

TURBOCHARGED
FOR SUCCESS



Introduction to Visualization

October 2021

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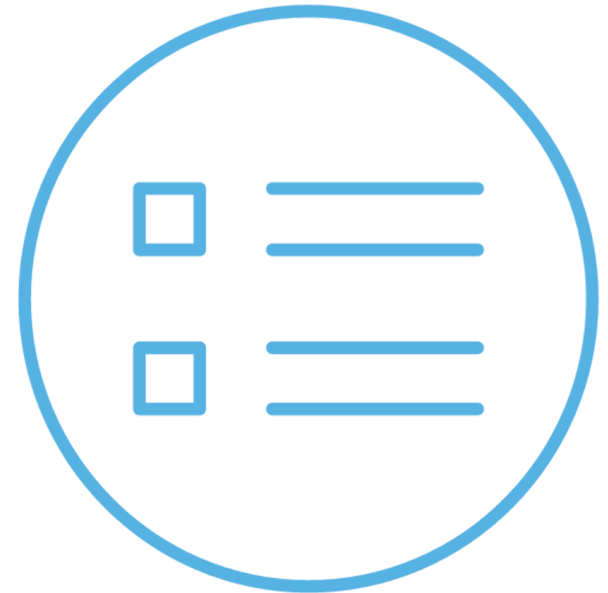
Introduction to Visualization

Why is Data Visualization for Business Analysis important?

Data visualization for business Analysis

Effective Visualization

Data Visualization in Practice

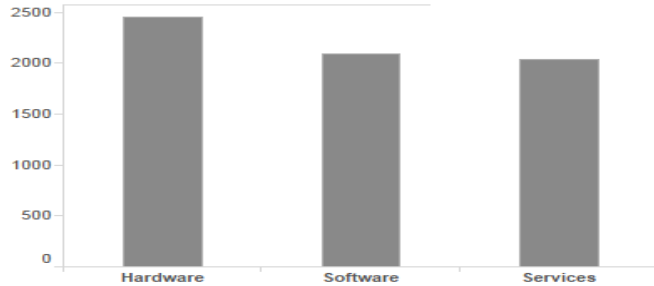


Introduction to Visualization

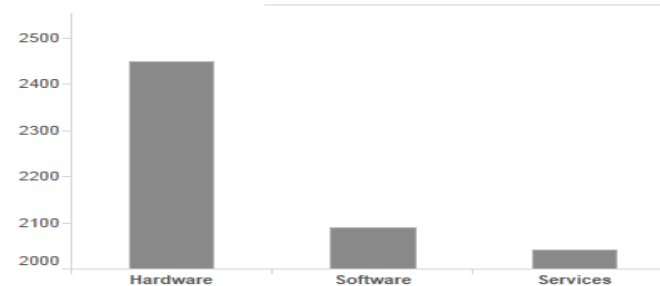
Introduction

To start, let's kick off with an exercise to get us warmed up...

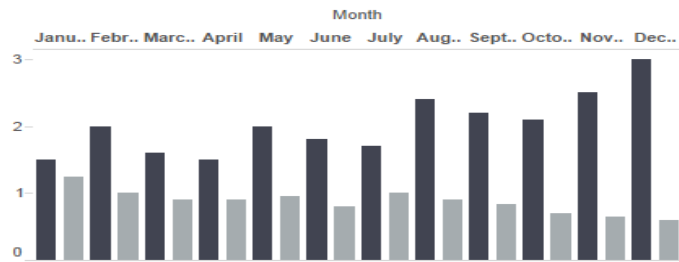
Which Visualization do you prefer?



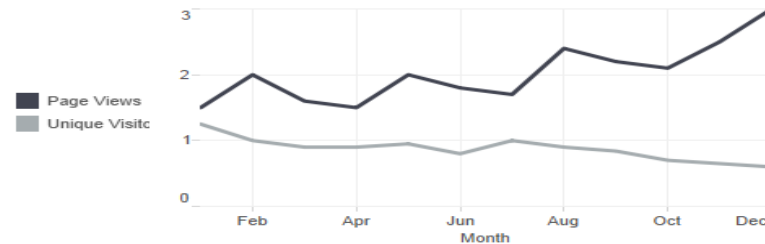
Option A



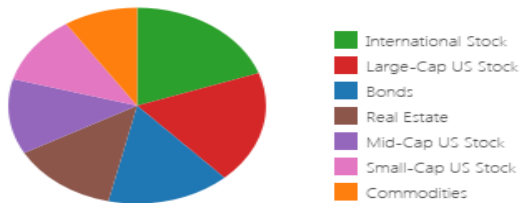
Option B



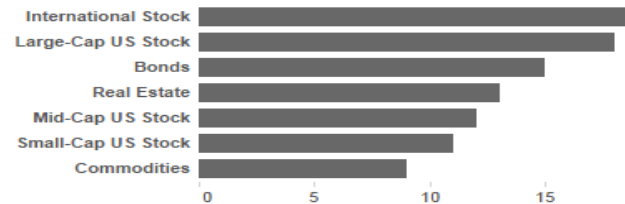
Option A



Option B

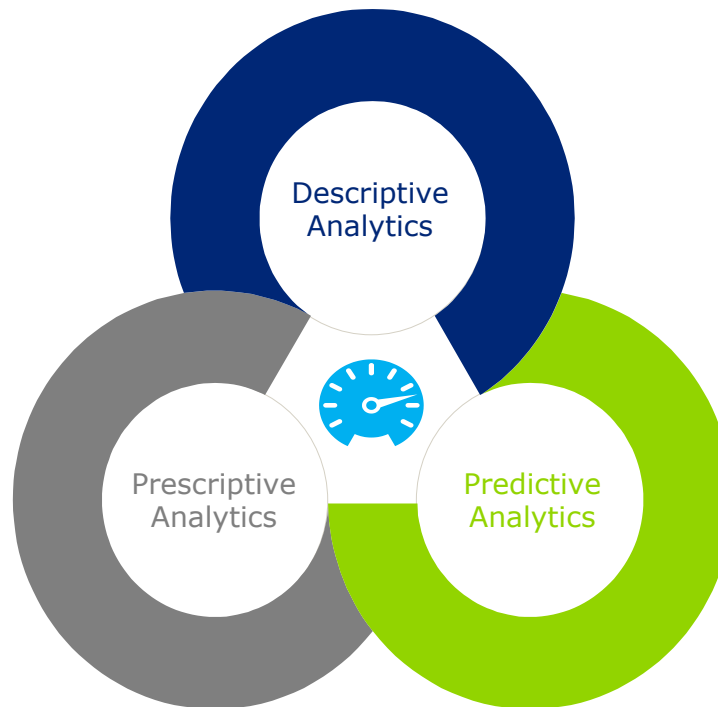


Option A



Option B

Analytics



MI, BI and Analytics

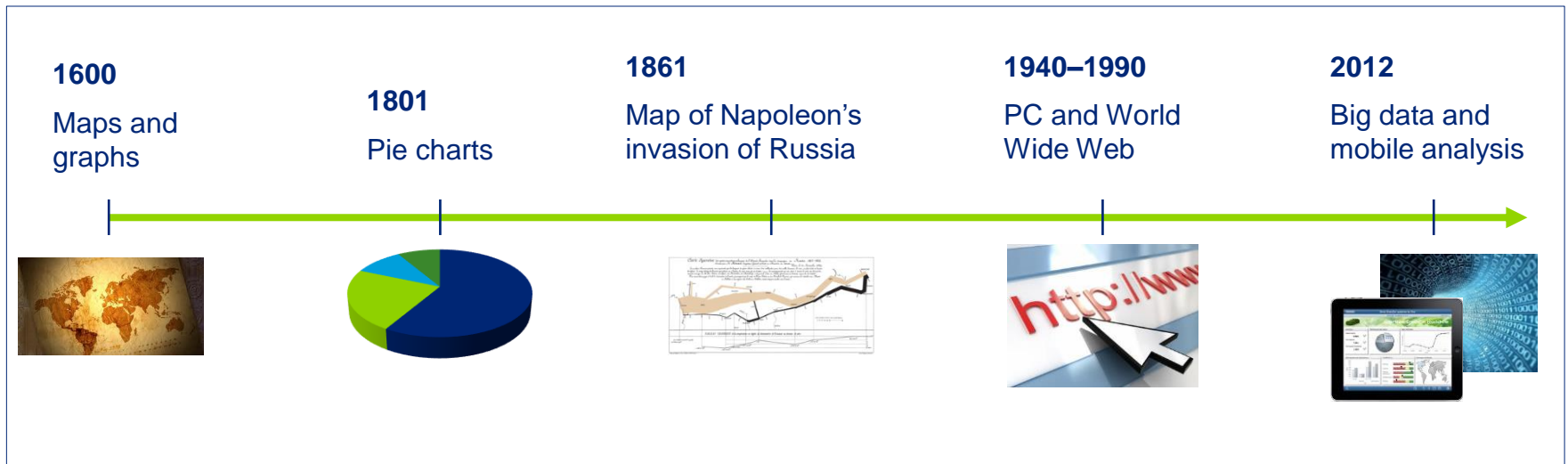


Why is data visualization for business analysis important?

Data visualization background

“The data visualization trend is all about presenting detailed insights in a visual way that helps individuals make faster and better decisions”

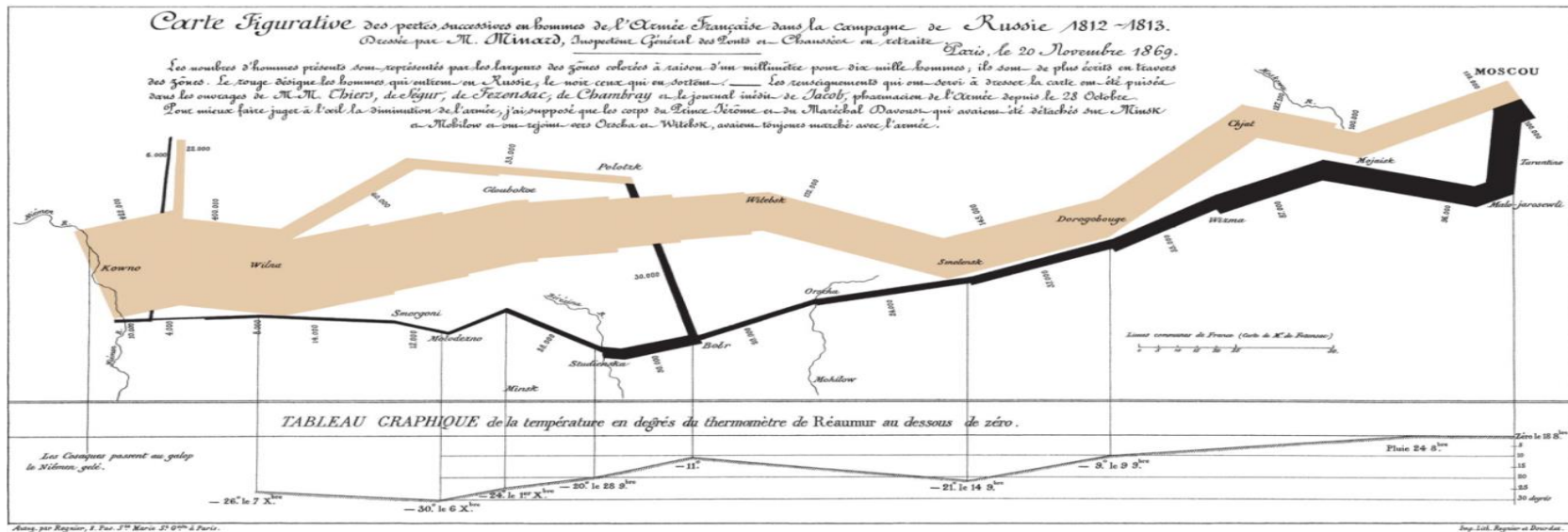
An information explosion has resulted in unimaginable amounts of data being available for business analysis. Enormous volumes of data have added to the complexity of data analysis and made it challenging to draw meaningful insights in a short time. Data visualization provides the capability to identify critical trends and patterns across complex data sets.



Data visualization - Prime example from the past

“One of the most compelling examples of powerful data visualizations from history dates back to 1812”

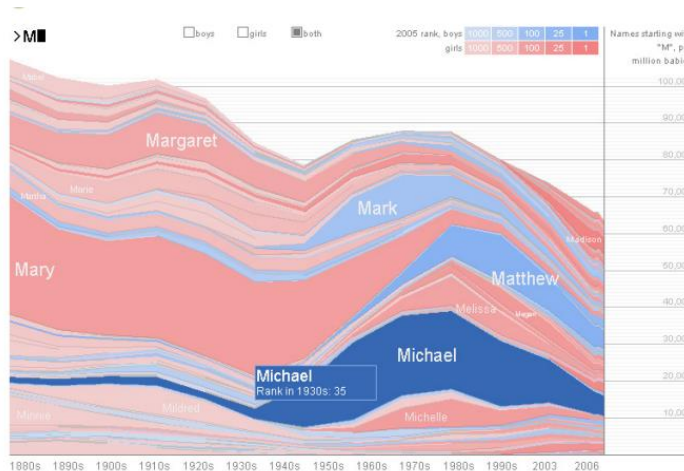
The Map of Napoleon's invasion of Russia depicted the four different changing variables (advance/retreat, geographical location, size of army, and temperature) in a single two-dimensional (distance and time) chart. The below chart depicted a vivid story about the fate of Napoleon's army in the Russian campaign and is one of the most revered charts from data visualization graphic from the past.



1. Charles Joseph Minard, History, War & Security

Need for powerful data visualizations

Improved use of appropriate visualization can help grab the attention of executive viewers and quickly explain a message in a simple way. With the number of competing messages, it is critical to use compelling and accurate visualizations to cut through the clutter.



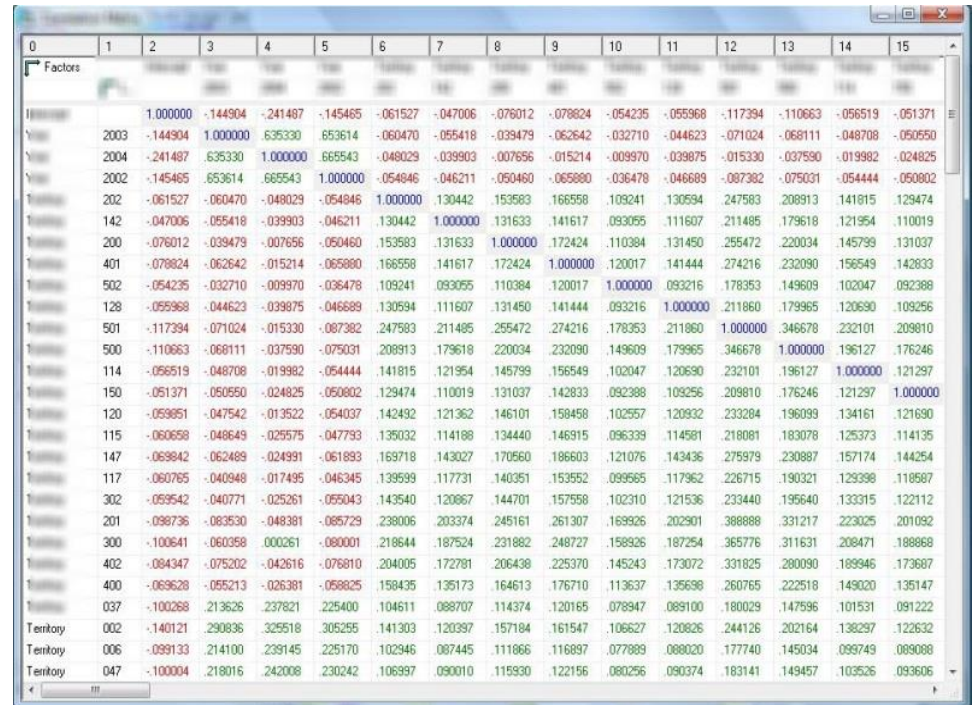
VS

Name	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
Margaret	2187	1240	5387	2359	2140	794	500	568	436	295	78
Mark	4987	5985	4879	2350	5698	9856	9588	6879	4587	4583	4587
Matthew	6980	4578	4578	2987	2975	3987	4957	7985	3424	4857	3476
Mary	1098	2058	4039	3765	2985	6980	9987	8878	7432	6874	4334
Michael	5498	4985	4875	2934	4568	4857	8659	7453	4563	4889	5874
Michelle	1923	5468	4587	9064	3459	3458	5873	6587	8453	4576	4576

“Organizations with solid information foundations can use visualization to leapfrog competitors. Laggards can use the allure of visualization as strong reason to finally shore up data management concerns. Regardless of which category your organization falls into, your employees, customers and partners will soon expect access and transparency to information that can be explored, manipulated and acted upon. Leading companies will be in a position to profit from getting it right.”

Why is Visualization important?

- The brain processes visual information faster
- Users can spot patterns or trends which are not obvious in a flat structure
- Conveys information in a universal manner
- Information can be interpreted by any audience
- Decision making is faster and cheaper



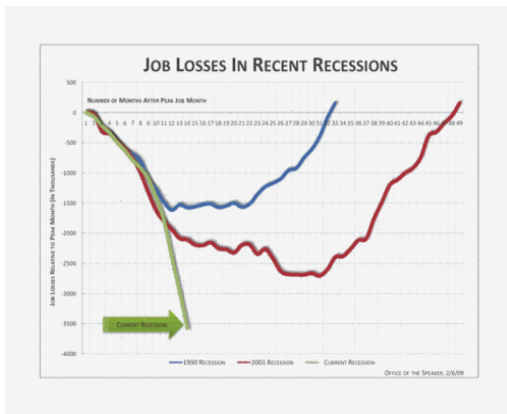
The screenshot displays a data visualization software interface. The main window shows a large table of numerical data. The columns are labeled 0 through 15. The rows are labeled with various factors and territories. The data is presented in a flat structure, which is the focus of the slide's message.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Factor	1.000000	-1.44904	-0.241487	-1.45465	-0.061527	-0.047006	-0.076012	-0.078624	-0.054235	-0.055968	-1.17394	-1.10663	-0.056519	-0.051371		
2003	-1.44904	1.000000	0.635330	0.653614	-0.060470	-0.055418	-0.039479	-0.062642	-0.032710	-0.044623	-0.071024	-0.068111	-0.048708	-0.050550		
2004	-0.241487	0.635330	1.000000	0.655543	-0.048029	-0.039903	-0.007696	-0.015214	-0.009970	-0.039875	-0.015330	-0.037590	-0.019982	-0.024825		
2002	-1.45465	0.653614	0.655543	1.000000	-0.054846	-0.046211	-0.050460	-0.065880	-0.036478	-0.046689	-0.087382	-0.075031	-0.054444	-0.050802		
202	-0.061527	-0.060470	-0.048029	-0.054846	1.000000	1.30442	153583	166558	109241	130594	247583	208913	141815	129474		
142	-0.047006	-0.055418	-0.039903	-0.046211	1.30442	1.000000	131633	141617	093055	111607	211485	179618	121954	110019		
200	-0.076012	-0.039479	-0.007696	-0.050460	153583	131633	1.000000	172424	110384	131450	255472	220034	145799	131037		
401	-0.078624	-0.062642	-0.015214	-0.065880	166558	141617	172424	1.000000	120017	141444	274216	232090	156549	142833		
502	-0.054235	-0.032710	-0.009970	-0.036478	109241	093055	110384	120017	1.000000	093216	178353	149609	102047	092388		
128	-0.055968	-0.044623	-0.039875	-0.046689	130594	111607	131450	141444	093216	1.000000	211860	179965	120690	109256		
501	-1.17394	-0.071024	-0.015330	-0.087382	247583	211485	255472	274216	178353	211860	1.000000	346678	232101	209810		
500	-1.10663	-0.068111	-0.037590	-0.075031	208913	179618	220034	232090	149609	179965	346678	1.000000	196127	176246		
114	-0.056519	-0.048708	-0.019982	-0.054444	141815	121954	145799	156549	102047	120690	232101	196127	1.000000	121297		
150	-0.051371	-0.050550	-0.024825	-0.050802	129474	110019	131037	142833	092388	109256	209810	176246	121297	1.000000		
120	-0.059851	-0.047542	-0.013522	-0.054037	142432	121362	146101	158458	102557	120932	233284	196099	134161	121690		
115	-0.060659	-0.048649	-0.025575	-0.047793	135032	114188	134440	146915	096339	114581	218081	183078	125373	114135		
147	-0.069842	-0.062489	-0.024991	-0.061893	169718	143027	170560	186603	121076	143436	275979	230887	157174	144254		
117	-0.060765	-0.040948	-0.017495	-0.046345	139599	117731	140351	153552	099585	117962	226715	190321	129398	118587		
302	-0.059542	-0.040771	-0.025261	-0.055043	143540	120867	144701	157558	102310	121536	233440	195640	133315	122112		
201	-0.098736	-0.083530	-0.048381	-0.085729	238006	203374	245161	261307	169926	202901	388888	331217	223025	201092		
300	-1.00641	-0.060358	0.000261	-0.080001	218644	187524	231882	248727	158926	187254	365776	311631	208471	188868		
402	-0.084347	-0.075202	-0.042616	-0.076810	204005	172781	206438	225370	145243	173072	331825	280090	189946	173687		
400	-0.069628	-0.055213	-0.026381	-0.058825	158435	135173	164613	176710	113637	135698	260765	222518	149020	135147		
037	-1.00268	213626	237821	225400	104511	088707	114374	120165	078947	089100	180029	147596	101531	091222		
Territory 002	-1.40121	290836	325518	305255	141303	120397	157184	161547	106627	120826	244126	202164	136297	122632		
Territory 006	-0.099133	214100	239145	225170	102946	087445	111866	116897	077889	088020	177740	145034	099749	089088		
Territory 047	-1.00004	218016	242008	230242	106997	090010	115930	122156	080256	090374	183141	149457	103526	093606		

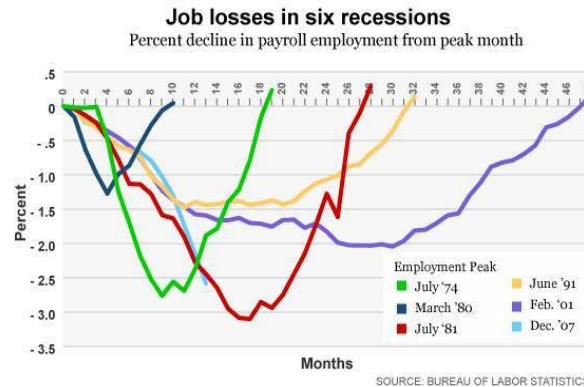
Charting at the core of powerful visualization

Central to powerful data visualizations is accurate choice of charting. Without correct usage of charting concepts, data explanation will be inaccurate and misleading. Thus, prior to discussions about mobile analytics and dashboards for visualization, understanding of charting requirements is critical.

Same data different messages



Published by Politician Nancy Pelosi



Published by TIME magazine

- Same data from the Bureau of Labor Statistics
- Both represent U.S. job losses by recessions
- Both tell very different stories, as the first manipulates the visualization to show exaggerated job loss

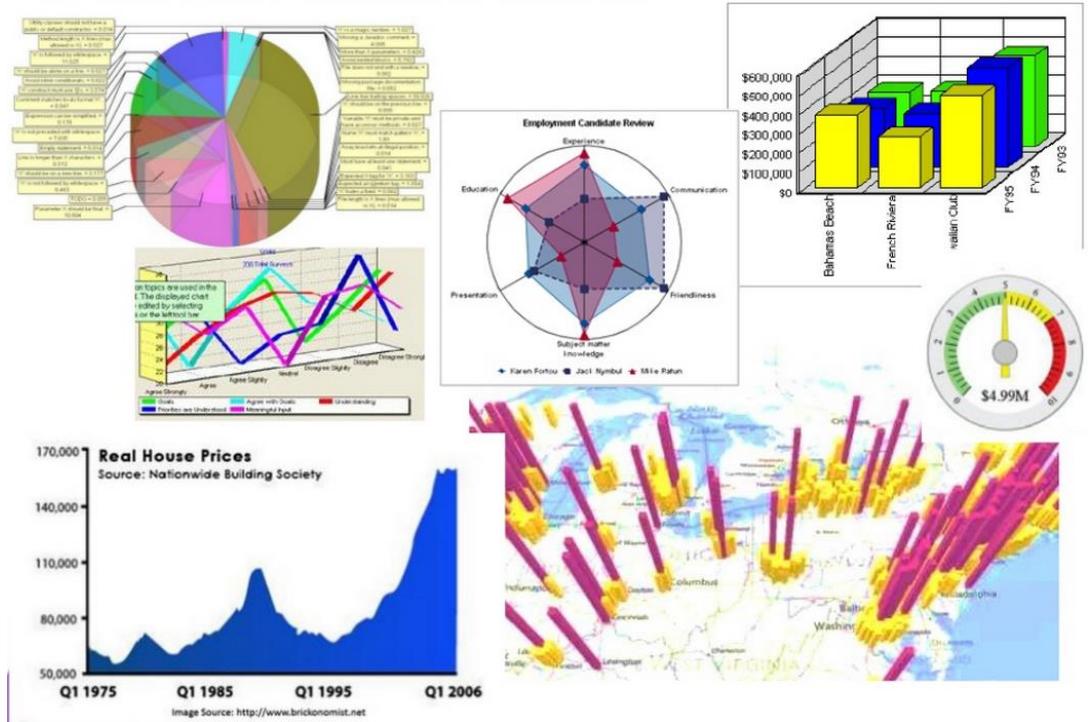
In this case, use of vertical scaling (larger y-axis), absolute values (numbers versus percentage), and narrower context (omitted data) affects the visualization to make the data tell different stories. Though one of the two is misleading, this demonstrates the critical decisions that must be made in charting when looking to convey accurate and meaningful messages.

Missteps in charting at a glance

Decisions made in charting are critical in effective visualization. Poor understanding of charting concepts can lead to the creation of visualizations that have confusing messages or distorted facts.

To the right are a number of examples of bad charts. Some of the missteps include:

- **Data overload** — Charts overloaded with data make them hard to understand
- **Data distortion** — Charts that distort data can be used to prove a point but may not be accurate
- **Data distraction** — Charts that use vibrant colors and 3D imagery make it difficult for viewing and detract from the overall message



Knowledge of charting concepts will help make correct decisions that truthfully and accurately display information in a visually compelling format and bad charts distort data explanation

Data explanation versus data exploration

While charting in data exploration can be used for exploration or explanation, the focus of this presentation is on data explanation for accurately presenting data analysis to senior audiences.

Data exploration: find a story the data is telling you

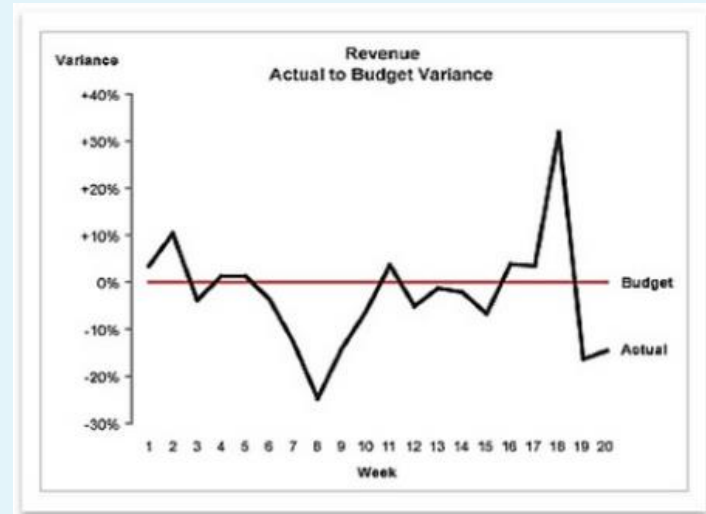


*Exploration of revenue **trend**:*

Uses data visualization to explore identify relationships and to recognize signals within the data set

vs.

Data explanation: tell a story to an audience



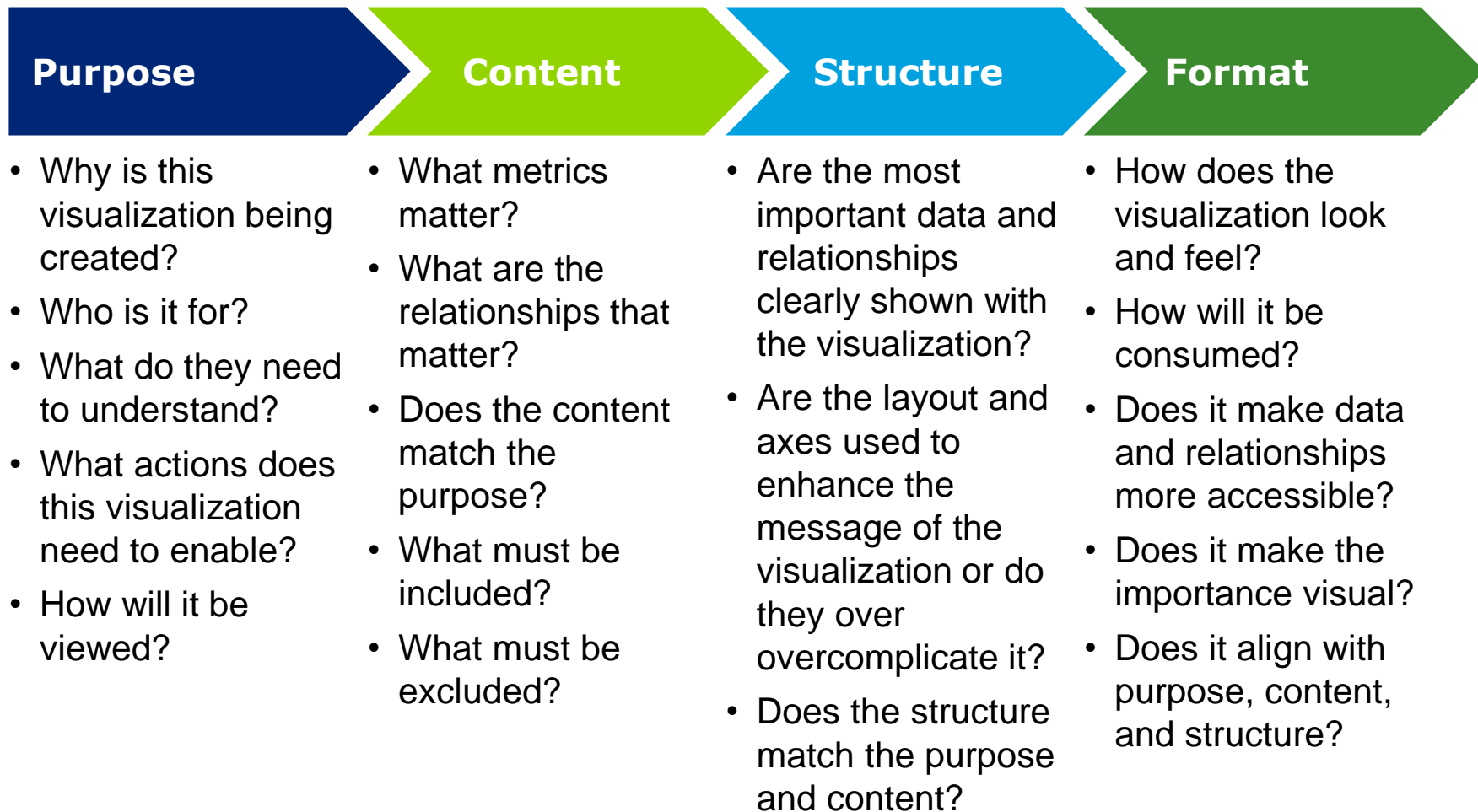
*Explanation of revenue **variance**:*

Visualizes data in a way that clearly expresses the defining data relationships in a truthful and accurate way

Data visualization for business analysis

Building powerful data visualizations

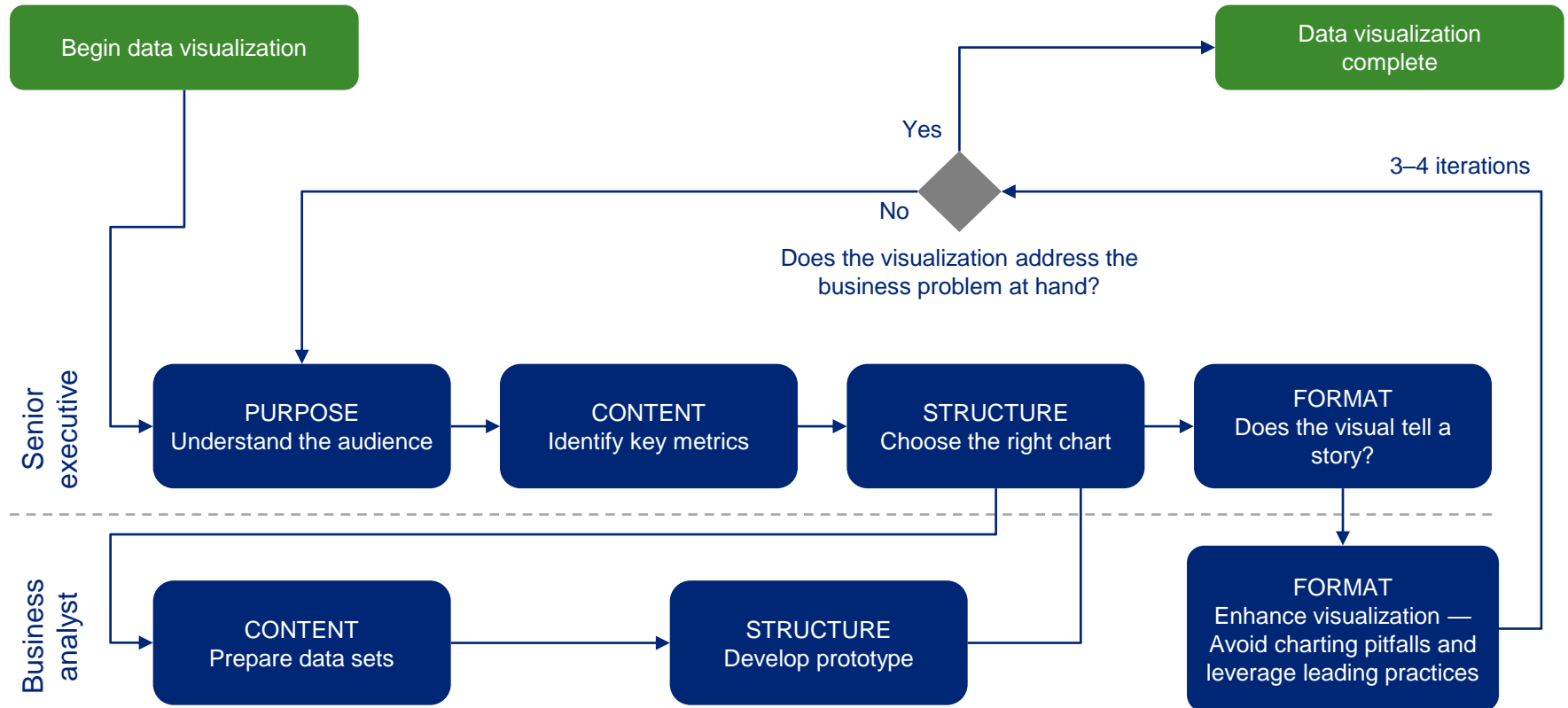
Successful visualization design ensures Purpose, Content, Structure, and Formatting have been considered.



Structured approach to data visualization

Decision workflow — Leverage rapid prototyping cycles to iteratively create the most optimal data visualization.

Rapid prototyping cycle



Audience considerations

Visualization is primarily geared toward senior business executives and managers who intend to draw meaningful insights from data to solve complex business problems. Understanding how they will perceive data visualization is critical

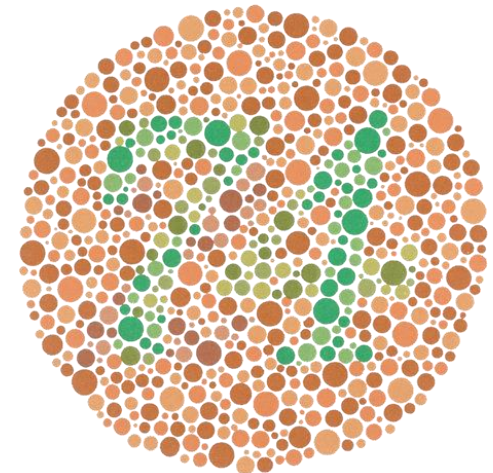
Who are the viewers?

- How technical is the audience? Will they understand the visualization presented?
- Cultural questions that affect design choices
 - Language and social context
 - What do colors mean
 - What icons are familiar
- Consider all possible obstacles of audience perception.
 - For example, a significant percentage of the population is colorblind, a consideration which may affect the color chosen

How are visualizations being viewed?

- Live presentation
 - Printed on paper?
 - Projected on a large screen?
- Stand-alone content
 - Interactive devices?
 - Static presentation?

1. Jen Underwood — Data Visualization Best Practices
2. Wong B. Color blindness. Nat Methods. 2011 Jun;8(6):441



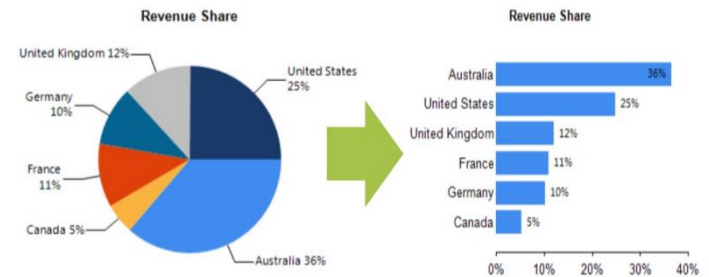
Ishihara Color Test is an example of a color perception test

Audience considerations

Understanding of the underlying data within the visualization is critical in effective messaging. Success or failure depends on understanding desired outcomes and using metrics that matter

Choosing metrics

- What action are you looking to inspire? Do the chosen metrics reflect this message?
- What metrics does the audience care enough about to motivate them?
- Is there enough detail to make the visualization actionable?
- What does the data say, and does it reinforce the message?



Part to whole relationships

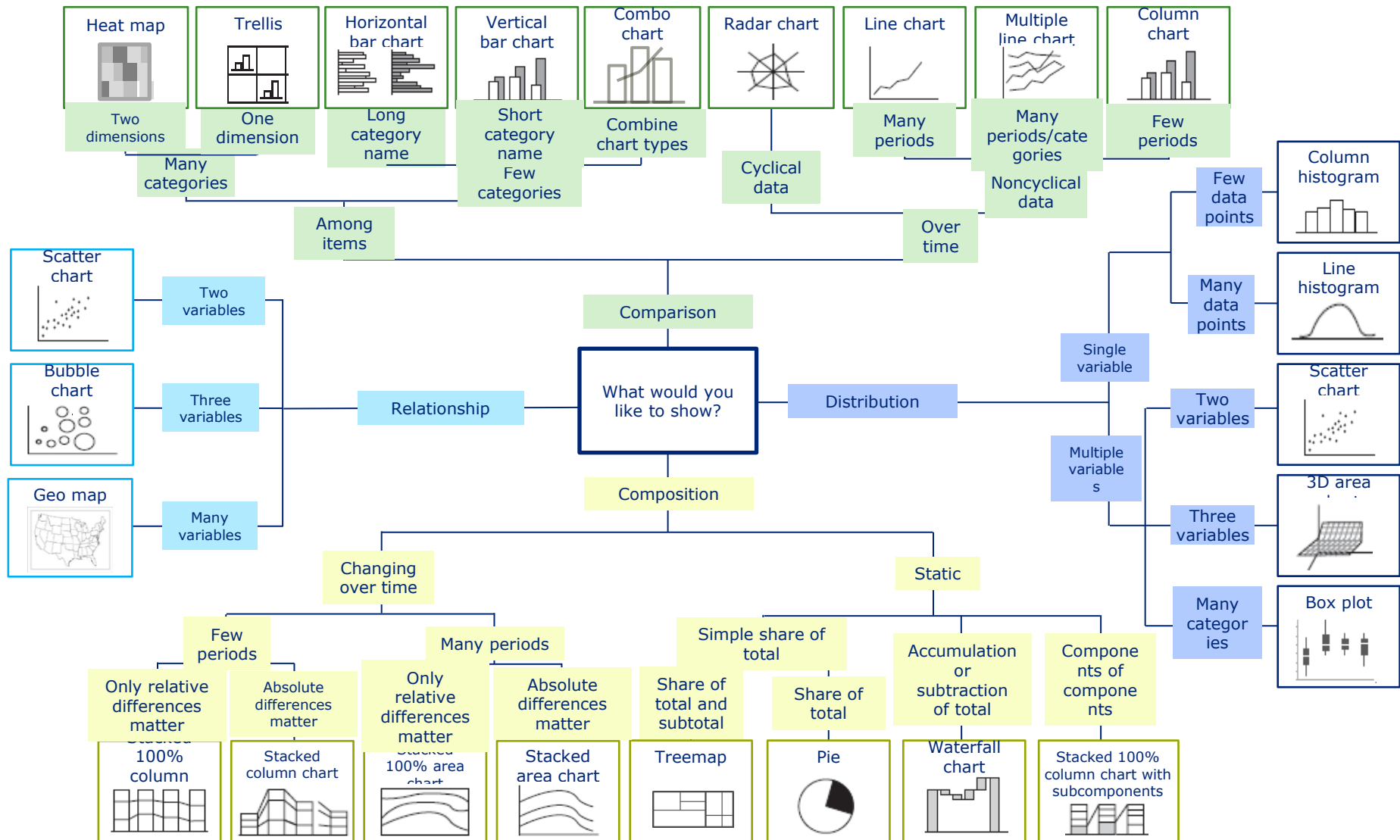


Dealing with disparate values

- What are you trying to show with the metrics? Distribution? Comparison? Composition? Relationship?
- Will the message come across in the data as percentages or absolute values? Are there scaling concerns?

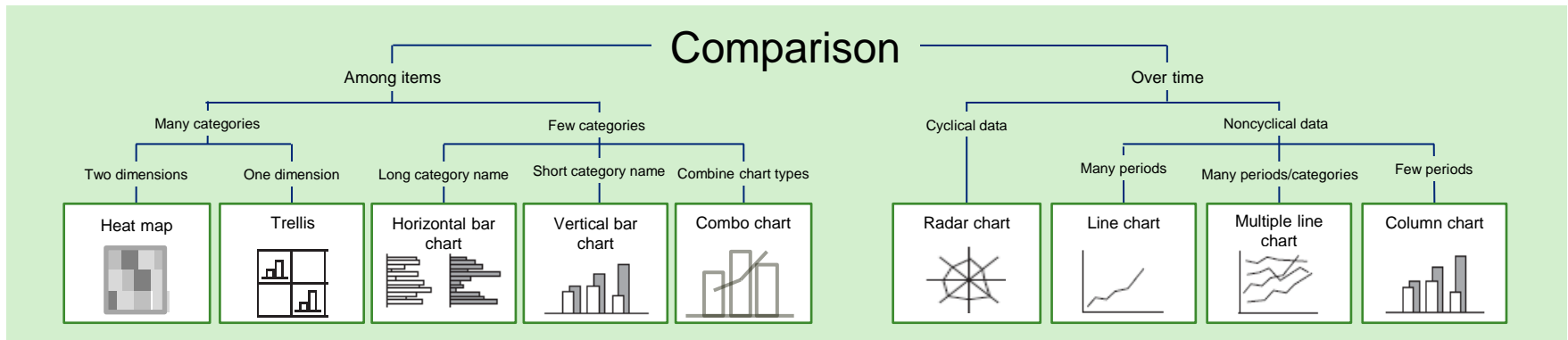
1. Jen Underwood — Data Visualization Best Practices
2. Wong B. Color blindness. Nat Methods. 2011 Jun;8(6):441

Design — How to choose the right chart



Design - How to choose the right chart: comparison

Listed below are some common business scenarios that can be tackled using the *comparison* aspect of charting



Heat map —
Compare full set of customers on sales increase versus sales volume to identify outliers for analysis

Line chart —
Depict financial performance trending over time

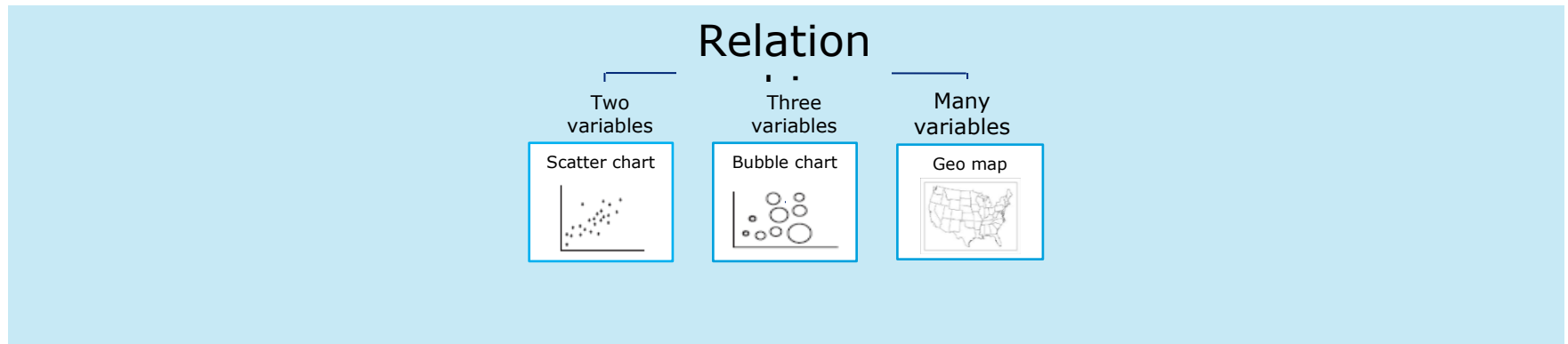
Trellis —
Compare change in cost of goods sold (COGS) components — fixed costs, overhead costs, direct labor, and direct material, against each other. It can also be used as a guided navigation aid

Staggered vertical bar chart —
Depict inventory trending (raw, work in progress, and finished goods) over time

Radar chart —
Assess product performance based on criteria such as safety, efficiency, reliability, speed, and comfort

Design - How to choose the right chart: Relationship

Listed below are some common business scenarios that can be tackled using the *relationship* aspect of charting



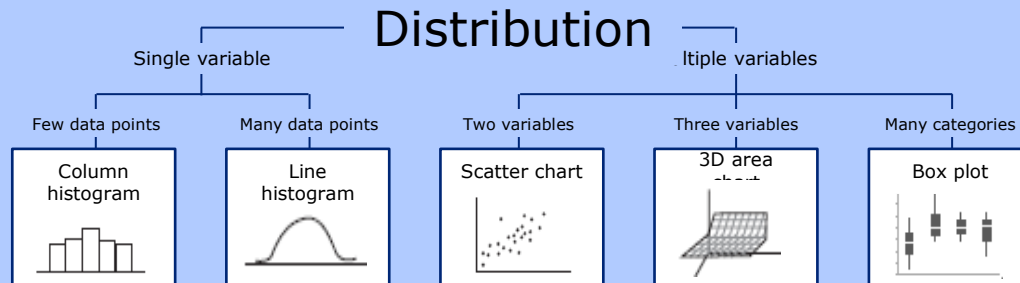
Scatter chart —
Depict plant maintenance costs against age of production facility to infer any possible correlation

Geo map —
Analyze consumer spending behavior by plotting average annual income and household size by geography

Bubble chart —
Profile market share and annual growth rate for comparing various product brands. Use size of the bubbles to indicate sales volume for each brand

Design — How to choose the right chart: Distribution

Listed below are some common business scenarios that can be tackled using the *distribution* aspect of charting



Line histogram —

Gain insight into investment decisions by depicting return on investment (ROI) against percentage of invested projects

Column histogram —

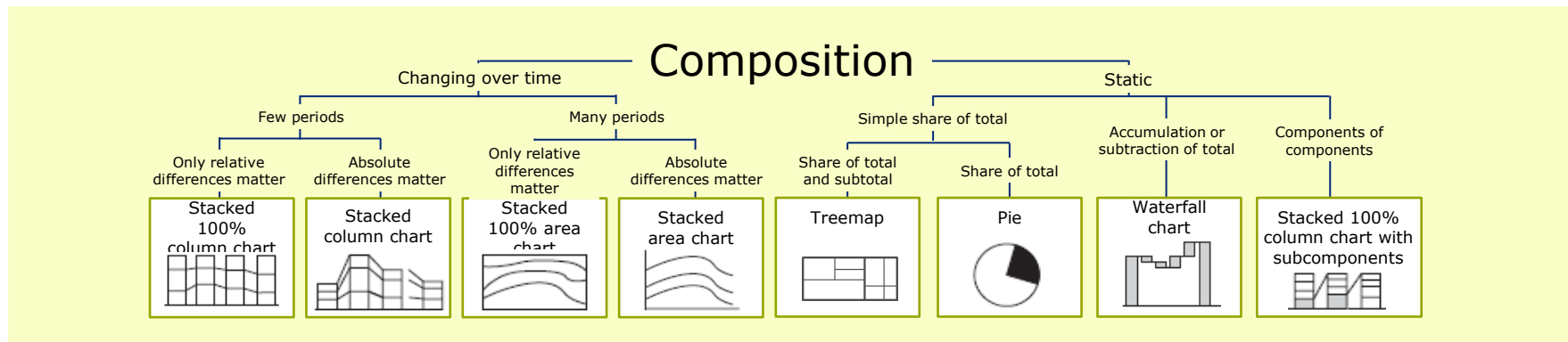
Highlight average distribution of aging inventory, i.e., 0–90 days, 91–180 days, 181–270 days, 271–360 days, and 360+ days

Box plot —

Analyze gross margin by stocking rate for the top selling products to understand and maximize margins

Design - How to choose the right chart: composition

Listed below are some common business scenarios that can be tackled using the *composition* aspect of charting



Tree map — Gain insight into channel performance of an omni-channel retailer by depicting sales by channel. Furthermore, show breakup of each channel by geography (ex. continents)

Waterfall chart — Analyze major drivers of price deductions by plotting gross margin to highlight deductions, such as discounts, rebates, returns, consumer credits, and allowances

Stacked area chart — Provide insight into actual sales numbers compared to forecast and budget, over the past eight quarters

Pie chart — Understand market share contribution by product categories, i.e., new products, existing products, and retiring products

Visual encoding — Leading practices

Visual Encoding refers to the process by which we remember visual images and can be leveraged to present data in meaningful ways. Humans can easily differentiate between various colors, shapes, sizes, and other properties. Listed below are some visual encoding leading practices to facilitate better data perception and draw insights

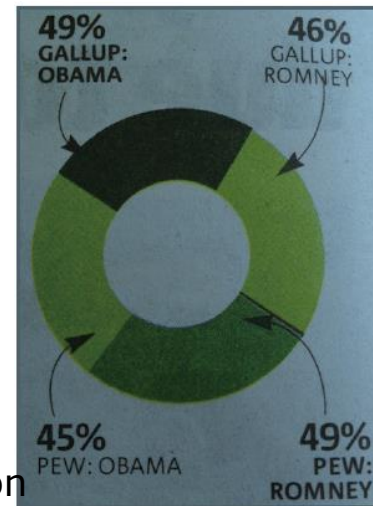
	Visual encoding	Properties			Best uses		
Example	Encoding	Ordered	Useful values	Quantitative	Ordinal	Categorical	Relational
	Position & placement	Yes	Infinite	Good	Good	Good	Good
	Text labels	Optional	Infinite	Good	Good	Good	Good
	Length	Yes	Many	Good	Good		
	Size & area	Yes	Many	Good	Good		
	Angle	Yes	Medium/Few	Good	Good		
	Pattern density	Yes	Few	Good	Good		
	Weight & boldness	Yes	Few		Good		
	Saturation & brightness	Yes	Few		Good		
	Color	No	Few (<20)			Good	
	Shape & icon	No	Medium			Good	
	Pattern texture	No	Medium			Good	
	Enclosure & connection	No	Infinite			Good	Good
	Line pattern	No	Few				Good
	Line endings	No	Few				Good
	Line weight	Yes	Few		Good		

1. Noah Iliinsky — [Complex Diagrams.com/Properties](https://ComplexDiagrams.com/Properties) 2012-10
2. Visual Encoding — Michael Dubakov, Target Process

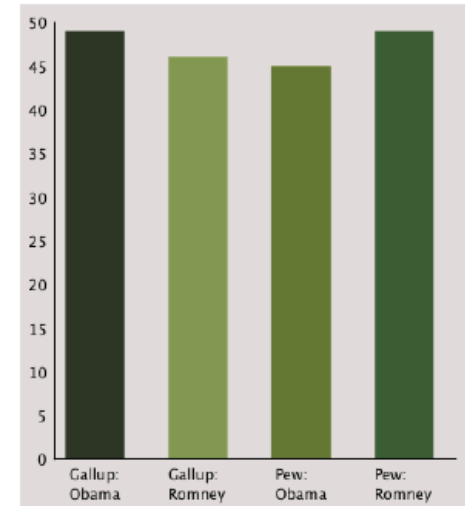
Test, review, and enhance — Charting pitfalls

Does the visual tell the story? Check the visualization for the following pitfalls to ensure that you are charting truthfully and accurately displaying information in a visually compelling format

1. Supplying inadequate context for the data
2. Displaying excessive detail or precision
3. Expressing measures indirectly
4. Choosing inappropriate media of display
5. Introducing meaningless variety
6. Using poorly designed display media
7. Encoding quantitative data inaccurately
8. Arranging the data poorly
9. Ineffectively highlighting what is important
10. Cluttering the screen with useless decoration
11. Misusing or overusing color
12. Exceeding the boundaries of a single screen
13. Designing an unappealing display
14. Color should not be used to display good or bad
15. Color should be used for categorization only
16. Color should be able to show contrast but not be distracting



**Wrong
visualization**



**Right
visualization**

Test, review, and enhance - Good charts/bad charts



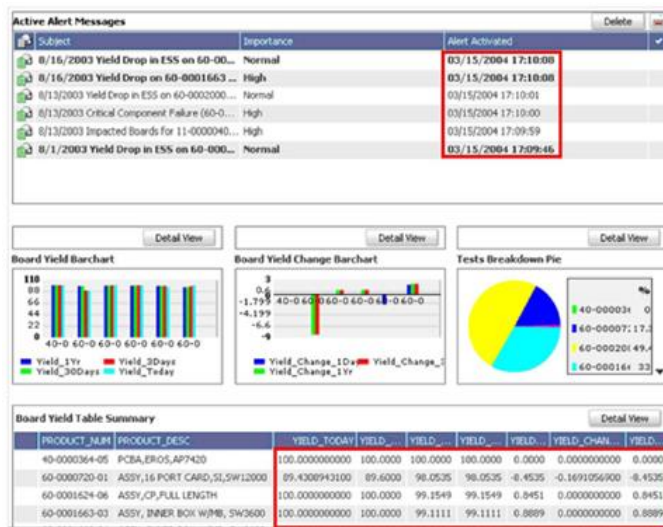
Charting pitfall

In this example, to state that quarter-to-date sales total \$736,502 without any context means little. Compared to what? Is this good or bad? How good or bad? Are we on track? Is this better than before? The right context for the key measures makes the difference between numbers that just sit there on the screen and those that enlighten and inspire action.

Measures of what is currently going on can be enriched by providing one or more comparative measures, such as a target or some history, as well as a quick visual means for assessing the measure's qualitative state (for example, good, satisfactory, or bad).

- 1 Supplying inadequate context for the data
- 2 Displaying excessive detail or precision
- 3 Expressing measures indirectly
- 4 Choosing inappropriate media of display
- 5 Introducing meaningless variety
- 6 Using poorly designed display media
- 7 SupEncoding quantitative data inaccurately
- 8 Arranging the data poorly
- 9 Ineffectively highlighting what is important
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Test, review, and enhance - Good charts/bad charts



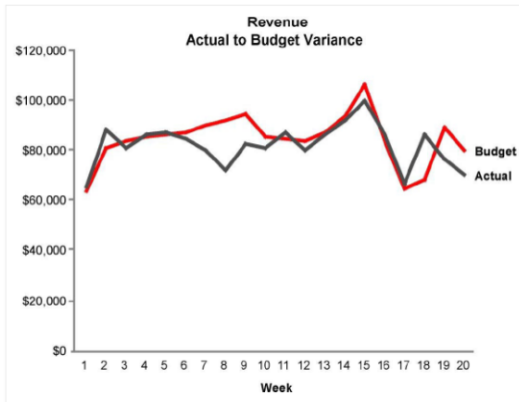
Charting pitfall

Charting for senior executives should never display information that is more detailed or precise than necessary. To do so would force the viewer to process levels of data that are irrelevant to the task at hand. Too much detail or measures that are expressed too precisely (for example, \$3,848,305.93 rather than \$3,848,306 or perhaps even \$3.8M) just slow them down without benefit.

Examine the two sections in the example above that are enclosed in red rectangles. The lower right section displays from 4 to 10 decimal digits for each measure, which might be useful in some contexts, but doubtfully on a dashboard. The upper highlighted section displays time down to the level of seconds, which seems excessive in this context. With a dashboard, every unnecessary piece of information results in wasted time, which is intolerable when time is definitely of the essence.

- 1 Supplying inadequate context for the data
- 2 Displaying excessive detail or precision
- 3 Expressing measures indirectly
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Test, review, and enhance - Good charts/bad charts



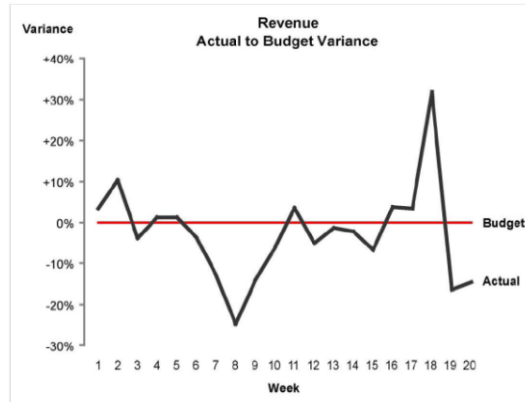
Bad charting:

Fails to express the variance amount directly

Charting pitfall

To express measures appropriately, you must understand exactly what viewers need to see and how they plan to use the information. For a measure to be meaningful, viewers must know what is being measured and the units in which the measure is being expressed. A measure is poorly expressed if it fails to directly, clearly, and efficiently communicate the meaning that viewer must discern.

If the viewer only needs to know by how much actual revenue differs from budgeted revenue, rather than displaying the actual revenue amount of \$76,934 and the budgeted revenue amount of \$85,000 and leaving it to the viewer to calculate the difference, why not display the variance amount directly? Additionally, percentages more clearly focus attention on the variance itself, rather than the raw difference (such as in dollars). Percentages also make it easier to compare the variances of multiple items when their actual values differ significantly in scale.



Good charting:

Directly expresses the variance between actual and budgeted revenue

- 1 Supplying inadequate context for the data
- 2 Displaying excessive detail or precision
- 3 Expressing measures indirectly
- 4 Choosing inappropriate media of display
- 5 Introducing meaningless variety
- 6 Using poorly designed display media
- 7 SupEncoding quantitative data inaccurately
- 8 Arranging the data poorly
- 9 Ineffectively highlighting what is important
- 10 Cluttering the screen with useless decoration
- 11 Misusing or overusing color
- 12 Exceeding the boundaries of a single screen
- 13 Designing an unappealing display
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Test, review, and enhance - Good charts/bad charts



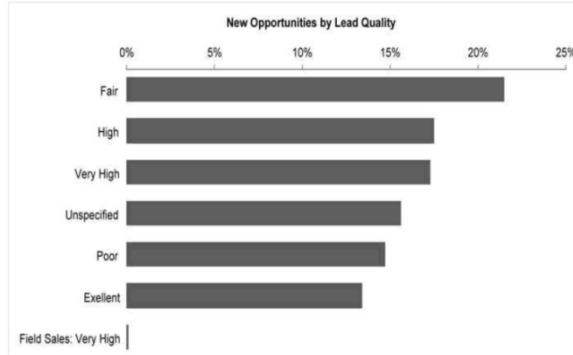
Bad charting:

Pie charts often do a poor job of showing how individual items relate to one another and the whole

Charting pitfall

Using a graph when a table of numbers would work better and vice versa is a frequent mistake, but what is more common and egregious is use of the wrong type of graph for the data and its message.

If you must read the numbers to determine how the slices of a pie chart relate to one another, you might as well use a table instead. We use graphs when the picture itself reveals something important that could not be communicated as well be a table of numbers. The slices of this pie cannot be interpreted in a useful way without reading the associated numbers, so what use is the picture? Using a bar graph below, however, tells the same story as the pie chart above, but does so clearly because it is a better medium of display for this information.

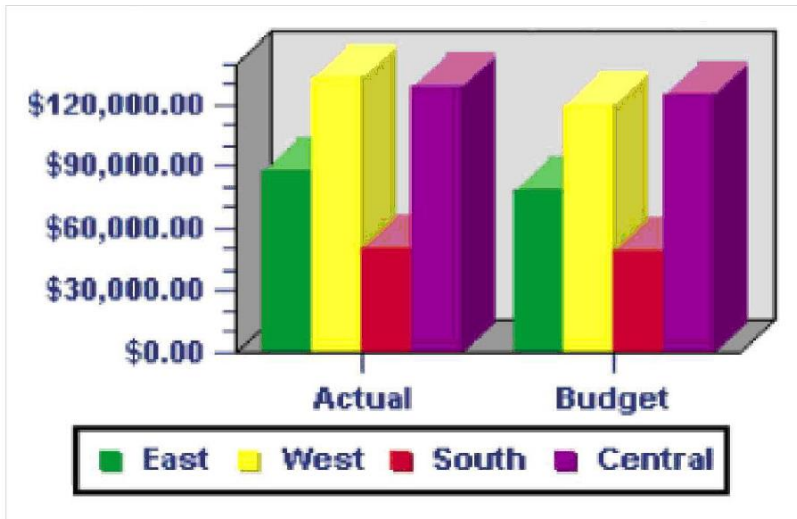


Good charting:

Bar graphs communicate the relationship between individual items and the whole.

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Test, review, and enhance - Good charts/bad charts



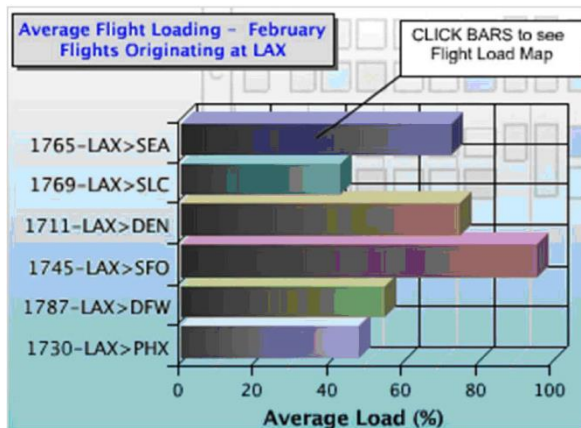
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Test, review, and enhance - Good charts/bad charts



Charting pitfall

Color can be used in powerful ways to highlight data, encode data, or create a relationship between individual items on a dashboard, but it is commonly overused and misused. Color choices must be made thoughtfully, based on an understanding of how people perceive color and the significance of color differences. Some colors are hot and demand our attention while others are cooler and less visible. When any color appears as a contrast to the norm, our eyes pay attention, and our brains attempt to assign meaning to that difference. When colors in two different displays are the same, we are tempted to relate them to one another. We merrily assume that we can use colors like red, yellow, and green to assign important meanings to data, but in doing so we exclude the 10% of males and 1% of females who are color blind.

A common problem is the use of too many colors, especially bright colors. Because dashboards are often densely packed with information, the visual content must be kept as simple as possible. The use of too many colors can be visually assaulting. When overused, color loses its power to highlight what is most important.

1. Stephen Few — Common Pitfalls in Dashboard Design

- 1 Supplying inadequate context for the data
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Exercise – Selecting the right chart

1.Sales trending over time

Line chart

2.Key Performance Indicator to measure proportion of orders being dispatched on time

Gauge chart

3.Project budget remaining at a point in time

Funnel chart

4.Percentage of staff passing and failing exams

Pie chart

5.Number of males and females being promoted

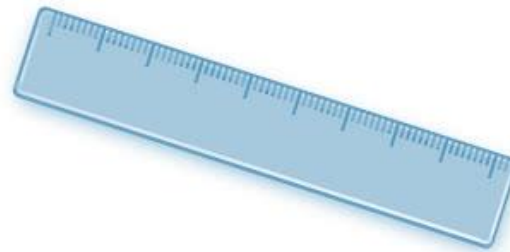
Bar chart

Effective Visualization

Data types

One way to separate data is to look at what is being measured. To do this there are four levels of measurement:

1. Nominal
2. Ordinal
3. Interval
4. Ratio



Different levels of measurement call for different statistical techniques. For example, it makes no sense whatsoever to find the mean, and median of a list of Social Security numbers.

Types of data - Nominal

The nominal level of measurement is the lowest of the four ways to characterise data. Nominal means "in name only" and that should help to remember what this level is all about. Nominal data deals with names, categories, or labels

Data at this level can't be ordered in a meaningful way, and it makes no sense to calculate things such as means and standard deviations.

Examples:

- Products – Books, Movies, Music
- Gender – Male, Female
- State – Virginia, Nevada, California



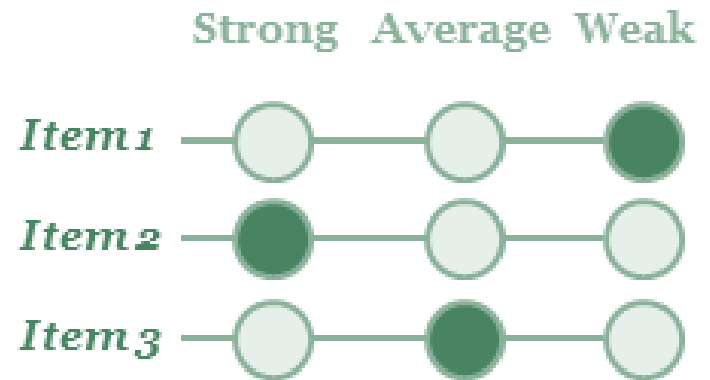
Types of data - Ordinal

The next level is called the ordinal level of measurement. Data at this level can be ordered, but no differences between the data can be taken that are meaningful

As with the nominal level, data at the ordinal level should not be used in calculations.

Examples:

- Date – 1/1/2014, 1/2/2014...
- Grades – A, B, C...
- Ranks – Like, Neutral, Dislike



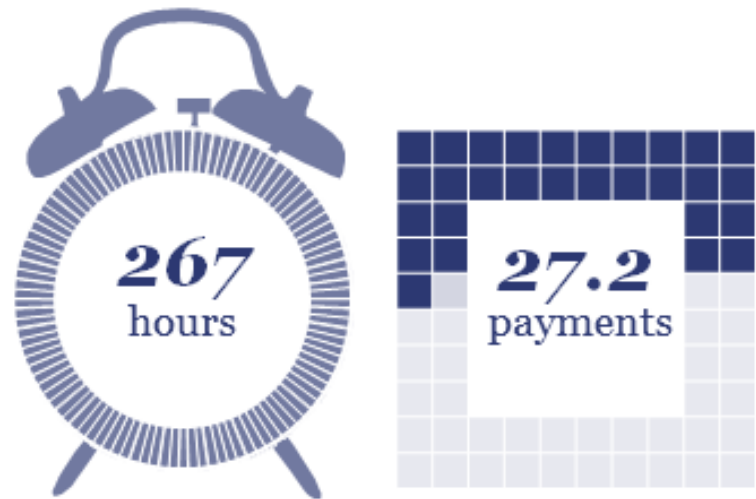
Types of data - Interval

The interval level of measurement deals with data that can be ordered, and in which differences between the data does make sense. Data at this level does not have a starting point.

Data at the interval level can be used in calculations. However, data at this level does lack one type of comparison. Even though $3 \times 30 = 90$, it is not correct to say that 90 degrees Celsius is three times as hot as 30 degrees Celsius.

Examples:

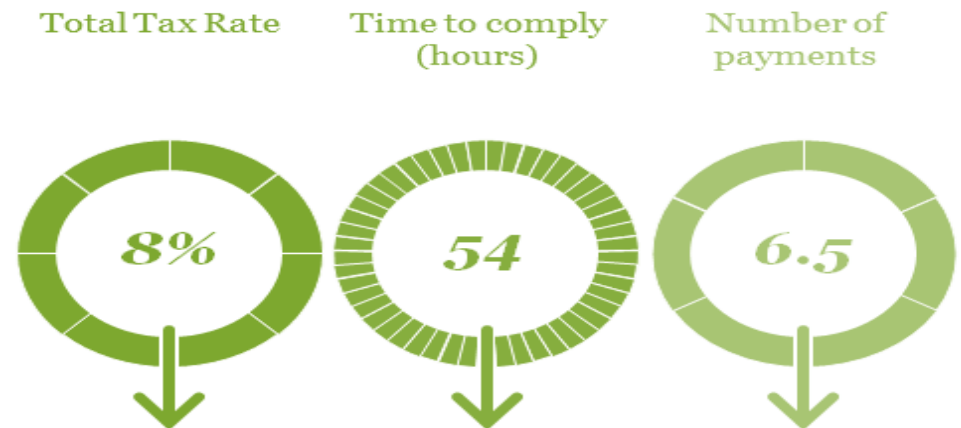
- Revenue, Cost, Profit
- Number of Customers
- Temperature



Types of data - Ratios

The fourth and highest level of measurement is the ratio level. Data at the ratio level possess all the features of the interval level, in addition to a zero value. Due to the presence of a zero, it now makes sense to compare the ratios of measurements. Phrases such as "four times" and "twice" are meaningful at the ratio level.

At the ratio level of measurement, not only can sums and differences be calculated, but also ratios. One measurement can be divided by any nonzero measurement, and a meaningful number will result.



On average across the eight years of the study the cost of tax, the Total Tax Rate, has fallen by almost **1%** for each year; the time to comply has fallen by **54 hours** (seven days); and the number of payments has fallen by **6.5**.

Visual perception - Law of Prägnanz

When people are presented with a set of ambiguous elements (elements that can be interpreted in different ways), they interpret the elements in the simplest way.



Visual perception – Law of similarity

The law of similarity states that elements within an assortment of objects are perceptually grouped together if they are like each other. This similarity can occur in the form of shape, color, shading or other qualities.

You would probably describe what you see as four rows of letters instead of ten columns of letters, because we tend to group similar things into whole sets

h h h h h h h h h h

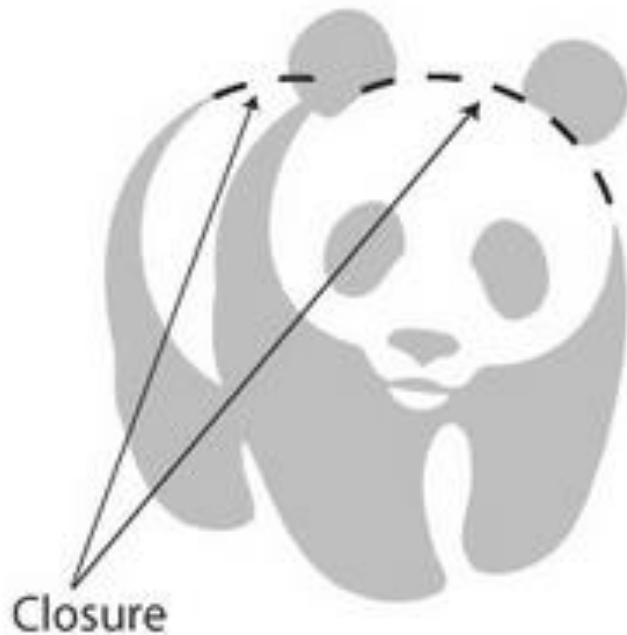
q q q q q q q q q q

n n n n n n n n n n

p p p p p p p p p p

Visual perception – Law of closure

The law of closure states that individuals perceive objects such as shapes, letters, pictures, etc., as being whole when they are not complete. Specifically, when parts of a whole picture are missing, our perception fills in the visual gap.

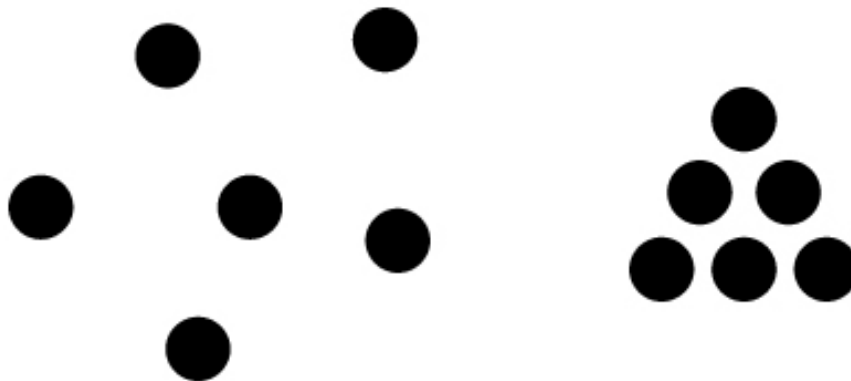


WWF Logo Using Closure

Visual perception – Law of proximity

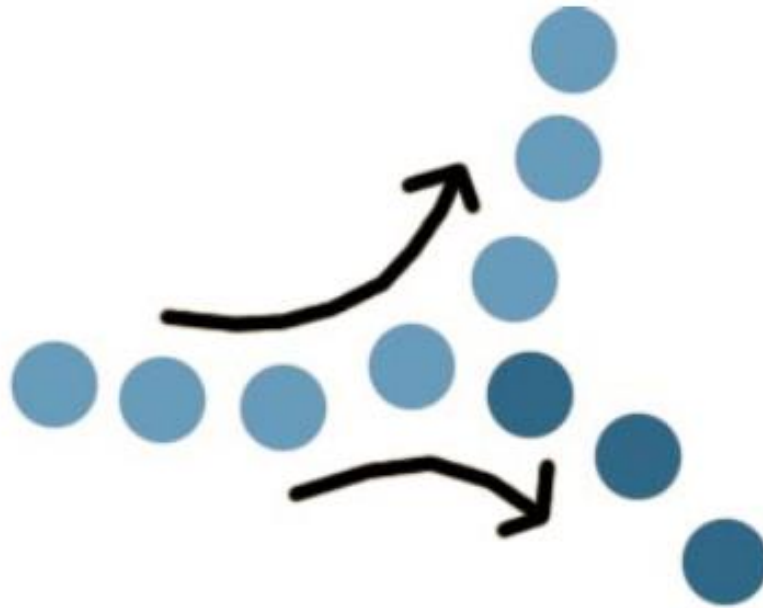
The law of proximity states that when an individual perceives an assortment of objects, they perceive objects that are close to each other as forming a group.

On the left side it appears that the circles are haphazardly placed in no order. On the right side, even though the same circles are used, it is clear to us that the shape of a triangle has been formed.

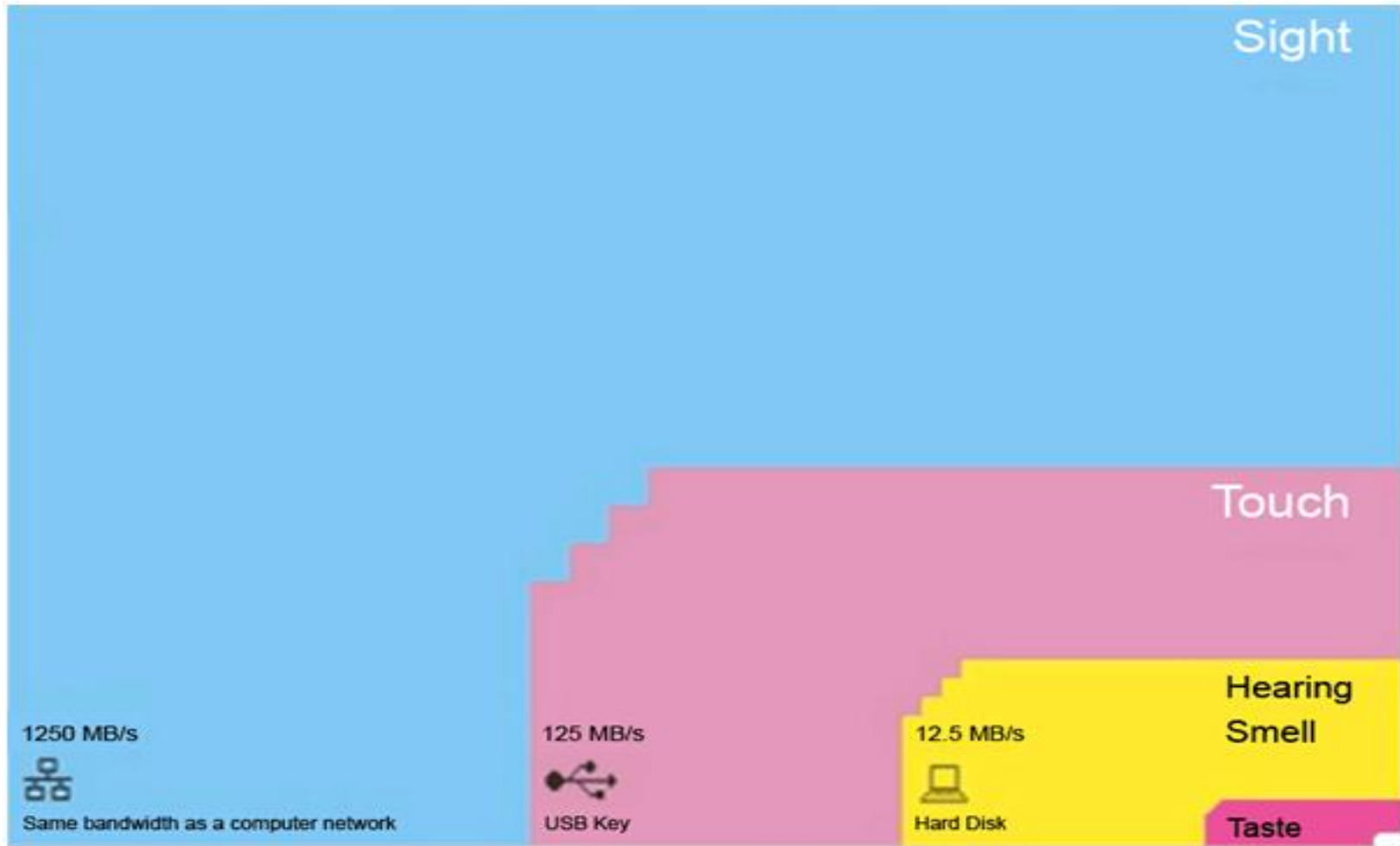


Visual perception – Law of continuity

The law of continuity states that elements of objects tend to be grouped together, and therefore integrated into perceptual wholes if they are aligned within an object. In cases where there is an intersection between objects, individuals tend to perceive the two objects as two single uninterrupted entities.

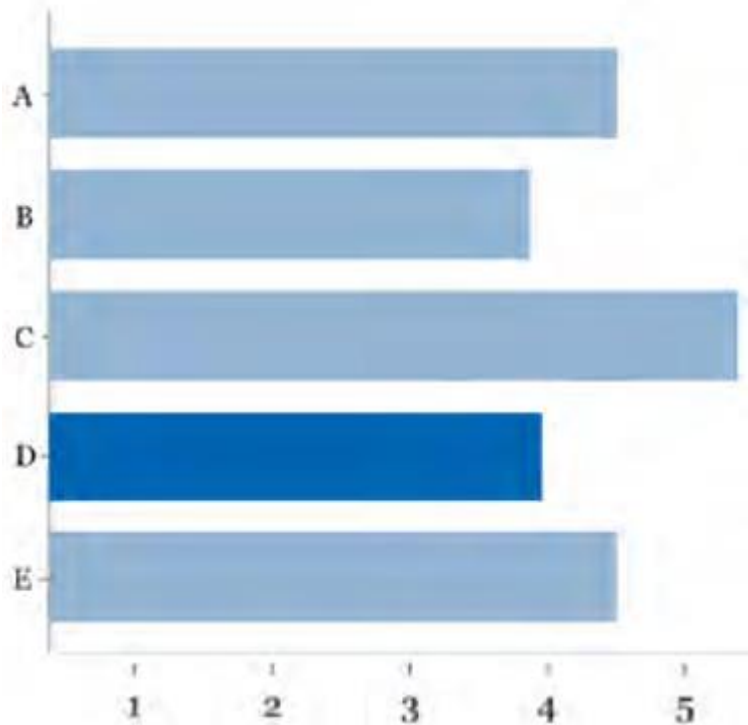


Visual perception - Bandwidth of the senses



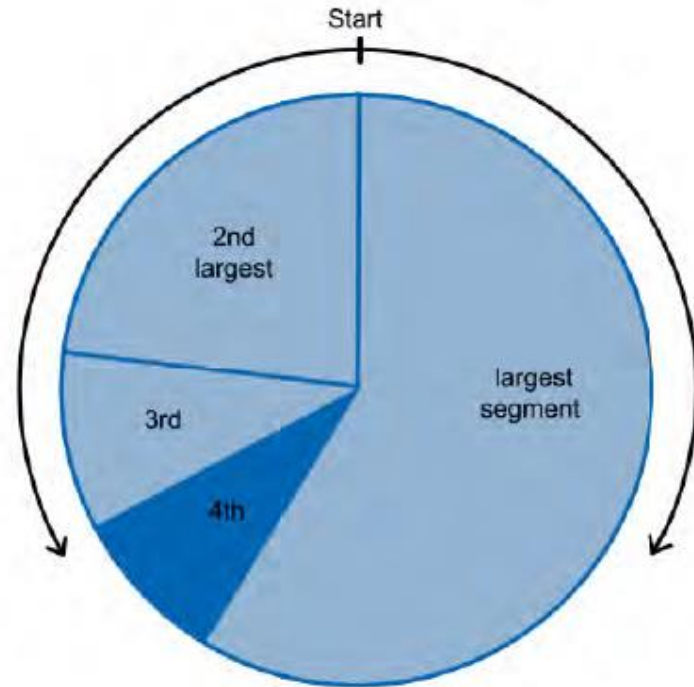
Best practice – Chart designing

Bar Chart



- Not for use with numerical data
- Axes start at zero
- Don't use shading or shadows
- Make width of bar about one to two times space between bars

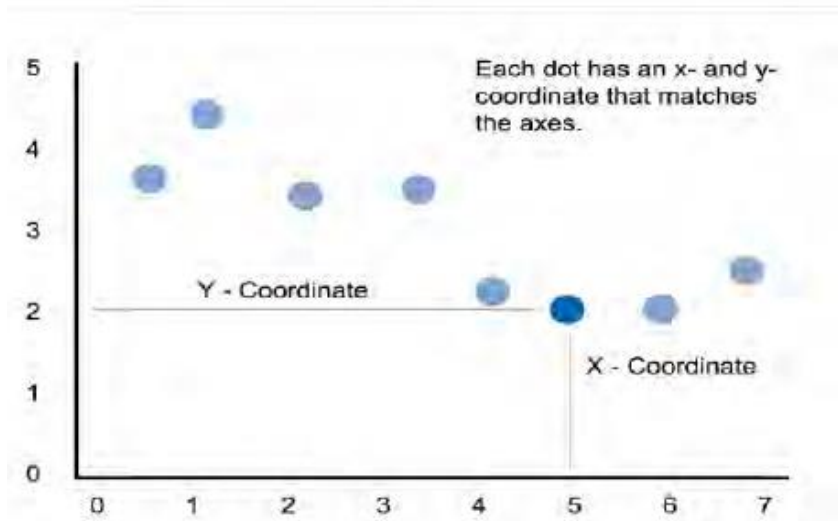
Pie Chart



- Population sums to 100%
- Limit the number of slices
- Never use 3D

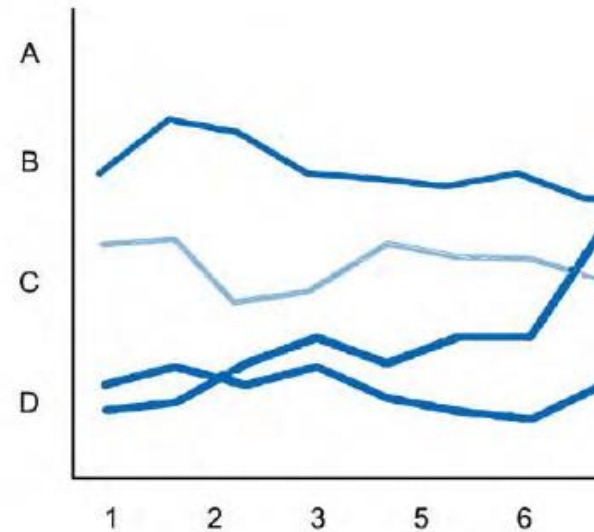
Best practice – Chart designing

Scatter Chart



- Relationship between two variables
- Can infer causality

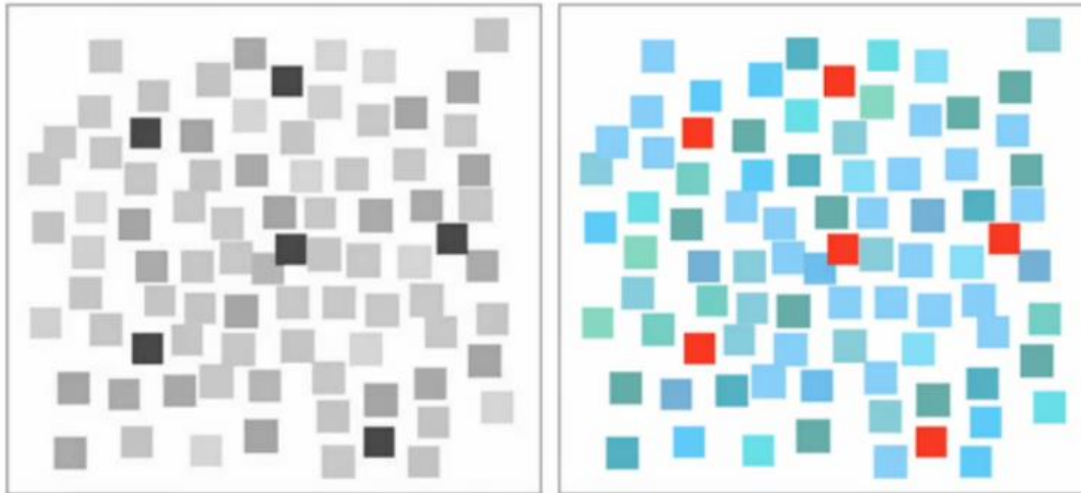
Line Chart



- Patterns over a continuous range
- Exercise caution with axes zeros

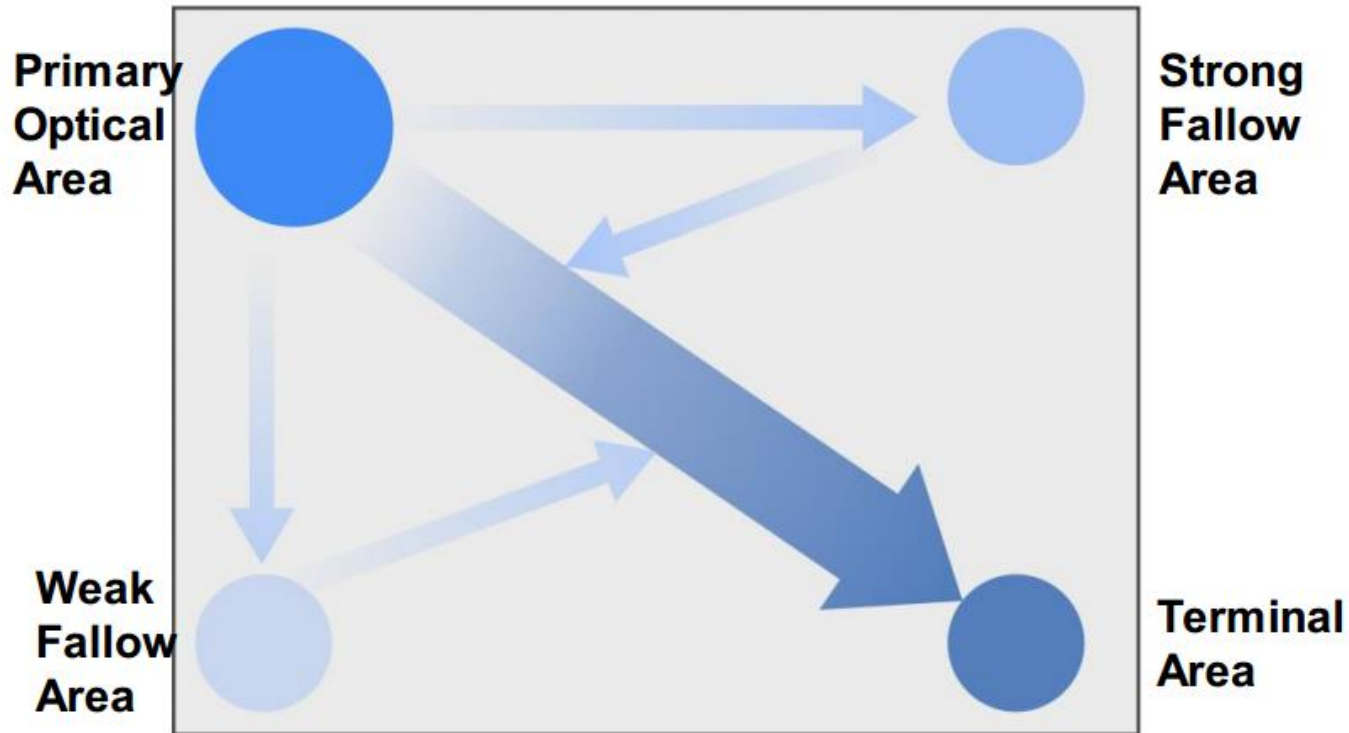
Best practice - Colors

- Do not use multiple colours to represent the same type of data
- Use a different shade, or occasionally a different colour to highlight data
- Beware of how colours are perceived to people who are Colour Blind and in printing
- Contrast separates; analogy groups



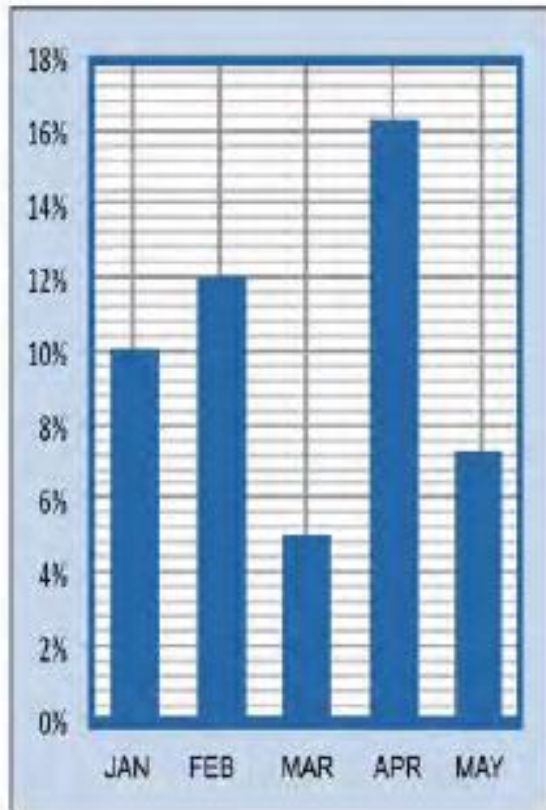
Best practice – Dashboard layout

Reading Gravity

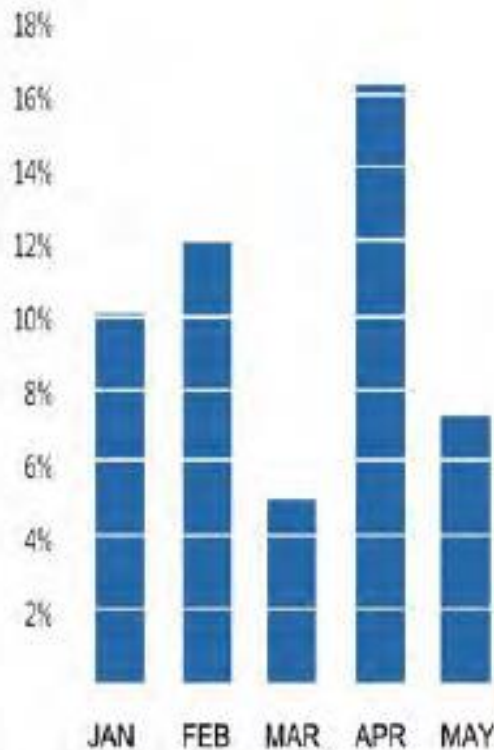


Best practice - Edward Tufte's Data:Ink Ratio

An example of a poor data-ink ratio



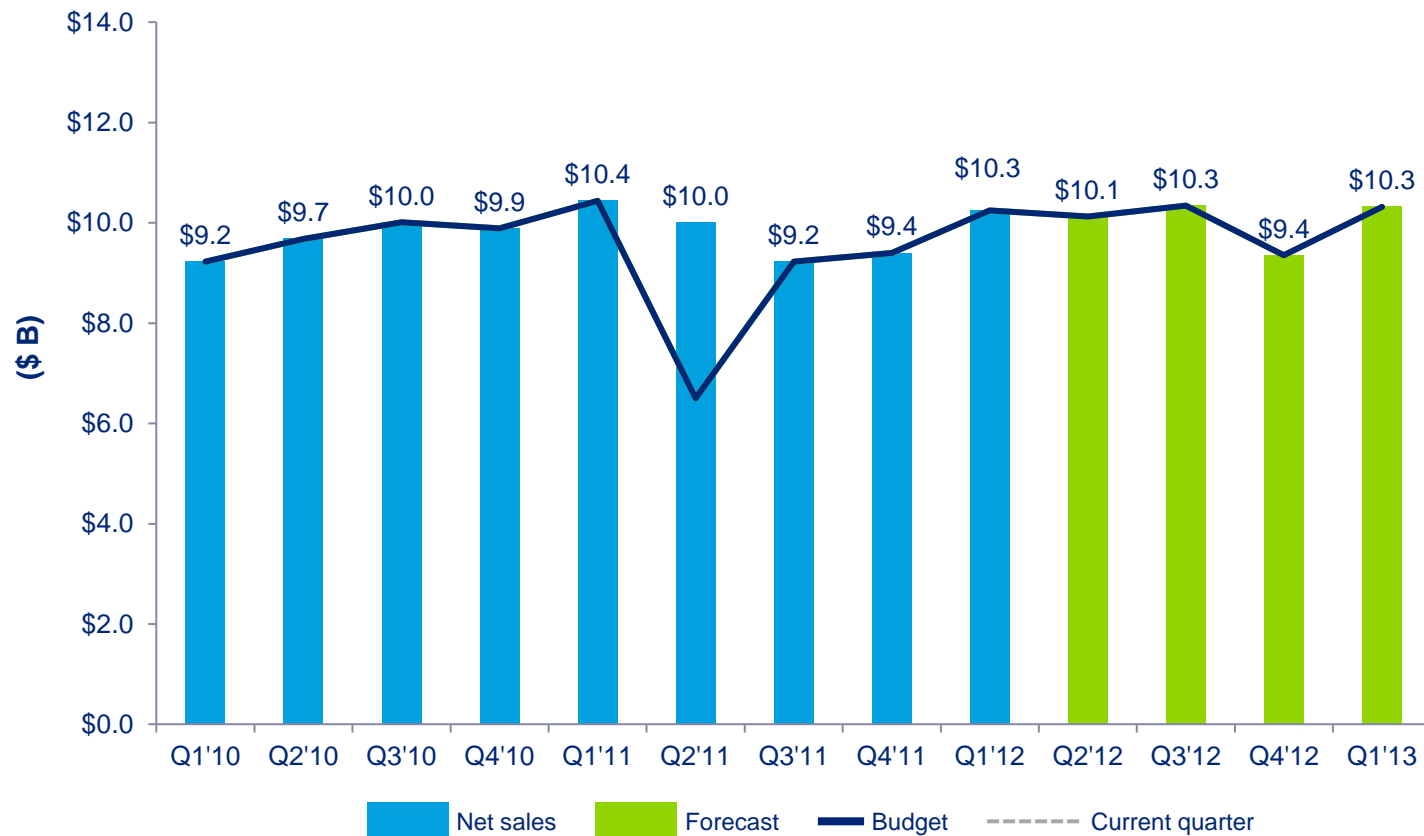
An example of a good data-ink ratio



Data visualization in practice

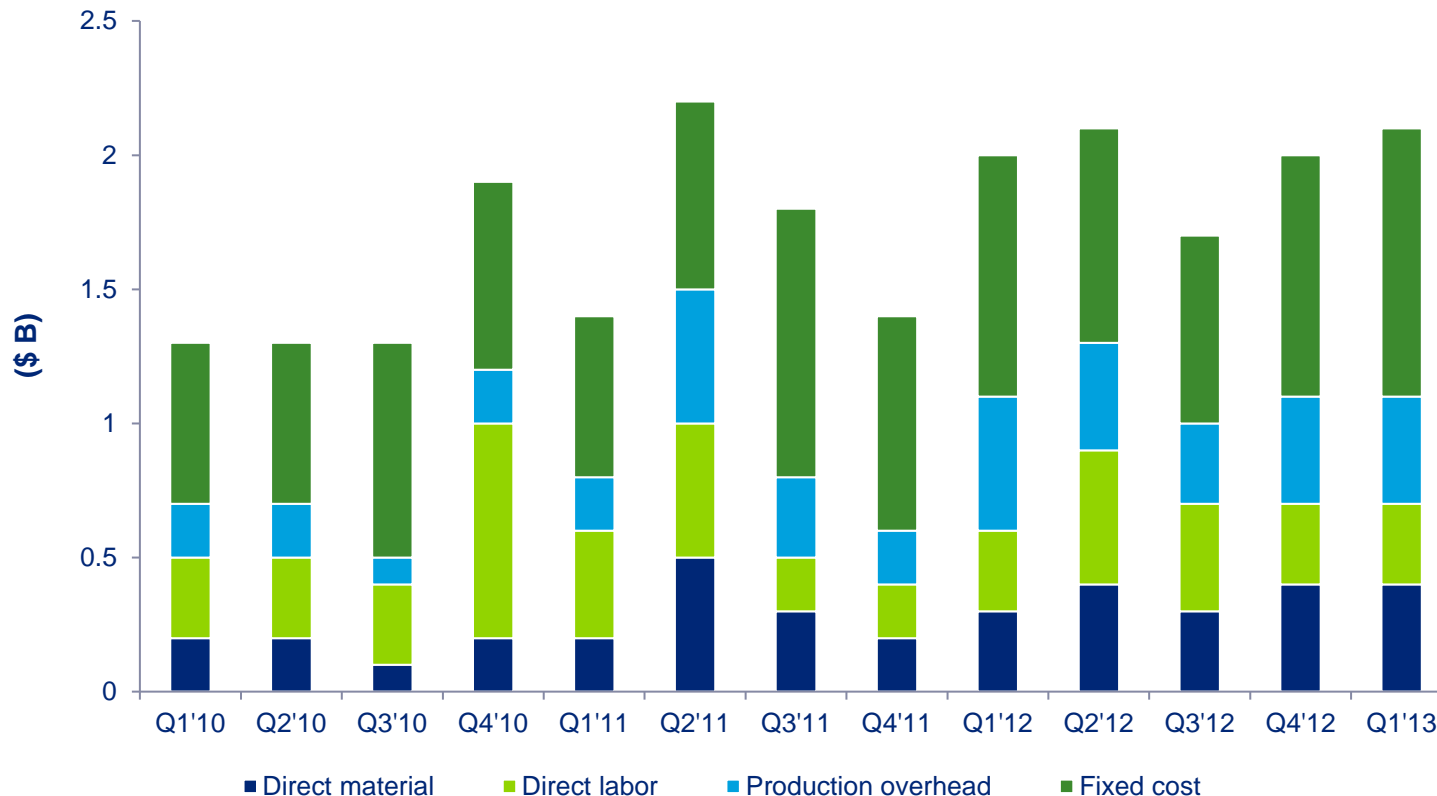
Common business analysis scenarios

Financial results to budget — Addressed by a combo chart to compare actuals against budget and forecast



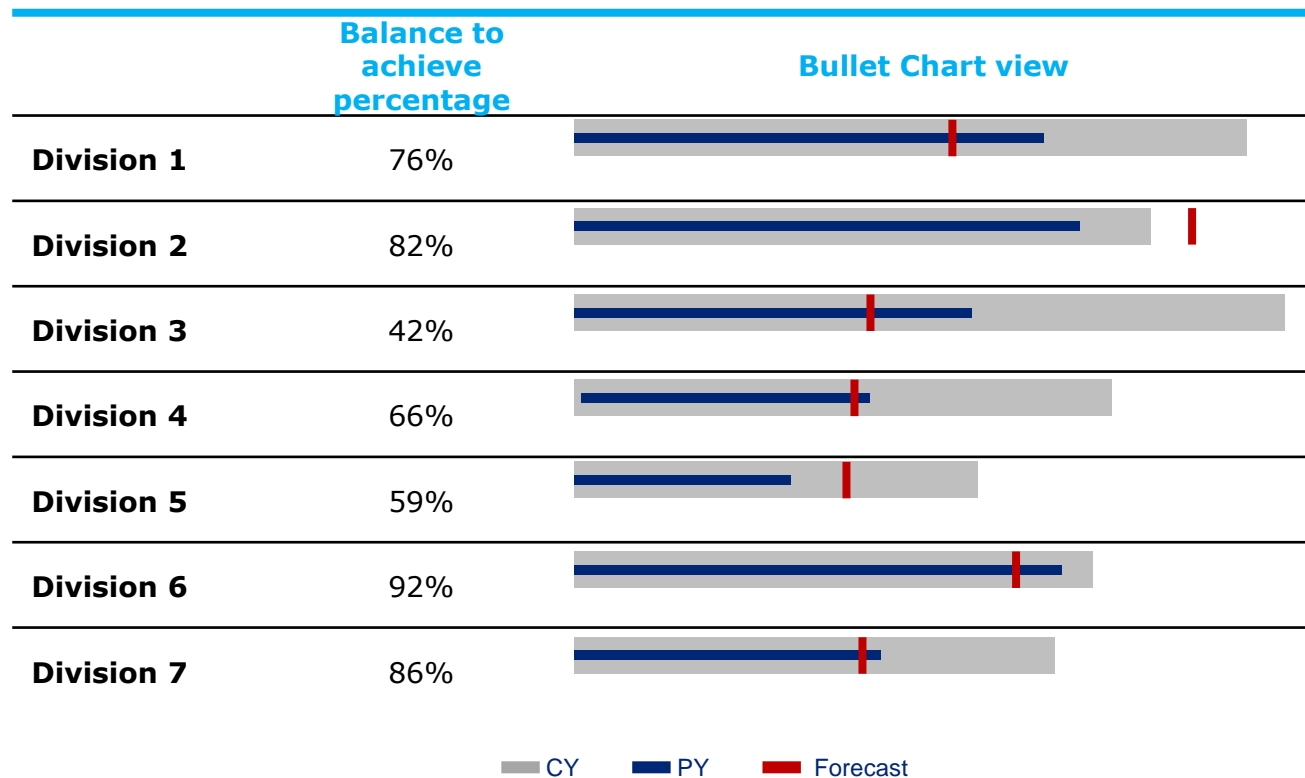
Common business analysis scenarios

Cost of goods accumulated cost analysis — Addressed by a stacked chart to represent the respective COGS components



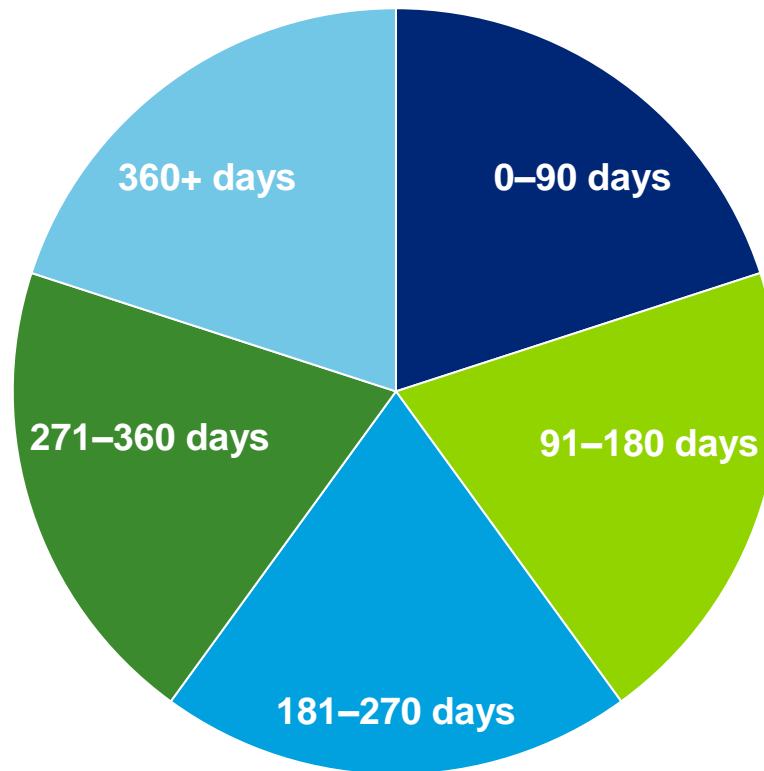
Common business analysis scenarios

Sales performance by division — Addressed by a bullet chart to represent the sales performance in current year (CY) versus prior year (PY) versus forecast



Common business analysis scenarios

Inventory aging analysis — Addressed by a pie chart to depict levels of inventory by their respective age



THANK YOU

