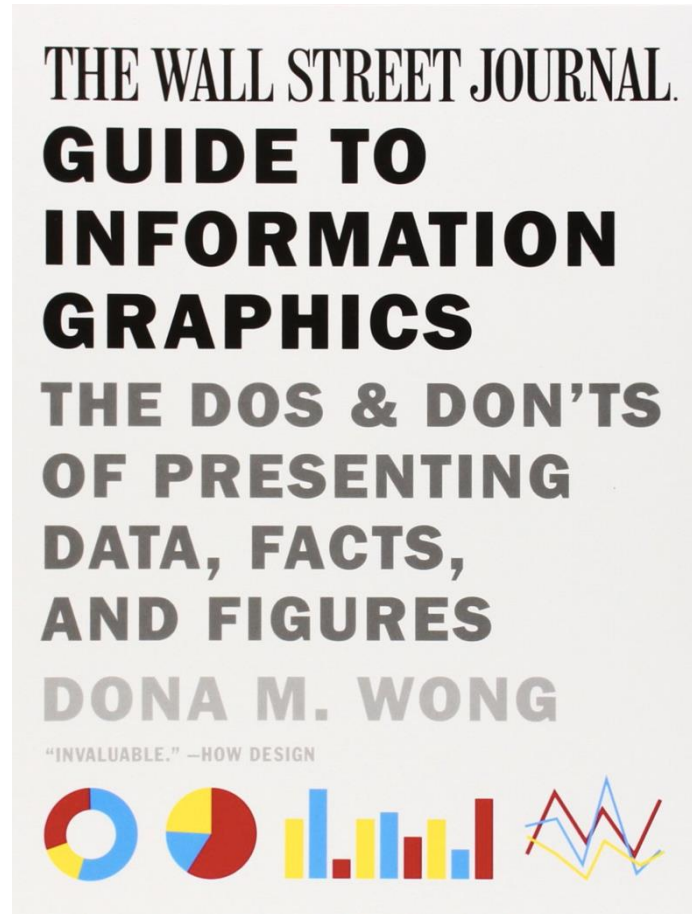


8 CHARTING TAXONOMY

S. Rinzivillo – rinzivillo@isti.cnr.it

CRASH COURSE ON EFFECTIVE CHARTING



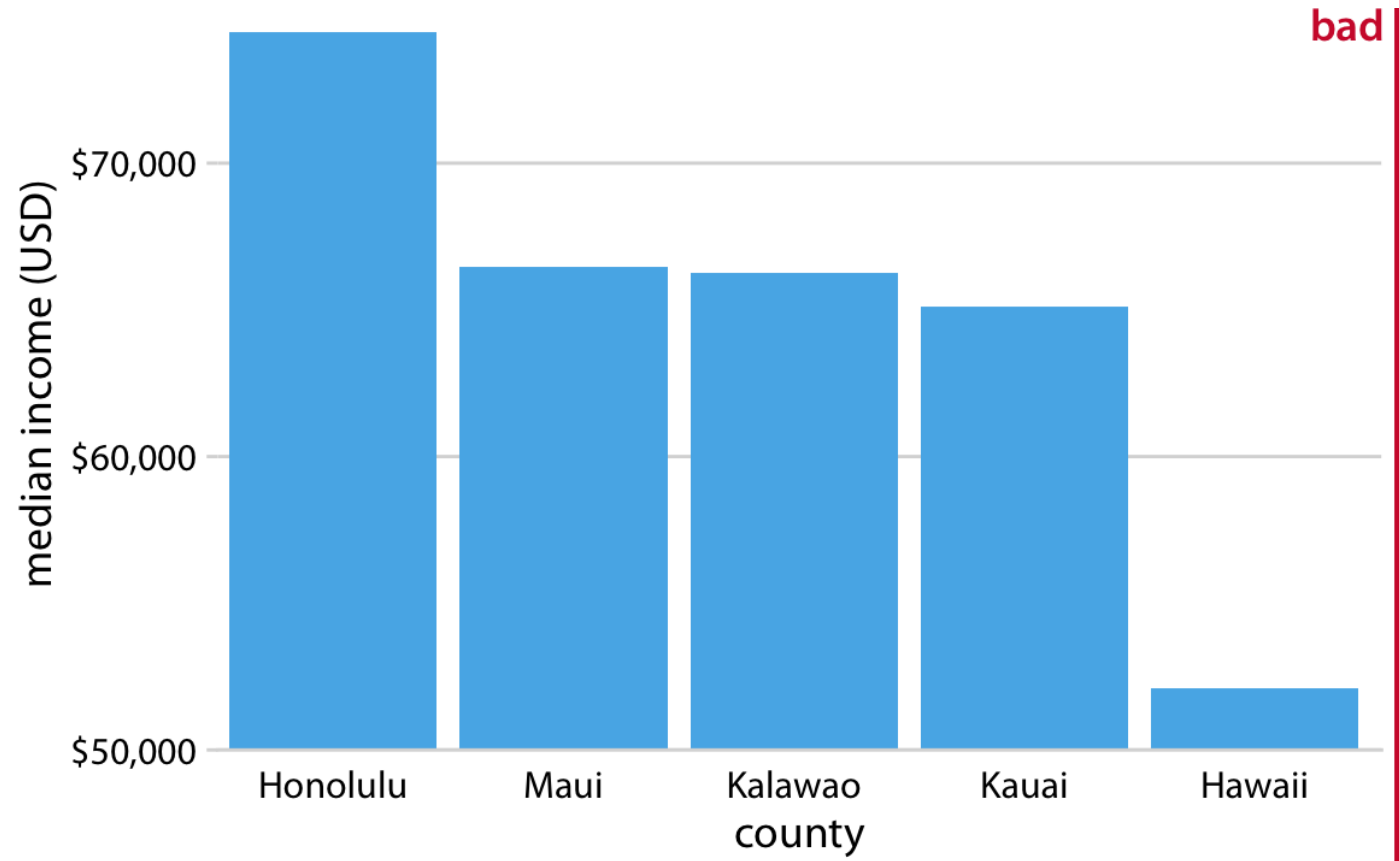
Dona M. Wong

Guide to Information Graphics

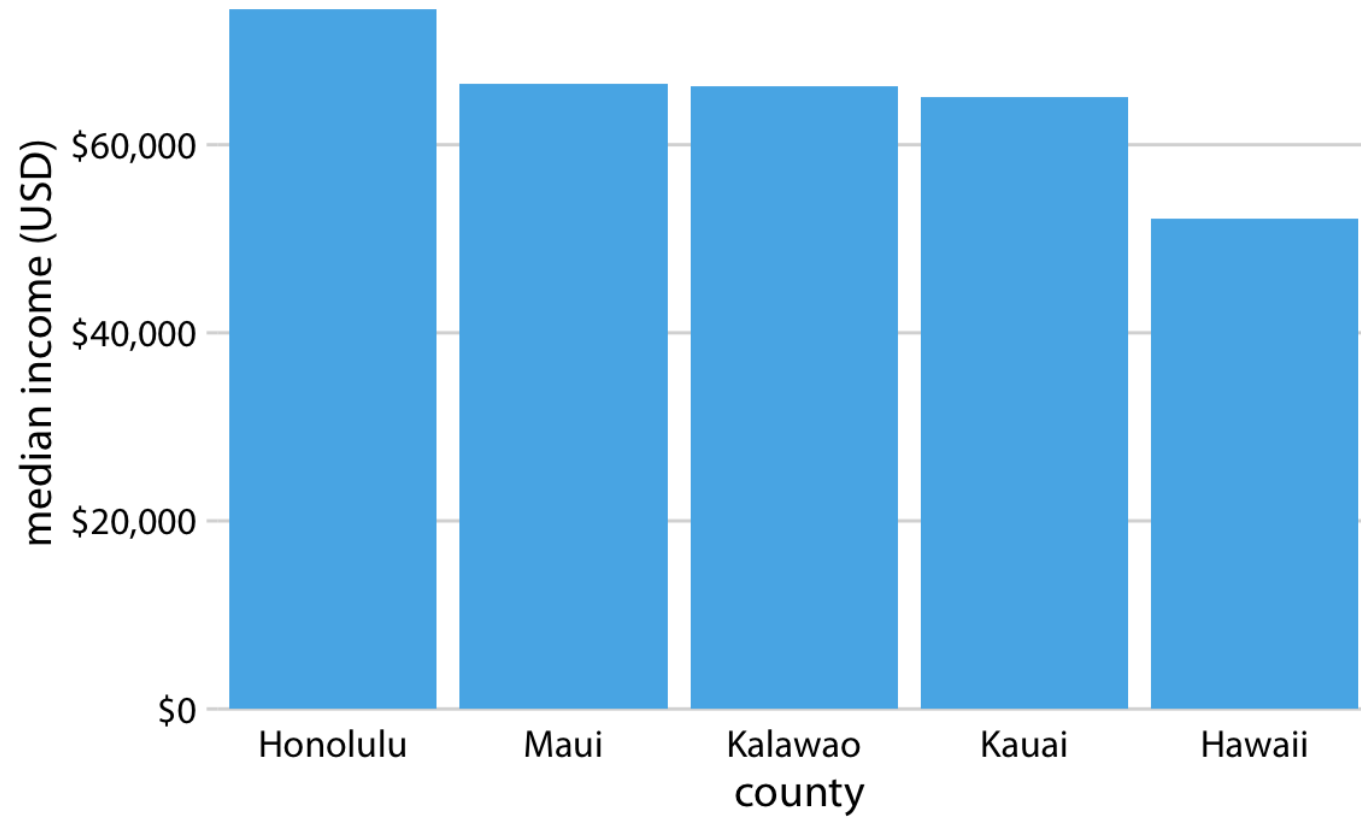
The Dos and Don'ts of Presenting Data, Facts, and Figures

W. W. Norton & Company

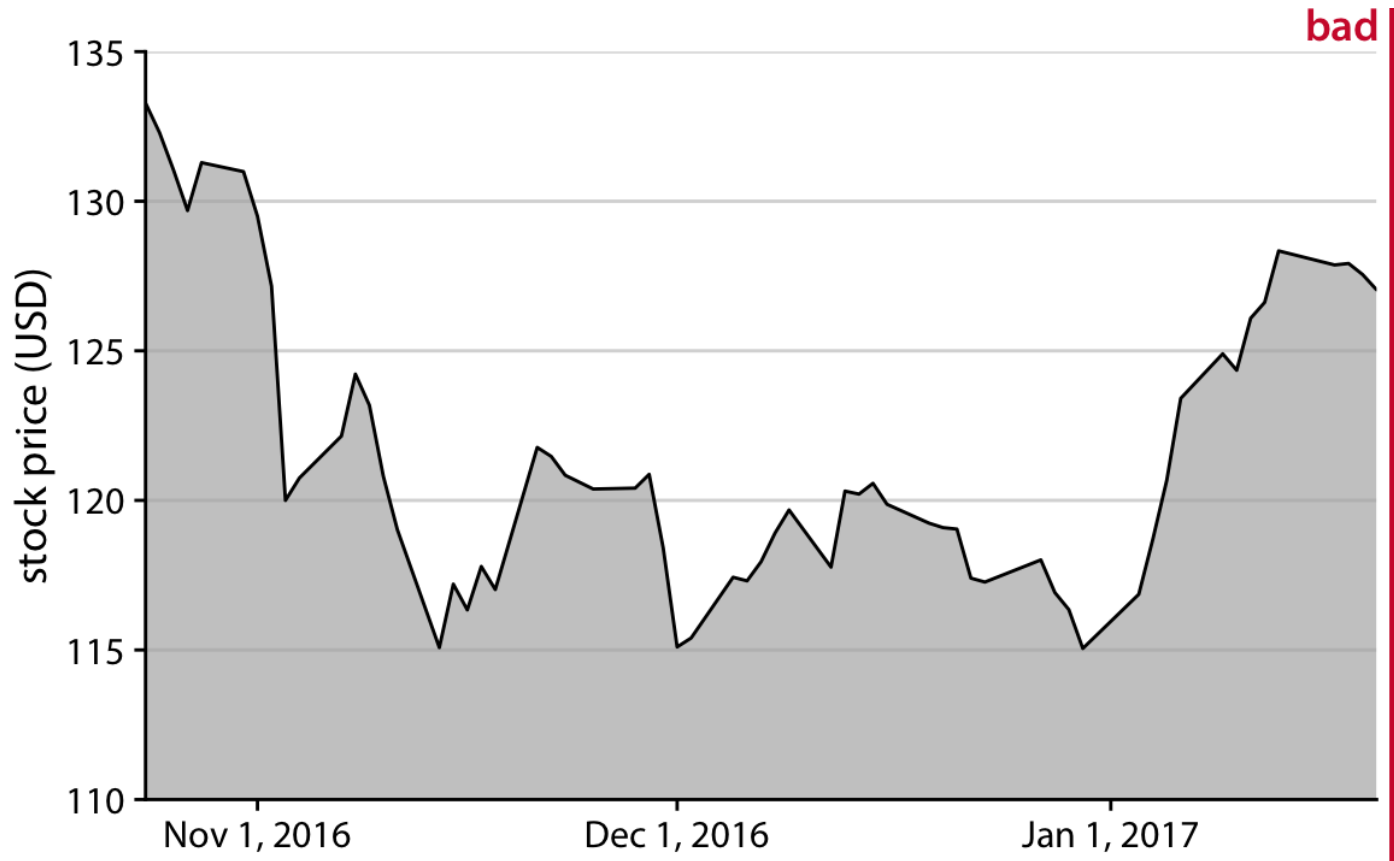
CHARTING EXAMPLES



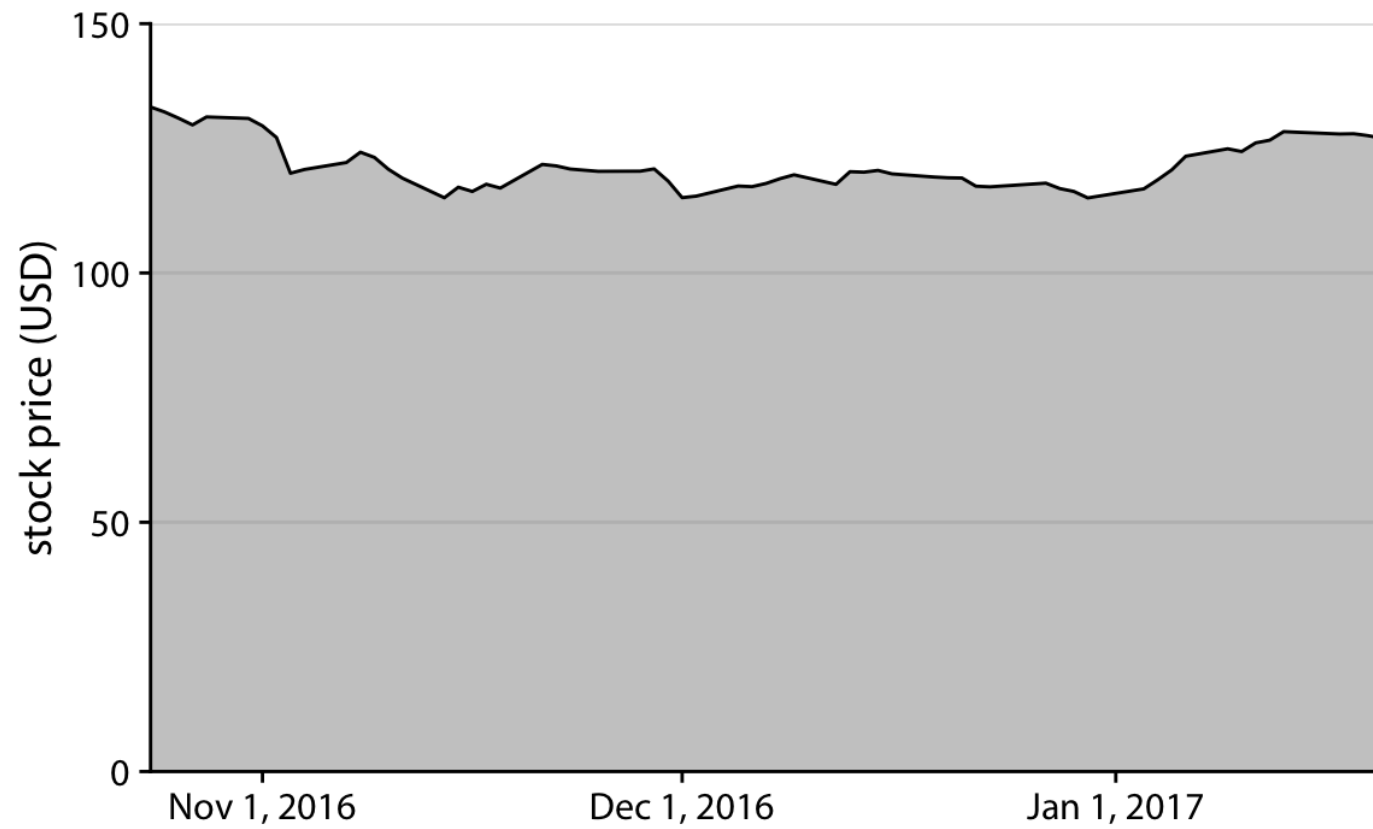
CHARTING EXAMPLES



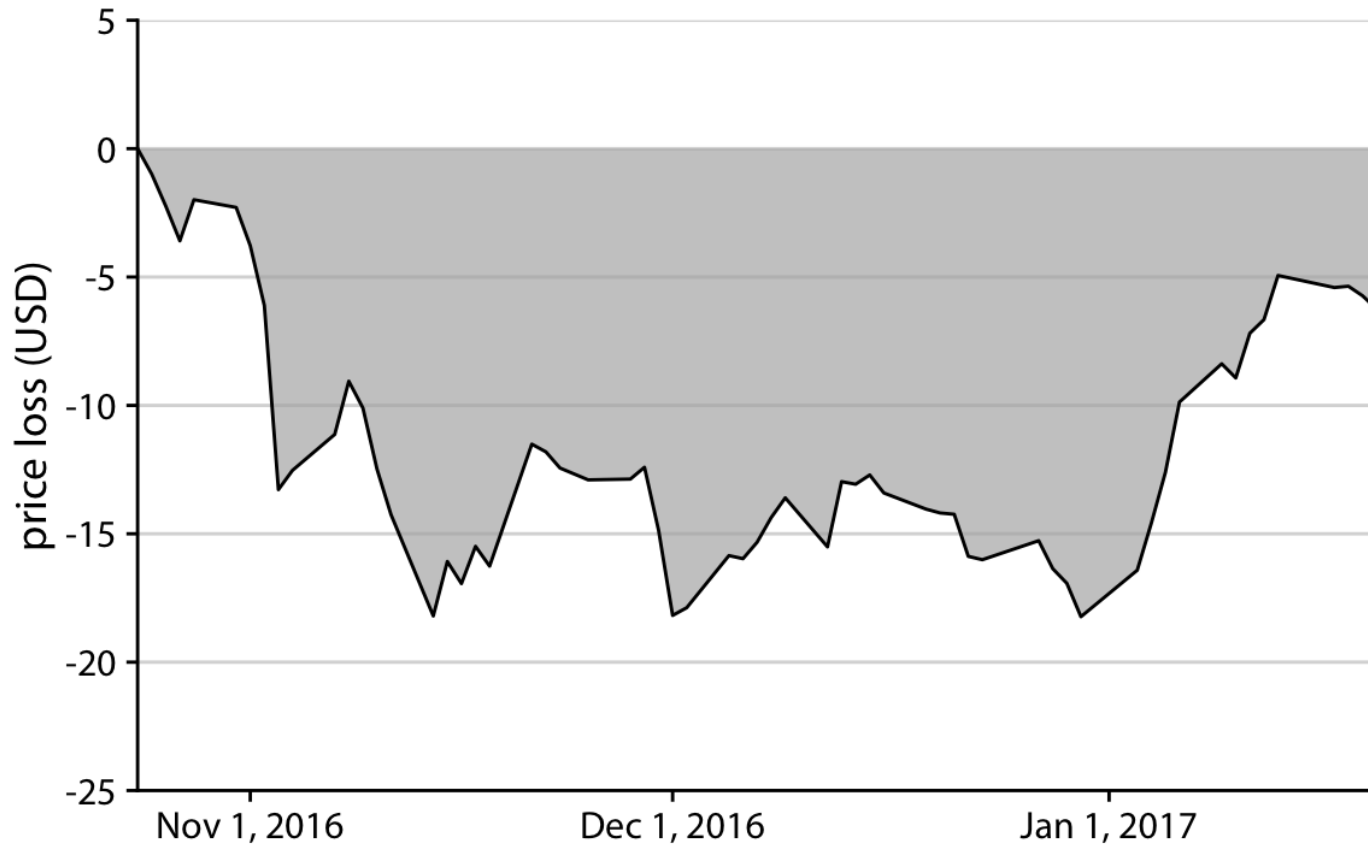
CHARTING EXAMPLES



CHARTING EXAMPLES

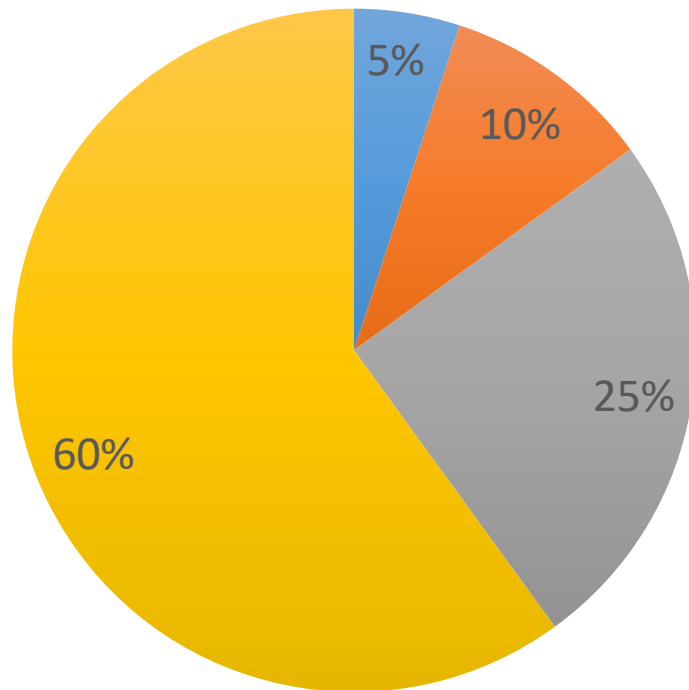


CHARTING EXAMPLES

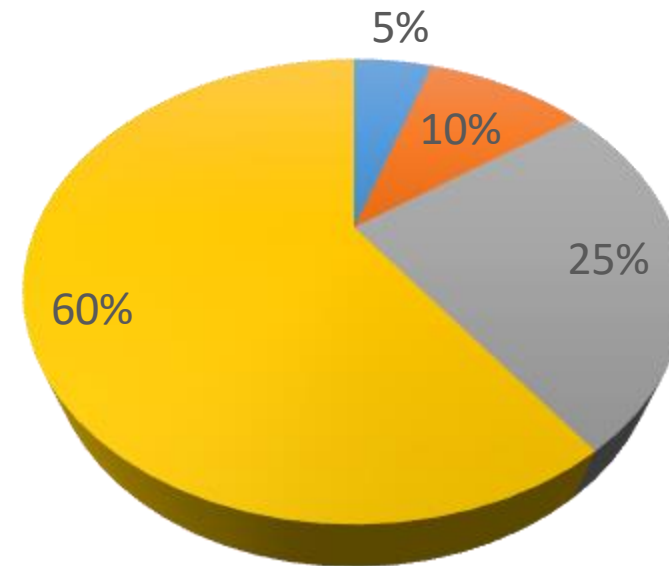


CHARTING EXAMPLES

Sales

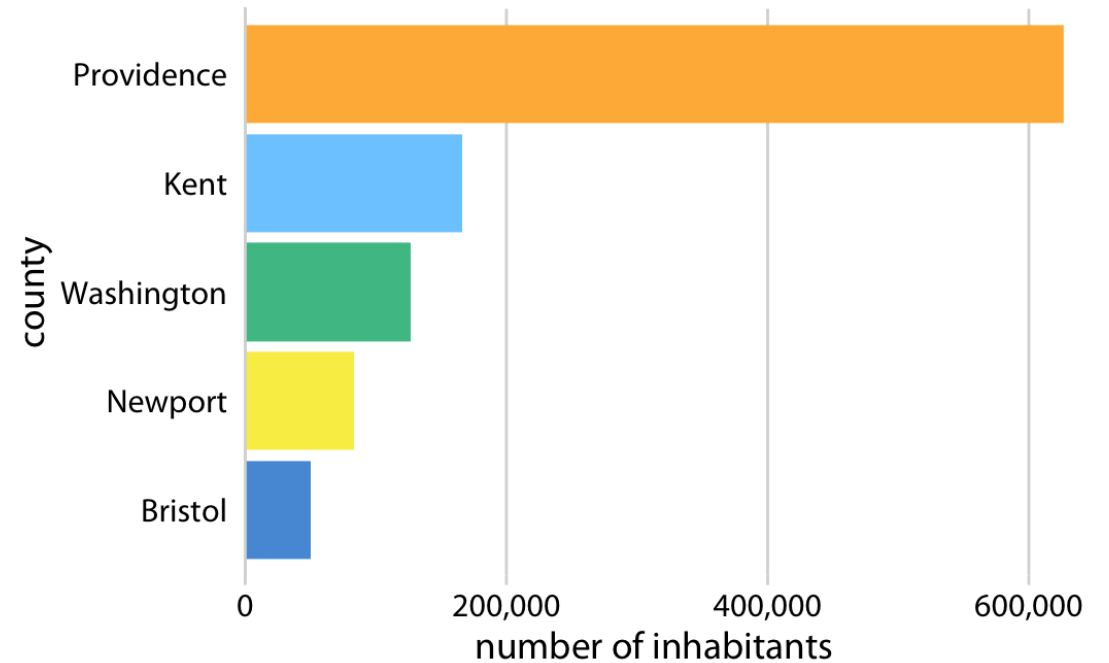
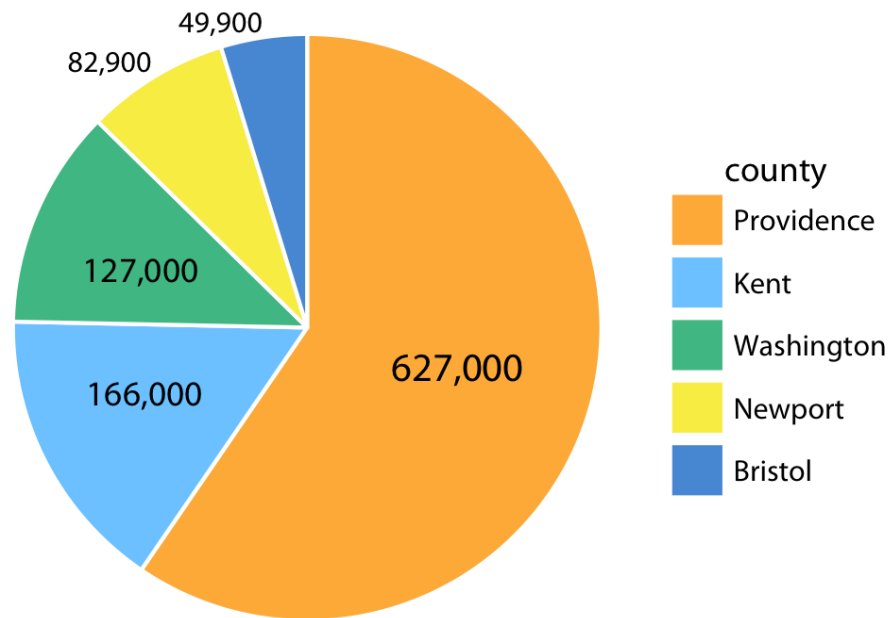


Sales



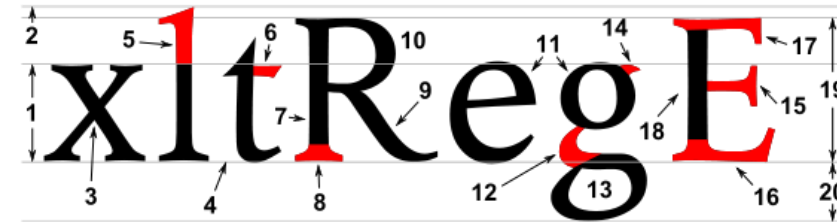
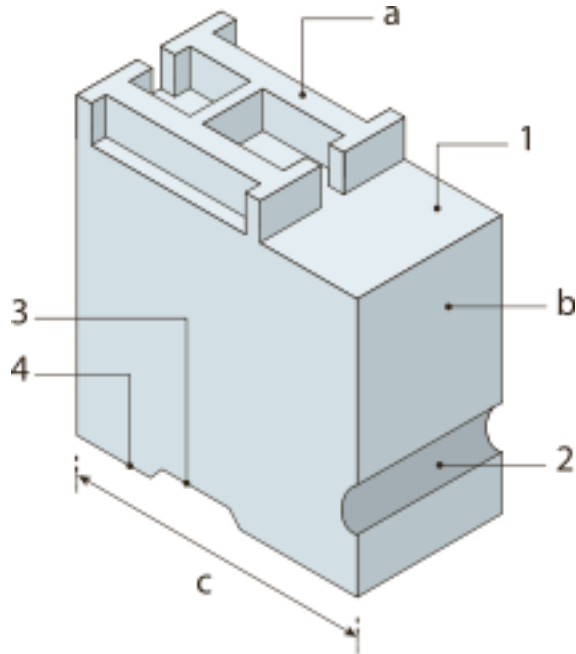
May these charts be improved? Why? How?

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

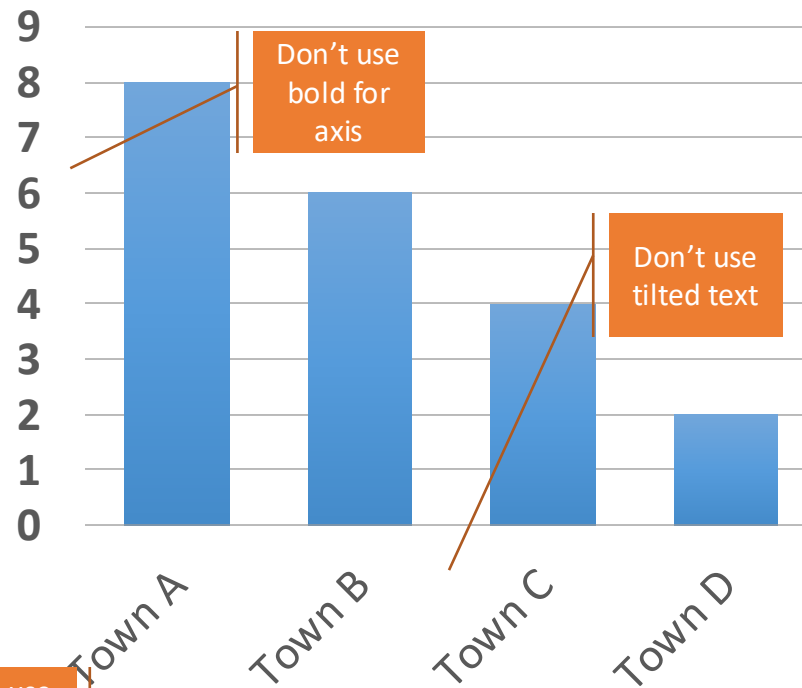
Fonts are meant to describe, not to adorn

TYPOGRAPHY IN CHARTS

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

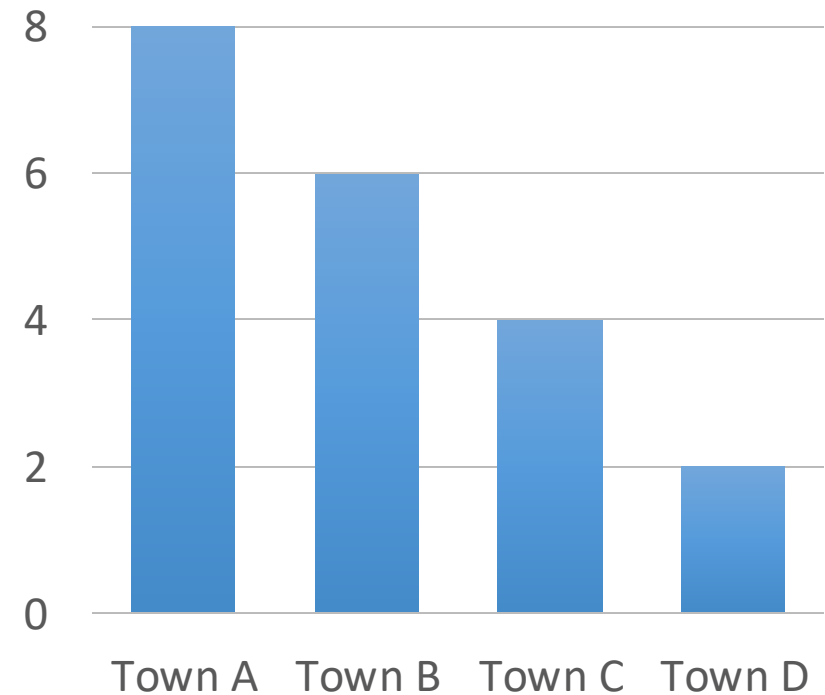
Don't

HEADLINE OF THE CHART



Do

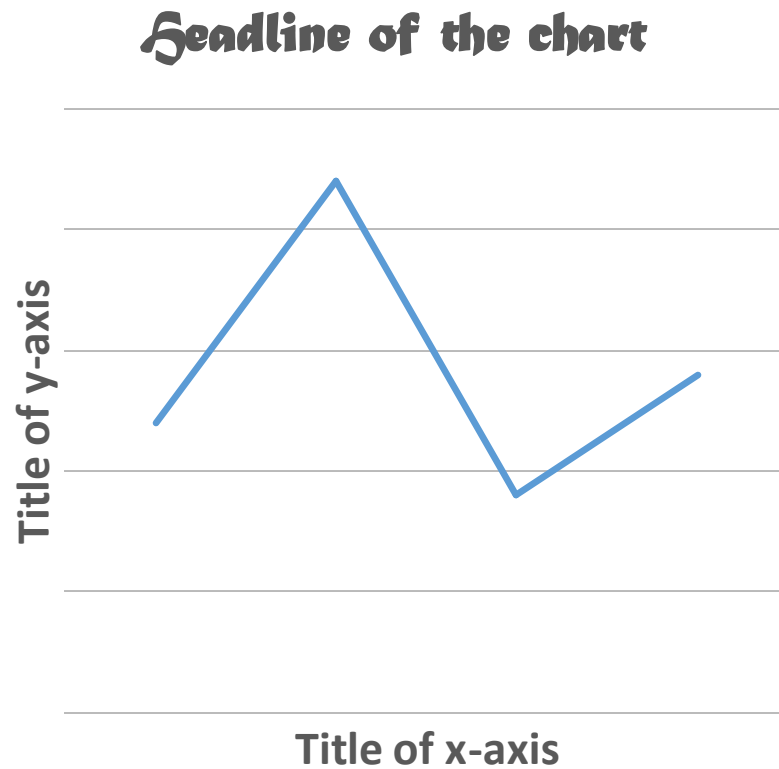
Headline of the chart



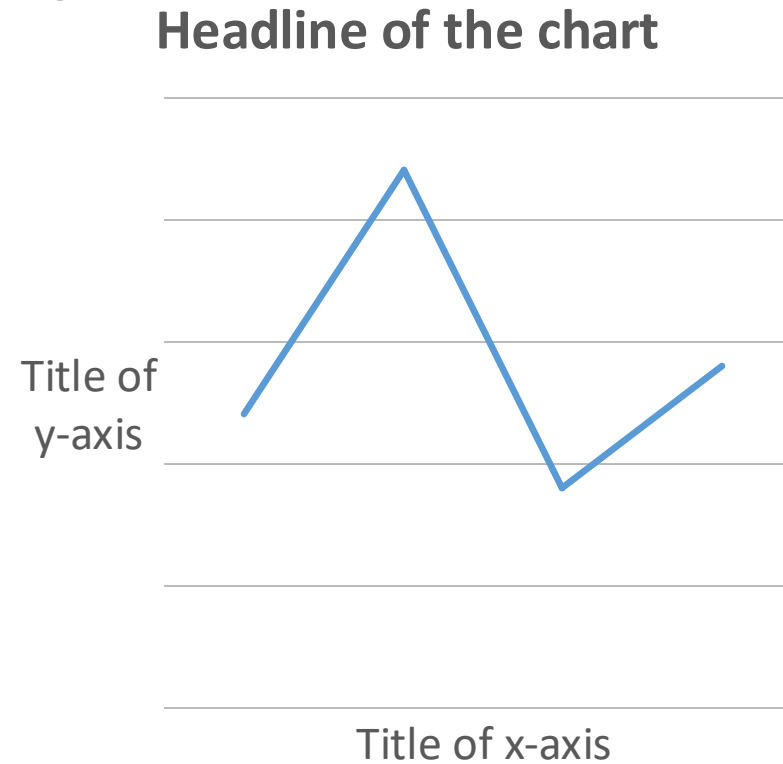
A brief description that outlines what the data shows

TYPOGRAPHY IN CHARTS

Don't



Do



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

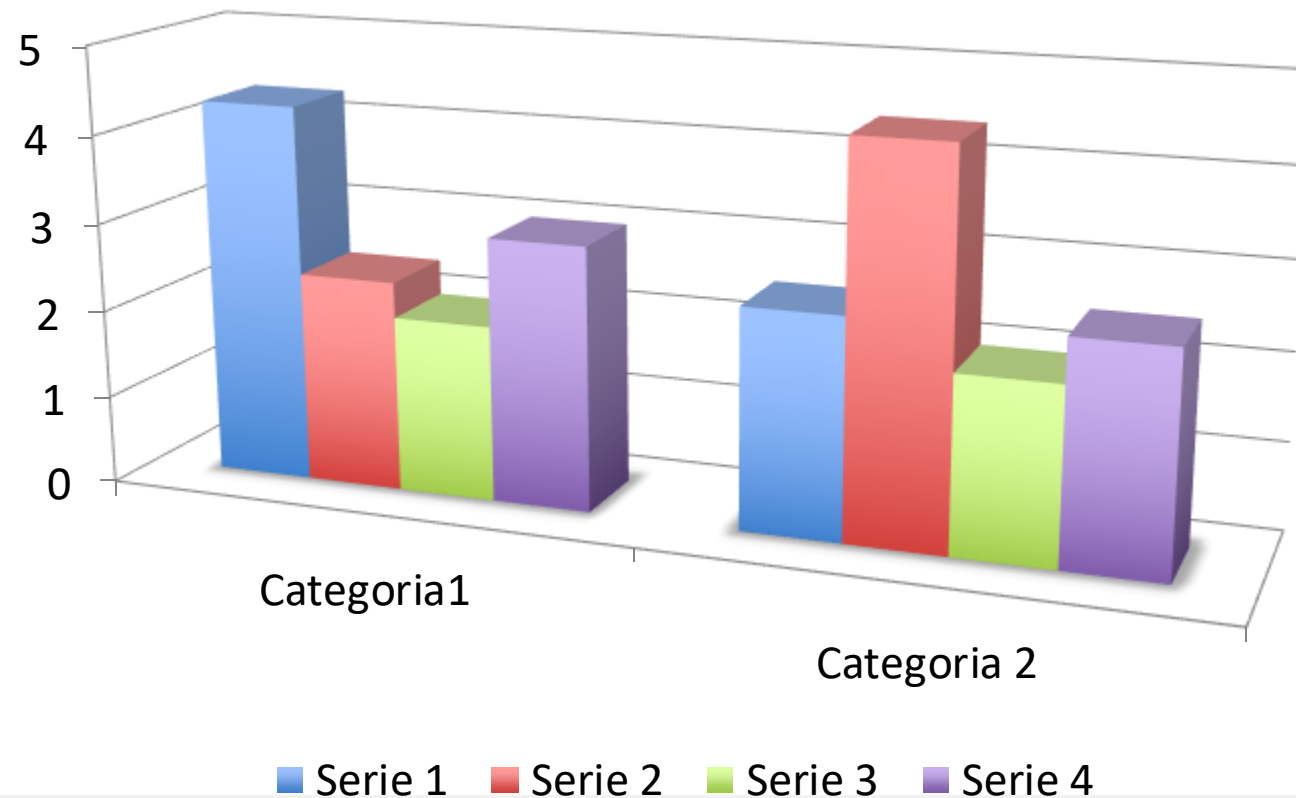
DATA-INK RATIO

Visual Display of Quantitative Data

Edward Tufte, 1983

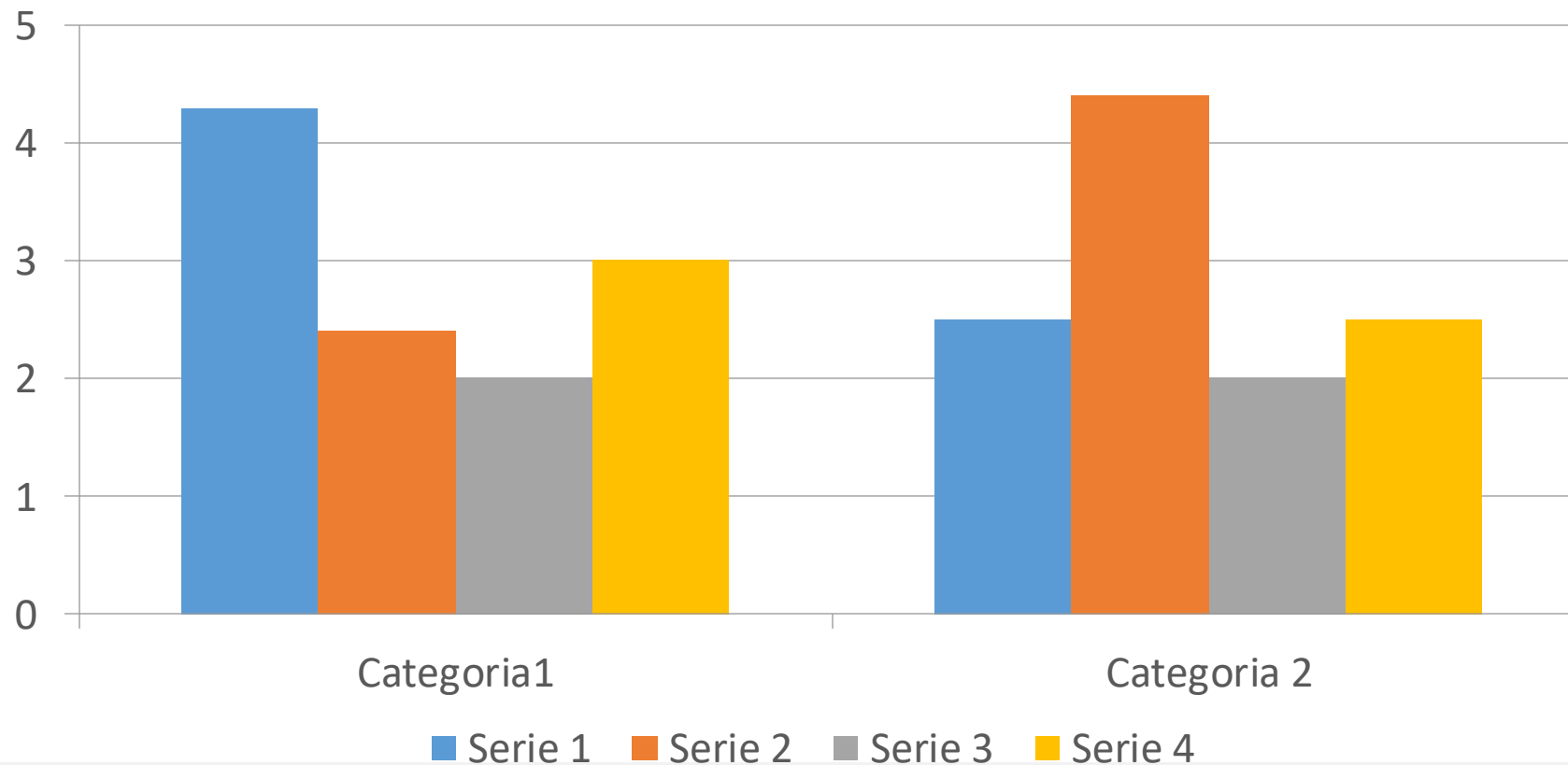
DATA-INK RATIOⁿ

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



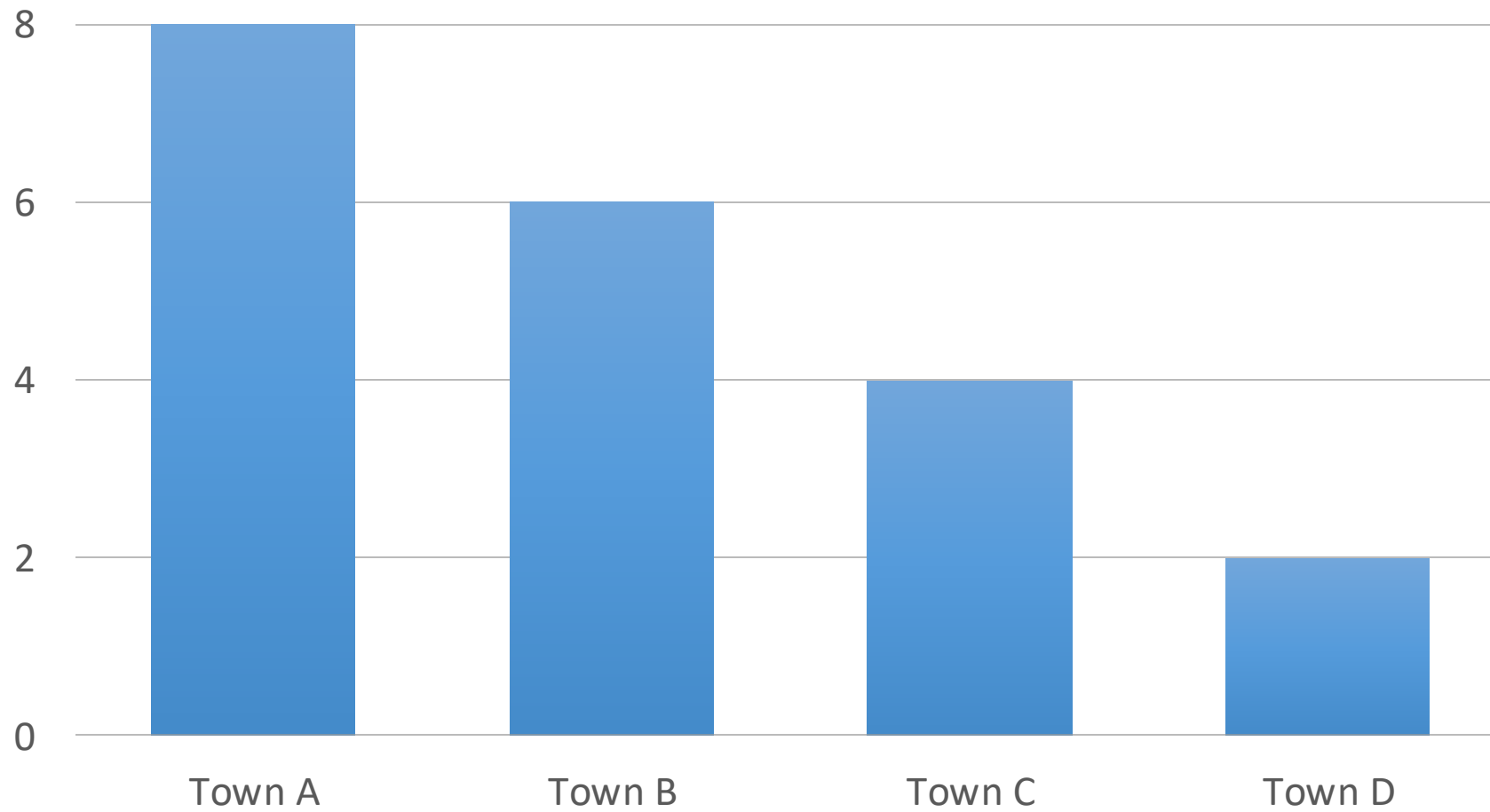
DATA-INK RATIO

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



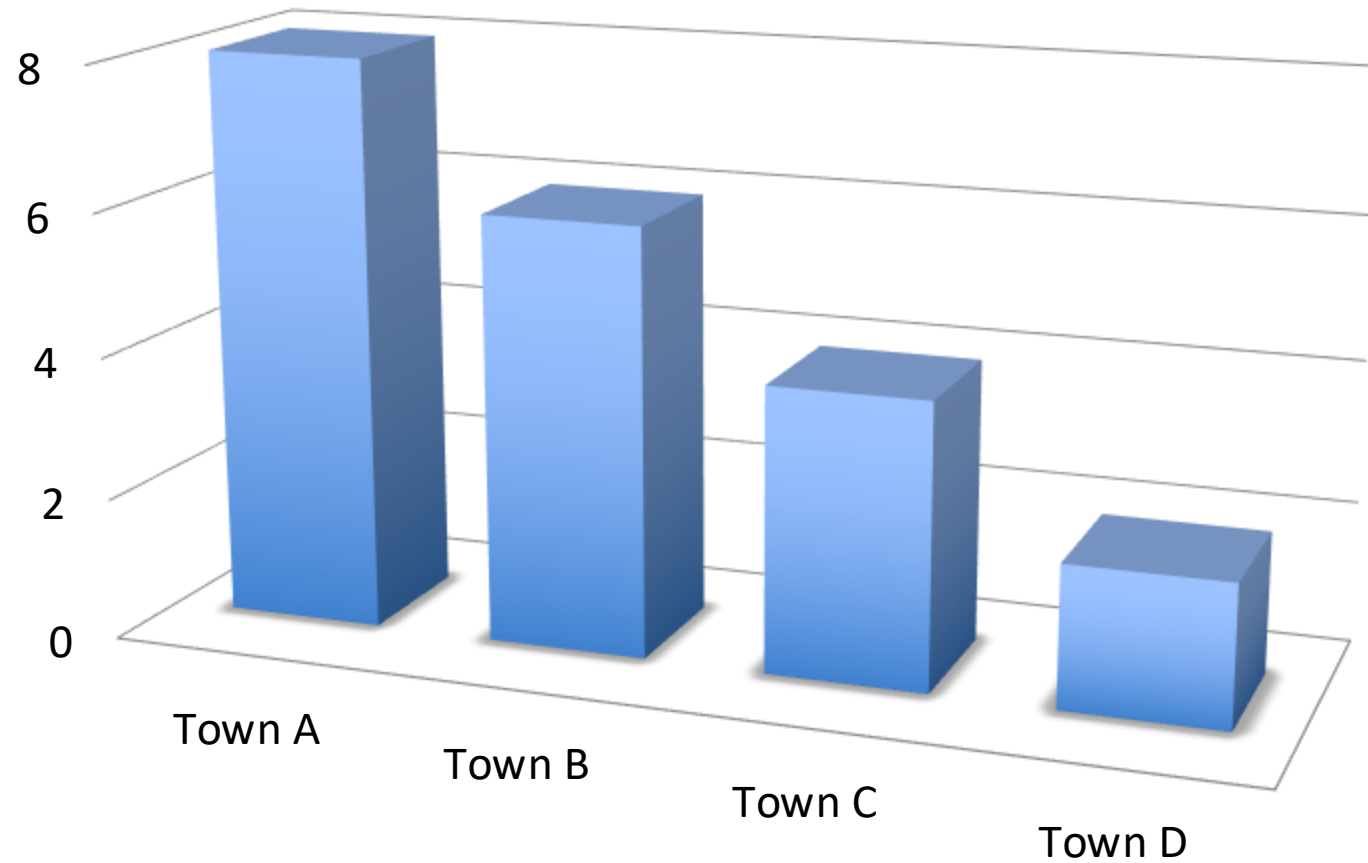
BAR CHARTS

Represent discrete quantities

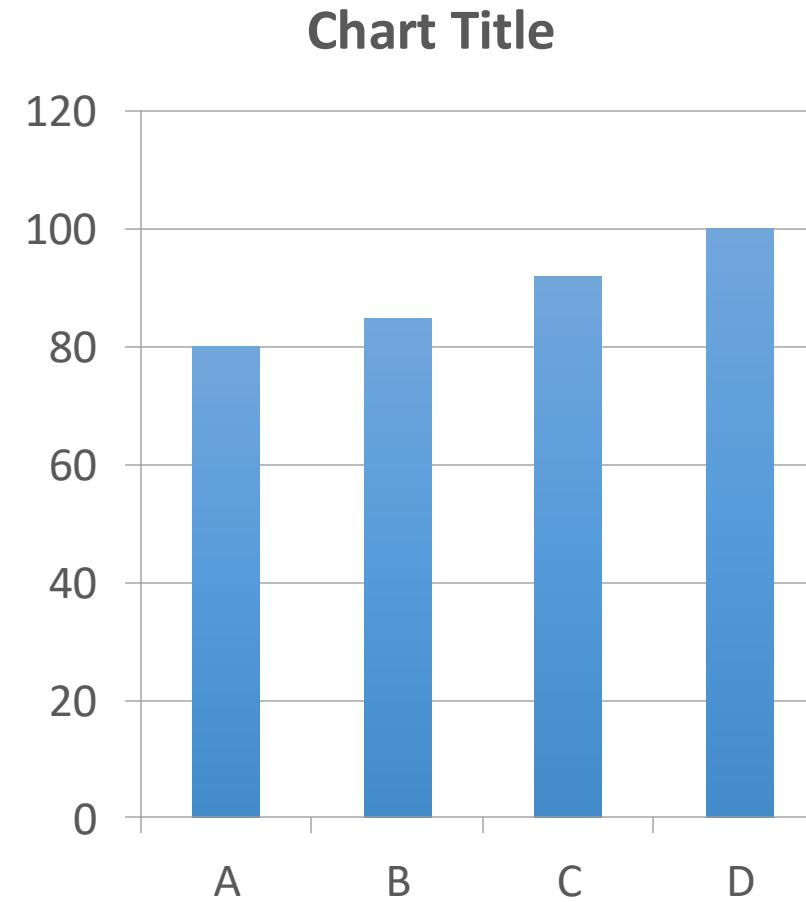
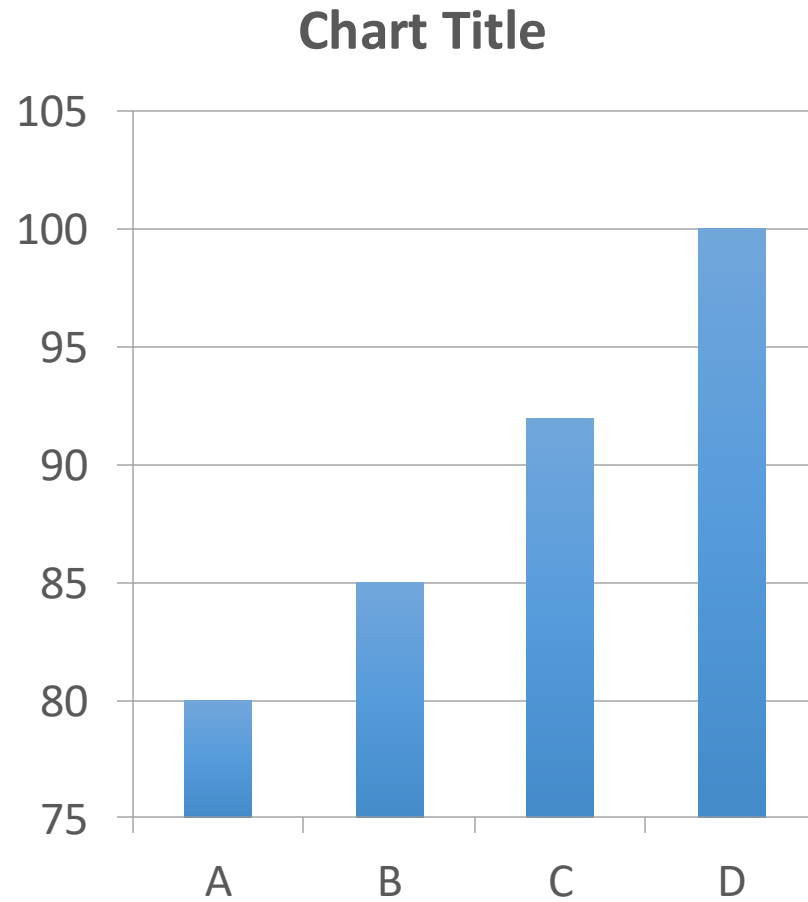


BAR CHARTS

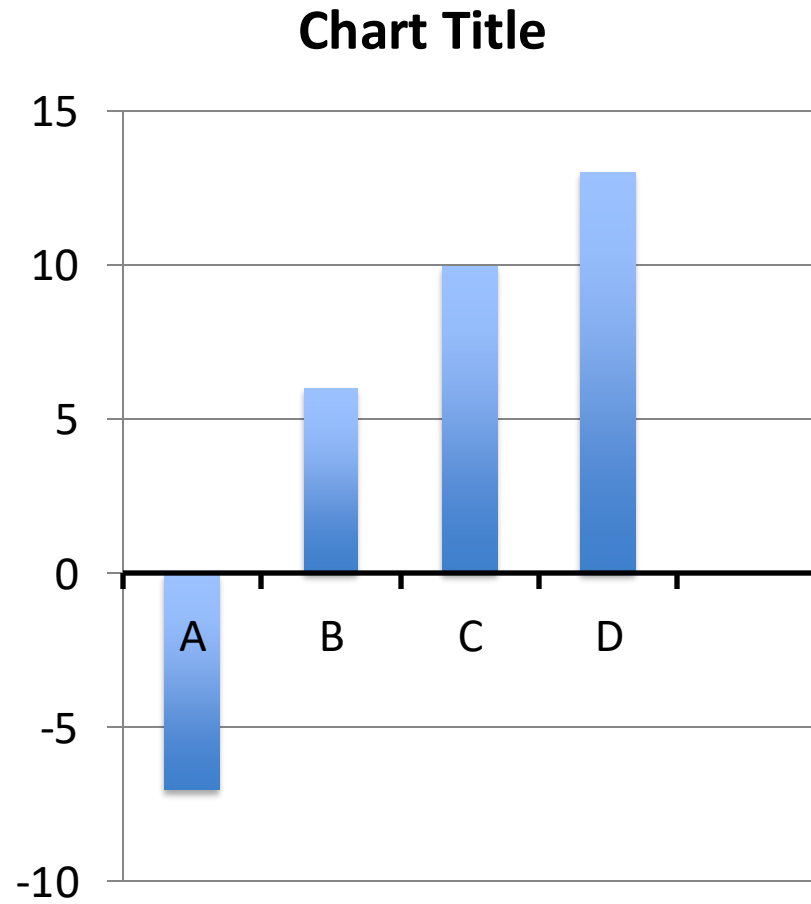
Avoid non-functional adornment



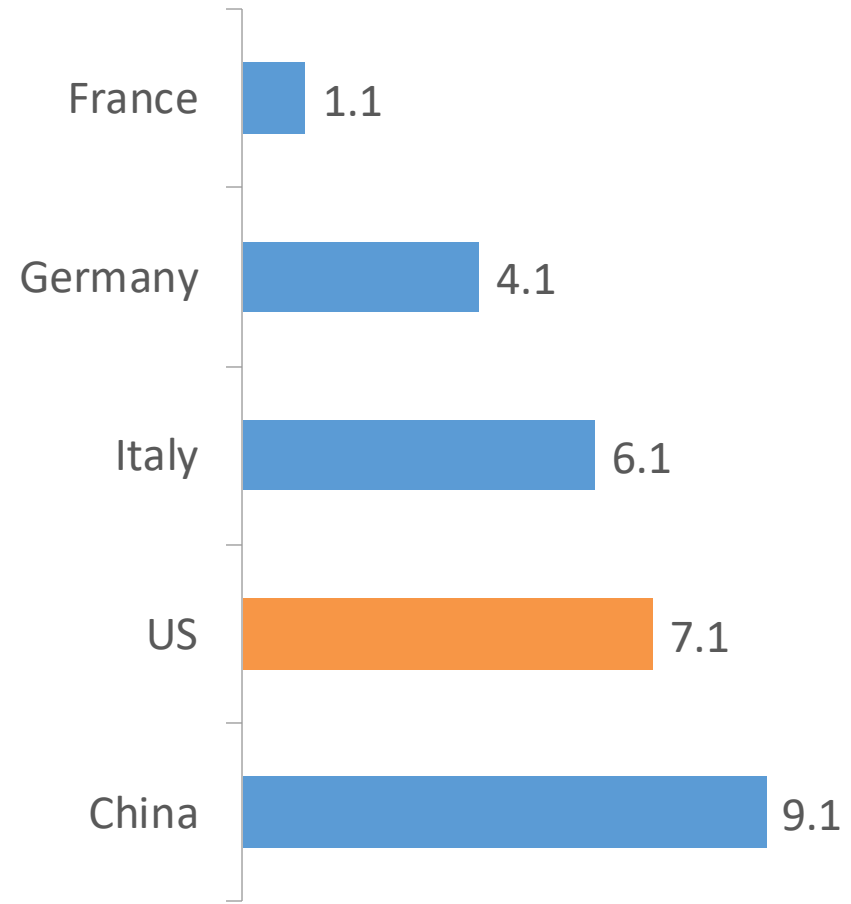
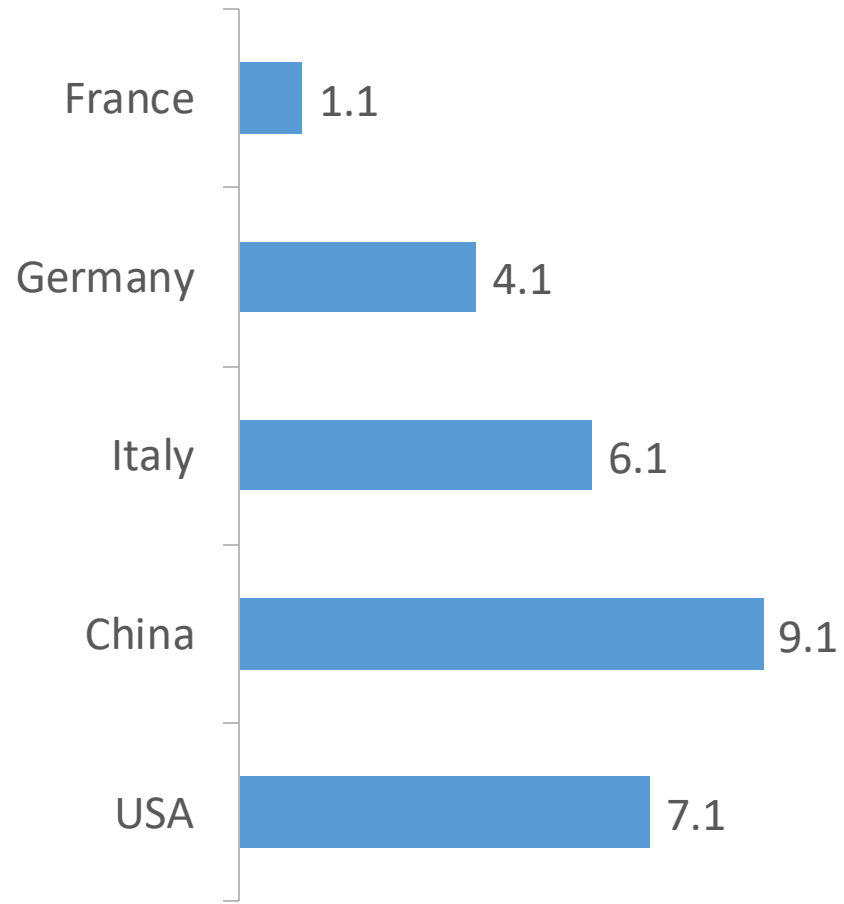
BAR CHARTS: BASELINE

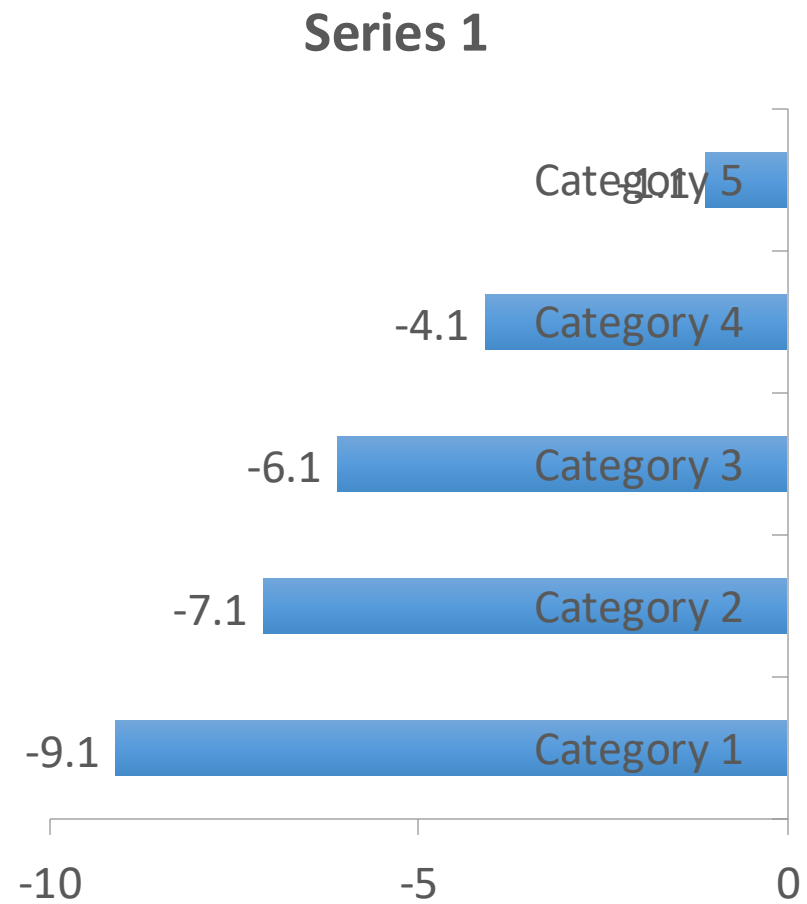
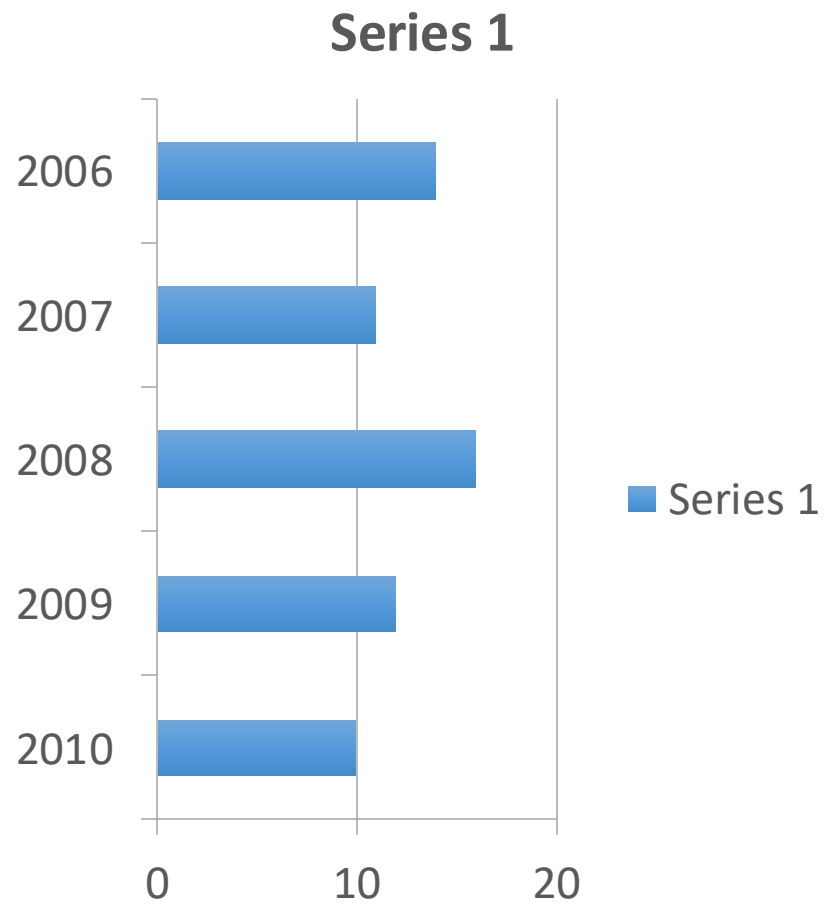


BAR CHARTS: BASELINE



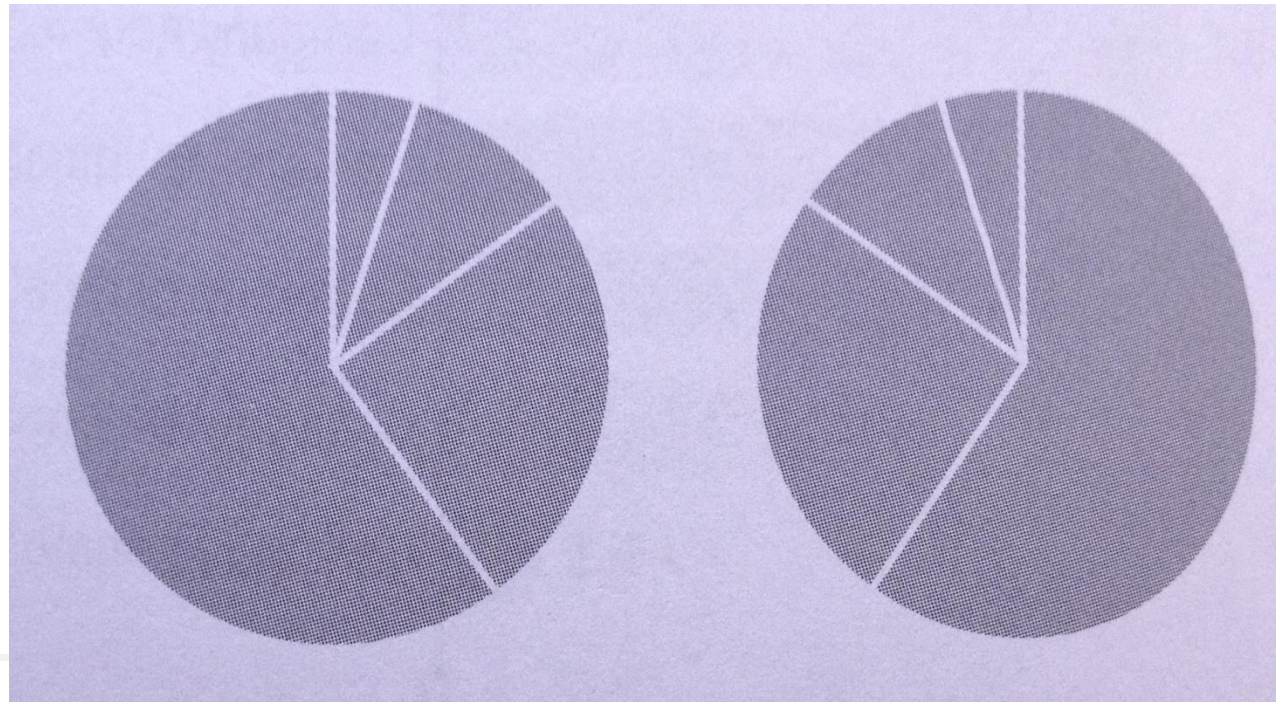
BAR CHARTS: ORDERING



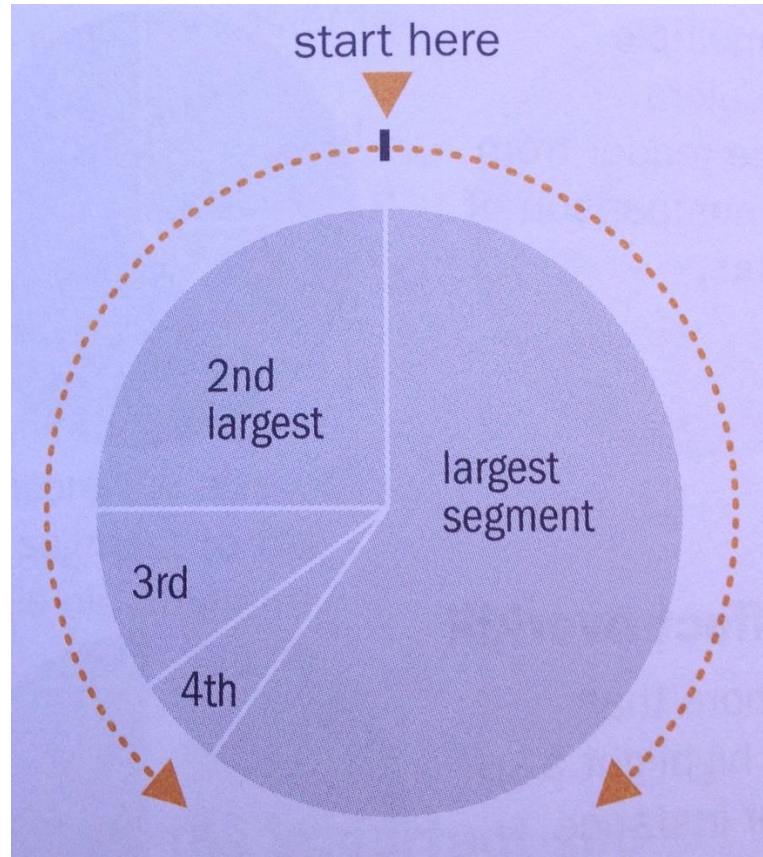


PIE CHARTS

- Pie Charts compares relative sizes and contributions

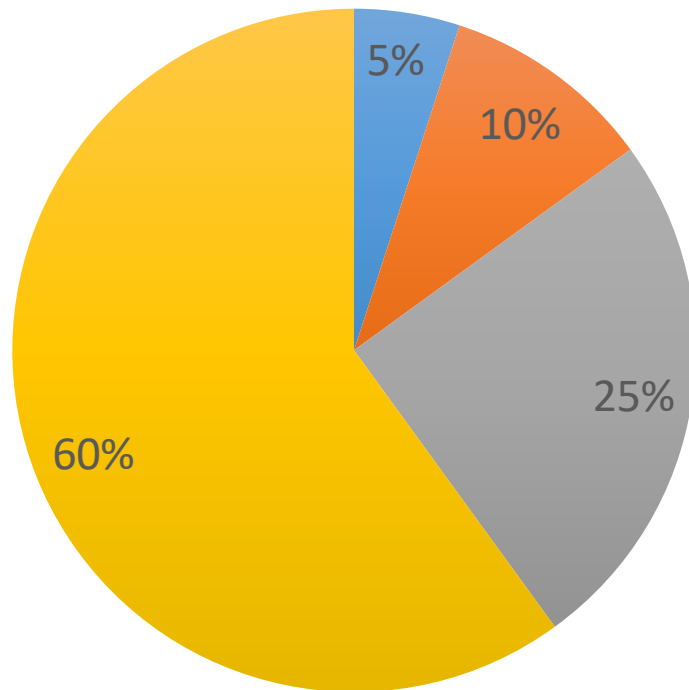


PIE CHARTS: ORDERING SLICES

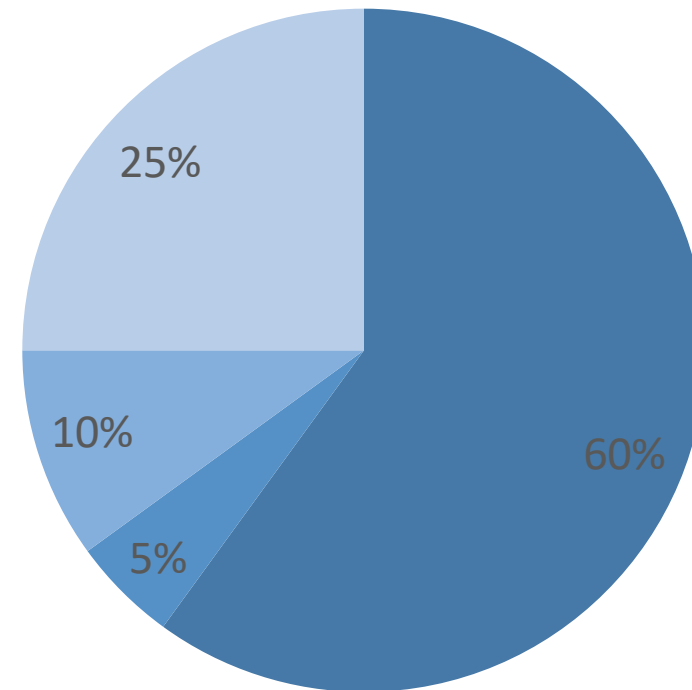


CHARTING EXAMPLES

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

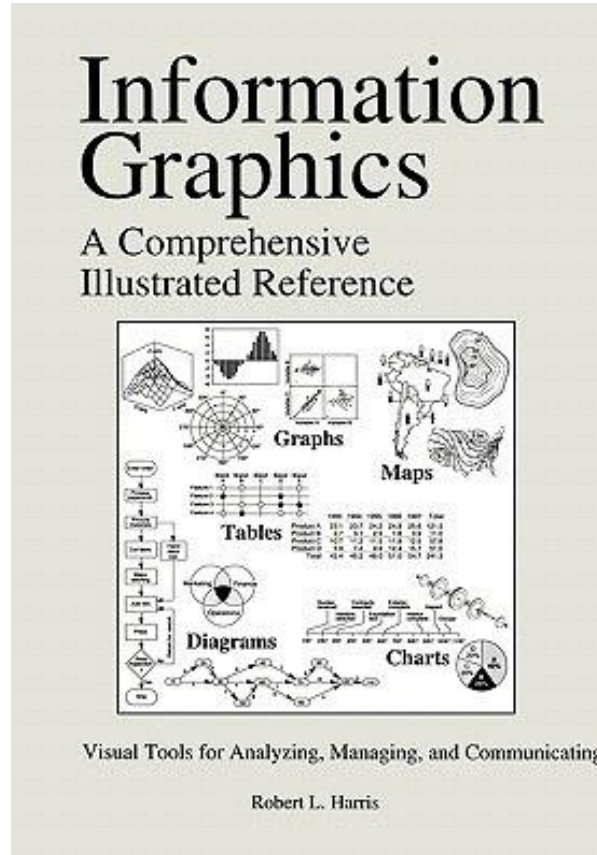
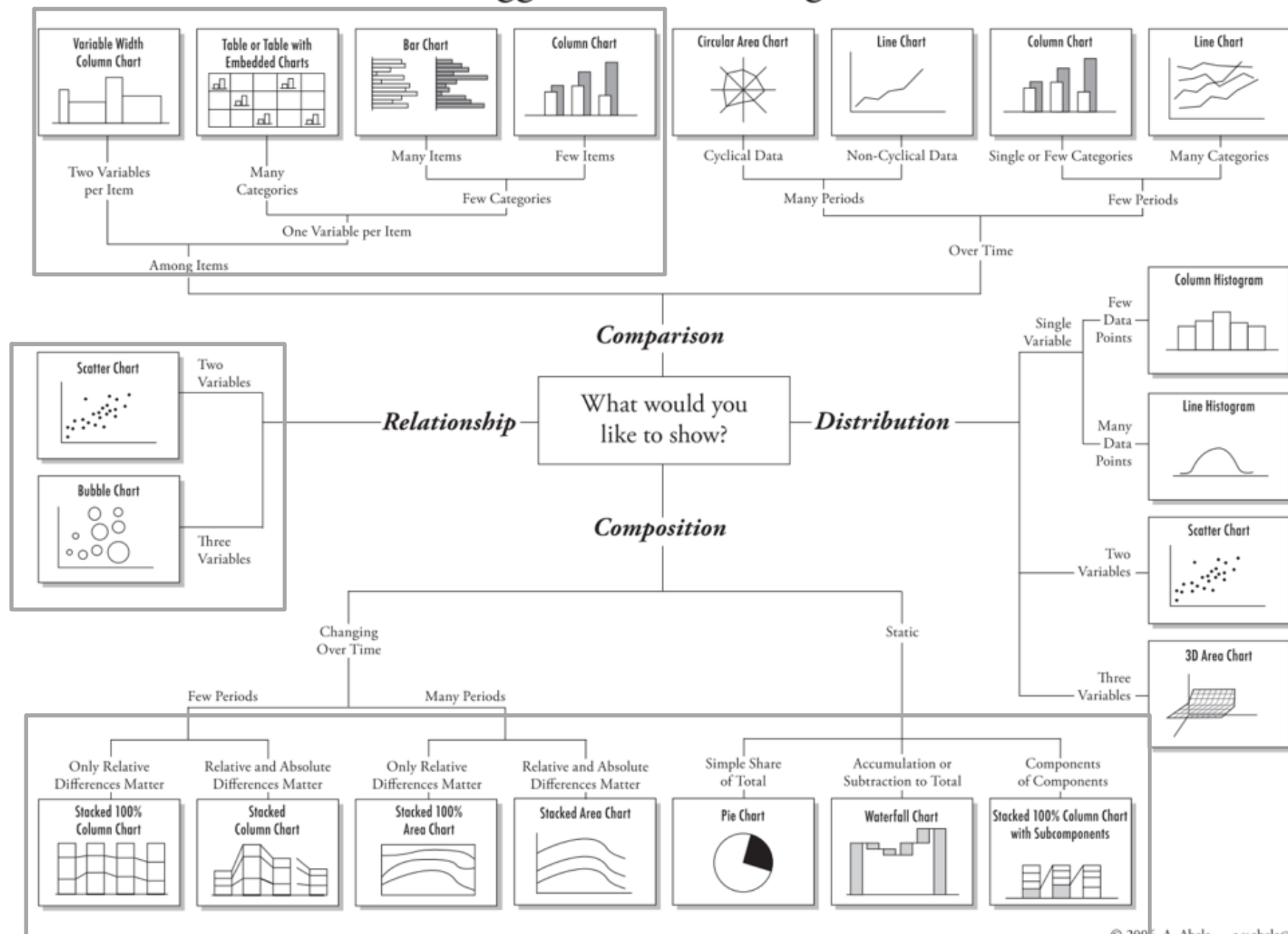
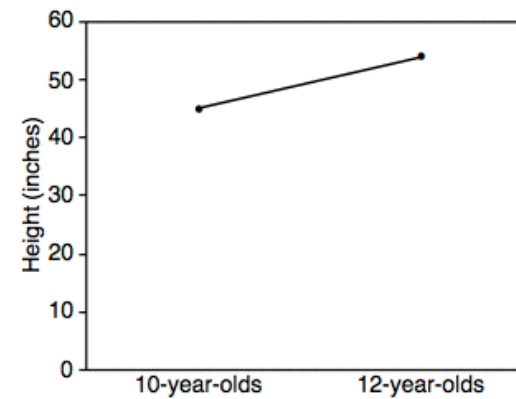
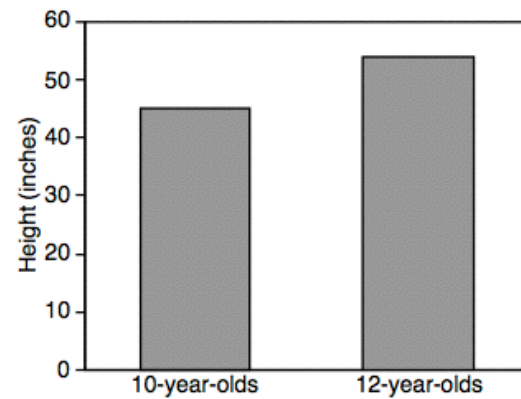
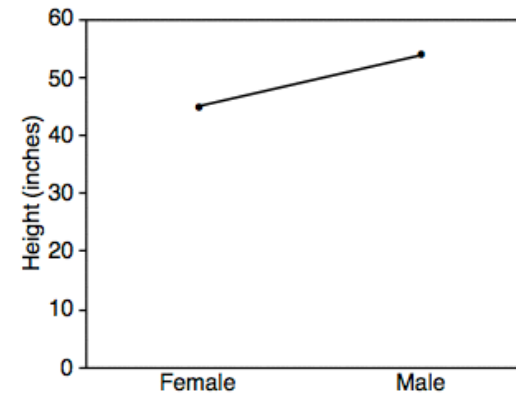
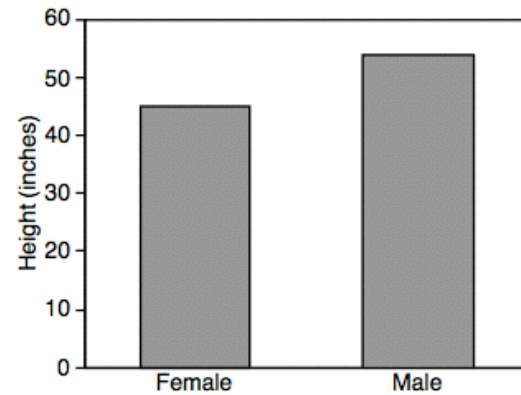


Chart Suggestions—A Thought-Starter



BARS VS. LINES

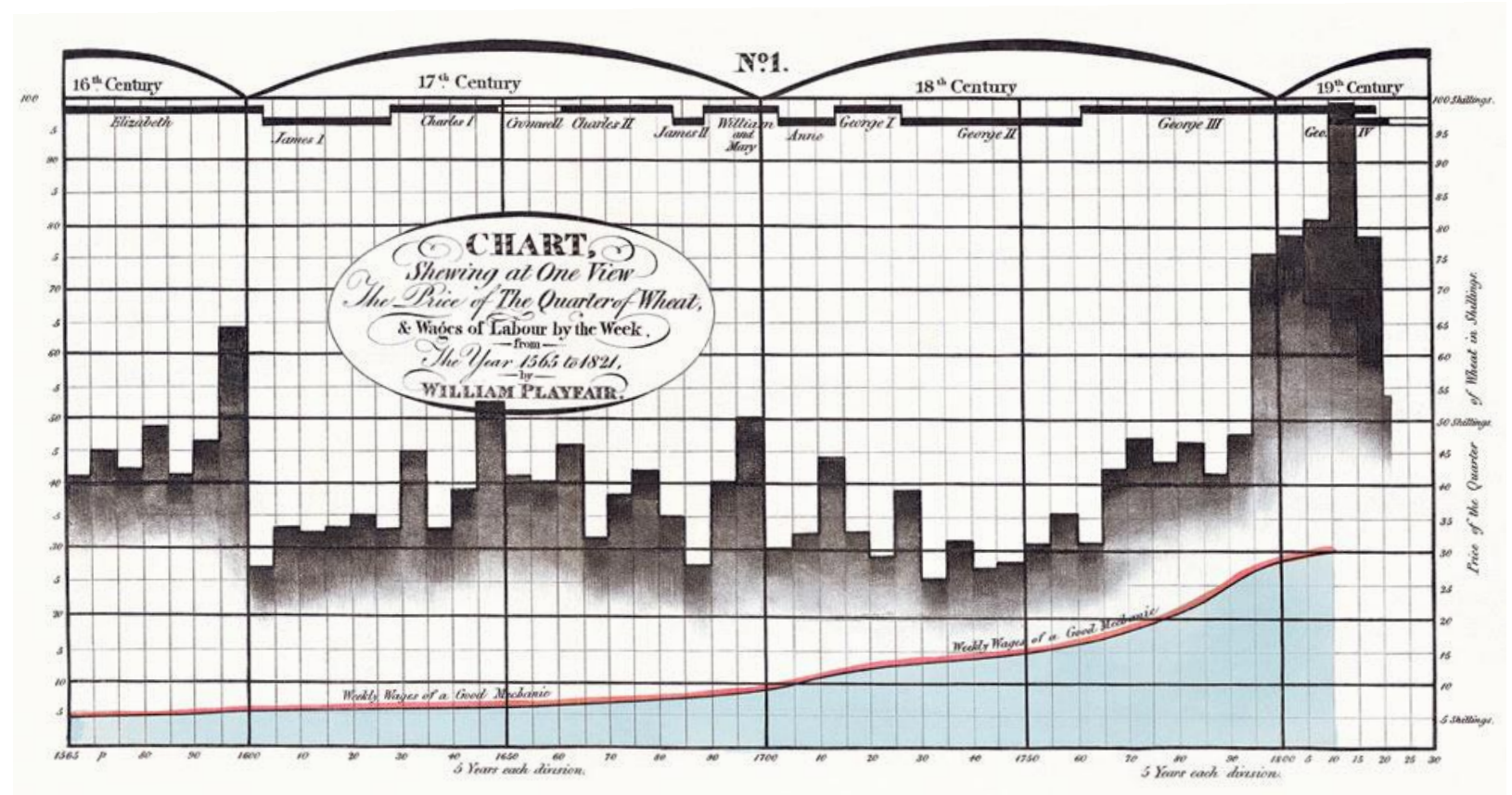


Line implies trends. Do not use for categorical data

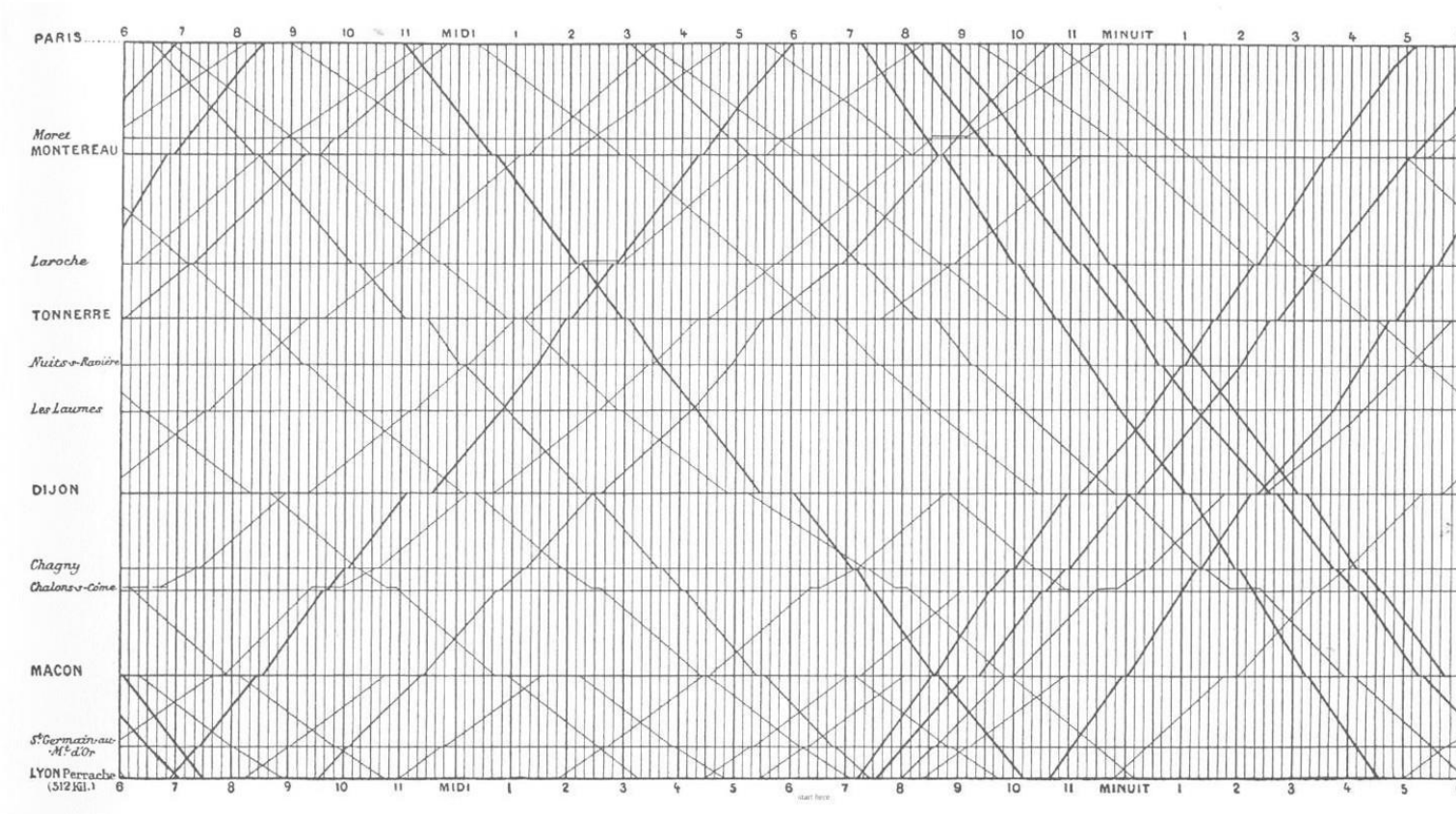
TREND OVER TIME

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

Enter name(s) or symbol(s)

GET CHART

COMPARE

EVENTS ▾

TECHNICAL INDICATORS ▾

CHART SETTINGS ▾

RESET

Feb 10, 2012 : AAPL 493.42



Volume 22,523,900



1D 5D 1M YTD 3M 6M 1Y 2Y 5Y Max

FROM: Mar 18 2011 TO: Mar 16 2012



Basic Chart | Full Screen | Print | Share | Send Feedback

TREND OVER TIME

Published: February 2, 2010

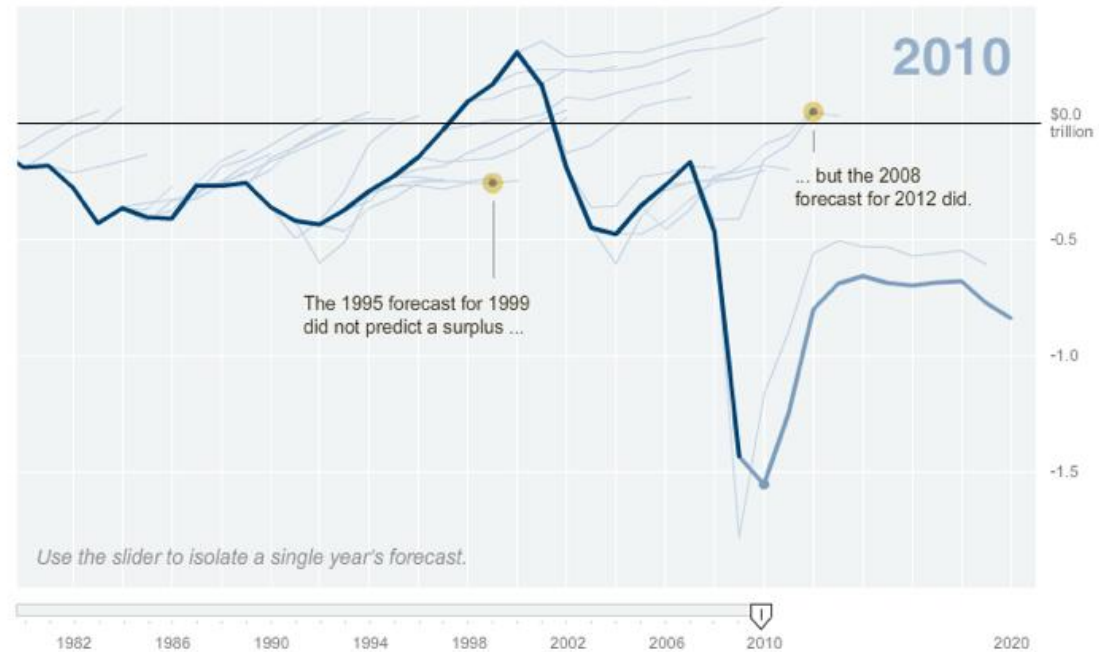
Budget Forecasts, Compared With Reality

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

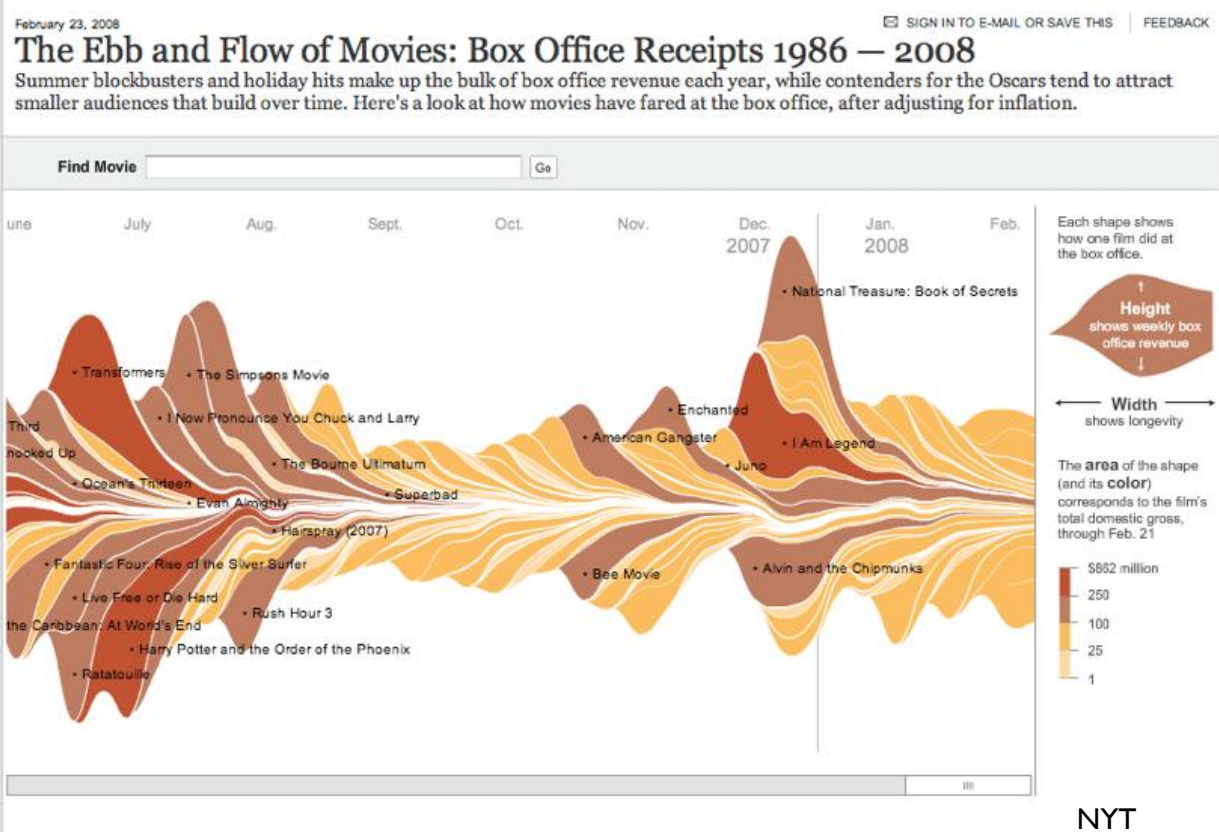
1 2 3 4 5 6 NEXT ▶

Latest forecast

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



STREAMGRAPHS



Vision Statement

Six Ways to Find Value in Twitter's Noise

How to Find Value in Twitter's Noise

It's easy to think of Twitter as a stream of tweets, but smart marketers will recognize it as a stream of treasure. Twitter data is the richest in real-time. Online visualization tools can help pinpoint what consumers are reading and sharing, uncover stories in the chatter, and reveal trends. To show marketers how they can gain insight from Twitter, we created a map that a half million tweets containing the word "iPad" that were broadcast during the product launch weekend in April. We then mapped key words that appeared in these tweets on the graph below.

© 2010 Apple Inc.

The iPad Launch by the Numbers

547,898
TOTAL TWEETS USING "IPAD" DURING PRODUCT LAUNCH WEEKEND

13% TWEETS MENTIONED "APPLE" (vs. 10% in 2009)

18% TWEETS MENTIONED "IPHONE" (vs. 15% in 2009)

1% TWEETS MENTIONED "IPAD" (vs. 0% in 2009)

1% TWEETS MENTIONED "APPLE" (vs. 10% in 2009)

1% TWEETS MENTIONED "IPHONE" (vs. 15% in 2009)

1% TWEETS MENTIONED "IPAD" (vs. 0% in 2009)

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1% TWEETS MENTIONED "IPAD" (vs. 0% in 2009)

1% TWEETS MENTIONED "APPLE" (vs. 10% in 2009)

1% TWEETS MENTIONED "IPHONE" (vs. 15% in 2009)

1% TWEETS MENTIONED "IPAD" (vs. 0% in 2009)

1 Look about the competitive landscape. Twitter about your product this includes the names of rival brands and what a lot about market positioning. Note of the product tweets didn't focus on the iPad's being a Kindle killer (or, for that matter, a Nook or Sony Reader competitor).

Apple's iPad is the only tablet that can run the same apps as the iPhone.

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Apple's iPad is the only tablet that can run the same apps as the iPhone.

2 Look for unexpected themes. As expected, words about the iPad's design, size, and price were common. But one unexpected theme was the iPad's ability to run the same apps as the iPhone. This was a surprise to many, as the iPad was often seen as a separate device.

Apple's iPad is the only tablet that can run the same apps as the iPhone.

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3 Dig deeper into the common. While design, size, and price were common, many tweets also mentioned the iPad's ability to run the same apps as the iPhone. This was a surprise to many, as the iPad was often seen as a separate device.

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Apple's iPad is the only tablet that can run the same apps as the iPhone.

4 Look for user expectations. Product type and features can't replace user expectations. Looking at iPad tweets with keywords "TYPING" and "KEYBOARD," and then digging out the most common words in those tweets (see above), gives you a breakdown from thousands of users. The negative words could help guide the marketing messages and product development.

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5 Look for negative words with rising negative words is a good way to locate consumer pain points. Though not frequently mentioned, the word "PROBLEM" appeared in tweets that focused on product functionality. Customer needs could be adjusted to address the most common concerns.

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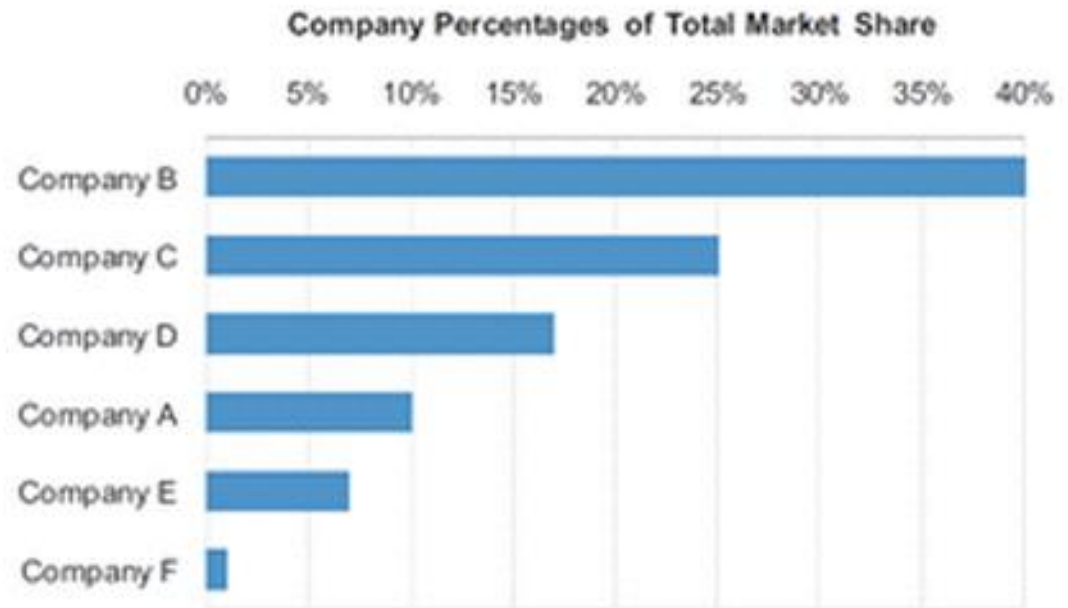
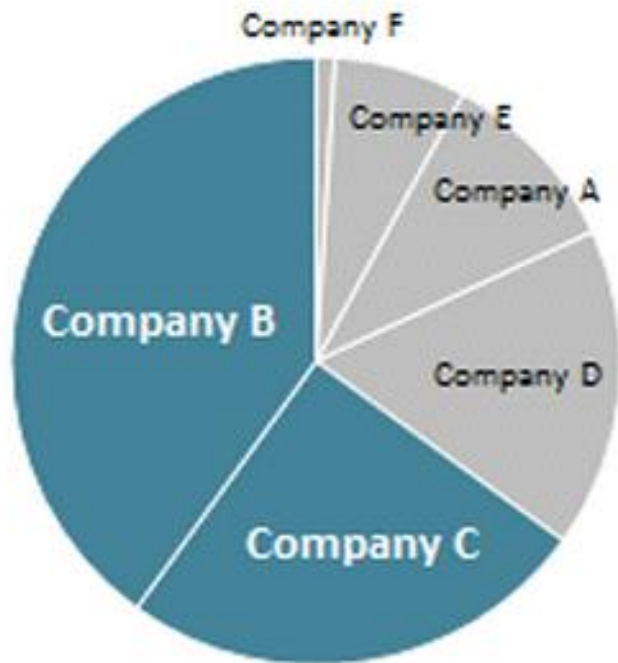
Apple's iPad is the only tablet that can run the same apps as the iPhone.

How to Read This Graph

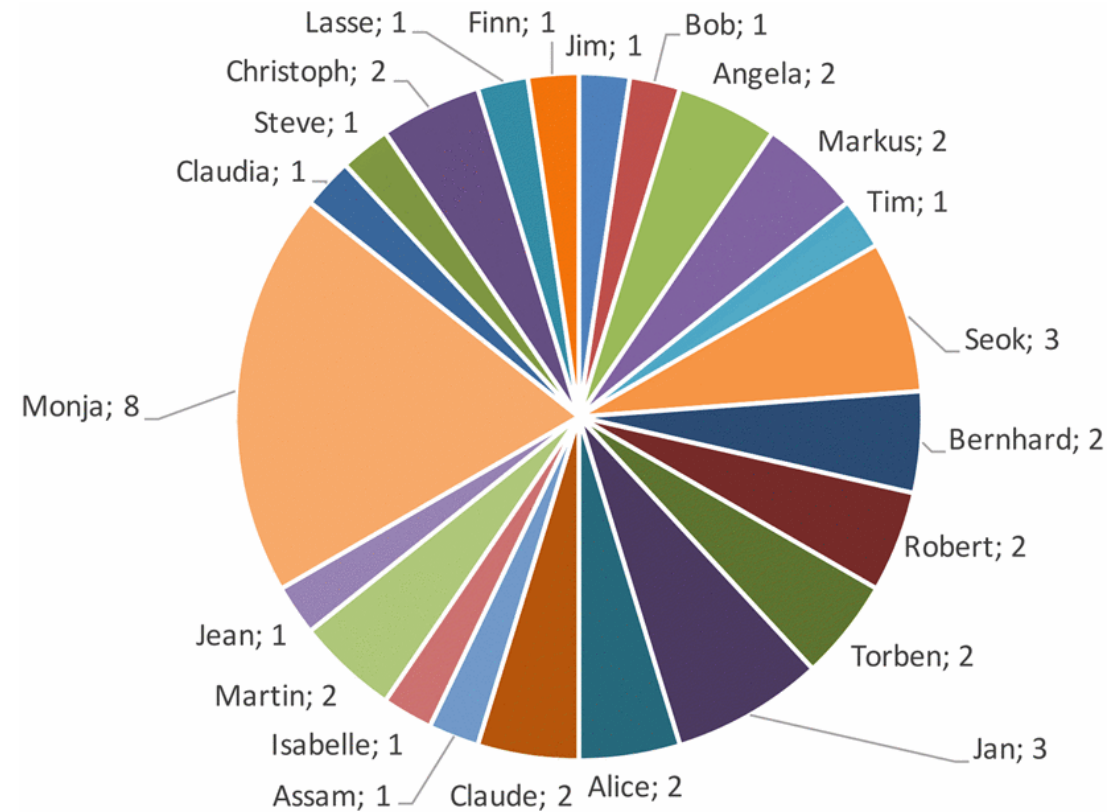
This stream graph shows tweets about the iPad over time. Each value represents the proportion of tweets containing a given word, such as "iPad". Color is used only to distinguish words.

PIE VS BAR CHARTS

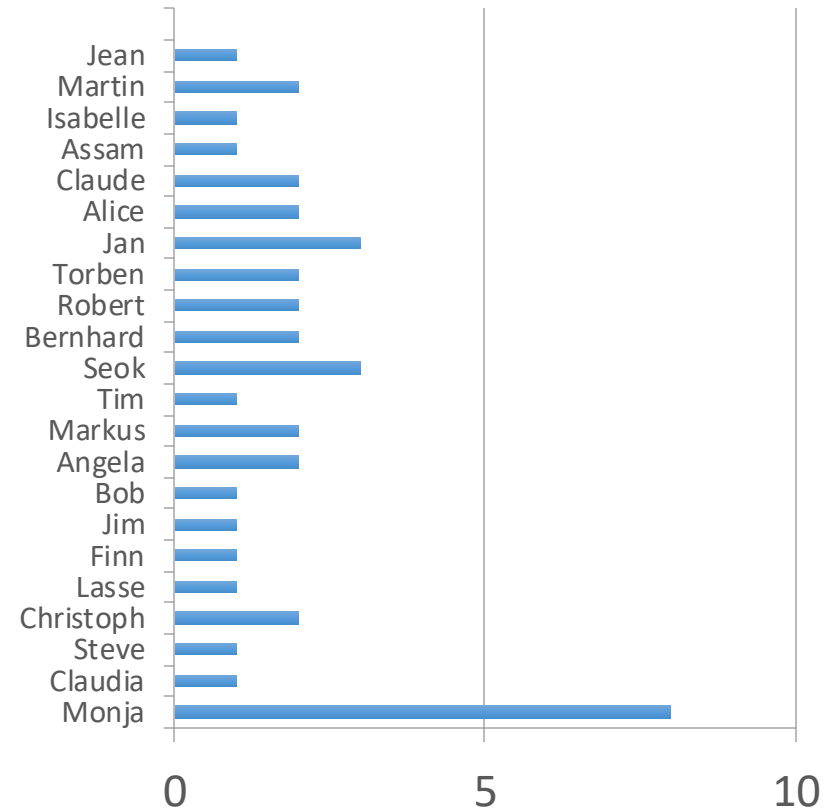
65% of the market is controlled by companies B and C



PIES VS BAR CHARTS

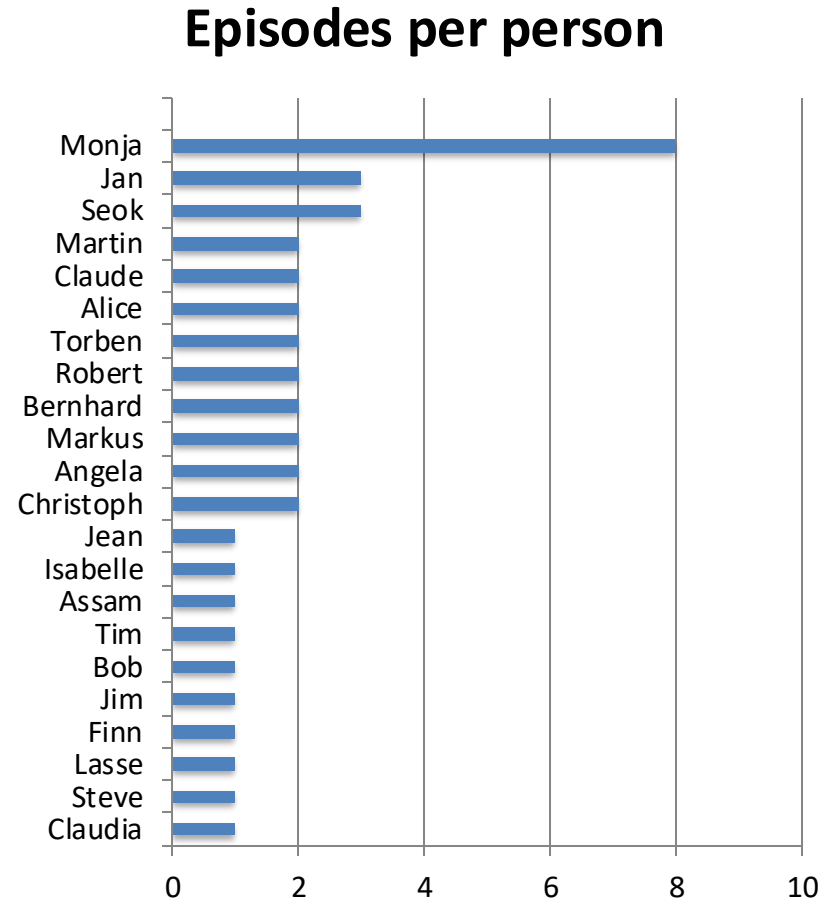
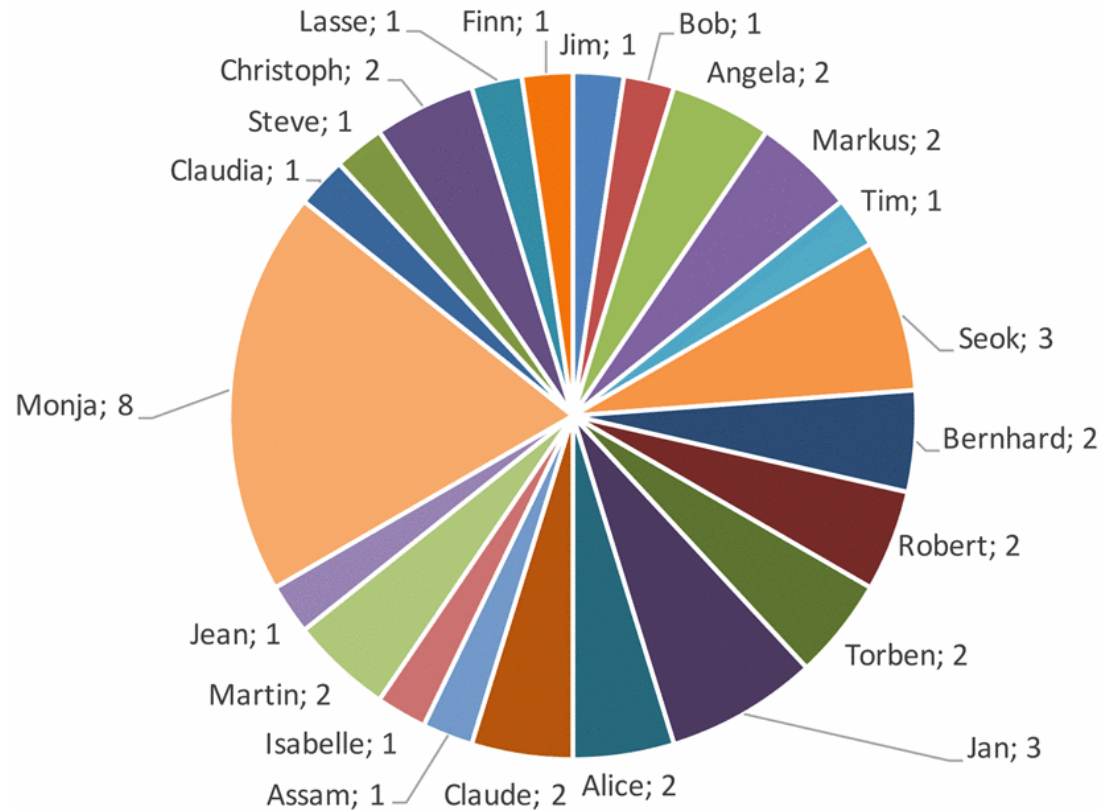


Episodes



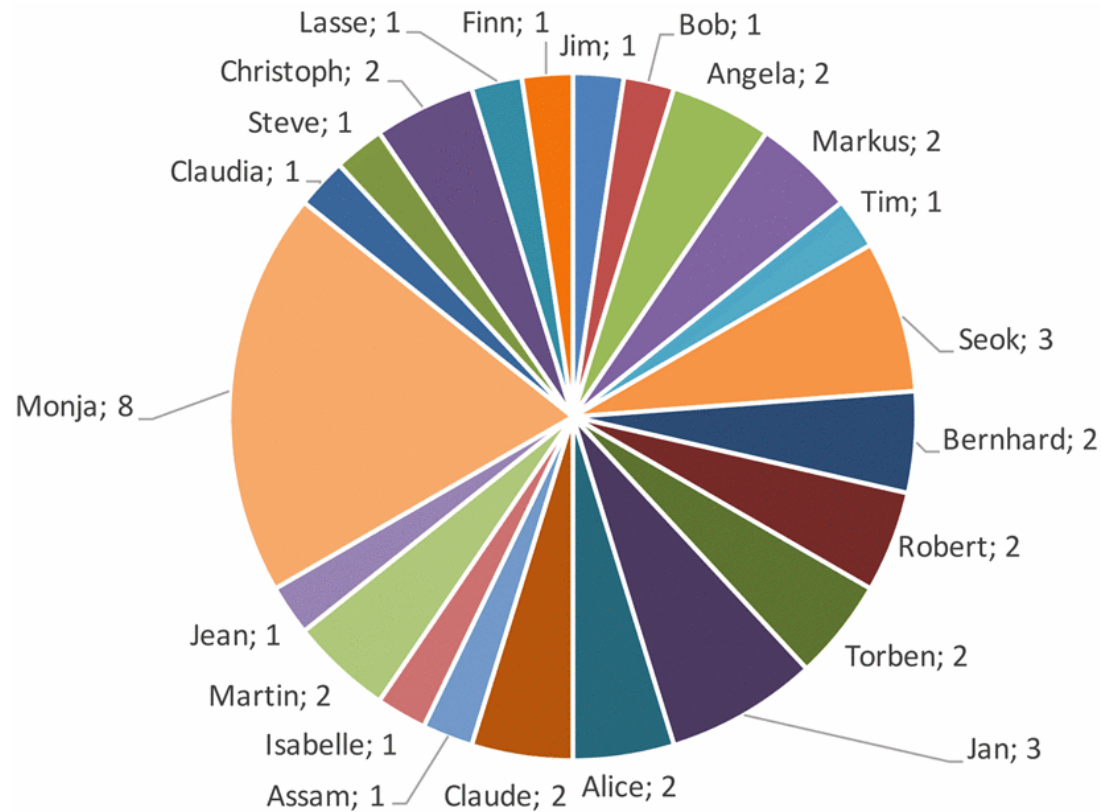
Furthermore, we present the distribution of attacks towards employees in detail in Fig. 10 right. The blue employees are secretaries, the green ones are administrators and the red ones are scientific employees. The number following the name is the number of times that person was attacked. All of the 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)

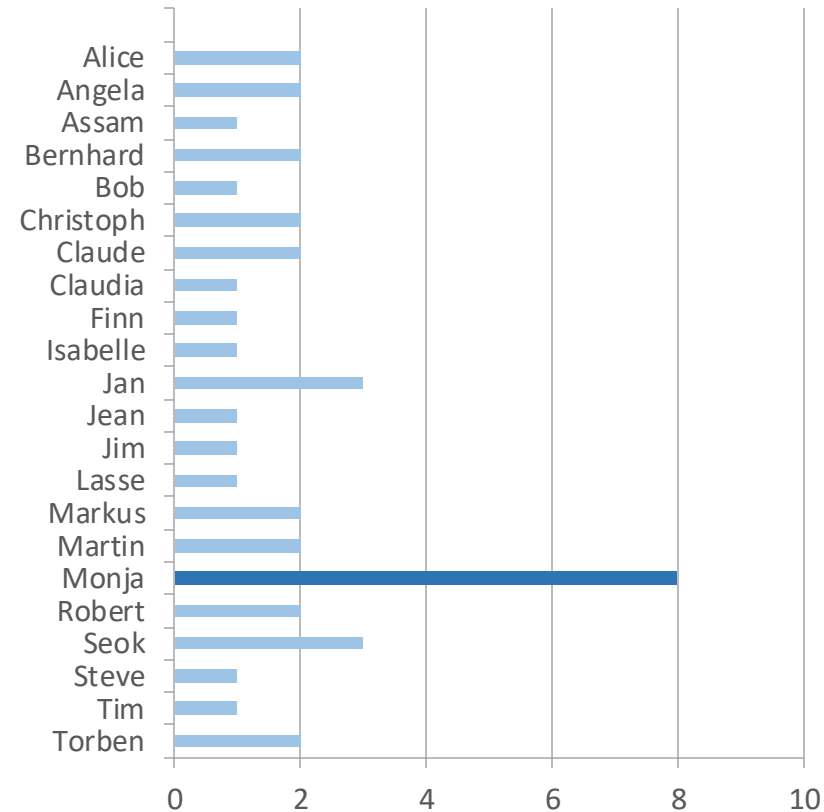


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PIES VS BAR CHARTS (IMPROVED)

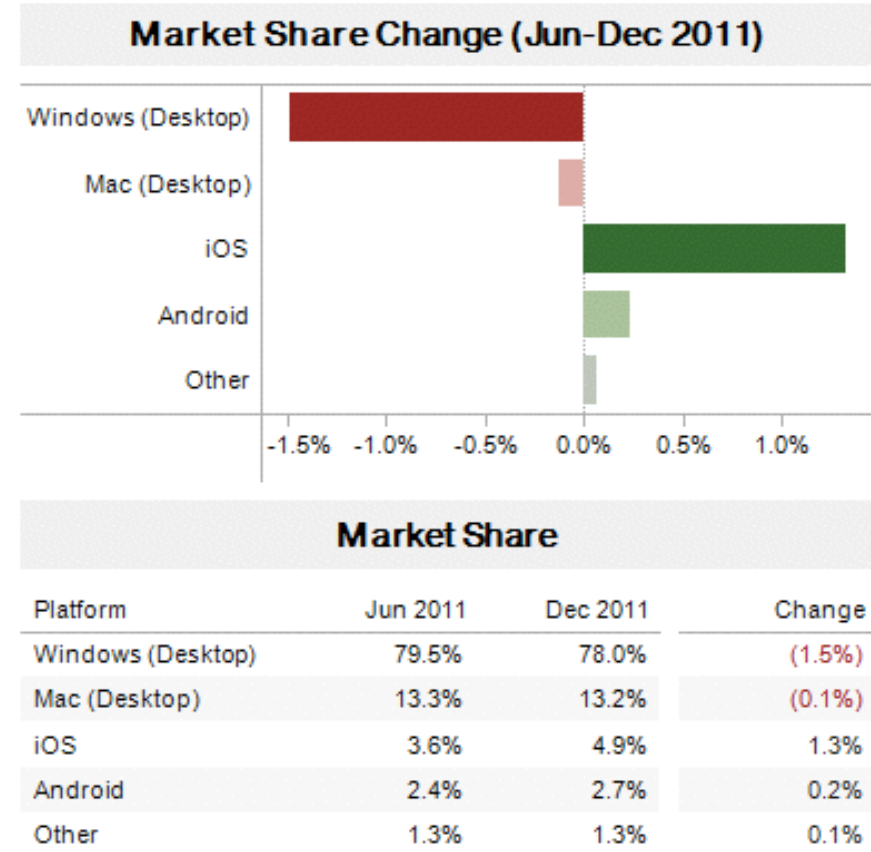
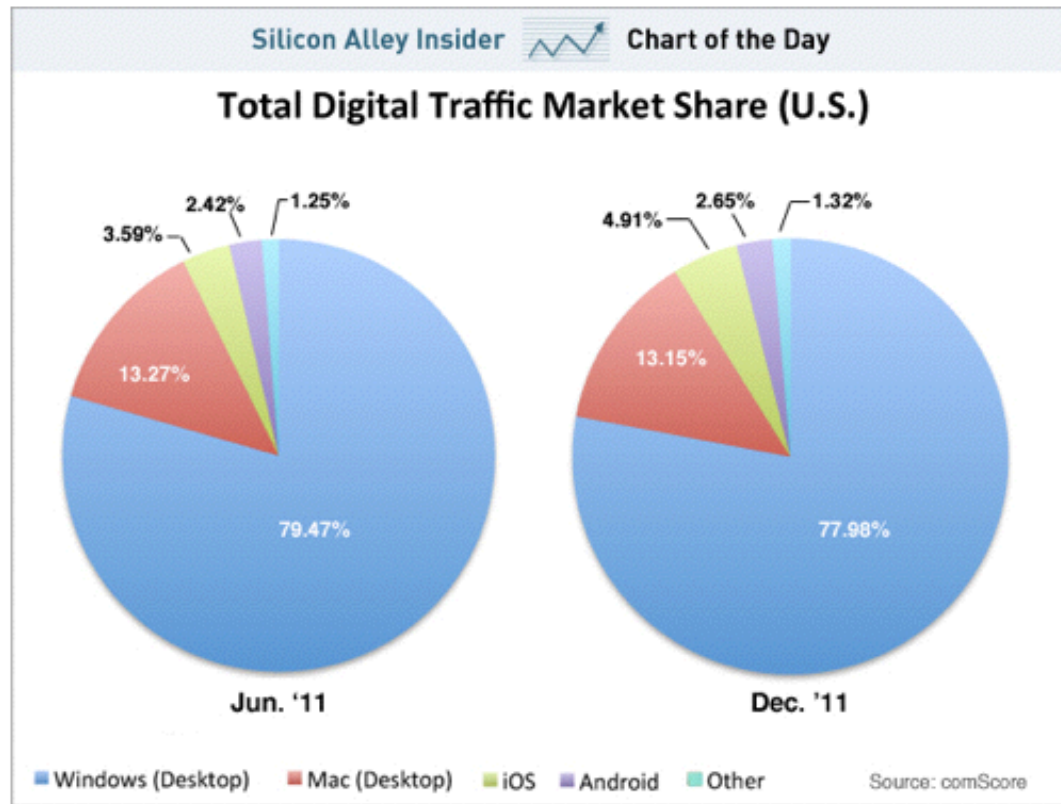


Episodes per person

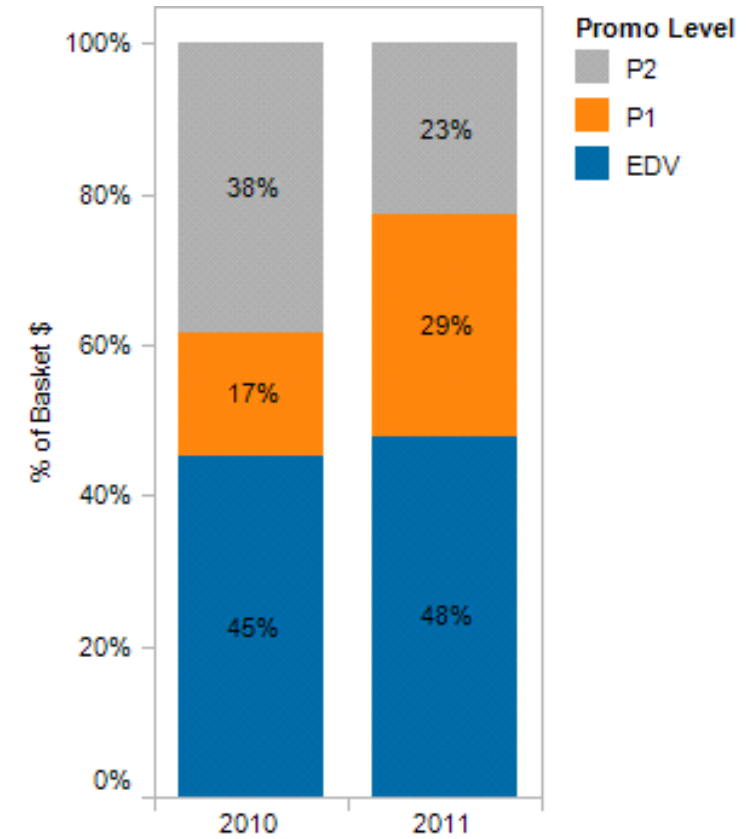
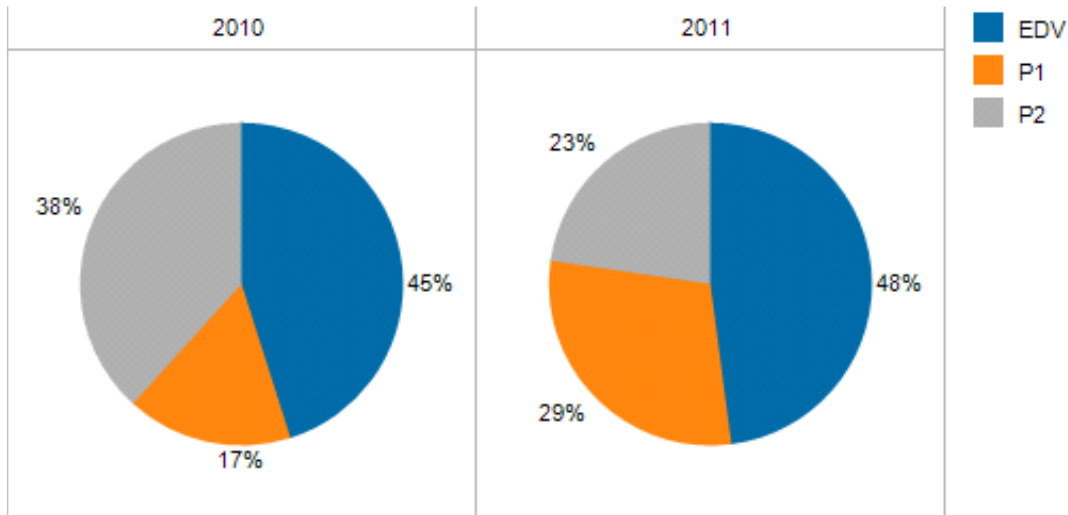


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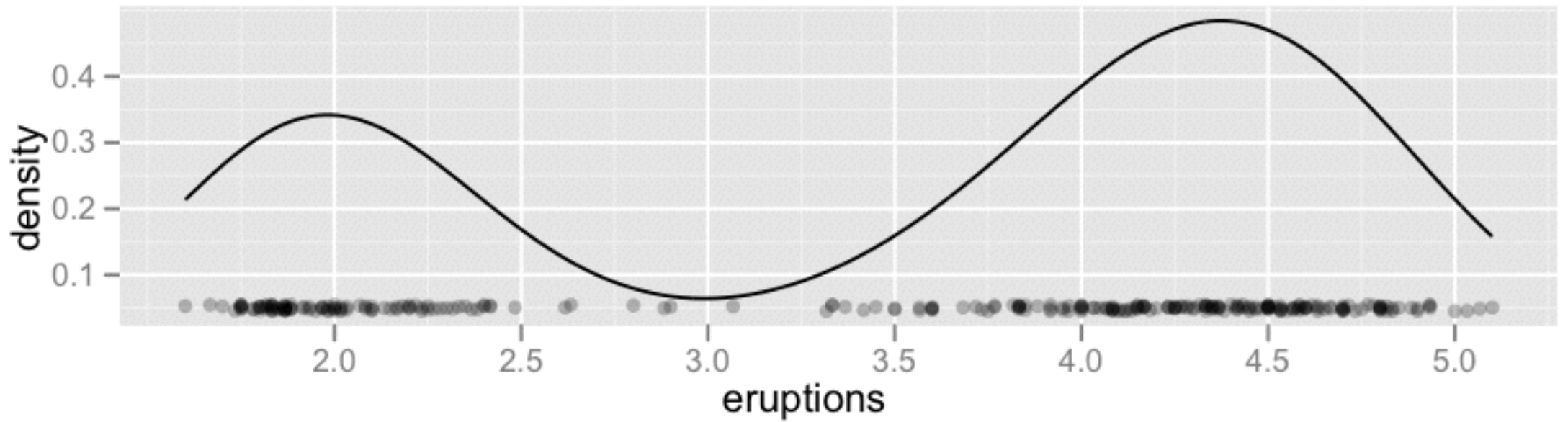
SHOWING CHANGES



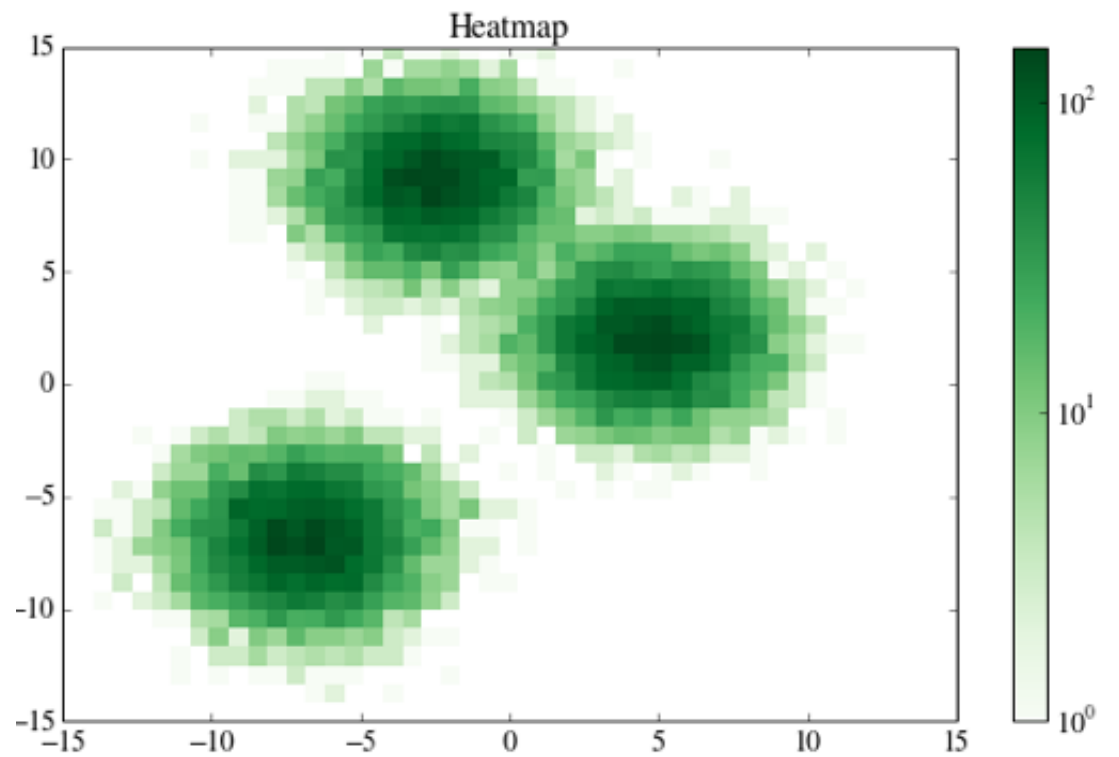
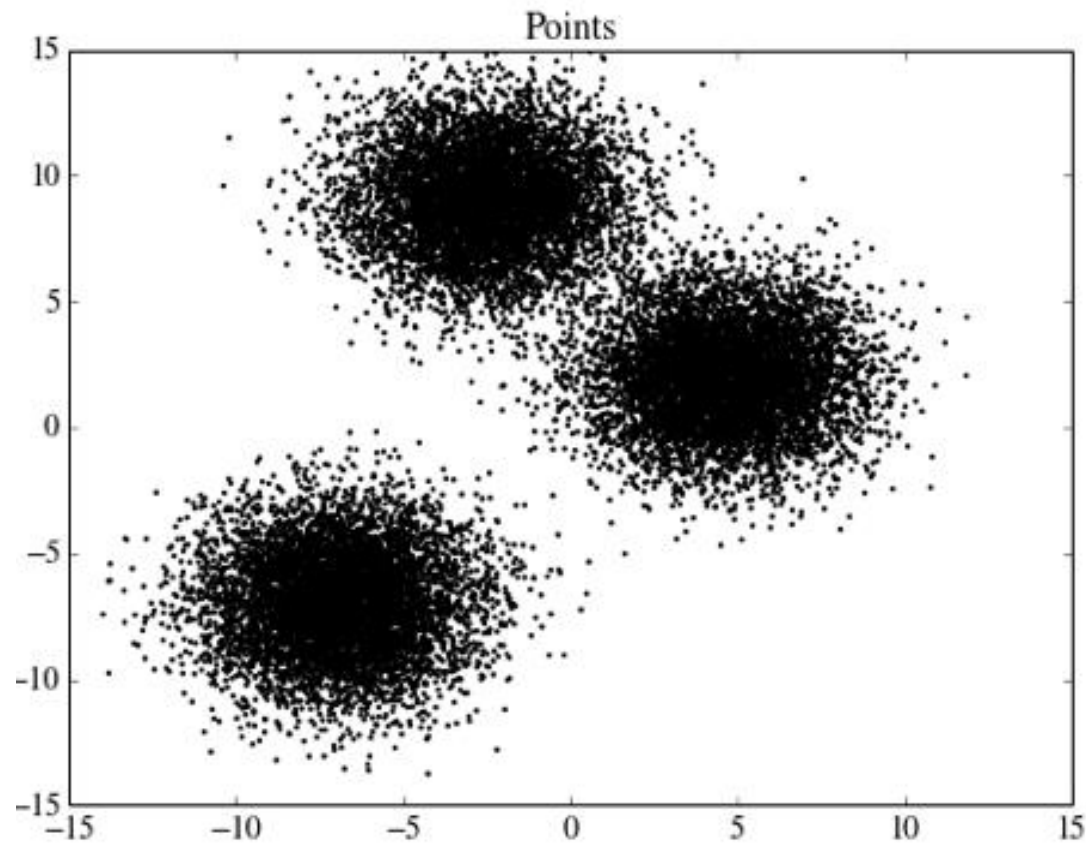
SHOWING CHANGES



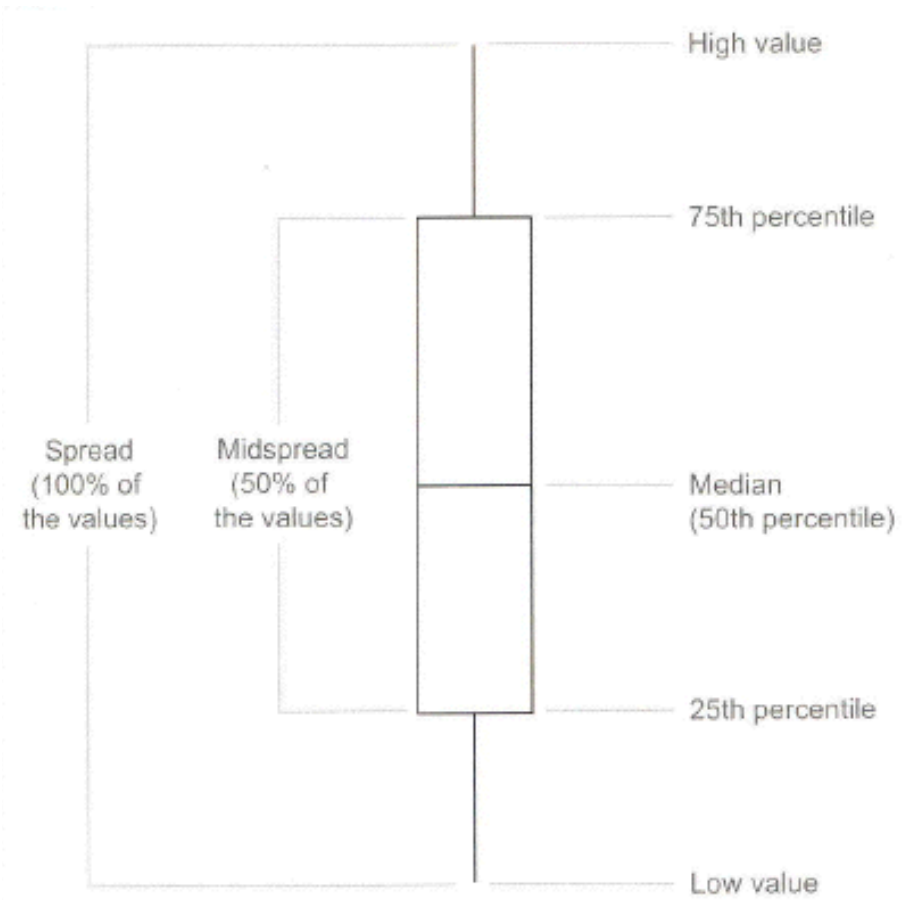
DENSITY PLOT



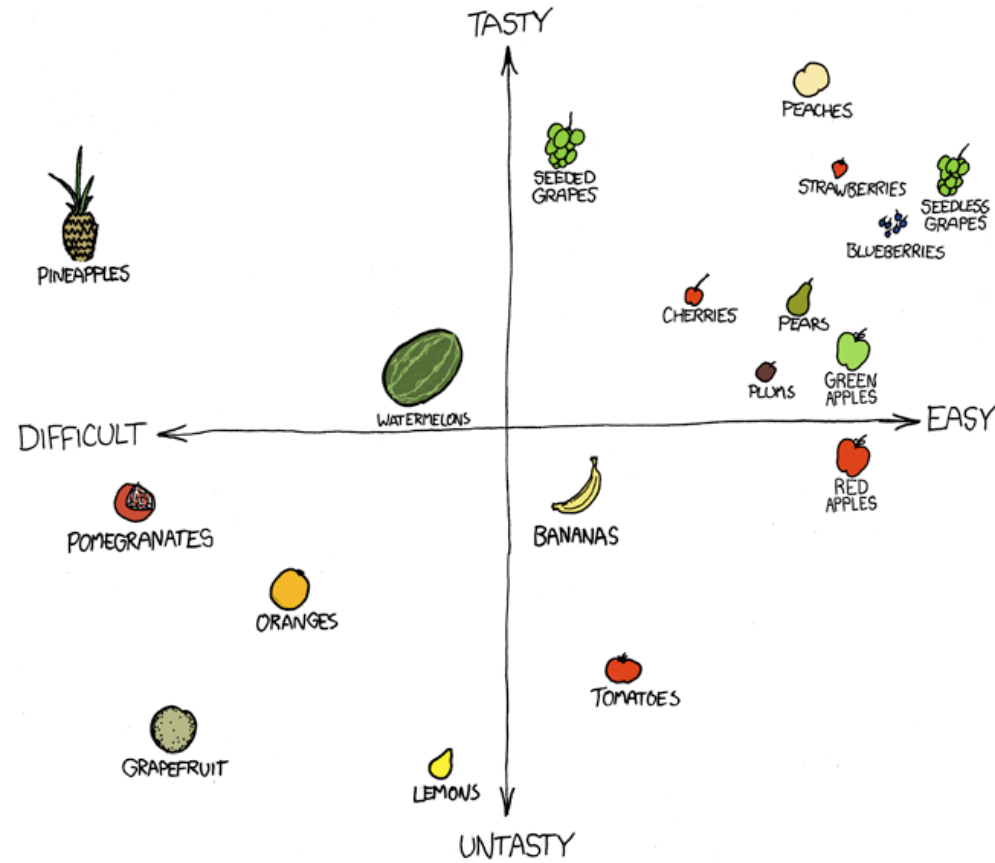
2D DENSITY PLOTS



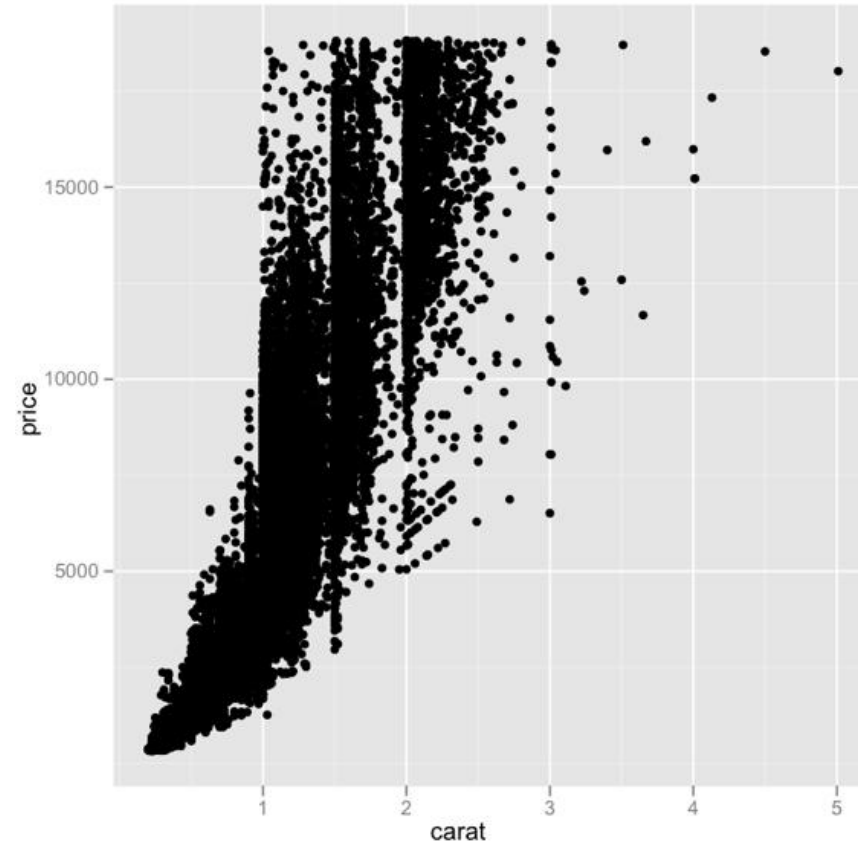
BOX PLOTS



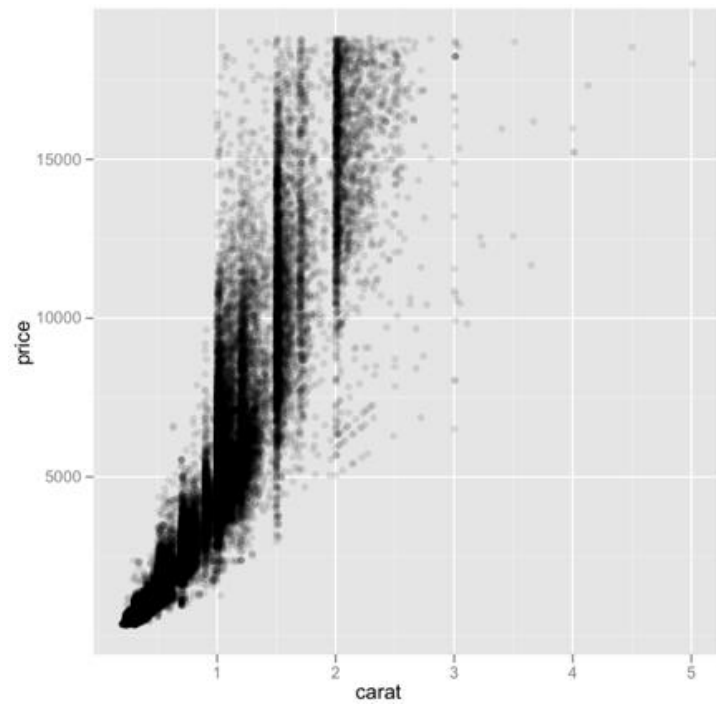
SCATTERPLOT



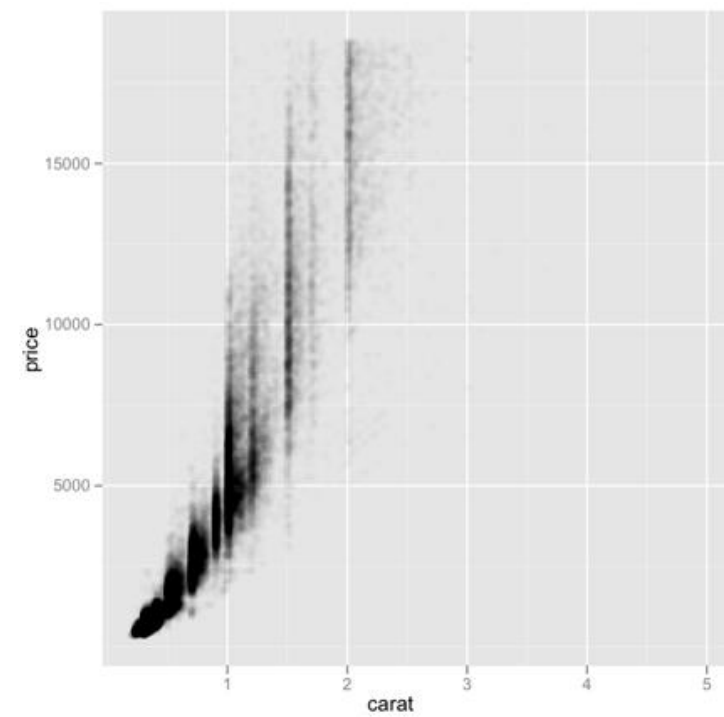
CLUTTERING, OVERPLOTING



$\alpha=1/10$

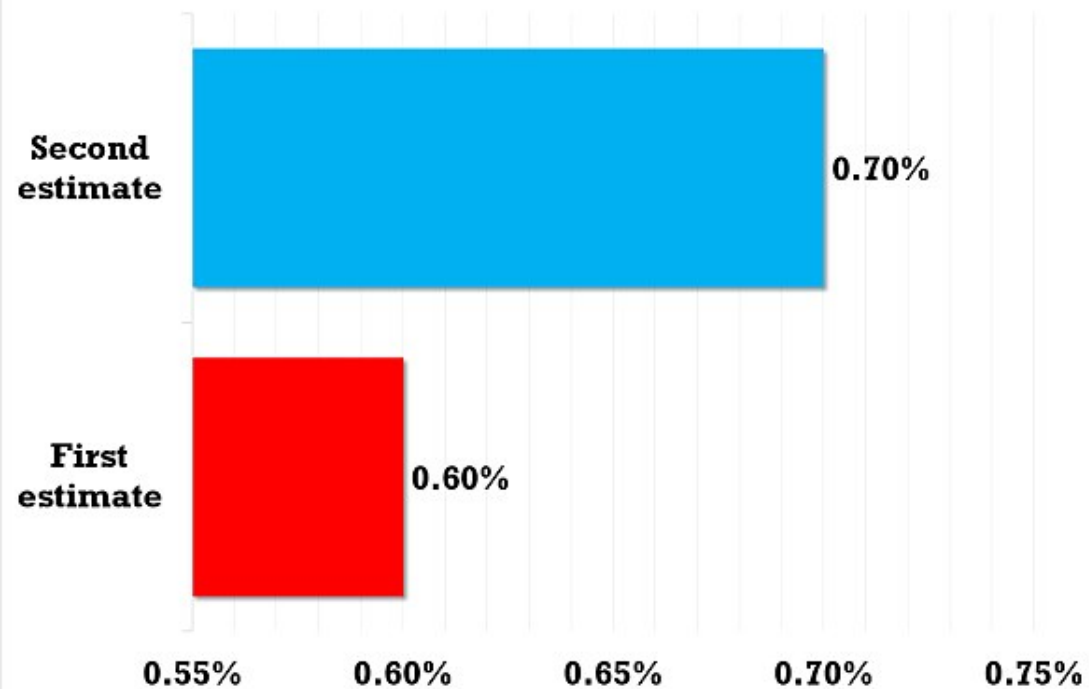


$\alpha=1/100$



A FEW EXAMPLES AND CASE STUDIES

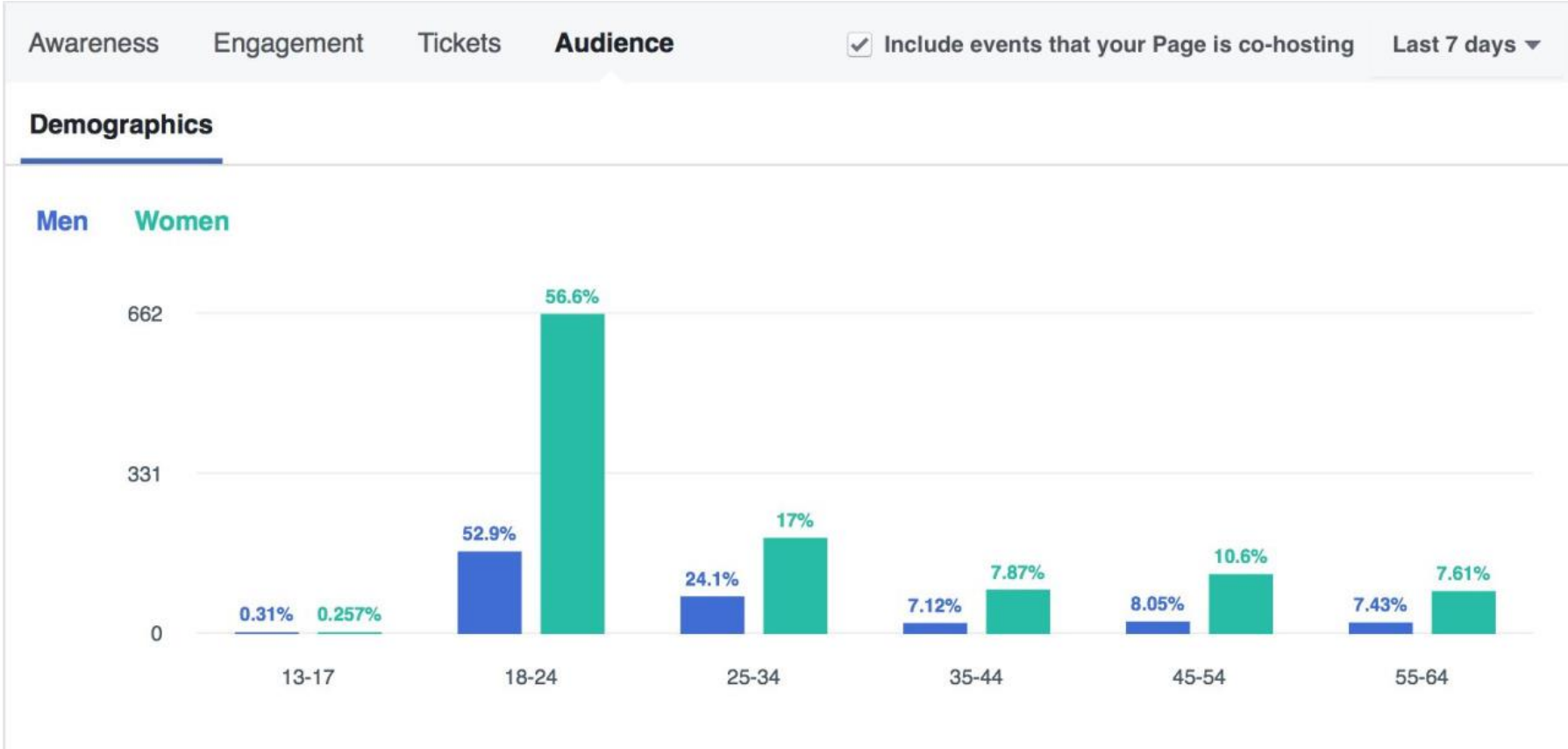
2016 Q4 GROWTH UPGRADED



Source: ONS

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%

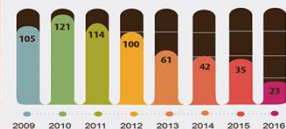


GAZETA.PL



CAMERA INDUSTRY FACTS 2009-2016

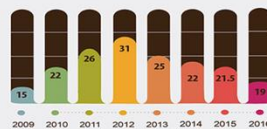
Amount of Total Cameras Manufactured by Year*



*In millions

**35%
DROP IN
SHIPPED
CAMERAS
IN 2016**

Amount of Interchangeable Lenses Manufactured by Year*



*In millions

**12%
DROP IN
SHIPPED
LENSES
IN 2016**

Number of Cameras Shipped in 2016 by Region

*In millions



THE ASIAN CAMERA MARKET SHARE GREW BY 2% IN 2016, WHILE THE MARKET SHARE OF EUROPE WENT DOWN BY 2%



Number of Lenses Shipped in 2016 by Region

*In millions



THE EUROPEAN LENS MARKET SHARE SHRANK BY 2% IN 2016

DSLR vs. Mirrorless 2013-2016

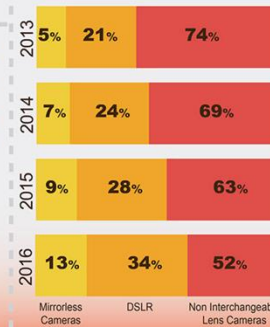
*in millions



**4% DECREASE
IN MIRRORLESS
PRODUCED**

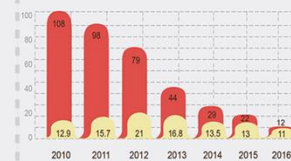
**17% DROP IN
DSLR PRODUCED
IN 2016**

Camera Market Overview 2013-2016



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

Cameras Manufactured Between 2010-2016
Interchangeable vs. Non interchangeable



DSLR/Mirrorless Non Interchangeable Lens Cameras

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

Lensvid.com

is THE place to find
the most interesting,
informative, professional
and inspiring photography
videos on the web.

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source: <https://lensvid.com/gear/lensvid-exclusive-happened-photography-industry-2016/>

Visual Analytics
va602aa

VISUAL TAXONOMY

The Data Visualisation Catalogue

About • Suggest • Shop • Resources

Search by Function

View by List



Arc Diagram



Area Graph



Bar Chart



Box & Whisker Plot



Brainstorm



Bubble Chart



Bubble Map



Calendar



Chord Diagram



Choropleth Map



Circle Packing



Connection Map



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

TAKEAWAY MESSAGES

- Appropriate chart type for specific data type and visualization task