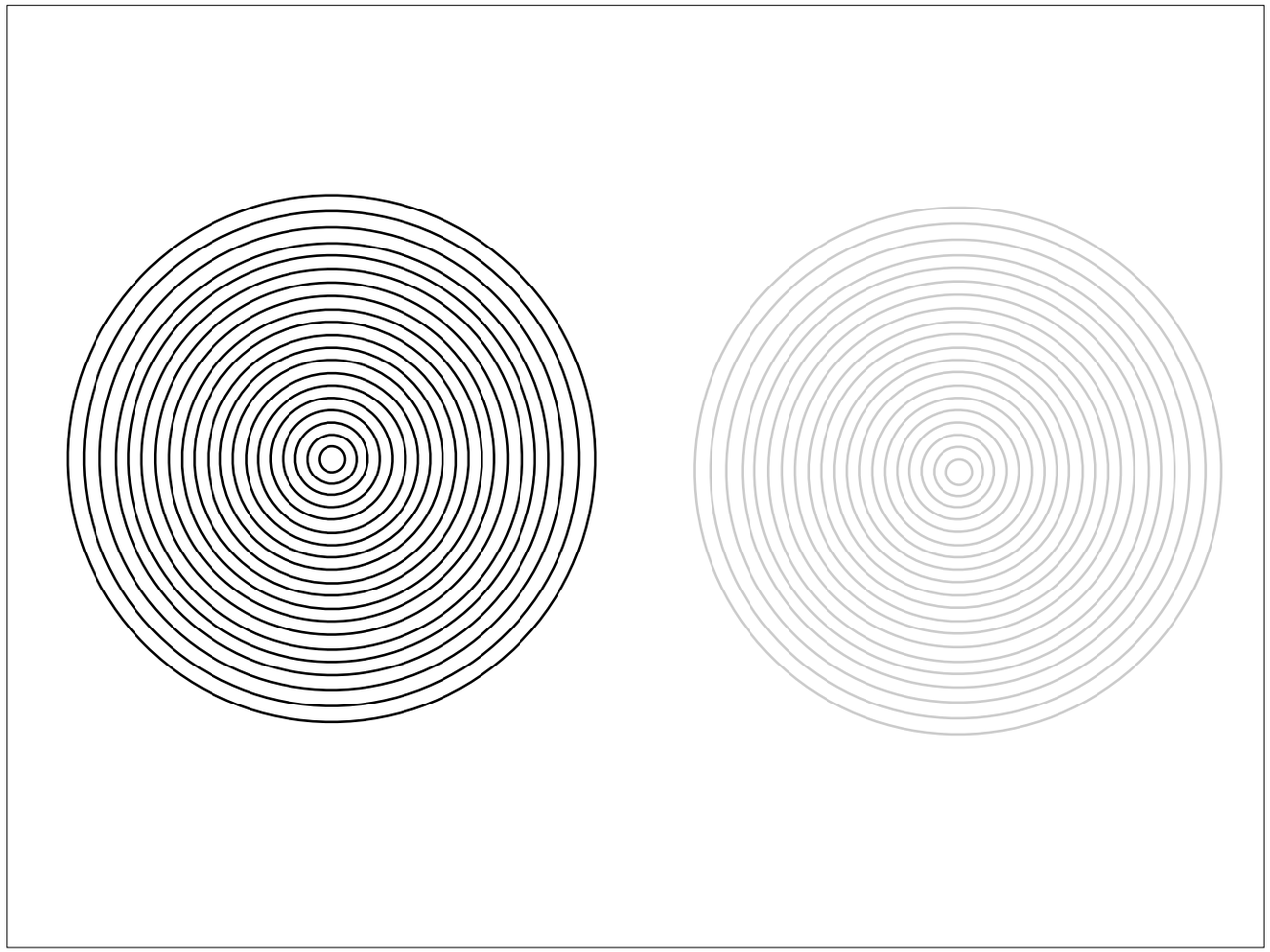
saturation? spectrum? intensity? There is no built in order.

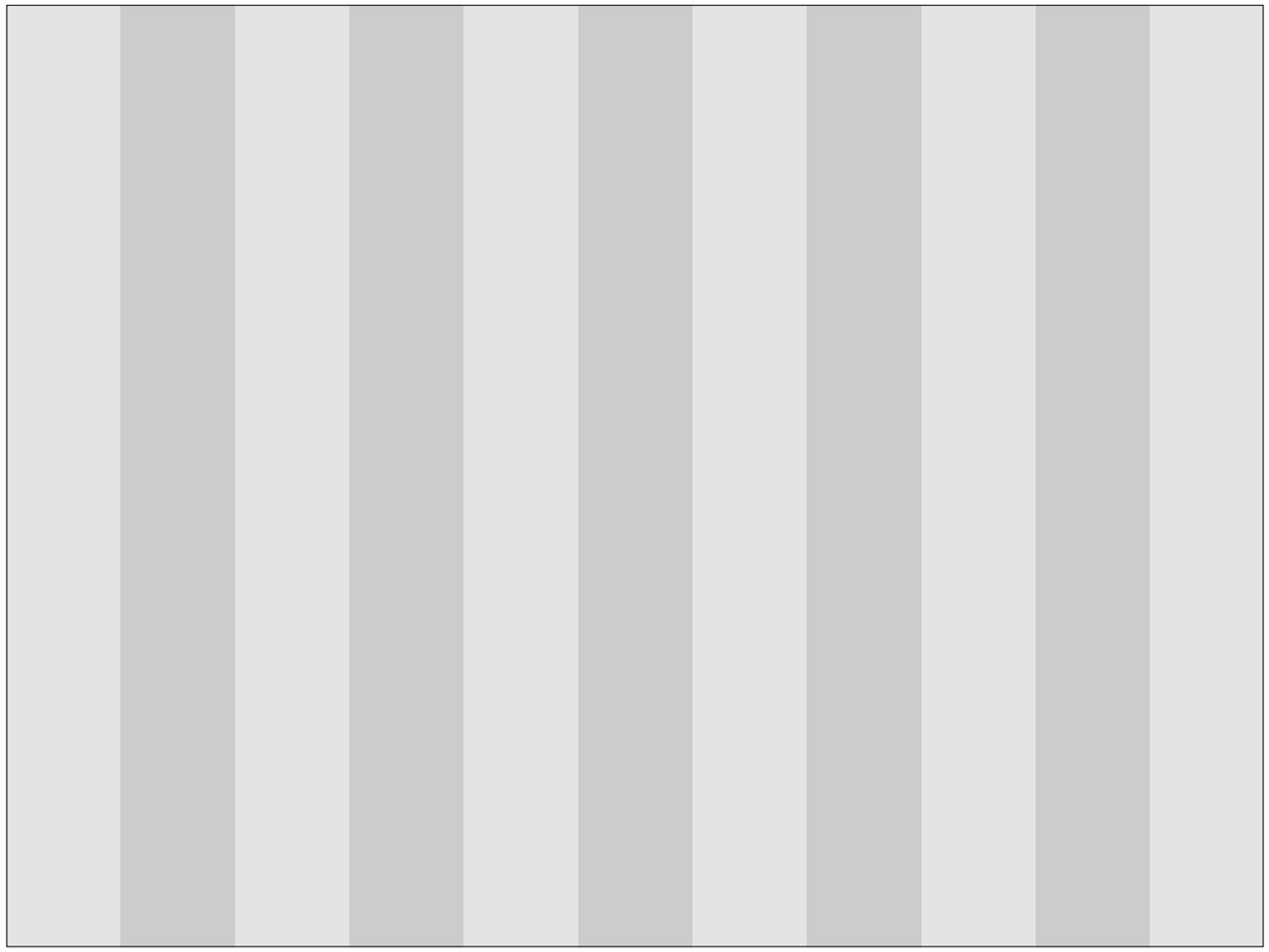


Warm colors are those in the red area of the color spectrum such as red, orange yellow and brown. Cool colors are the blue side of the spectrum and include blue, green and neutral gray. Warm colors appear larger than cool colors so red can visually overpower blue, even if used in equal amounts. Warm colors appear closer while cool colors visually recede.

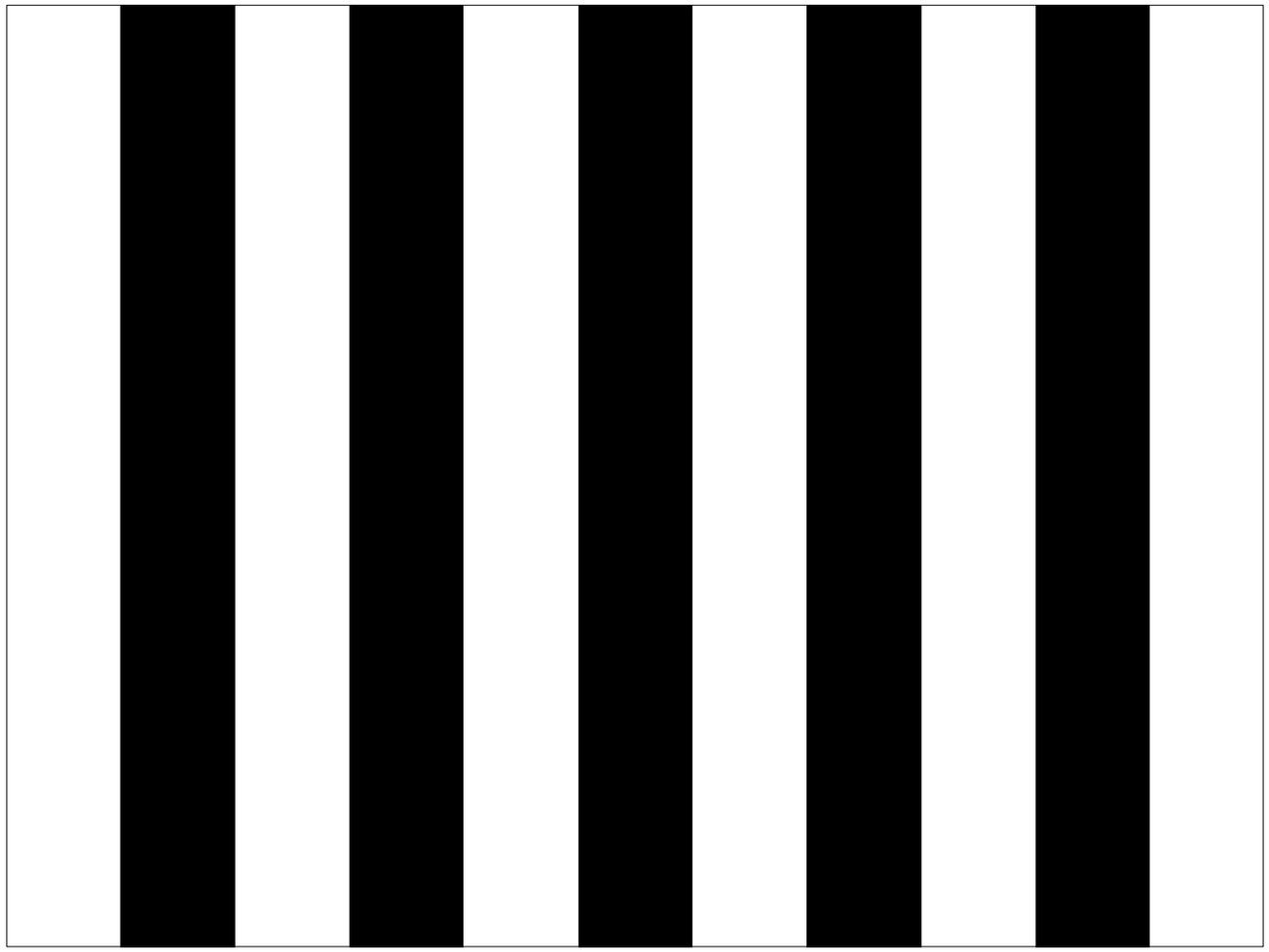


Colors that are opposite each other are … opposite colors and should never be used as a pair.

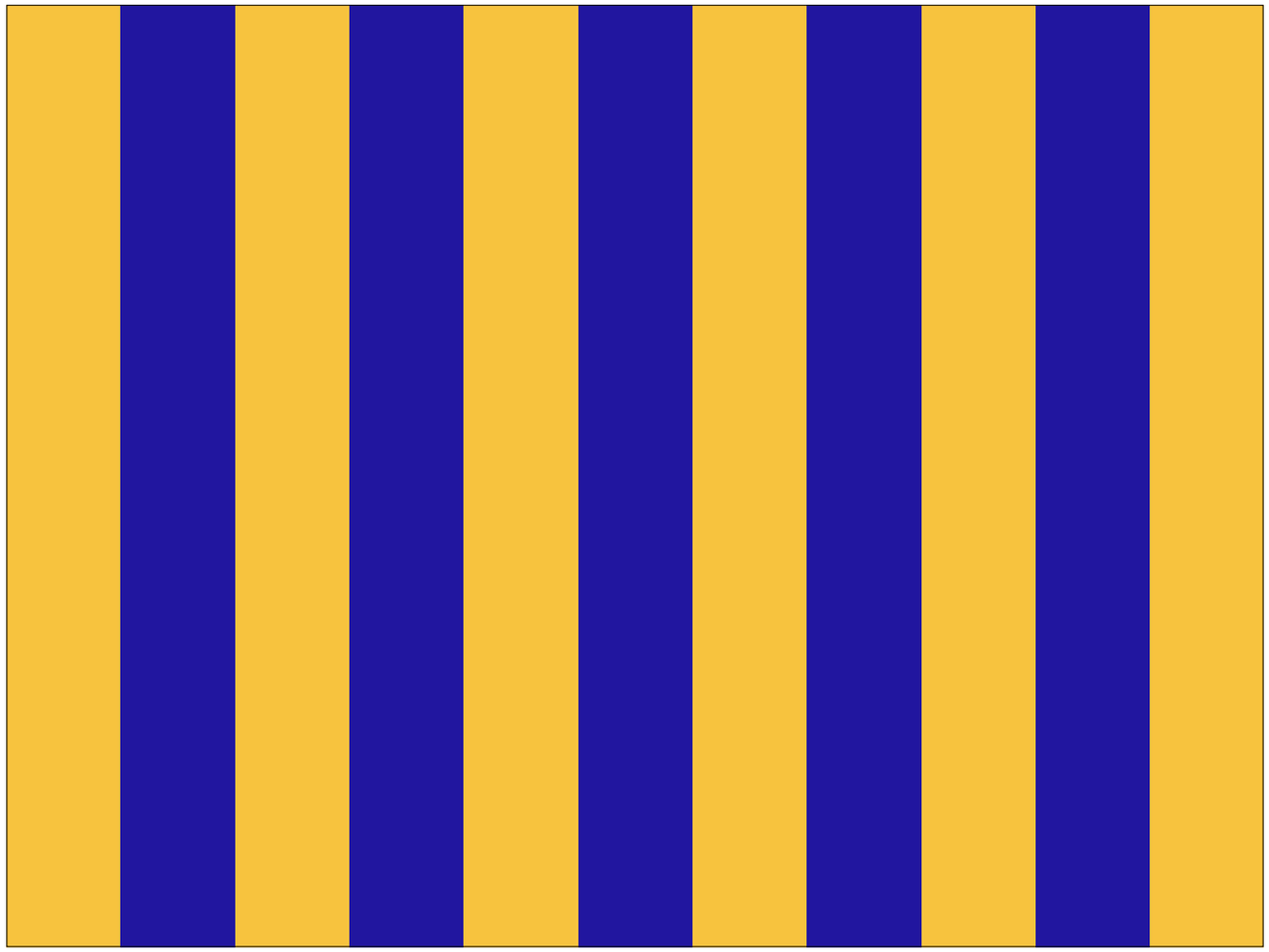




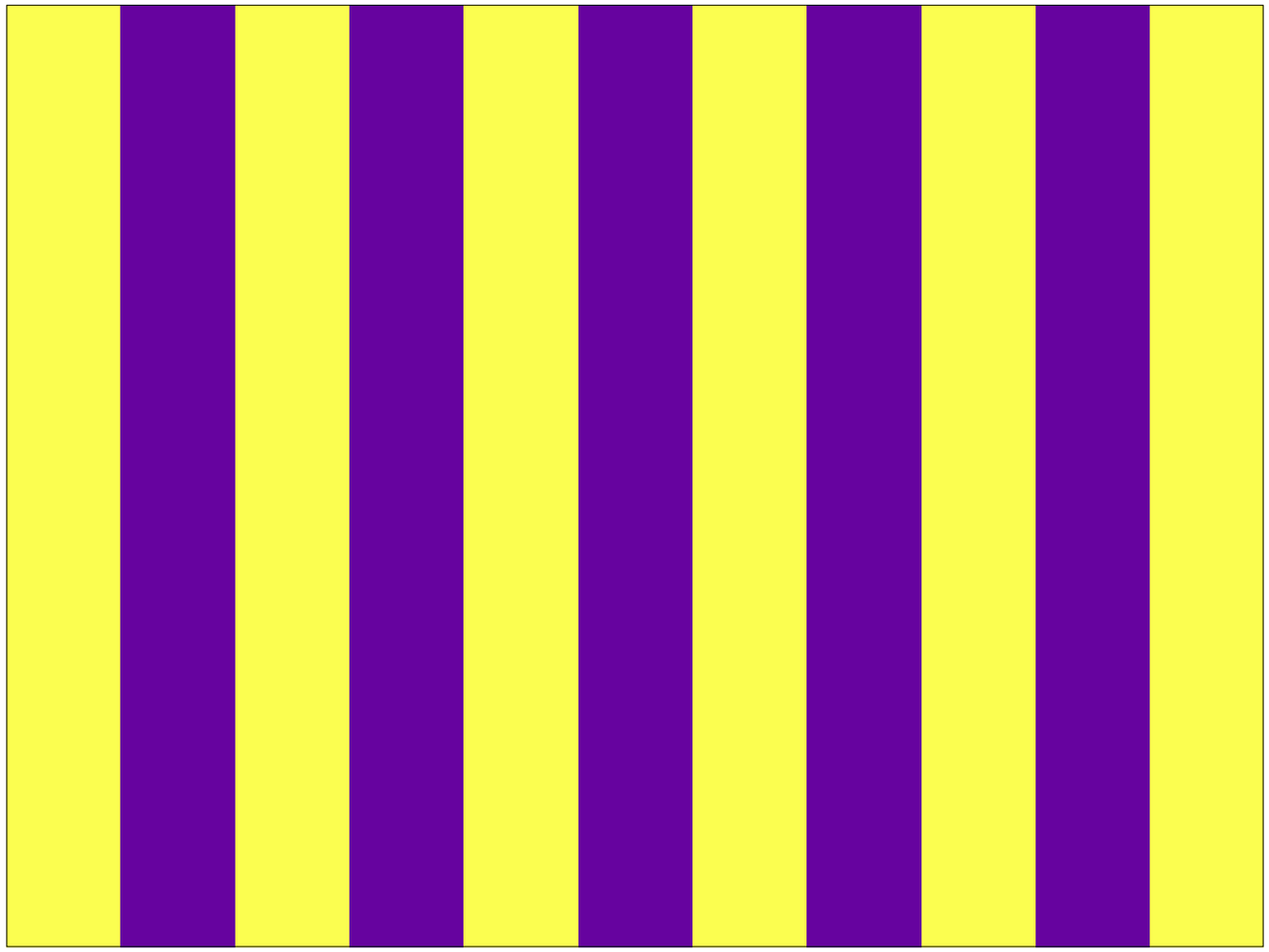
Using low contrast is easy on the eyes and readable.



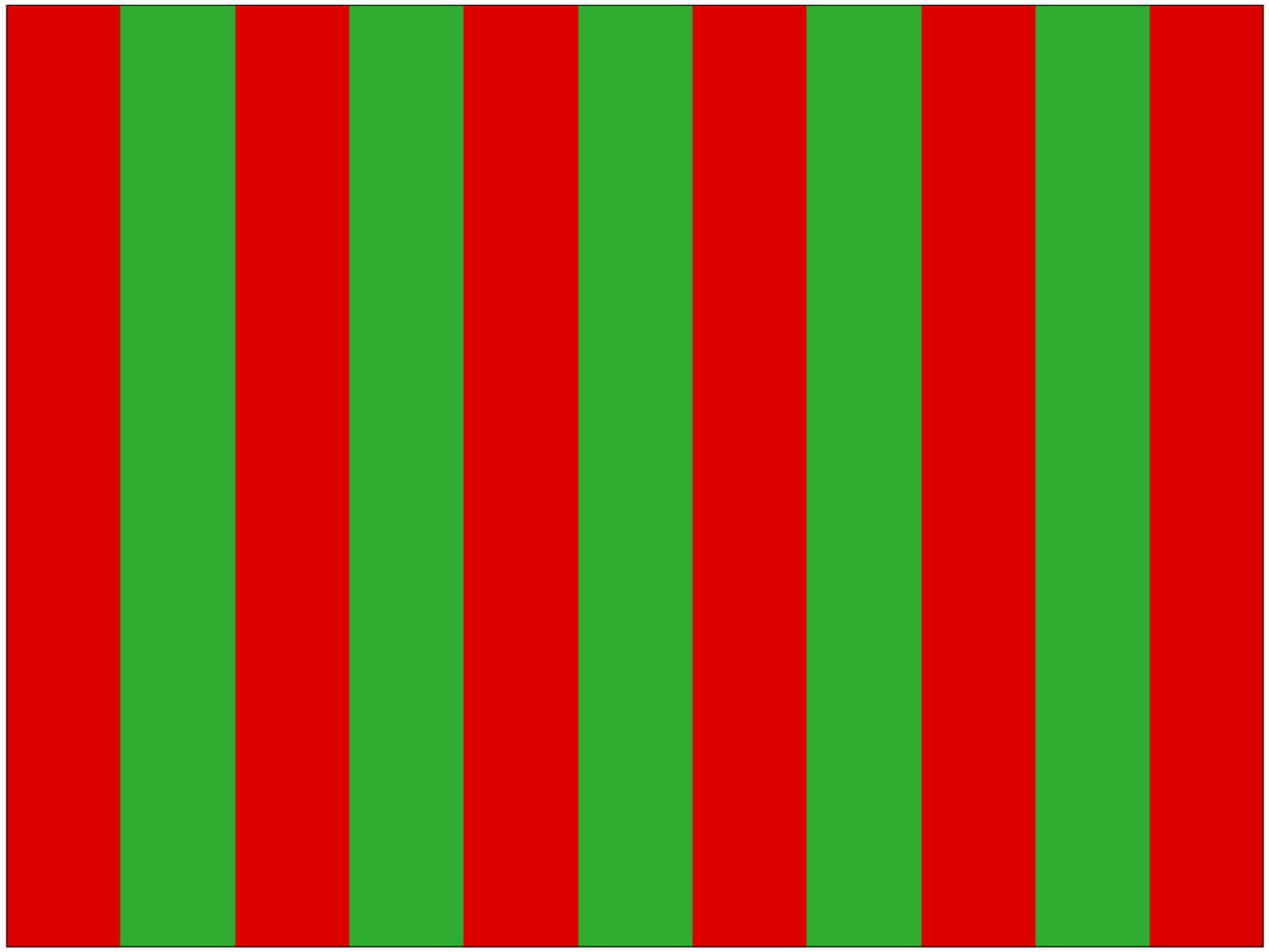
High contrast causes illusions if stared at and is difficult to read.



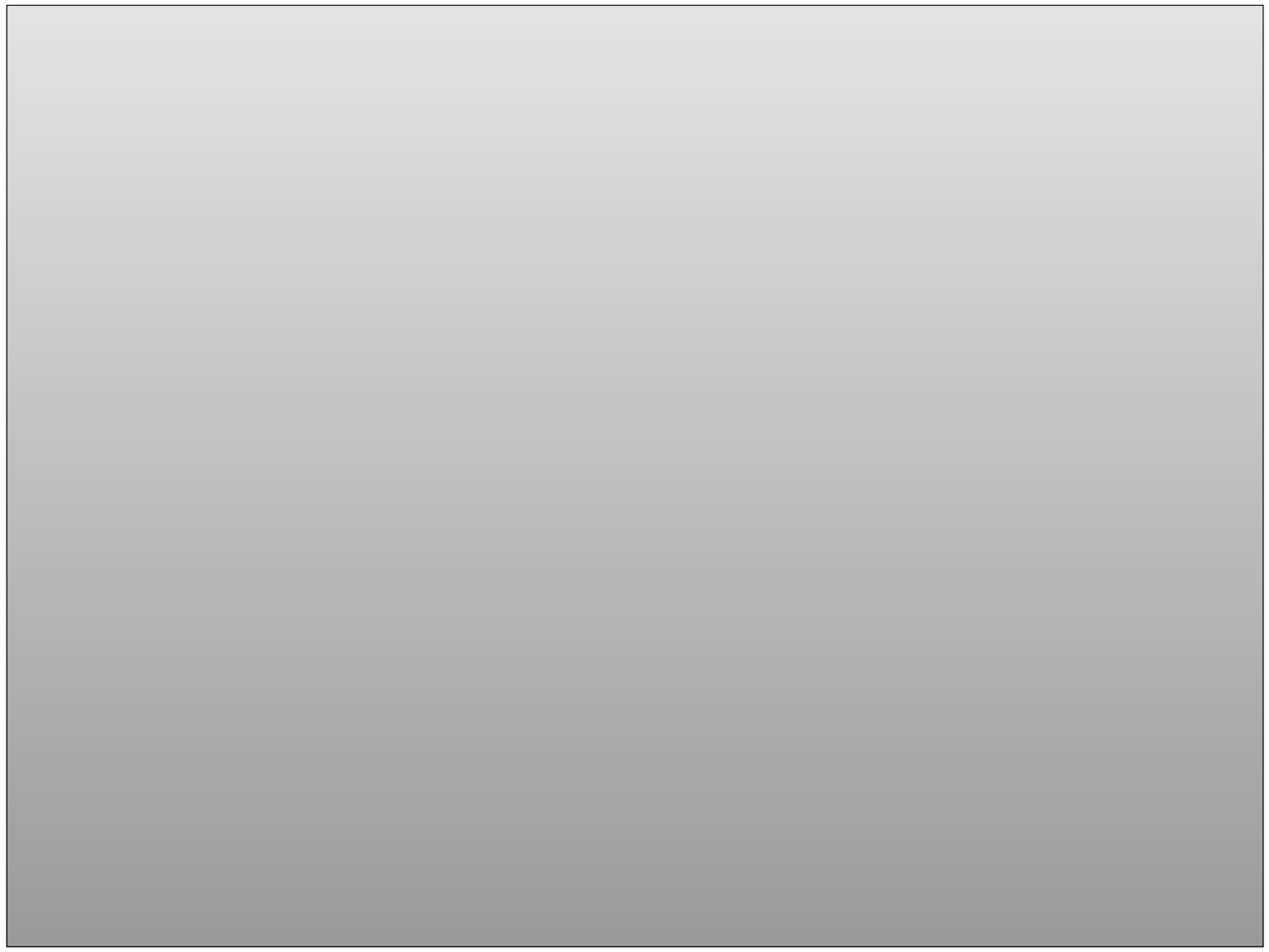
The same goes for opposite colors.



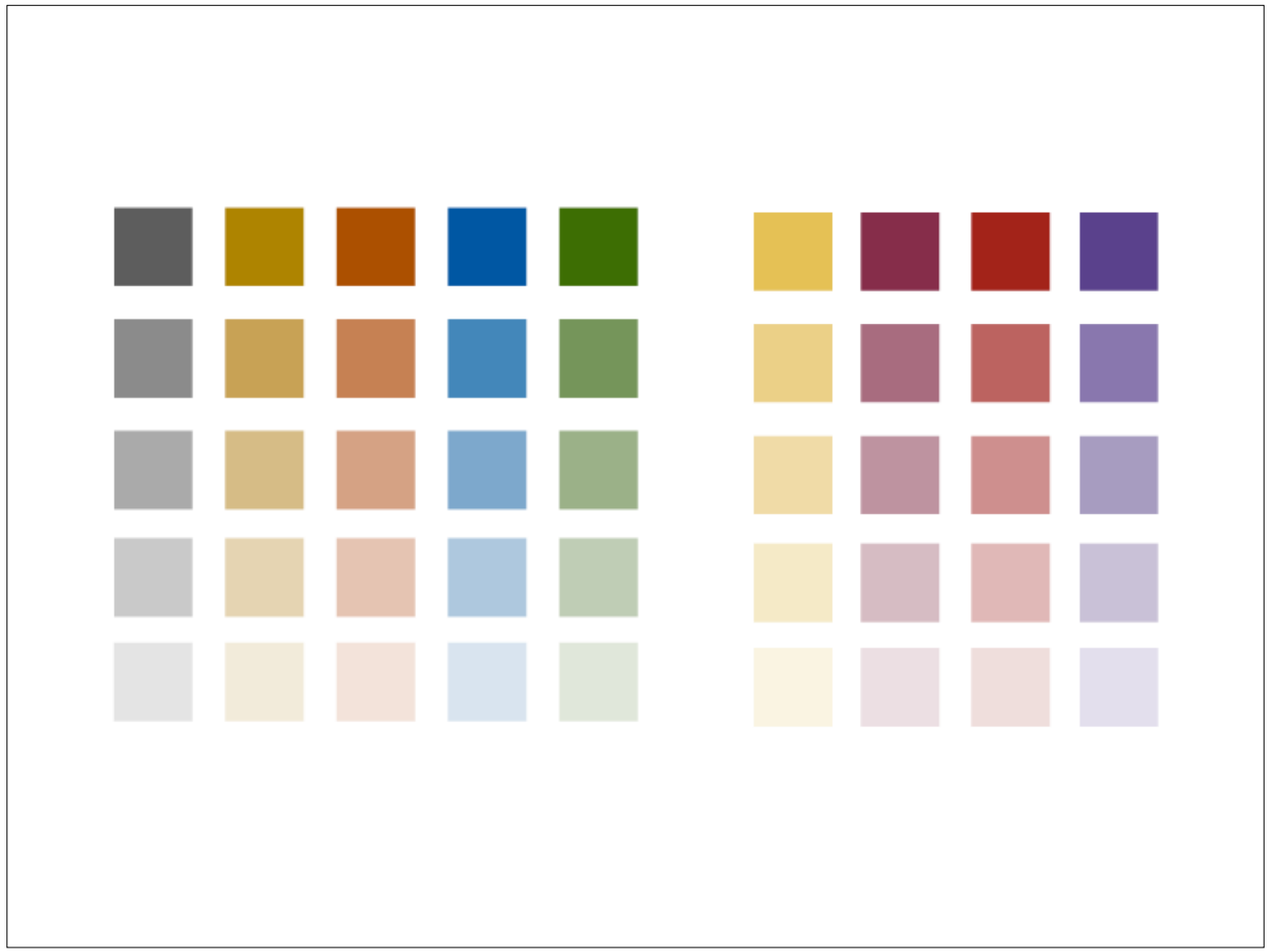
Any opposite colors.



Even the ones people, for some reason, frequently choose together.

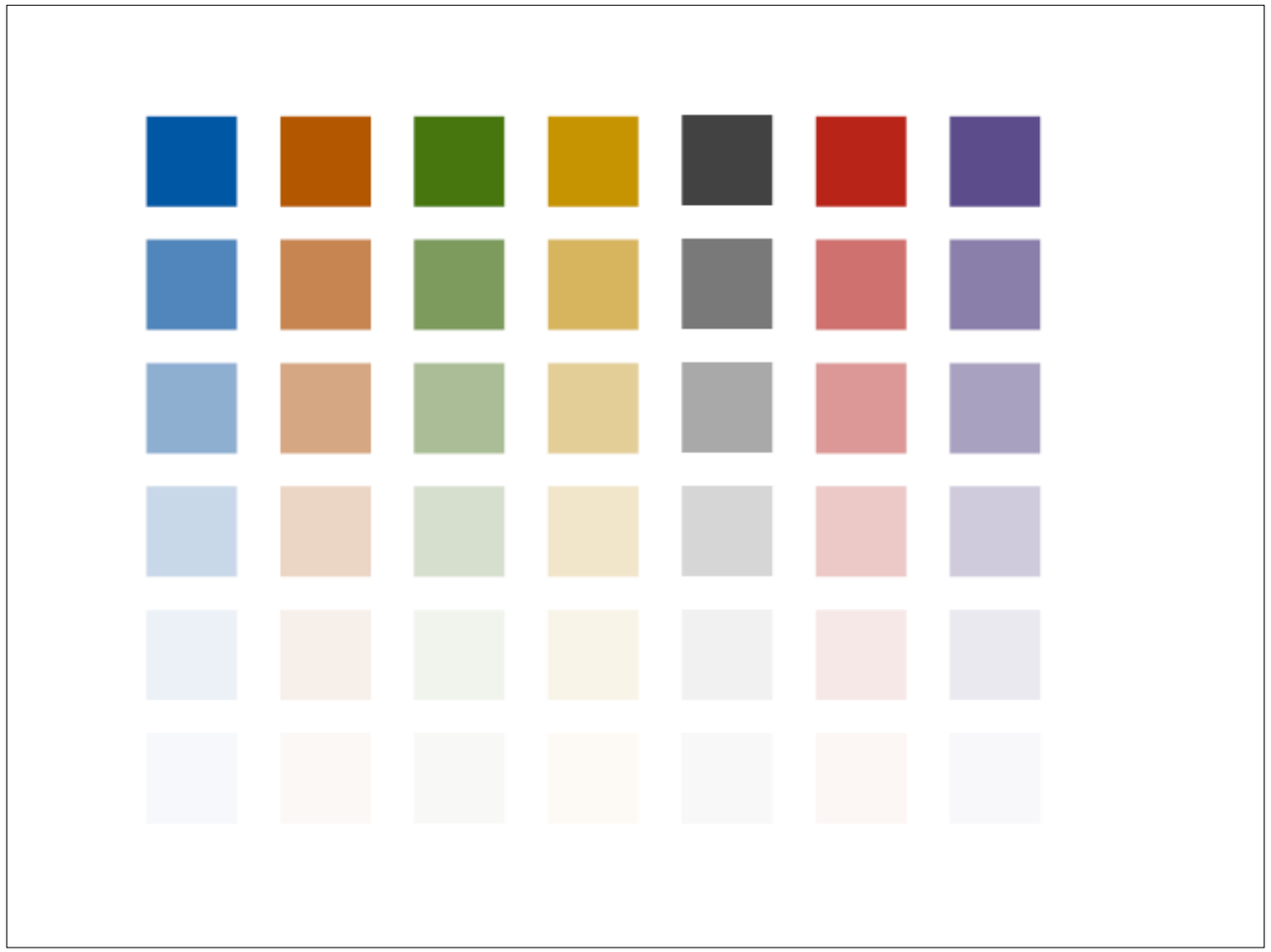


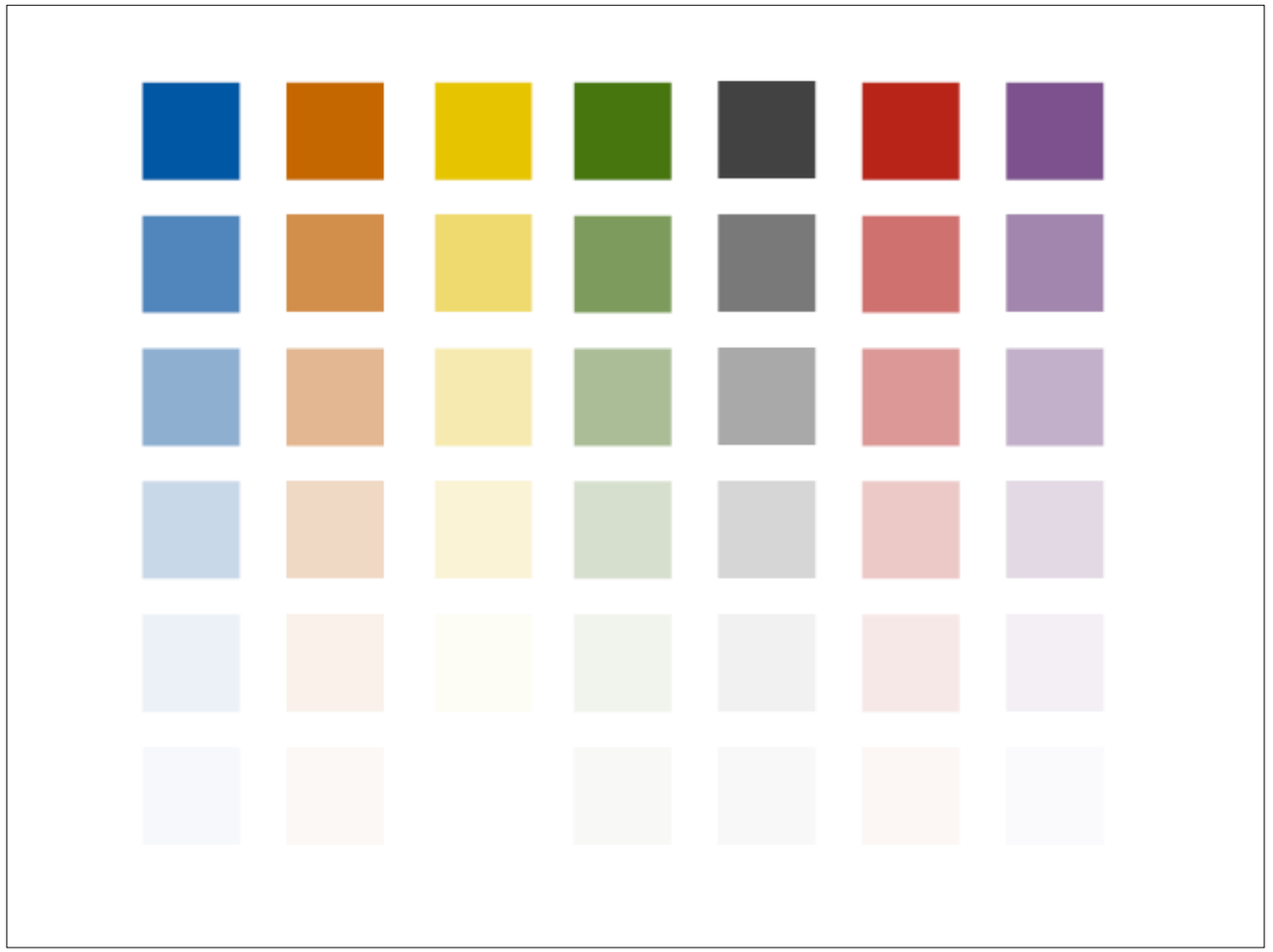
See a ghost image? Let’s try to avoid that when designing charts.



The whole color wheel is very rarely acceptible for representing data. This is the sixth version of DataMarket's chart pallette, showing seven base colours in various lightness. The lightest color is sometimes needed for large areas, using the darker colour above for outlines. The darkest ones are not often used, mostly for highlighting or gradients.

The second row is my default for lines. The third for bars.





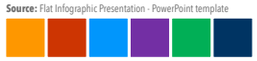
For lines and dots

For bars and... and... ok, pies.

For backgrounds, marker heads and suchlike. Outlines are from second bar row.

Source: Shift - PowerPoint template

Source: Flat Infographic Presentation - PowerPoint template



Source: Google Charts

Source: Apple Numbers (default + muted)

Source: Stephen Few

Source: Mu Lin - mulinblog.com

Source: ColorBrewer 2.0

Source: D3 category 10

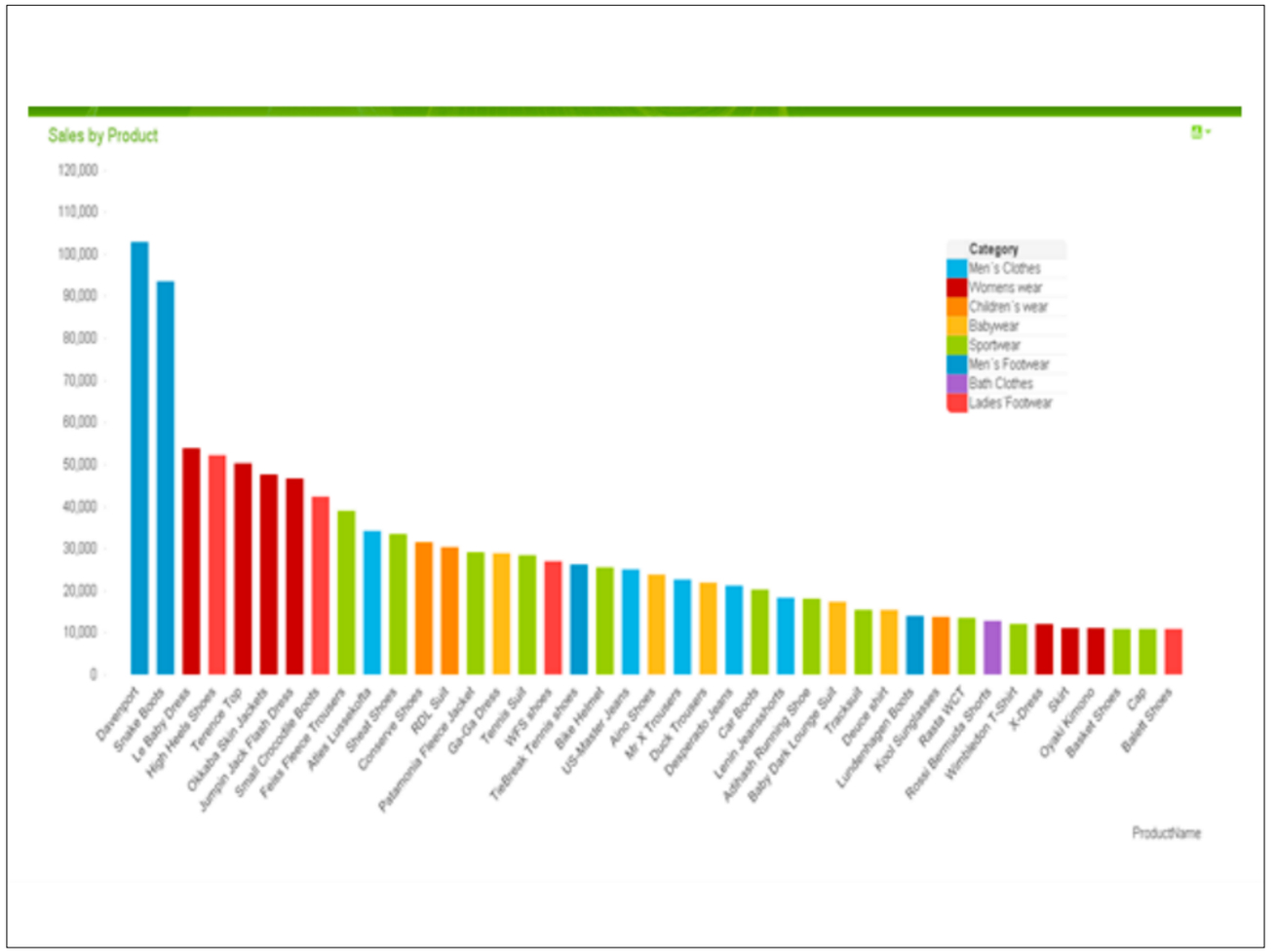
Source: Google 10c

ColorBrewer http://colorbrewer2.org/
ColorCode http://colourco.de/
Adobe Color CC https://color.adobe.com/explore/most-popular/?time=month
Paletton http://paletton.com/#uid=1000u0kllllaFw0g0qFqFg0w0aF

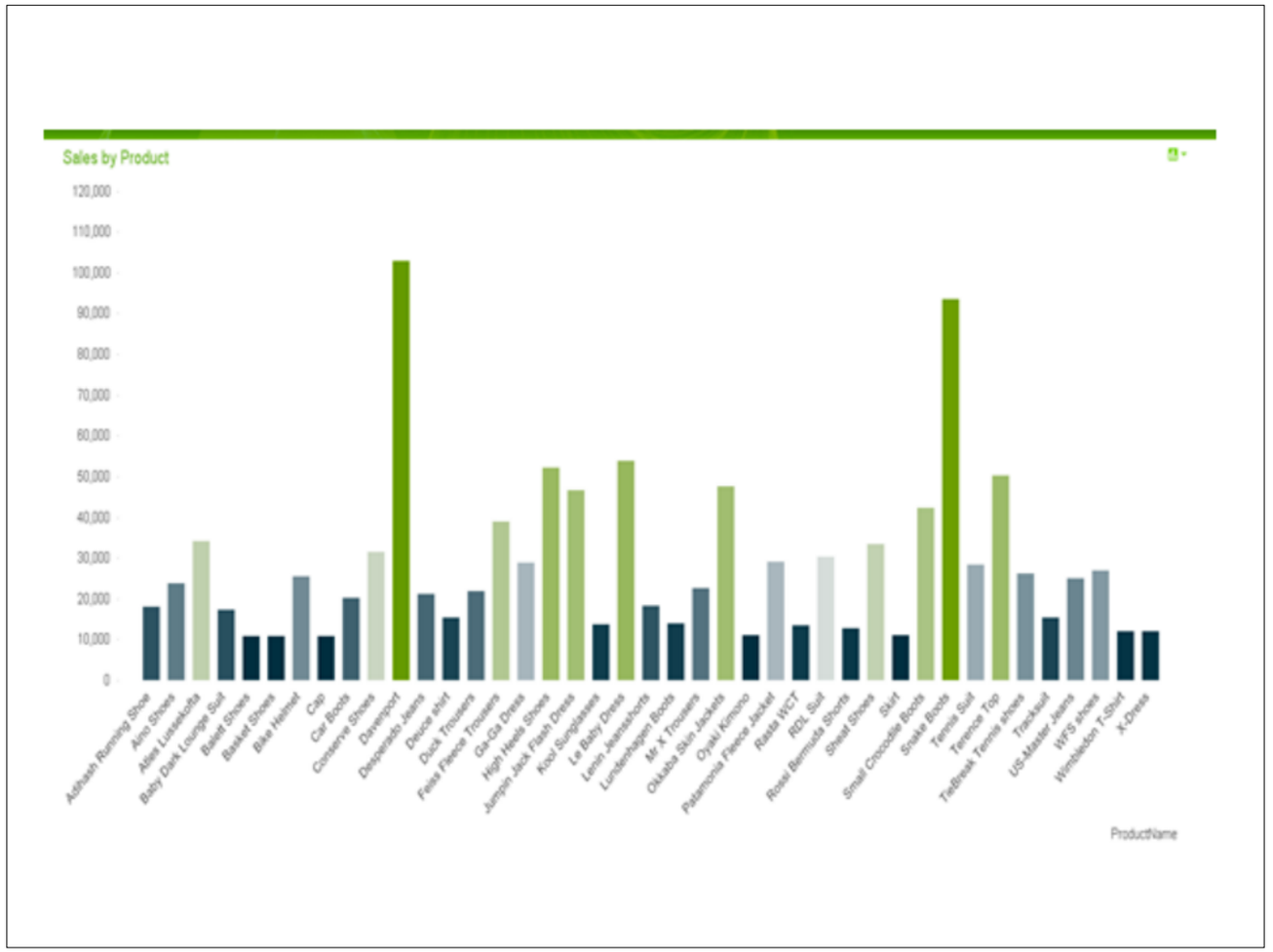
To rea[redacted]cks h[redacted]er color.

To read this text the blocks have to be in a lighter color.

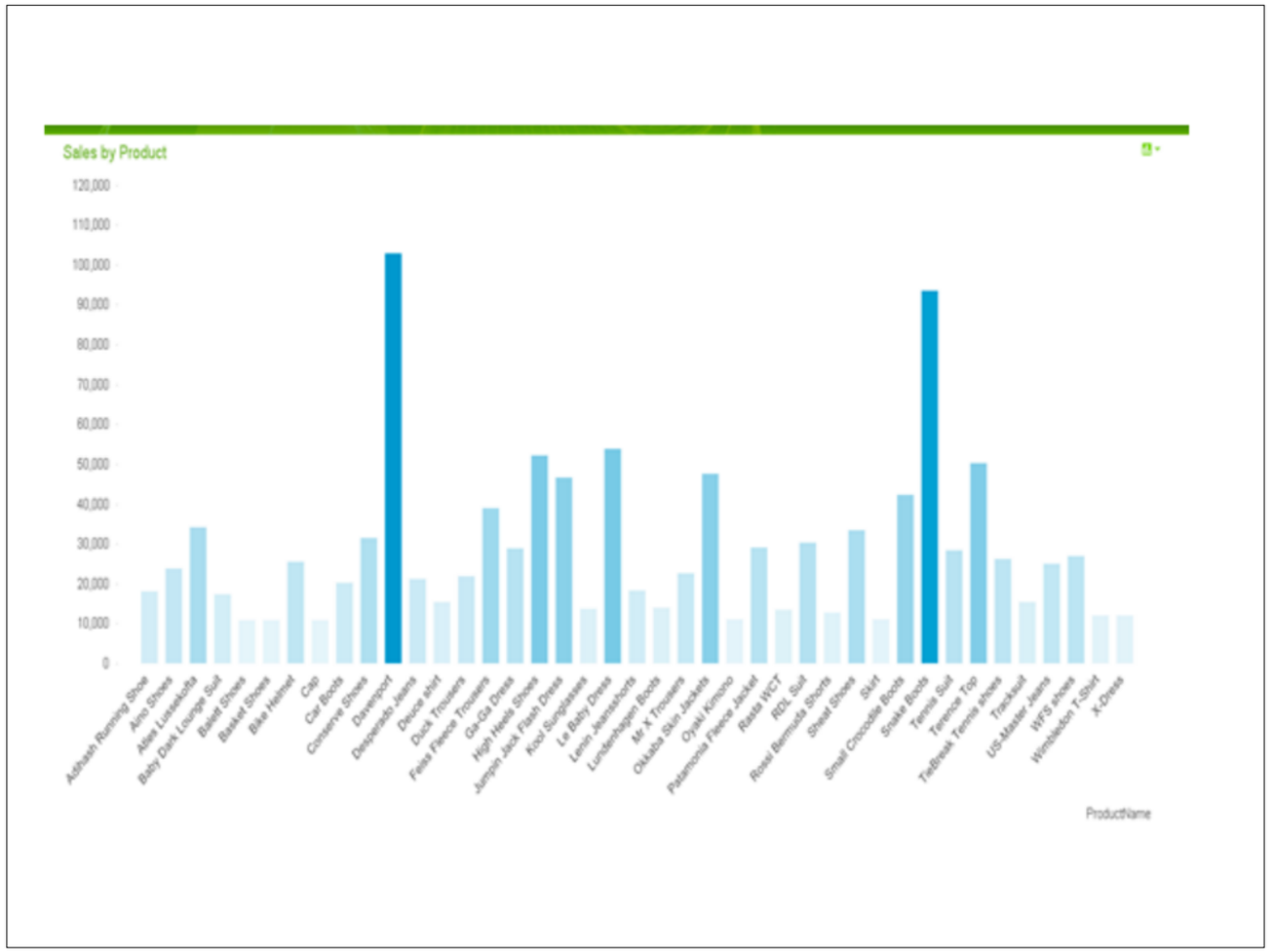
To read this text the blocks have to be in a lighter color.



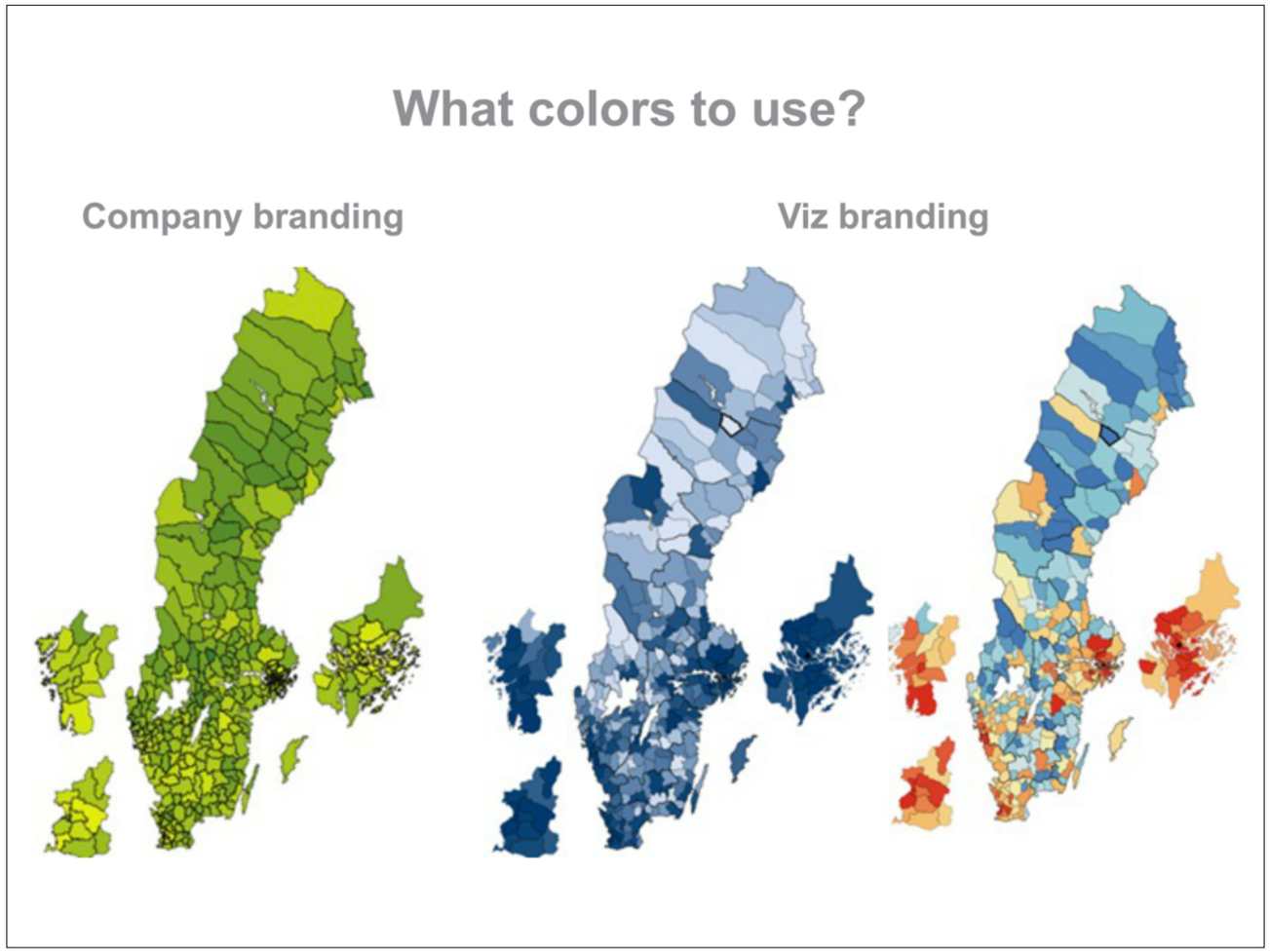
color categories. order by size. This is a nice use of colors. In fact, there are few better ways to communicate categories.



color by variation from a size (divergent). I really dislike this, because the colors don’t add anything to the chart. Yes, the large ones have a color, and the small ones another. This is better communicated with the columns height. And is.



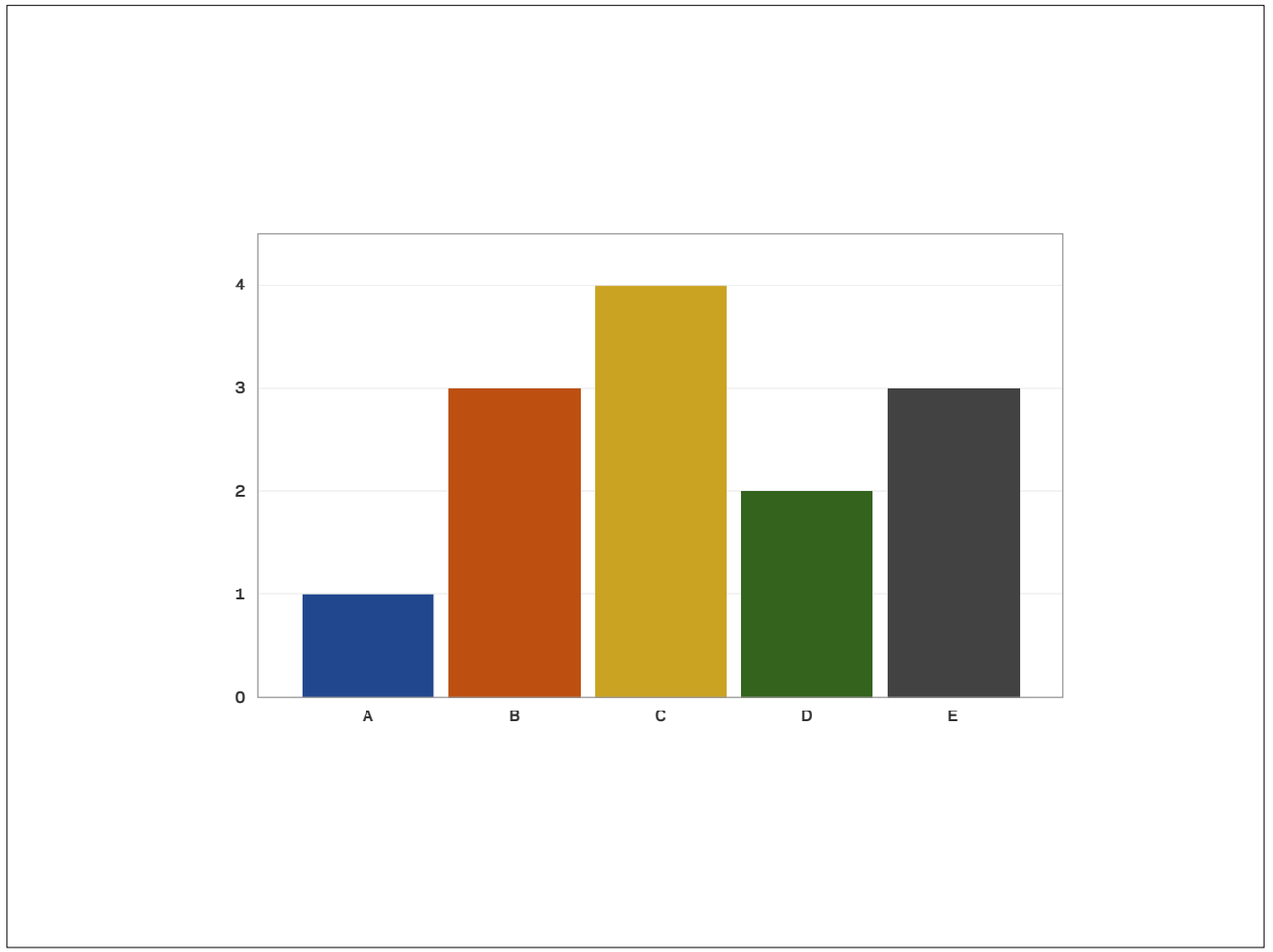
color by value. Instead of a divergent scale, this has a sequential one. But it’s still not saying any more than it would with one color.



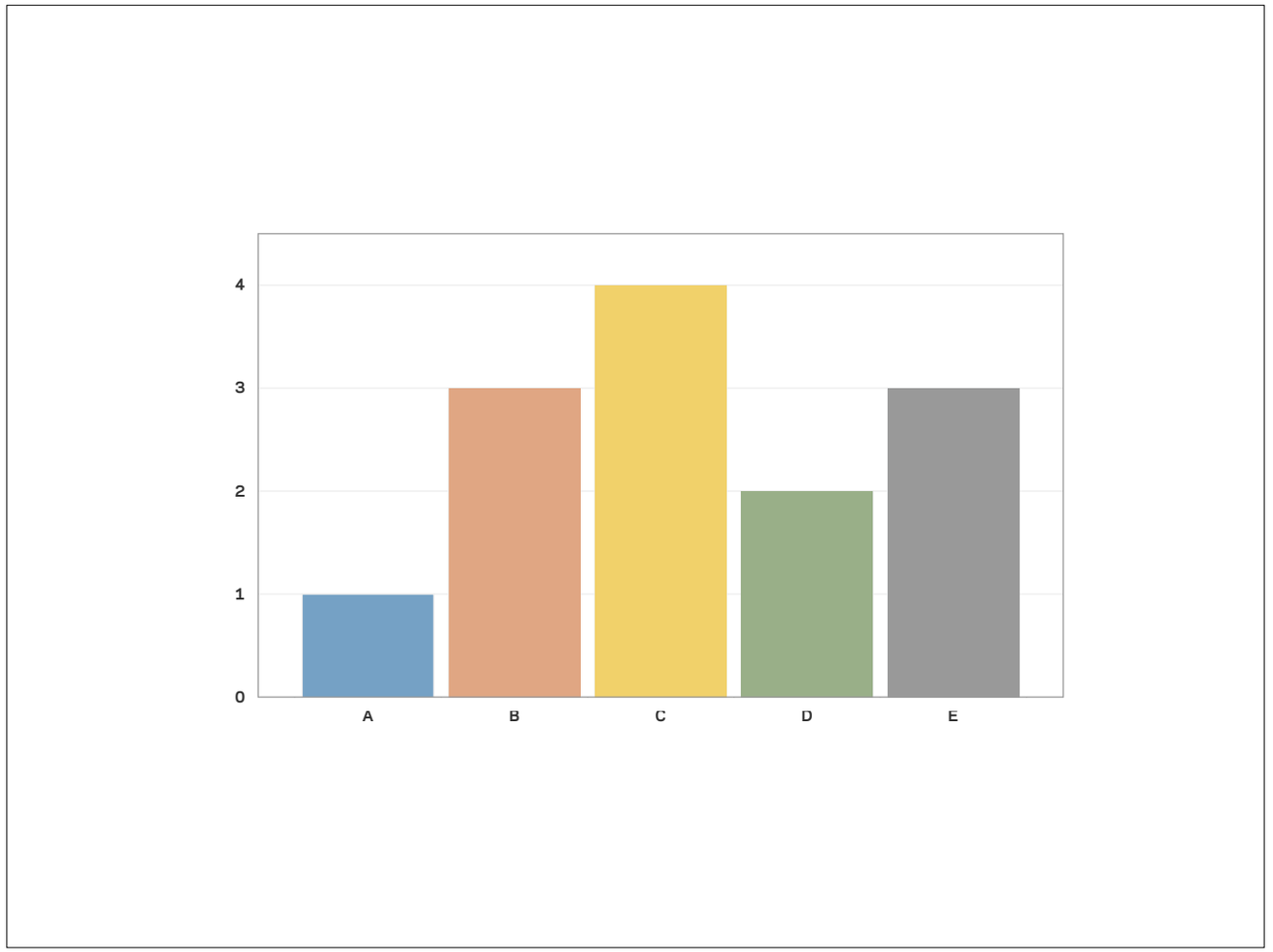
branded colors (left) vs. well chosen colors.

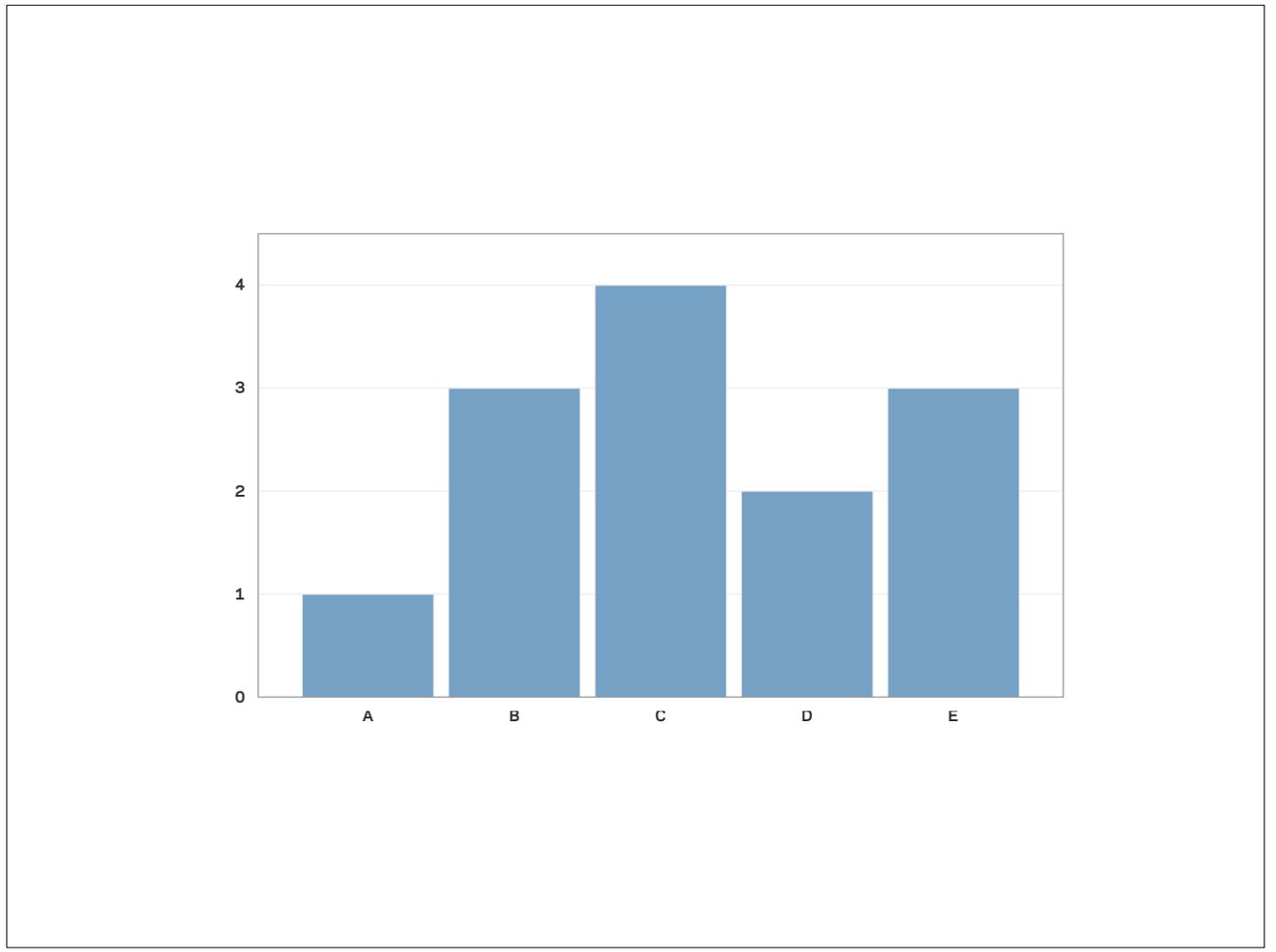
branding is for brochures and ads. not visualizations.

go to colorbrewer2.org for effective color schemes.

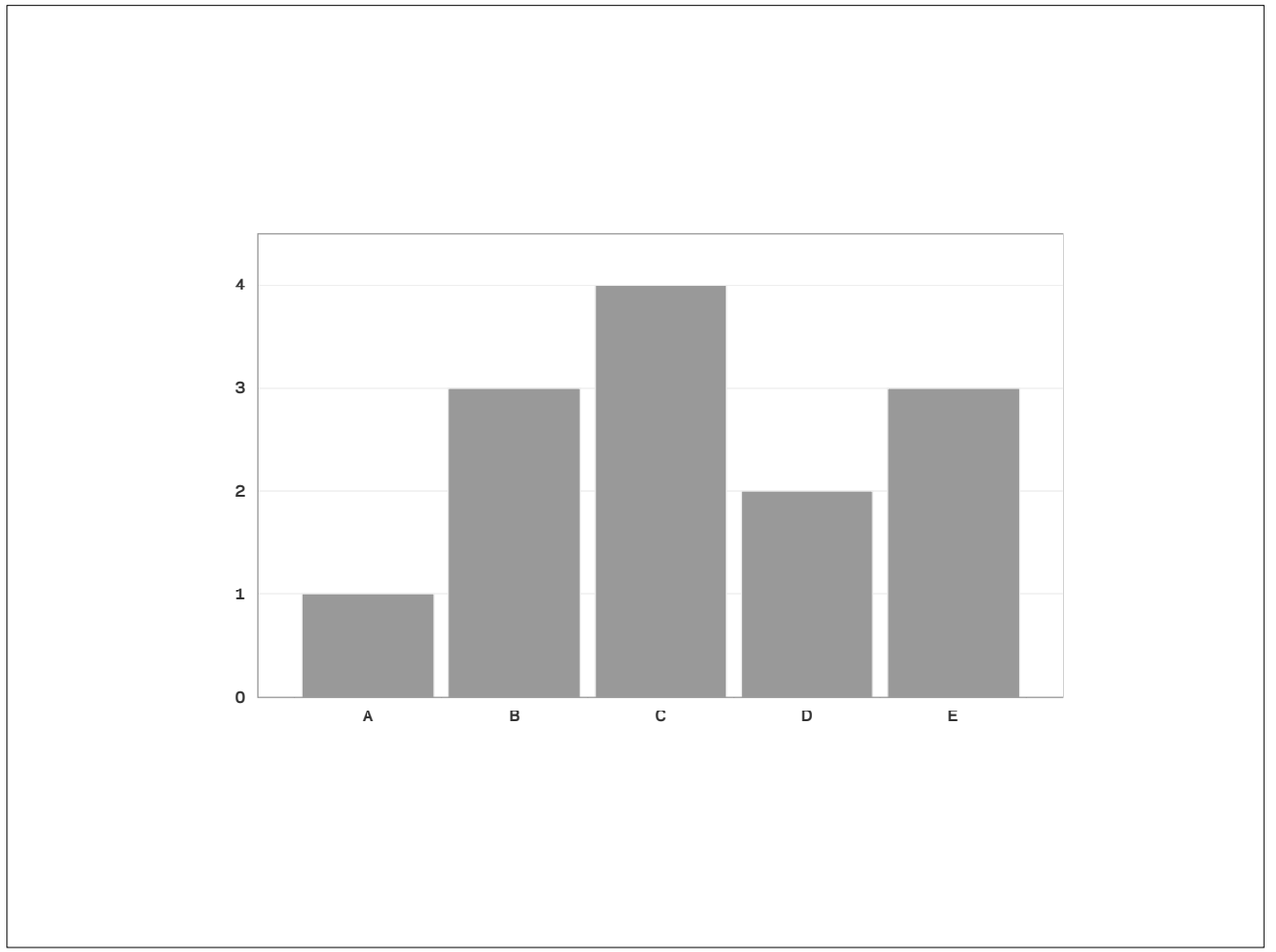


Using heavily saturated colors

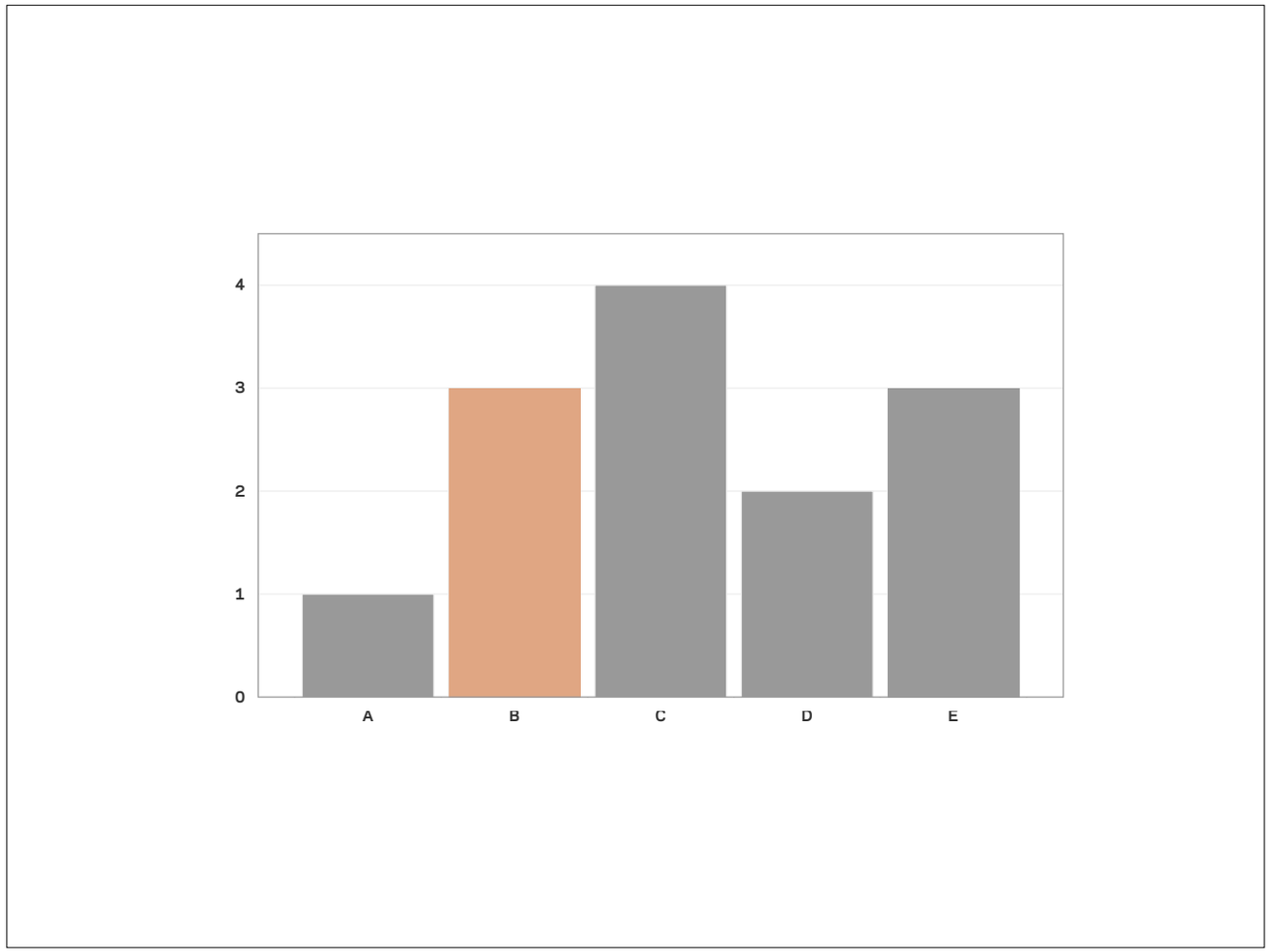

4
3
2
1
0
A
B
C
D
E



Using two colors, black/gray for the axis and labels and light blue for the bars, draws attention to the difference between the length of the bars — the data itself.

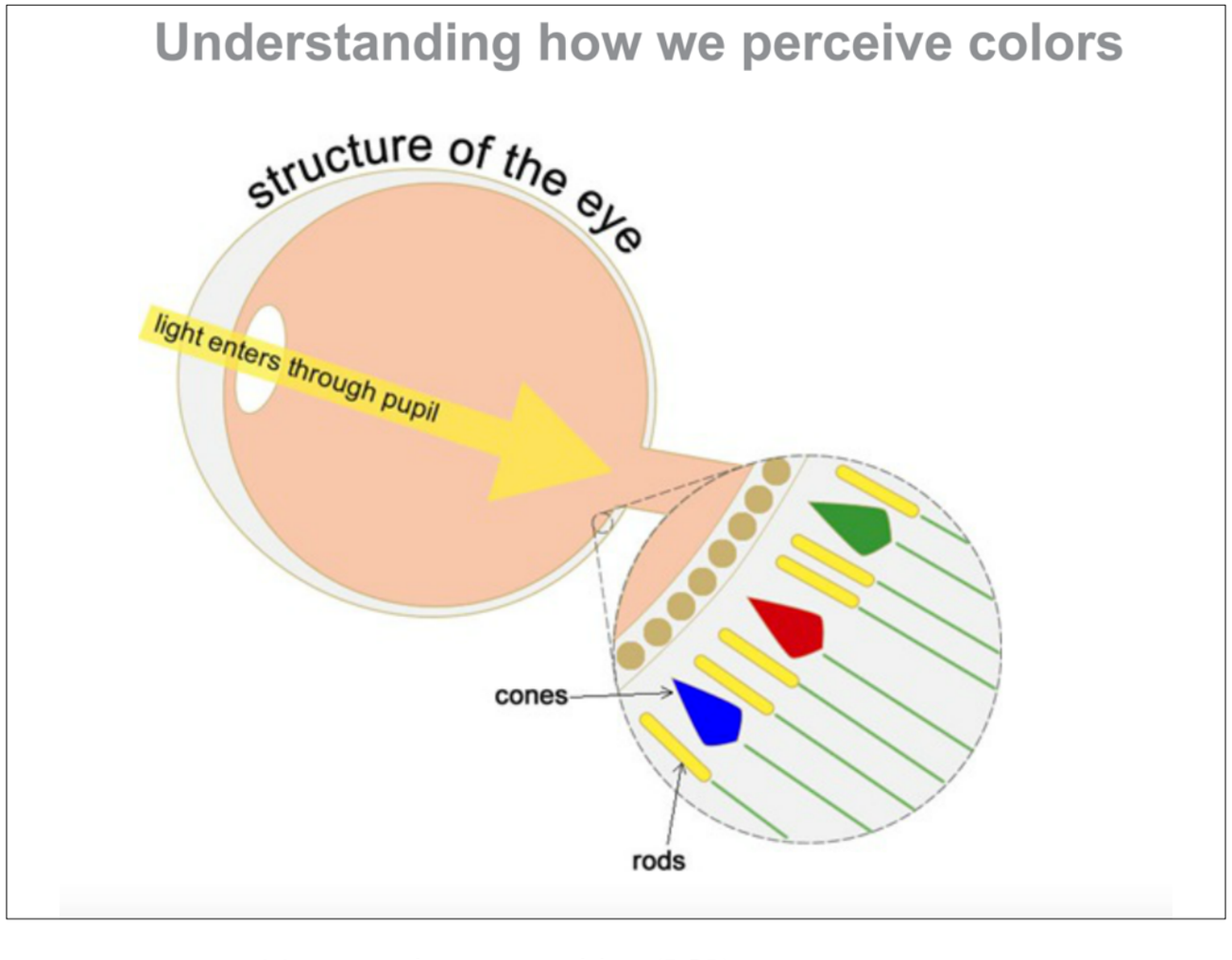


One could still argue that the blue color does nothing to enhance the data. Using only one color can be a bit dull, but it does give you the chance to direct the attention of the reader by adding color.

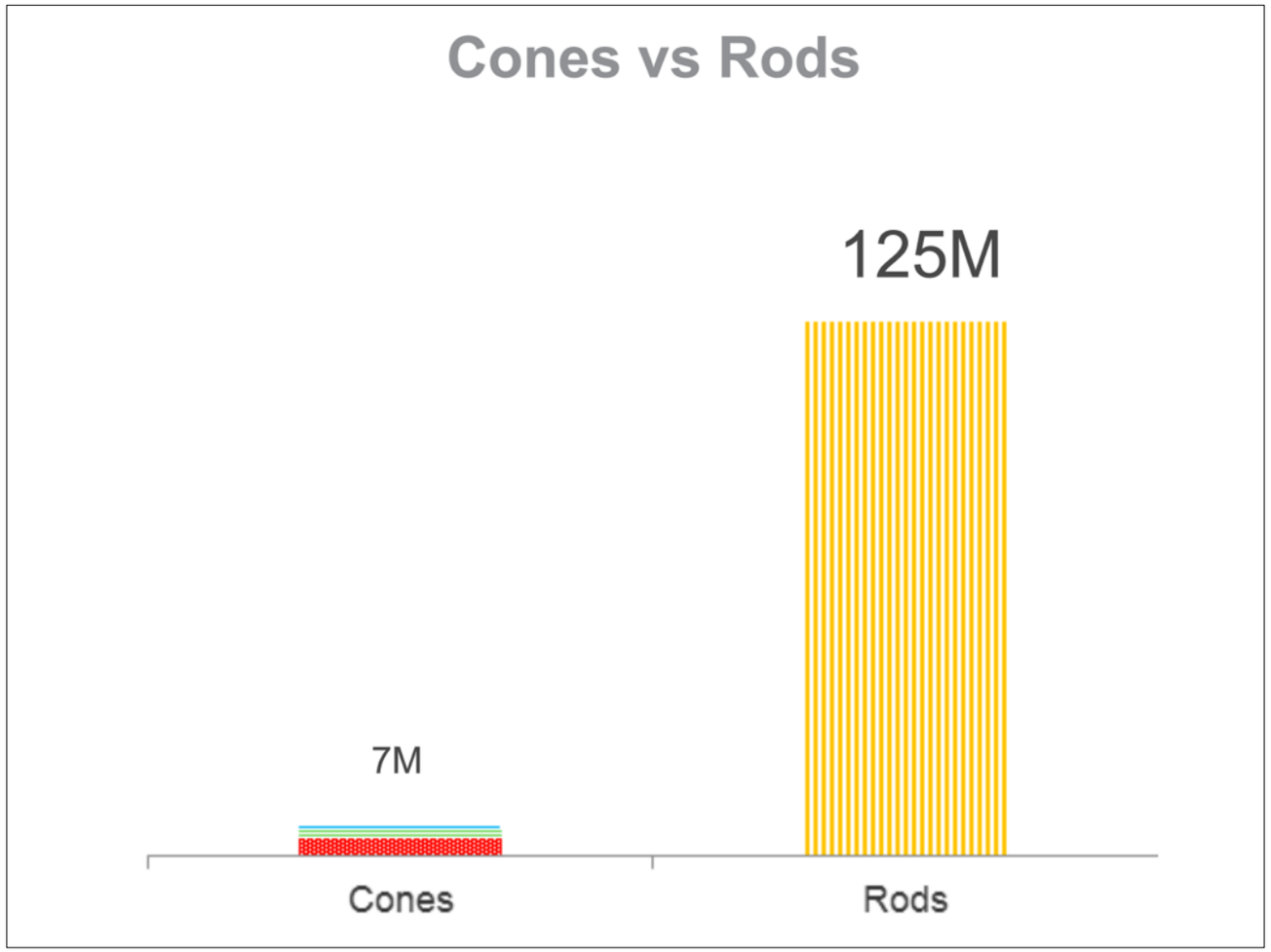


Use color sparingly to enhance the data and the story being told with it.

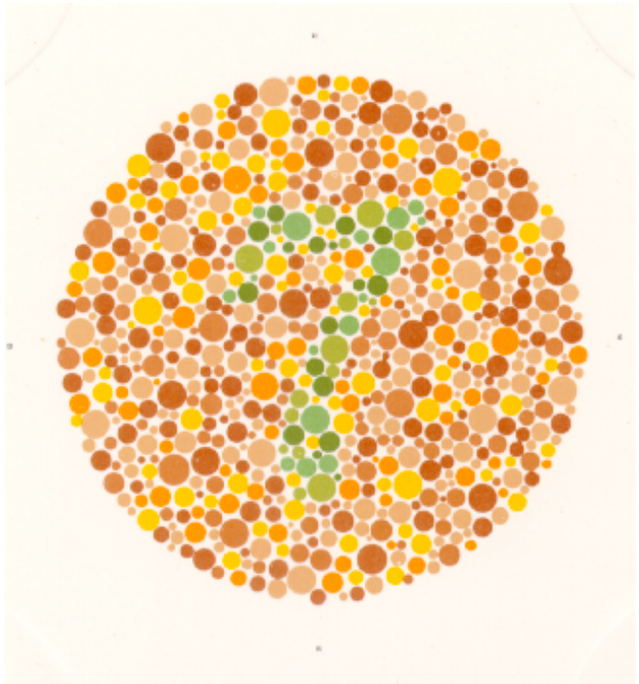
Understanding how we perceive colors



Rods are sensitive to brightness. Cones are more sensitive to red, green or blue (RGB)

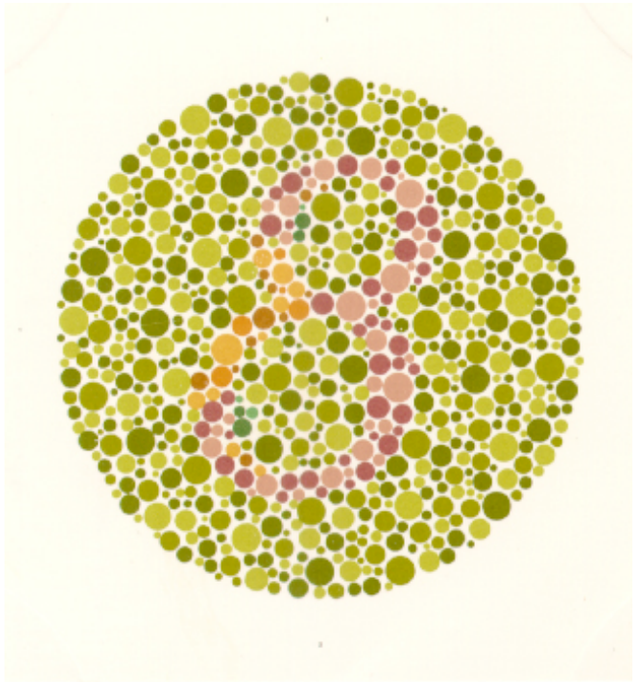


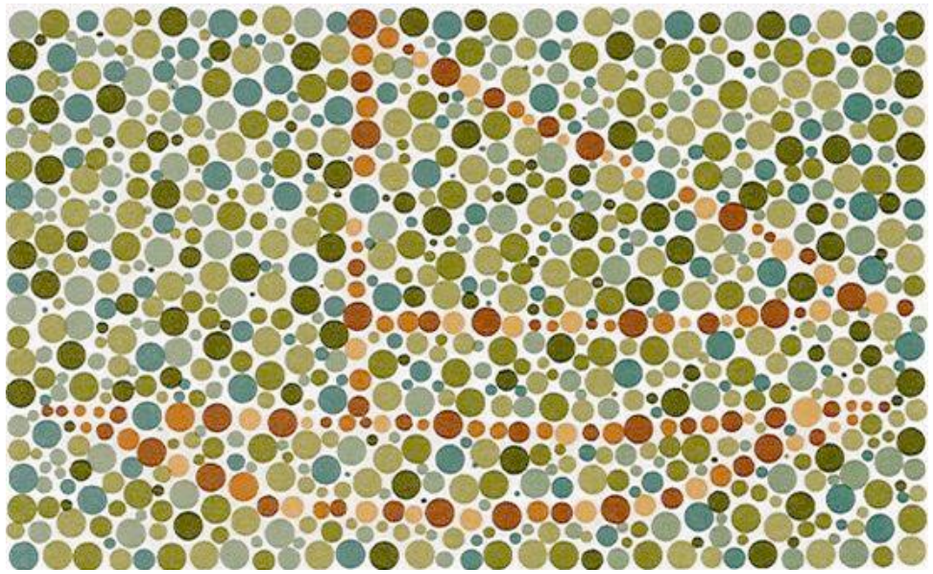
And we have a bit more rods than cones

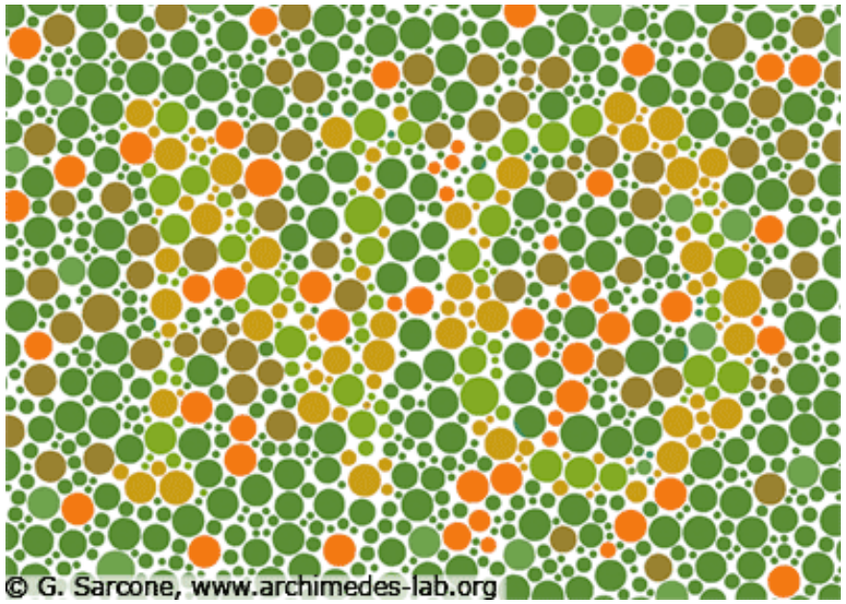


This is an Ishihara plate. It was developed by the Japanese ophtalmologist Shinobu Ishihara (1879-1963) to screen miolitary recruits for abnormalities of color vision. What do you see?

(Source: http://www.archimedes-lab.org/colorblindnesstest.html)





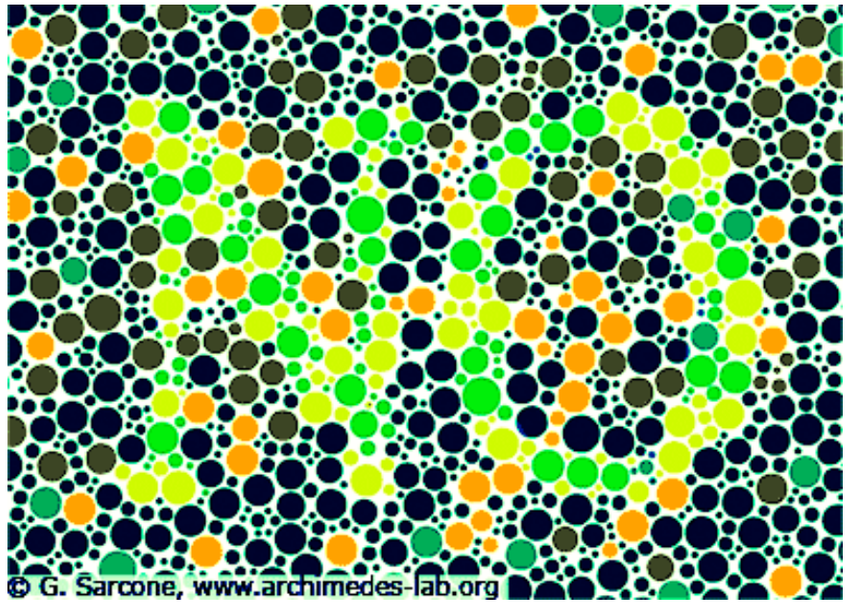


What do you see now? Give it time.

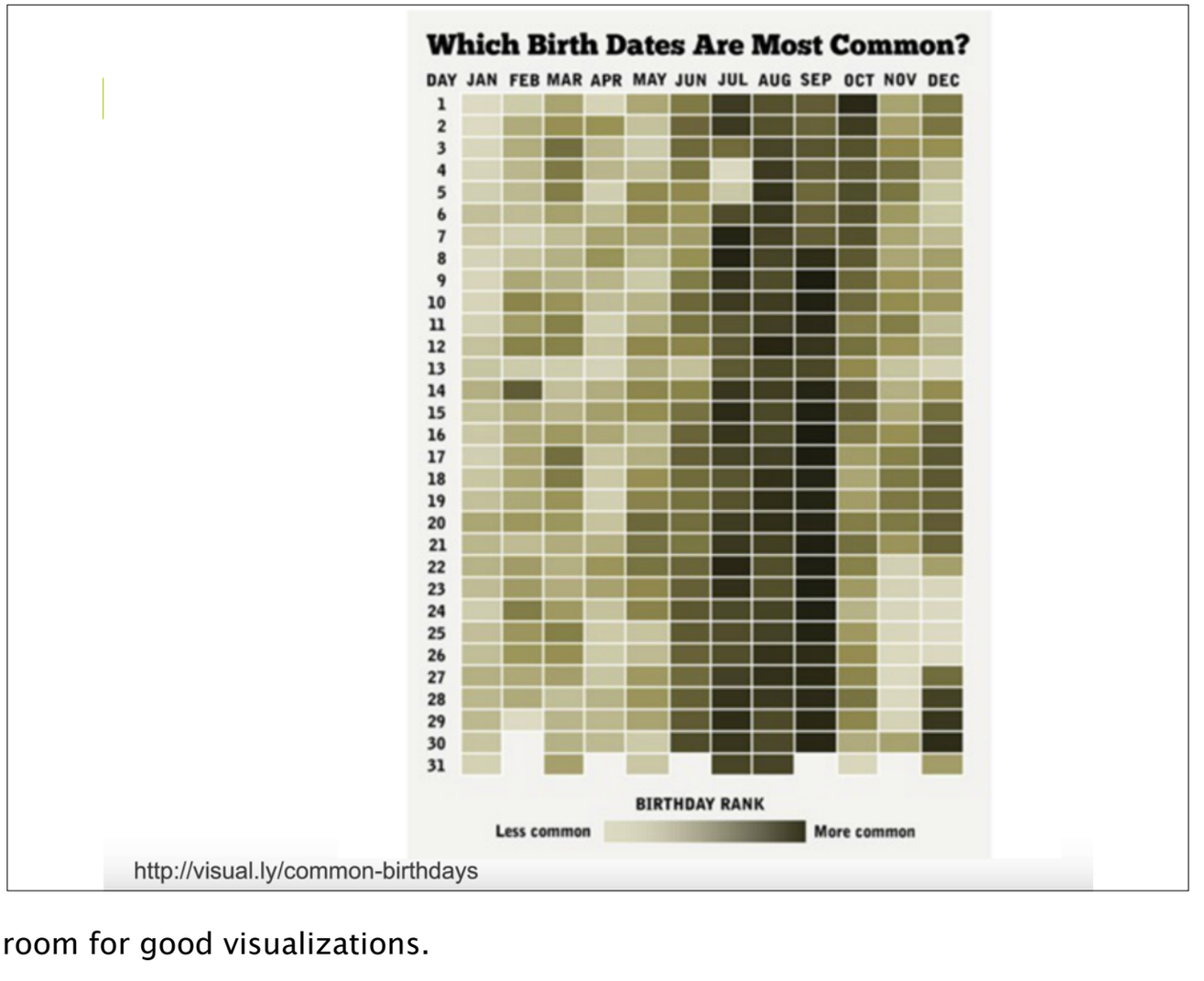
- -

Given up? Are you sure?

This is a reverse Ishimara test that only a certain type of colorblind people can read. Keep the frustration you're feeling right now in mind the next time you're choosing colors for a visualization.

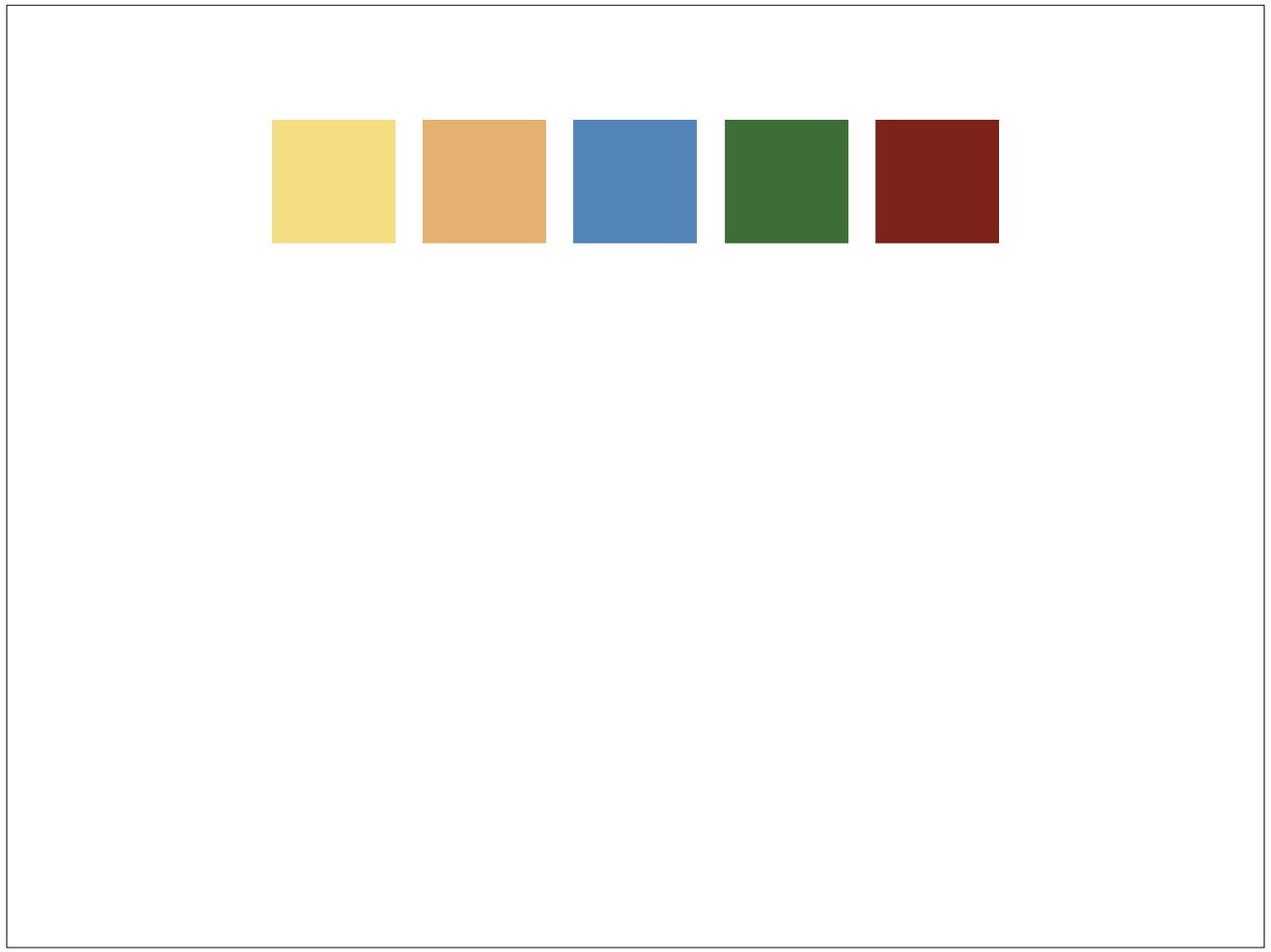


After a lot of tweaking with hues and color blends, I managed to tease out the hidden message.



Using fewer colors still leaves ample room for good visualizations.

What is up with the 4th of July? Vacation and fewer caesarians?



Creating a color blind palette grows increasingly hard with the more colors you add. (Making a beautiful color blind palette is even harder.)

This is a color pallette that is colorblind safe. It is also suitable for a black and white conversion.

To make it even safer, create a greater difference between red and green.

Look at http://colorbrewer2.org/ for well researched (although not the prettiest) palettes to use.

Creating a color blind palette grows increasingly hard with the more colors you add. (Making a beautiful color blind palette is even harder.)

This is a color pallette that is colorblind safe. It is also suitable for a black and white conversion.

To make it even safer, create a greater difference between red and green.

Look at http://colorbrewer2.org/ for well researched (although not the prettiest) palettes to use.

Creating a color blind palette grows increasingly hard with the more colors you add. (Making a beautiful color blind palette is even harder.)

This is a color pallette that is colorblind safe. It is also suitable for a black and white conversion.

To make it even safer, create a greater difference between red and green.

Look at http://colorbrewer2.org/ for well researched (although not the prettiest) palettes to use.

Designing charts

*“Overview first, zoom and filter,
then details-on-demand.“*

— Bill Schneiderman

The Visual Information Seeking mantra: “Overview first, zoom and filter, then details-on-demand”. — Bill Schneiderman.

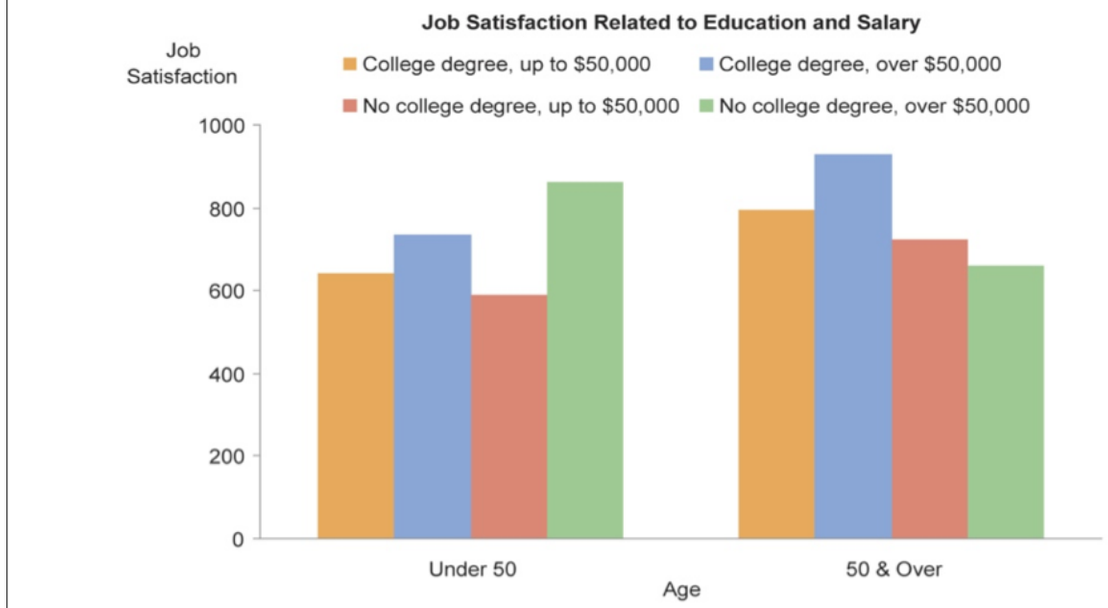
http://www.ifp.illinois.edu/nabhcs/abstracts/shneiderman.html

Job Satisfaction By Income, Education & Age

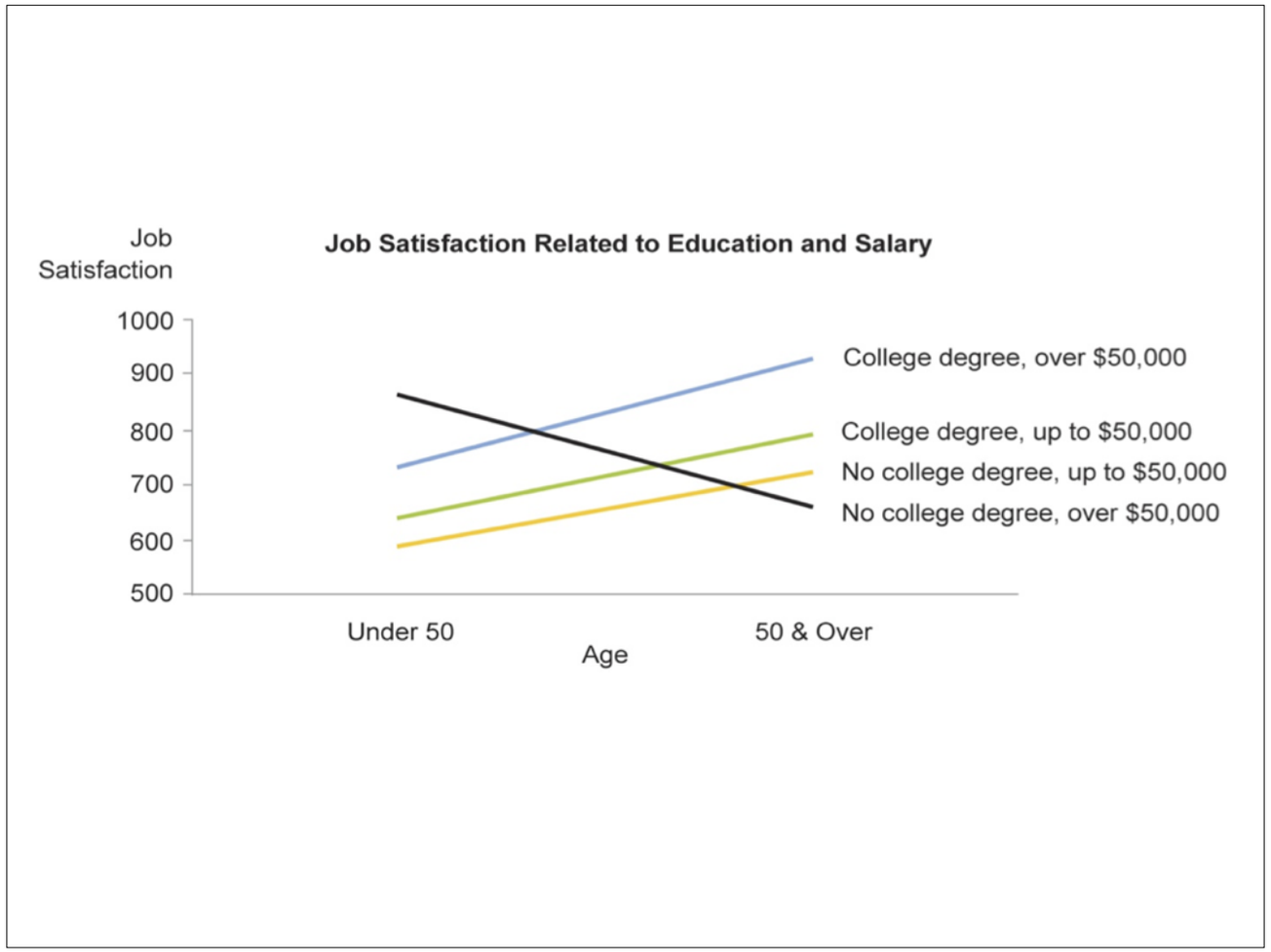
	College Degrees		No College Degrees	
Income	Under 50	50 & over	Under 50	50 & over
Up to $50,000	643	793	590	724
Over $50,000	735	928	863	662

The message in this table deals with job satisfaction for people under and over 50 years old, with or without a college degree. You have to work hard to get this message the display as it is currently designed.

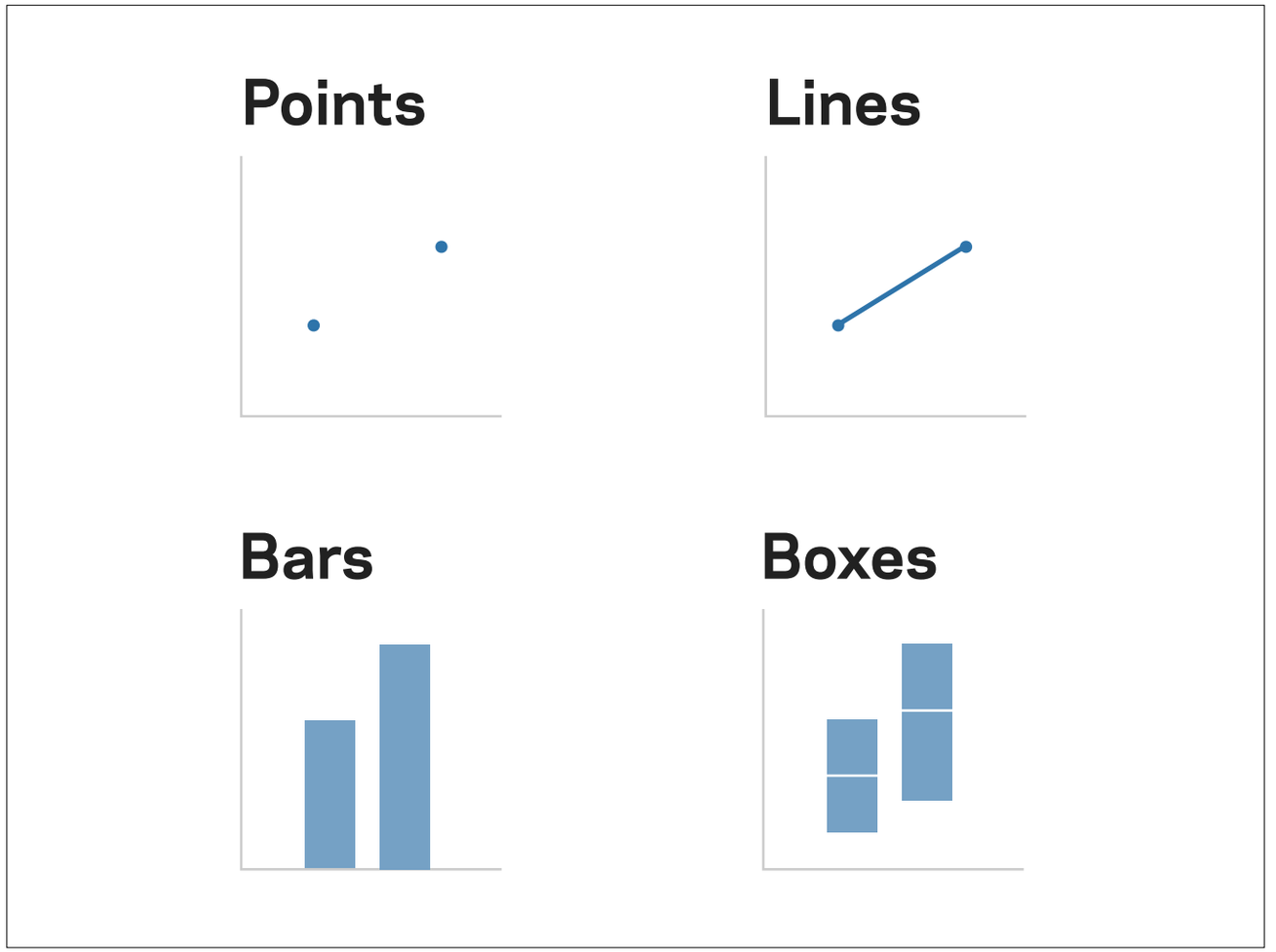
.



Changing the table to a bar graph, the decrease in job satisfaction among those without college degrees in their later years is no longer as obvious.

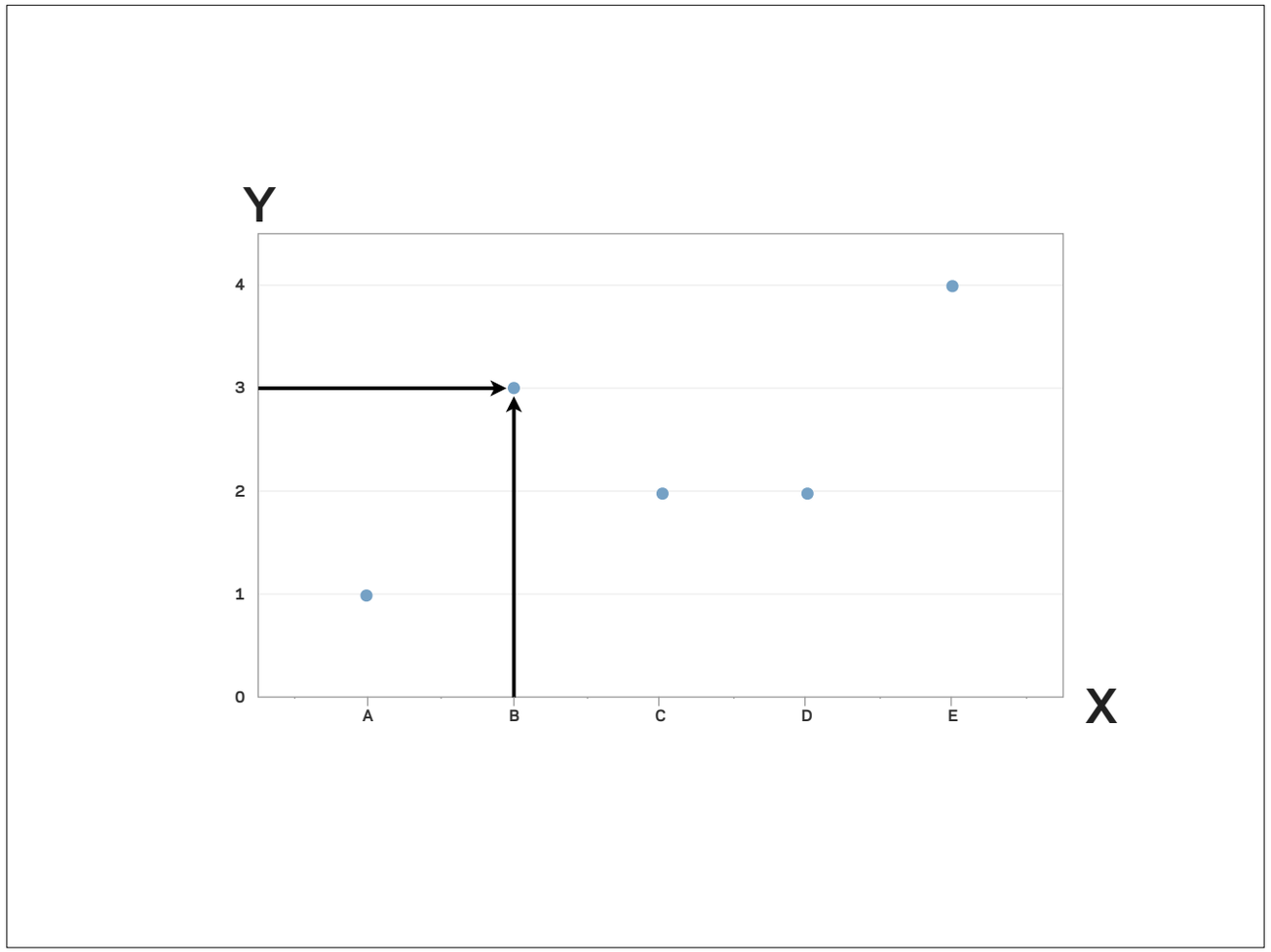


This line chart is designed very specifically to display the intended message. Because this graph is skillfully designed to communicate, its message is crystal clear. A key feature that makes this so is the choice of percentage for the quantitative scale, rather than dollars.

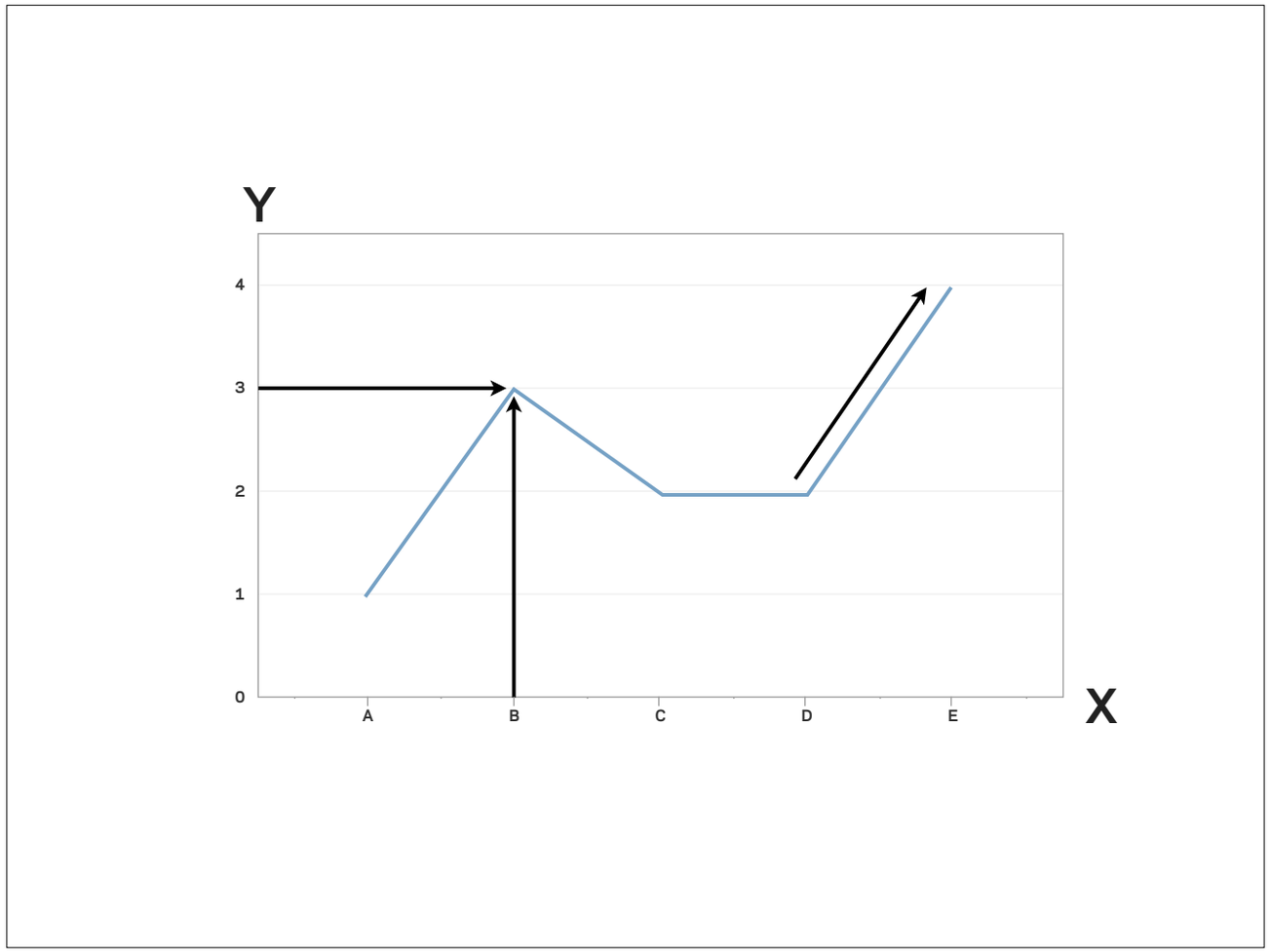


Four different objects can be used to visually encode data in graphs:

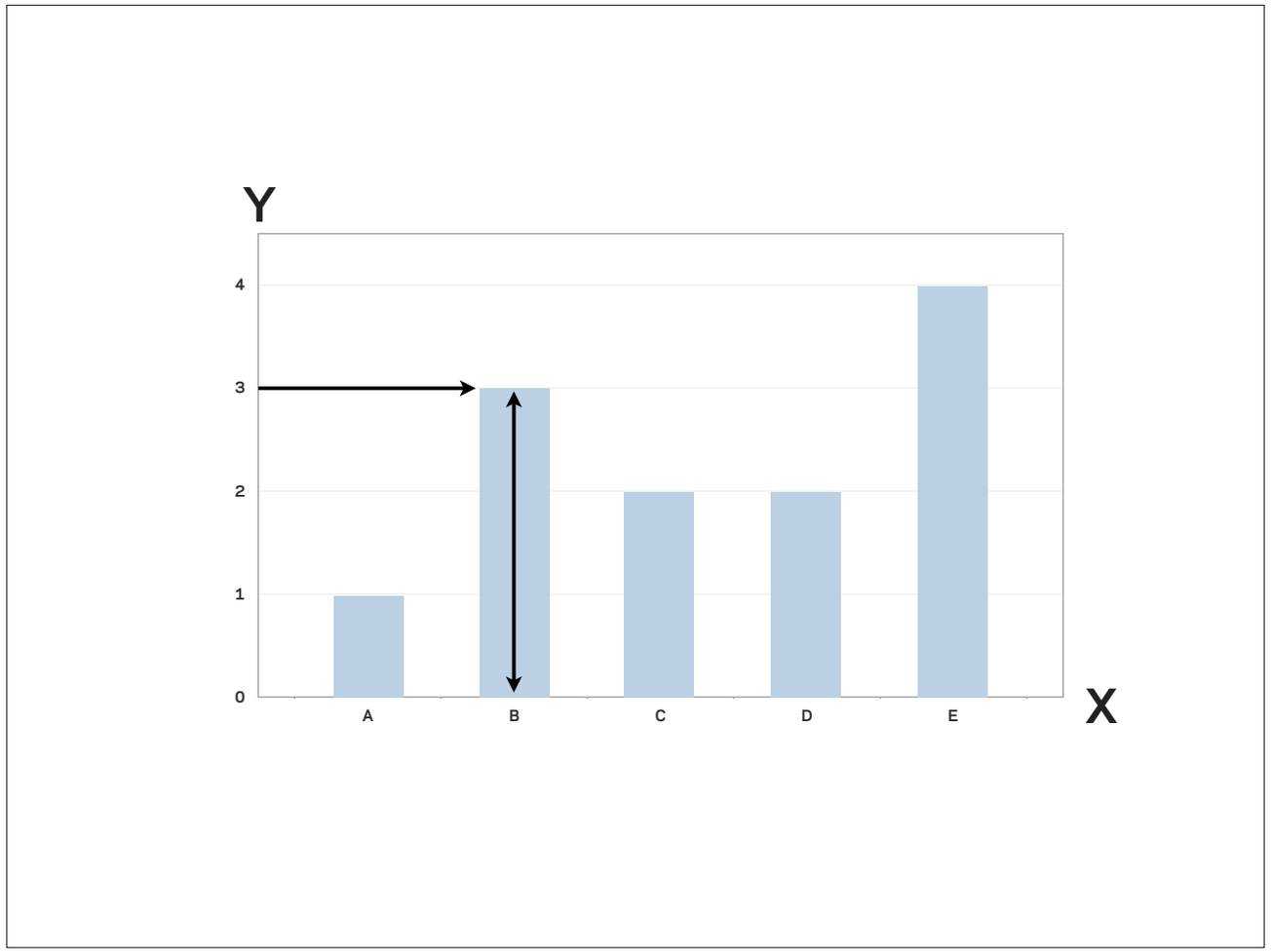
- The simplest is a point, which for all practical purposes has zero dimensions, for it marks a point in space, but has neither height nor width.
- The second is a line, which can be thought of as a point that has been extended in a particular direction to become a one-dimensional object.
- The third is a rectangle, or what we call a bar when it is used in graphs, which you can think of as a line to which the additional dimension of width has been added to turn it into a two-dimensional object.
- The last and probably least familiar is a box, which is just like a bar, except that both ends are used to mark a value in the graph.



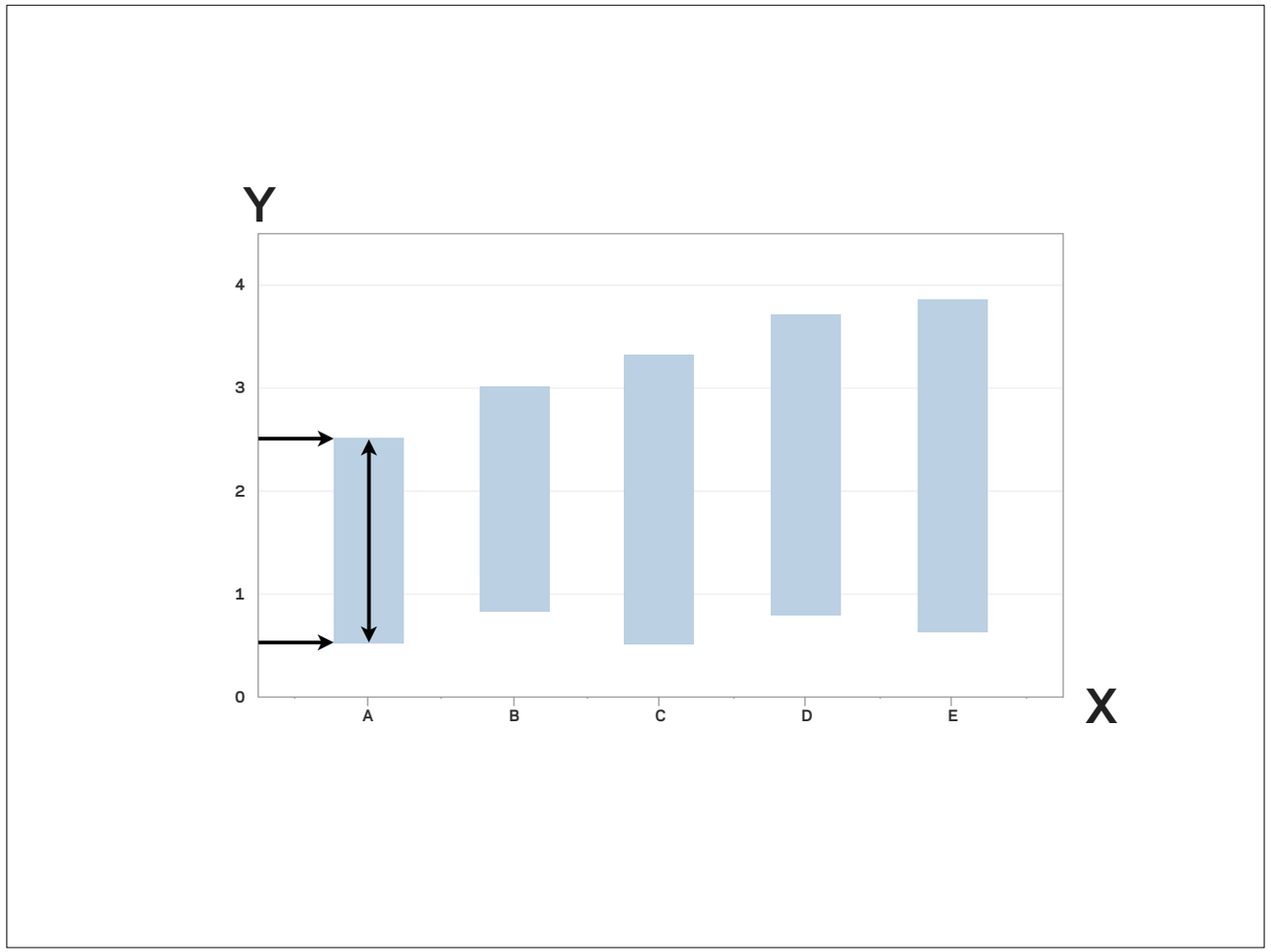
Points encode individual values as 2-D position.



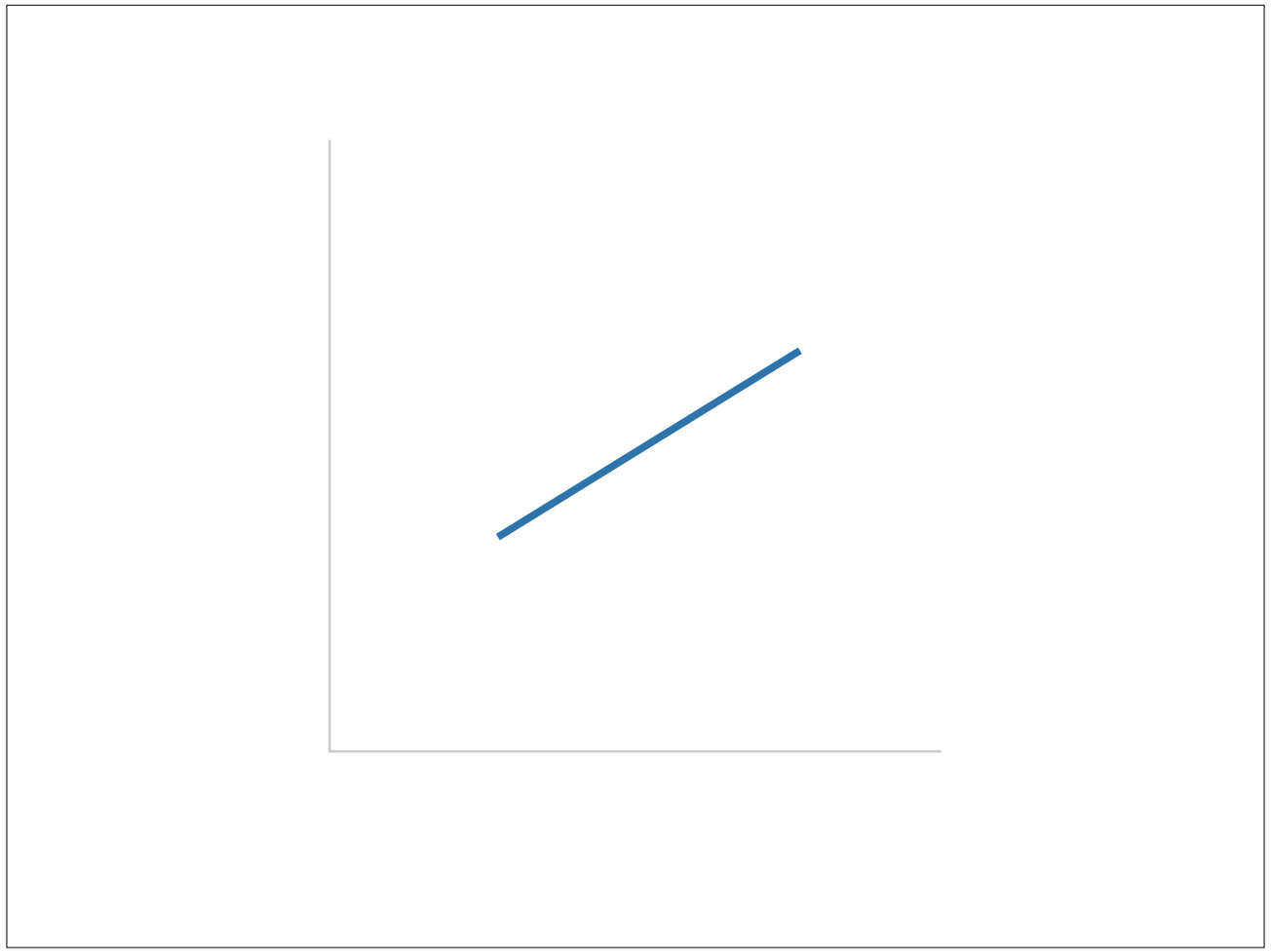
Lines encode individual values as 2-D position (at each data point connected by the line), but by connecting the data values the added characteristics of slope and direction also carry information.



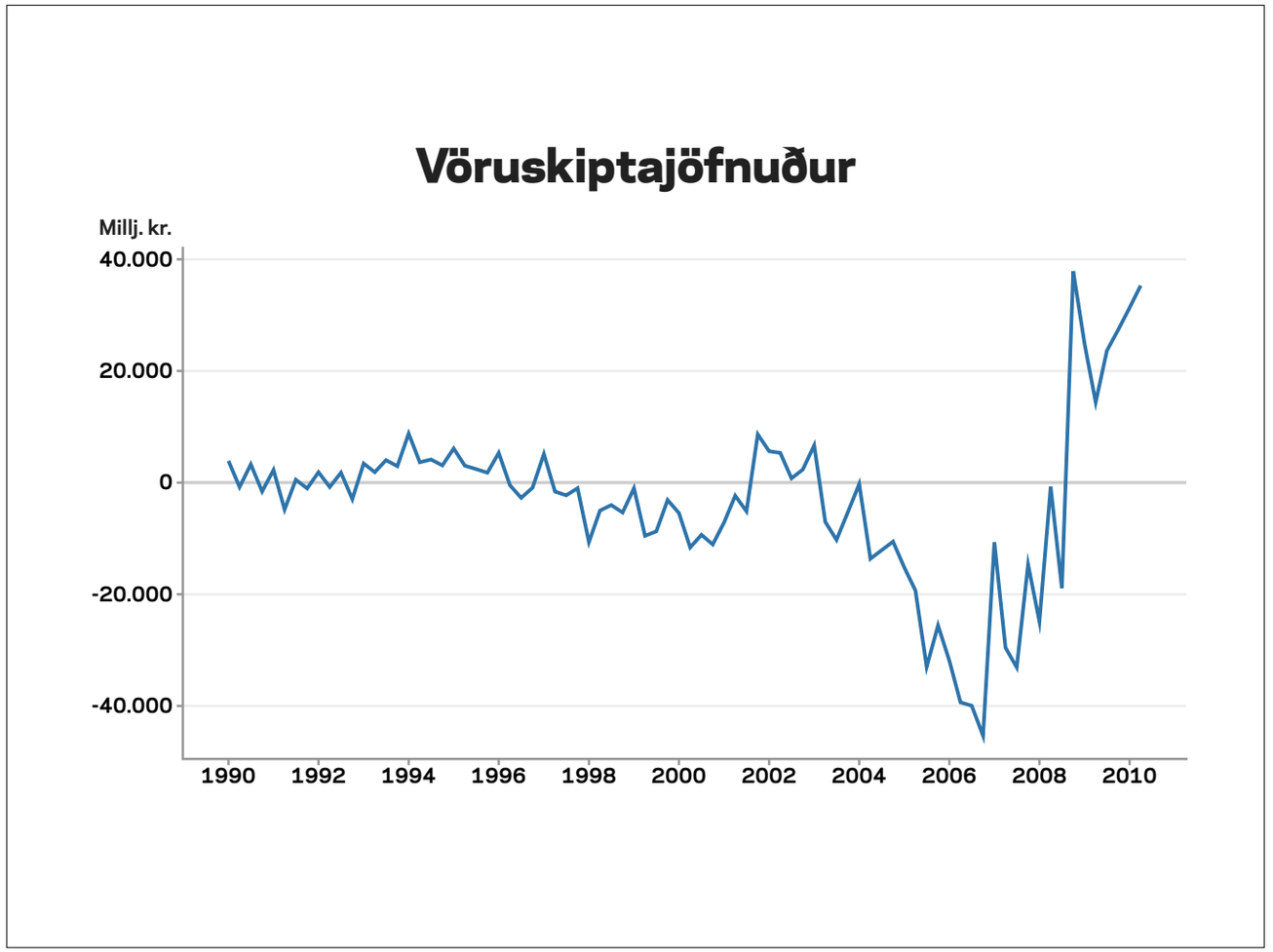
Bars encode individual values as 2-D position at the endpoint of the bar, and also as height (vertical bars) or length (horizontal bars).



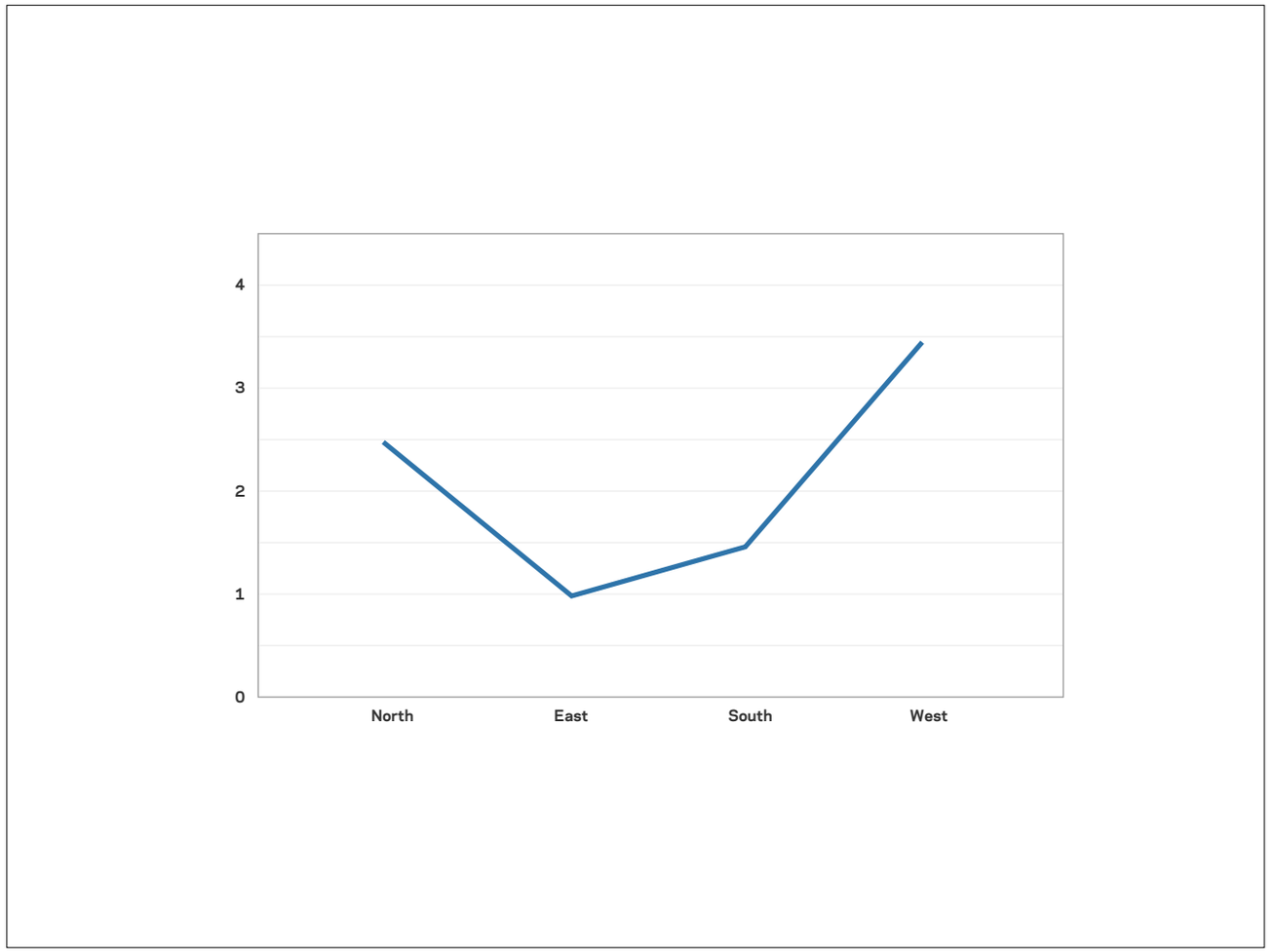
Boxes look and mostly function like bars, except that they encode two values, rather than one. They represent a range of values by using the one end of the box to encode the lowest value in the range and the other end to encode the highest value. Like bars, boxes encode values both as 2-D location based on the position of each end, and as line length based on the length of the box.



When we see a line – in this case one that is angled upwards from left to right – we are inclined to interpret it as increase, something moving upwards. This is precisely what lines are good at. They do a great job of showing the shape of change from one value to the next, such as change through time.

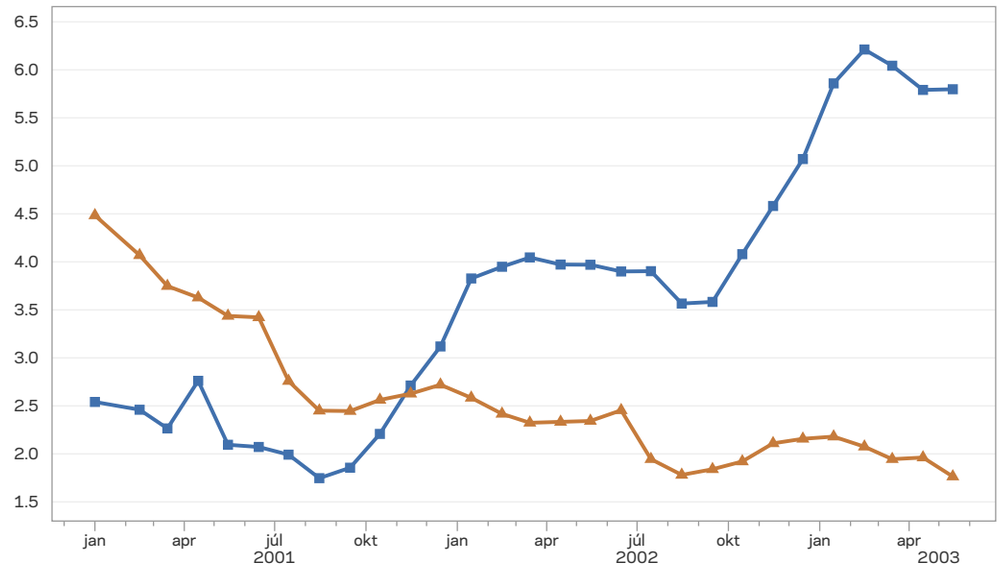


The strength of lines is their ability to emphasize the overall trend of the values and the nature of change from one value to the next. They should only be used to encode continuous variables along an interval scale, never discrete variables. The most common examples of continuous variables are those corresponding to a time series (continuous units of time) or a frequency distribution (continuous ranges of quantity, such as 0-5, 6-10, 11-15, and so on).



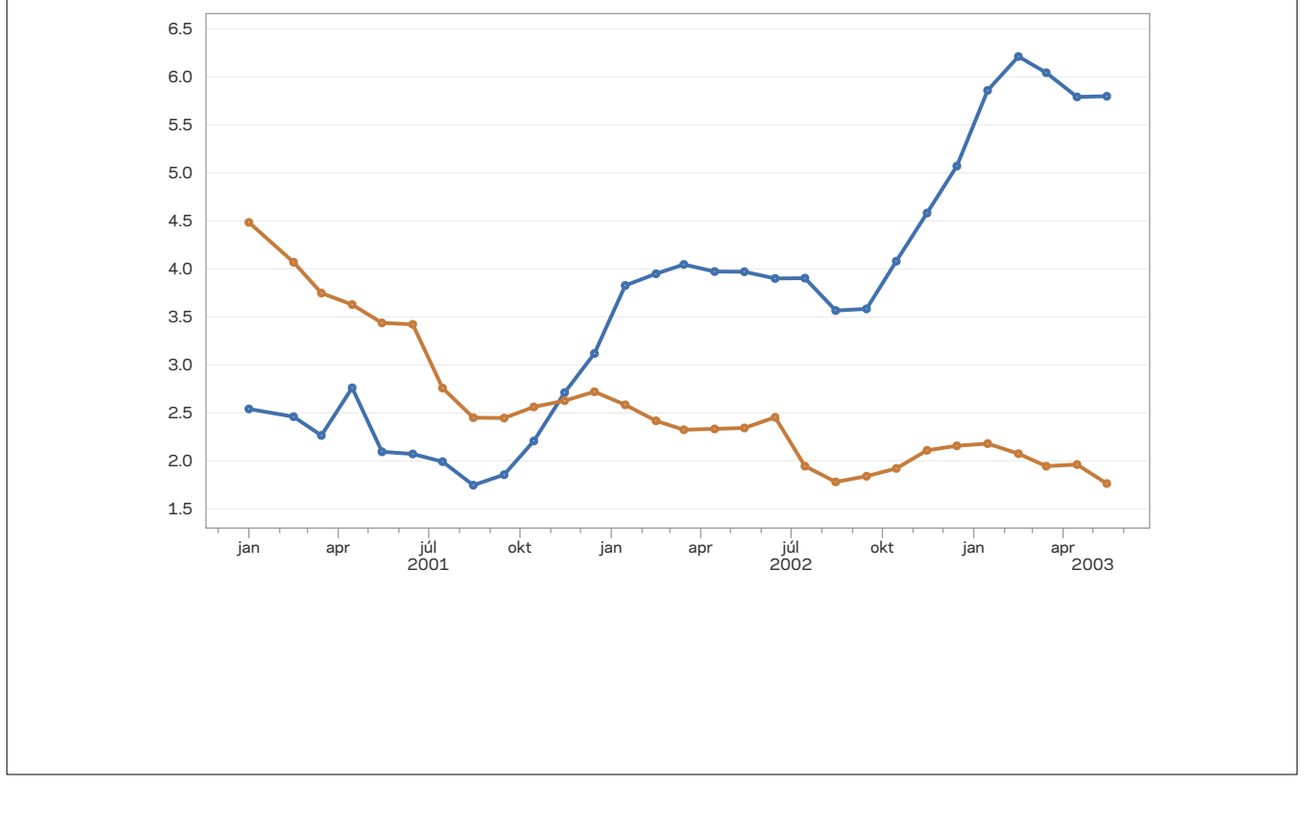
It is never appropriate to use lines to connect values along a nominal scale, as shown above. Doing so suggests a connectedness in the data that doesn't exist, and presents slopes and patterns that have no meaning.

It is also not appropriate to use lines to connect values along an ordinal scale, except to encode a value that is cumulative from one item to the next along the ordinal scale. This works, because cumulative values along an ordinal scale are intimately connected from one to the next, not only in their order, which in itself would not warrant the use of lines, but also in that each new value incorporates the sum of all those that came before it.

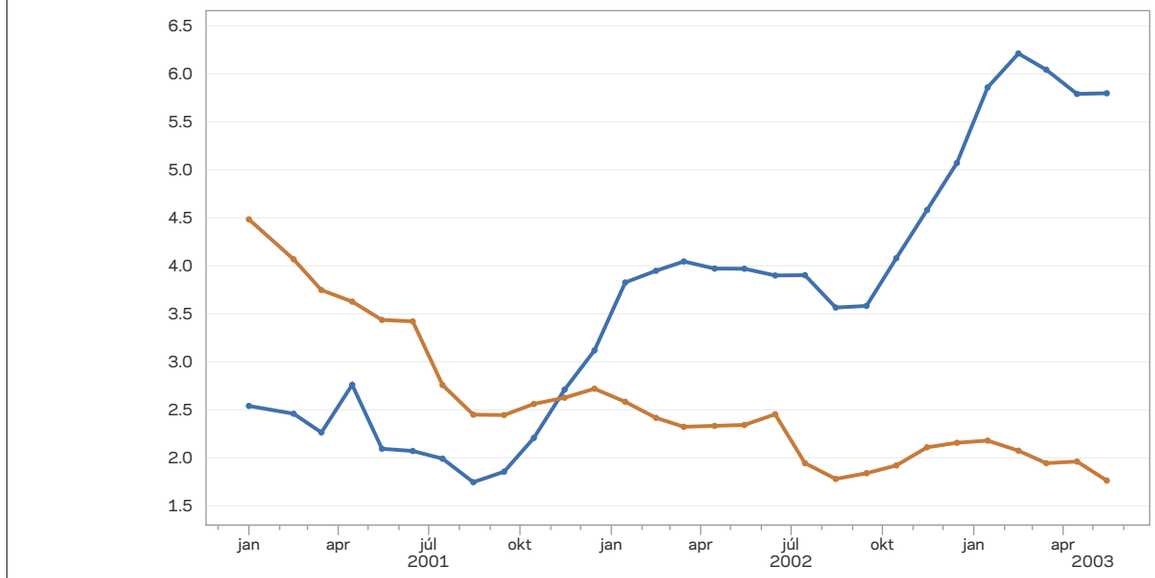


For most purposes, it isn't necessary to display data points along lines. Data points add a bit of clutter that is best avoided when they aren't necessary. I only include data points when one of the primary uses of the graph is to compare on different lines at a particular point in time. For example, if I want to compare the sales and budget values in the month of April, the data points make it easier for my eyes to know precisely where along the lines to make the comparison.

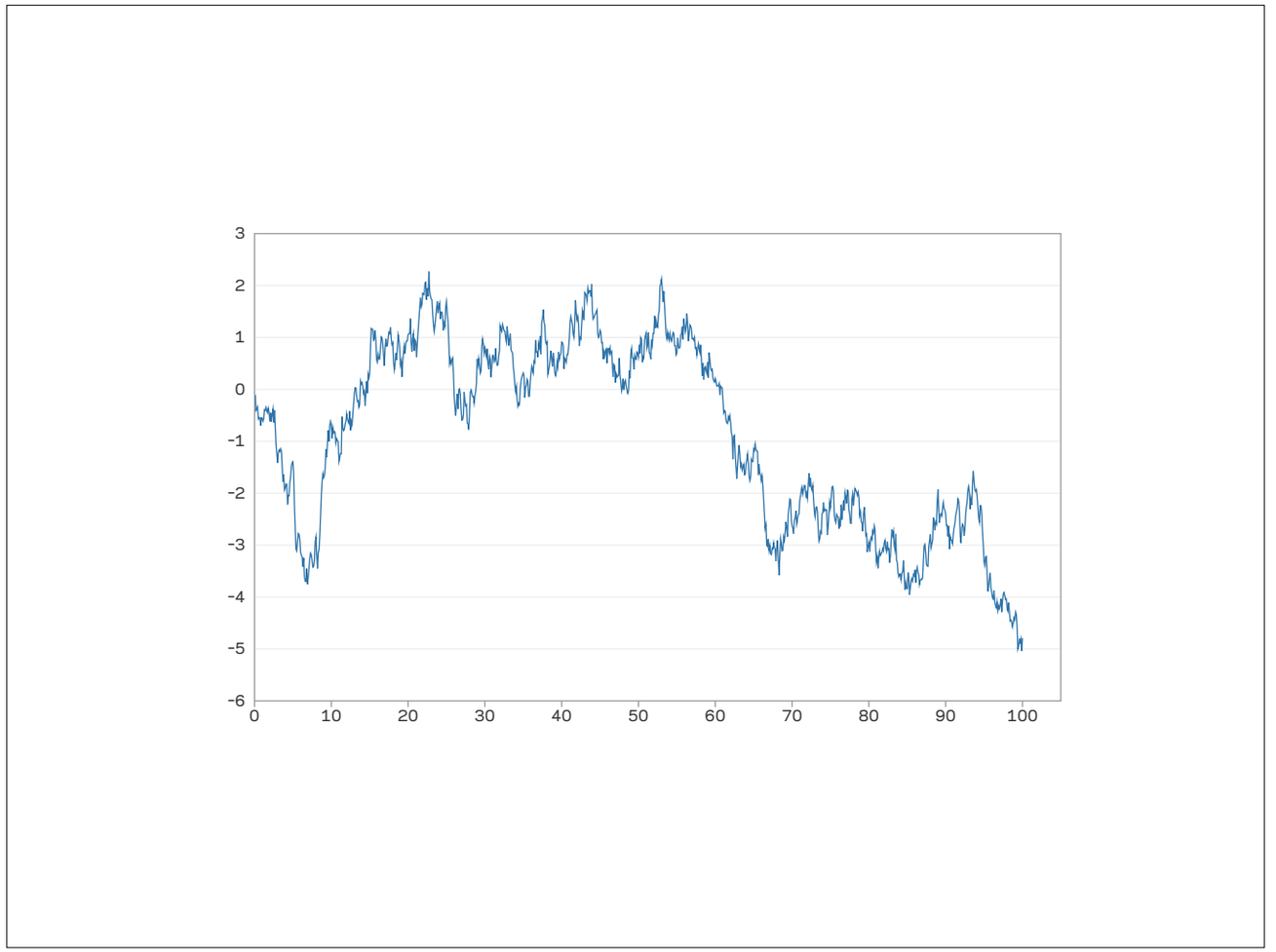
When you include data points along the lines, it works best to keep them just large enough to assist the eyes and no more. You certainly don't need large data points, nor do you need to vary the shape of the data points for each line.



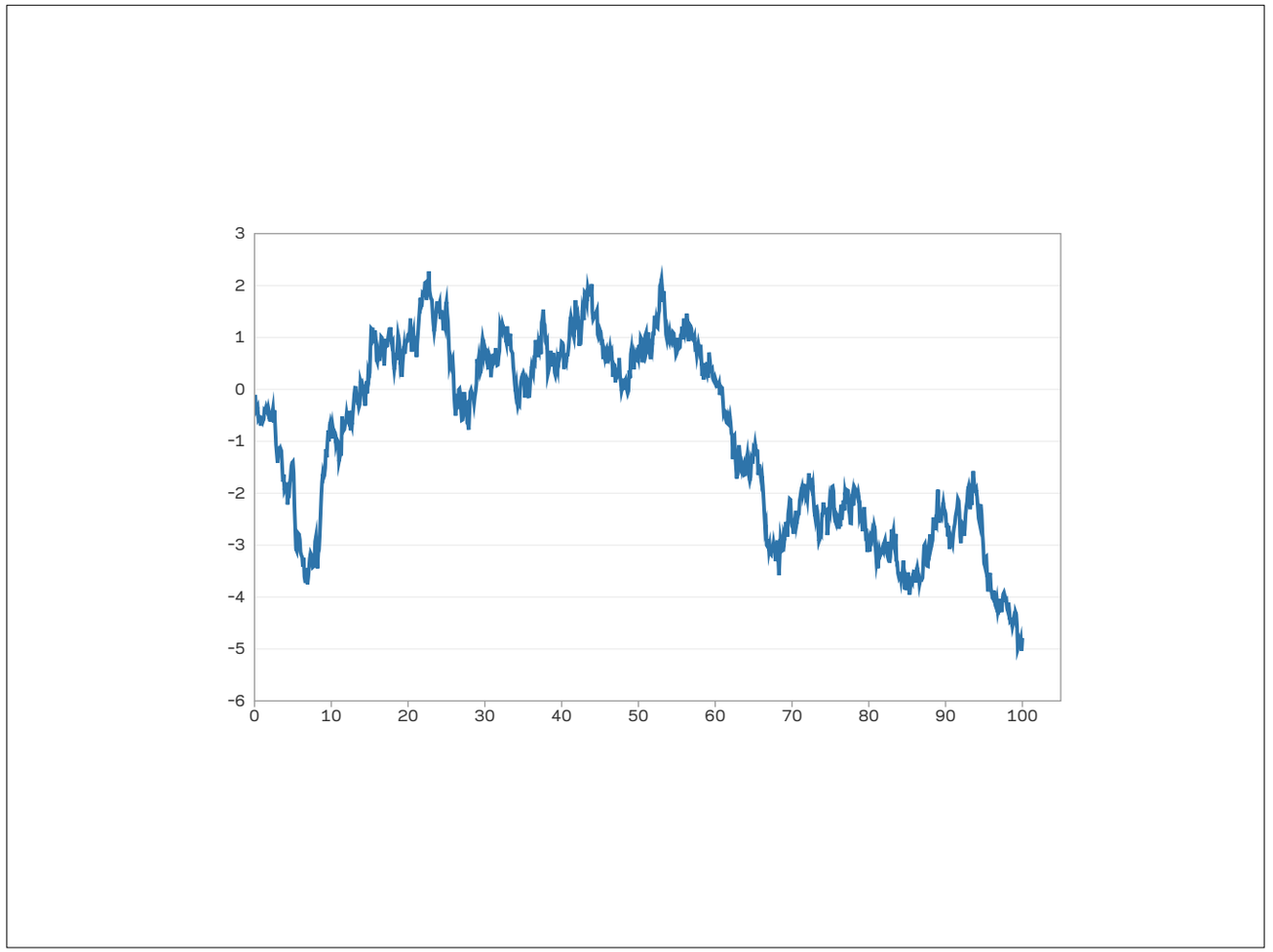
For most purposes, it isn't necessary to display data points along lines. Data points add a bit of clutter that is best avoided when they aren't necessary. I only include data points when one of the primary uses of the graph is to compare on different lines at a particular point in time. For example, if I want to compare the sales and budget values in the month of April, the data points make it easier for my eyes to know precisely where along the lines to make the comparison.



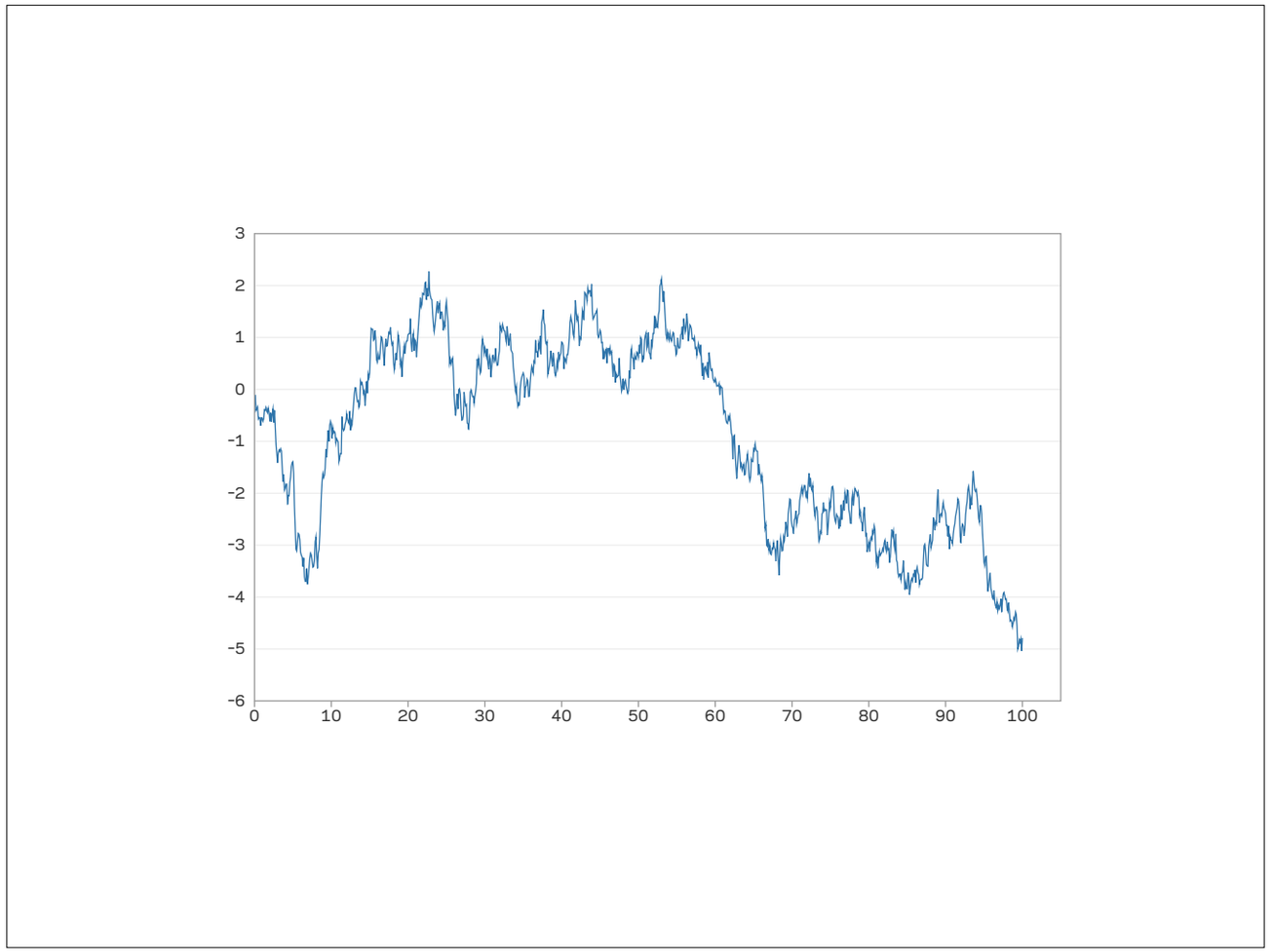
When you include data points along the lines, it works best to keep them just large enough to assist the eyes and no more. You certainly don't need large data points, nor do you need to vary the shape of the data points for each line.



The thickness of the lines must be enough to see the line clearly and it’s colour. Too thin and it’s hard to read.

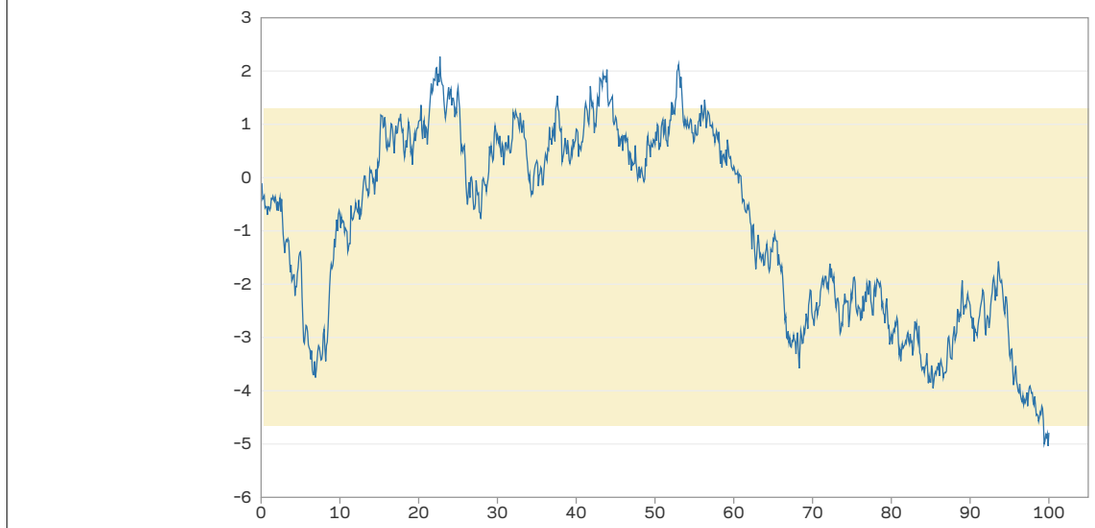


But not too much or we will lose detail.



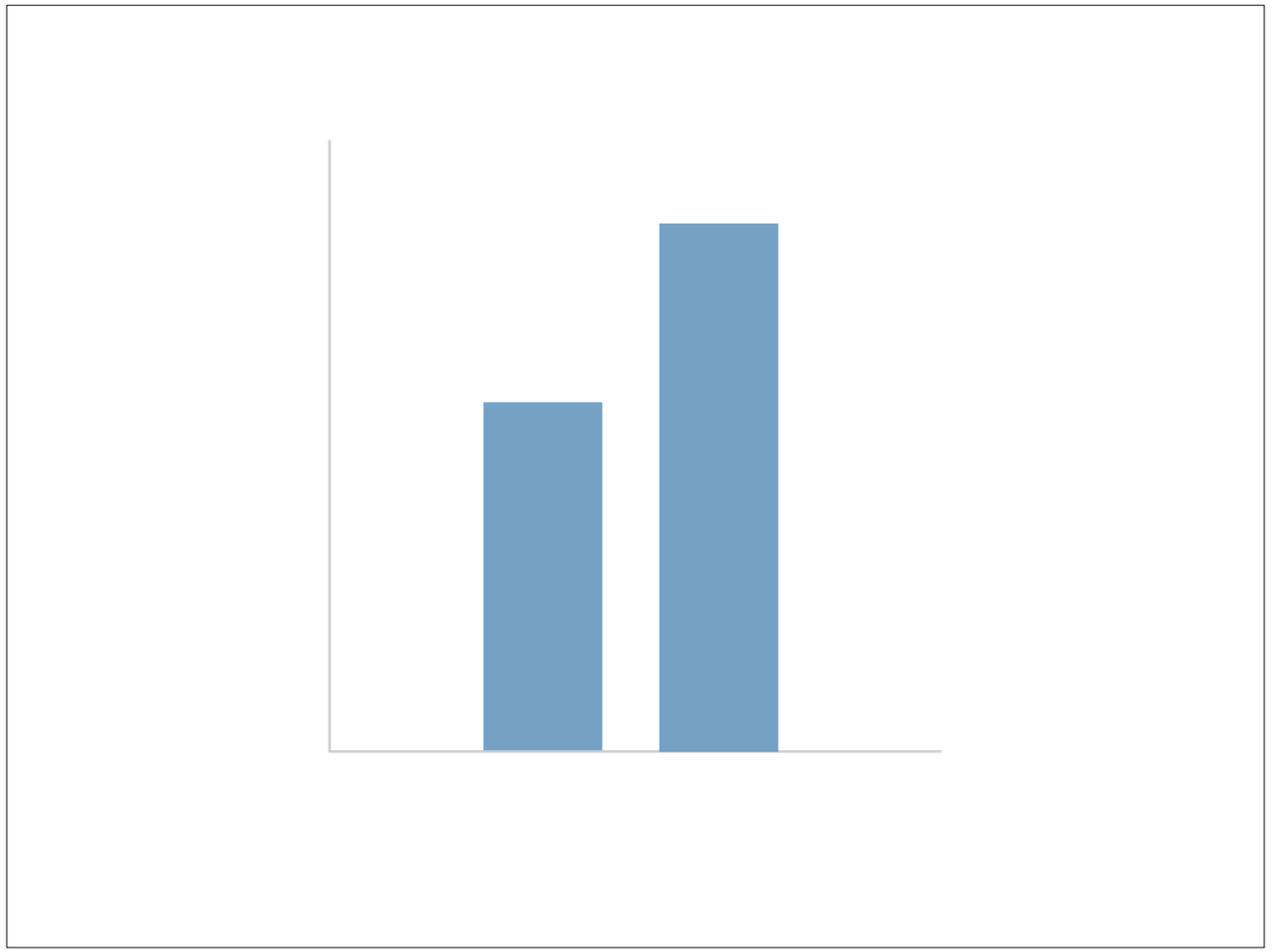
Also, as a rule of thumb, two thirds of the chart should be the data. That does not mean that everything outside must be empty, but where the main body of the data should be.

Note Sveinn Steinarsson's work on downsampling data in line charts: https://github.com/sveinn-steinarsson/



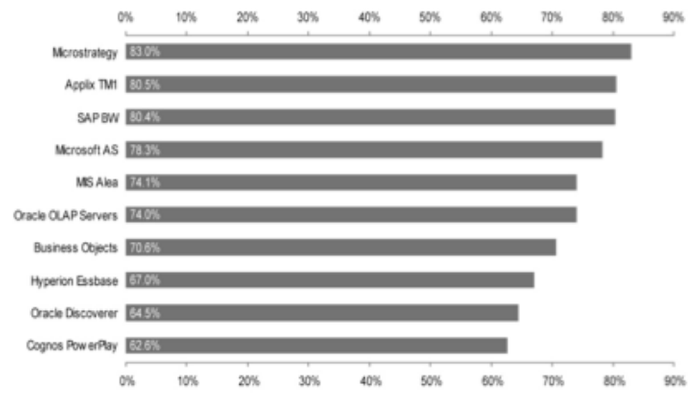
Also, as a rule of thumb, two thirds of the chart should be the data. That does not mean that everything outside must be empty, but where the main body of the data should be.

Note Sveinn Steinarsson's work on downsampling data in line charts: https://github.com/sveinn-steinarsson/



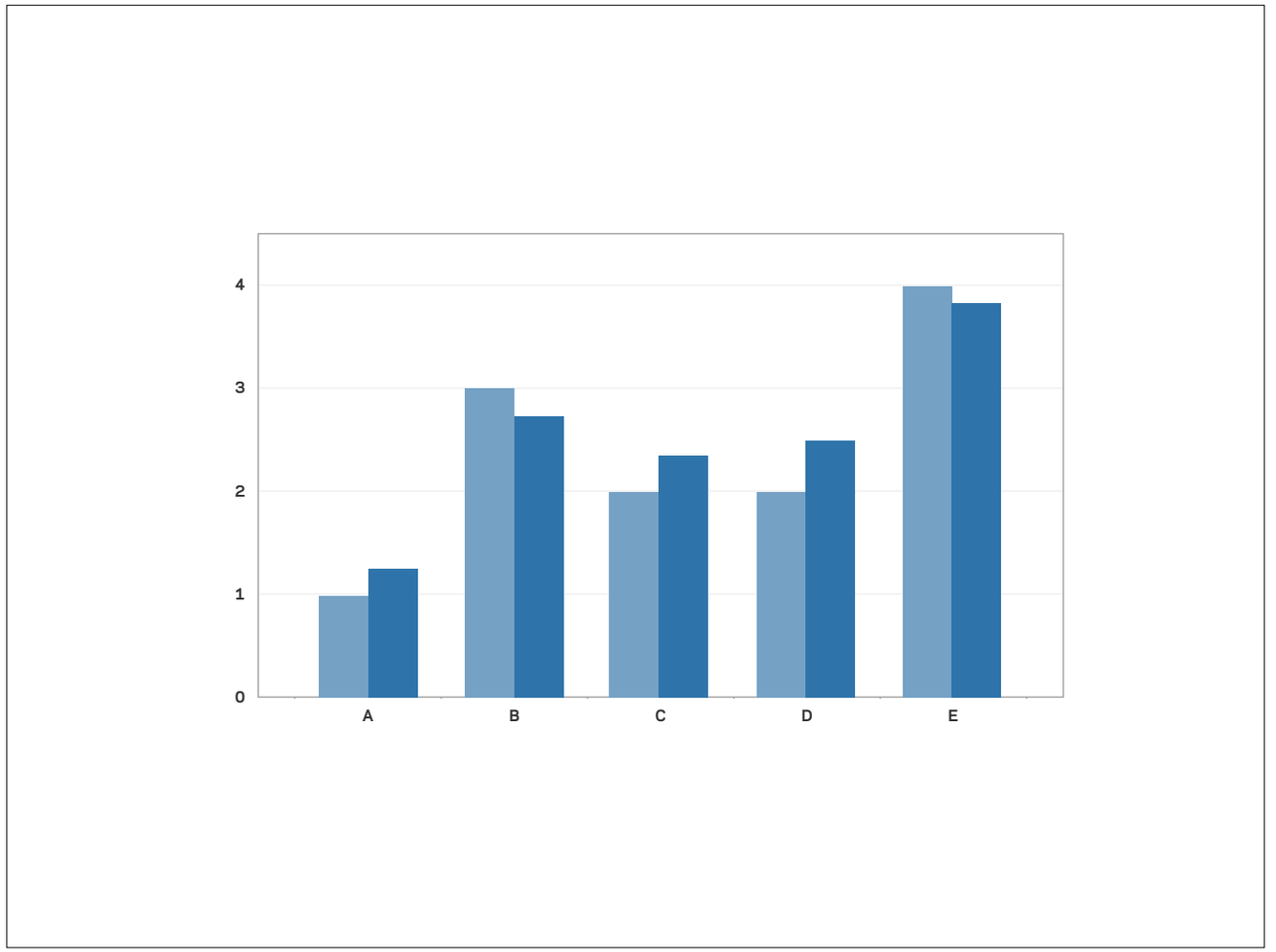
When we see two objects like these bars, arranged in this manner, what stands out is the difference in their heights, which encourages us to compare their heights and notice that one is taller than the other. This is what bars are good at: displaying differences in magnitudes and making it easy for us to compare these differences.

Something is very wrong here. Can you see the problem?

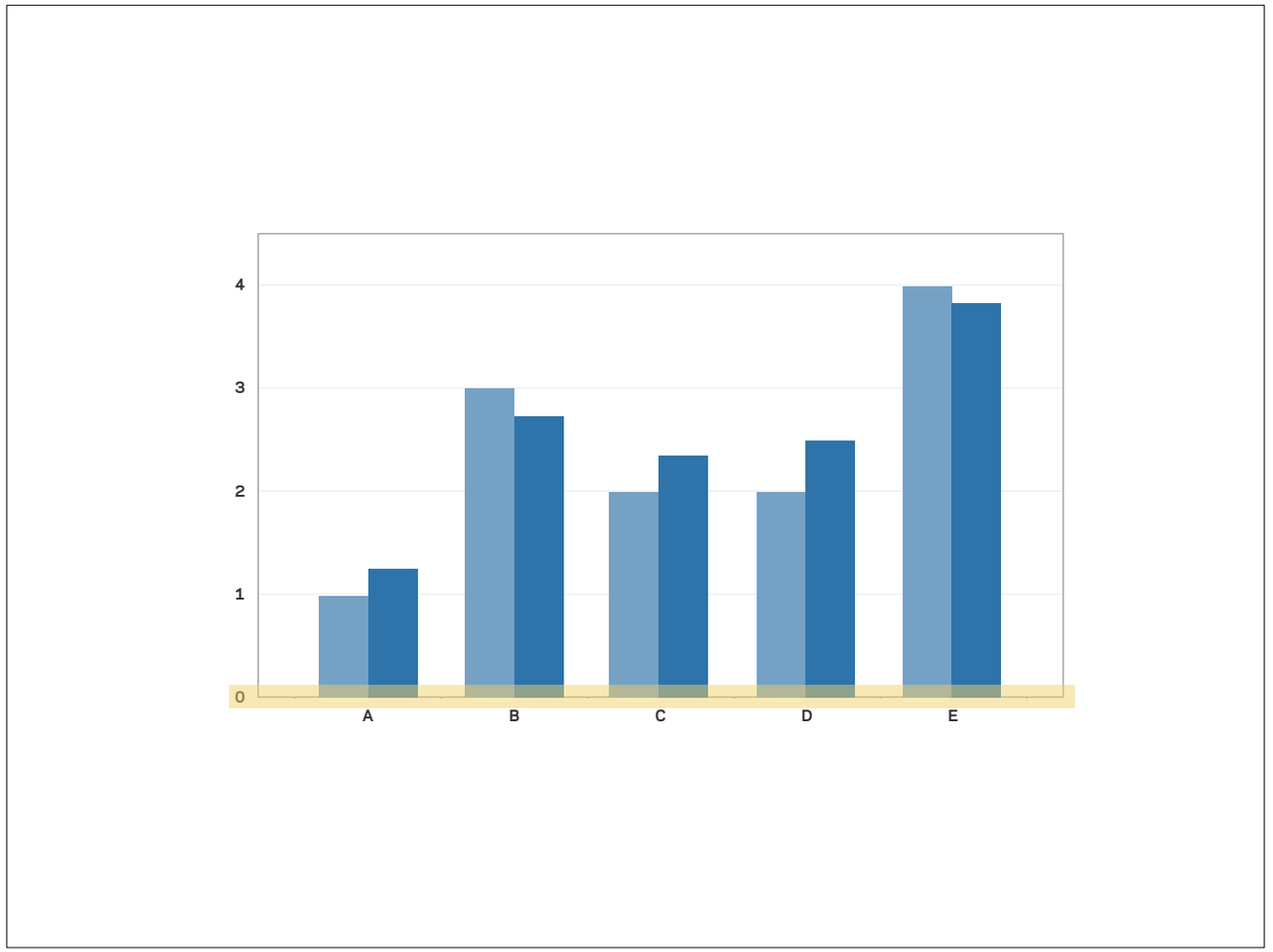


Because bars encode quantitative values in part as line length, they must always begin at a value of zero, otherwise their length does not correspond accurately to their quantitative value.

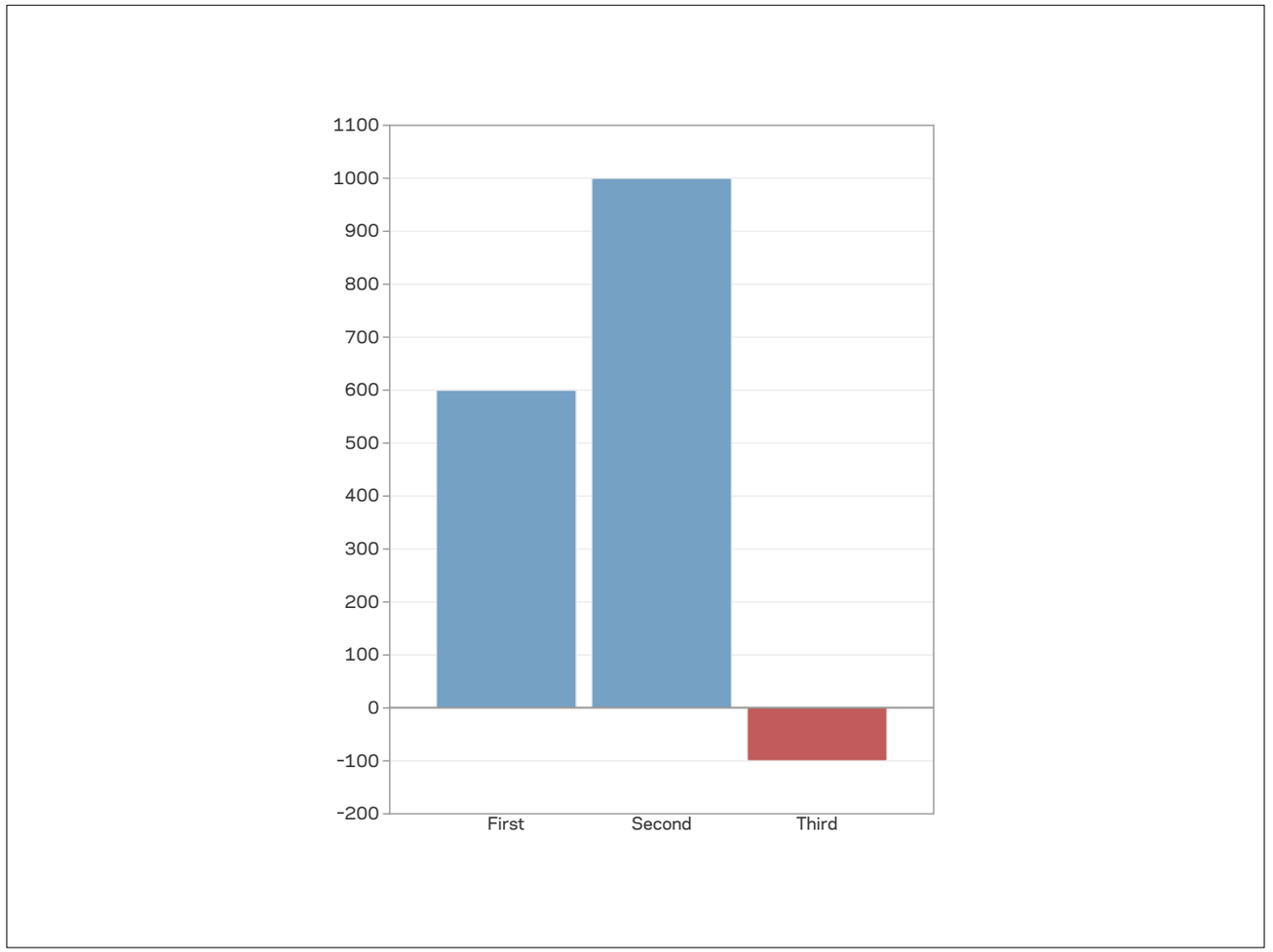
MicroStrategy's customer service score is only 33% greater than the lowest scoring product, Cognos PowerPlay, but the difference in the lengths of these two bars graph is 650%. That's a lie factor of **617%** (650% / 33% = 617%). Notice how different the data looks when encoded accurately in the bottom graph.



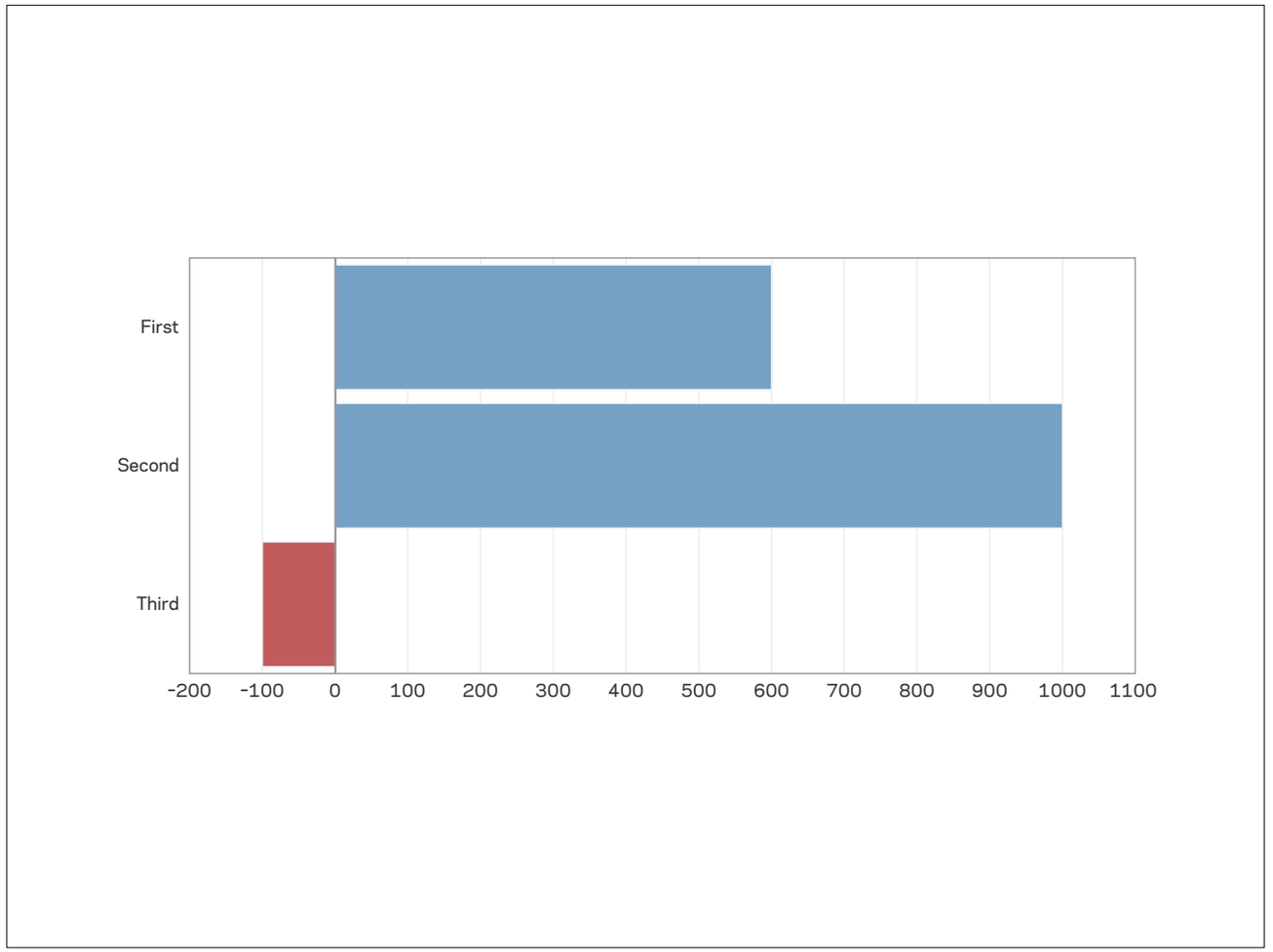
The strength of bars, because they have such great visual weight, like great columns rising into the sky, is their ability to emphasize individual discrete values. Because bars encode quantitative values in part as line length, they must **always begin at a value of zero**, otherwise their length does not correspond accurately to their quantitative value.



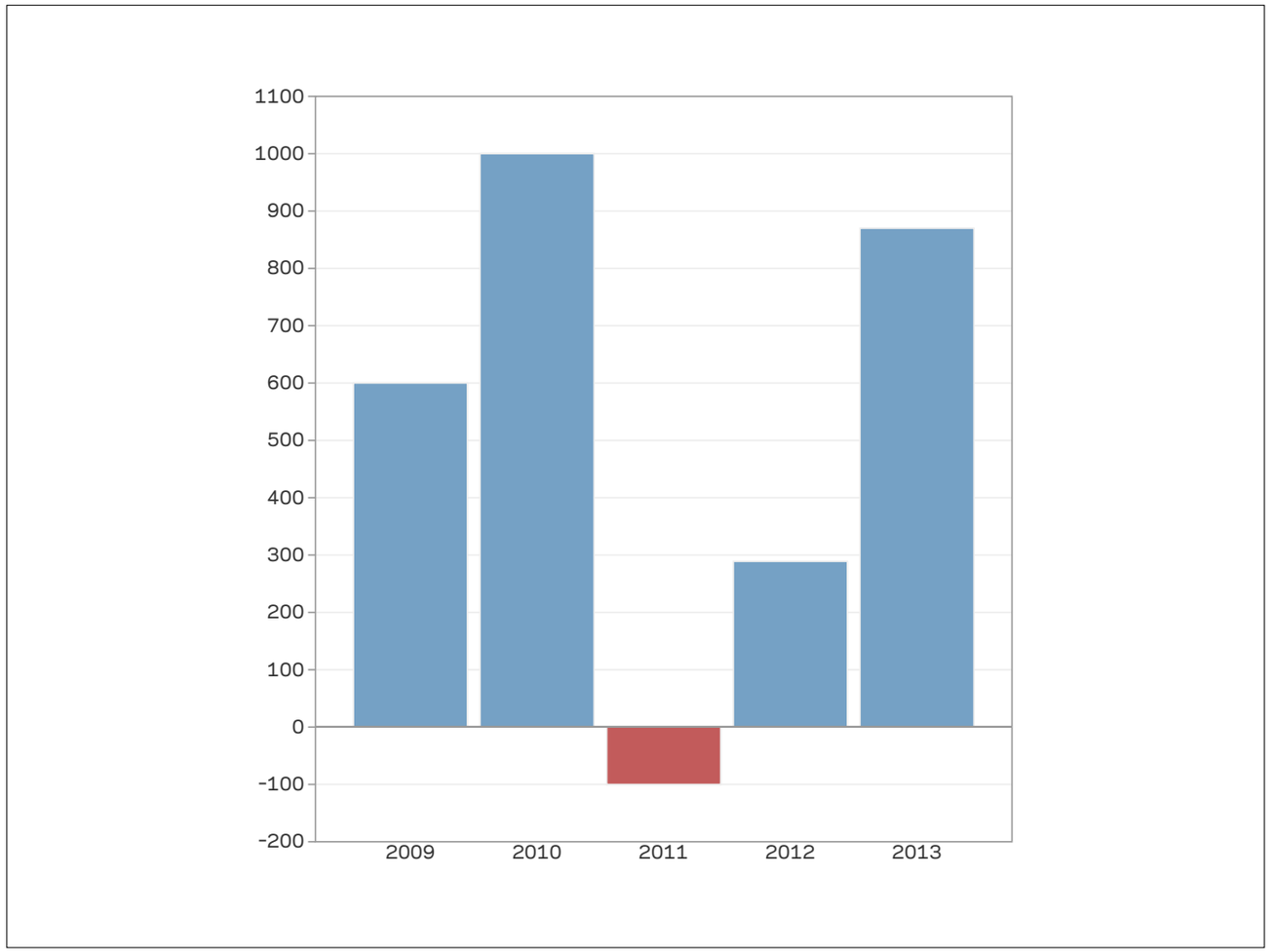
The strength of bars, because they have such great visual weight, like great columns rising into the sky, is their ability to emphasize individual discrete values. Because bars encode quantitative values in part as line length, they must **always begin at a value of zero**, otherwise their length does not correspond accurately to their quantitative value.



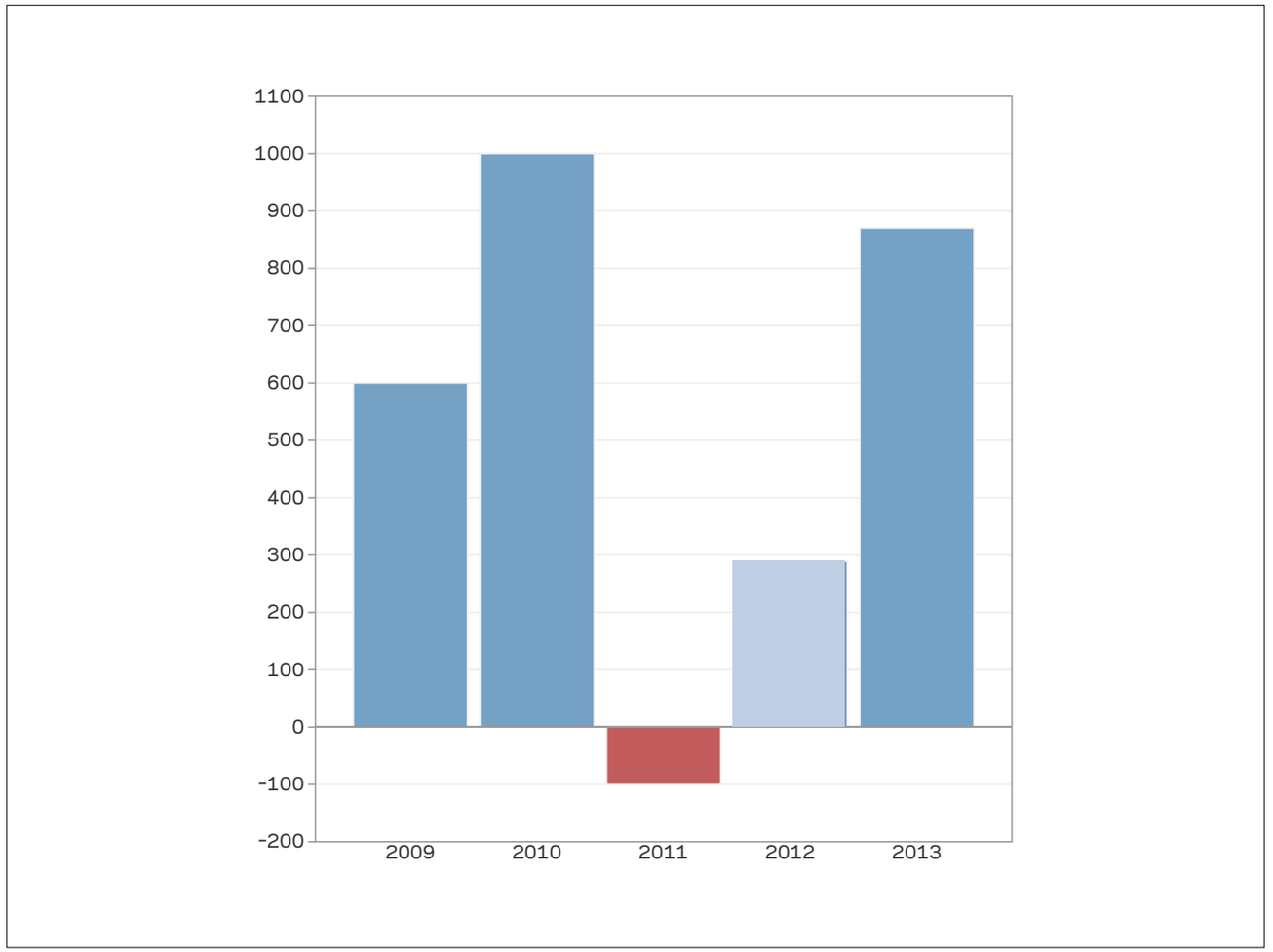
Negative bars should always go down…



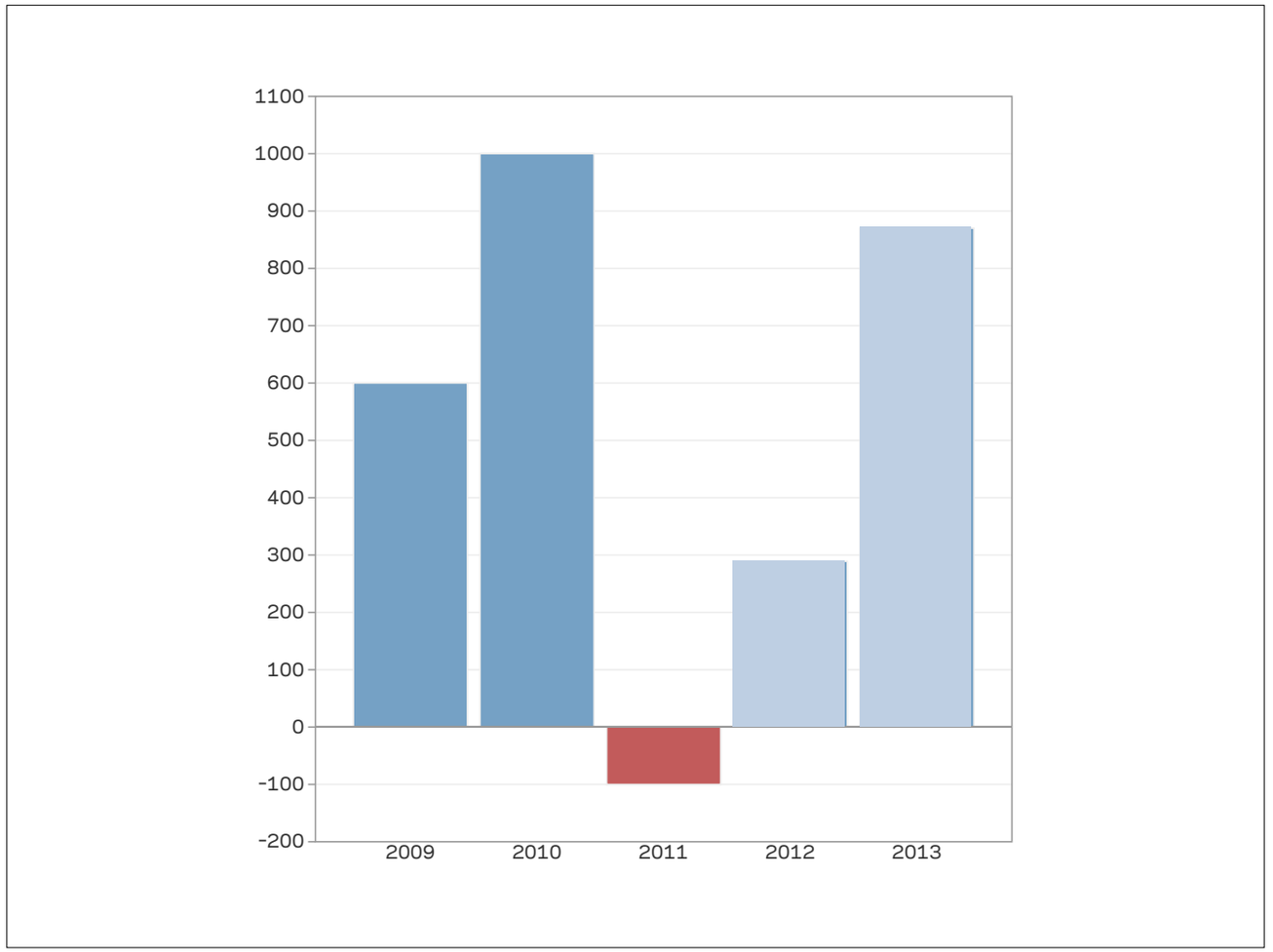
… or to the left. Coloring it red is a good idea as well.



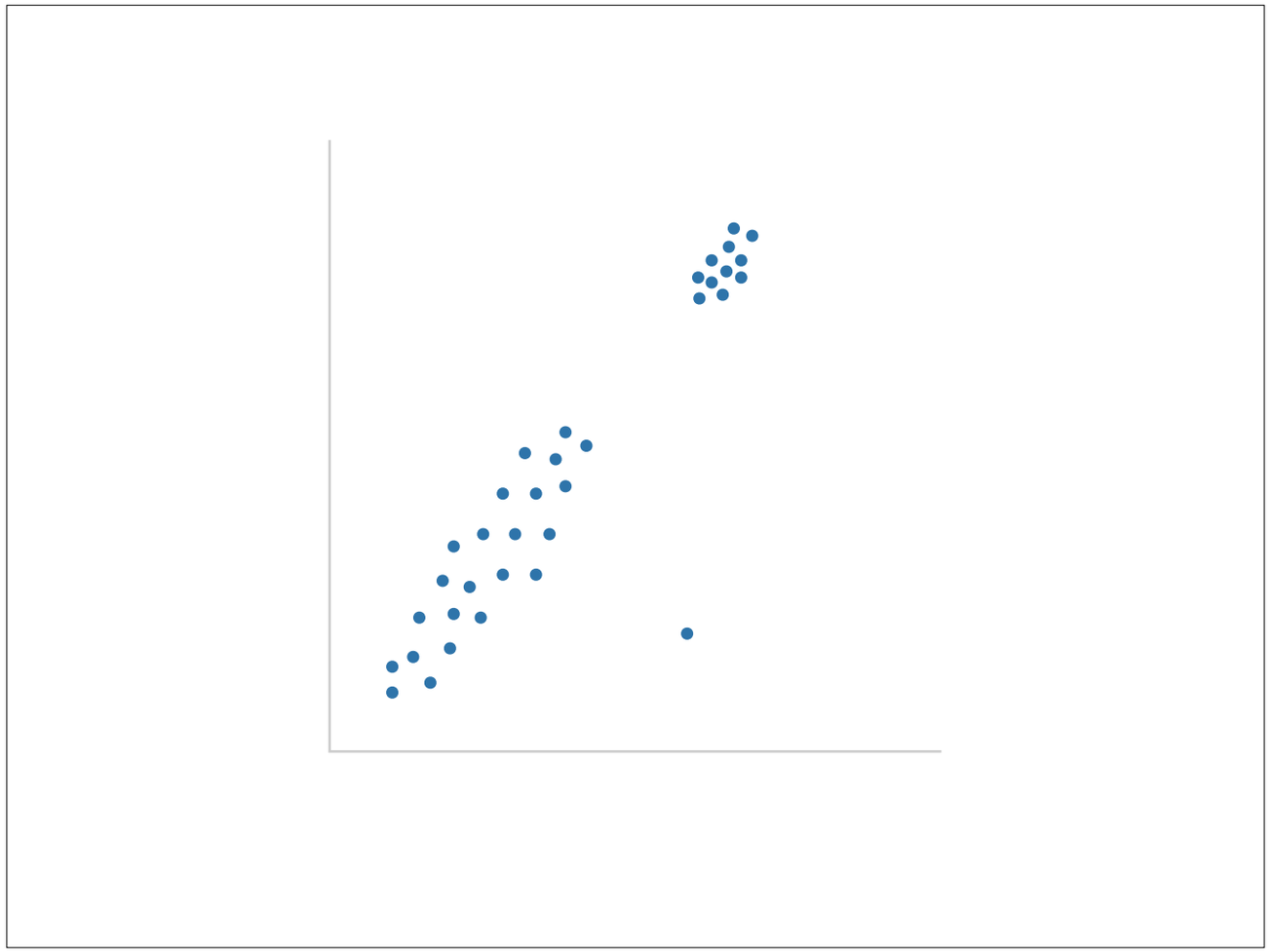
Finally, always use a lighter colour for forecasts, to identify them better from actual numbers.



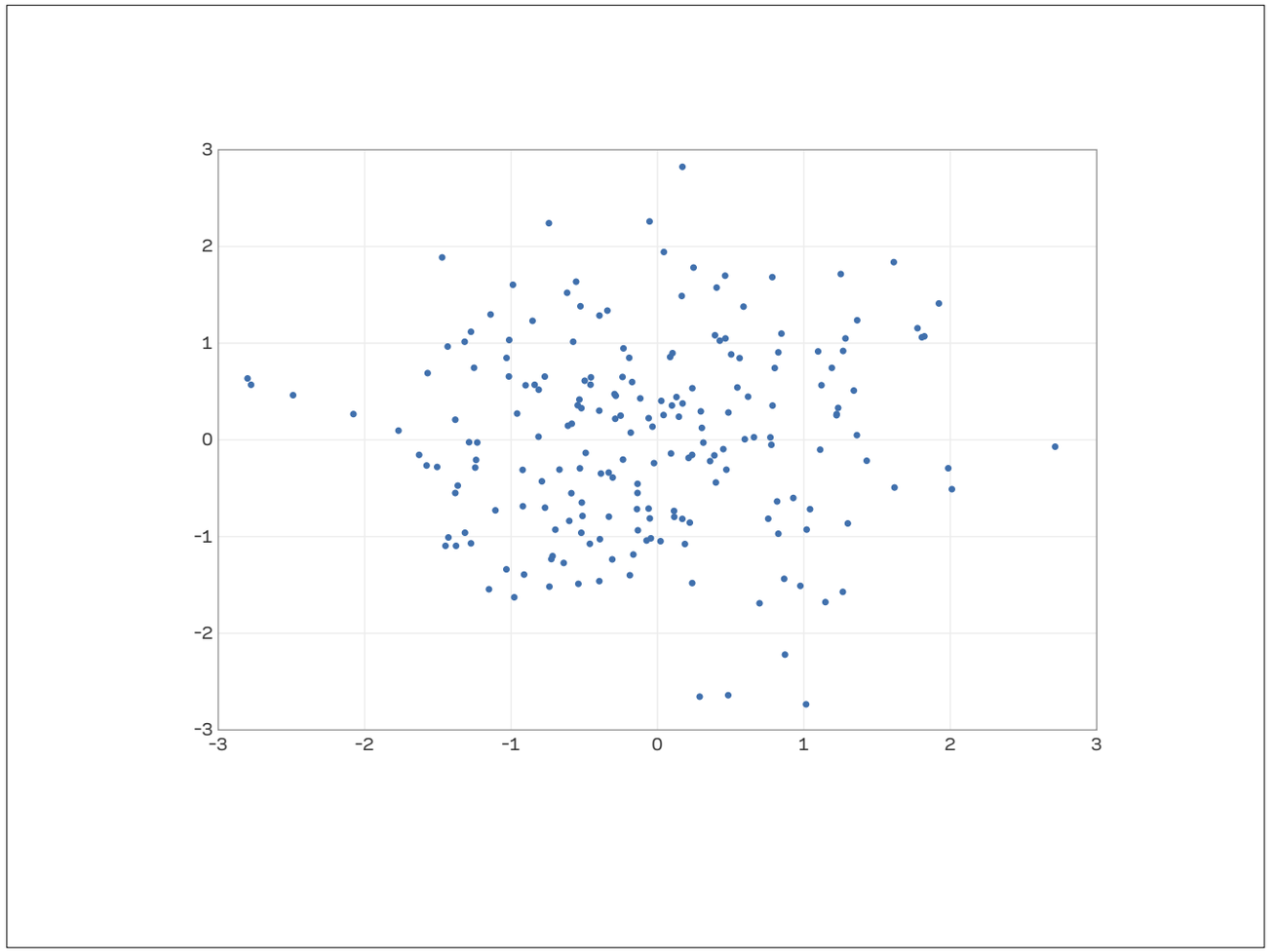
Finally, always use a lighter colour for forecasts, to identify them better from actual numbers.



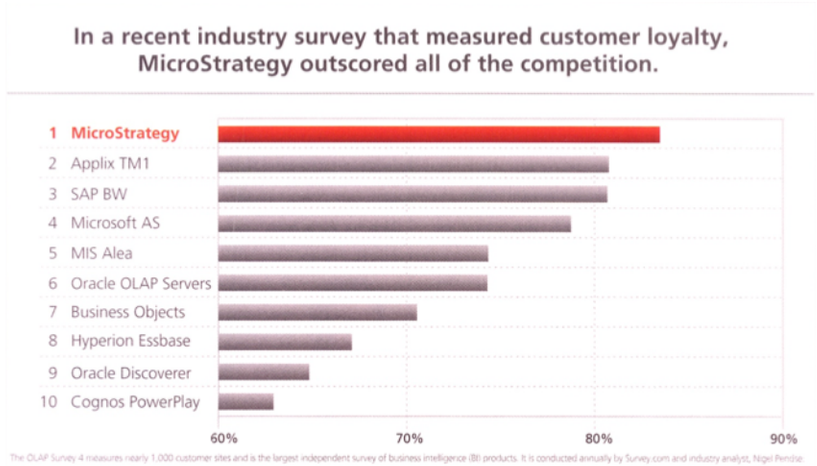
Finally, always use a lighter colour for forecasts, to identify them better from actual numbers.

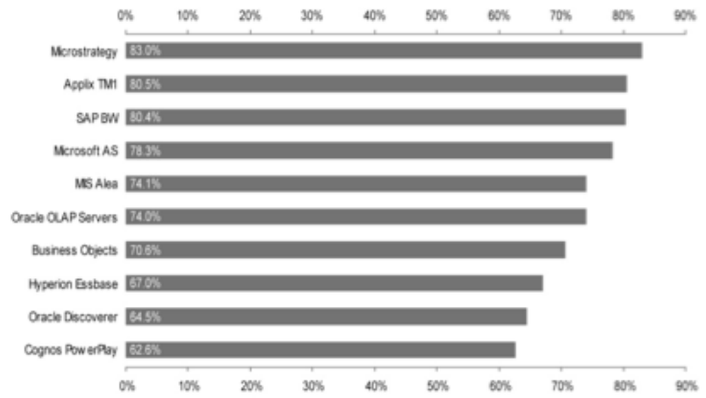


Data points like these, especially in a scatterplot, encourage us to notice such things as clusters of values, linear arrangements of values, gaps in values, and values that are much different from the norm (that is, exceptions or outliers). These are precisely the kinds of patterns that are meaningful in correlation relationships.

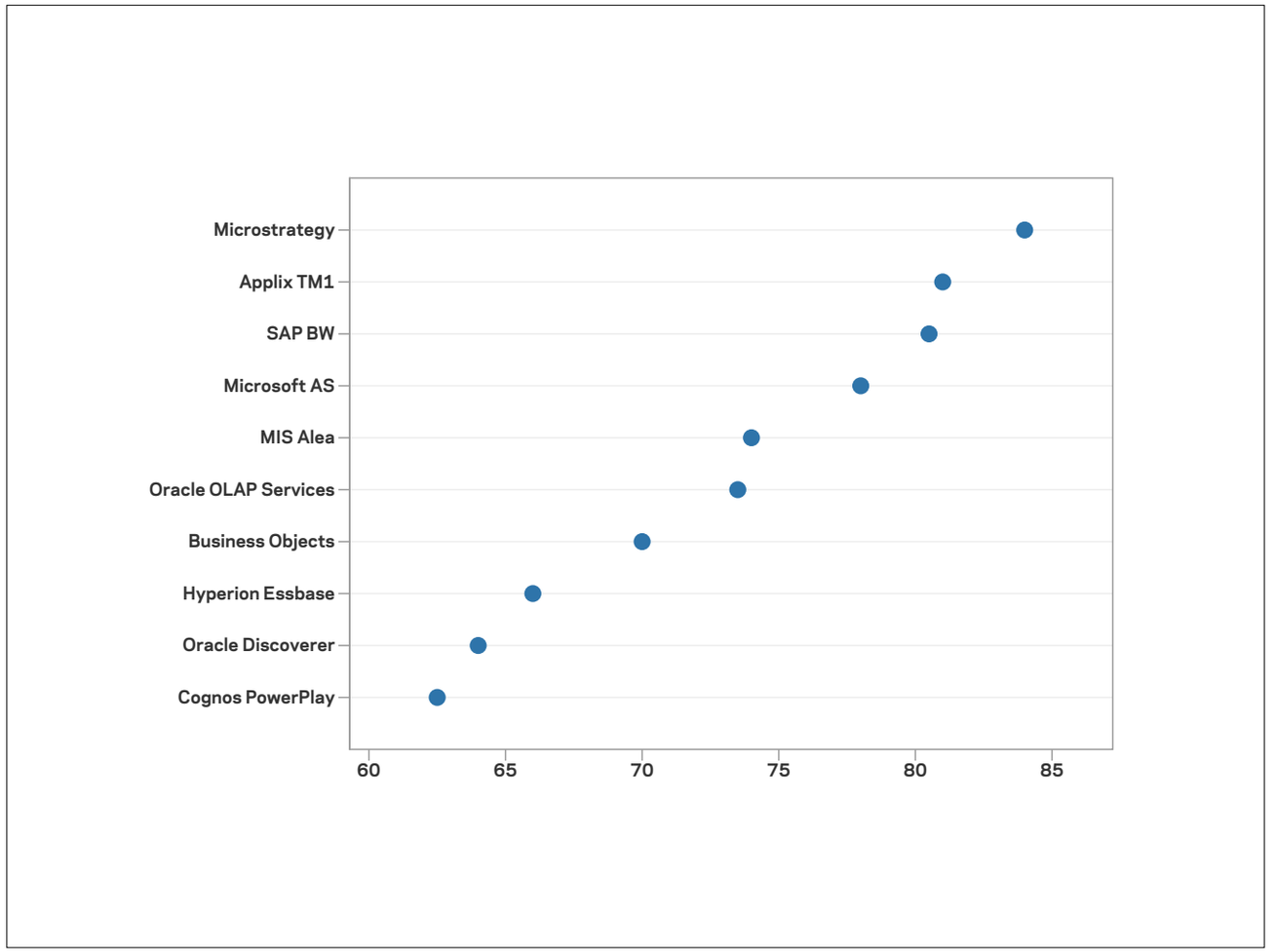


The unique strength of points is their ability to encode values along two quantitative scales aligned with two axes simultaneously.

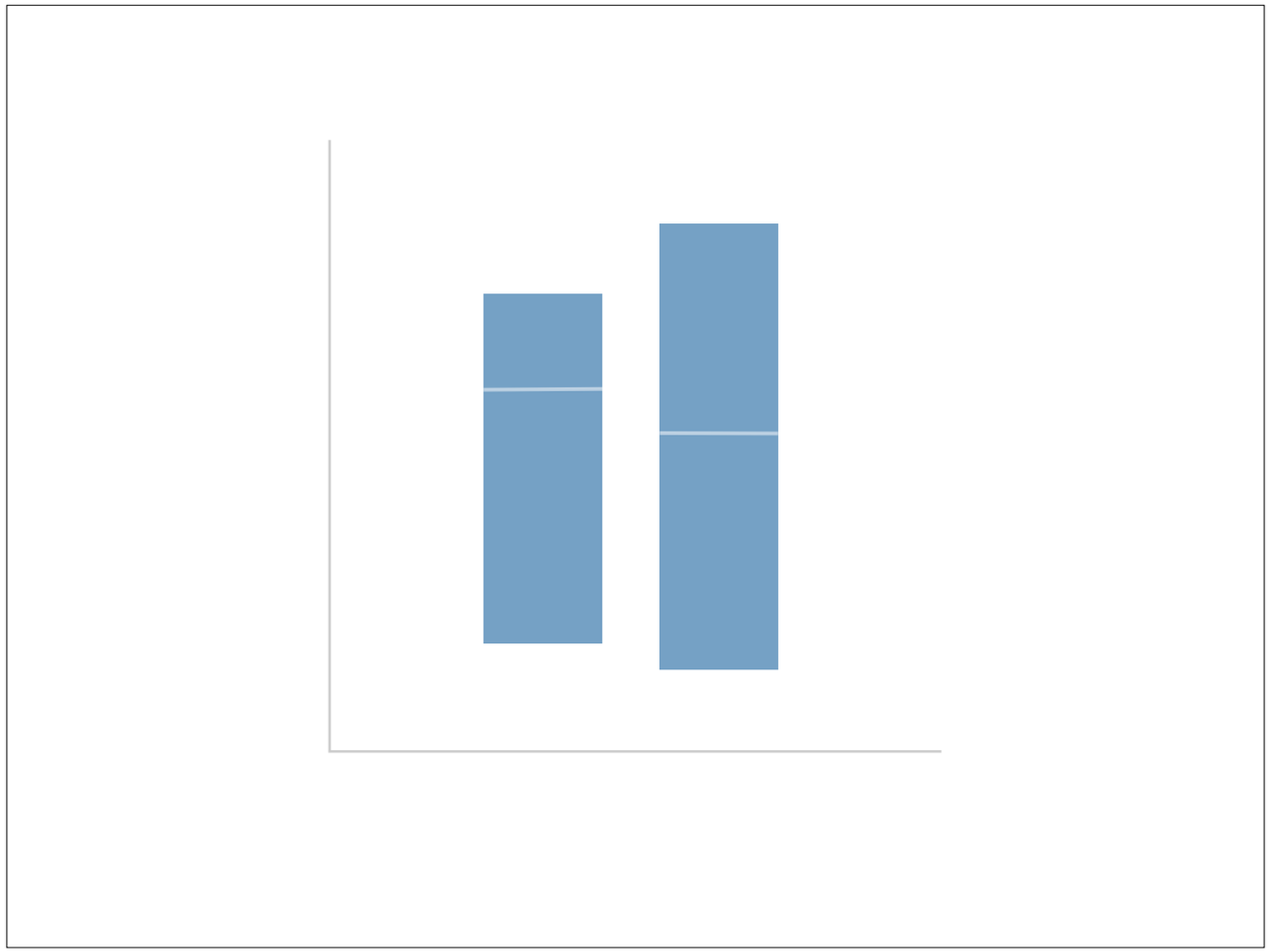




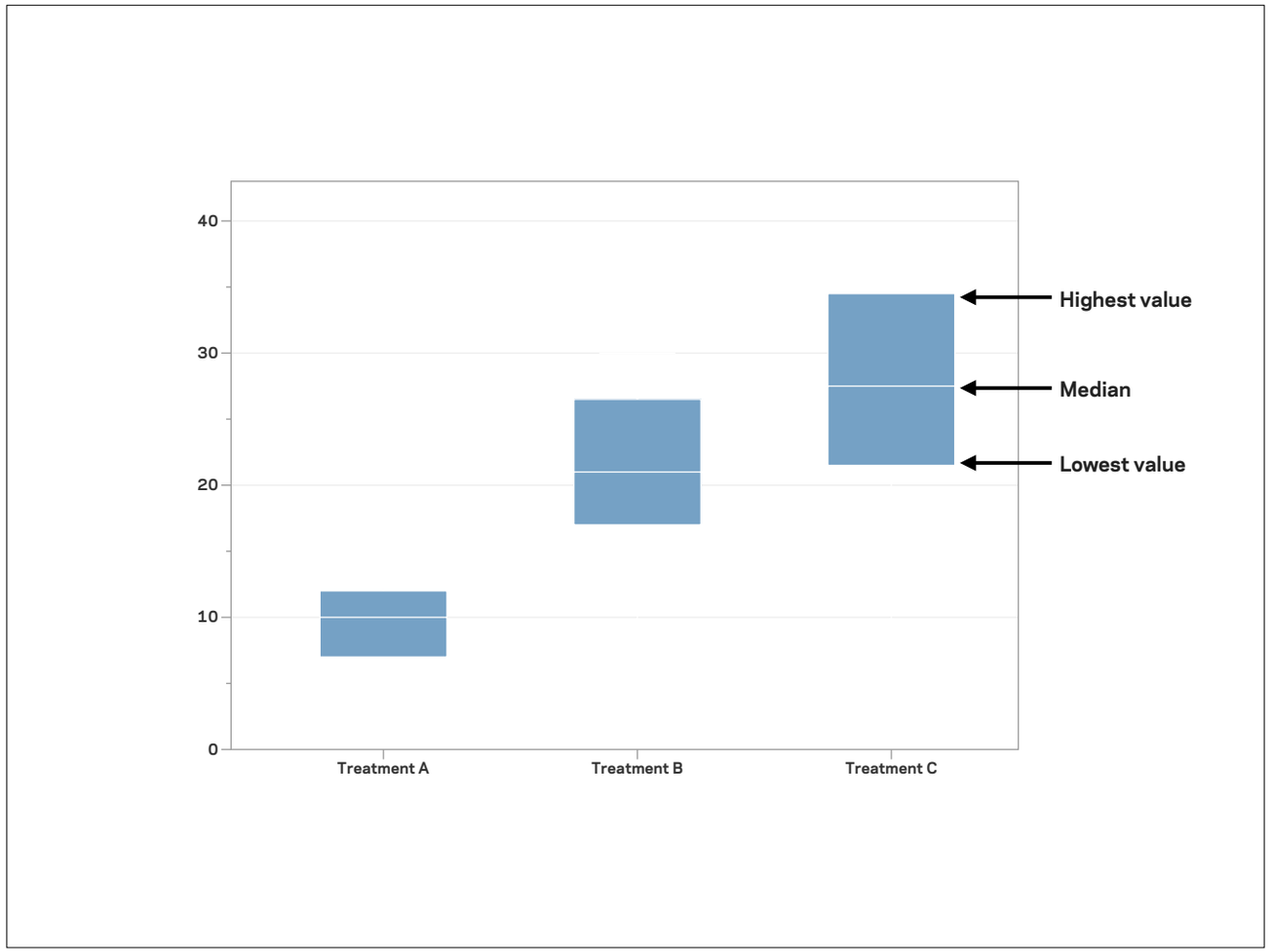
Remember this?



Points can also be used when you would normally use bars if there is a significant advantage to narrowing the quantitative scale such that zero is not included.



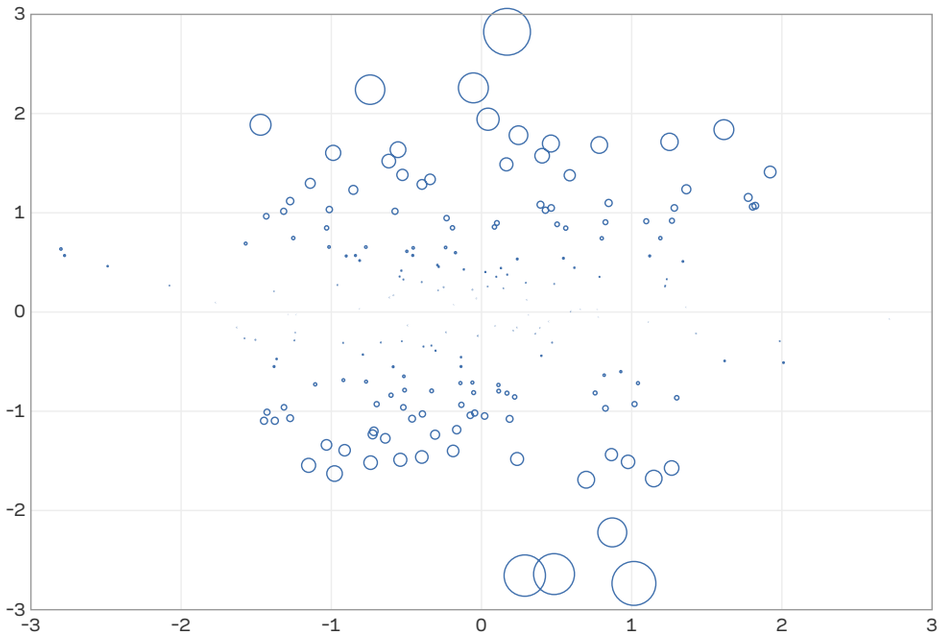
These rectangles are similar to bars, but because they don't share a common baseline, we tend to notice the difference between the positions of their tops, the difference between the positions of their bottoms, and the difference between their lengths. This is precisely what these rectangles are designed to help us do. Rather than bars, these are called boxes, which are used in a kind of graph called a box plot. Each box represents the distribution of an entire set of values: the bottom represents the lowest value, the top the highest value, and the length the full spread of the values from lowest to highest. The mark that divides the box into two sections—in this case a light line—indicates the center of the distribution, usually the median or mean. A measure of center or average gives us a single number that we can use to summarize an entire set of values. Notice how your eyes are encouraged compare the different positions of these box's centers—the fact that on average, the values represented by the box on the right are higher than those on the left.



Because boxes have a two ends that can both be used to mark a position along a quantitative scale, they can be used to encode the range from lowest to highest of a full set of values. A data point in some form, such as the short line on the examples above, can be used to mark the center of the range such as the median of the full set of values. This combination of points and bars provides a powerful way of summarizing the distributions of multiple sets of values.

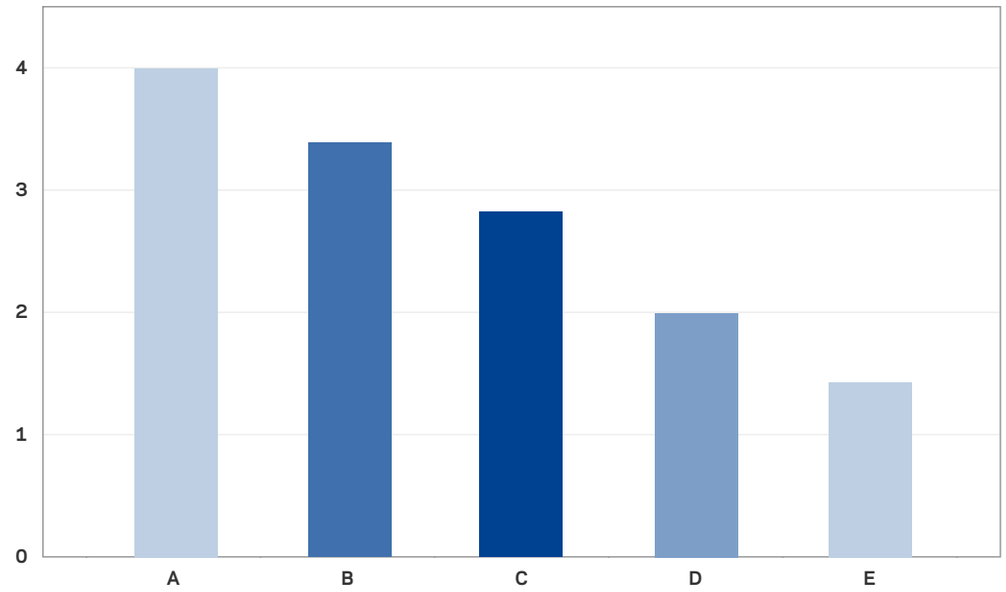
When boxes and points are combined in this or similar ways to encode a distribution of values, it is called a box plot.

Secondary attributes for quantitative encoding

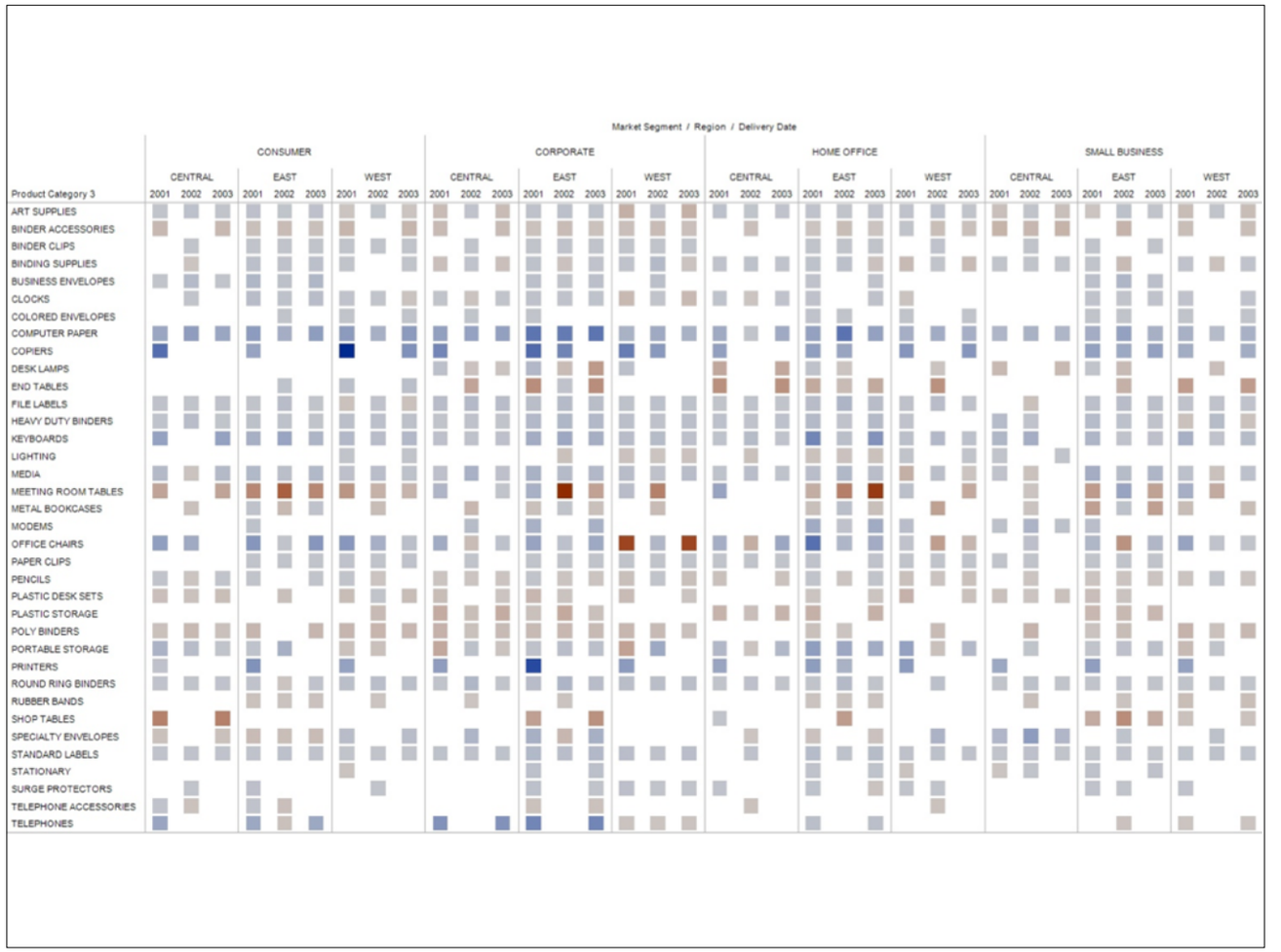


In this bubble chart, the size of the data point is being used to encode a third quantitative variable, because 2-D position along the X and Y axes has already been used. As you can see, precise magnitude comparisons based on the sizes of the bubbles are not possible, but you can roughly perceive these differences in value.

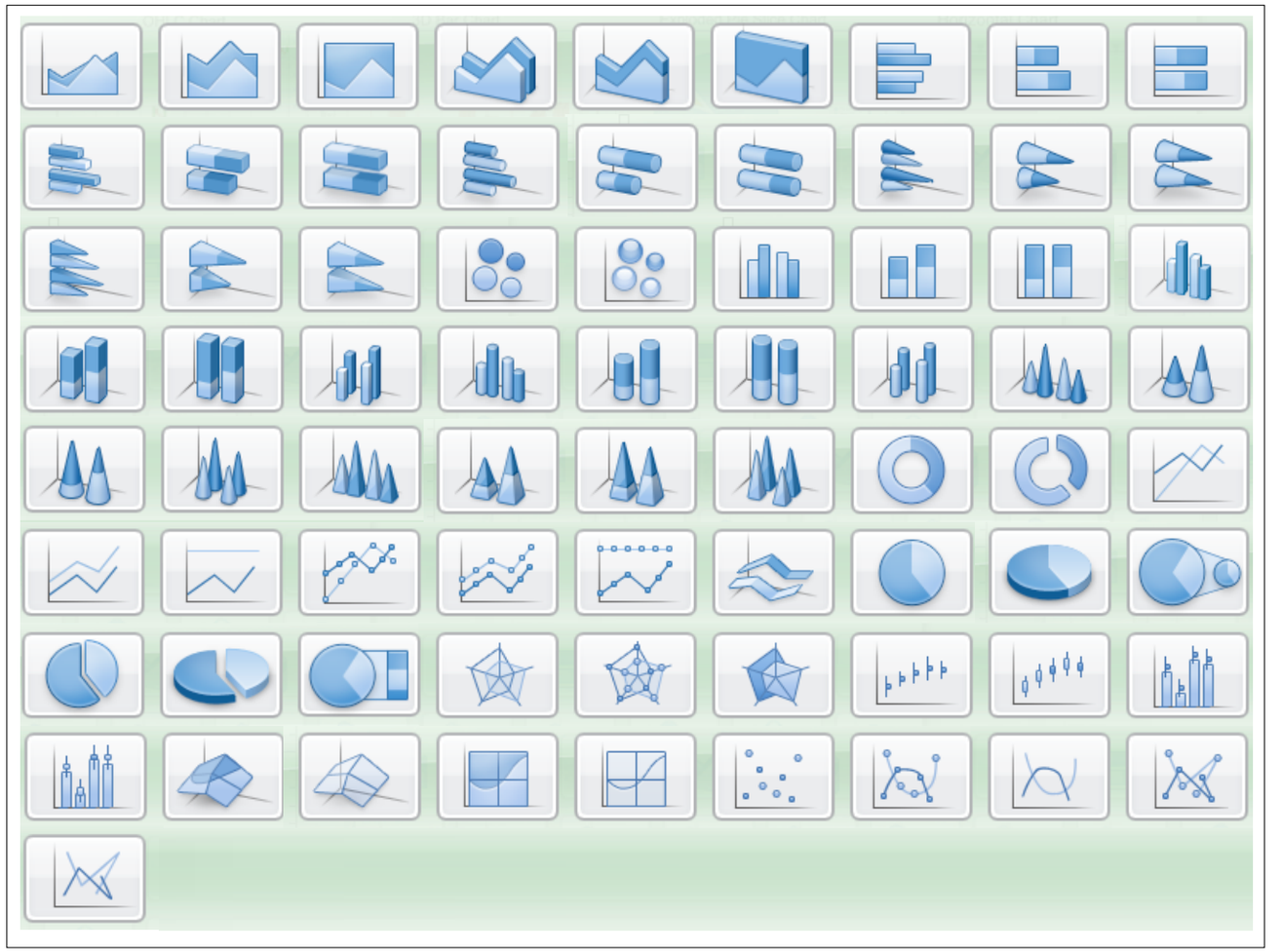
Secondary attributes for quantitative encoding



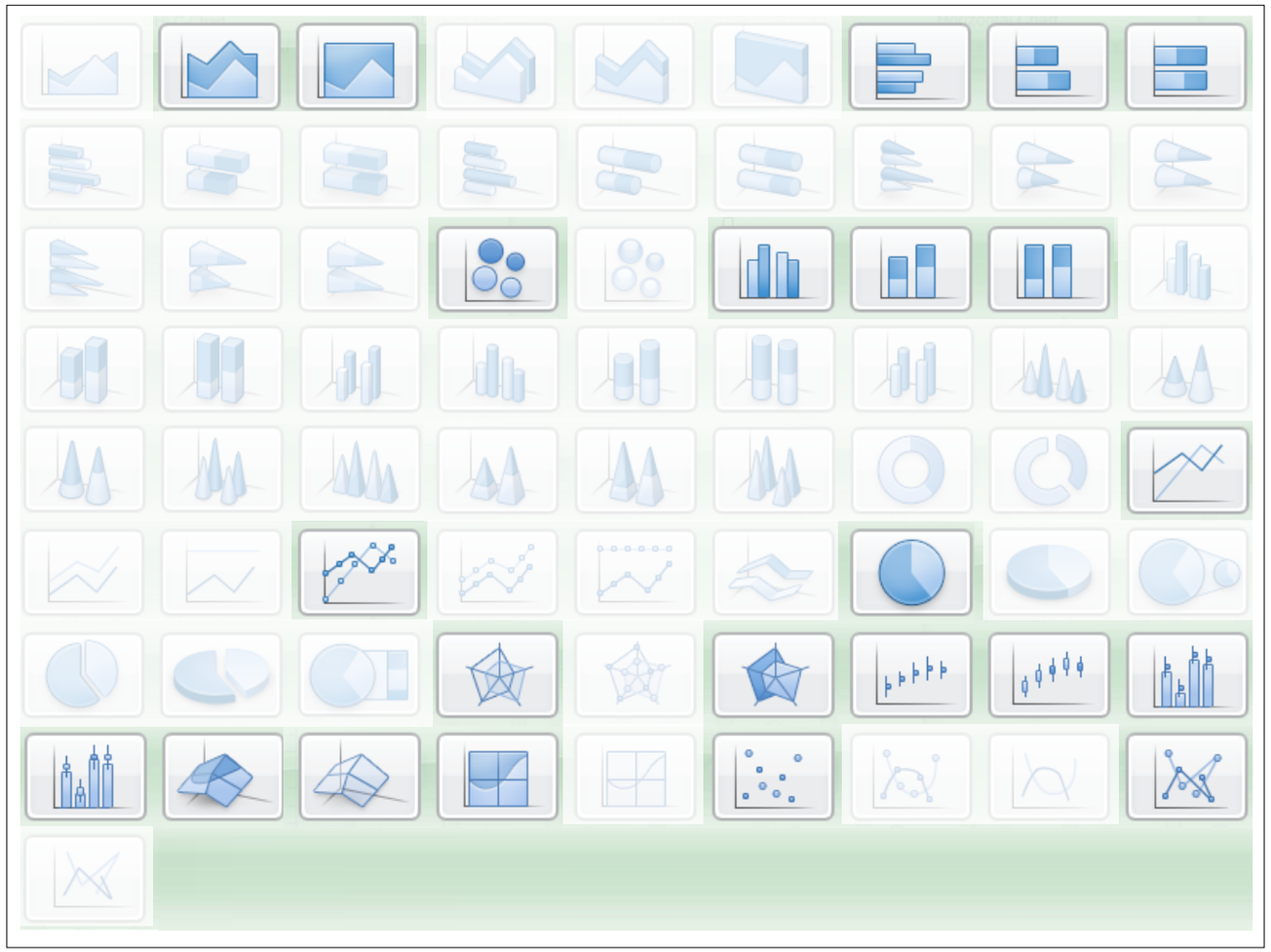
In this bar graph, two quantitative variables have been encoded in the bars: one as the heights of the bars in relation to the Y axis and a second as the color intensity of the bar ranging from light blue for low values and dark blue for high values. If you imagine that the heights of the bars encode revenues for various sales regions and that color intensity encodes profits, a graph such as this could be used to determine that the region with the greatest revenue falls somewhere near the center in terms of profits, whereas the third ranking region in revenues earns the highest profits. Precisely how much greater the profits are for region C compared to region A, however, you cannot determine, but if your objective doesn't require this precision, a graph of this type can be quite useful.



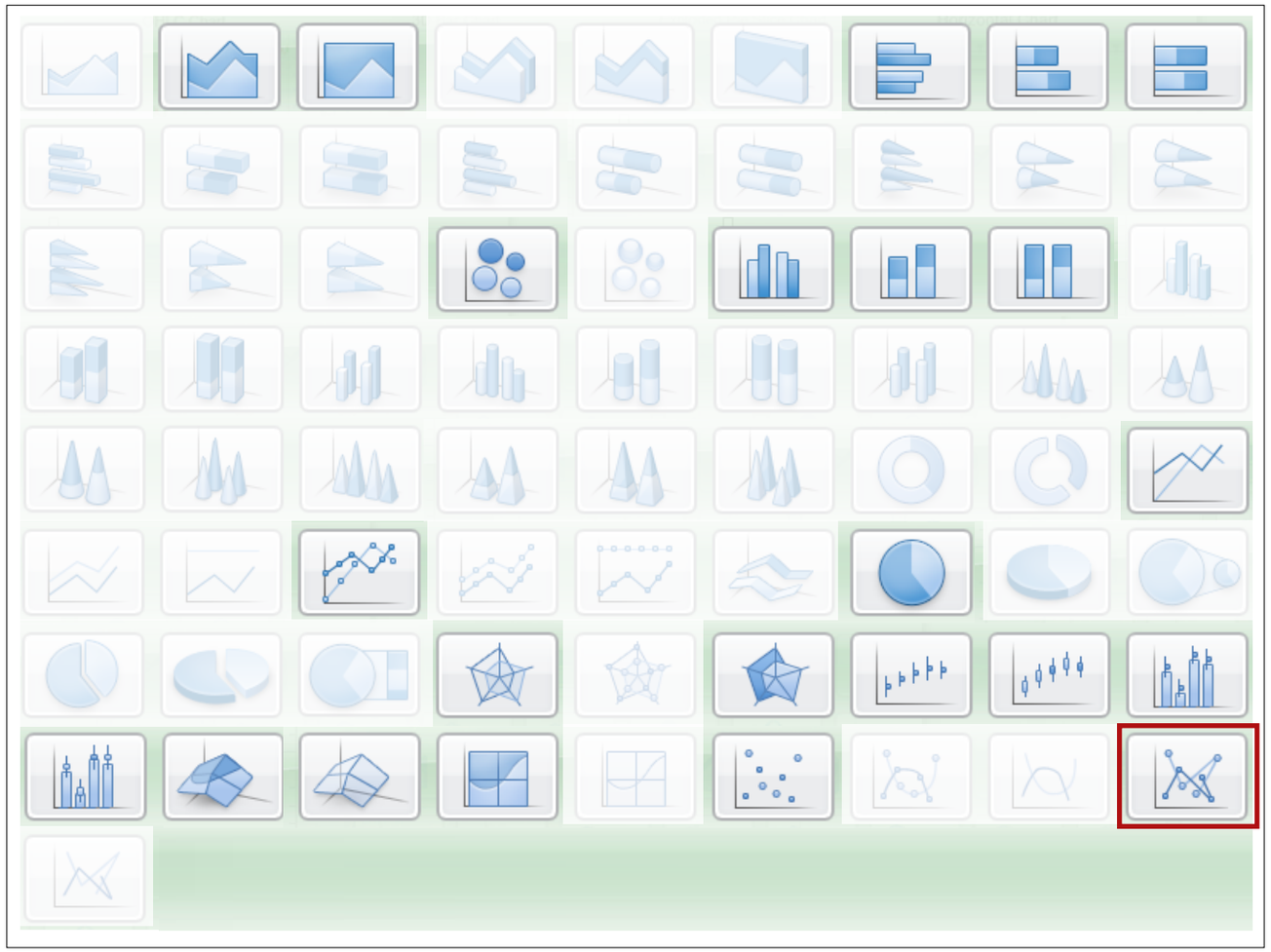
When you need to get a birds-eye view of a large number of values to spot extremes, exceptions, concentrations, or gaps, heatmap matrices such as this (that is, a tabular arrangement of data using color intensity to encode the quantitative values) allow you to display a large number of values in the limited space of your computer screen.



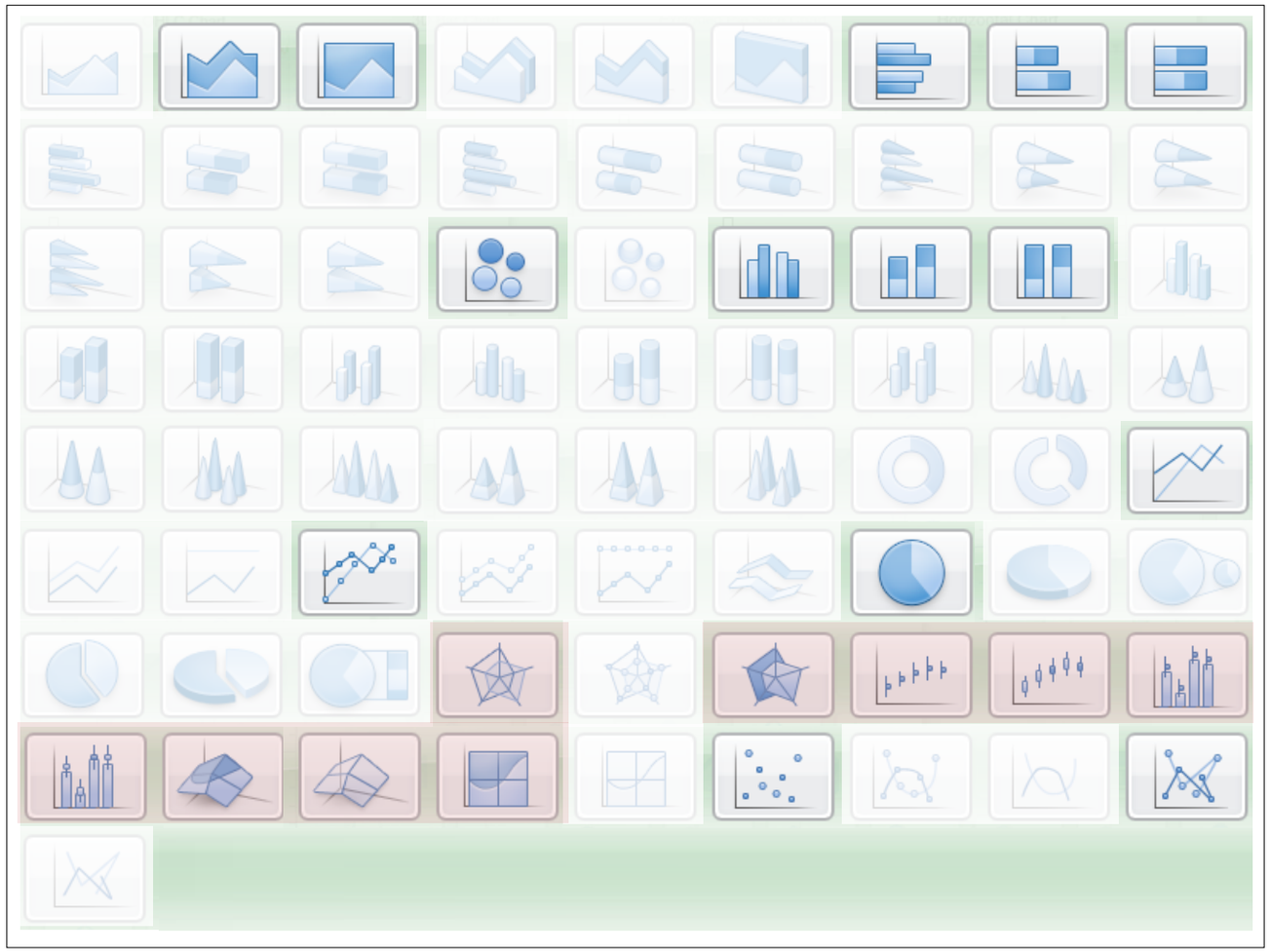
These are all the chart types available in Excel 2008 for Mac. Of all these chart types, only 21 are actually useful. And almost half of those are only useful to specialists.



All the charts I've dimmed, could be eliminated from Excel without having any impact on the users ability to create efficient and useful data visualizations. One is in by a very slim margin — the scatterplot with lines. I've seen it efficiently used once, where the data was sorted by date, and the chart narrated (for it is not easy to understand without explanation).

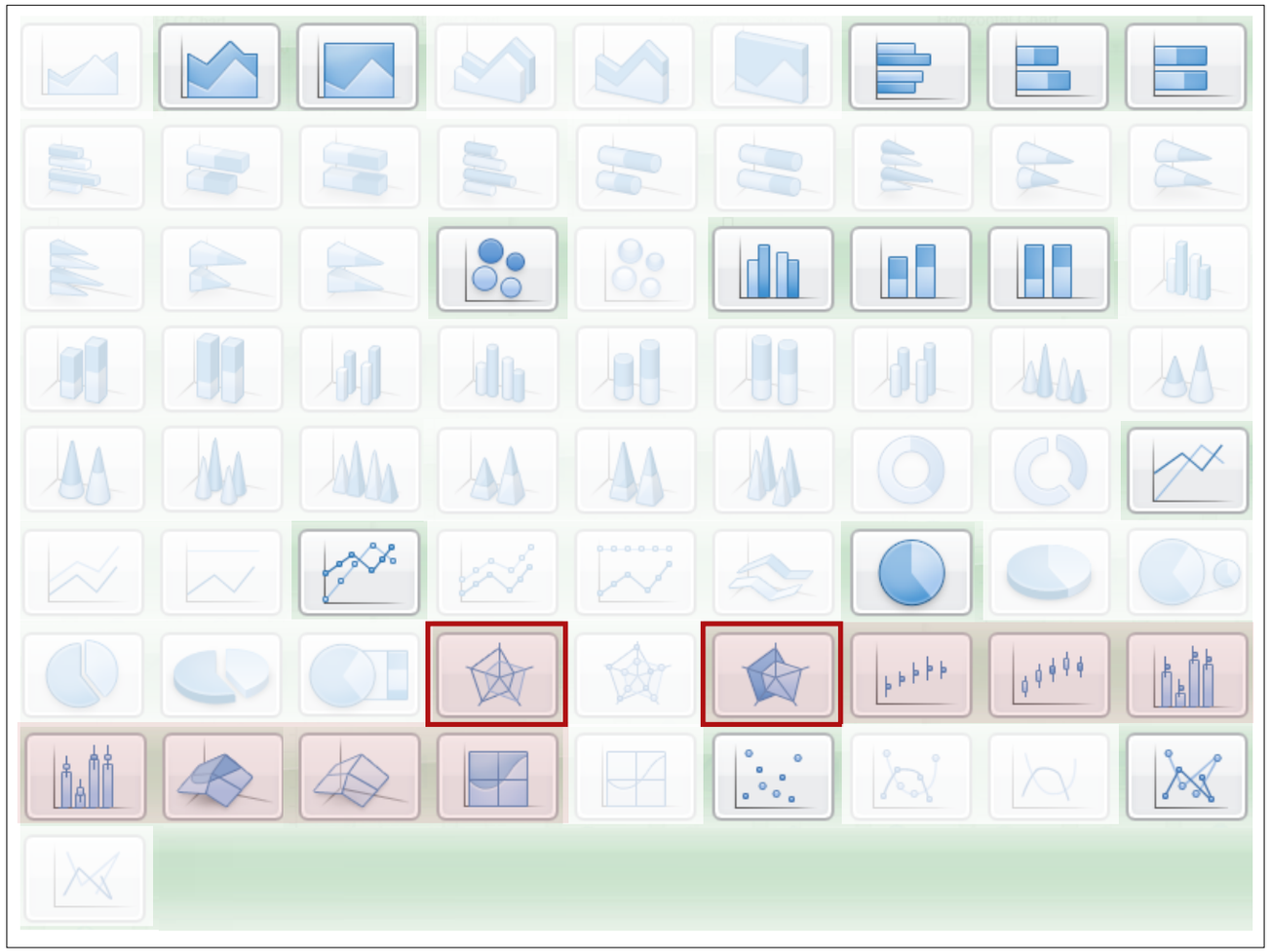


All the charts I've dimmed, could be eliminated from Excel without having any impact on the users ability to create efficient and useful data visualizations. One is in by a very slim margin — the scatterplot with lines. I've seen it efficiently used once, where the data was sorted by date, and the chart narrated (for it is not easy to understand without explanation).



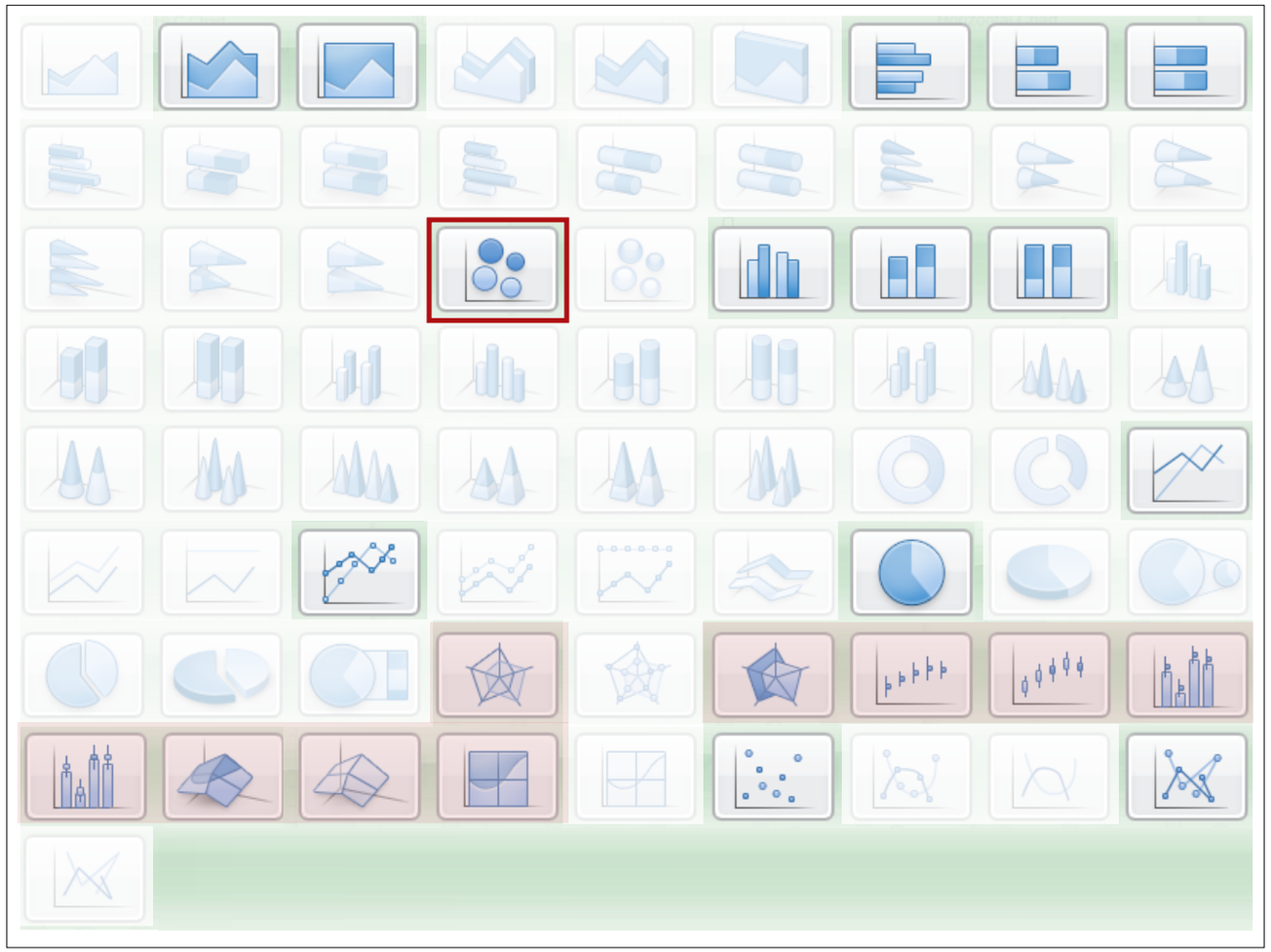
The chart types I've highlighted are only applicable to very specific cases or to specialists in a field. For example, the spider-chart is a handy tool for creating a wind rose: To show from which way the wind blows (in a very literal sence) and of it's strenght.

(The other types are stock charts, surface and contour charts. Stock charts are only for tracking a single stock — the High-Low-Close can be useful for charting temperature readings or variances in scientific experiments or statistical studies). Surface and contour charts are used by mathematicians.)



The chart types I've highlighted are only applicable to very specific cases or to specialists in a field. For example, the spider-chart is a handy tool for creating a wind rose: To show from which way the wind blows (in a very literal sence) and of it's strenght.

(The other types are stock charts, surface and contour charts. Stock charts are only for tracking a single stock — the High-Low-Close can be useful for charting temperature readings or variances in scientific experiments or statistical studies). Surface and contour charts are used by mathematicians.)



There's one chart type that should also be used with care. It's the made-famous-by-Hans-Rosling bubble chart. As has been shown by Rosling, this chart can be very effective to make a point. However, decoding a quantifiable value from the area of a circle does not come naturally to us.

“9 pizza

“12 pizza

Our inability to estimate the area of a circle becomes pretty clear when you ask someone to estimate the size difference between a 9”, 12” and a 16” pizza.

“9 pizza
64 in^2

“12 pizza
113 in^2

Our inability to estimate the area of a circle becomes pretty clear when you ask someone to estimate the size difference between a 9”, 12” and a 16” pizza.

Our inability to estimate the area of a circle becomes pretty clear when you ask someone to estimate the size difference between a 9”, 12” and a 16” pizza.

Our inability to estimate the area of a circle becomes pretty clear when you ask someone to estimate the size difference between a 9”, 12” and a 16” pizza.

Data Attributes

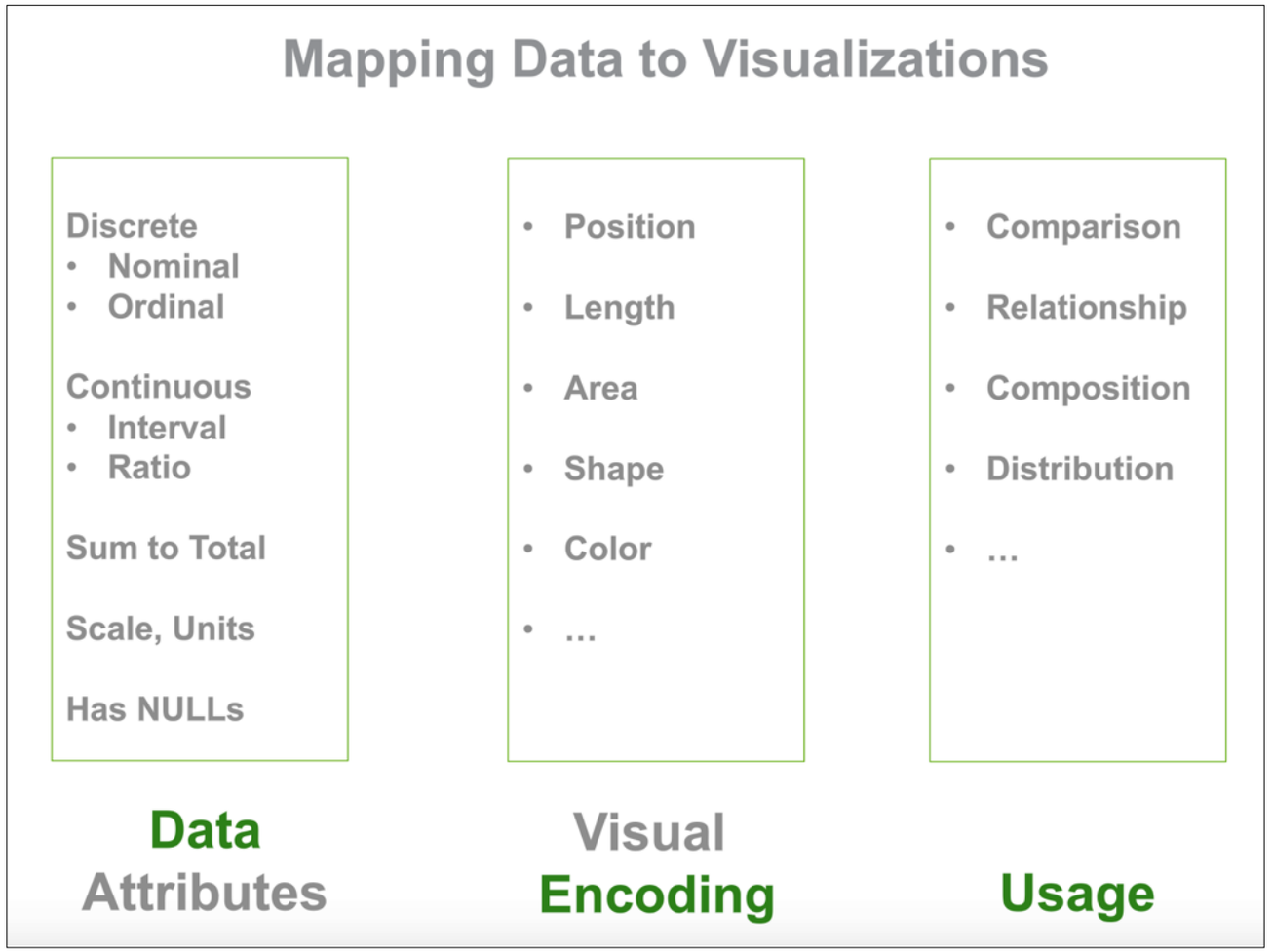
- Ratio
  - Cost: $15, $30, $45
  - Age: 10 years, 20 years, 30 years

- Interval
- Temperature: -5 °, 10 °, 25°
- Time: 1am, 5am, 9am

- Ordinal
  - Size: Small, Medium, Large
  - Position: 1st, 2nd, 3rd

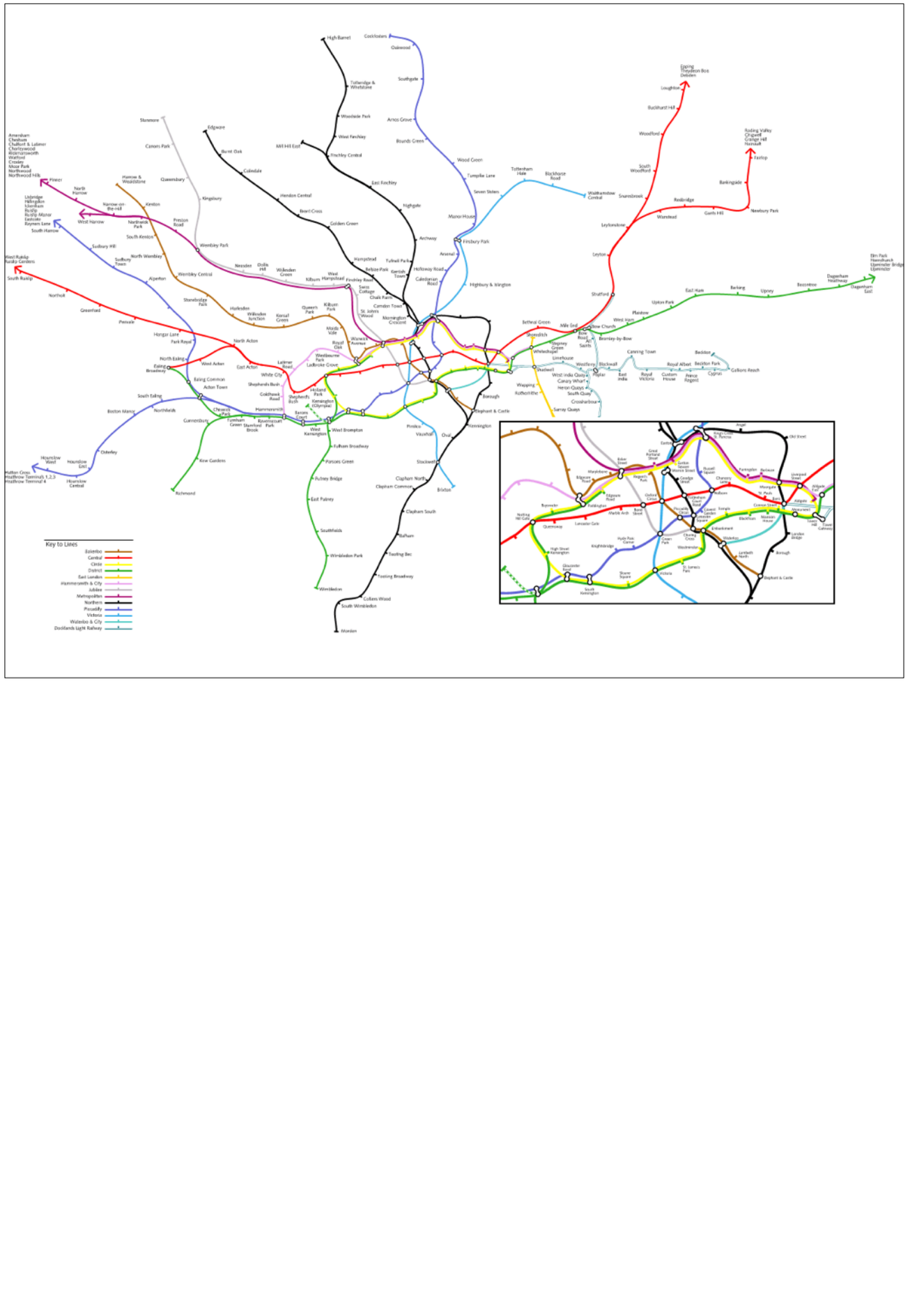
- Nominal
  - Sex: Male, Female
  - Sports: Soccer, American Fotball

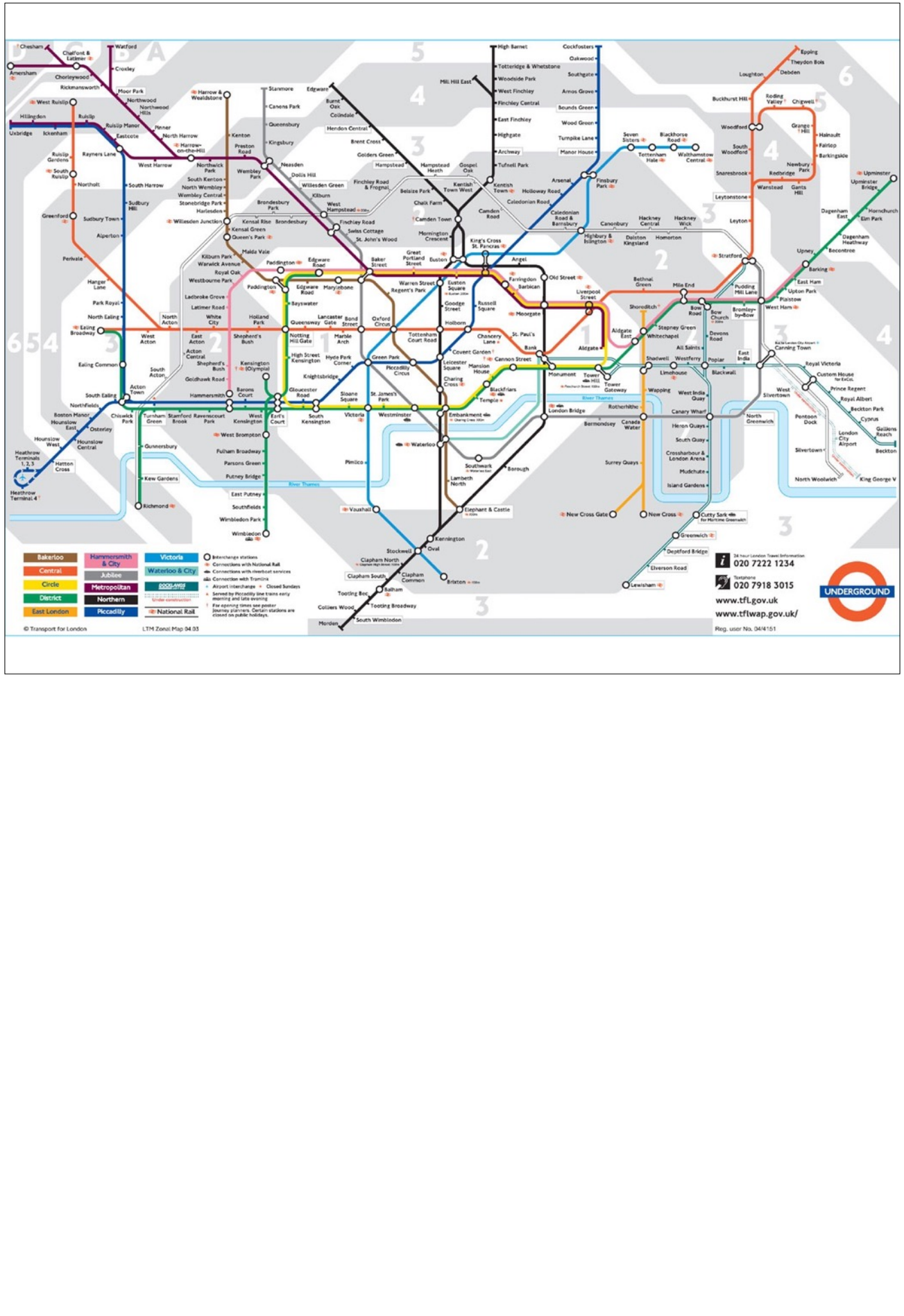
The data dictates strongly what can and should be done with it.

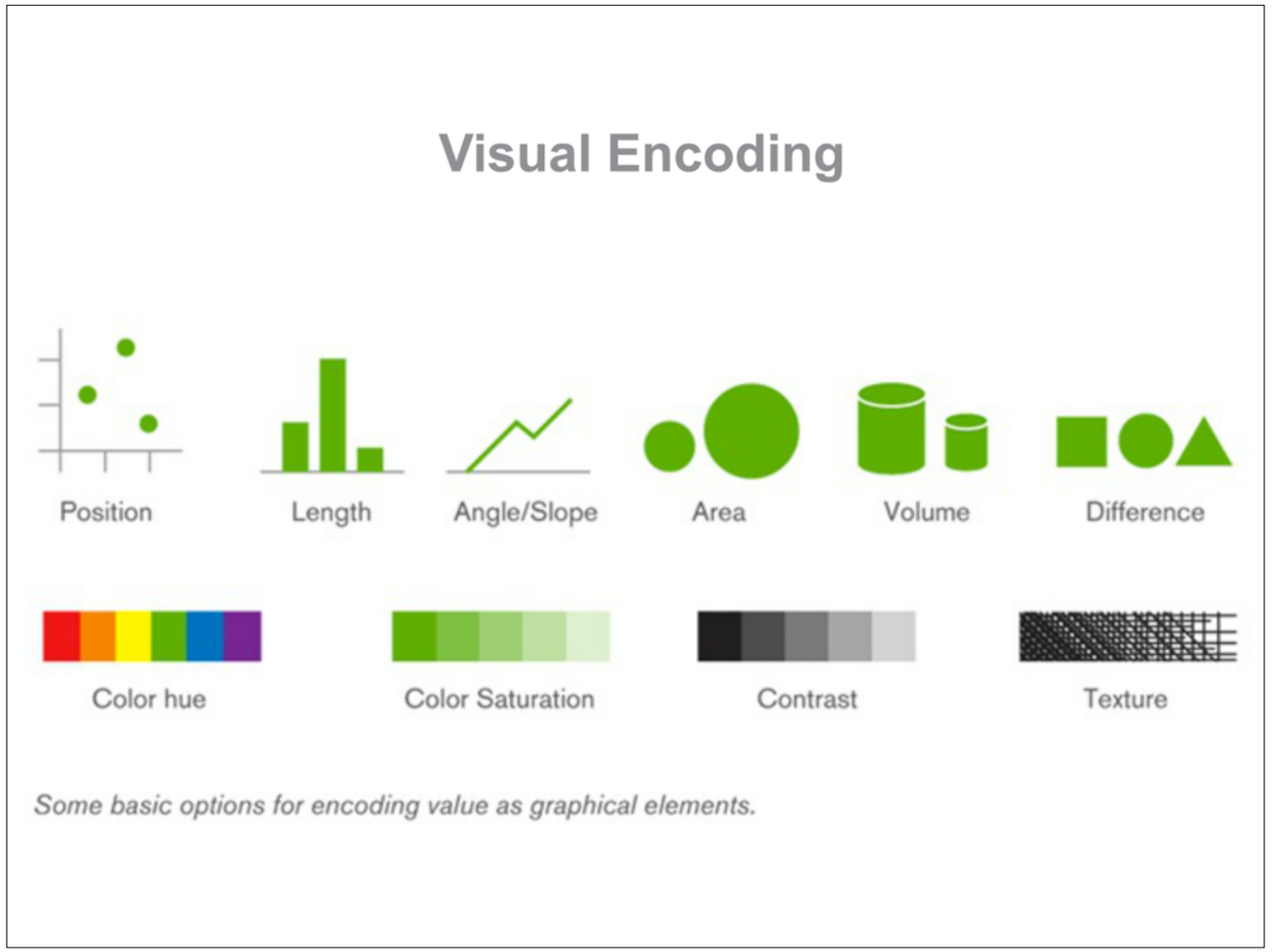


But the purpose of the chart should always be the driver. Compare original London underground with the original ordered map, and the most geographically correct one.

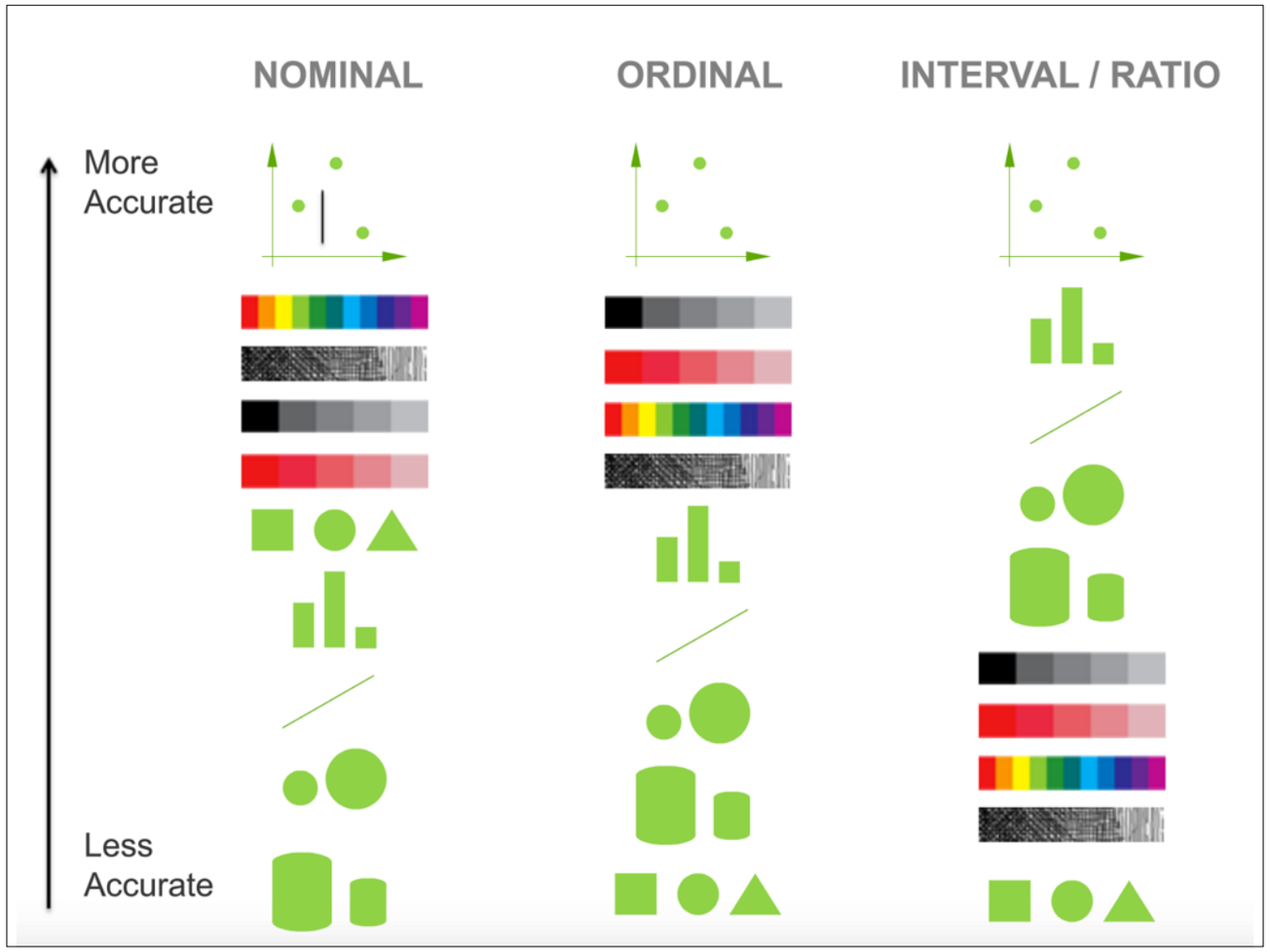
Think about the intent of design. Why include stuff like exact geo-location if is it isn't important?


High Barnet
Cockfosters
Oakwood
Tottenham & Whitehall
Southgate
Woodside Park
Arnos Grove
West Finchley
Bounds Green
Finchley Central
Wood Green
Mill Hill East
East Finchley
Tottenham Hale
Blackhorse Road
Seven Sisters
Highgate
Edgware
Burnt Oak
Colindale
Manor House
Archway
Finsbury Park
Hendon Central
Arsenal
Brent Cross
Golders Green
Holloway Road
Highbury & Islington
Hampstead
Kilburn
West Hampstead
Finchley Road
Swiss Cottage
Chalk Farm
Camden Town
St. John's Wood
Mornington Crescent
Queen's Park
Kilburn Park
Maida Vale
Warwick Avenue
Royal Oak
Westbourne Park
Ladbroke Grove
White City
Shepherd's Bush
Holland Park
Kensington (Olympia)
Barons Court
West Kensington
Goldhawk Road
Hammersmith
Ravenscourt Park
Stamford Brook
Turnham Green
Chiswick Park
Gunnersbury
Kew Gardens
Richmond
Acton Town
Ealing Common
Ealing Broadway
North Ealing
East Acton
West Acton
Park Royal
North Acton
Willesden Junction
Kensal Green
Harlesden
Stonebridge Park
Wembley Central
Wembley Park
Neasden
Dollis Hill
Willesden Green
Kilburn
Preston Road
Northwick Park
Harrow & Wealdstone
Queensbury
Kingsbury
Canons Park
Stanmore
Harrow-on-the-Hill
Kenton
South Kenton
North Wembley
Sudbury Town
Sudbury Hill
Alperton
Sudbury Hill Harrow
South Harrow
West Harrow
Rayners Lane
Eastcote
Ruislip Manor
Ruislip
Ickenham
Hillingdon
Uxbridge
Pinner
North Harrow
Amersham
Chesham
Chalfont & Latimer
Chorleywood
Rickmansworth
Watford
Croxley
Moor Park
Northwood
Northwood Hills
West Ruislip
Ruislip Gardens
South Ruislip
Northolt
Greenford
Perivale
Hanger Lane
Boston Manor
South Ealing
Northfields
Osterley
Hounslow West
Hounslow East
Hounslow Central
Hatton Cross
Heathrow Terminals 1,2,3
Heathrow Terminal 4
Bromley-by-Bow
Bow Road
Mile End
Stepney Green
Whitechapel
Shadwell
Limehouse
Westferry
Blackwall
Poplar
East India
Canning Town
Royal Victoria
Custom House
Royal Albert
Prince Regent
Beckton
Beckton Park
Cyprus
Gallions Reach
Wapping
Rotherhithe
Canary Wharf
Heron Quays
South Quays
Crossharbour
Surrey Quays
Bethnal Green
Shoreditch
Bank
Monument
Tower Hill
Aldgate
Aldgate East
Liverpool Street
Moorgate
Barbican
Old Street
Angel
King's Cross St. Pancras
Euston
Great Portland Street
Euston Square
Baker Street
Marylebone
Edgware Road
Regent's Park
Bayswater
Paddington
Oxford Circus
Bond Street
Marble Arch
Lancaster Gate
Queensway
Notting Hill Gate
Holborn
Tottenham Court Road
Russell Square
Warren Street
Goodge Street
Charing Cross
Leicester Square
Piccadilly Circus
Green Park
Hyde Park Corner
Knightsbridge
High Street Kensington
Gloucester Road
South Kensington
Sloane Square
Victoria
St. James's Park
Westminster
Pimlico
Vauxhall
Oval
Kennington
Waterloo
Lambeth North
Embankment
Temple
Blackfriars
Mansion House
Cannon Street
Monument
Tower Hill
Tower Gateway
London Bridge
Borough
Elephant & Castle
Stockwell
Clapham North
Clapham Common
Clapham South
Balham
Tooting Bec
Tooting Broadway
Colliers Wood
South Wimbledon
Morden
Brixton
Southfields
Wimbledon Park
Wimbledon
East Putney
Putney Bridge
Parsons Green
Fulham Broadway
West Brompton
Earl's Court
Upminster
Upminster Bridge
Hornchurch
Elm Park
Dagenham East
Dagenham Heathway
Becontree
Upney
Barking
East Ham
Upton Park
Plaistow
West Ham
Stratford
Leyton
Leytonstone
Wanstead
Redbridge
Snaresbrook
South Woodford
Woodford
Buckhurst Hill
Loughton
Debden
Theydon Bois
Epping
Newbury Park
Gants Hill
Barkingside
Fairlop
Roding Valley
Chigwell
Grange Hill
Hainault
Walthamstow Central
Key to Lines
Bakerloo
Central
Circle
District
East London
Hammersmith & City
Jubilee
Metropolitan
Northern
Piccadilly
Victoria
Waterloo & City
Docklands Light Railway

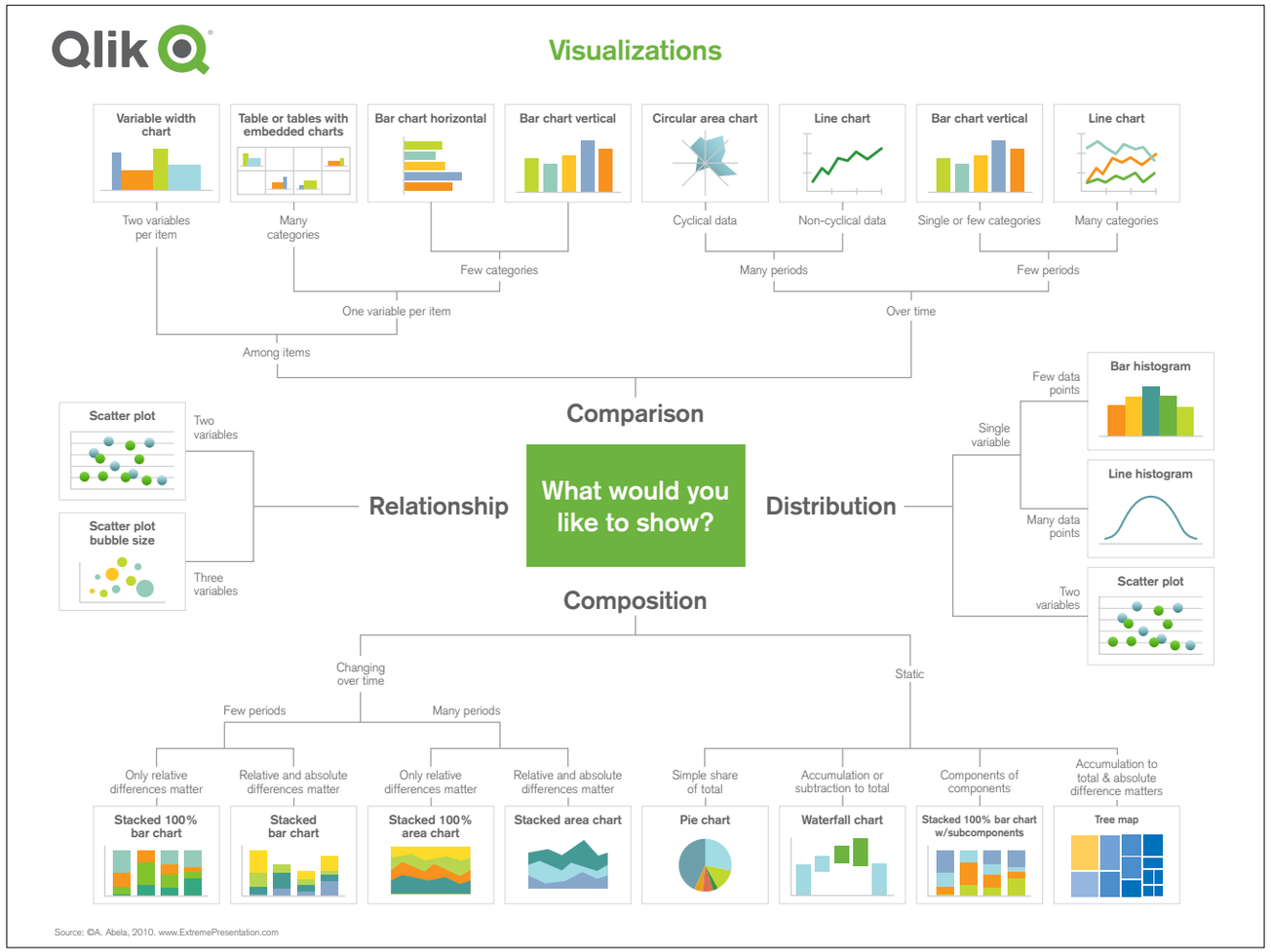

Bakerloo
Central
Circle
District
East London
Hammersmith & City
Jubilee
Metropolitan
Northern
Piccadilly
Victoria
Waterloo & City
DOCKLANDS LIGHT RAILWAY
Under construction
National Rail
Interchange stations
Connections with National Rail
Connections with riverboat services
Connection with Tramlink
Airport interchange
Closed Sundays
Served by Piccadilly line trains early morning and late evening
For opening times see poster journey planners. Certain stations are closed on public holidays.
© Transport for London
LTM Zonal Map 04.03
24 hour London Travel Information
020 7222 1234
Textphone
020 7918 3015
www.tfl.gov.uk
www.tflwap.gov.uk/
Reg. user No. 04/4151
UNDERGROUND



Here are some basic tools we have to communicate values.



And some of them work well for some things, and some work for others. Knowing which one to use is a good skill to have.



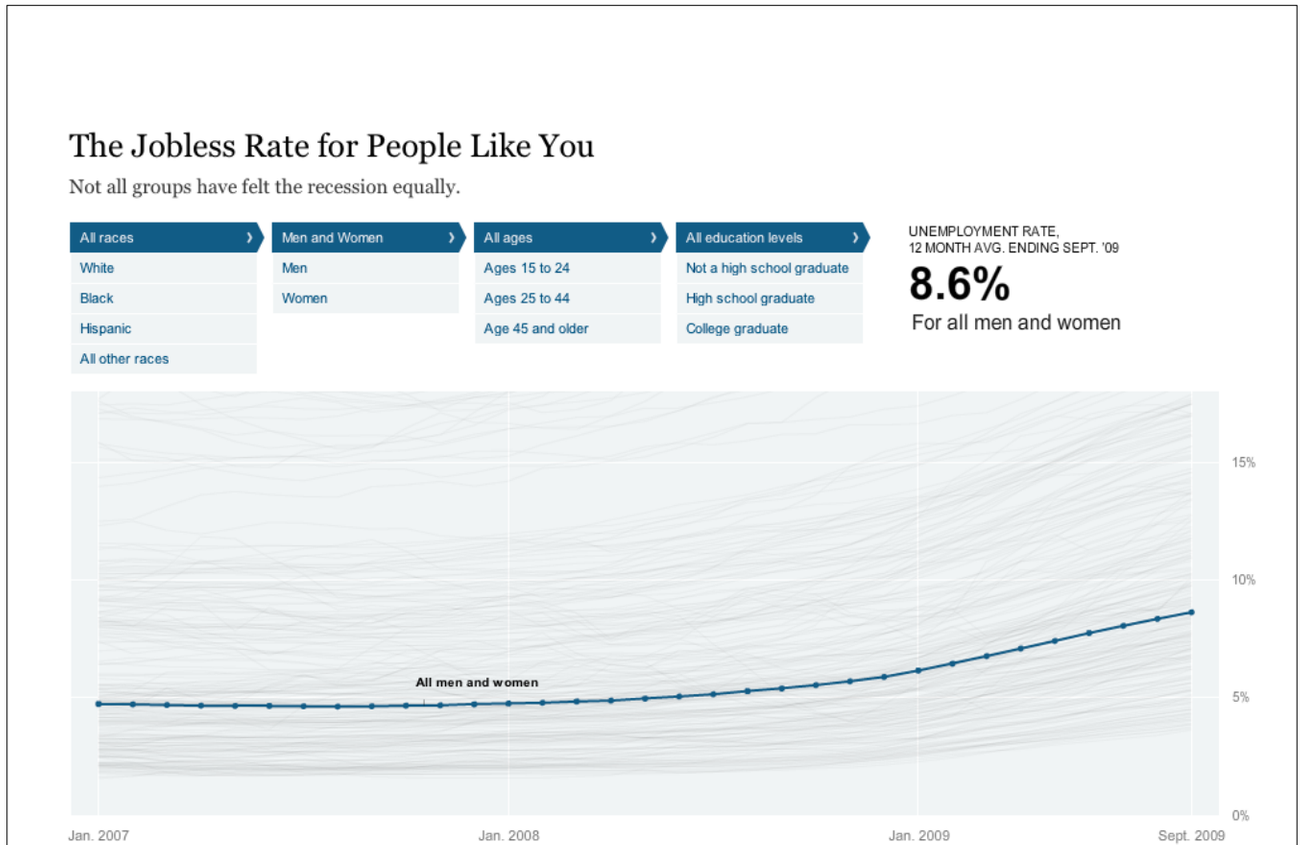
this will help :)

http://global.qlik.com/uk/blog/posts/patrik-lundblad/third-pillar-of-mapping-data-to-visualizations-usage

The others

“There’s something out there waiting for us, and it ain’t no man.“

— Billy (Predator)

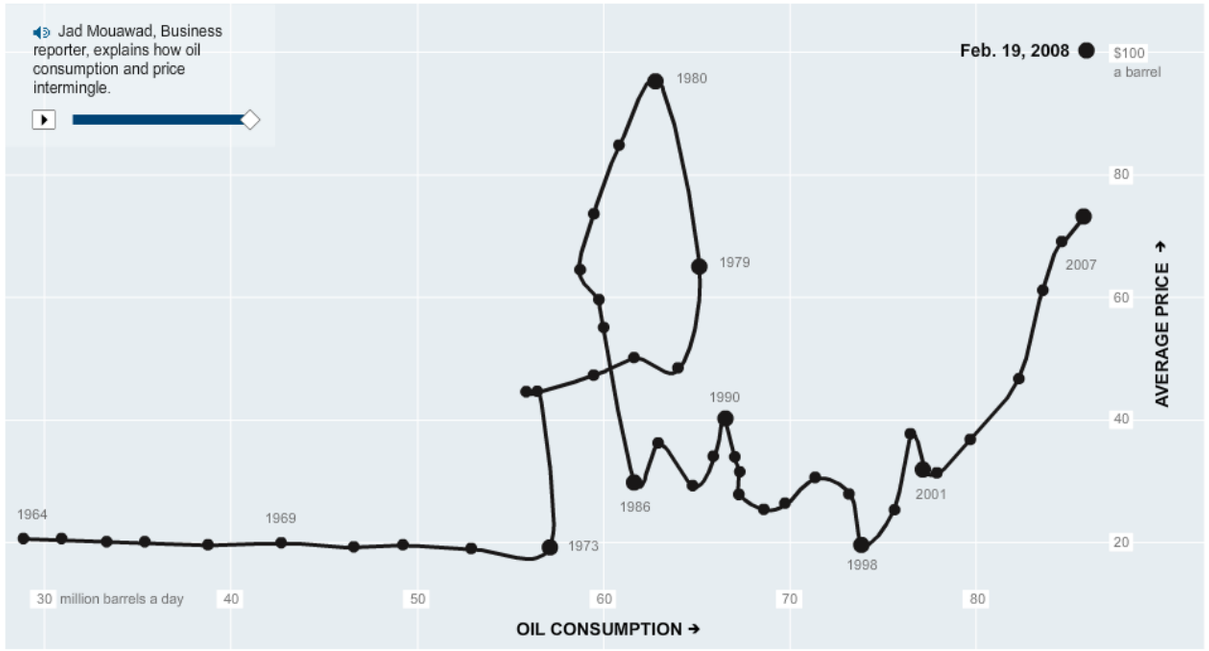


And this is “only” a line chart as well.

My point is, the chart type doesn’t need to be invented to create an amazing visualization. It’s a mixture

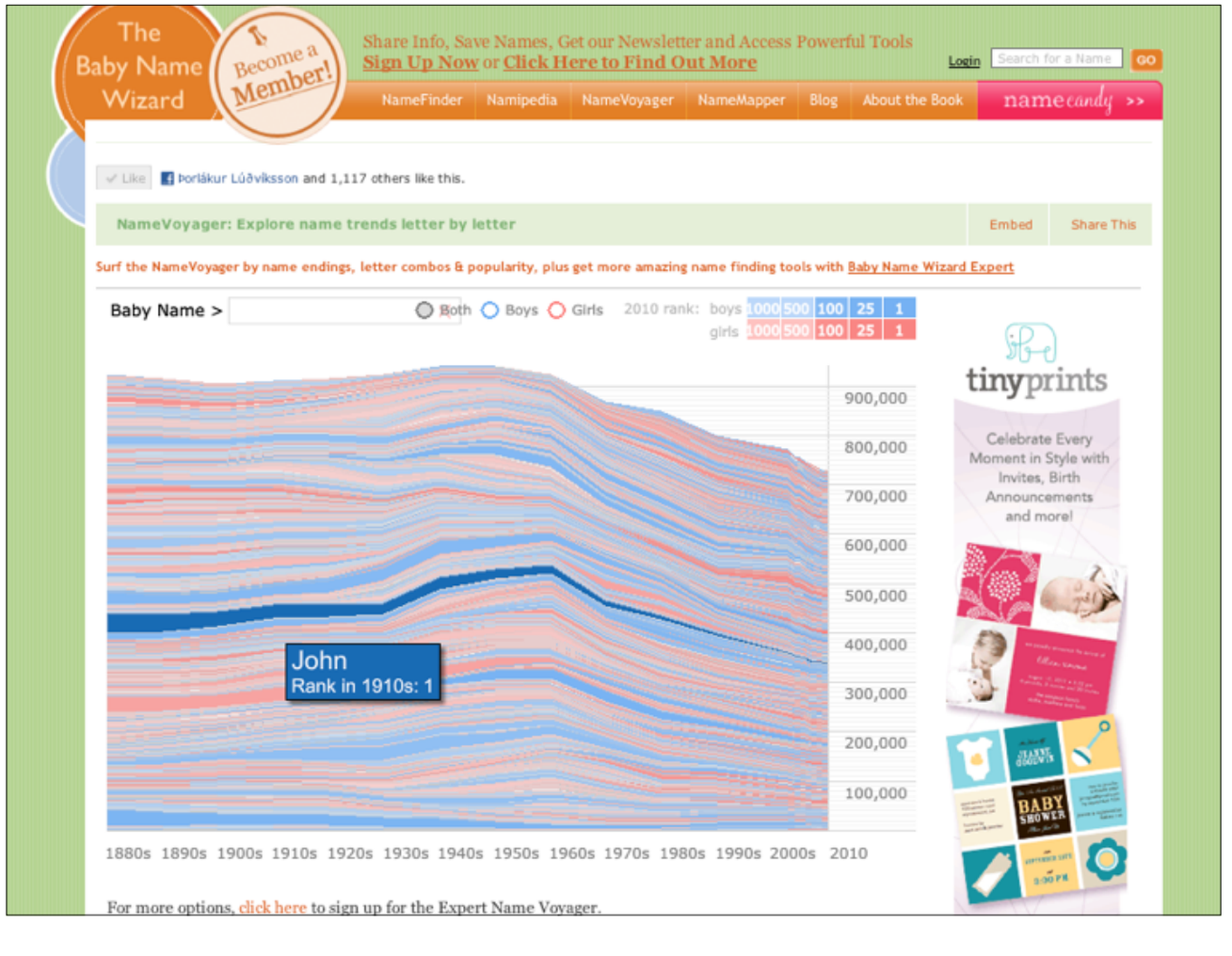
(Source: http://www.nytimes.com/interactive/2009/11/06/business/economy/unemployment-lines.html)

Oil Prices Reach a Symbolic Mark

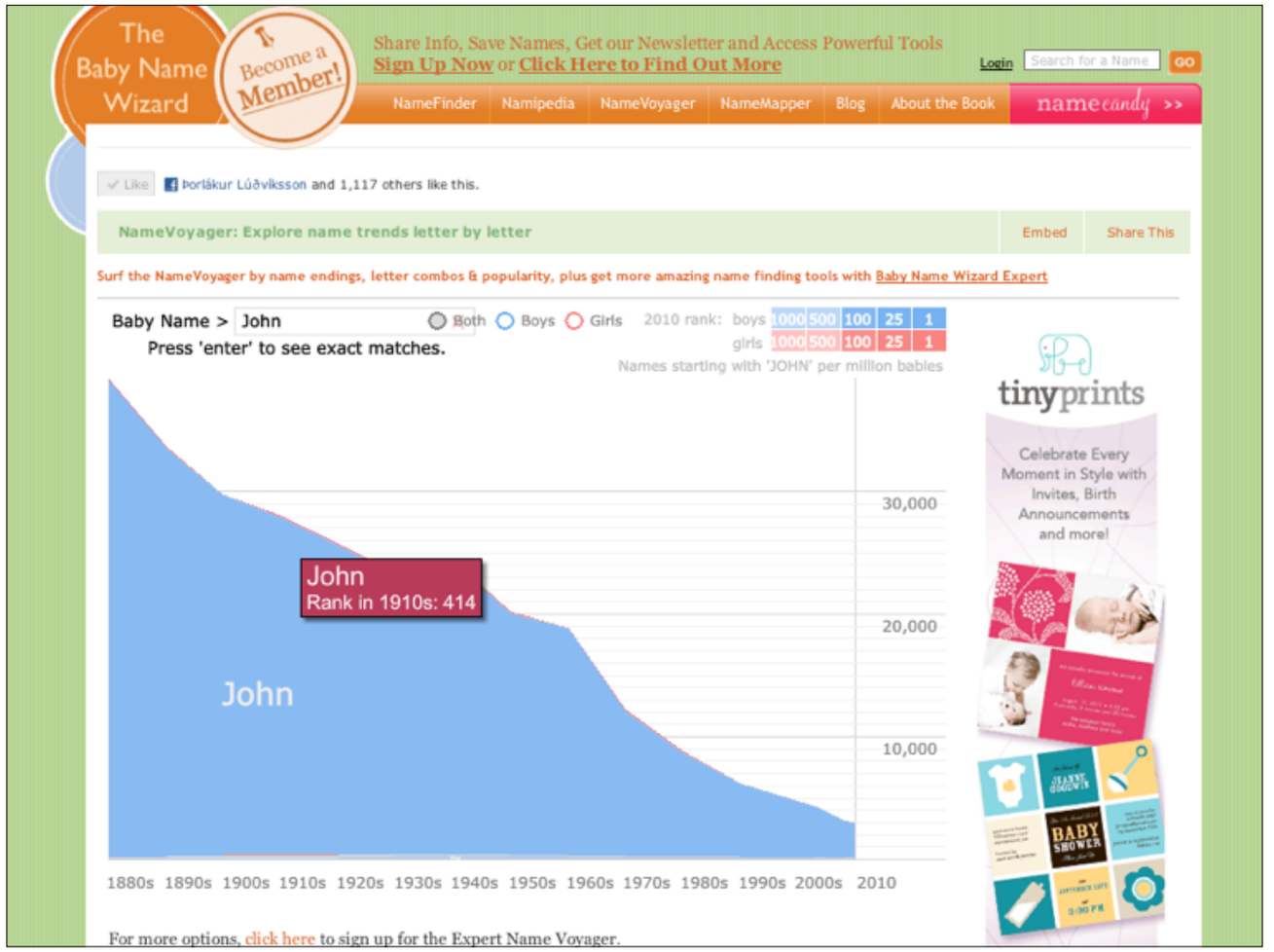


And this is “just” a line chart.

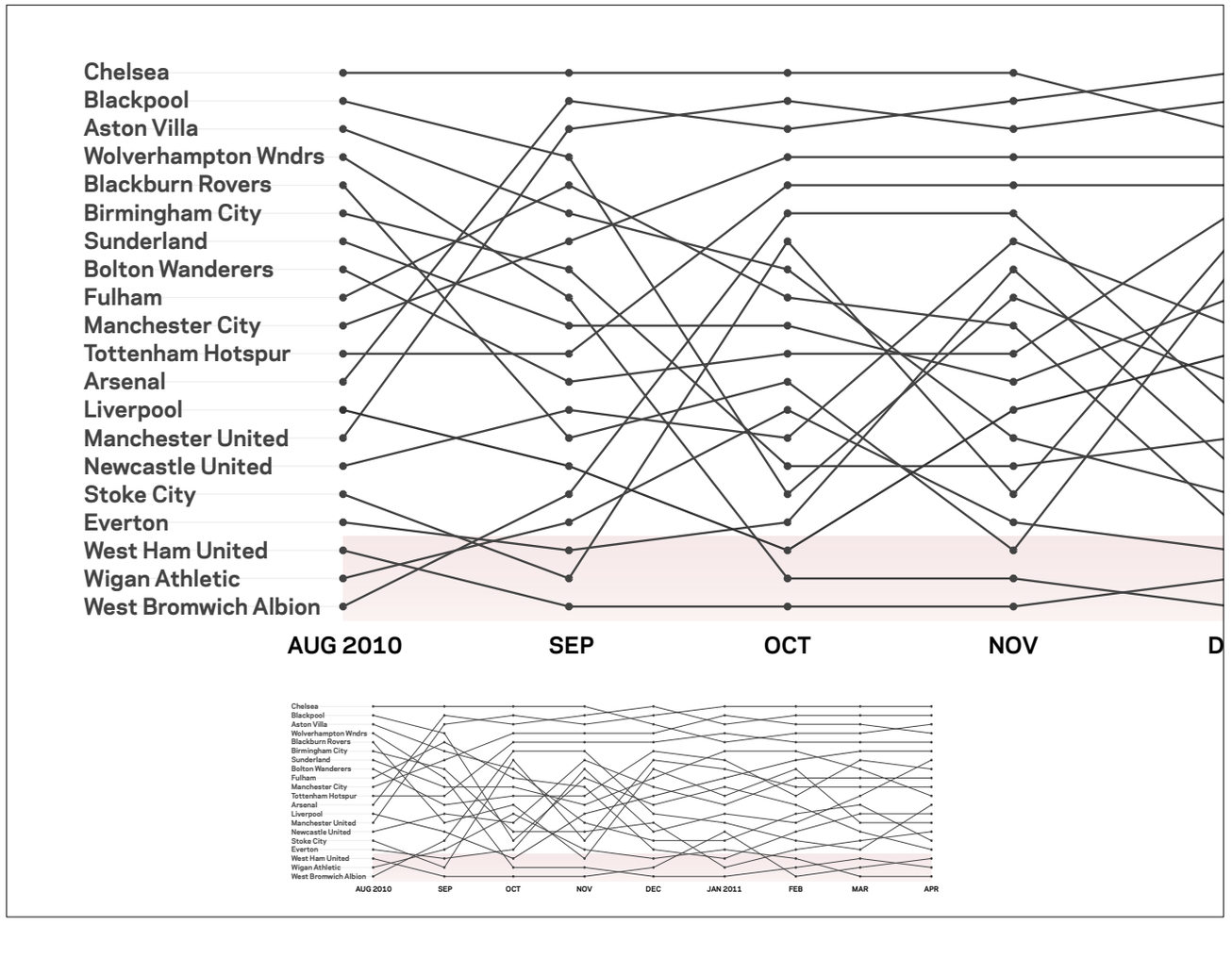
(Source: http://www.nytimes.com/interactive/2008/02/19/business/20080220_CENTURY_GRAPHIC.html)



Effectively, this is “just” a stacked line area chart.

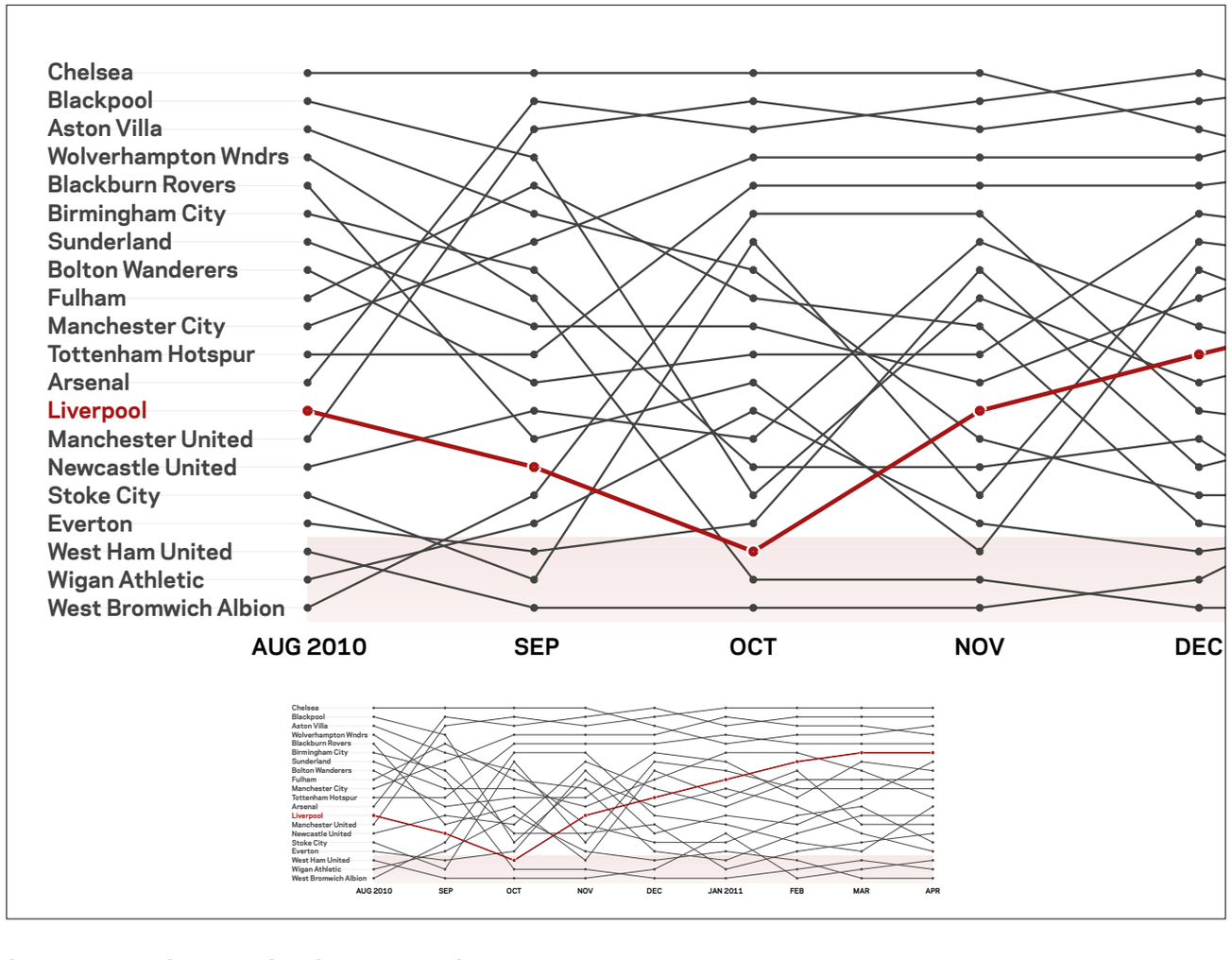


With the highlight and zoom feature we discover that John has also been used as a girl ’s name. Either an interesting fact or a mistake in the data.

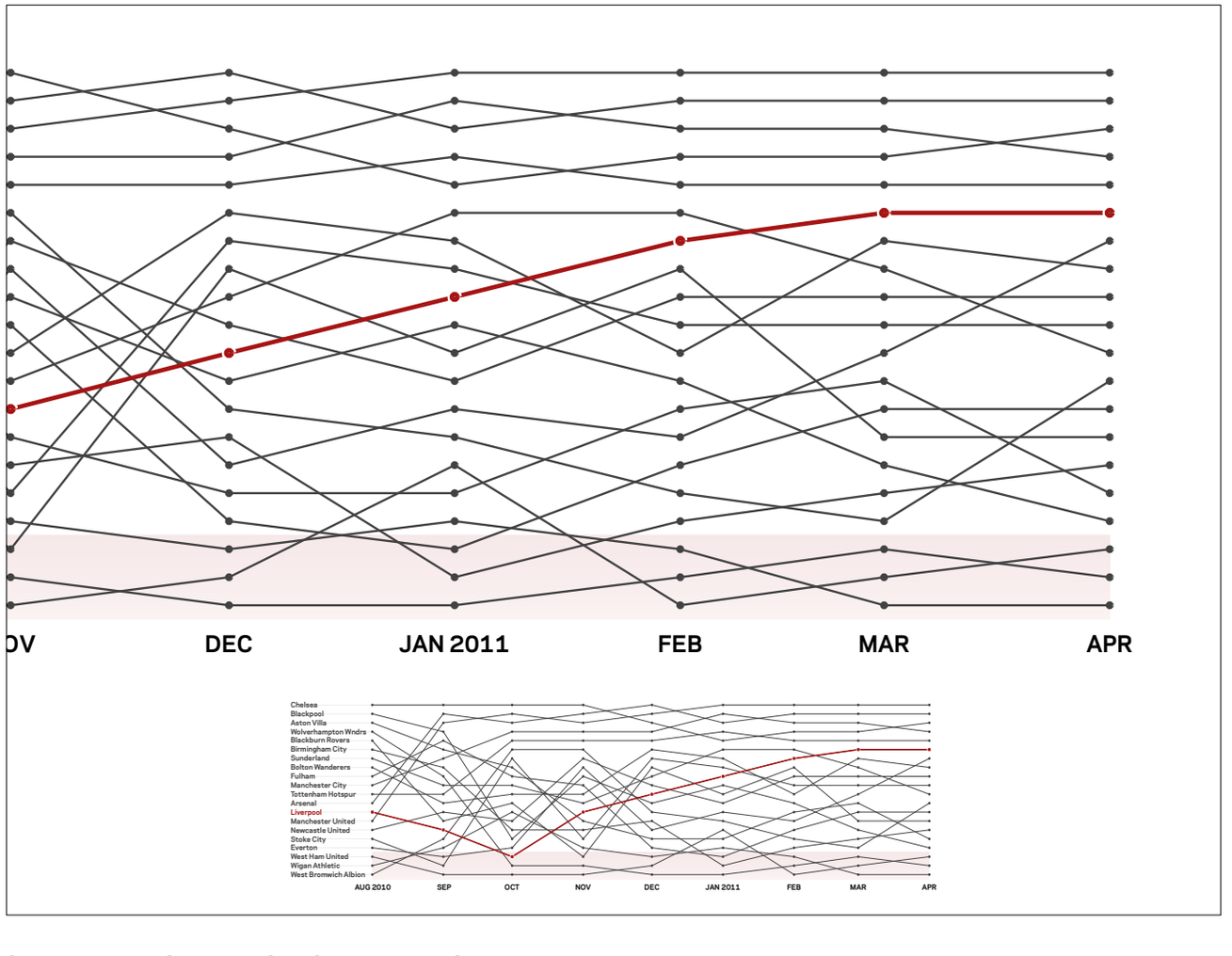


English Premier League 2010-2011. Also “just a line chart”.

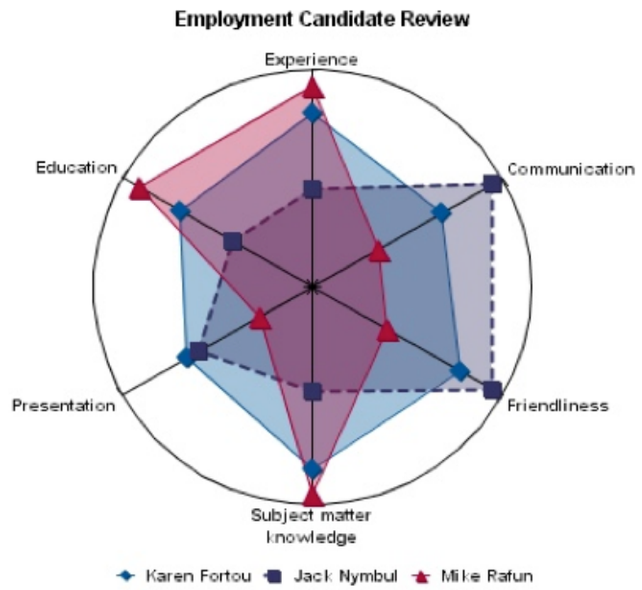
http://www.statto.com/football/stats/england/premier-league/2010-2011/table/2011-04-02



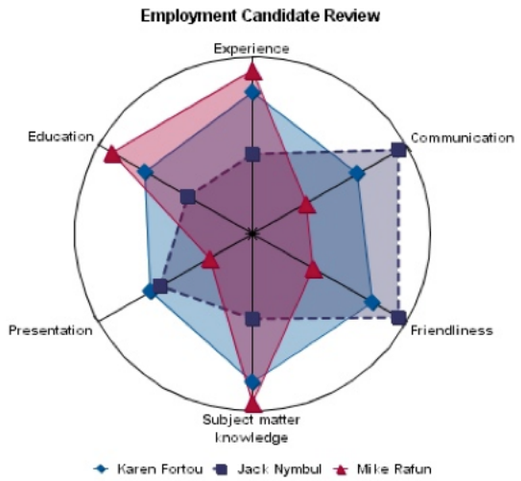
Nöfnin ættu að vera aftast, því við höfum meiri áhuga á núinu en þáinu



Nöfnin ættu að vera aftast, því við höfum meiri áhuga á núinu en þáinu



Spider Chart or a radar chart. Widely used to compare categorical values in a very uneffective way.



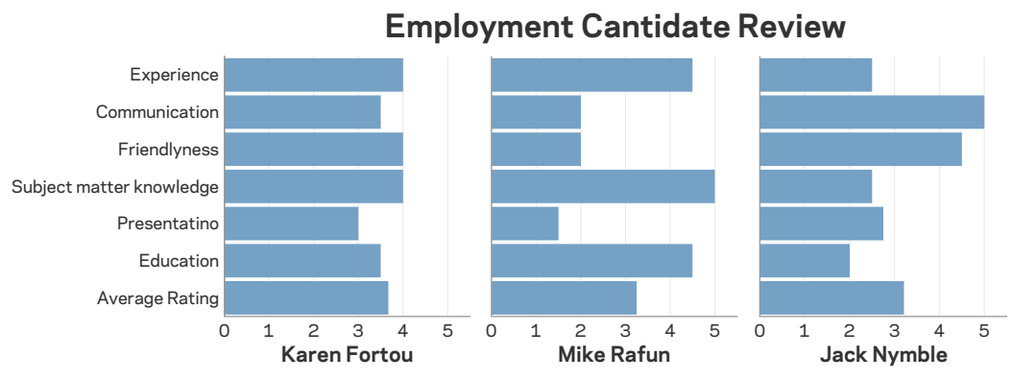
Employment Candidate Review

	Candidates		
Rating Areas	Karen Fortou	Mike Rafun	Jack Nymbul
Experience	4.00	4.50	2.50
Communication	3.50	2.00	5.00
Friendliness	4.00	2.00	4.50
Subject matter knowledge	4.00	5.00	2.50
Presentation	3.00	1.50	2.75
Education	3.50	4.50	2.00
Average Rating	3.67	3.25	3.21

This is information that can be better visualized in a single table, adding extra information not available in the spider chart, namely the average rating. But I think it can be done even better.

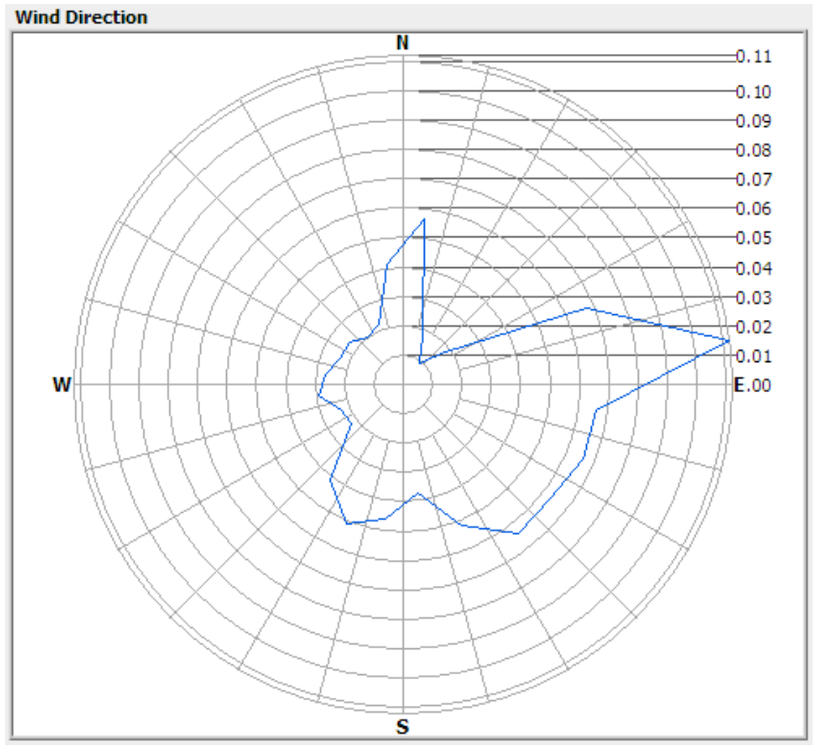
Employment Candidate Review

	Candidates		
Rating Areas	Karen Fortou	Mike Rafun	Jack Nymbul
Experience	4.00	4.50	2.50
Communication	3.50	2.00	5.00
Friendliness	4.00	2.00	4.50
Subject matter knowledge	4.00	5.00	2.50
Presentation	3.00	1.50	2.75
Education	3.50	4.50	2.00
Average Rating	3.67	3.25	3.21

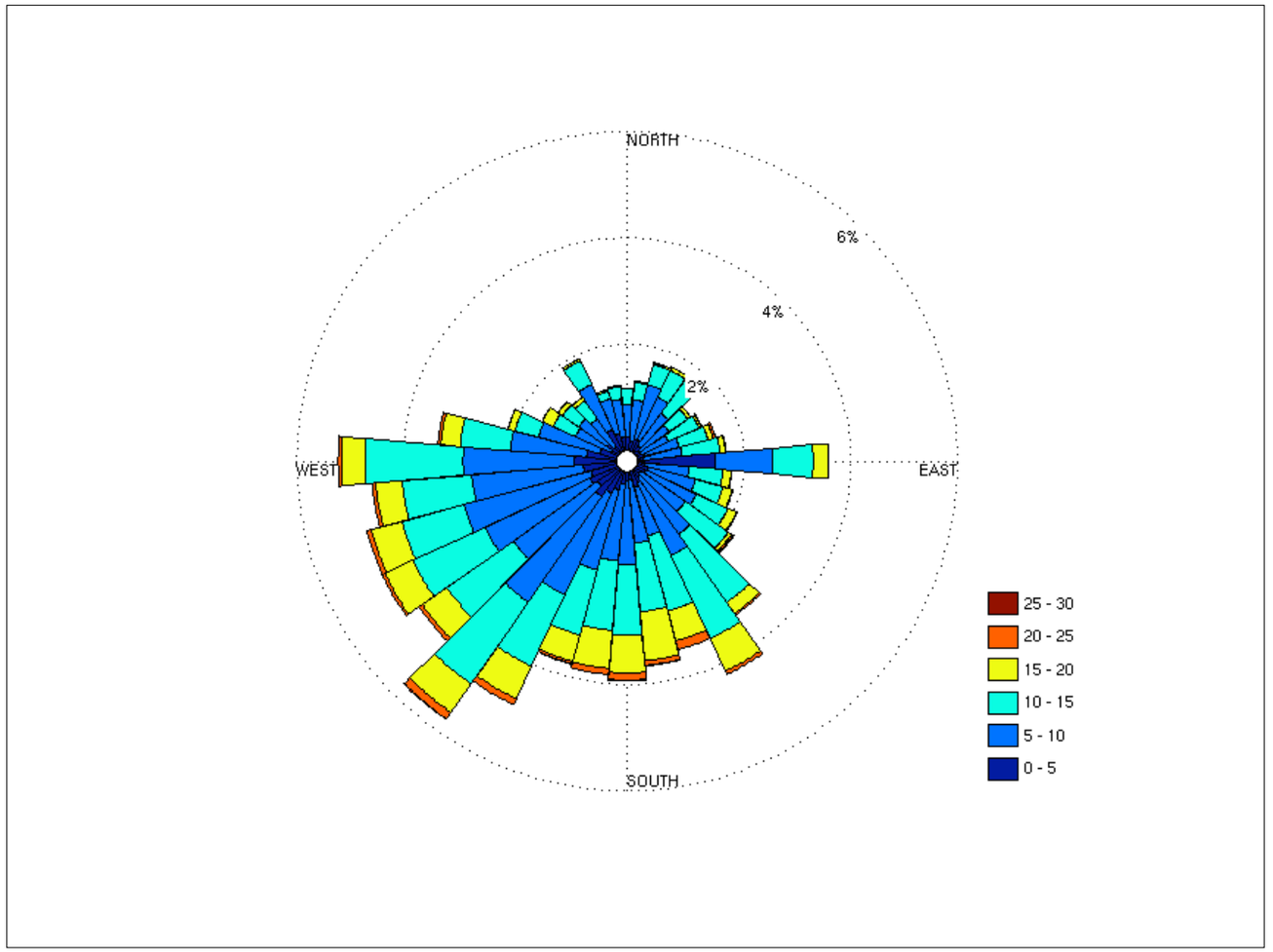


As a table lens, the highs and lows become even more visual and easier to scan.

I have said that this type of chart is very good for a certain type of information, namely one that we are used to view on a circle. Like a clock or a compass.



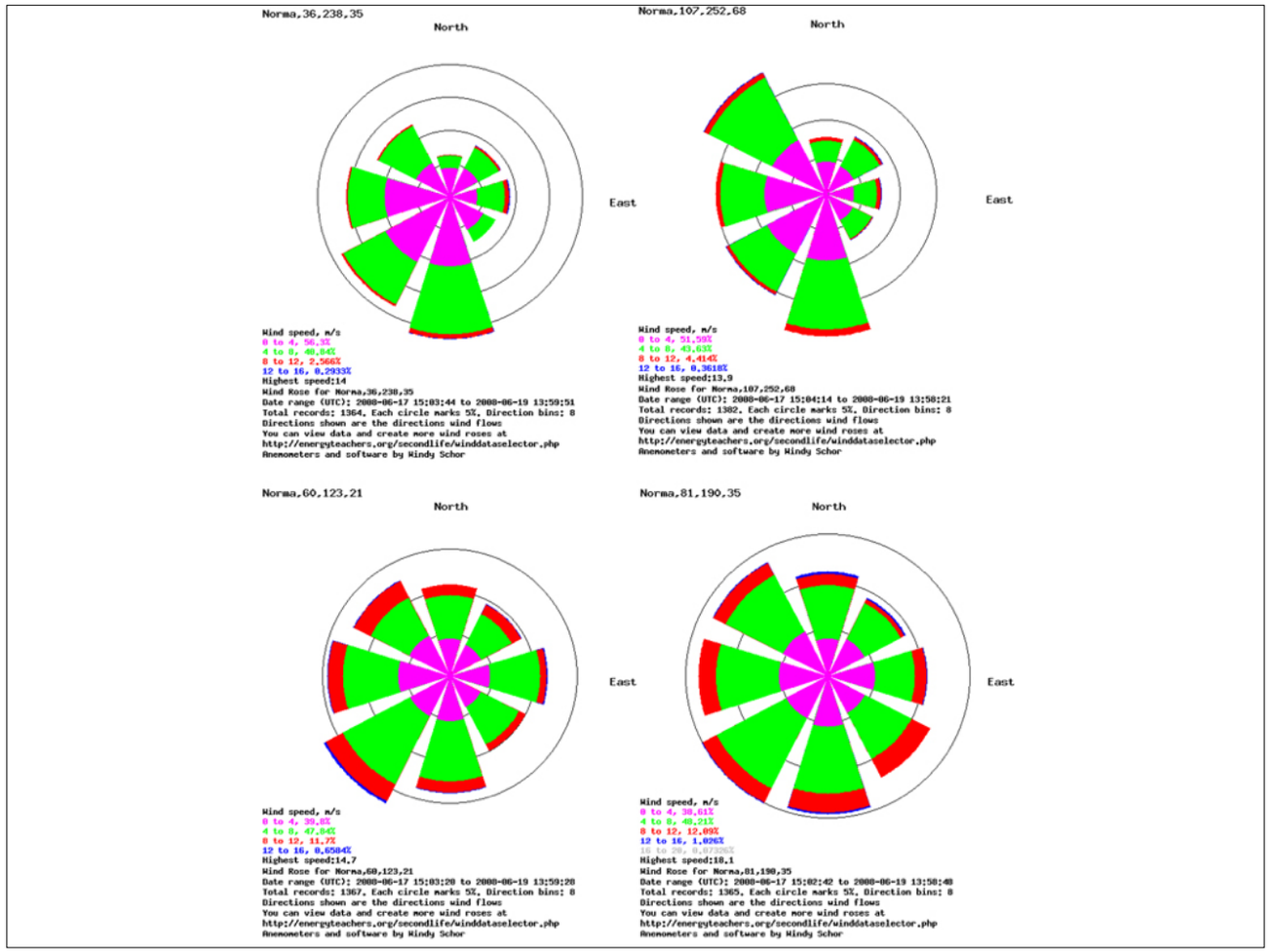
The compass form is a very natural grid for the “wind rose”. A chart used to show from which way the wind blows plus another variable drawn with colour, usually wind speed. This is a very basic sample, showing only the wind direction.



This one adds the wind speed using colour. What's wrong with it?

The colour choice has no meaning and would benefit from being in a single hue with increasing intensity as the wind increases.

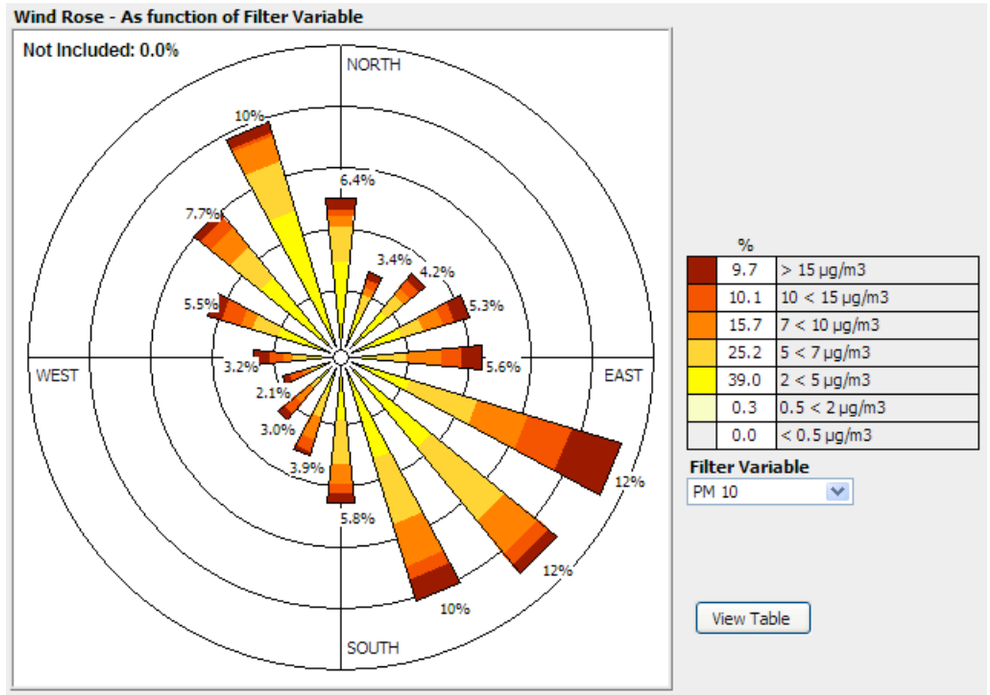
(Sources: http://www.mathworks.com/matlabcentral/fx_files/17748/5/wind_rose.png)



These also use colour in a very unpleasant way. But there an even worse crime being committed here.

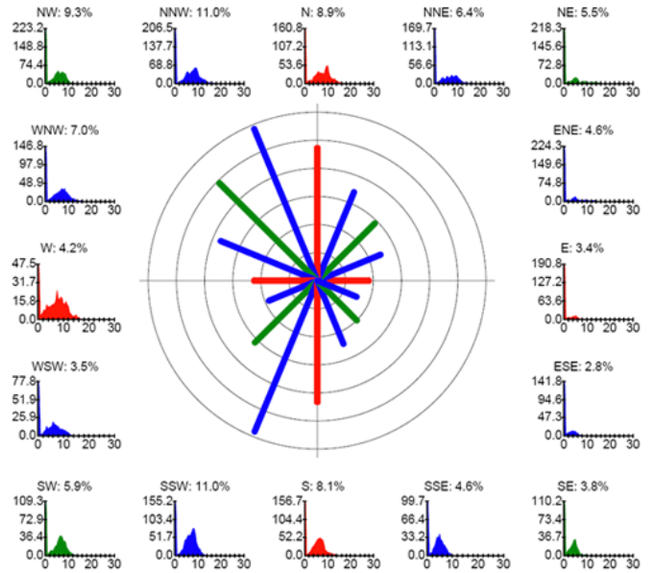
To successfully compare these graphs, which is what is implied here by placing the charts together (gestalt theory), the only thing that may differ between the charts is the data. Different gridlines make each set only true within itself and therefor unusable for comparison.

(Source: http://voyager.blogs.com/voyeurism/2008/06/wind-rose-data.html)



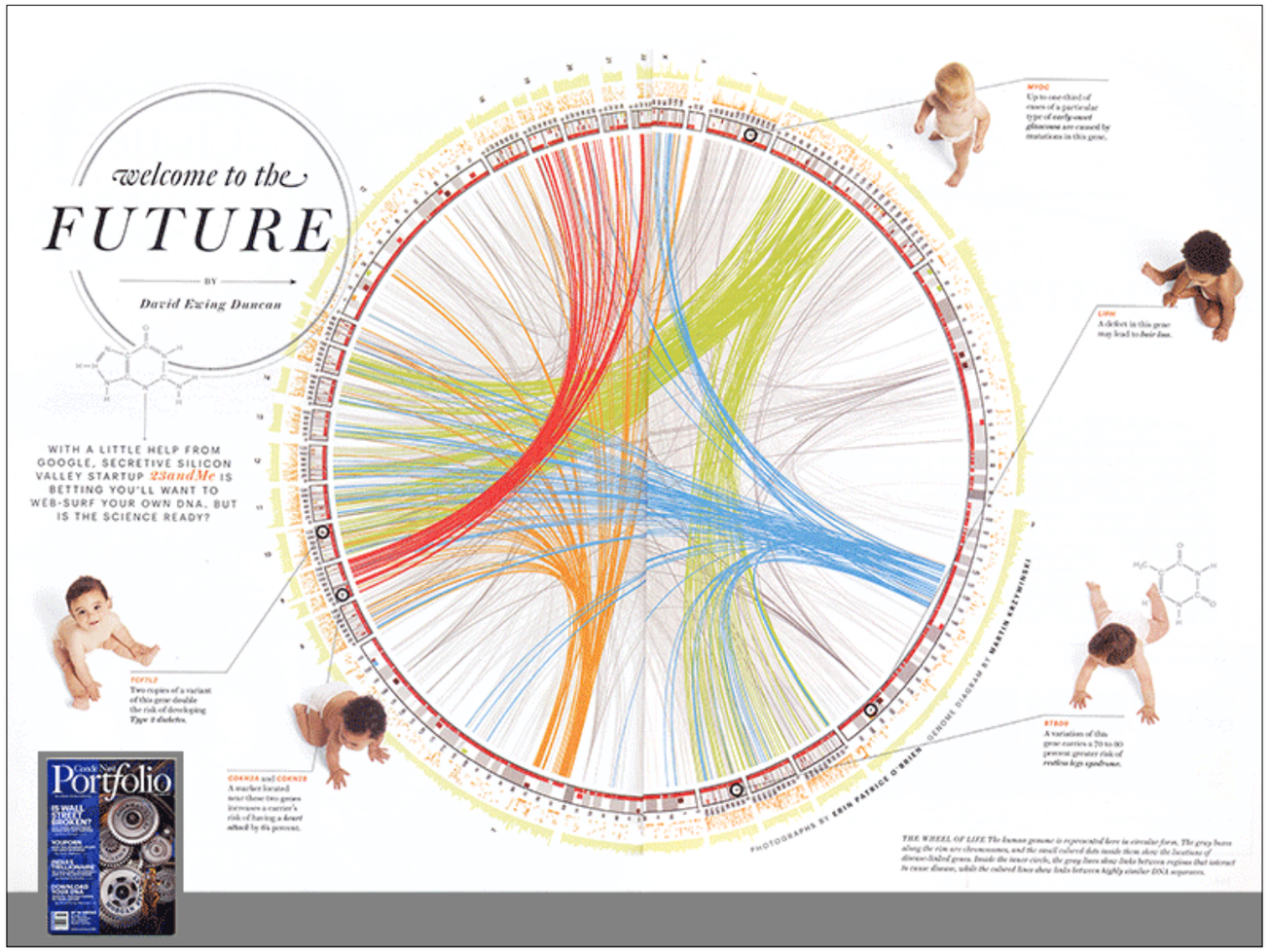
This chart would benefit from lighter gridlines, but is, overall, well implemented. I've yet to research a better way to draw these; a way that eliminates the widening bar effect that over emphasizes long slices.

(Source: http://www.vistadatavision.com/reports/wind-rose/)



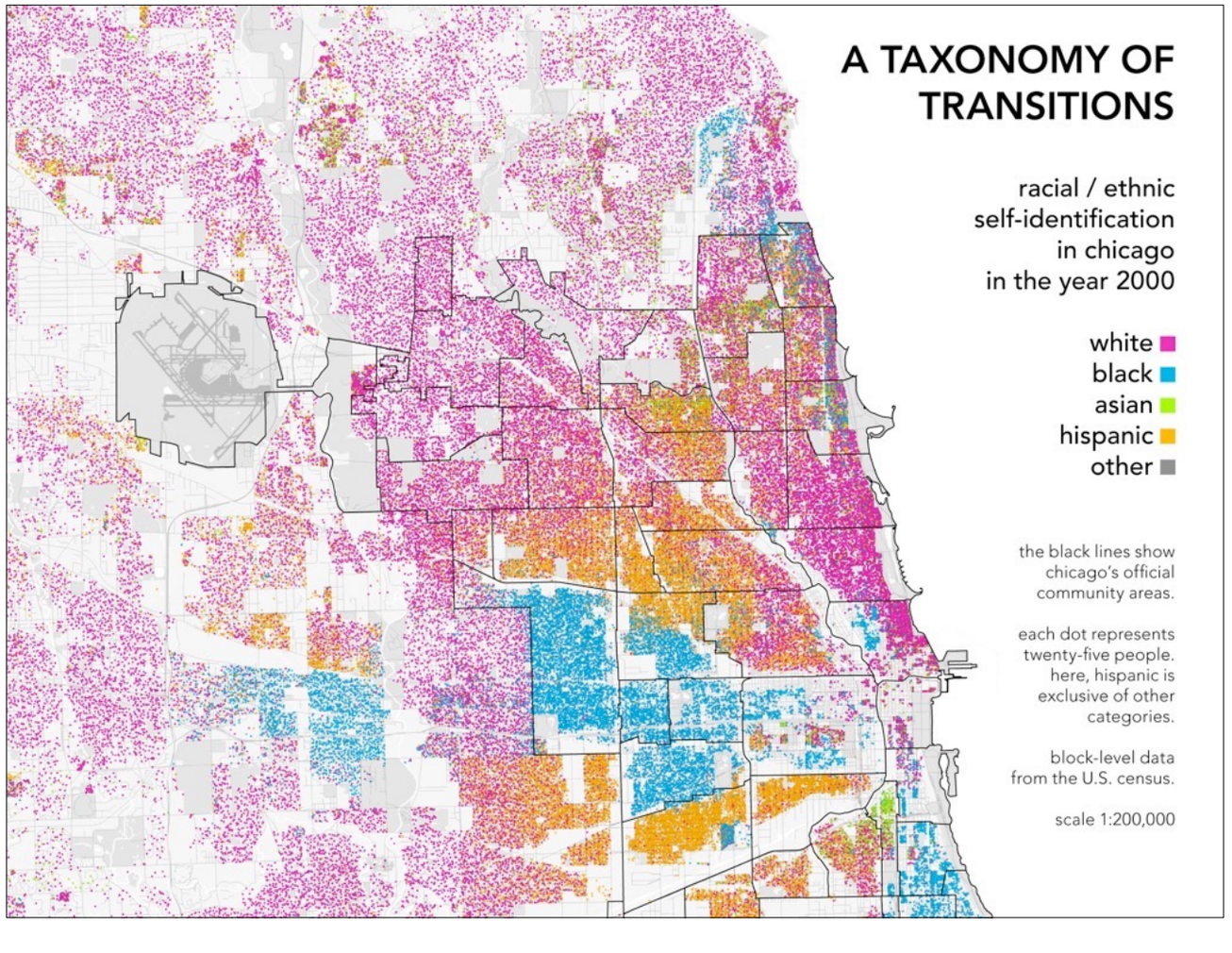
Here is an interesting way of doing that. Using lines instead of widening bars is a good idea. Though it doesn't need to use the different colours for each line, that just adds confusion. It also needs to either coordinate all y-axis' to allow for comparison between the small multiples, or use the rule of thirds to show better detail per each small line chart.

(Source: http://www.nimex2004.bg/en/4/wind_potential_evaluation/)

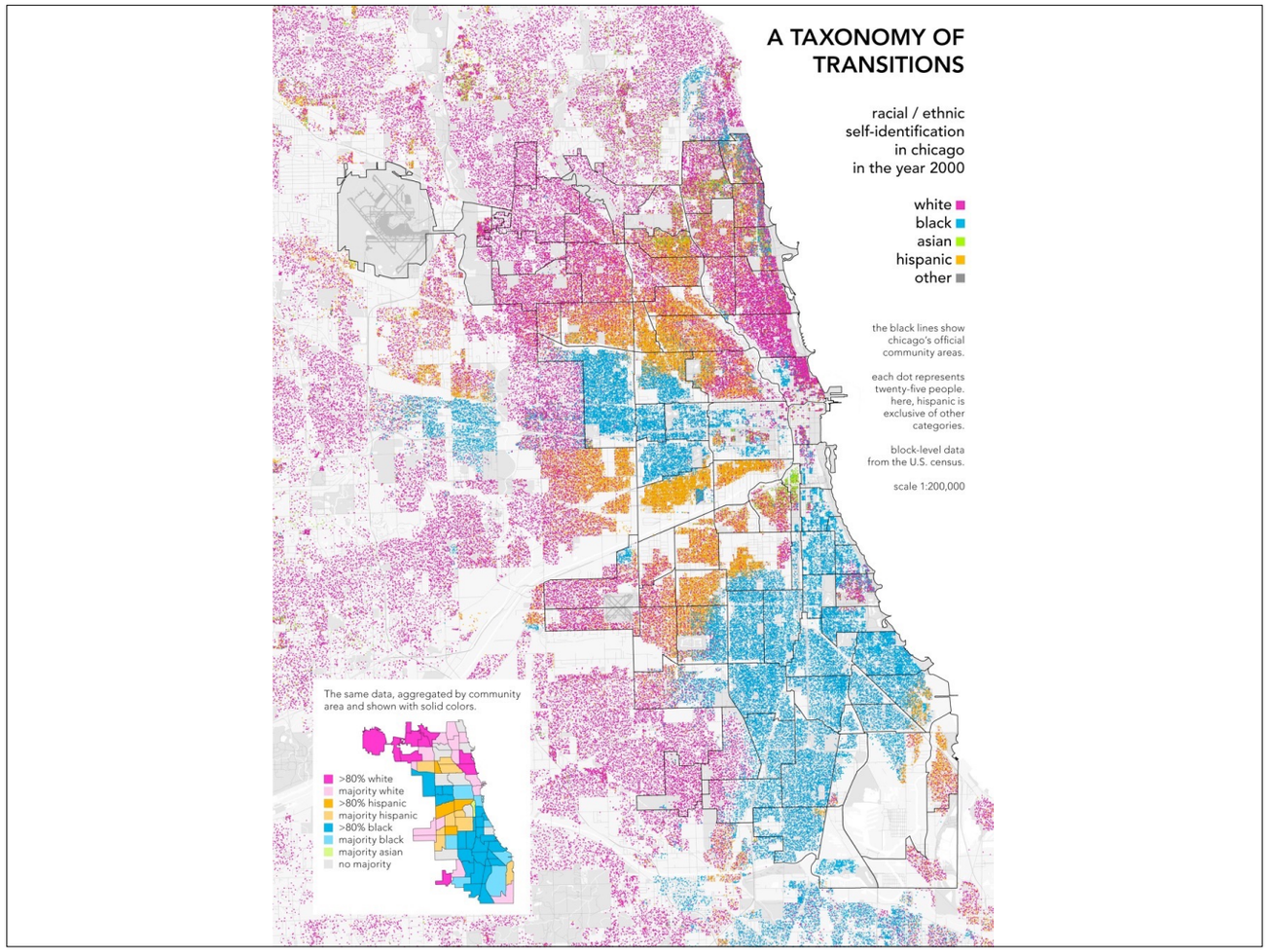


Circular visualisation (also Relation circle).

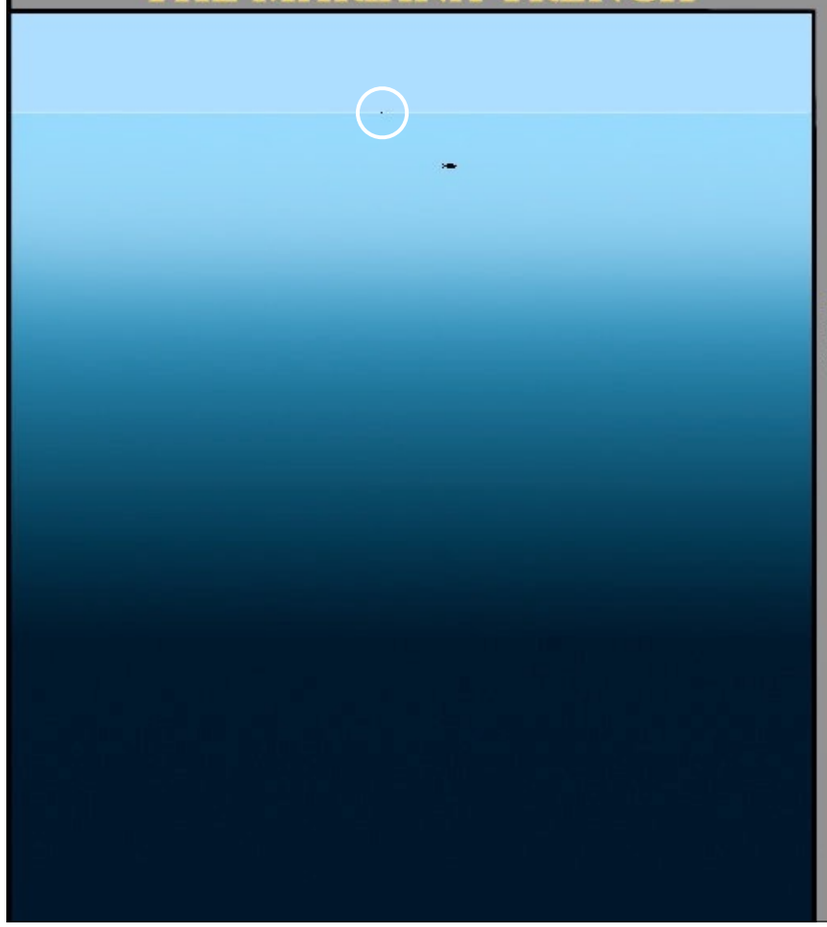
(Source: http://circos.ca/intro/published_images/, http://www.niceone.org/infodesignpatterns/index.php5#/patterns/pattern.php5?id=90)



(Source: http://www.radicalcartography.net/index.html?chicagodots)


A TAXONOMY OF TRANSITIONS
racial / ethnic self-identification in chicago in the year 2000
white
black
asian
hispanic
other
the black lines show chicago's official community areas.
each dot represents twenty-five people. here, hispanic is exclusive of other categories.
block-level data from the U.S. census.
scale 1:200,000
The same data, aggregated by community area and shown with solid colors.
>80% white
majority white
>80% hispanic
majority hispanic
>80% black
majority black
majority asian
no majority

THE MARIANA TRENCH



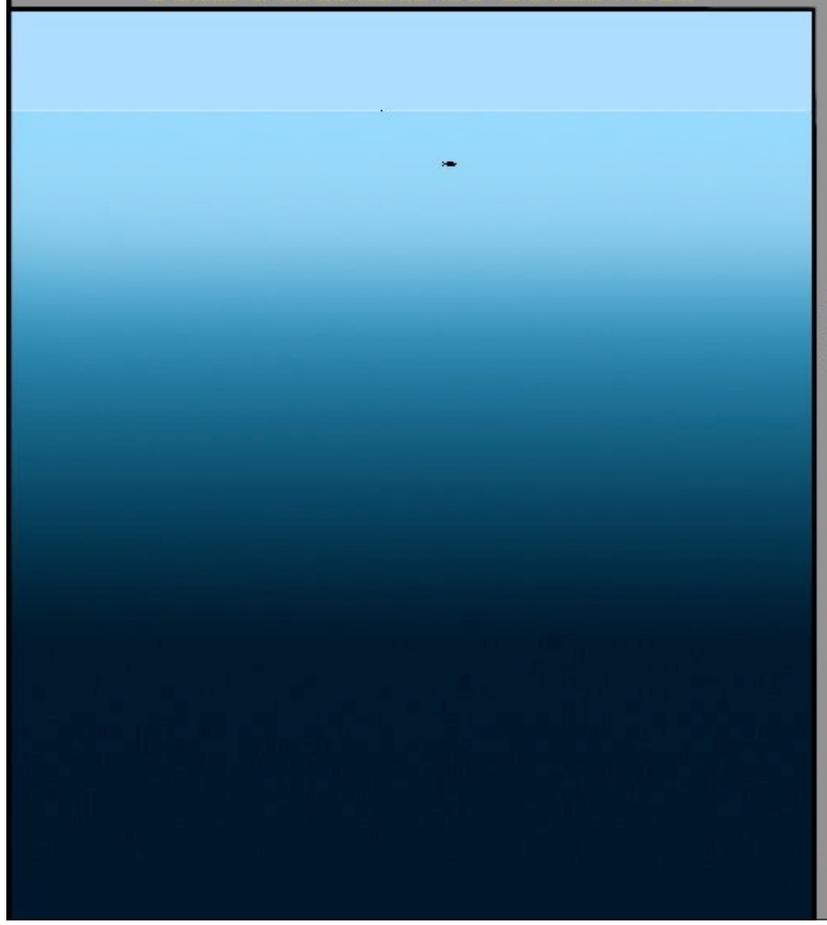
0 FT: The black dot is an approximate scale representation of a 6+ foot tall person.

350 FT: Maximum diving depth of a blue whale, the largest known animal on earth. Large-sized, full-grown adult represented on scale.

1250 FT: Height of the Empire State Building. If you were to drop the whole skyscraper into the Mariana Trench, it would be covered with water at this point.

3280 FT: After this point, light can no longer penetrate the water.

THE MARIANA TRENCH

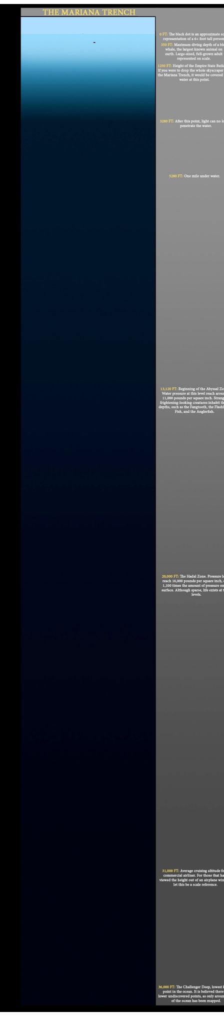


0 FT: The black dot is an approximate scale representation of a 6+ foot tall person.

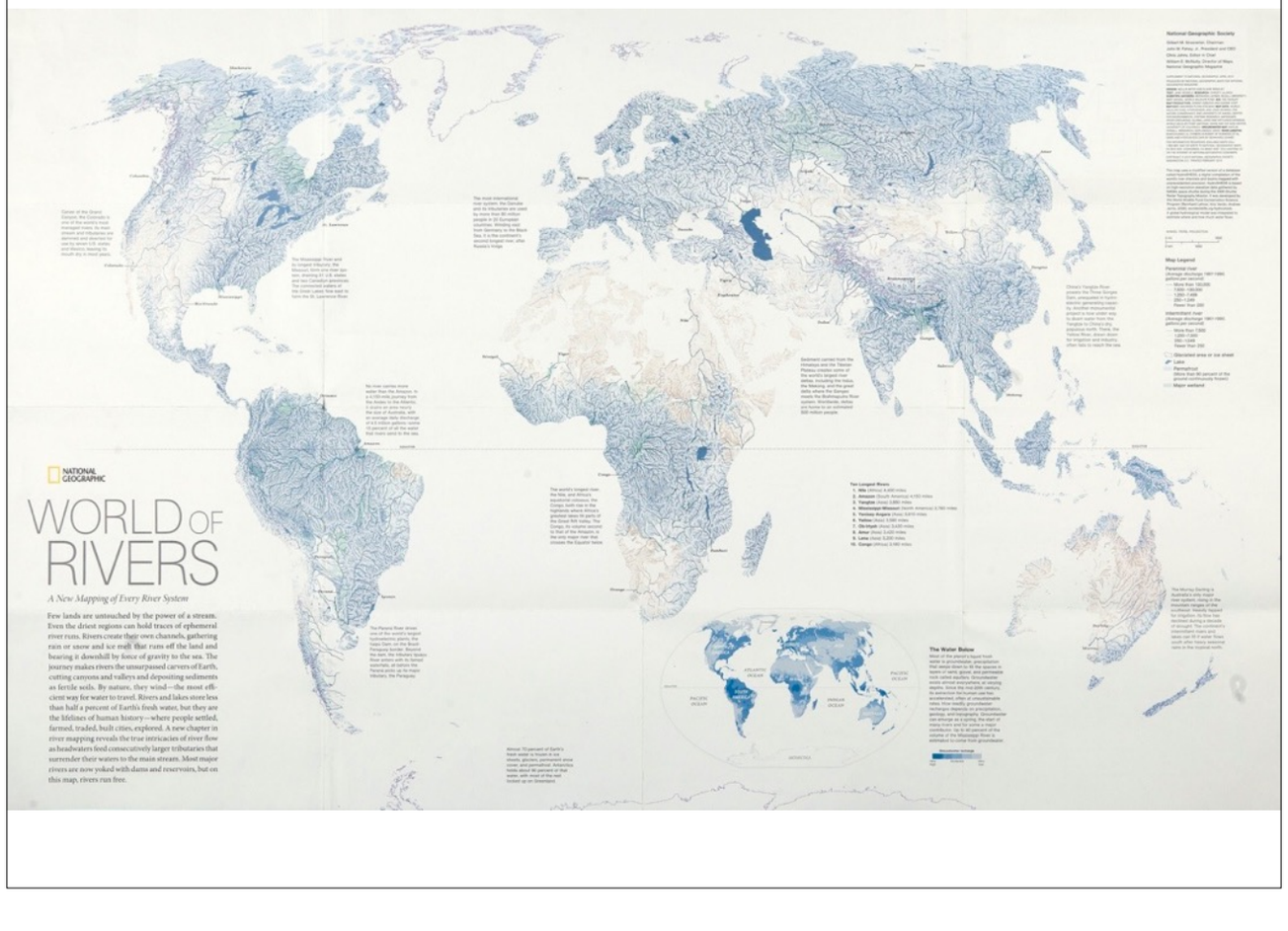
350 FT: Maximum diving depth of a blue whale, the largest known animal on earth. Large-sized, full-grown adult represented on scale.

1250 FT: Height of the Empire State Building. If you were to drop the whole skyscraper into the Mariana Trench, it would be covered with water at this point.

3280 FT: After this point, light can no longer penetrate the water.

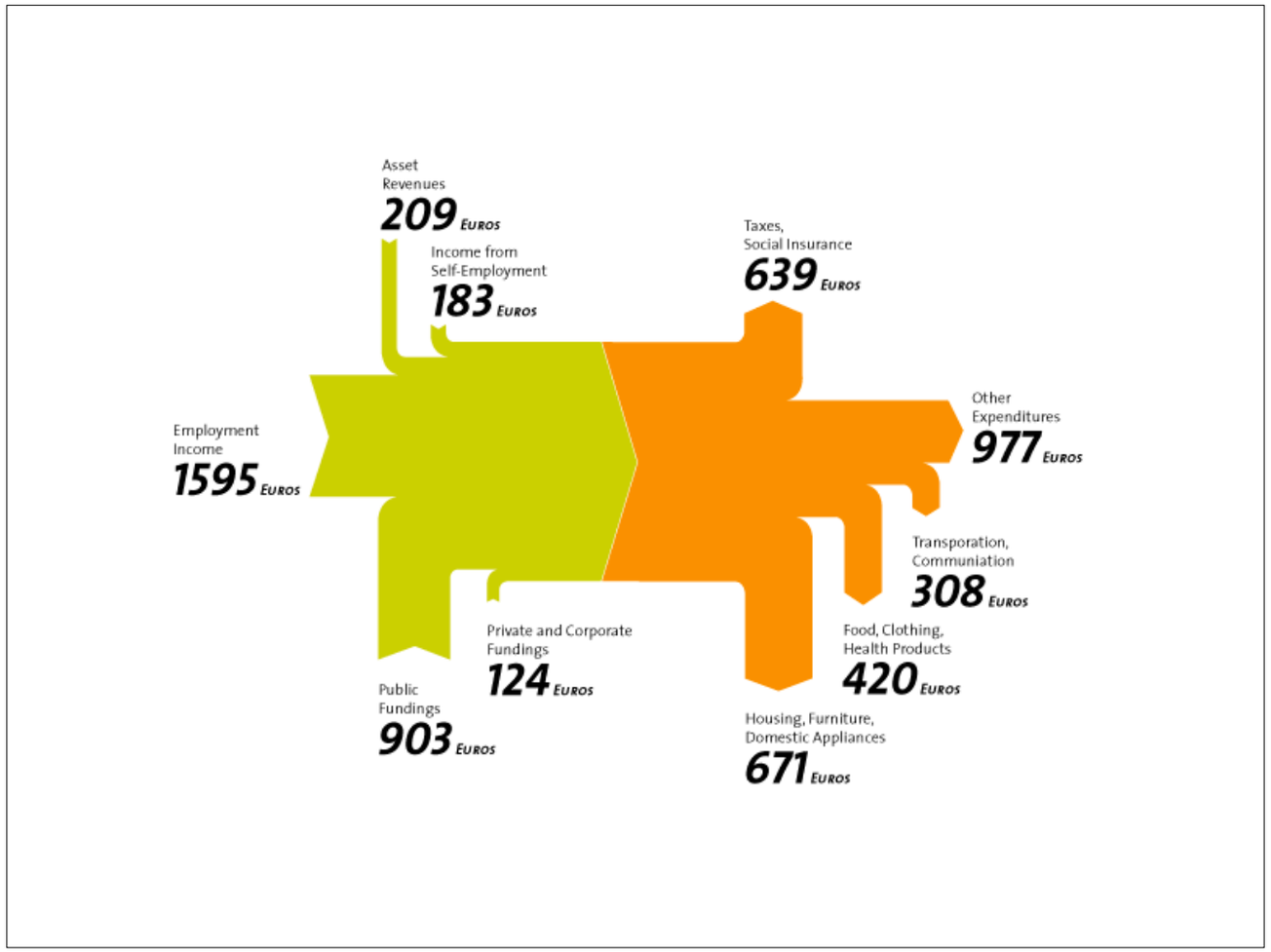


THE MARIANA TRENCH
0 FT: The black dot is an approximate scale representation of a 6+ foot tall person.
350 FT: Maximum diving depth of a blue whale, the largest known animal on earth. Large-sized, full-grown adult represented on scale.
1250 FT: Height of the Empire State Building. If you were to drop the whole skyscraper into the Mariana Trench, it would be covered with water at this point.
3280 FT: After this point, light can no longer penetrate the water.
5280 FT: One mile under water.
13,120 FT: Beginning of the Abyssal Zone. Water pressure at this level reach around 11,000 pounds per square inch. Strange, frightening-looking creatures inhabit these depths, such as the Fangtooth, the Flashlight Fish, and the Anglerfish.
20,000 FT: The Hadal Zone. Pressure levels reach 16,000 pounds per square inch, over 1,100 times the amount of pressure on the surface. Although sparse, life exists at these levels.
31,000 FT: Average cruising altitude for a commercial airliner. For those that have viewed the height out of an airplane window, let this be a scale reference.
36,000 FT: The Challenger Deep, lowest known point in the ocean. It is believed there are lower undiscovered points, as only around 10% of the ocean has been mapped.



(Source: http://www.snd-e.com/en/malofiej/premios)

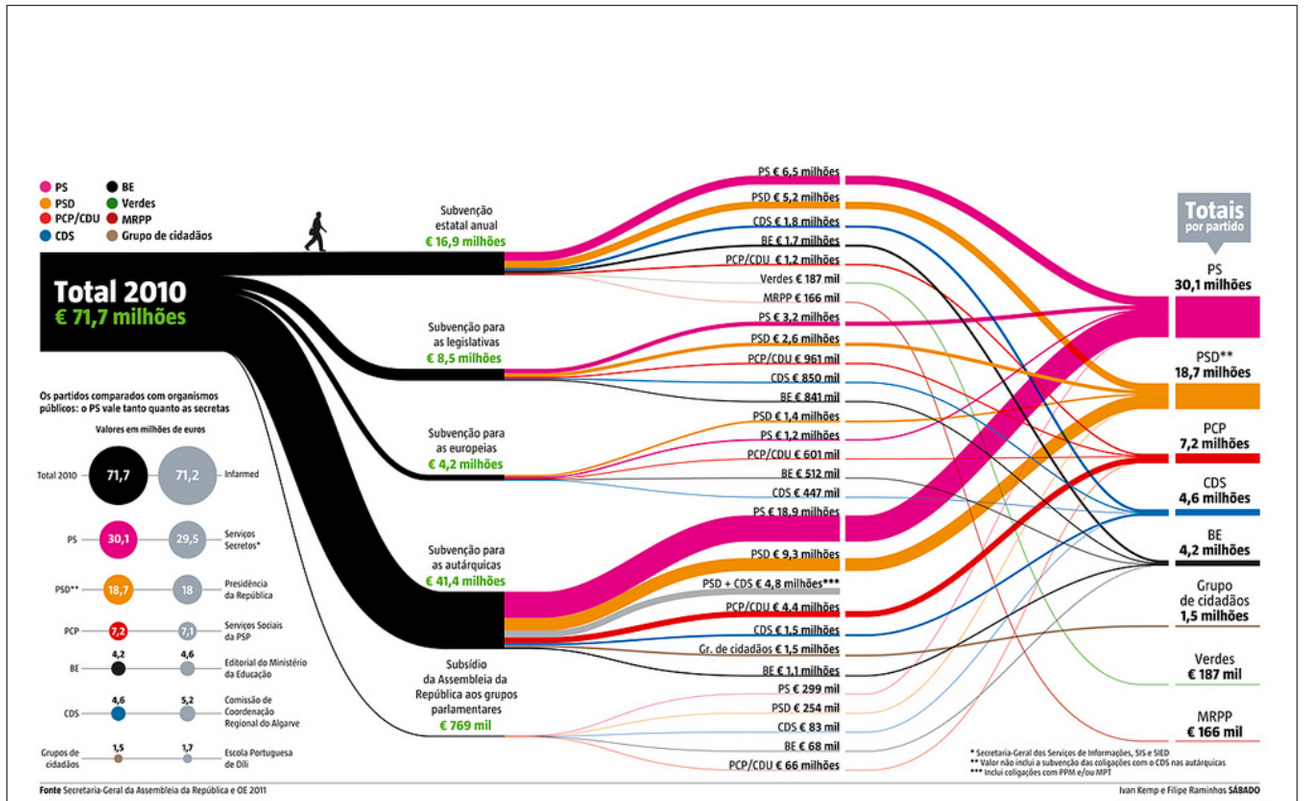
(Source: http://www.snd-e.com/en/malofiej/premios)



Sankey Diagram

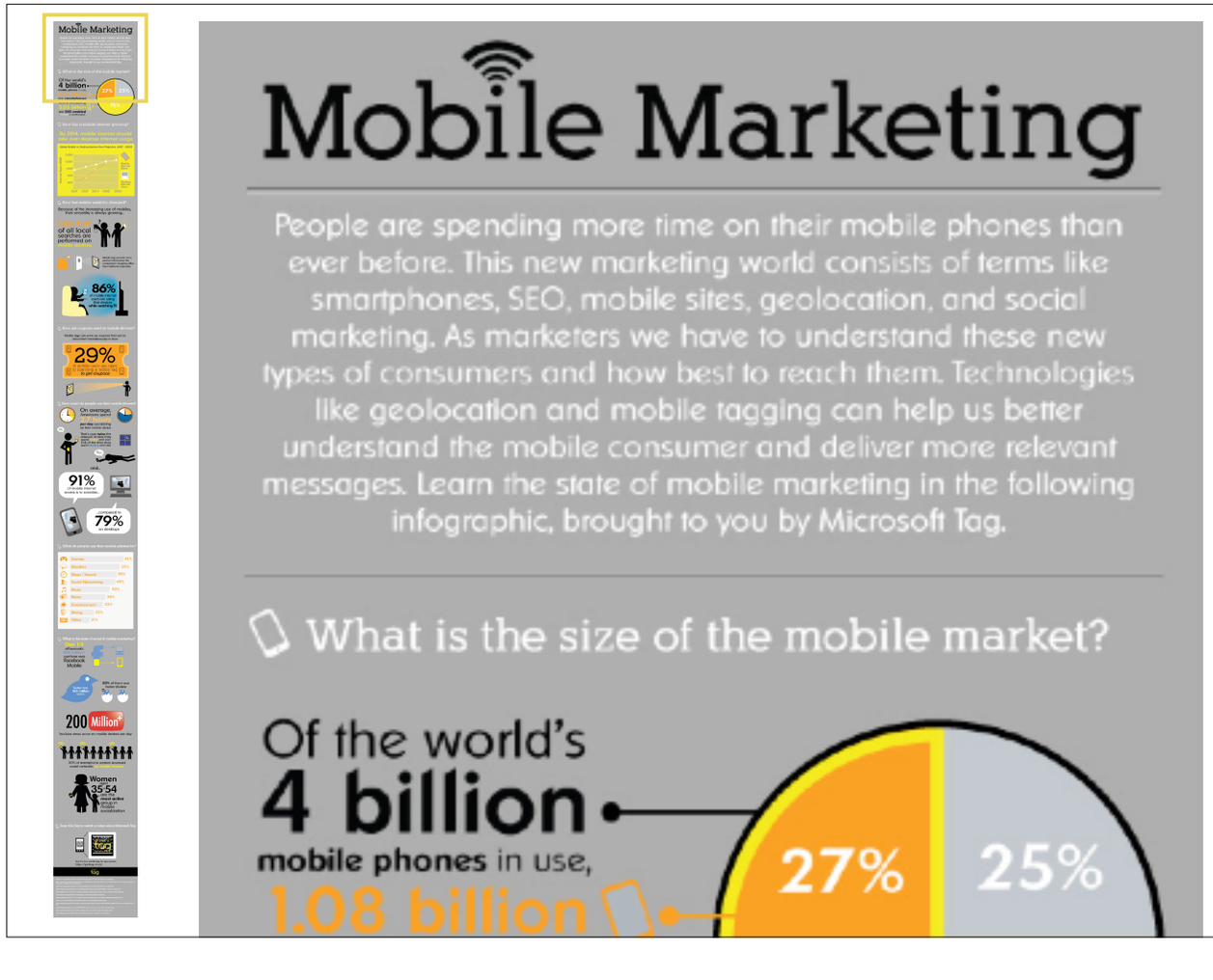
Pros & cons. Discuss.

(Source: http://www.niceone.org/infodesignpatterns/index.php5#/patterns/pattern.php5?id=85)



Portuguese Political Parties by Ivan Kemp. This depicts the distribution of public money to the different political parties. Although it would be difficult to mentally encompass all of this information at once, the infographic helps us see the five ways they receive money, how much of each they receive and the total each party receives all at once. Viewers get both a big picture understanding and can zoom in for details.

(Sources: http://www.flickr.com/photos/52485260@N08/5405849867/sizes/l/in/photostream/, http://understandinggraphics.com/visualizations/infoposters-are-not-infographics/)



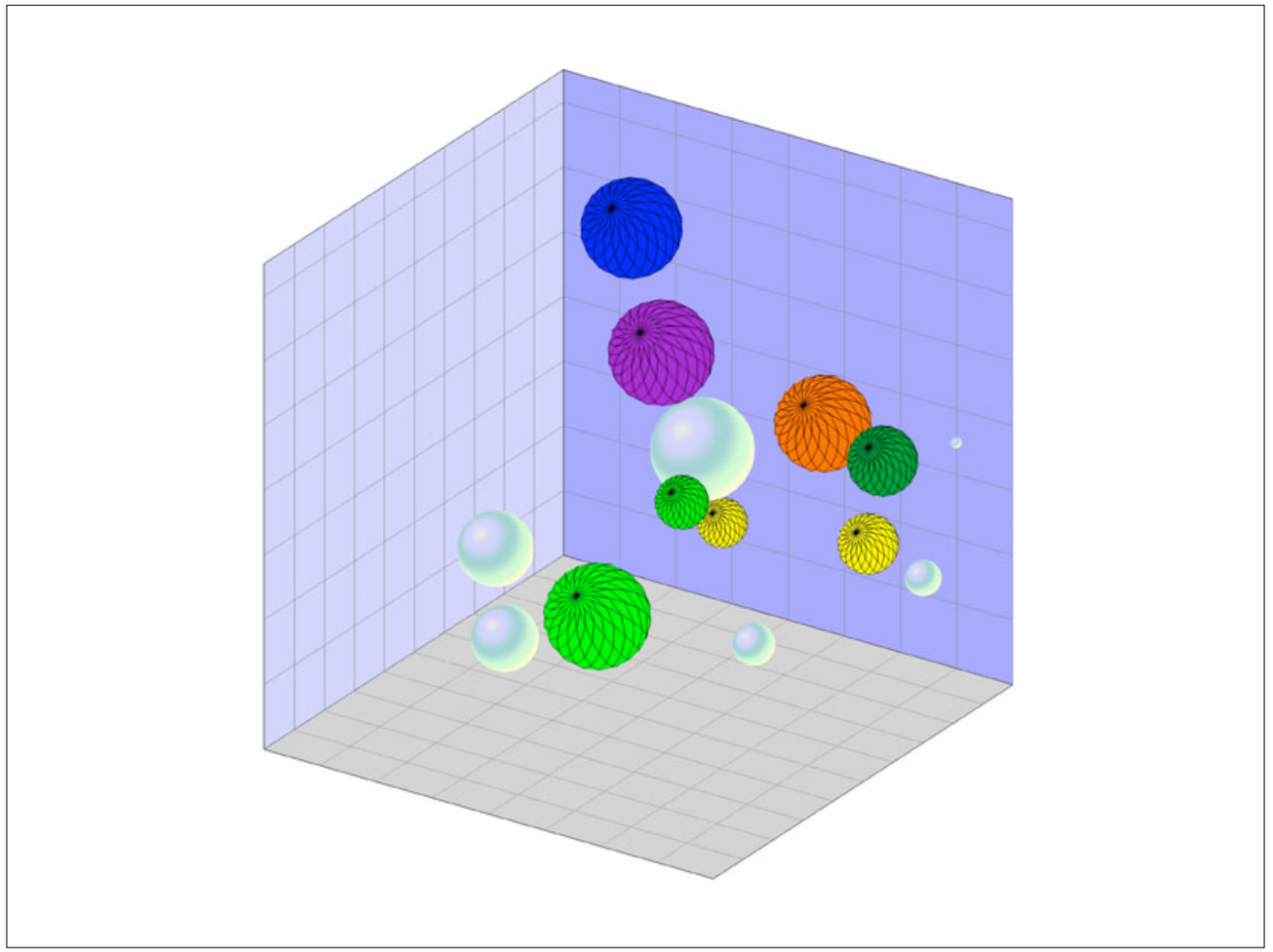
Here's a good comment from mashable on this infoposter: "Wow. It isn't great when the sources list for an infographic are a bunch of other infographics. That's seriously recursive." — dbarefoot

A good way to check if something is an infoposter is to take all the graphic away. If you can still get the information, then it's definately an infoposter.

Here's a good comment from mashable on this infoposter: "Wow. It isn't great when the sources list for an infographic are a bunch of other infographics. That's seriously recursive." — dbarefoot

A good way to check if something is an infoposter is to take all the graphic away. If you can still get the information, then it's definately an infoposter.

… and finally



A new contender for the worst chart ever made. Let this not be you.

(If you focus, you can invert the background into a square.)

(Source: http://www.groundwatersoftware.com/grapher.htm)

Remember...

- Put numbers in context
- Do the math for the readers
- Work hard to make it effortless for your readers
- Use as few graphical elements as possible
- Add complexity only when it communicates new information