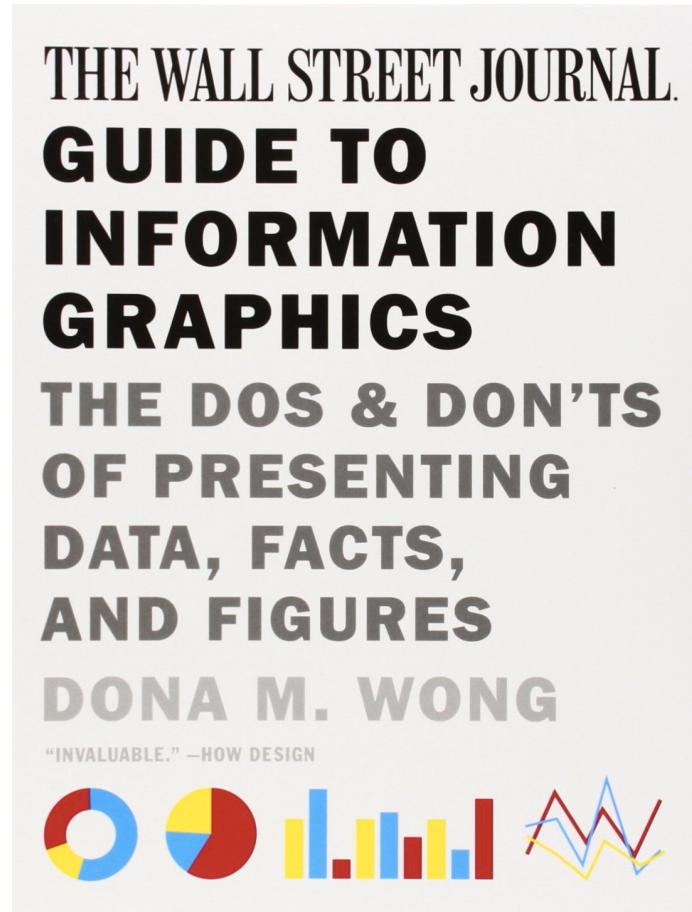


6 CHARTING TAXONOMY

S. Rinzivillo – rinzivillo@isti.cnr.it

CRASH COURSE ON EFFECTIVE CHARTING



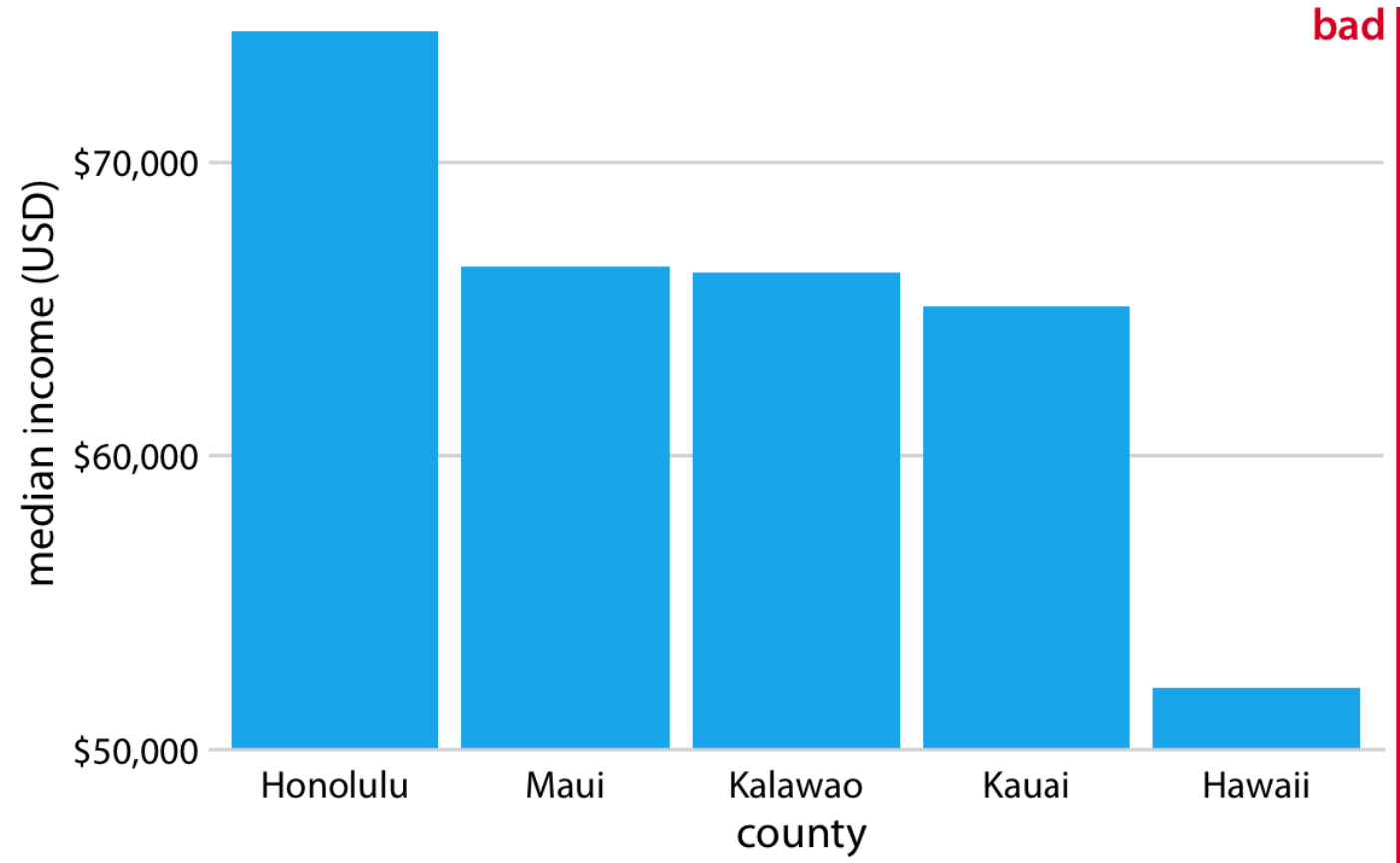
Dona M. Wong

Guide to Information Graphics

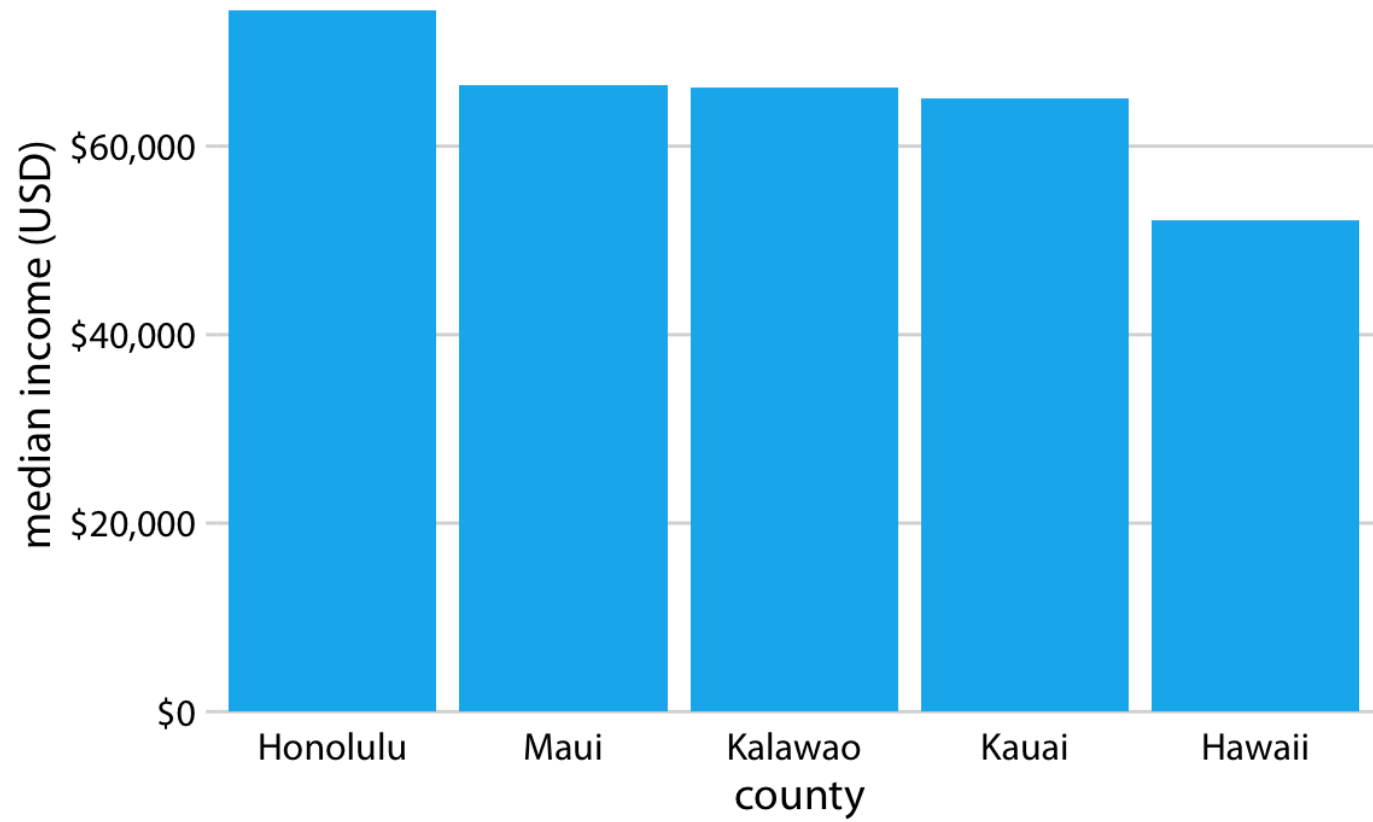
The Dos and Don'ts of Presenting Data, Facts, and Figures

W. W. Norton & Company

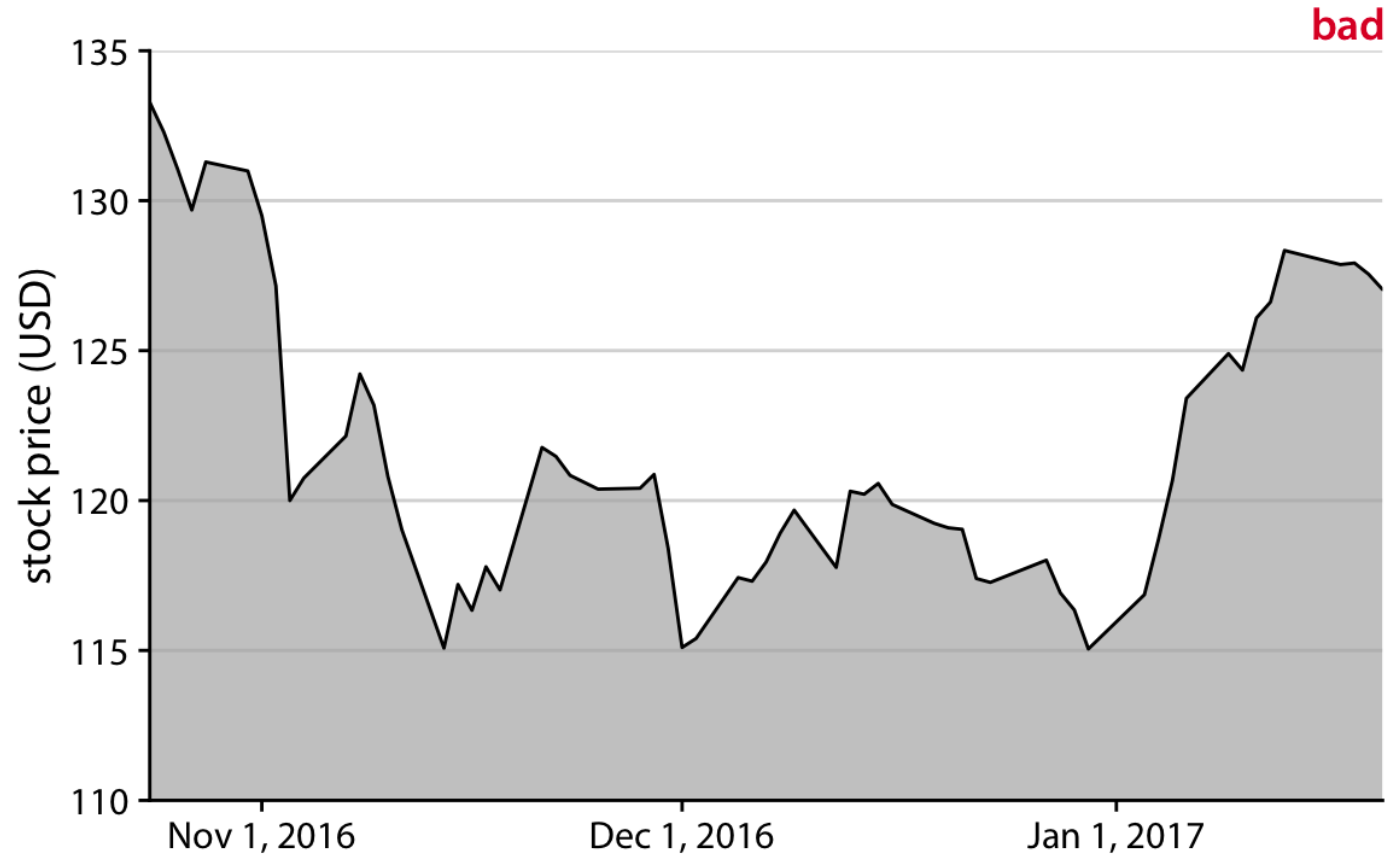
CHARTING EXAMPLES



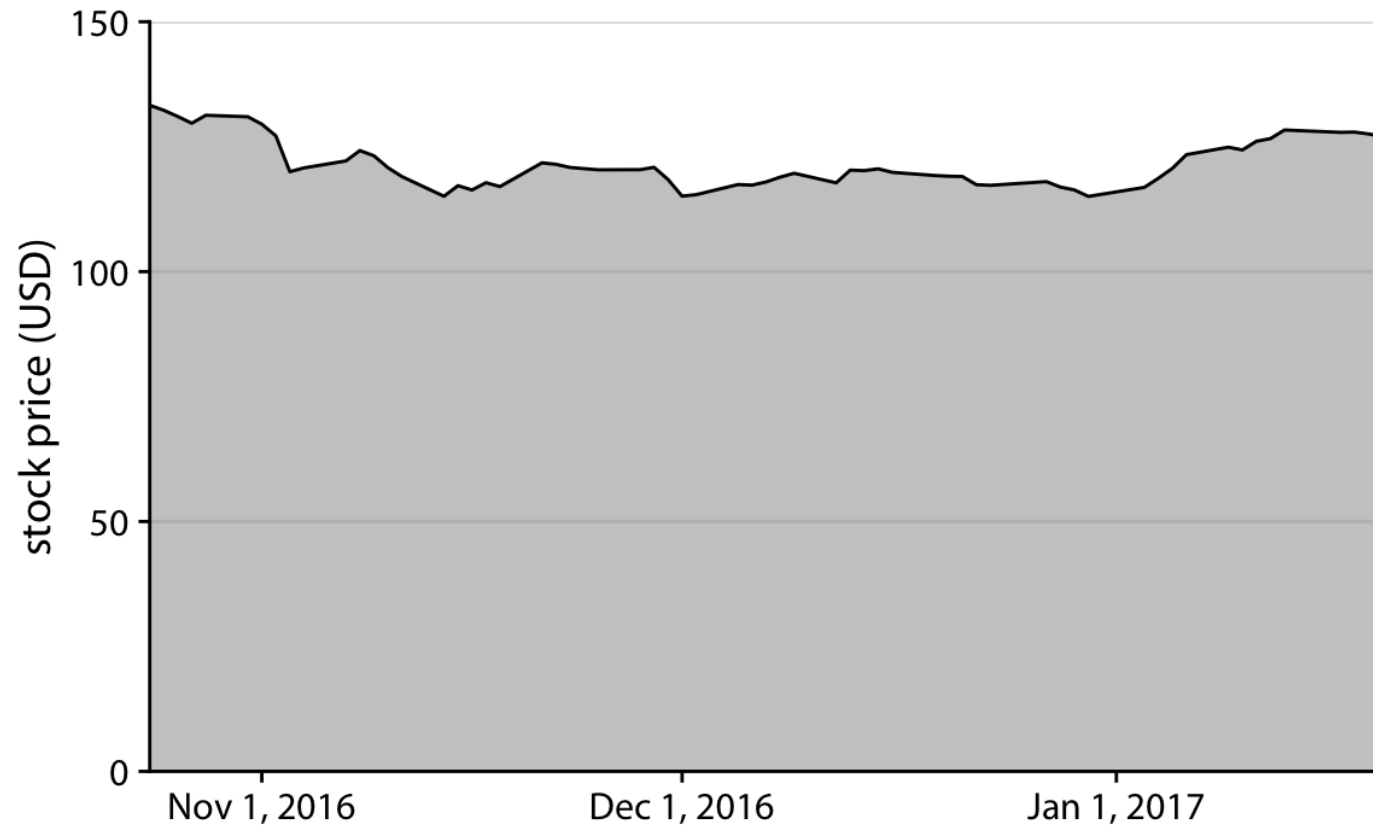
CHARTING EXAMPLES



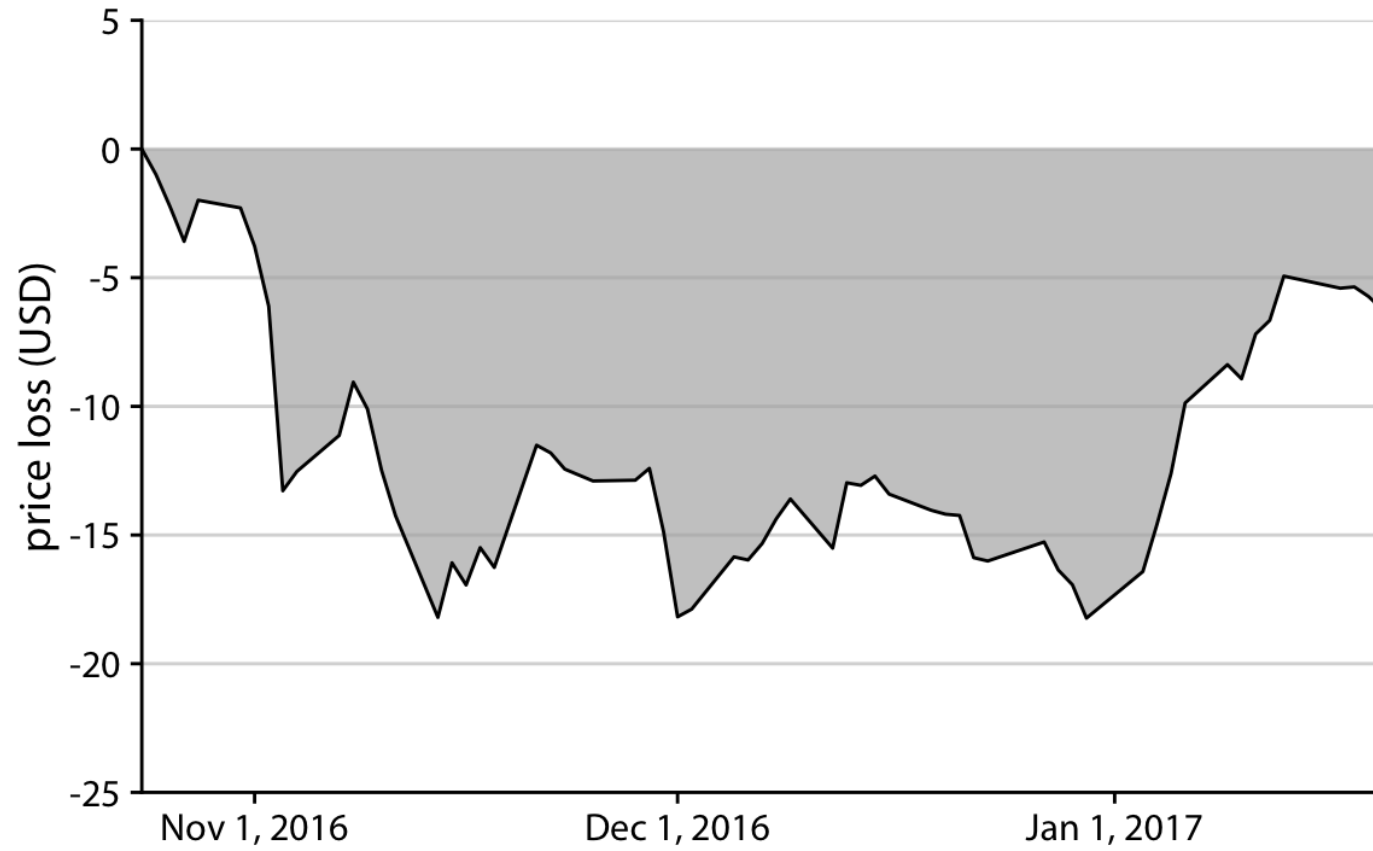
CHARTING EXAMPLES



CHARTING EXAMPLES

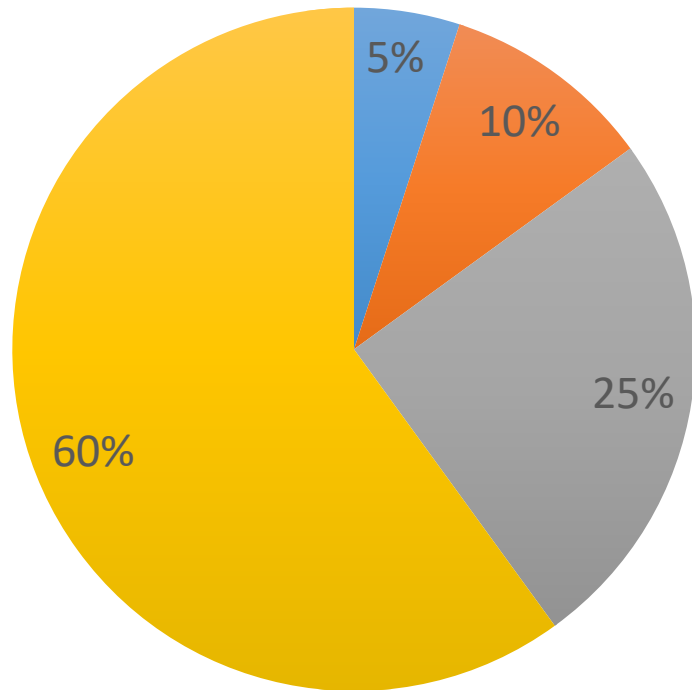


CHARTING EXAMPLES

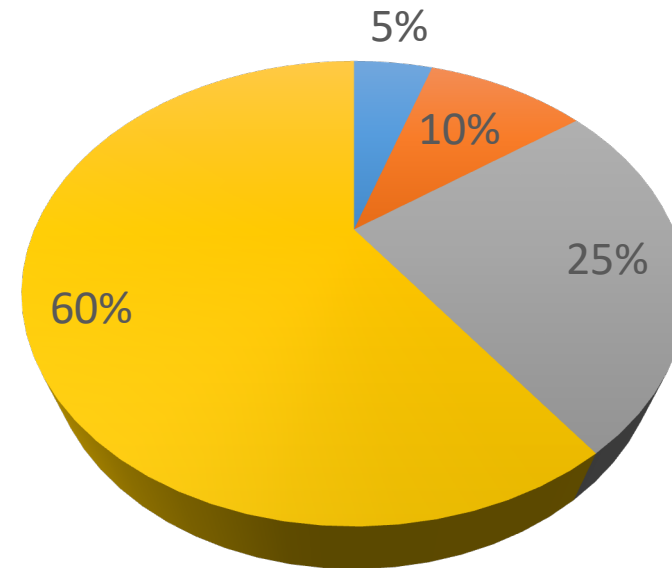


CHARTING EXAMPLES

Sales

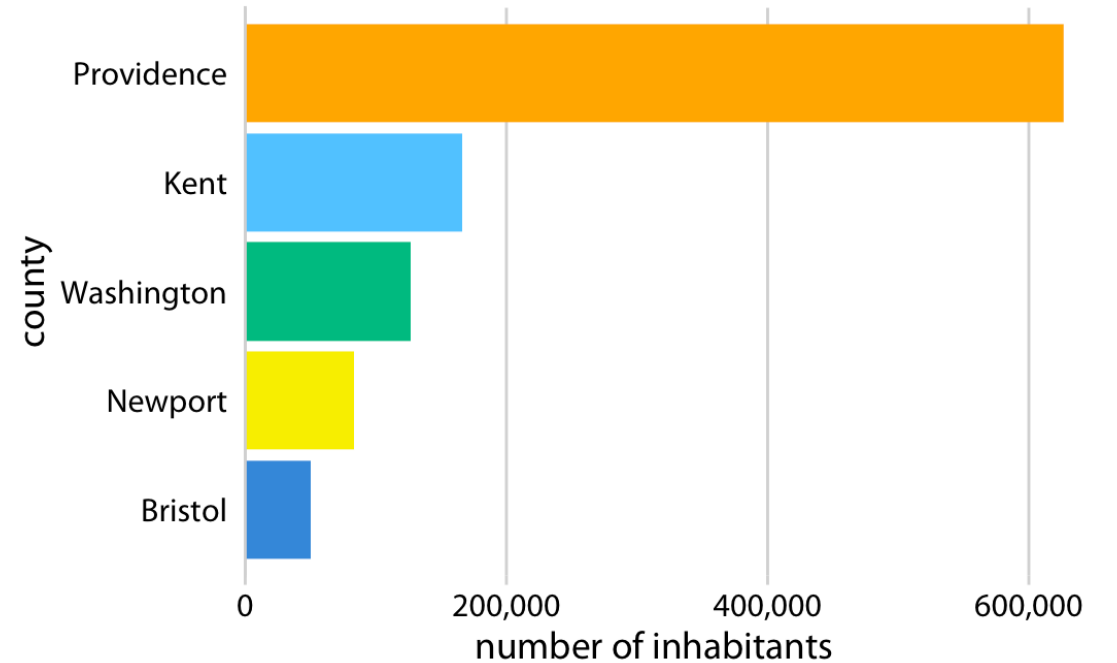
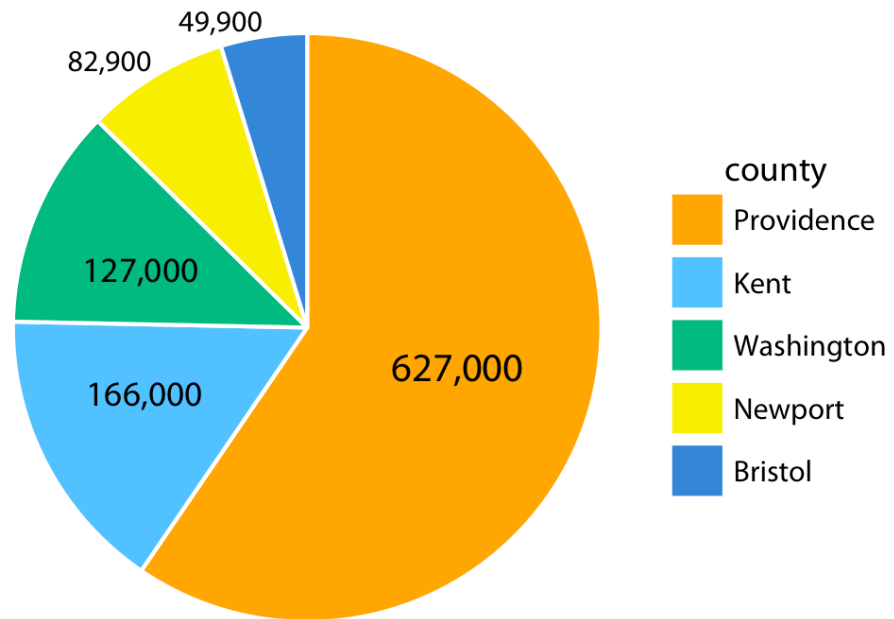


Sales



May these charts be improved? Why? How?

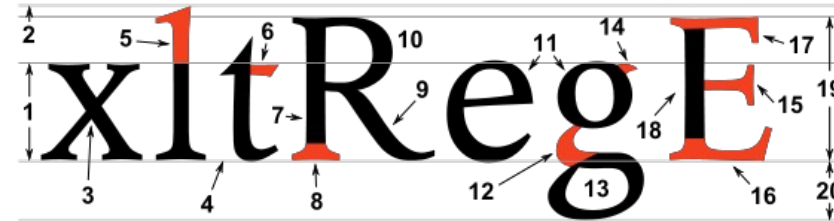
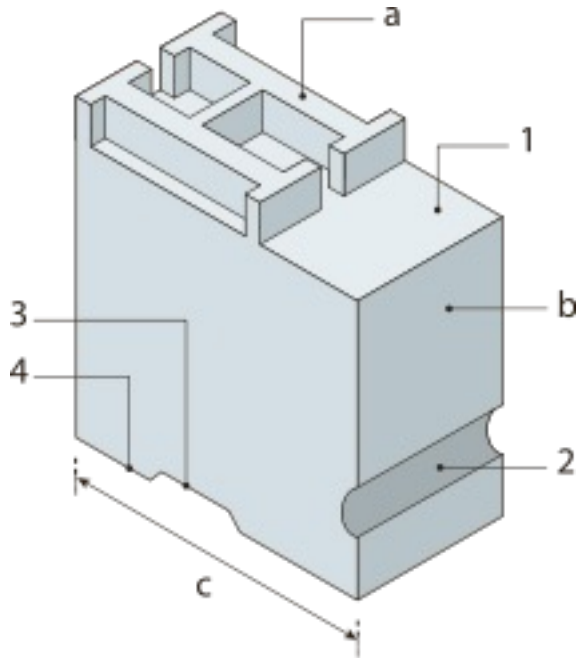
CHARTING EXAMPLES



FONTS



FONTS



Typographic parts of a glyph:

1) x-height; 2) **ascender line**; 3) apex; 4) **baseline**; 5) ascender; 6) crossbar; 7) stem; 8) **serif**; 9) leg; 10) bowl; 11) counter; 12) collar; 13) loop; 14) ear; 15) tie; 16) horizontal bar; 17) arm; 18) vertical bar; 19) cap height; 20) **descender line**.

$$\begin{aligned}\text{Font size} &= (1) + (2) + (20) \\ &= (19) + (20)\end{aligned}$$

FONTS: GENERAL RULES

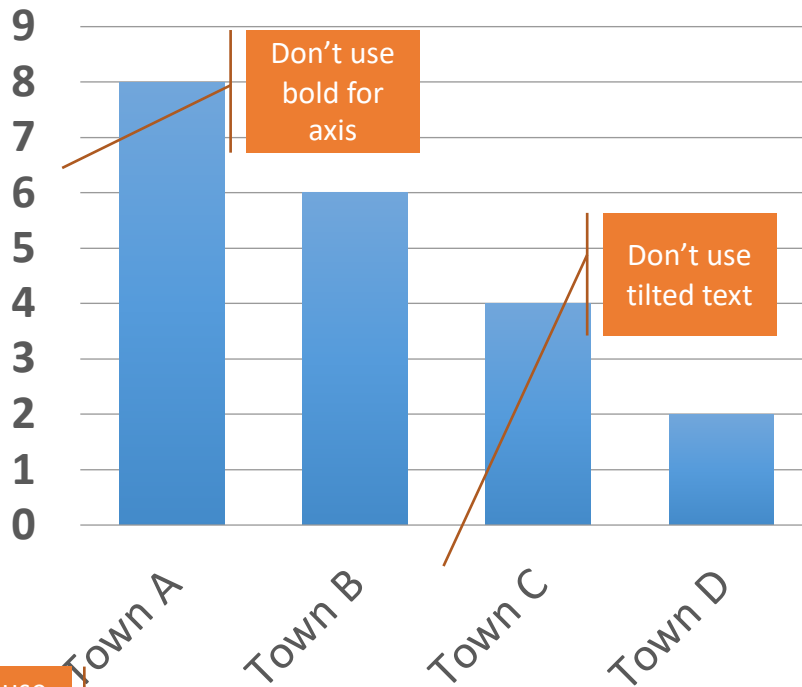
- Leading should be 2 points larger than type size
- Avoid too small or condensed type faces
- Keep style simple: use **bold** or *italic* to emphasize a word (better not ***both***)
- Avoid ALL CAPS
- Avoid *styled fonts*
- Avoid C***C Sans Serif
- Reduce type at an angle
- Avoid t r a c k i n g

TYPOGRAPHY IN CHARTS

Don't use all caps or high contrast white type out of black

Don't

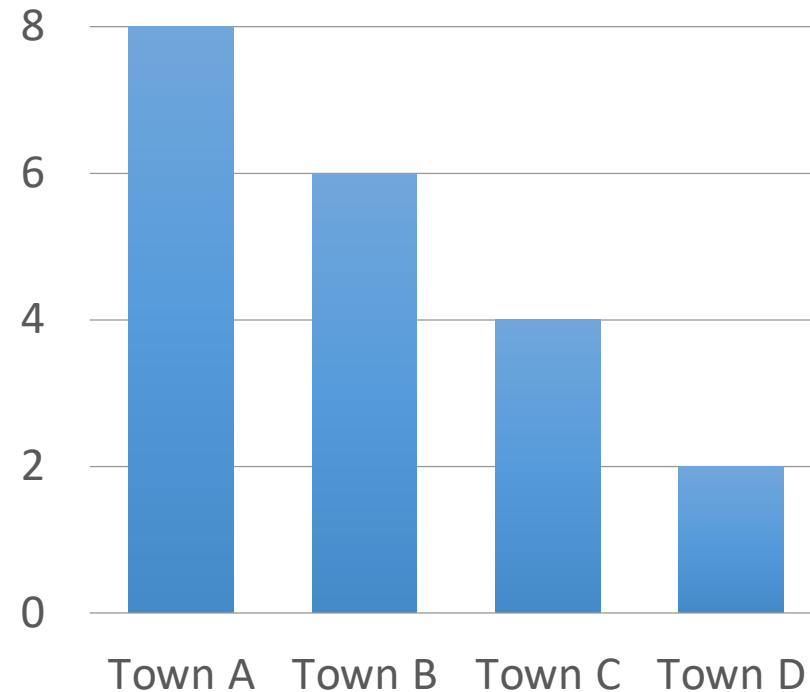
HEADLINE OF THE CHART



A brief description that outlines what the data shows

Do

Headline of the chart

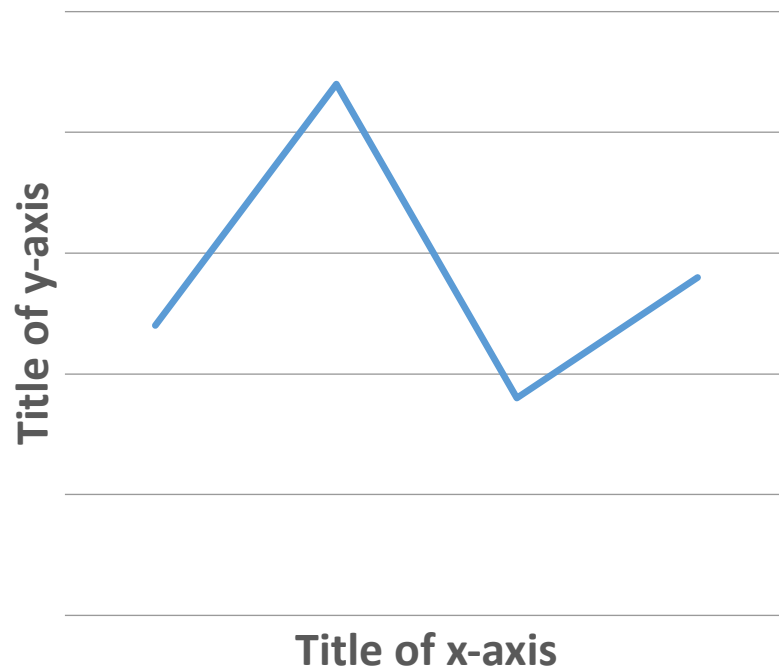


A brief description that outlines what the data shows

TYPOGRAPHY IN CHARTS

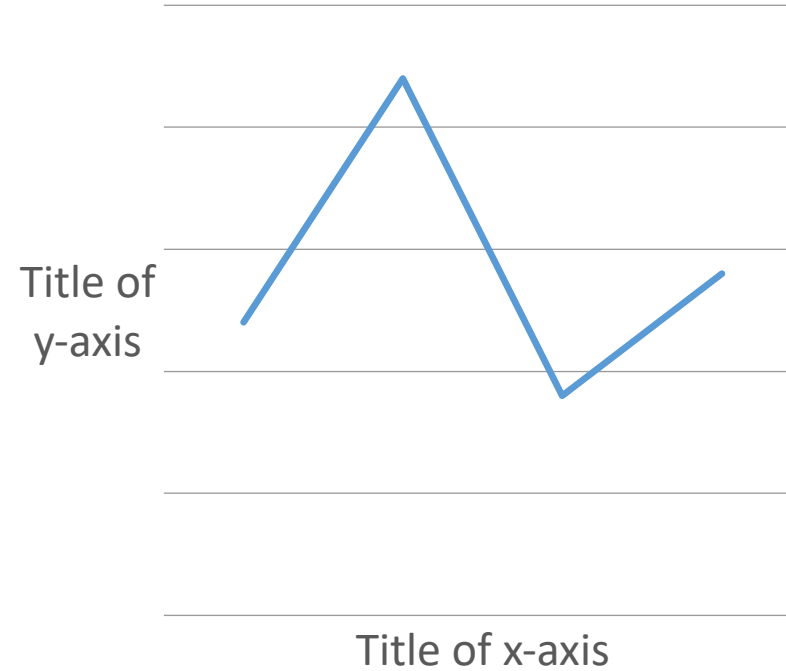
Don't

Headline of the chart



Do

Headline of the chart



TYPOGRAPHY IN CHARTS

Name	Data	Data	Data
Company A	0.0	0.0	0.0
Company B	0.0	0.0	0.0
Company C	0.0	0.0	0.0
Company D	0.0	0.0	0.0

Many elements in bold. Which part is highlighted?

Name	Data	Data	Data
Company A	0.0	0.0	0.0
Company B	0.0	0.0	0.0
Company C	0.0	0.0	0.0
Company D	0.0	0.0	0.0

Give emphasis to relevant results

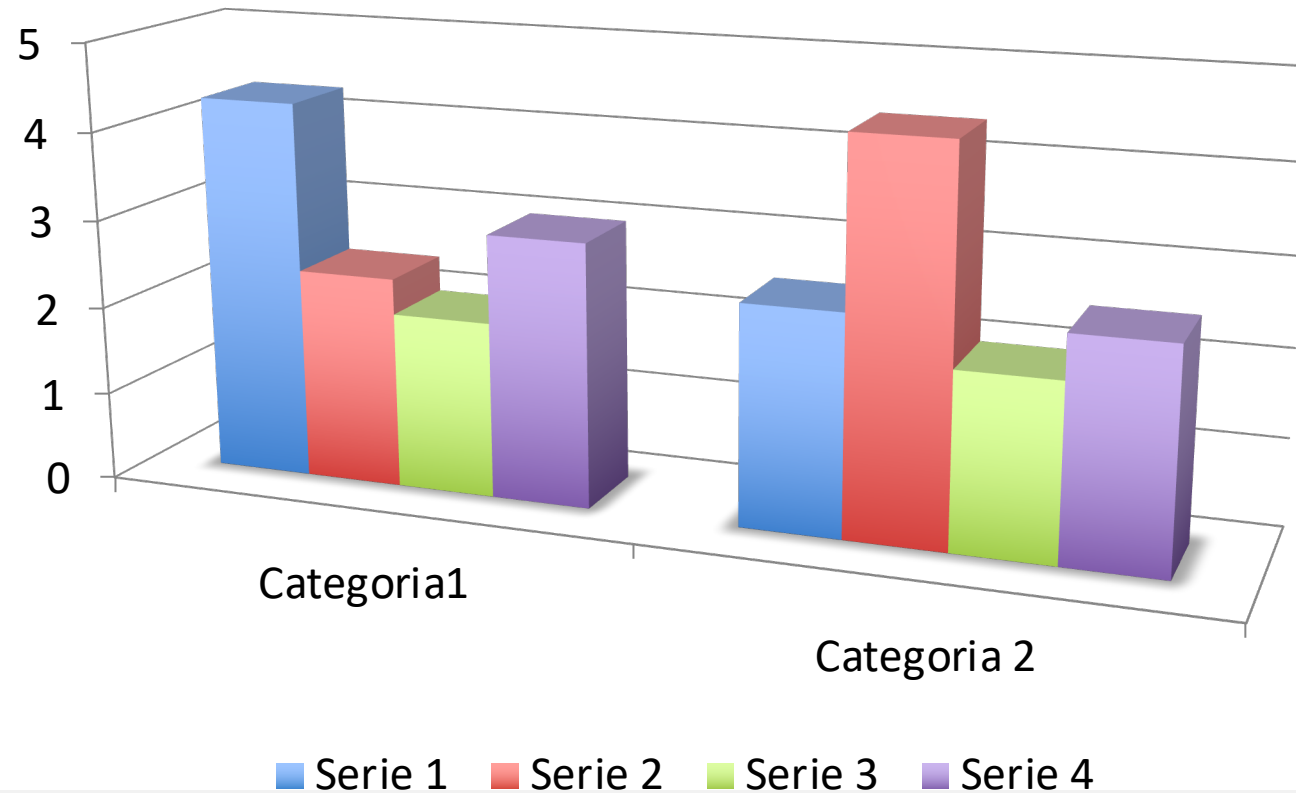
DATA-INK RATIO

Visual Display of Quantitative Data

Edward Tufte, 1983

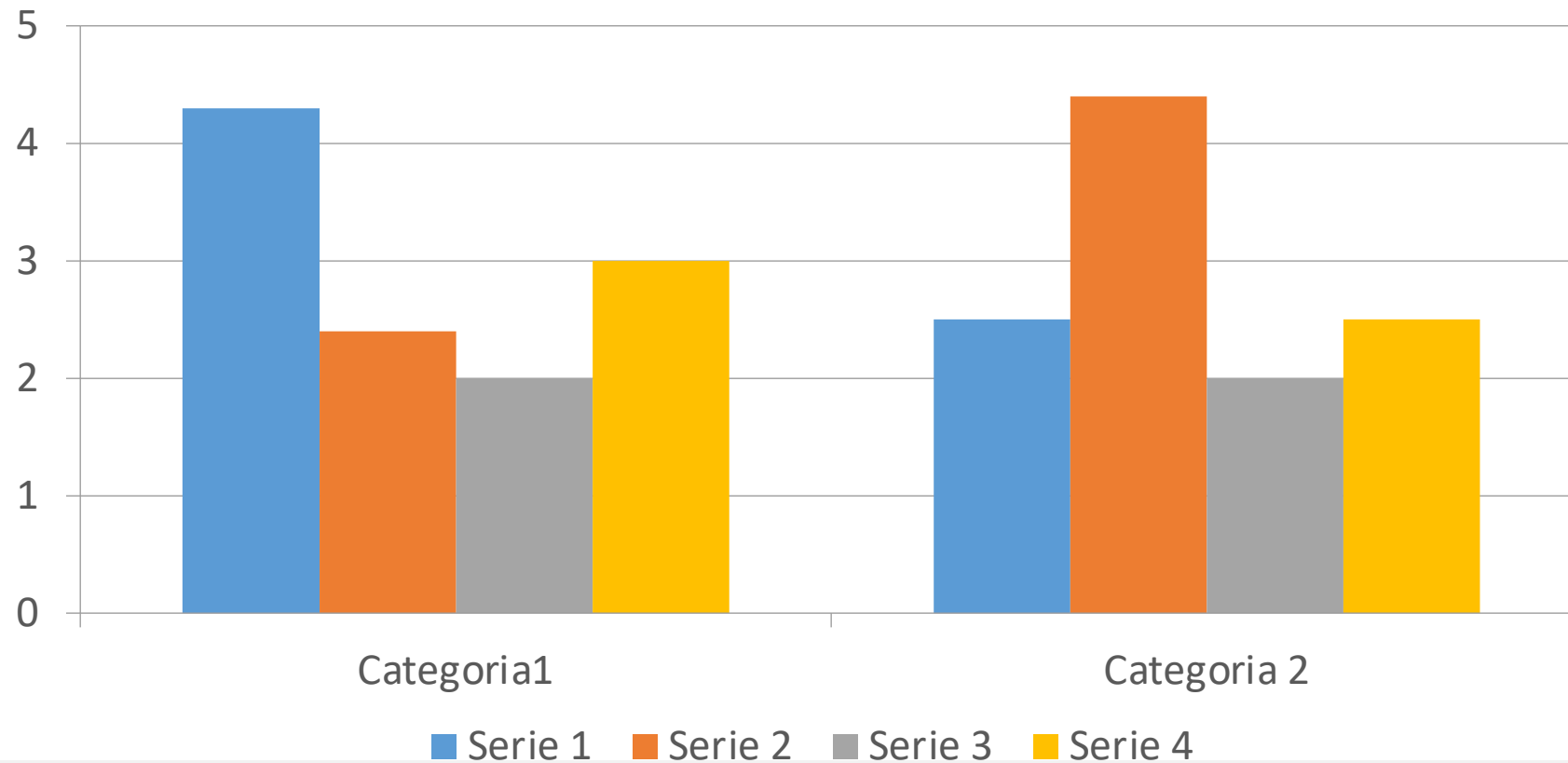
DATA-INK RATIOⁿ

$$\text{Data-Ink Ratio} = \frac{\text{Data ink}}{\text{Total ink used in graphic}}$$



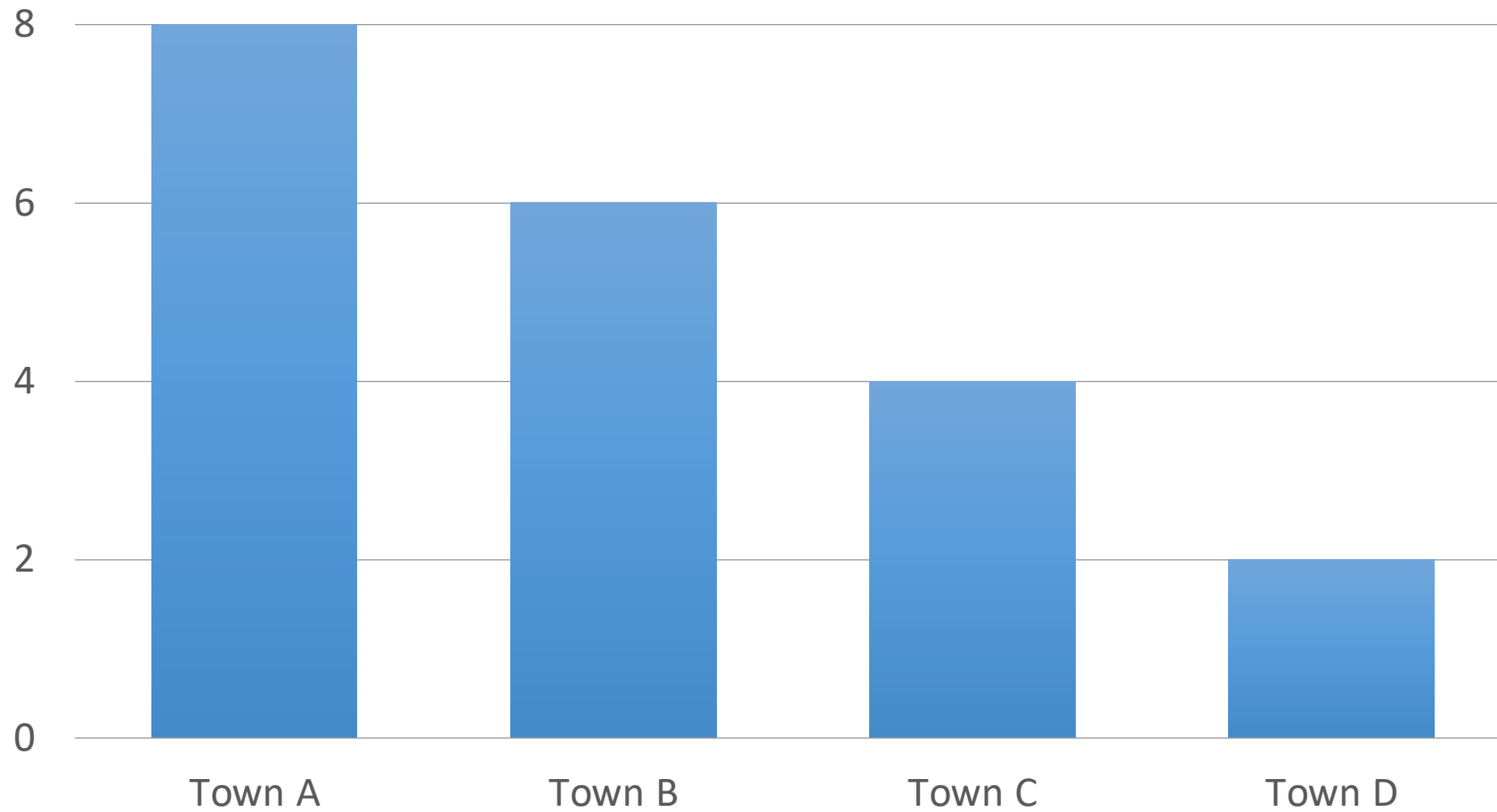
DATA-INK RATIOⁿ

$$\text{Data-Ink Ratio} = \frac{\text{Data ink}}{\text{Total ink used in graphic}}$$



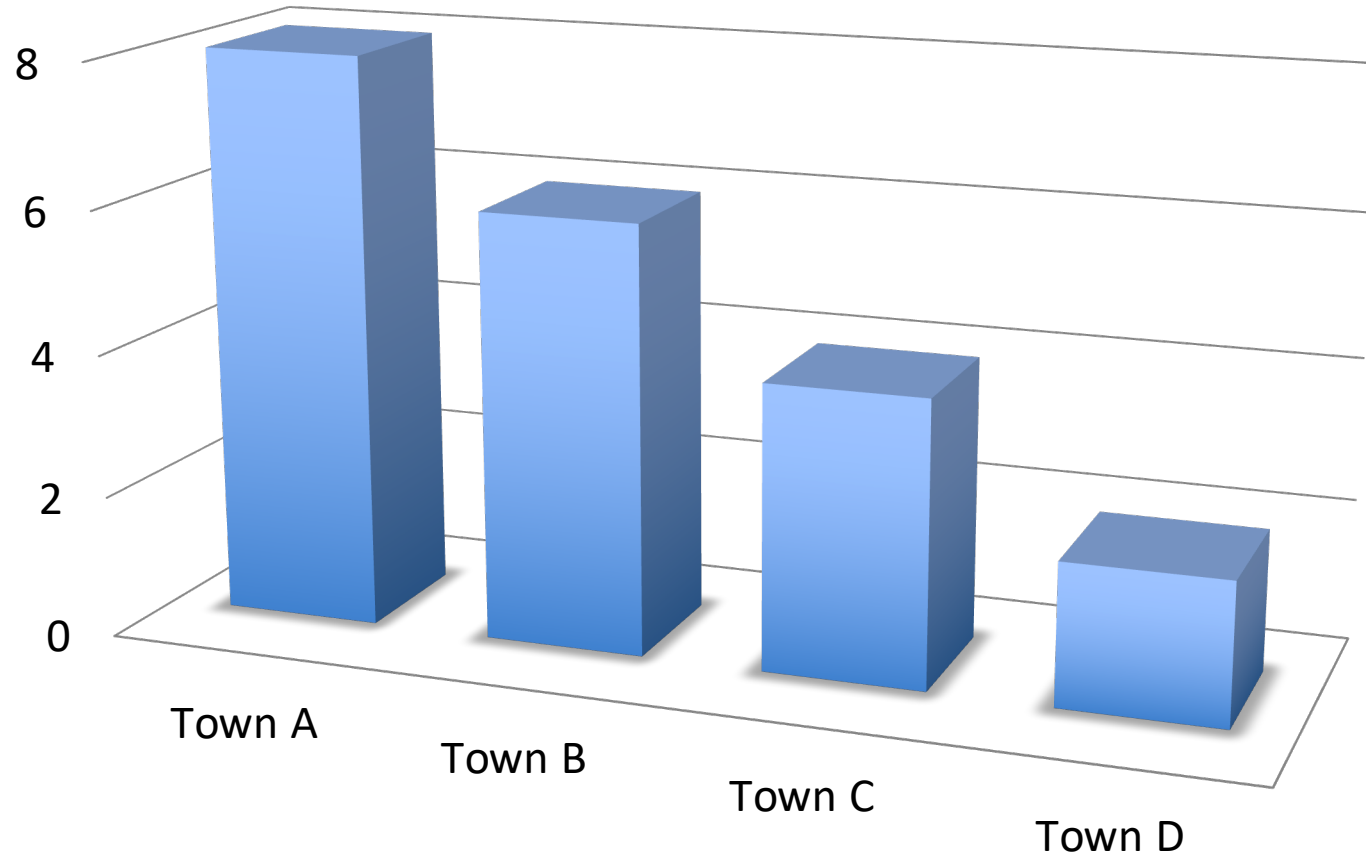
BAR CHARTS

Represent discrete quantities

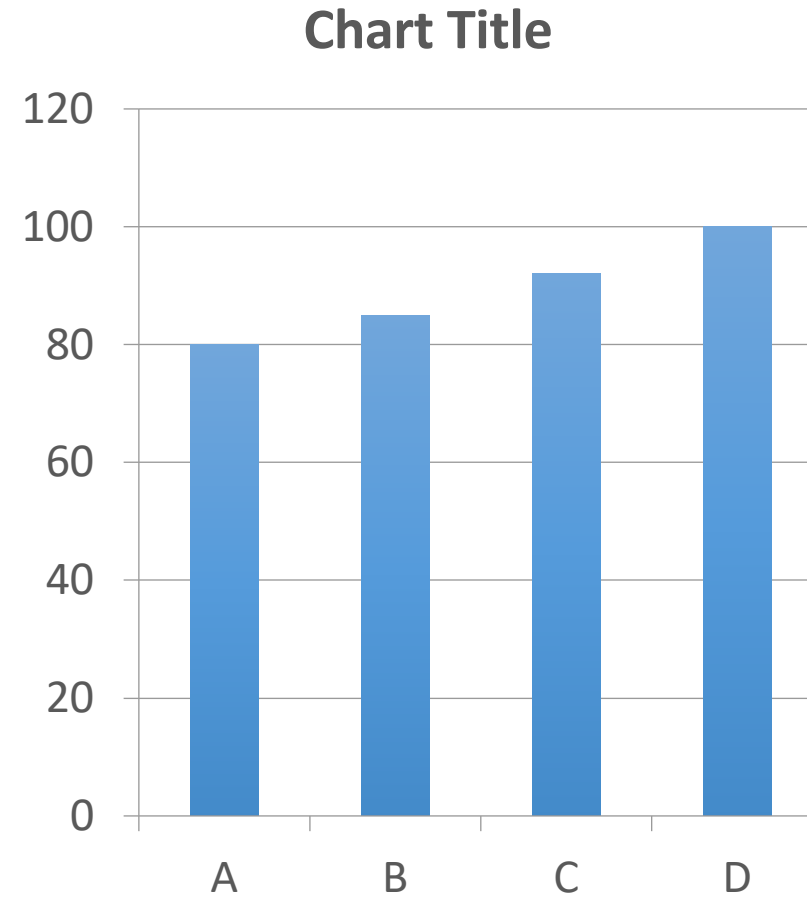
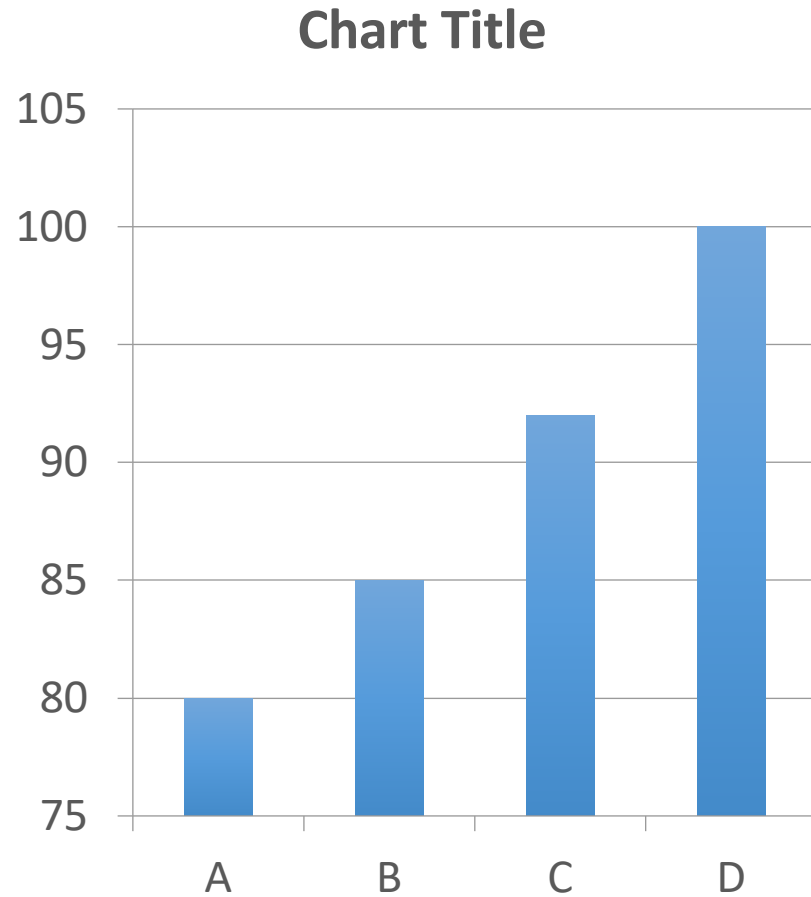


BAR CHARTS

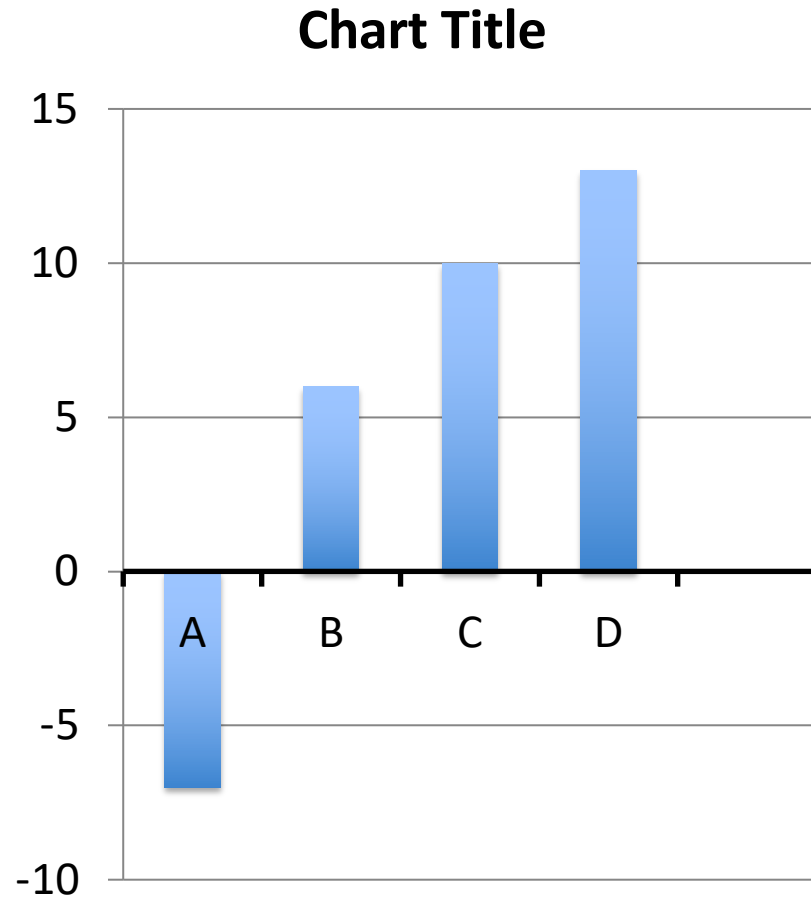
Avoid non-functional adornment



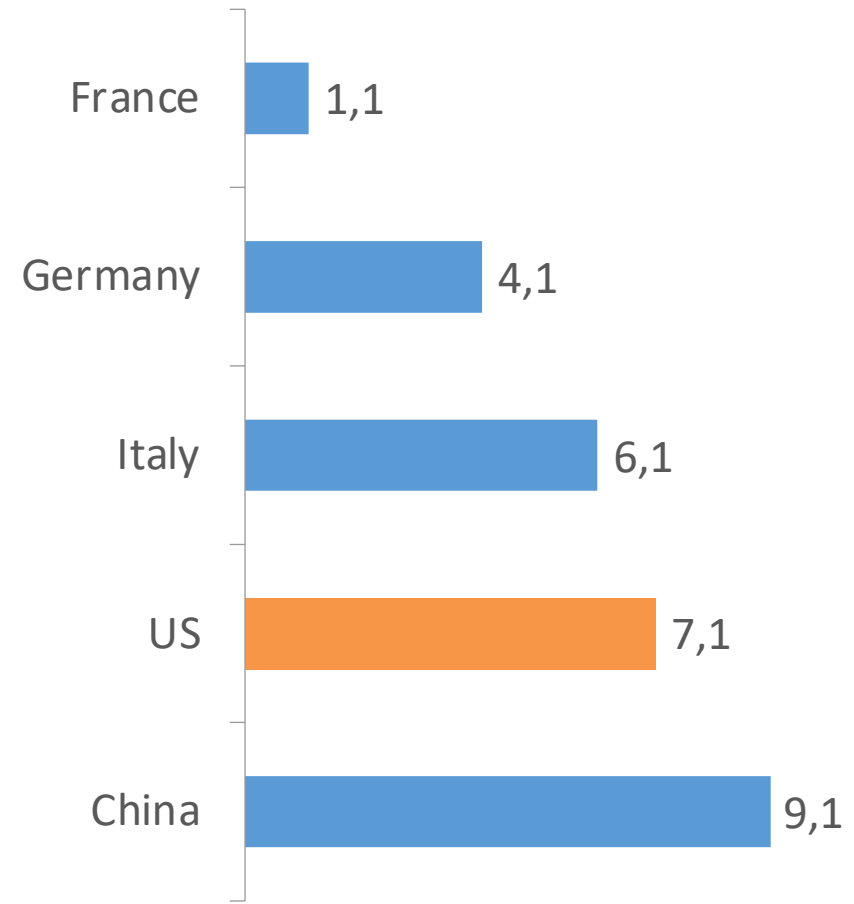
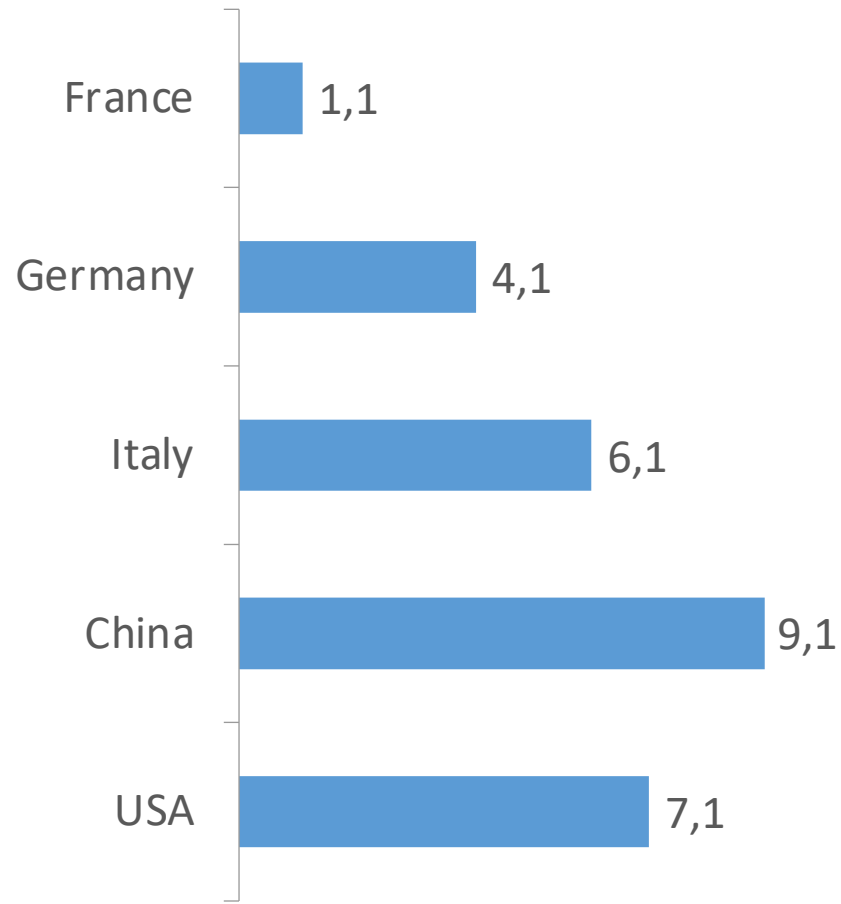
BAR CHARTS: BASELINE

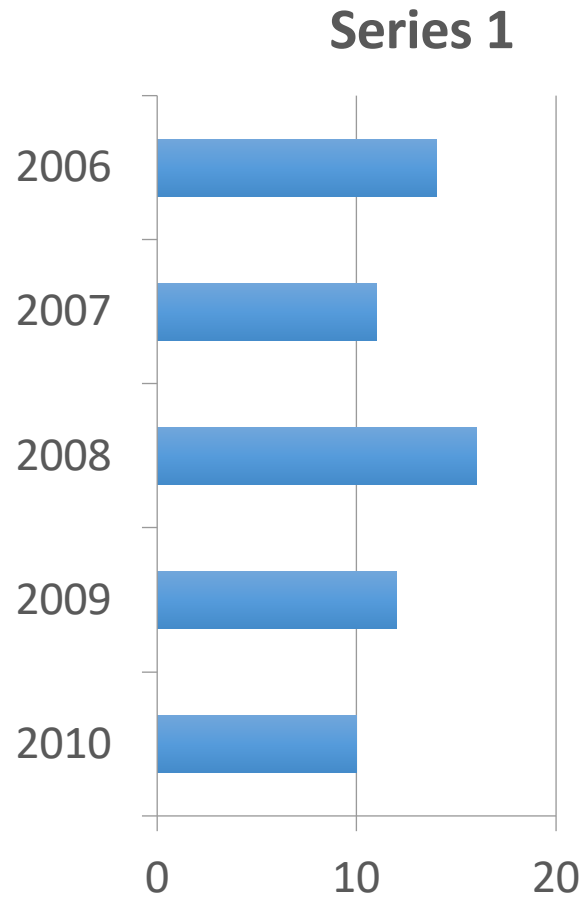


BAR CHARTS: BASELINE

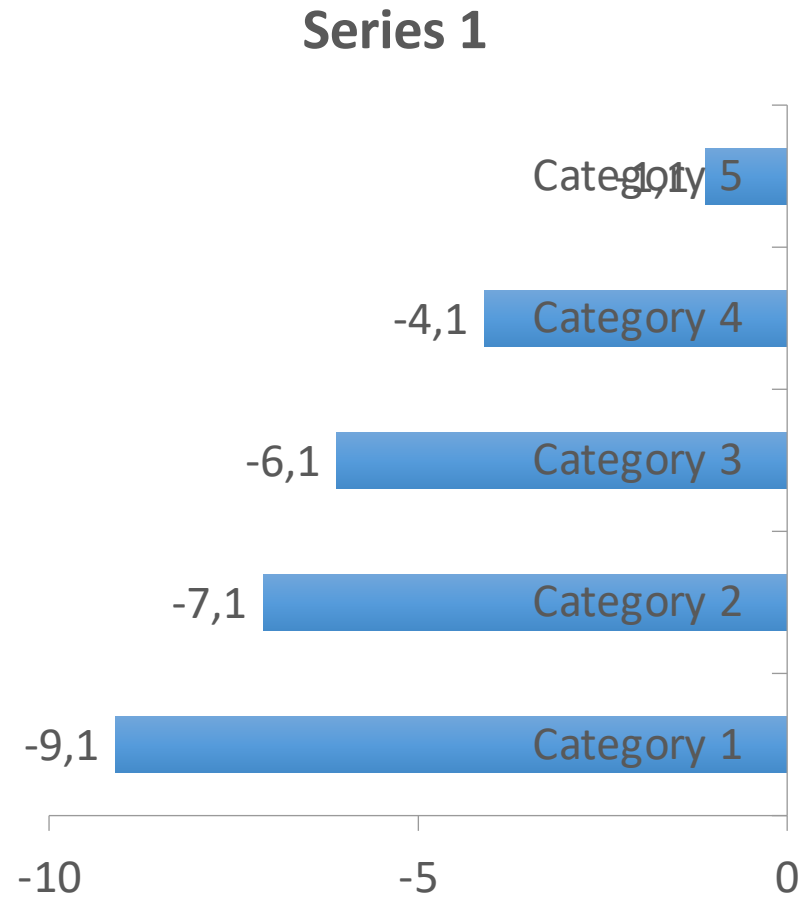


BAR CHARTS: ORDERING



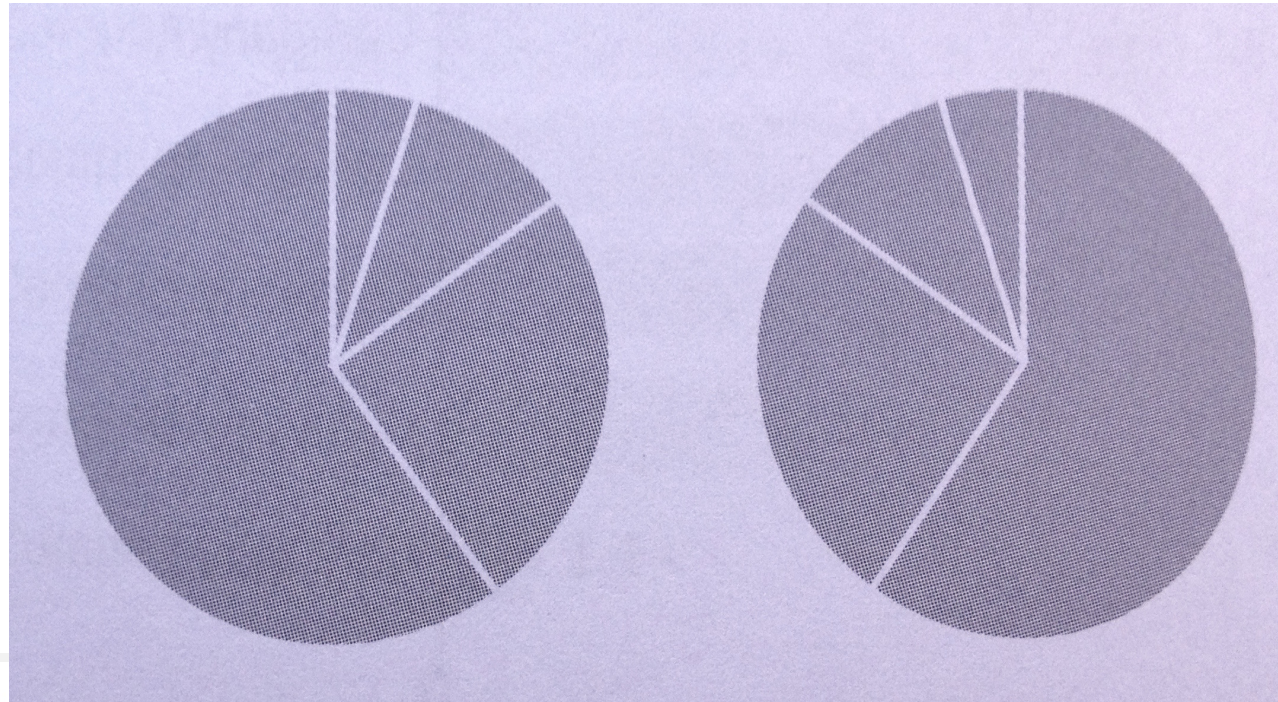


Series 1

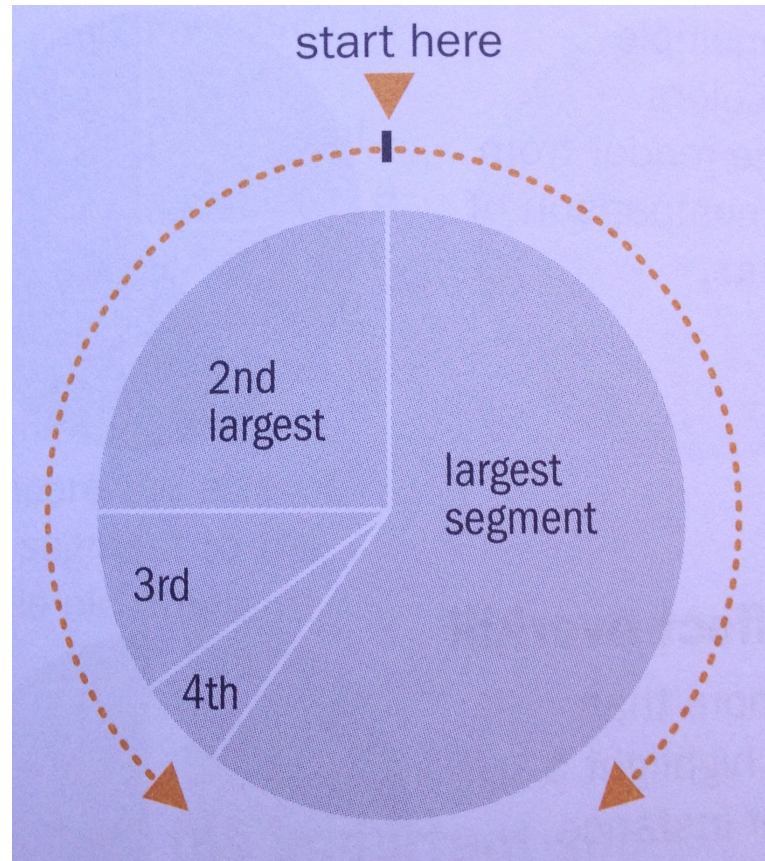


PIE CHARTS

- Pie Charts compares relative sizes and contributions

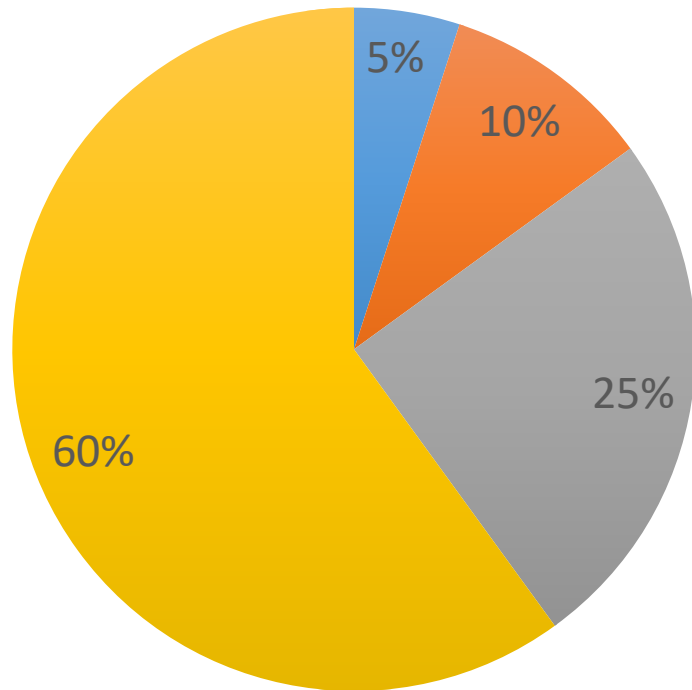


PIE CHARTS: ORDERING SLICES

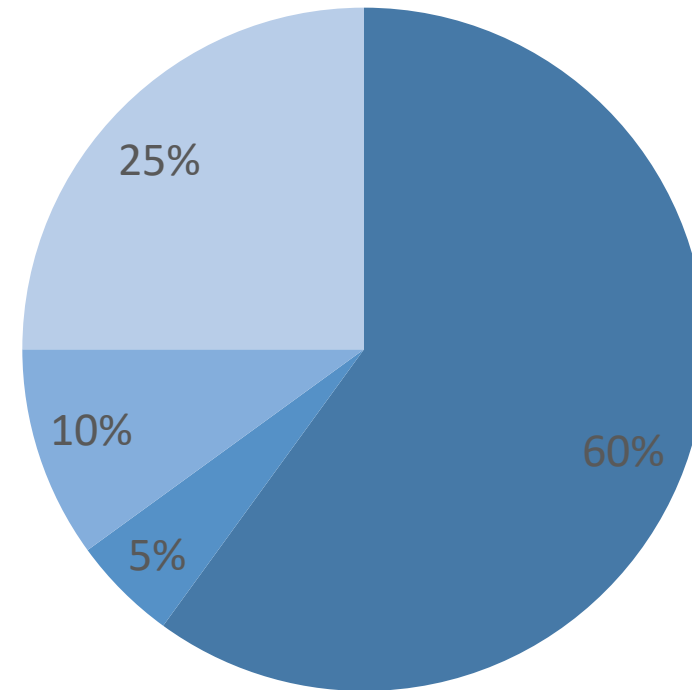


CHARTING EXAMPLES

Sales



Sales



May these charts be improved? Why? How?

TAKEAWAY MESSAGES

- Charts exploit position on scale VV
- Best practice to reduce biases and misinterpretation of charts

VISUALIZATION TAXONOMY

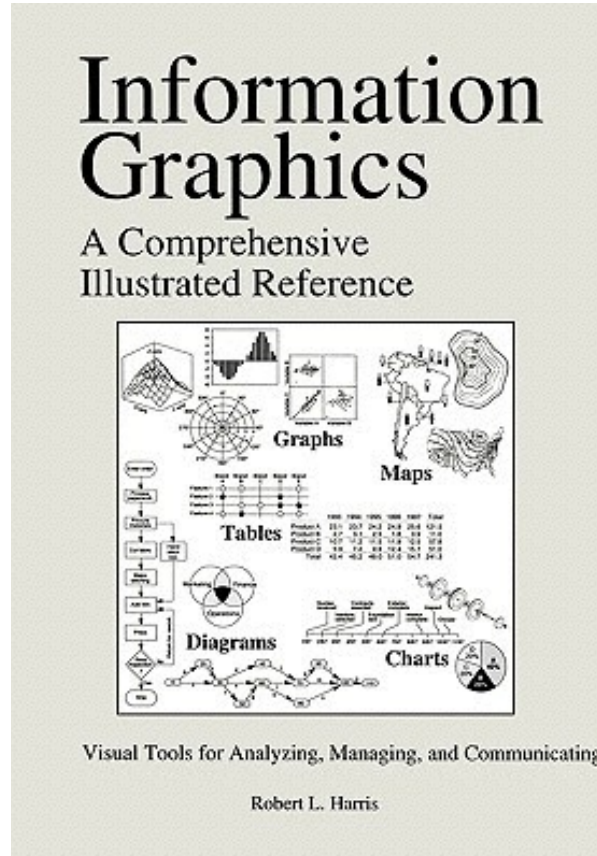
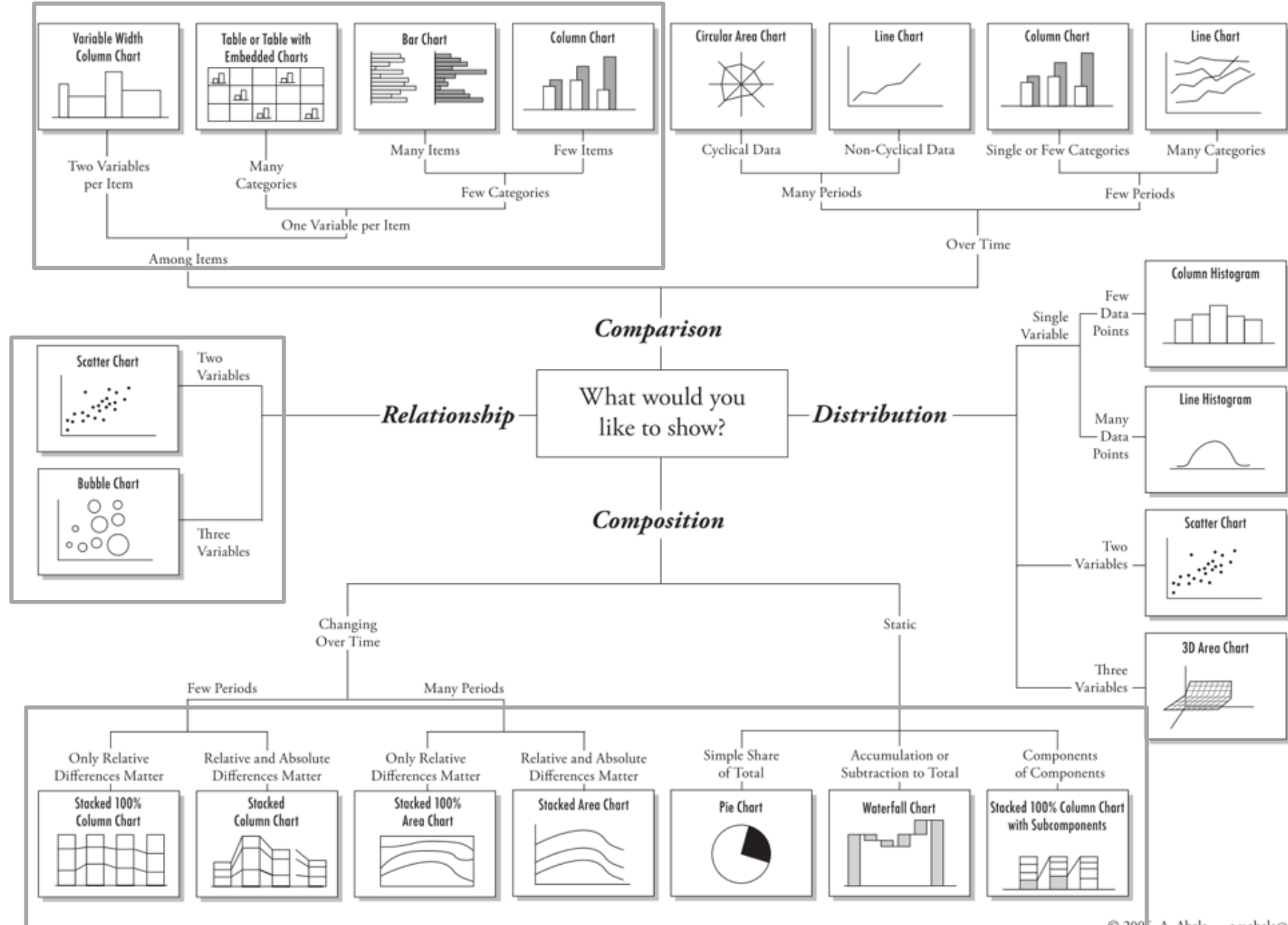
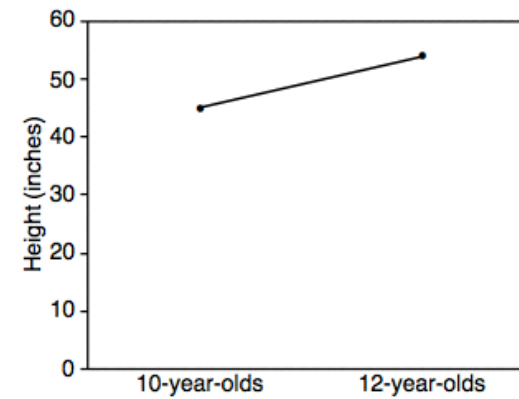
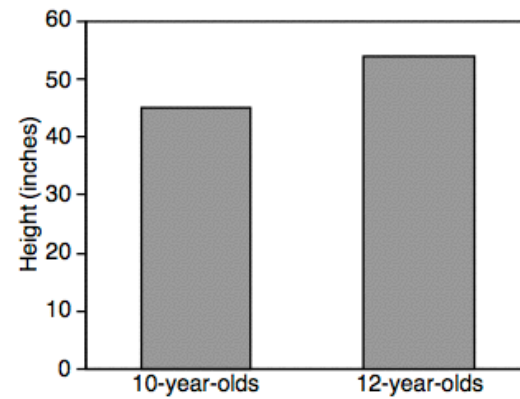
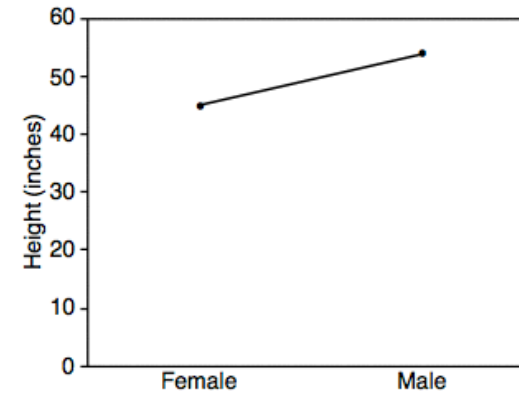
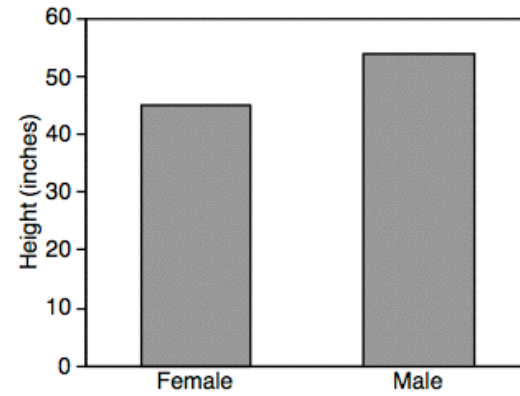


Chart Suggestions—A Thought-Starter



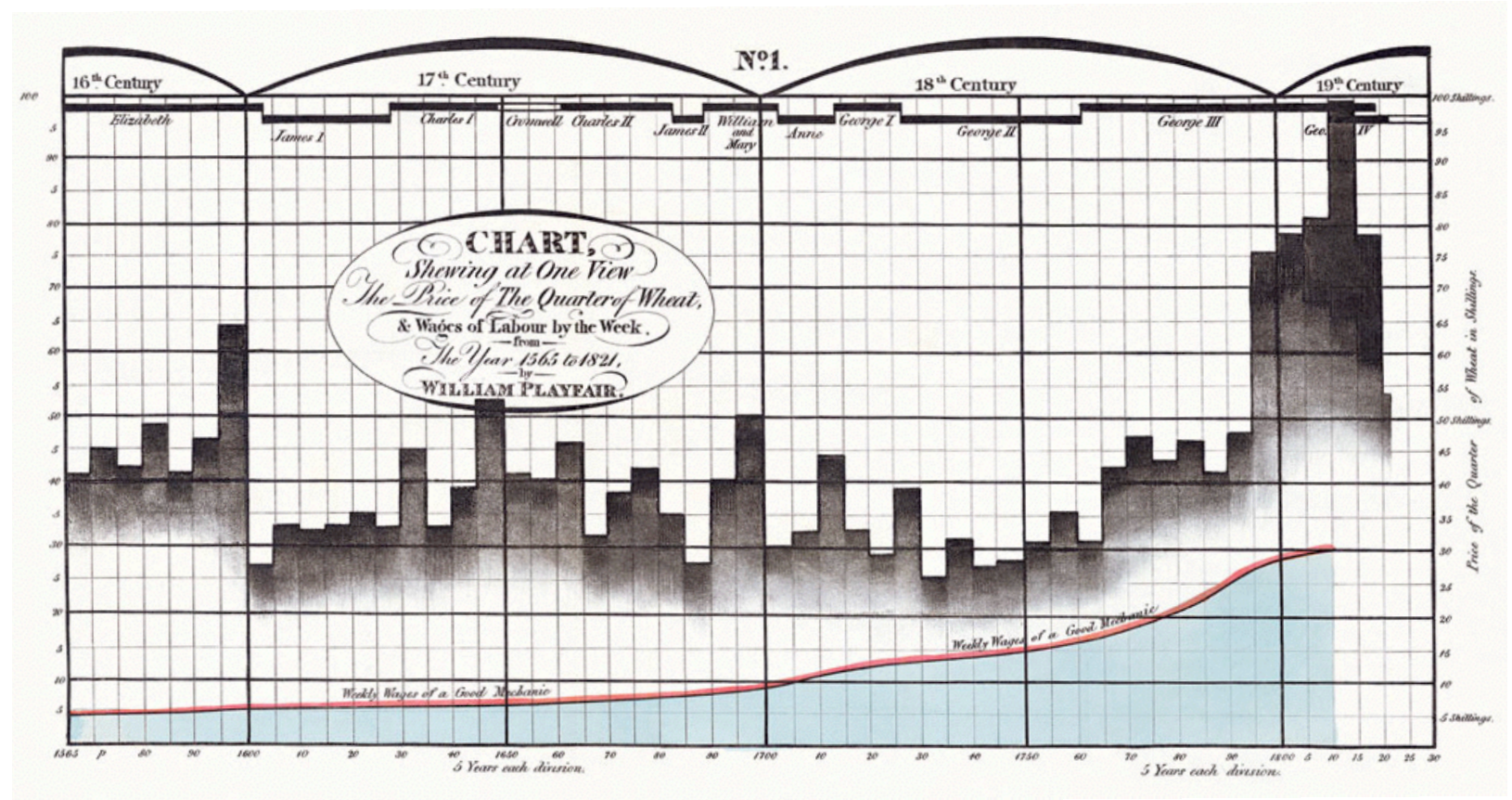
BARS VS. LINES



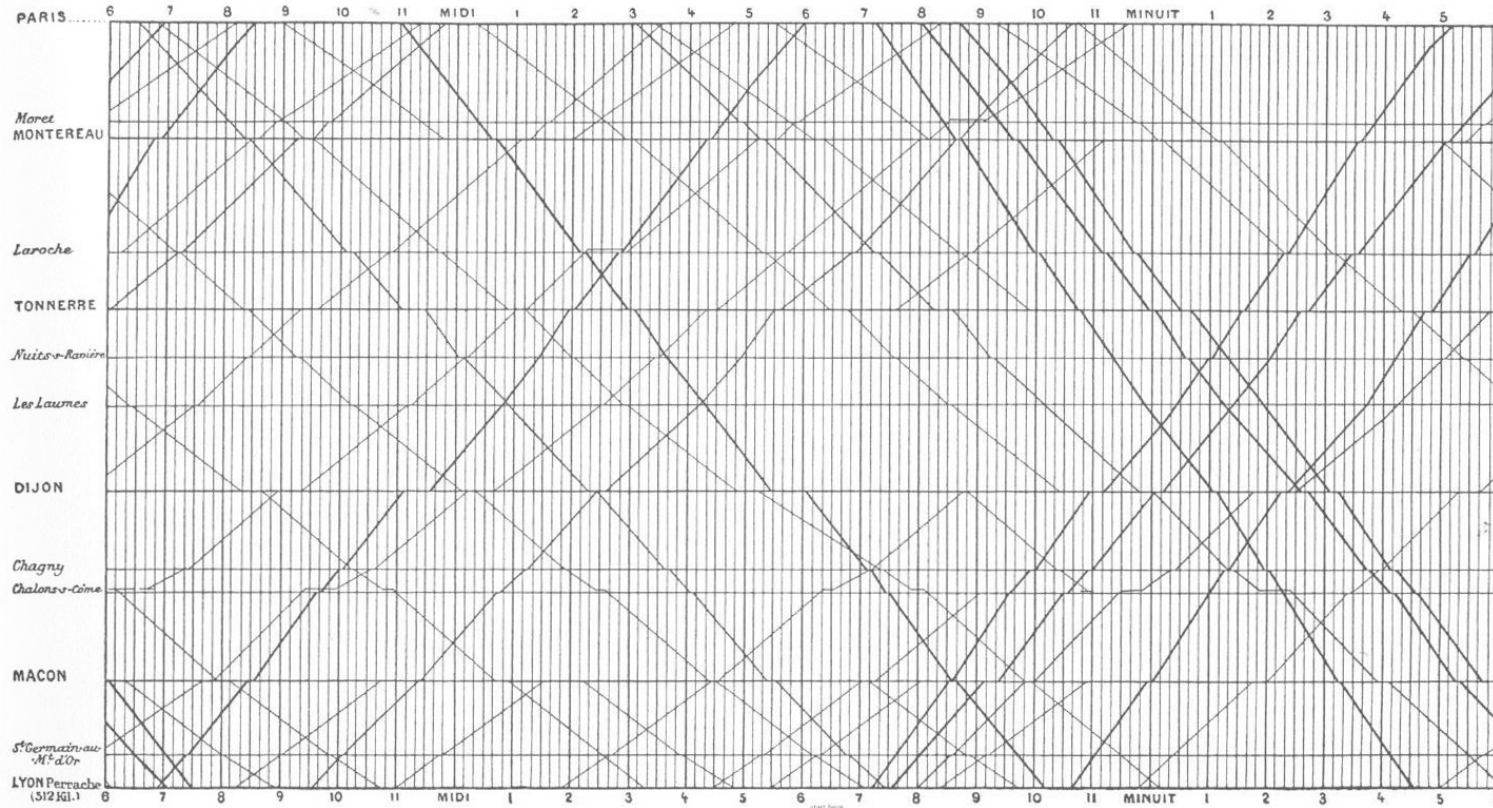
TREND OVER TIME

WILLIAM PLAYFAIR

1759-1823



PATTERNS OVER TIME



TREND OVER TIME

Apple Inc. (AAPL) - NasdaqGS

[+ Add to Portfolio](#) [Like](#) 6k

601.10 ↑ 15.53 (2.65%) 4:00PM EDT | After Hours: **604.60** ↑ 3.50 (0.58%) 7:15PM EDT - Nasdaq Real Time Price



TREND OVER TIME

Published: February 2, 2010

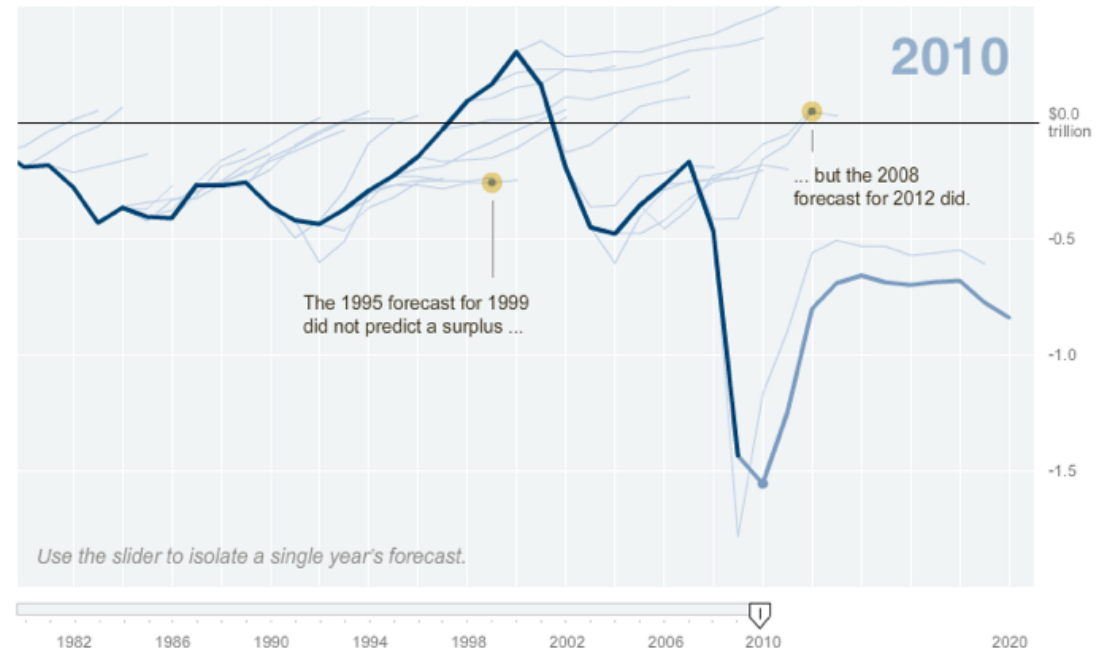
Budget Forecasts, Compared With Reality

Just two years ago, surpluses were predicted by 2012. How accurate have past White House budget forecasts been?

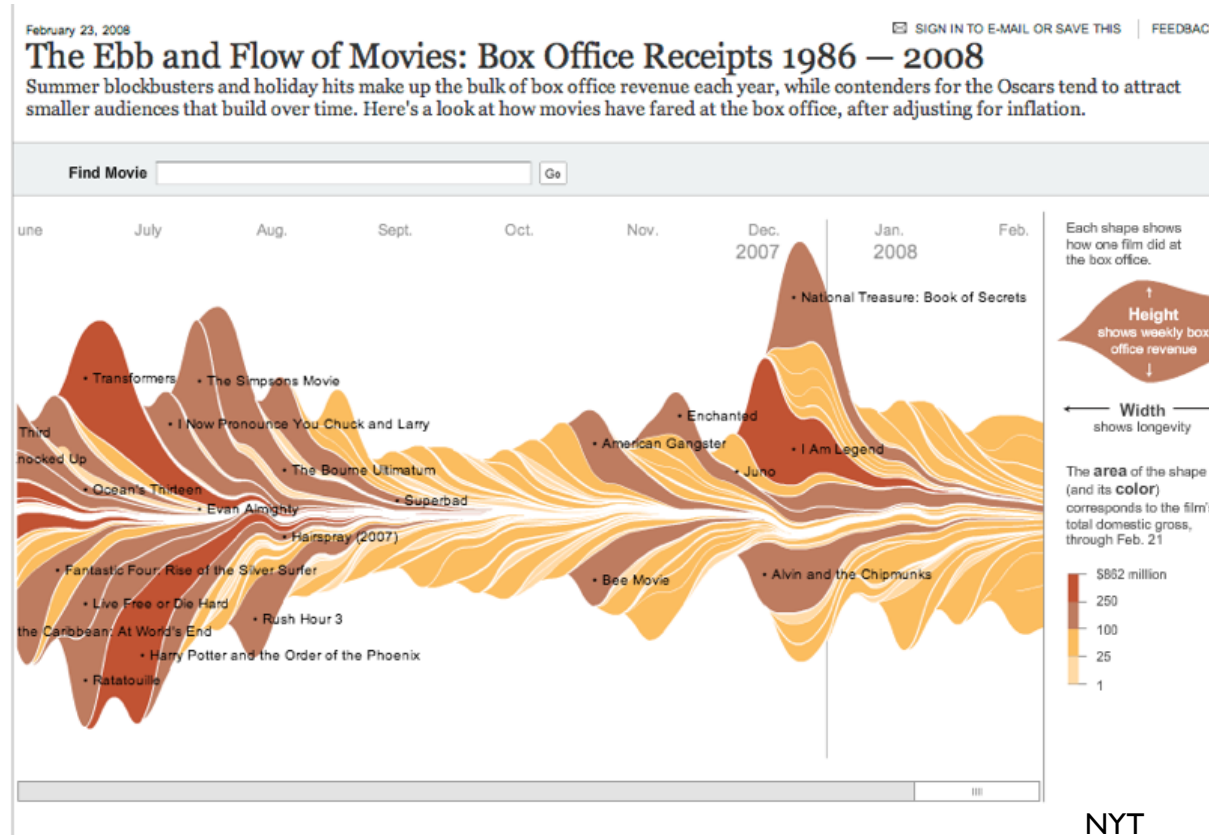
1 2 3 4 5 6 NEXT ▶

Latest forecast

Today, with a better understanding of the severity of the economic downturn, the deficit situation is much more dire.



STREAMGRAPHS



Vision Statement

Dave Berkata is an editor at HBR. **Jeff Clark** is a designer and information scientist based in Toronto.

Six Ways to Find Value in Twitter's Noise

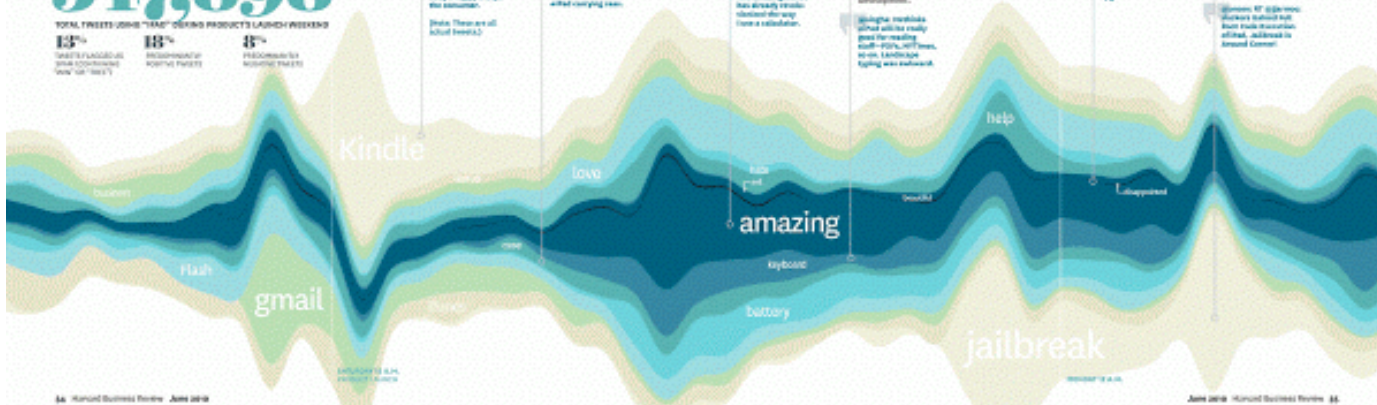
It's easy to dismiss Twitter as jabber, but smart marketers will recognize it as a stream of free consumer data to be mined in near-real time. Data visualization tools can help pinpoint what consumers are reading and sharing, elucidate voices in the chatter, and unearth trends. To show marketers how they can gain insight from Twitter, we captured more than a half million tweets containing the word "iPad" that were broadcast during the product's launch weekend in April. We then mapped key words that appeared in those tweets on the graph below.

HBR Research Project

The iPad Launch by the Numbers

547,898

TOTAL TWEETS USING "IPAD" DURING PRODUCT'S LAUNCH WEEKEND
13% TWEETS FLAGGED AS SPAM (COMPARING NEW USE THIS YEAR)
18% RECOMMENDED BY OTHER USERS
4% RECOMMENDED BY FOLLOWERS



1 Learn about the competitive landscape. Tweets about your product that include the names of rival brands can reveal a lot about market positioning. Most of the **Kindle** tweets didn't focus on the iPad's being a Kindle killer (or, for that matter, a **Kindle** killer). Instead, they talked the virtues of the Kindle app for the iPad—something Apple's **Kindle** app will face serious competition.

2 Look for unexpected themes. **Keyboard** words point to potential ideas. The word **crashes** became a common sight after people started typing **help**. The second **help** and **helpful** words were trending high about addressing their expected new gadget.

3 Dig deeper into the screen. This stream graph gives an overall impression of what people are saying about it, it's important to know what other words are being used in relation to those in the stream. A lot of tweets were containing the word **help**. Some not from Apple fans but from gamers tweeting about the virtual of **iPad** that is for the iPad. In our case, it might look as though a lot of tweets are more calling the iPad **amazing**. But in fact, most of this specific time from users wanting a job has been connected to **crashes**.

4 Look for user experiences. Product testing and reviews can't replace user reactions. Looking at iPad tweets with the words **typing** and **keyboard**, and then digging out the most common words in those tweets (see above), gives you feedback from **THOUSANDS** of users. The negative events could help prioritize existing messages and product development.

5 Learn why negative words are coming up. Finding negative events is a good way to locate consumers' pain points. Though not frequent, **padding** and **protection** appeared tweets that focused on product functionality. Customer service could be adjusted to address the most common complaints.

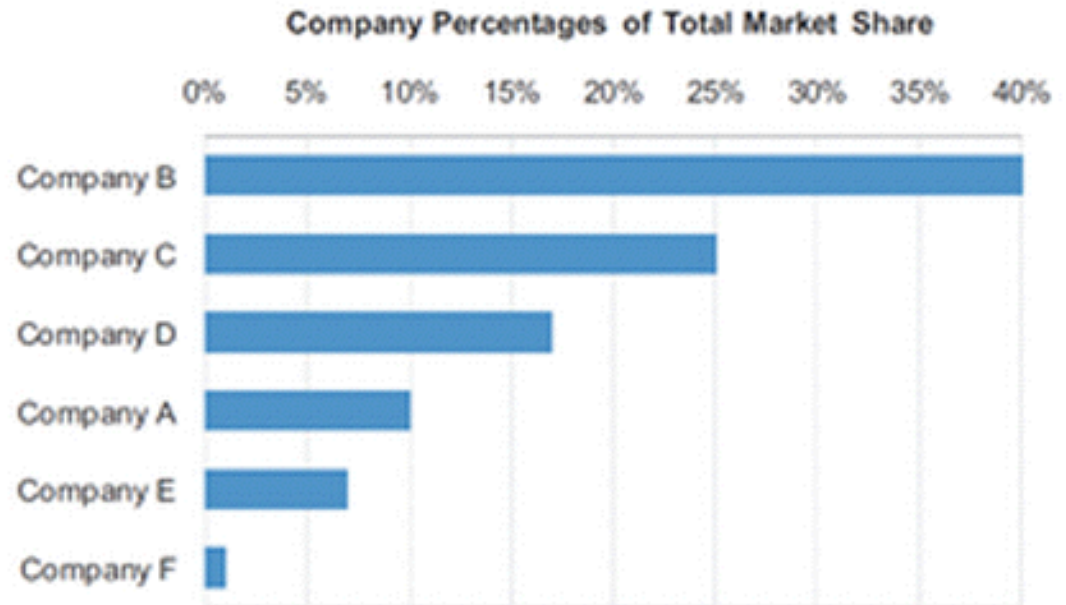
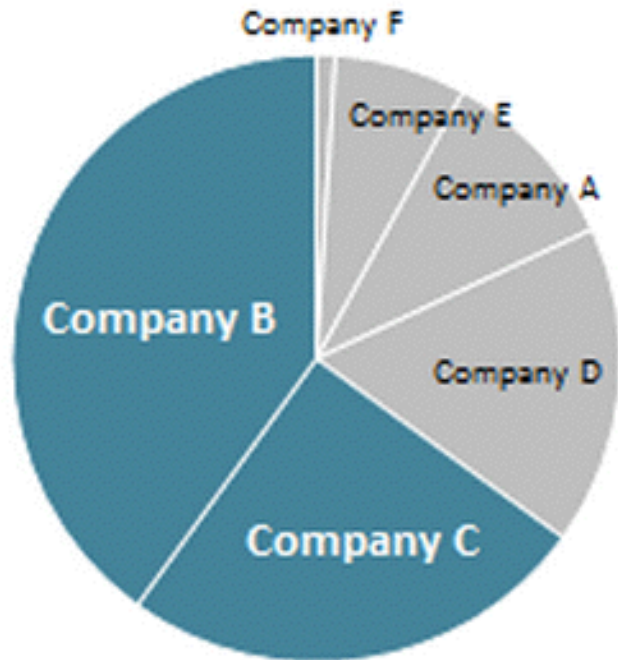
6 Learn about conversation dominators. Words that suddenly dominate the word stream may mean something has happened. The word **LAUNCH** refers to **Facebook**'s use of iPad. Some tools to run software and software by Apple. Twitter's word stream helps to identify, create, and video tutorials on how to hook the device.

How to Read This Graph
This stream graph shows tweets about a new item. Each node illustrates the proportion of tweets containing a given word, such as **IPAD**. Color is used only to distinguish nodes.

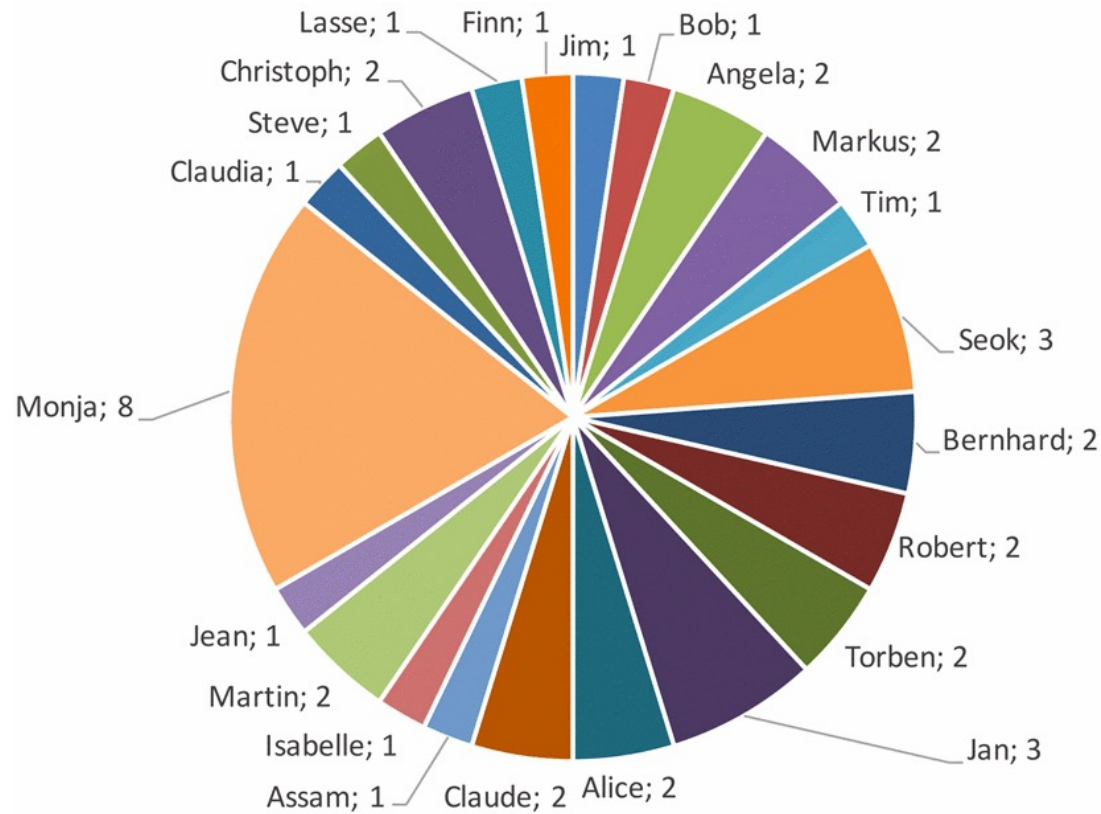


PIE VS BAR CHARTS

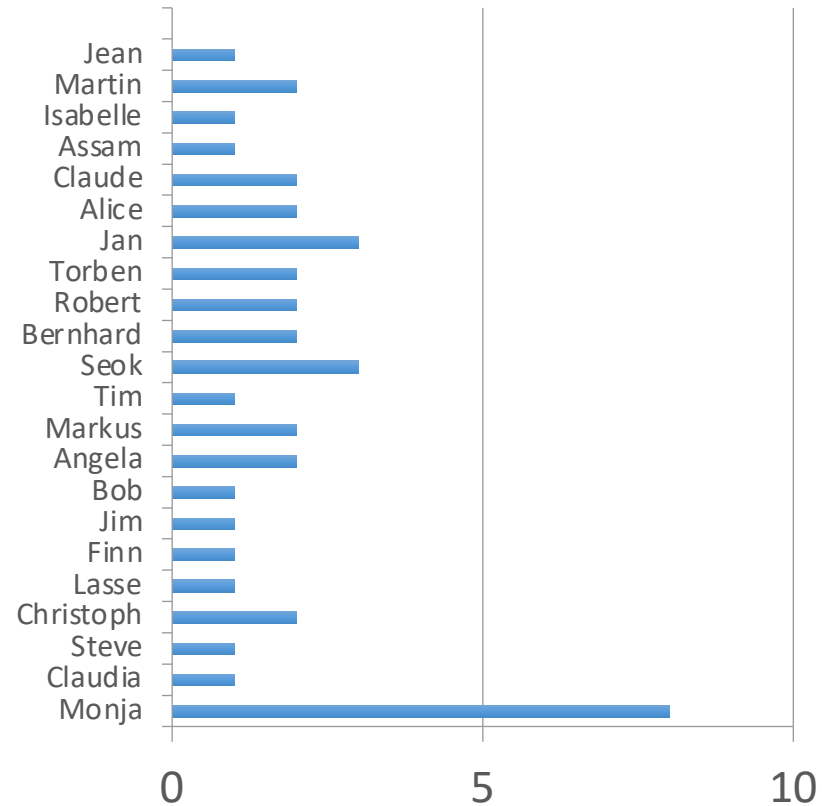
65% of the market is controlled by companies B and C



PIES VS BAR CHARTS

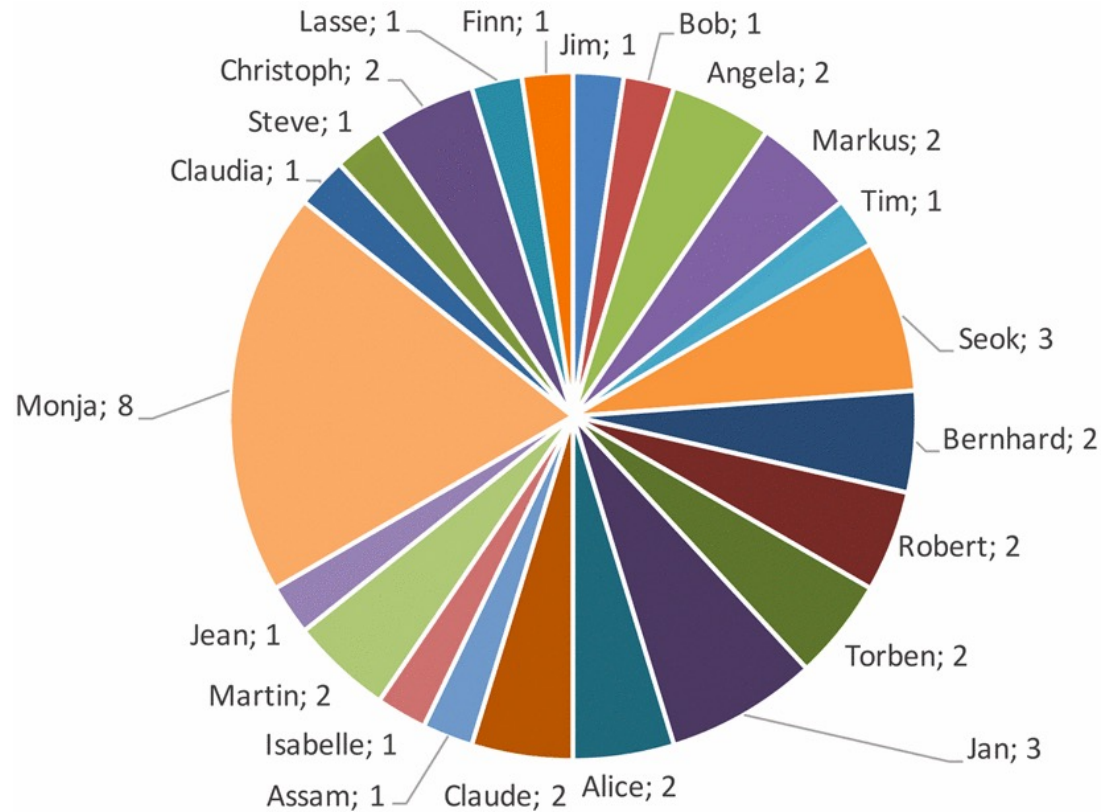


Episodes

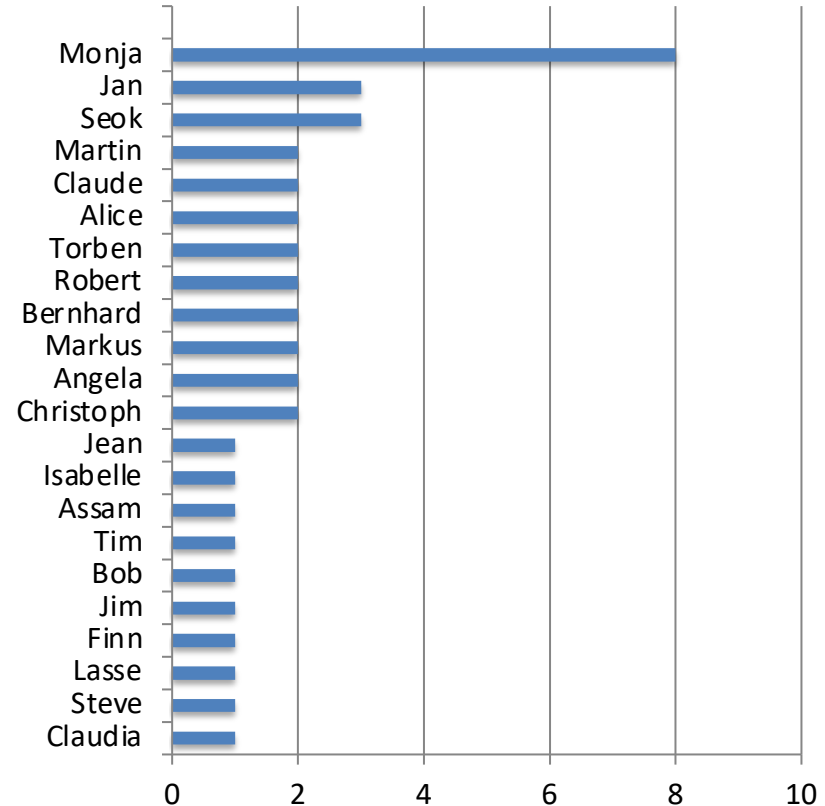


Furthermore, we present the distribution of attacks towards employees in detail in Fig. 10 right. The blue employees are secretaries, the green ones are administrators and the red ones are scientific employees. The number following the name is the number of times that person was attacked. All of the names are pseudonyms for real people. The person that suffered the most attacks is Monja a secretary with overall 8 attacks. In contrast, all other victims suffered between 1 and 3 attacks.

PIES VS BAR CHARTS (IMPROVED)

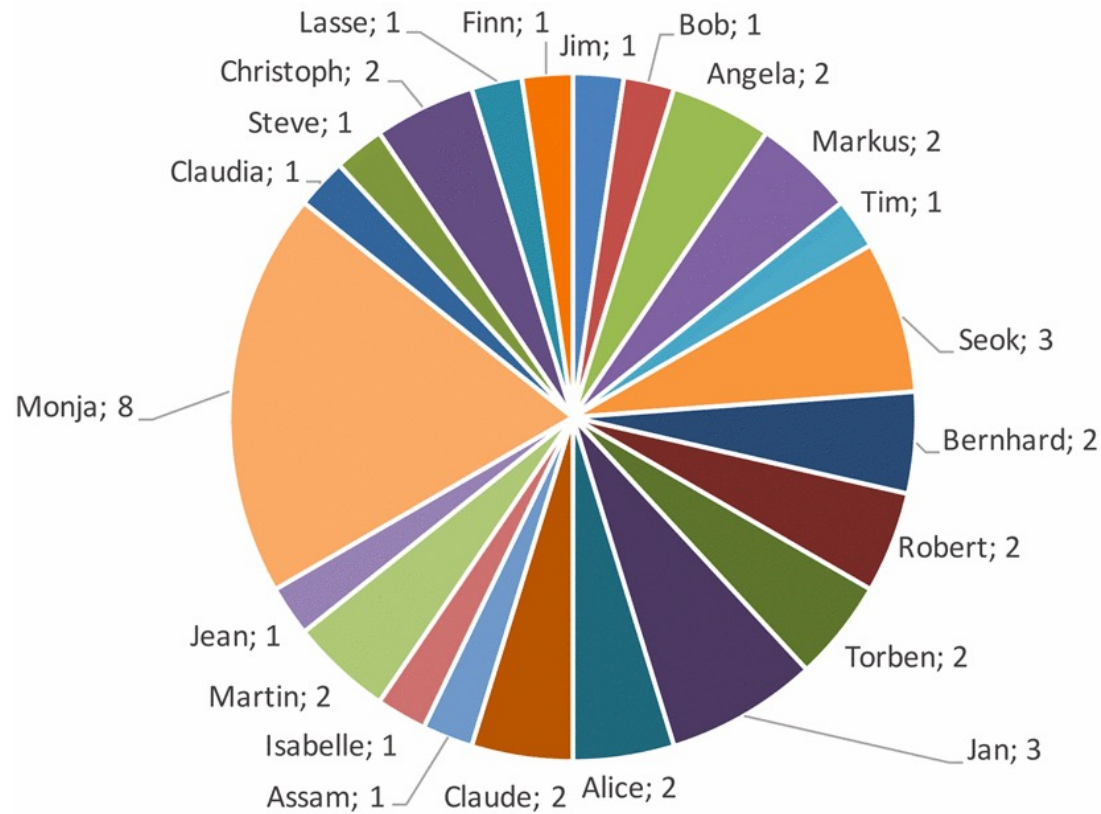


Episodes per person

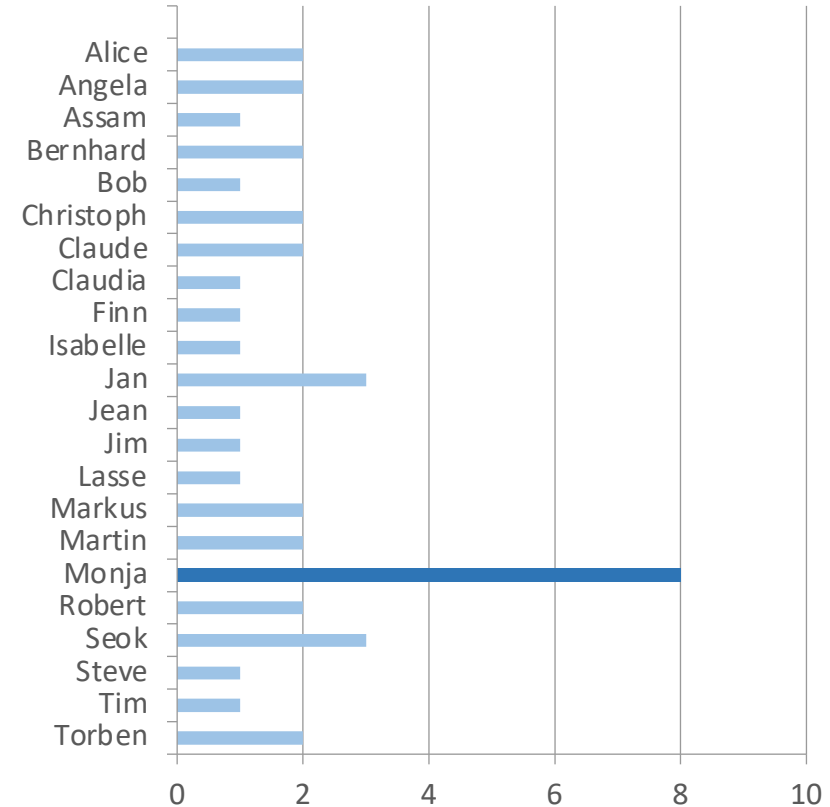


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PIES VS BAR CHARTS (IMPROVED)

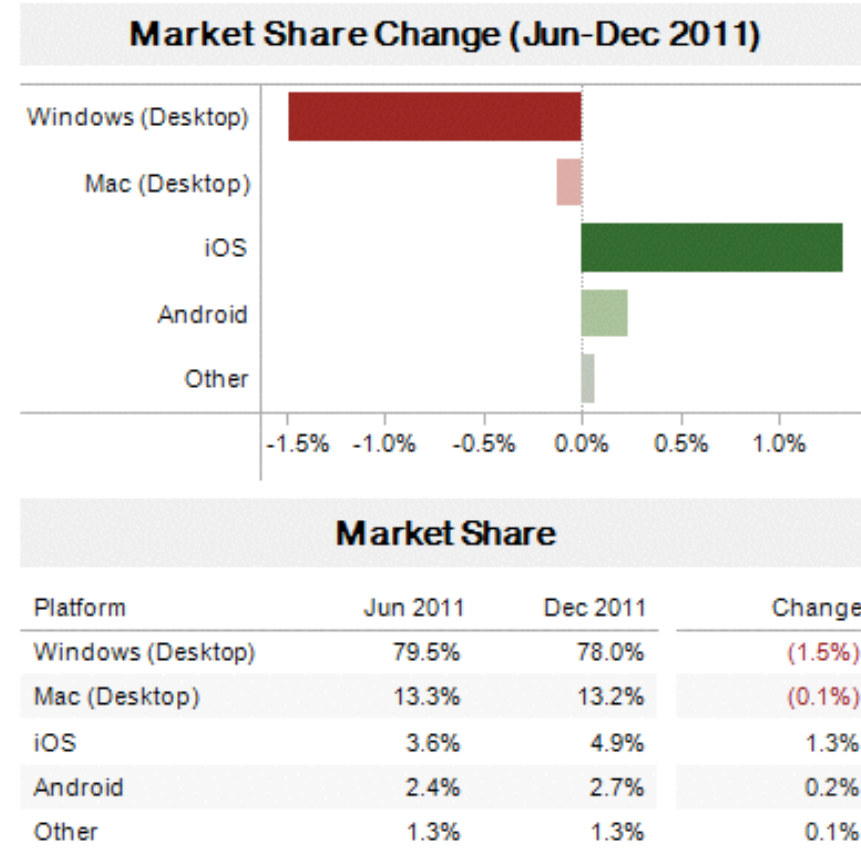
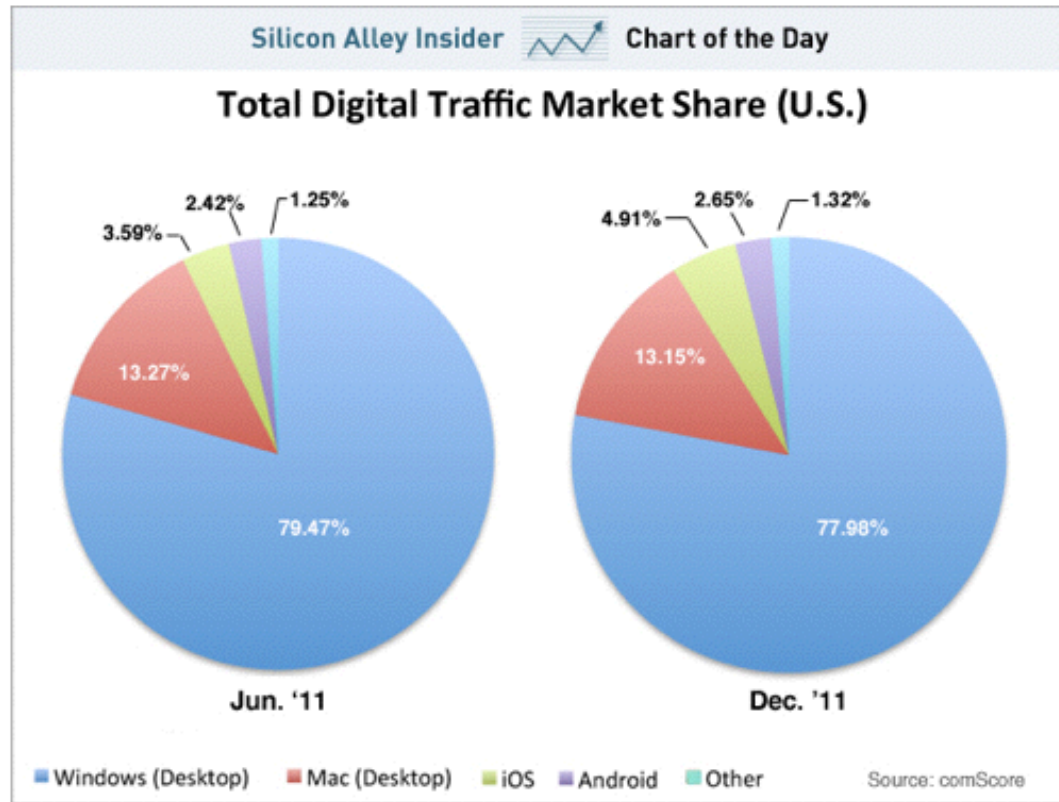


Episodes per person

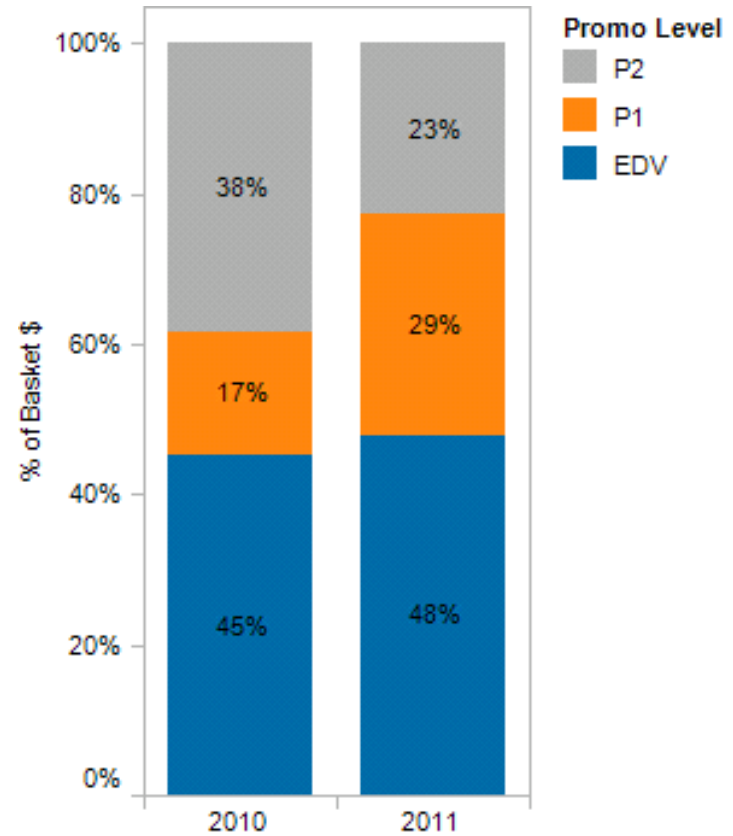
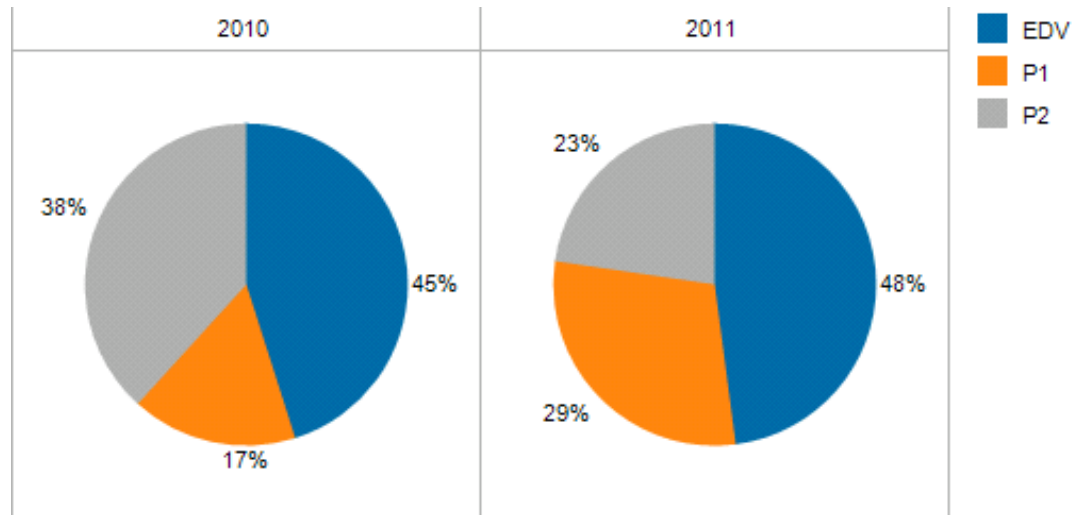


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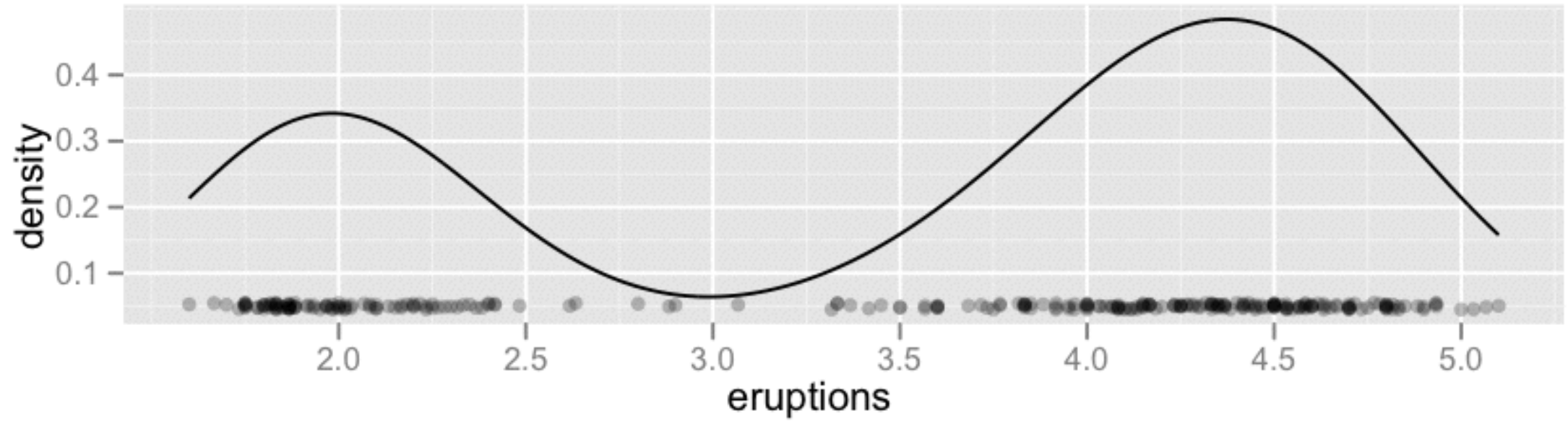
SHOWING CHANGES



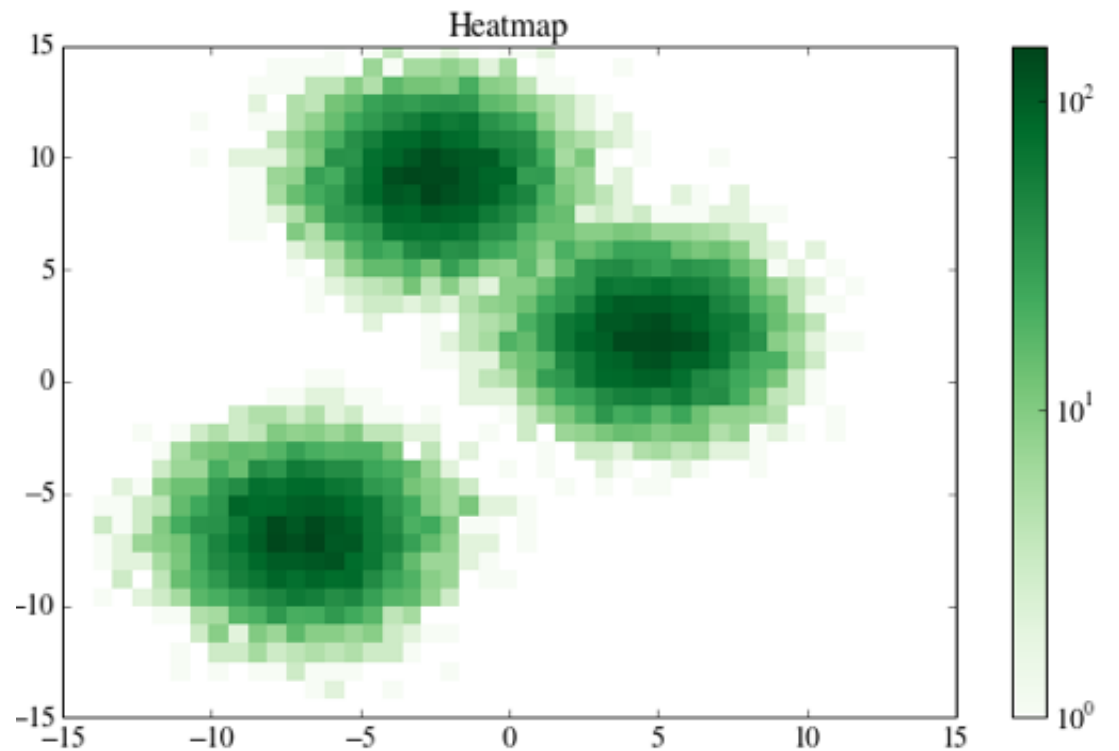
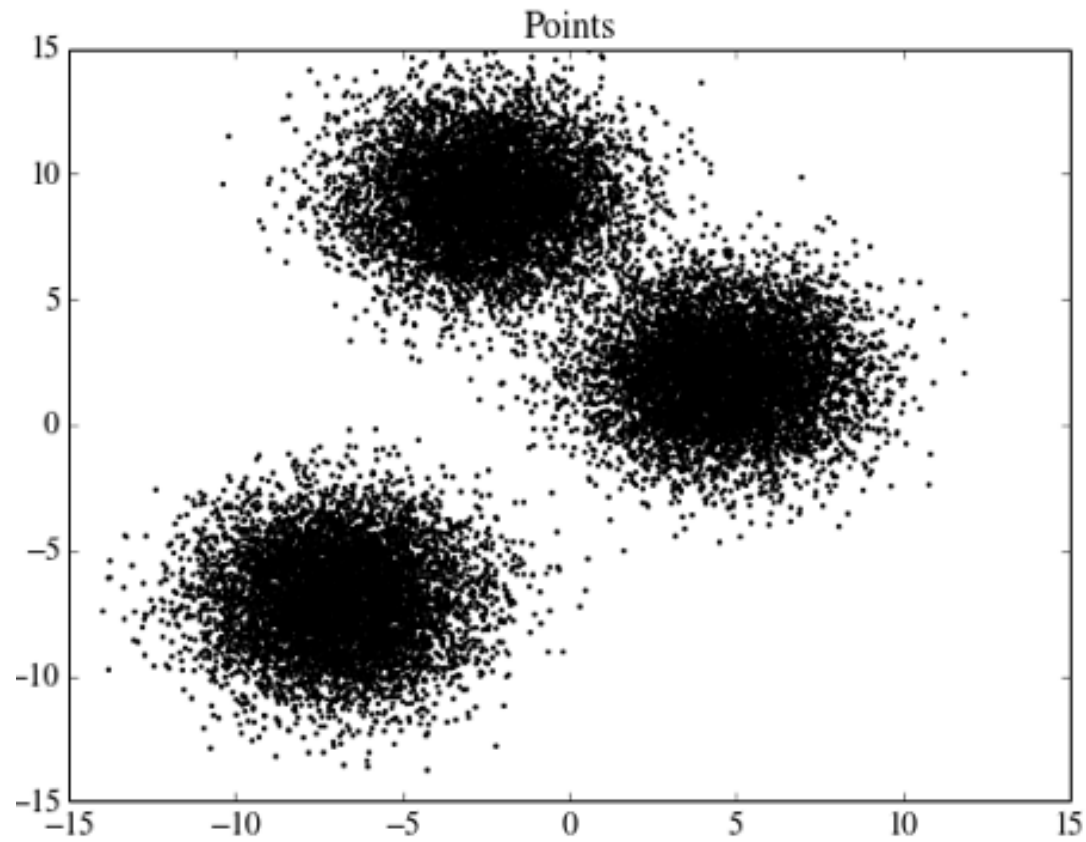
SHOWING CHANGES



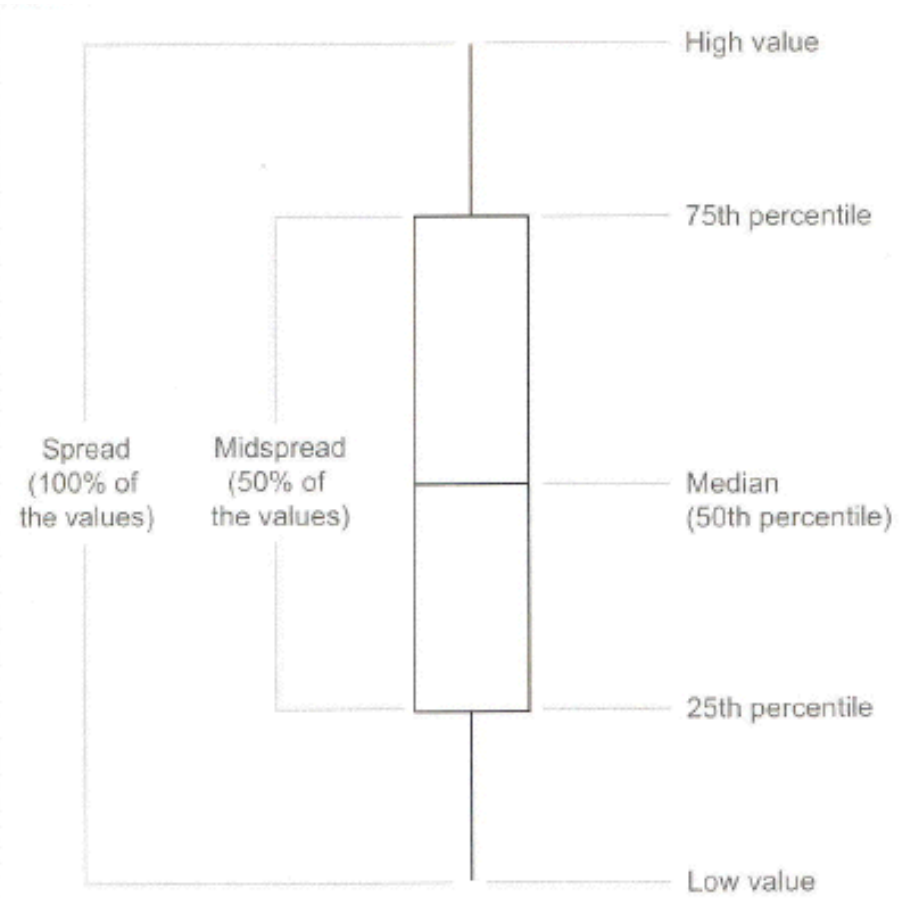
DENSITY PLOT



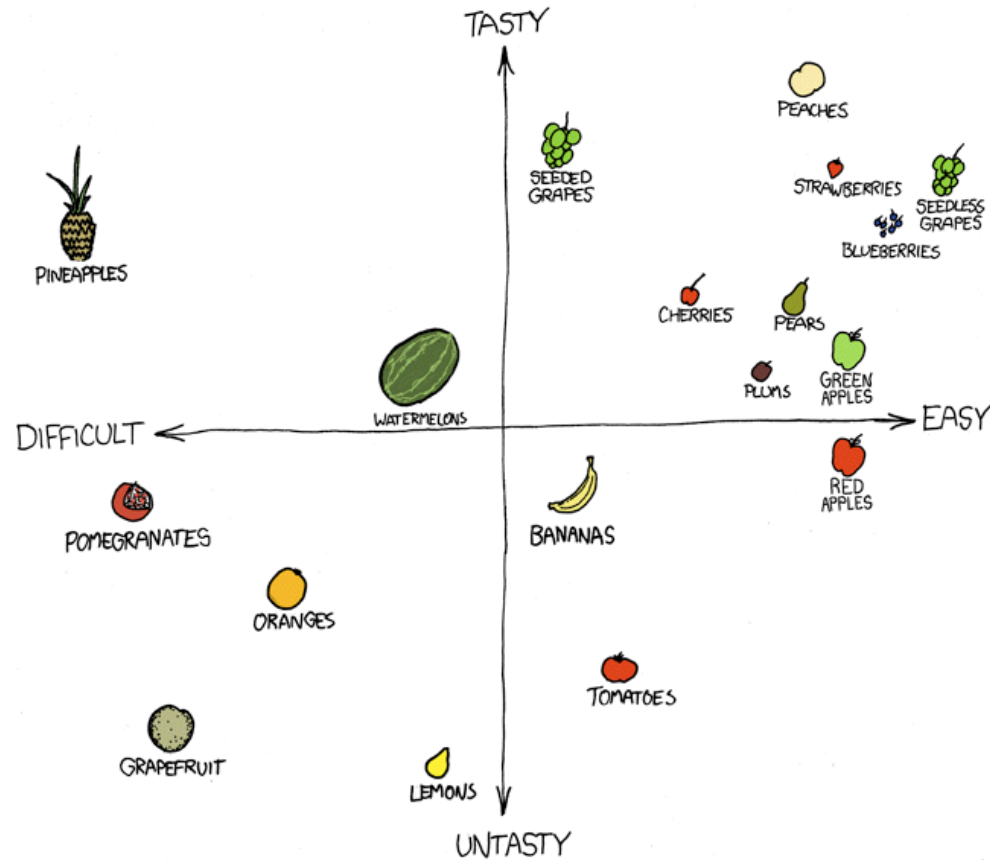
2D DENSITY PLOTS



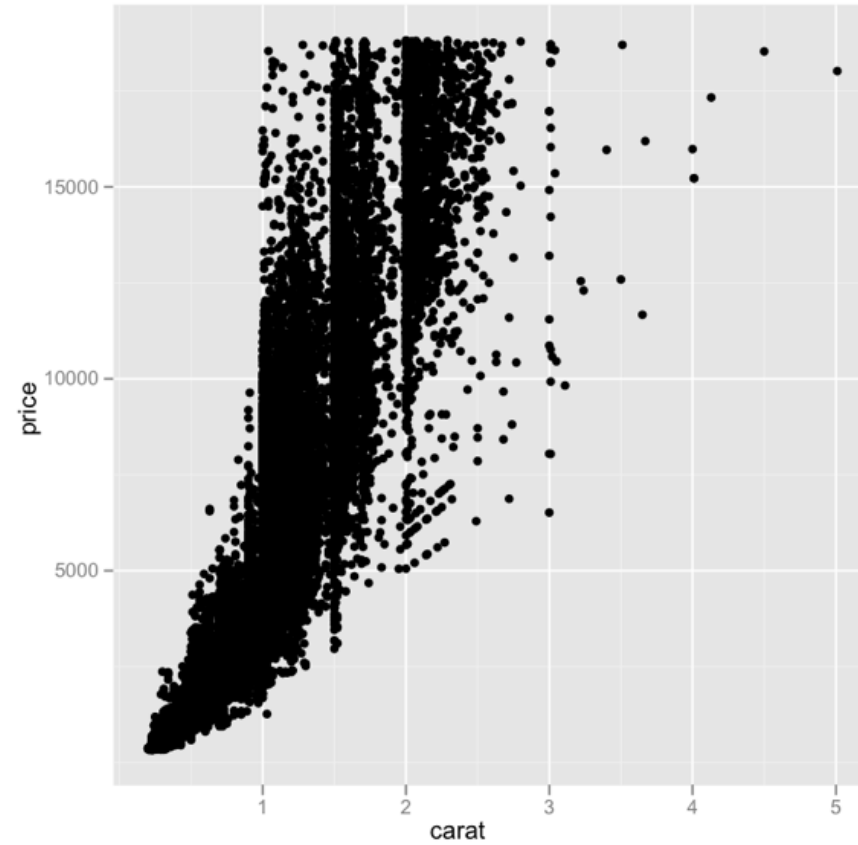
BOX PLOTS



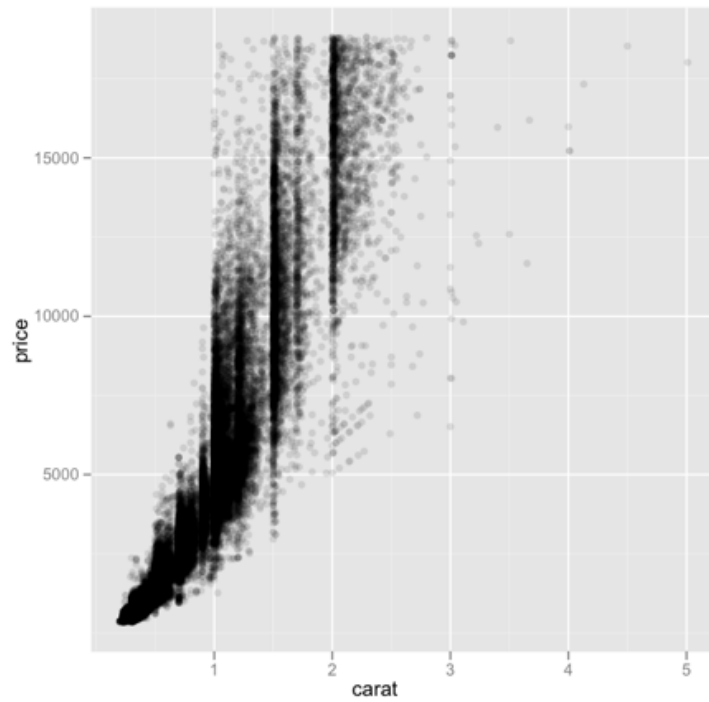
SCATTERPLOT



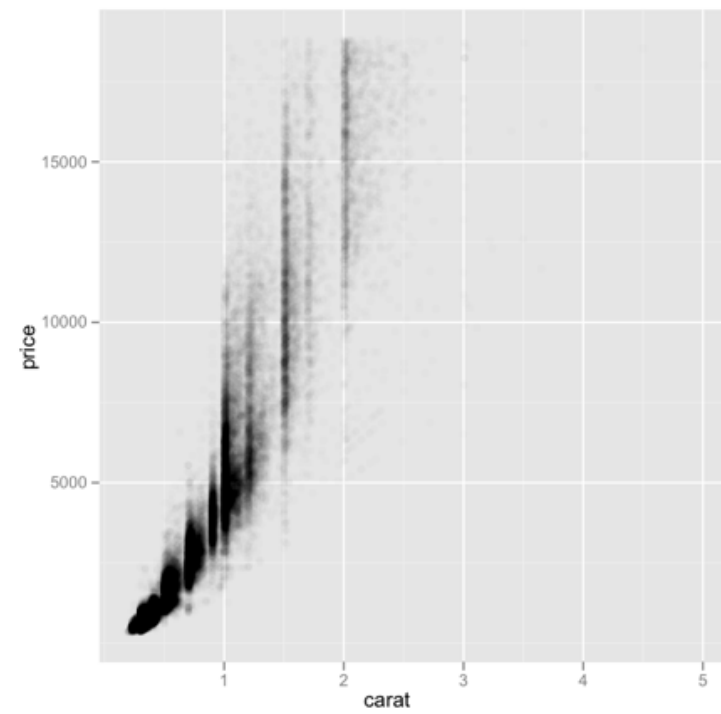
CLUTTERING, OVERPLOTTING



alpha=1/10

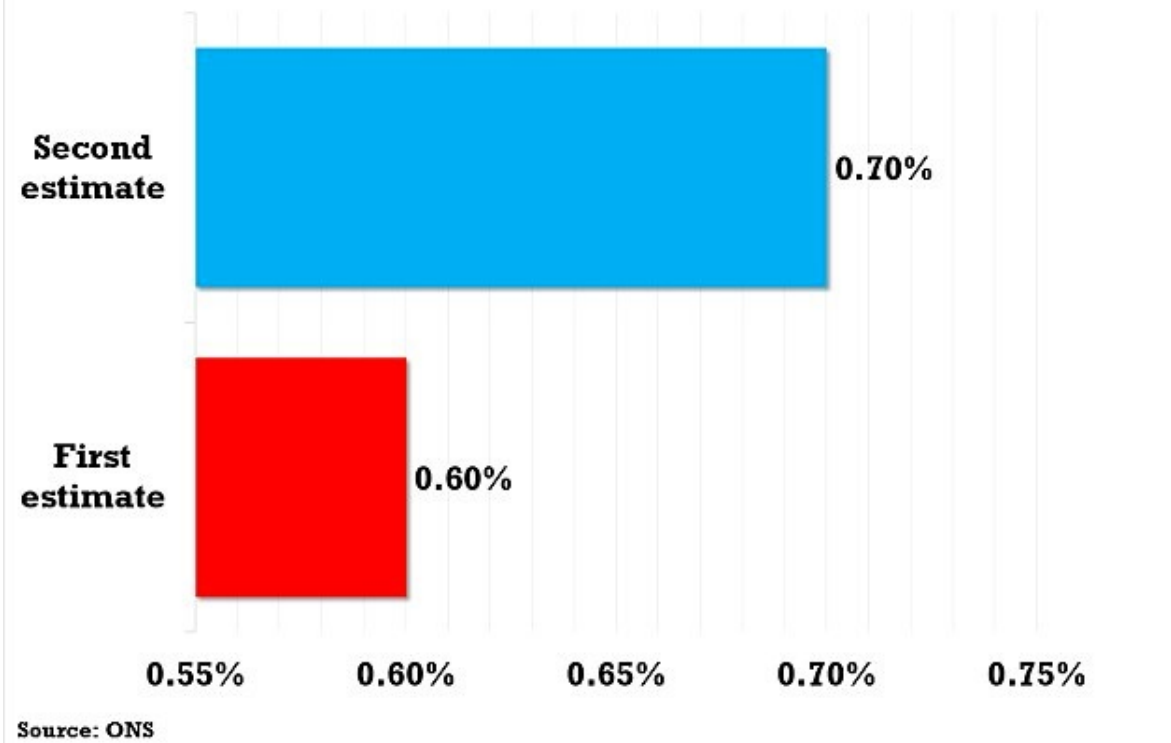


alpha=1/100



A FEW EXAMPLES AND CASE STUDIES

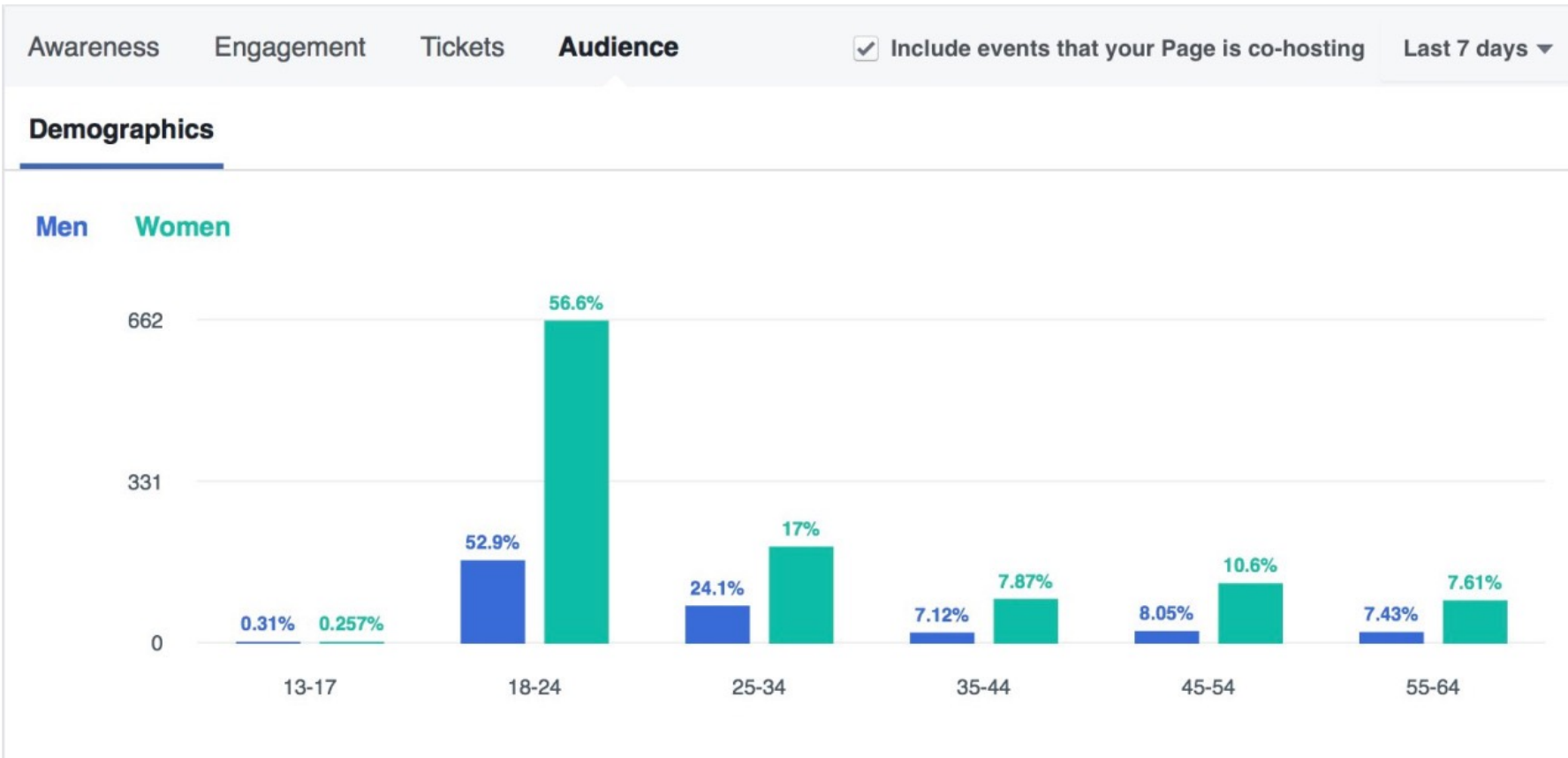
2016 Q4 GROWTH UPGRADED



The Office for National Statistics (ONS) said gross domestic product (GDP) expanded by 0.7 per cent in the fourth quarter - an

increase from the 0.6 per cent calculated on the watchdog's first look at the economy

Source: <http://www.dailymail.co.uk/news/article-4248690/Economy-grew-0-7-final-three-months-2016.html>



Procent użytków rolnych w gospodarstwach > niż 50 ha:

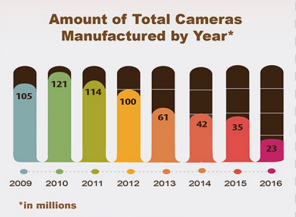
1989

25%

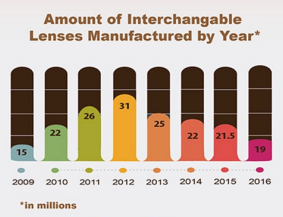


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CAMERA INDUSTRY FACTS 2009-2016



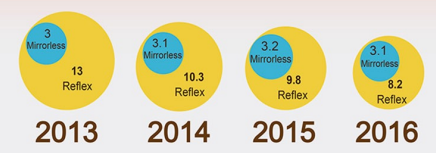
35% DROP IN SHIPPED CAMERAS IN 2016



12% DROP IN SHIPPED LENSES IN 2016

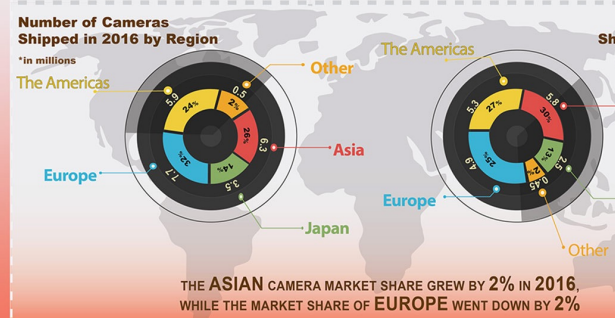
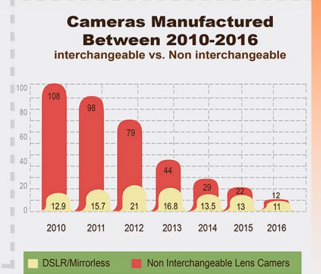
DSLR vs. Mirrorless 2013-2016

*in millions

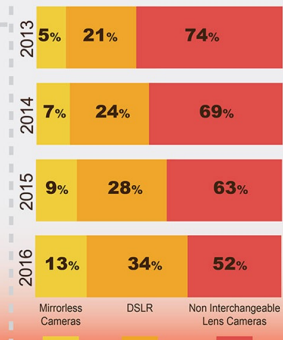


4% DECREASE IN MIRRORLESS PRODUCED & 17% DROP IN DSLR PRODUCED IN 2016

Based on CIPA (Camera & Imaging Products Association), Shipment of Digital Still Cameras & Lenses Data



Camera Market Overview 2013-2016



THE ENTIRE CAMERA MARKET IN 2016 SAW 81% DROP COMPARED TO 2010

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Chord Diagram



Choropleth Map



Circle Packing



Connection Map



TAKEAWAY MESSAGES

- Appropriate chart type for specific data type and visualization task