

The Basics

What really makes a chart effective are font, color and design and the depth of critical analysis displayed. In other words, do you have information worth making a chart for and have you portrayed it accurately? Remember that a single wrong data point can discredit the rest of the information and make the entire chart worthless.

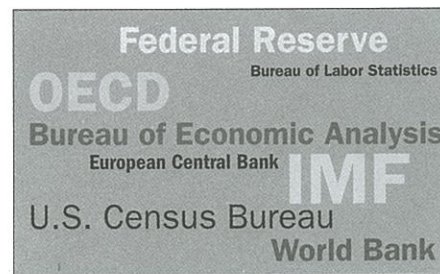
In this chapter I provide practical guidelines and templates for fonts and the choice of colors — bright or muted. I answer questions like: Do two numbers constitute a chart? What is good data?

These basics provide the backbone and foundation for executing intelligent and persuasive charts.

How to create effective charts

The best charting practice is to systematically follow four essential steps — research, edit, plot and review.

1 Research



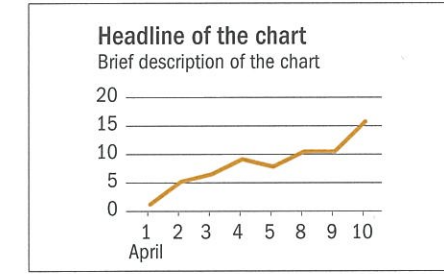
- Research from up-to-the-minute authoritative sources.
- Use an independent source for disputable data that is open to interpretation, such as market share, to avoid bias and conflict of interest.
- Obtain permission to use the data, if required.

2 Edit

Absolute values		Percentage change	
A	B	A	B
10	100		
20	110	+100%	+10%
30	120	+200%	+20%

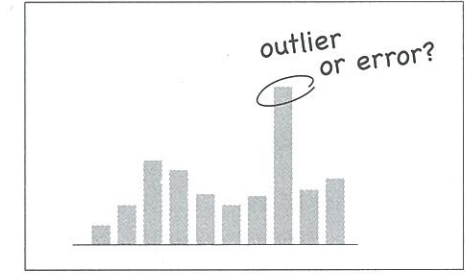
- Identify your key message.
- Choose the best data series to illustrate your point, e.g. market share vs. total revenue.
- Filter and simplify the data to deliver the essence of the data to your intended audience.
- Make numerical adjustments to the raw data to enhance your point, e.g. absolute values vs. percentage change.

3 Plot



- Choose the right chart type to present the data, e.g. a line to show trend or a bar to show discrete quantities.
- Choose the appropriate chart settings, e.g. scale, y-axis increments and baseline.
- Label the chart, e.g. title, description, legends and source line.
- Use color and typography to accentuate the key message.

4 Review



- Check the plotted data against your sources.
- Use judgment to evaluate whether your chart makes sense.
- Try to look at the chart from the reader's perspective.
- Verify your data with additional sources and consult with experts in the field for questionable content and outliers.
- Refer to this book to check best charting practices.

Too often, this step is skipped for the sake of expedience. However, taking the time to go over every step of your work can make the difference between a professional and an amateur attempt. Unlike a misspelled word in a story, one wrong number discredits the whole chart.

Tangible evidence

When calculating the figures and plotting the graphs, use decimal places for accuracy. However, in labeling your chart, round off the numbers to the significant digit (or digits) for easy comparison. For example, labeling 12.345 may be more precise than 12.3, but it distracts from the visual impact of the chart.

Words vs. Charts

Charting is a powerful tool that puts a series of numbers in close proximity to each other. The numbers in a chart convey information to the reader both visually and narratively. The same set of numbers looks more concrete and precise when charted than when presented in a story or a caption.

Test

Numbers in a story:

Company A earns \$100 million and outperforms company B which earns \$75 million.

Numbers plotted:

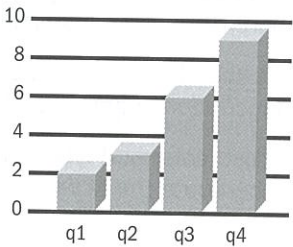


The chart shown above on the right allows you to make a judgment at a glance. It is more memorable than a string of numbers held together by words.

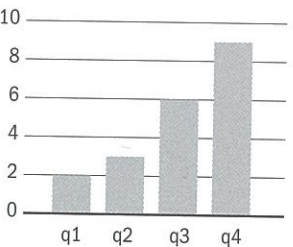
Let the data speak for itself

The best chart should be free of any distraction and allow the reader to compare or contrast the data and draw a conclusion.

A chart with obtrusions such as heavy gridlines and 3-D rendering obscures the data and diverts the reader's attention from the content.



In contrast, a clean and crisp chart allows the reader to focus on the data, which is the message of the story.



Create the right comparison

Same numbers, different stories

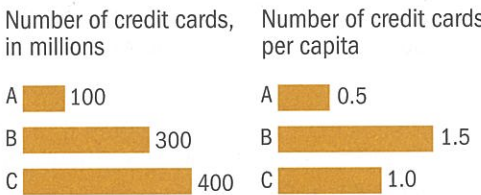
Filter and edit the data to keep it consistent and relevant to your message. Embellishments are not a substitute for organizing and presenting the data in the right way.

Example

Credit card issued by bank X in each country

Country	Number of credit cards	Population	Number of credit cards per capita
A	100 million	200 million	0.5
B	300	200	1.5
C	400	400	1.0

Presenting the number of credit cards on an aggregate basis and on a per capita basis will tell two different stories and convey different impressions with the same data.



Country C has the largest total market. This chart reflects the overall credit card market.

Country B has the highest issuance per capita. This chart demonstrates the success of the marketing effort in country B despite its smaller population.

If the raw data is insufficient to tell the story, do not add decorative elements. Instead, research additional sources and adjust data to stay on point.

Frame the reference

It's all relative

Imagine your wealthy uncle gave you \$10,000. You would be happy. If you found out he had given your brother \$20,000, would you still *feel* \$10,000 richer? or \$10,000 poorer?

\$10,000 richer?



\$10,000 poorer?



The frame of the information dictates how readers interpret the data. People need a reference point. **When you supply the reference point, you control the message.**

Readers frame the information based on what they expect to see. Even with a random number, they will create a reference point and assign meaning to it.

Quiz

Stock A is \$100 a share. A. ☐ high
The share price is... B. ☐ low
C. ☐ not sure

It is impossible to assess whether \$100 is a fair price without any context. If we knew, for example, the 52-week high and low of stock A, we could answer this question.

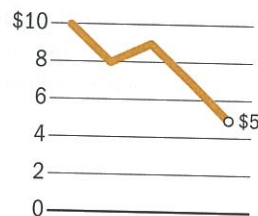
Creating reference with charts

A single number by itself may not mean much. Plotting a series of numbers together can create an impact.

Example

A statement with a single number has no implication. **Stock B is at \$5 a share.**

However, by plotting prices of stock B over time, the chart clearly shows that at \$5, the stock has lost half its value.



Send the right signal

One set of numbers can be charted in many ways. **People feel the pain of a \$1,000 loss more than the joy of a \$1,000 gain.** Use the right context to communicate the message you intend.

Example

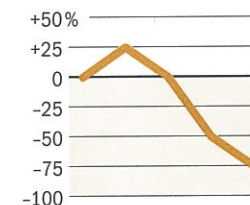
Performance of stock A

Share price	Percent change from first data point
\$ 8	0%
10	+25
8	0
4	-50
2	-75

Plotting the actual share prices:



Plotting the percentage change in prices will bring the line into negative territory. This accentuates the drop in share prices. Just by setting the baseline, the chart visually implies the performance is unacceptable.

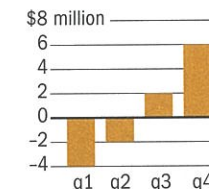


Both charts give a fair picture. Clearly, the choices you make in charting create the framework that sends a specific message to the readers.

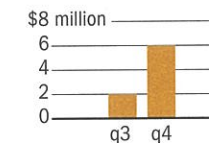
The message of the chart should be consistent with ALL the facts and evidence available. For instance, when plotting profit and loss, a chart that omits previous quarters with poor performance would misrepresent the facts.

Example

Full disclosure



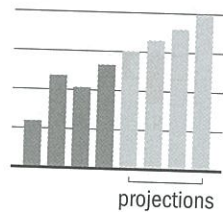
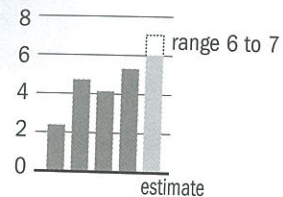
Half truth



Tell the whole truth

Predicting the future?

Charting estimates with a definitive range or plotting projections far into the future gives a faulty impression of precision. Both practices use a precise tool to define arbitrary numbers.



Do sweat the small stuff

Data is only as good as its source. Getting data from reputable and impartial sources is critical. For example, market share data should be benchmarked against a third party to avoid bias and add credibility.

Always assess data with a critical eye. If there is something wrong with one number, it is important to get to the bottom of it. One wrong data point can destroy the credibility of the whole chart.

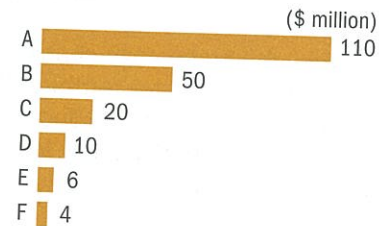
Bad data + Good visualization = Bad chart

One size doesn't fit all

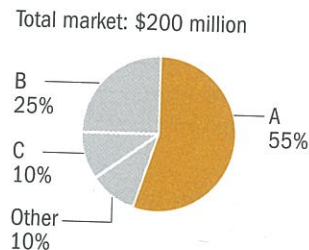
Every set of data requires individual analysis and interpretation. There are many ways to present and visualize the same set of data. The choice ultimately depends on the intended message.

Example

A bar chart shows the revenue of all the companies in a particular market.



A pie chart, on the other hand, shows company A has 55% of the total market.



Put numbers in context

Build credibility by presenting facts fairly. An initiative to hire 200 people can be 1% of the workforce in one company or 10% in another company.

Showing a percentage without a base number is also meaningless. A 10% increase from what number to what number?

Example

Market share for product x



The only conclusion we can draw from the two pie charts is that A and B both have a 60% market share. However, not knowing the size of each market makes it impossible to judge which has more sales.

Leave rounding to the end

Don't round off your numbers until the last step in the presentation process. Rounding the figures up and down during the analysis stage can lead to final results that are far from the truth and subsequent erroneous interpretations.

Example

	Data	After rounding
	12.4	12
	16.5	17
Percent change	+33.1%	+41.7%

Example

	Data	After rounding
Company A	\$2.9 billion	\$3 billion
Company B	3.1	3
Company C	4.2	4

The comparison between company A and B is lost. Besides, \$0.2 billion or \$200 million is a lot of money.

Beware of showing a big percentage change based on small numbers. It is generally unfair to compare the percentage change in revenue of a big company to that of a small company. Even if a small company increases its revenue threefold, it may still be a small sliver in the total market.

The more, the merrier?

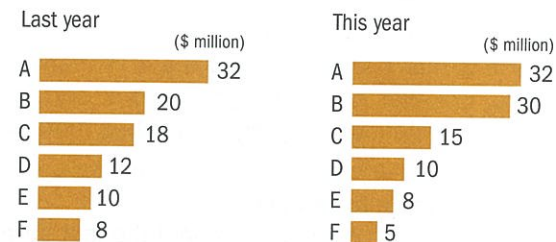
Rich data means quality data — accurate data from reputable sources plus effective filtering of the data for the audience. In presentation, sometimes less is more.

Exercise judgment, edit

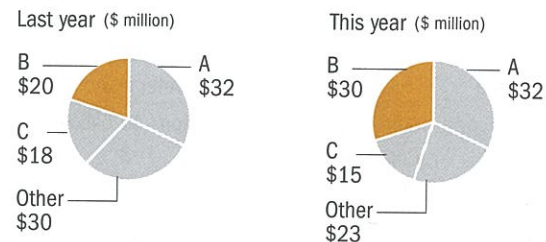
In the research stage, a bigger data set allows more in-depth analysis. In the edit phase, it is important to assess whether all your extra information buries the main point of the story or enhances the story and makes it more convincing.

Example

Without the benefit of editing and filtering, the bar charts show extensive detail of the revenues of all the companies in the market. However, the highlight of the story — the growth in market share of company B — is buried in the details.



After analyzing the data, the pie charts show company B has a stronger market presence. Even though some details are lost in combining the smaller companies, the readers benefit from the editor's effort in highlighting the underlying data.

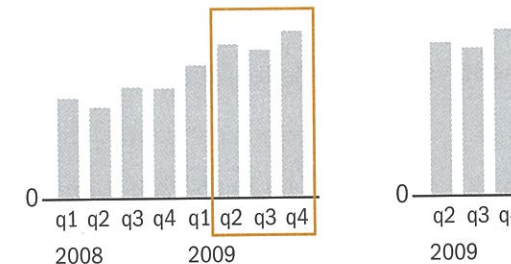


Tell the whole story with an excerpt

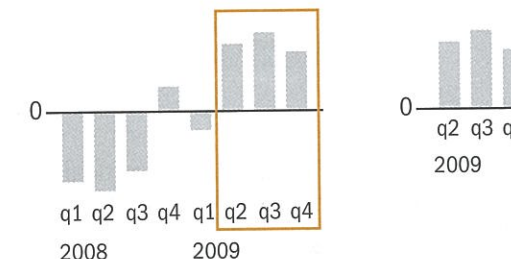
It is acceptable to extract a few numbers out of a series if these data points tell a story without misleading the reader to make wrong assumptions of the past and future.

Example

It is not deceiving to extract the recent performance data since sales have been basically rising at a steady rate. However, it is more advantageous to show all eight quarters to accentuate the point that performance has been consistently strong.

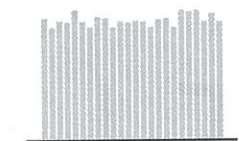


However, it would be misleading to extract the last three quarters in the chart below. In this case, excluding the previous quarters hides the bad performance data. The reader would draw a different conclusion if all the facts were shown.

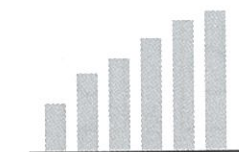


Data quantity does not equal data richness. Plotting a lot of data points is not necessarily better. A series of data points is meaningful and significant if it indicates a change from the baseline pattern.

Inconclusive



An upward trend



Legibility

With thousands of typefaces available today, in different styles and weights — serif, sanserif, italic, all caps, light, medium, bold and black — choosing type can be a daunting task. In the end, though, type in charts is meant to describe the information and not to adorn. And it is with that perspective that typography should be chosen purely on the merit of legibility.

Terminology

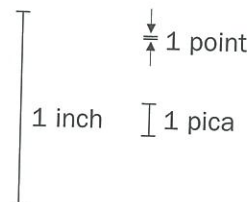
Serif type has a stroke added to the beginning or end of the main strokes of the letter.



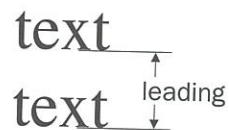
Sanserif type means “letter without serifs.”



Type size is the height of the type, which originated from the height of the metal block on which the letter was cast. In digital type, the type size is the height of the assumed equivalent of the block, and not the dimension of the letter itself.



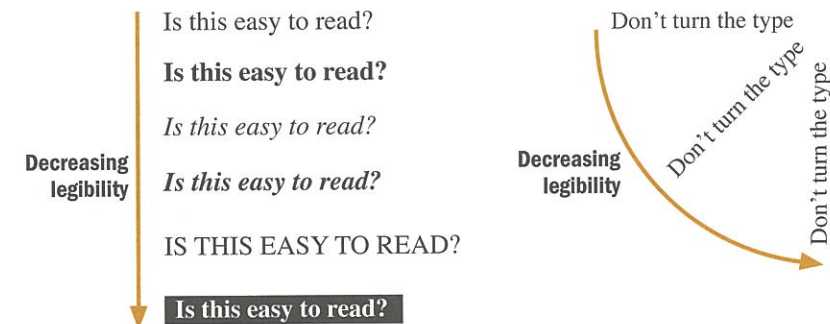
A point is the unit of measure for type size. Twelve points make a pica. A pica is close to one-sixth of an inch.



Leading (*pronounced led-ing*) is the vertical distance from the baseline of one line to the baseline of the next.

Basic rules of type legibility in charts

- In general, the leading should be about two points larger than the type size for comfortable reading, for example, 10-point type with 12-point leading.
- Don't set type too small or too condensed (*condensed*).
- Whether it is serif or sanserif, keep the type style simple. Use **bold** or *italic* only to emphasize a point. Don't use ***bold and italic*** at the same time.
- Don't use ALL CAPS. It is hard to read. Just like handwriting, we use upper- and lowercase letters.
- Avoid knocking **white type out of black** or color.
- Avoid hyphenation.
- Don't use highly stylized fonts (*stylized*).
- Don't set type at an angle.
- Don't track the type (*this is tracking*).



Simple test for legibility Reduce the chart on a copy machine to a reasonably small size. When typography is done right, the type will still be legible.

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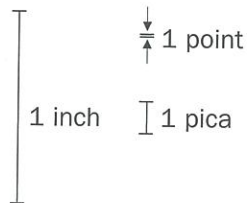
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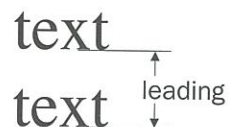
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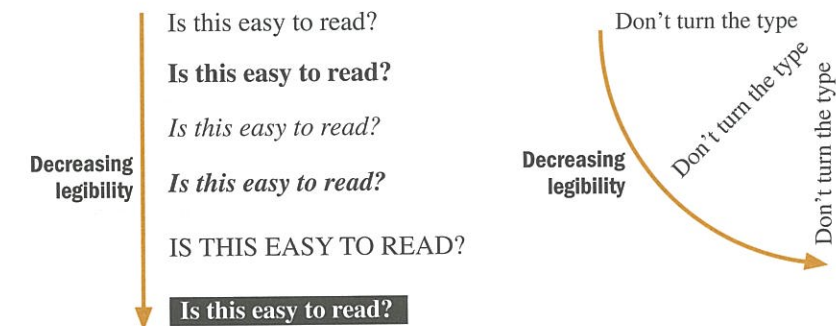
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Typography in charts

In charts, typography should not be center stage. The data is the focus. Type in charts is there to describe the chart clearly and not to evoke an emotion, as in a fashion magazine or political poster. Poor typography draws undue attention away from the underlying data, which carries the main message. The impulse to use type styles to spice up the chart should be avoided at all costs. Typography done right helps present the information in the most efficient and direct way.

DON'T Don't permit typography to oppress the underlying data.

Don't use all caps or knock white type out of black.

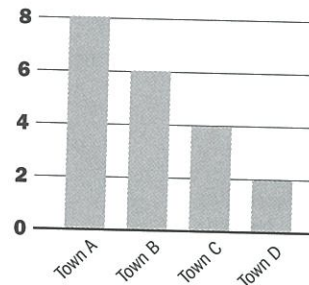
Don't use bold italic.

Don't use bold for the numbers on the scale.

Don't set type at an angle.

HEADLINE OF THE CHART

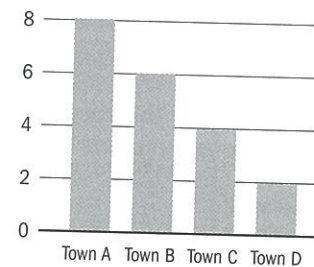
A brief description that outlines what the data shows



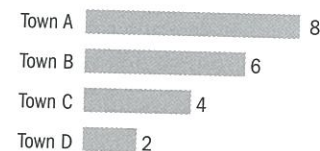
DO Keep the typography simple. The headline can be either bold or a couple of sizes larger.

Headline of the chart

A brief description that outlines what the data shows



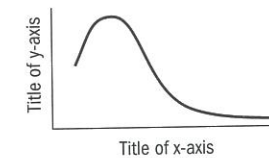
Alternatively, chart the data as horizontal bars to accommodate long names.



DON'T Don't use highly stylized fonts or turn the type sideways to save space.

Headline of the chart

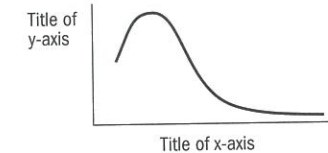
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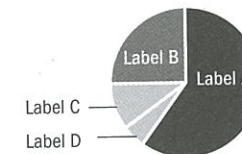
DO Serif and sanserif fonts can complement each other and add variety, and are still highly legible.

Headline of the chart

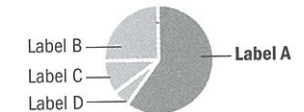
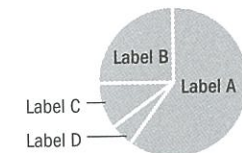
A brief description that outlines what the data shows



DON'T Don't knock white type out of black or color. Legibility is compromised.



DO Use bold to increase legibility on a shaded background or to emphasize a segment.



DON'T Don't set a huge amount of text in bold. Emphasizing everything means nothing gets emphasized.

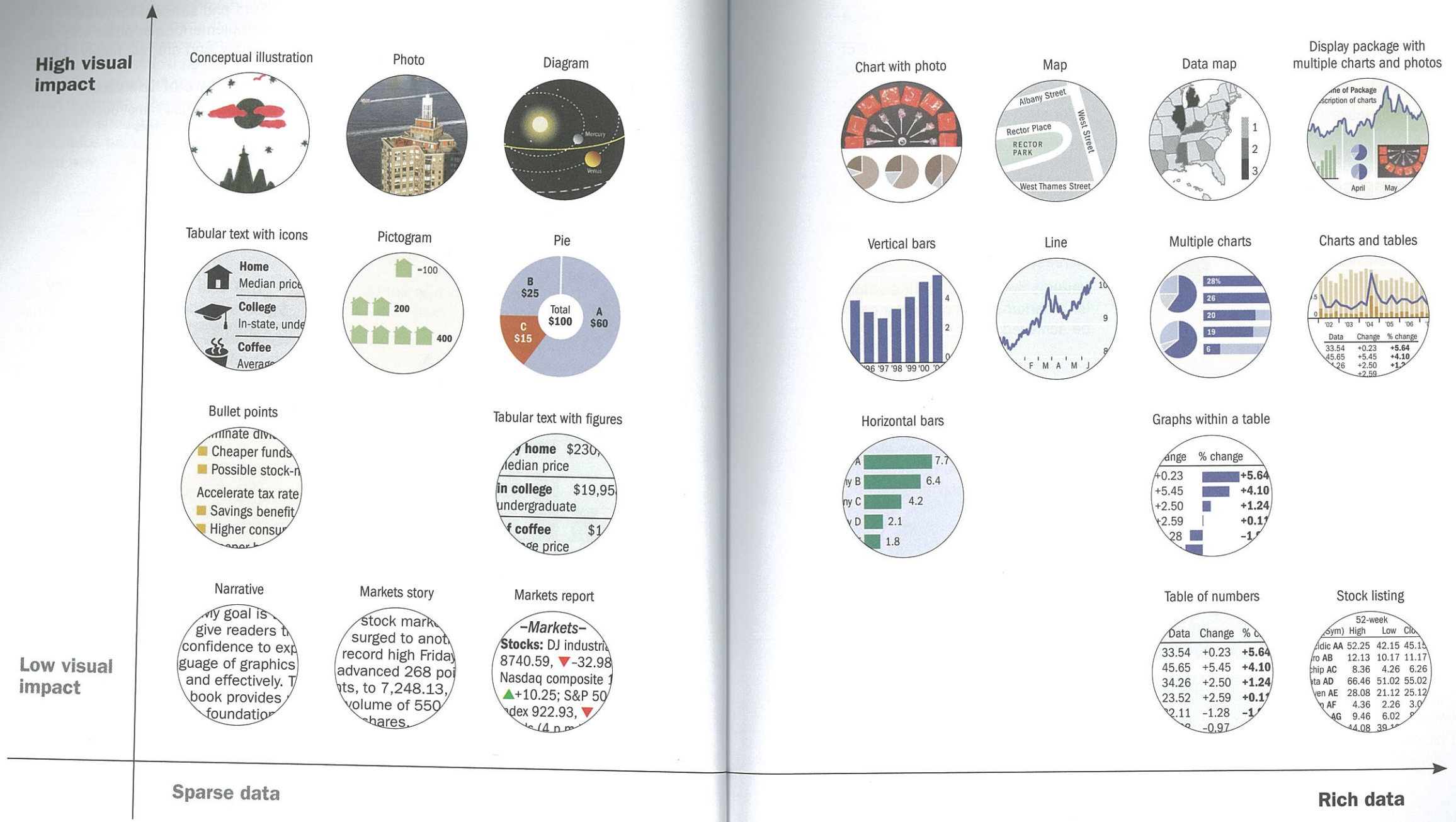
Name	Data	Data	Data
Company A	0.0	0.0	0.0
Company B	0.0	0.0	0.0
Company C	0.0	0.0	0.0
Company D	0.0	0.0	0.0

DO Use bold type to emphasize the focal point of the message. Be judicious.

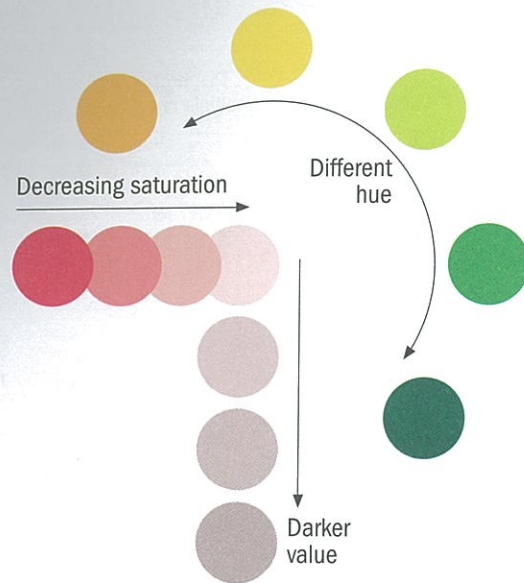
Name	Data	Data	Data
Company A	0.0	0.0	0.0
Company B	0.0	0.0	0.0
Company C	0.0	0.0	0.0
Company D	0.0	0.0	0.0

The Visual-Data Continuum

Rich data, high visual impact



Basics



Describing colors

There are three main attributes of a color: hue, saturation and value.

Hue is how we normally describe color such as red, green and blue.

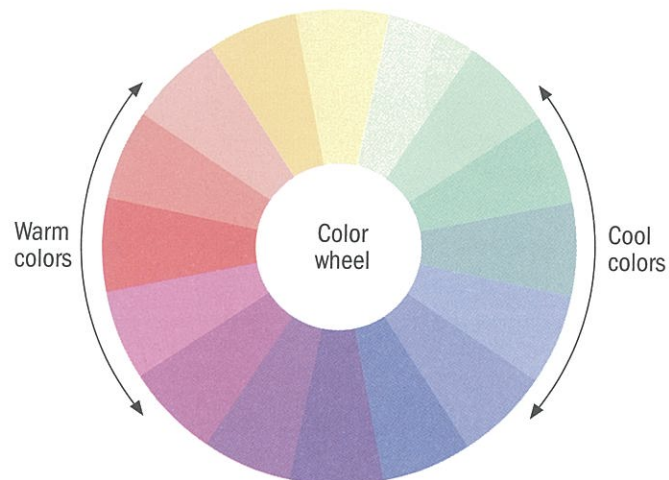
Saturation is the intensity of the color. A color with higher saturation is more intense in the same hue. For instance, a red becomes a more intense red (less pinkish) as the saturation increases.

Value is how light or dark a color is. A darker shade of a color can be achieved by adding black ink.

Warm and cool colors

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.



Specifying colors

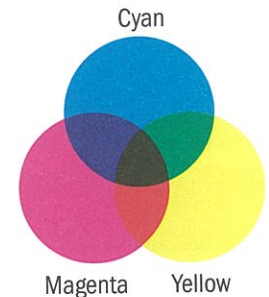
Colors can be specified in different ways, depending on the application.

CMYK

Cyan, magenta, yellow, black are the four inks used by printers to produce full-color printing. In theory, overprinting cyan, magenta and yellow produces black, but in reality, the combination is a muddy brown. Black is used as the fourth printing ink to get a crisp solid black. Colors are specified as percentages of these inks.

Example

CMYK (100, 30, 0, 0) will print a color with 100% cyan, 30% magenta, 0% yellow and 0% black.

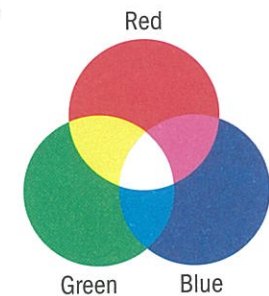


RGB

Red, green and blue light sources are combined to display colors on television and computer monitors. When all three lights illuminate simultaneously, white light is produced. When working with images for the screen, colors are assigned by the amount of red, green and blue. The range of each color component runs from 0 to the highest value 255.

Example

Red RGB (255, 0, 0)



Hex value/hex triplet

A six-digit hexadecimal number or triplet is used to define colors in web design. Colors can be specified in the format of #RRGGBB, where RR, GG, and BB are the hexadecimal values for the red, green and blue values of the color. The range of each color component is from #00 to the highest value #FF.

Example

Red RGB (255,0,0) #FF0000
Green RGB (0,255,0) #00FF00
Blue RGB (0,0,255) #0000FF

Color palettes

A color palette for charts should include the basic colors and three to five shades of each hue. This gives you the option of using fewer colors within a chart to avoid distraction. Once you choose a palette, stay with it for the entire presentation so all the visuals look coordinated.

Bright color palette



Muted color palette



Color in charts

Admit colors into charts gracefully, as you would receive in-laws into your home. Don't apply all the colors in your palette at the same time. Using too many colors in a single chart is confusing and garish. Instead, choose harmonious combinations, such as different shades of the same color or colors on the same side of the color wheel. Limit the scope — even if color is available, it is okay not to use it at all.

Don't choose your colors arbitrarily. Choose them strategically to compare and contrast your data effectively. Every time you change a color, it signifies a change in information or an added layer of data. Ultimately, the information you present should determine every color you choose for your charts.

DON'T Don't use multiple colors to represent the same kind of data.



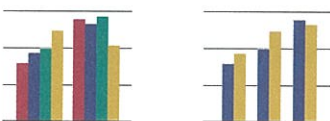
DO Use the same color to represent the same variable so the readers can focus on comparing the data.



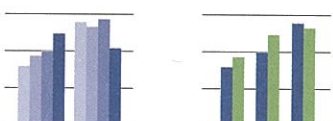
A darker shade or a different color can be used to highlight the focal point.



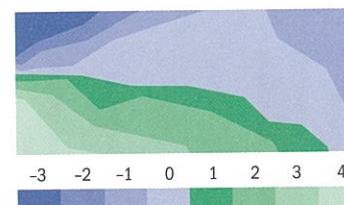
DON'T Don't use different colors or colors on the opposite side of the color wheel in a multiple-bar chart. The color contrast distracts the reader from the data.



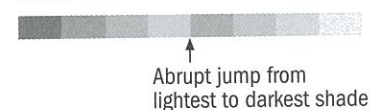
DO Use graduating shades of one color or colors on the same side of the color wheel to keep a multiple-bar chart clean and crisp. The readers can then focus on the underlying data.



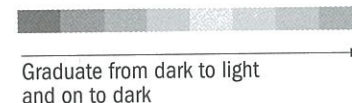
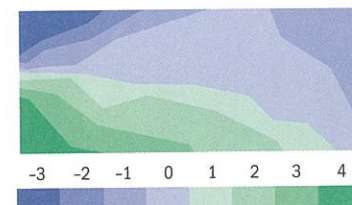
DON'T Don't set the scale with alternating light and dark colors in the middle of the scale. The eyes can't draw meaningful comparison jumping between light and dark shades.



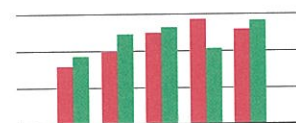
Test: Convert the color scale to gray scale to test for the gradation.



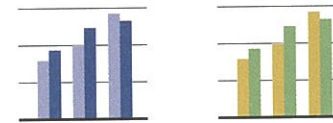
DO The color scale should graduate from lightest to darkest or vice versa, regardless of the color. A simple test is to convert the color scale to black and white and check for smooth progression from light to dark.



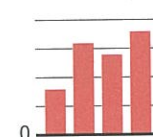
DON'T In general, avoid thematic representation of colors, such as red and green to show Christmas sales.



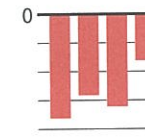
DO Colors can reflect the tone, for instance, deep blue for conservative and bright colors for something cheerful.



DON'T Don't use red for positive numbers in a bar chart. Red is strongly associated with losses in business.



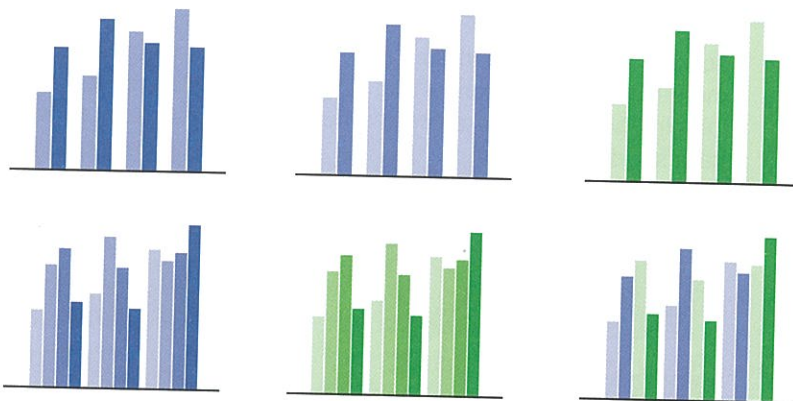
DO Depicting negative earnings in red bars can be highly effective.



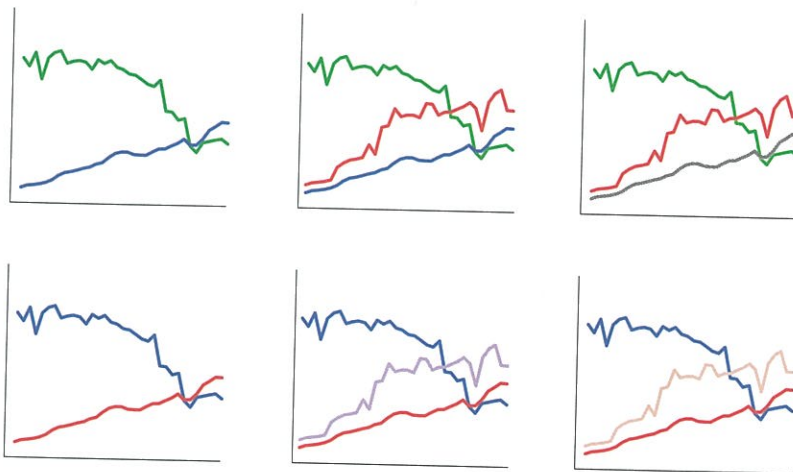
Color chart templates

With the bright color palette

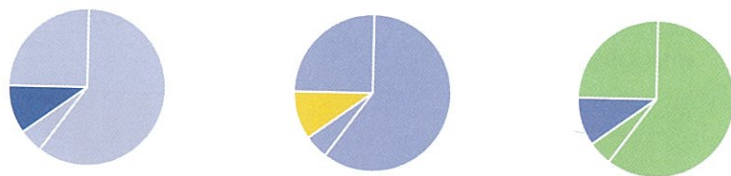
Use different shades of the same color or colors on the same side of the color wheel.



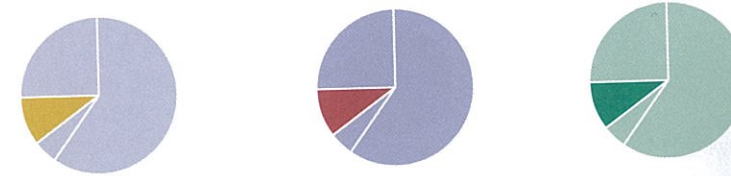
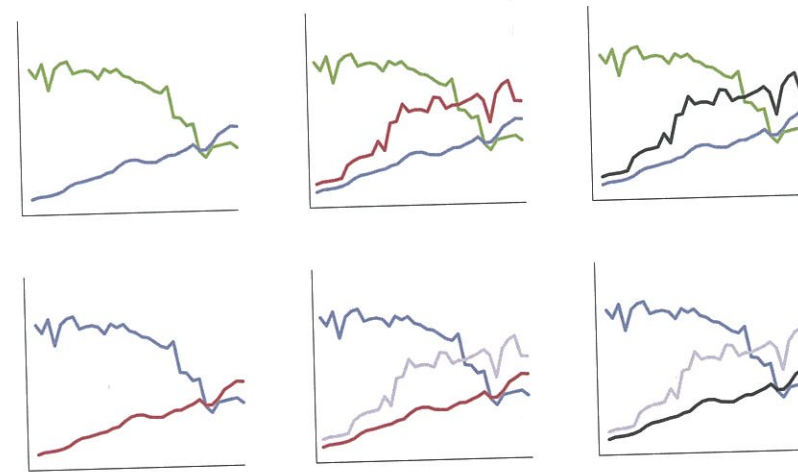
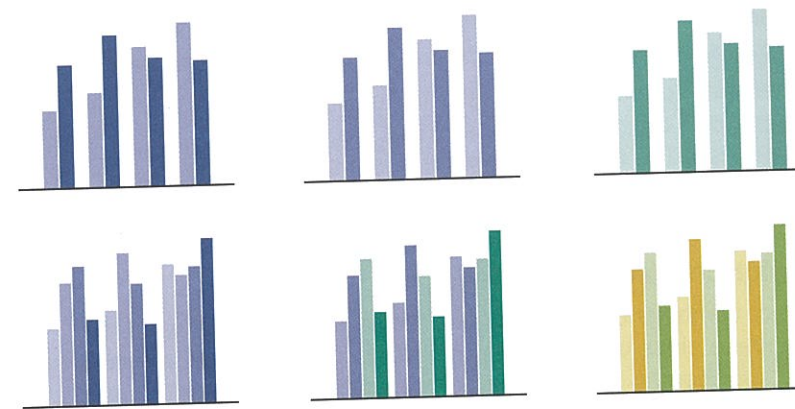
Use bright or dark colors such as red and black to emphasize the important line.



Use a darker shade or a different color to highlight a segment.



With the muted color palette



Coloring for the color blind

A color change in any chart element signifies a change in information or an added layer of data. If color is a carrier of information and is not seen, the translation of information is severely impeded. A chart is only successful if a reader can access, read and understand the content.

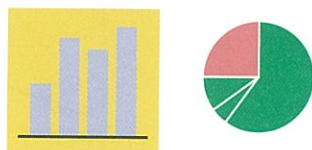
According to the National Institutes of Health, about 1 in 10 men have some form of color blindness. There are two major types of color blindness. The most common form is distinguishing between red and green and the other type is distinguishing between blue and yellow.

Color combination pitfalls

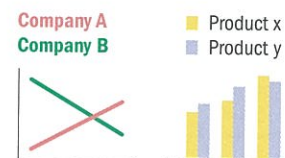
Color combinations such as red/green or blue/yellow are on opposite sides of the color wheel. The color hues are very different but they can be similar in value or lightness. The color intensity overpowers the underlying data. The colors even vibrate when used in large quantities. These color combinations are distracting for readers with normal color vision. The lack of contrast in lightness makes it virtually unreadable for color-blind users.

A legend that relies on color alone to convey information can be extra work for general users and possibly indecipherable for color-blind readers. Legends are often difficult for most readers since our eyes cannot draw immediate distinction between small color swatches, especially when there is not enough contrast in color and value.

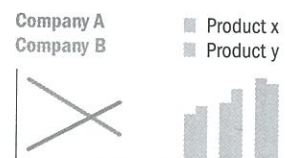
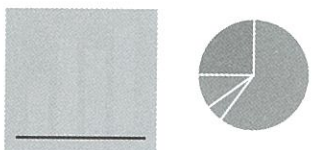
Different hues, same value



Color text and legends



Lack of contrast when converted to black and white:



Strategies for selecting effective colors

1 Set type in black

Black provides the highest contrast. It is most effective to use black type on a light background. Color type is hard to read even for readers with normal color vision. If you need a dark background for design reasons, use white type and not color type.

Use black text

White text

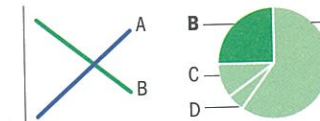
Use black text

White text

2 Label directly on chart elements

Direct labeling is helpful for all readers. If you must use a legend, be sure the colors have high contrast in values.

In addition to using darker shades to highlight a bar or a line, you can set the label in bold typeface. See segment B in the pie chart on the right. This redundant means of presenting information will guarantee all information conveyed with color is also clear without color.



3 Ensure high contrast in values

If a different color is used to distinguish different chart elements or signify a change in data, use a lighter or darker shade of that second color. It is easier for the eyes to differentiate lightness or darkness. Sufficient contrast in values makes the chart more accessible to all readers.



4 Final test: Convert to gray scale

Print the chart in black and white or make a copy in gray scale to test whether the contrast in values, not colors, is sufficient. The colors work if the chart holds up in black and white.

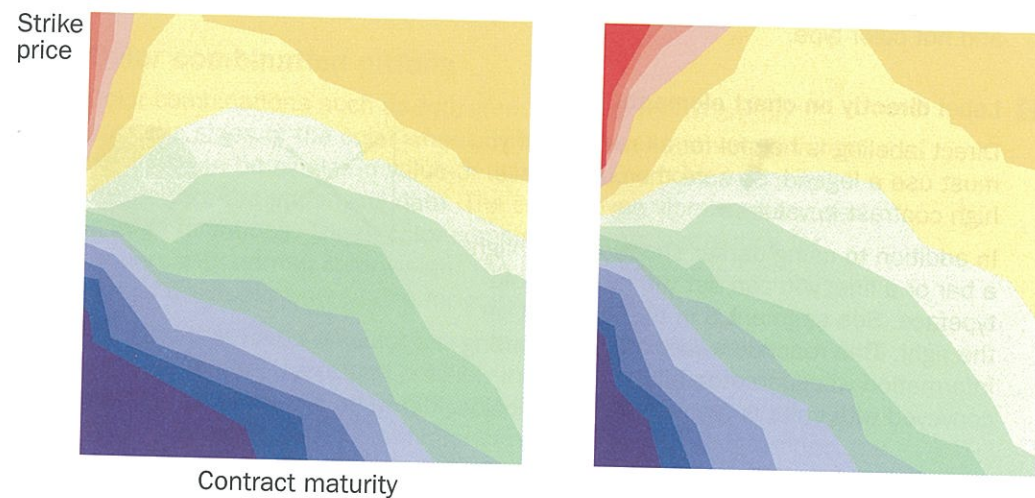


Color scale application

The **heat map** is one of the tools that investors use to identify new opportunities in changing markets so that they can then take advantage of them. Juxtaposing a series of heat maps can help reveal how prices of different securities move together.

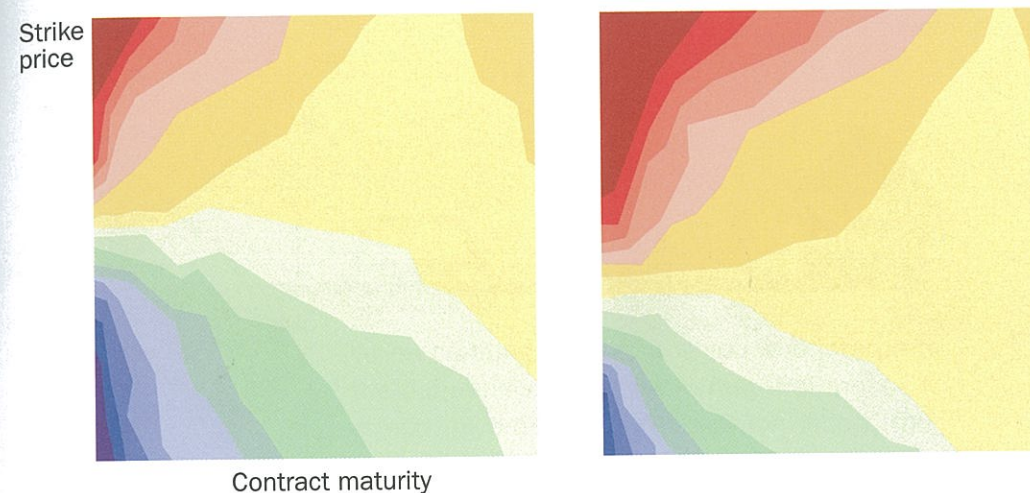
Example

Change in volatility in a stock index option over the course of a trading day.



Color is the third dimension that is used to show the relationship among three variables in a flat display. These heat maps show how the change in options volatility depends on both contract maturity and strike price over time.

Any measure that shows a continuous range of values can be mapped with a color gradient.



Change in volatility

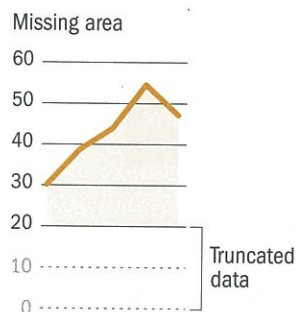


Overall, the color scale should graduate smoothly from lightest to darkest or vice versa, regardless of the color. There should not be alternating dark and light strips in the middle of the spectrum.

Lines

Height and weight

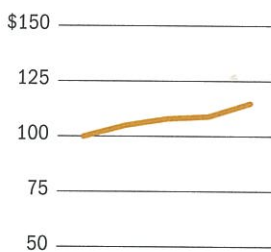
Never shade below a line unless the chart has a zero baseline. Filling in below a line turns a line chart into an area graph. Just like a bar chart, an area graph measures discrete quantities. Coloring below a fever line that does not start at zero truncates data.



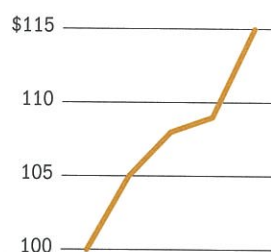
Misrepresenting the trend

The purpose of a line chart is to show a trend. Choosing a y-axis scale that yields a flat line totally defeats the purpose. On the other hand, an exaggerated line creates a drama that may not be a fair representation of the data.

Too flat obscures the message



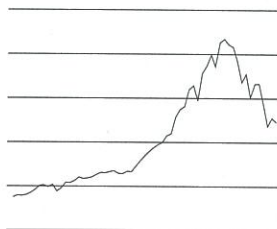
Too exaggerated overstates the trend



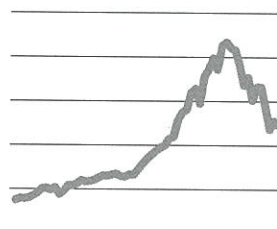
Missing the twists and turns

A line chart can show massive amounts of data in a very small space. A thin line could fade into the background. However, a thick line obscures the data points between peaks and troughs.

Too thin makes the line hard to read

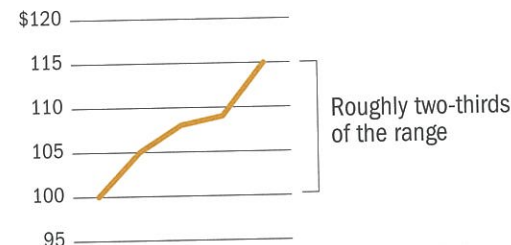


Too thick hides the details



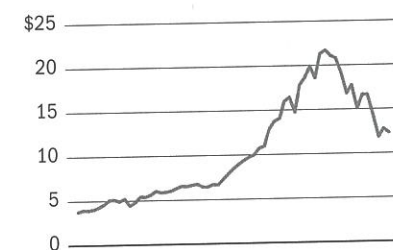
The right height — two-thirds of the chart area

Choose the y-axis scale so that the height of the fever line occupies roughly two-thirds of the chart area. The scale should also encompass relevant reference points, which help determine the range and make it less arbitrary. For example, the range of a stock chart should include its 52-week high and low.



The right weight — visible with details

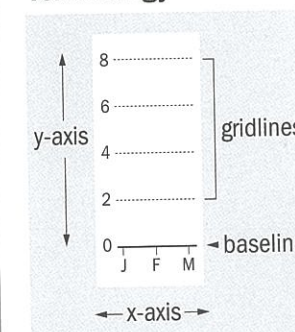
The weight of the fever line should be thick enough to stand out against the grid line but still thin enough to show the twists and turns of the line. Keep the grid lines thin and the zero baseline slightly thicker than the rest of the grid lines.



Lines are best used to display continuous data series over a period of time, such as stock prices and index values. Lines are suited for showing trend, acceleration or deceleration, and volatility, including sudden peaks or troughs.

Unlike a bar chart, a fever line doesn't necessarily require a zero baseline. For example, plotting a stock index with a range in the thousands from a zero baseline would make it hard to discern daily changes.

Terminology

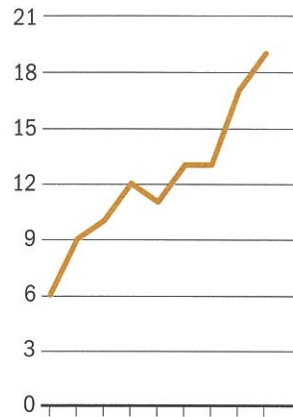


Lines

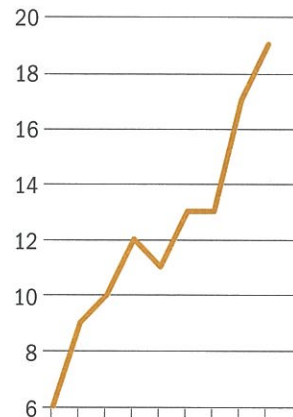
Y-axis increments

Even though a line chart does not have to include a zero baseline, avoid starting a y-axis with values that are close to zero. If adding a couple of grid lines can cover the zero baseline, do so.

Bad increments



Bad baseline

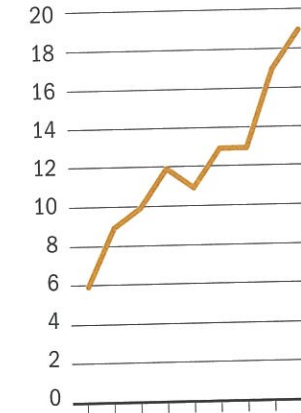
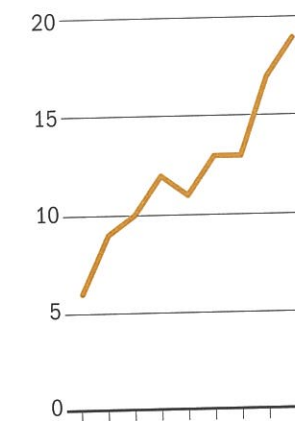


Awkward increments

- 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

While the chart above right uses acceptable y-axis increments — 6, 8, 10, 12, etc. — the fever line starts at the value “6,” which makes the upward trend appear more dramatic than it actually is.

Two examples with good use of increments



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, 100
- 0, 0.2, 0.4, 0.6, 0.8, 1.0
- 0, 0.25, 0.50, 0.75, 1.00

Keep it simple and **use the increments people naturally use when counting**: 0, 5, 10, 15, 20, etc. Readers can easily recognize a data point in between two grid lines.

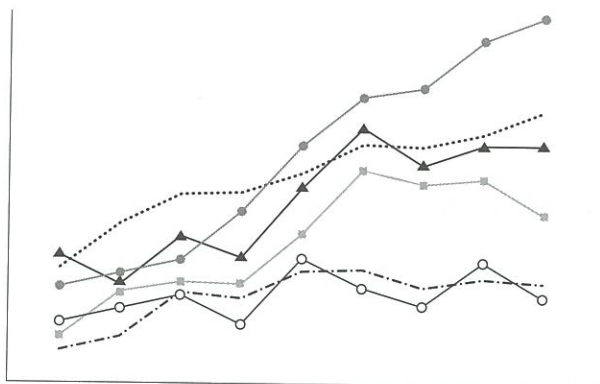
Clean lines, clear signal

Even if color is available, do not plot more than four lines on a single chart. You won't find a pot of gold at the end of that rainbow.

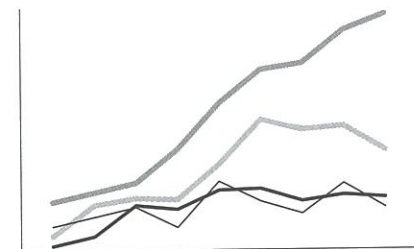
No spaghetti lines

To differentiate each line, it is tempting to try out all the dashed lines and shape markers in the graphics software toolbox. But they only obscure the lines which carry the information.

You can use solid lines exclusively by limiting the chart to four or fewer lines. Varying weights and shades do the work of differentiating the lines more effectively than distracting patterns and markers.

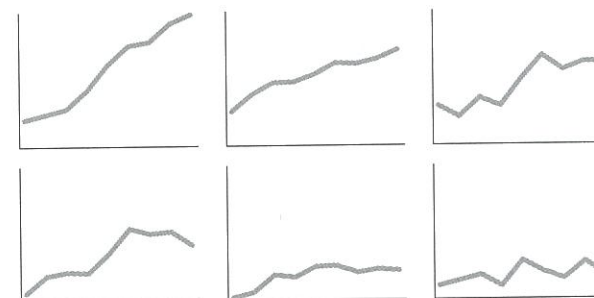


Four or fewer lines



In a single chart, keep the maximum number of lines to three or possibly four if the lines are not intersecting at many points. Select the three or four data series that will convey a difference. More is not necessarily better. The purpose of a multiple-line chart is to compare and contrast different data series. Plotting too many lines on the same chart gives a confusing picture and defeats the whole purpose.

Panel of charts



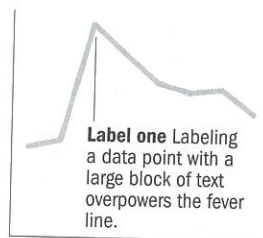
With four or more data series, an array of individual charts can display a pattern and allows better comparison among all the lines than a spaghetti chart. This way the clarity of each individual line is preserved.

In a black-and-white multiple-line chart, the darkest line should represent the most important data series. In a color chart, the most important line should be one color, for instance, red, and the other lines should be shades of a second color, such as blue. Using different colored lines could be confusing and may be illegible for color-blind readers.

Legends and labels

Do not label the line with a large block of text that overwhelms the line. Keep your label concise, no more than one short sentence.

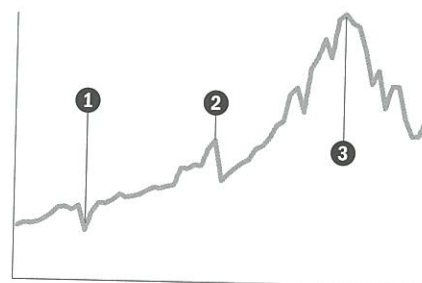
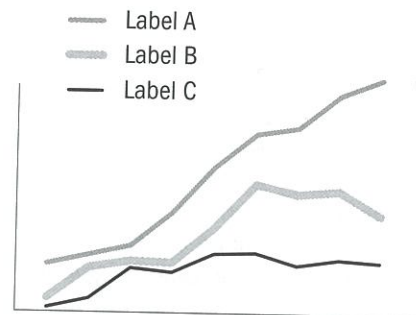
Here, the text weighs down the line.



Avoid labeling at long distance

A legend separated from the line requires the readers to do extra work cross-referencing between the key and the line.

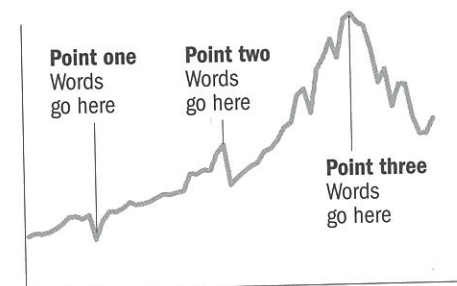
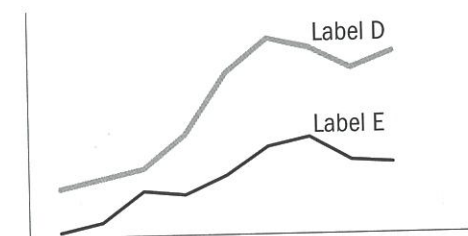
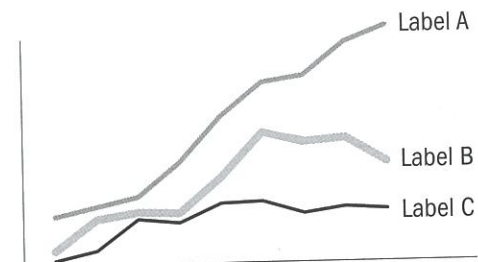
It is hard for readers to focus on the relationship between the lines while their eyes dart back and forth from the legend to the chart.



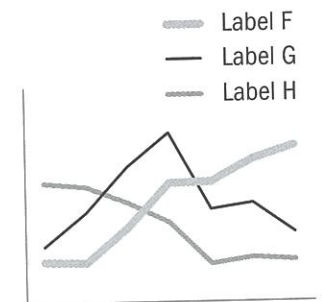
- ① **Point one** Description text goes in this space. Text goes in this space.
- ② **Point two** Description text goes in this space. Text goes in this space.
- ③ **Point three** Description text goes in this space. Text goes in this space.

Label the lines directly

A legend need not be in a small box tucked into the corner of the chart. Direct labeling allows the reader to identify the lines quickly and focus on comparing and contrasting the patterns.



Use a legend only when space is tight and the lines intersect extensively. The order of the legend should match the ranking of the end points since they are the most current data points.



Lines

Left-right y-axis scales

Do not use left-right scales when the two data series measure the same kind of quantities, such as stock prices. Instead, use a comparable scale or chart the percentage changes to compare the two series.

Do not mix apples and oranges

Do not chart two uncorrelated series with one scale on the left and another one on the right. Saving space is not a good reason.

Example

Revenue is plotted against a market index on a double y-axis scale.



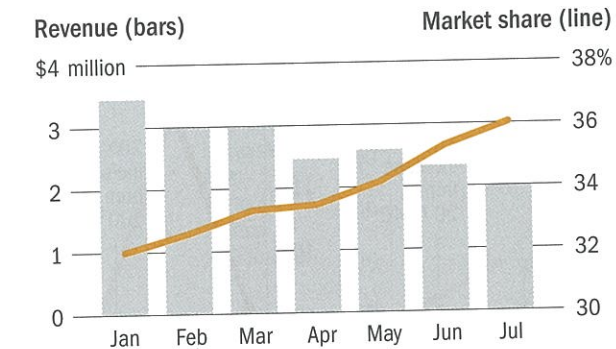
One can argue the stock market influences sales, but the relationship is not direct or measurable. Overlaying the two variables only makes your chart more confusing.

Moving in tandem

Using left-right y-axis scales can help show how two directly related series move together.

Example

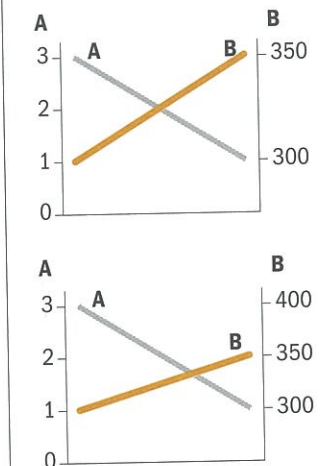
The chart below shows how an increase in market share has not helped generate more revenue.



Always label the scales clearly to avoid any confusion.

Adhere to the correct chart type for each series — lines for continuous data and bars for discrete quantities. Do not deviate for stylistic reasons. The only exception is when both data series call for a chart with vertical bars. In such instances, convert one to a line.

Use left-right scales sparingly. Your choice of scale can change the apparent relationship between the two lines.



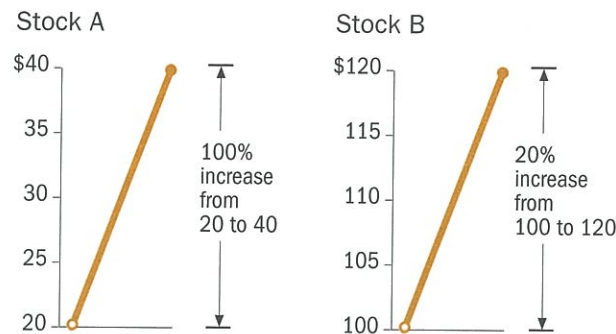
Lines

Comparable scales

Don't use awkward y-axis increments when calculating the ranges of the comparable scales.

Biased comparison

Anytime two or more charts are juxtaposed in the same space, the reader will compare and contrast the lines. Plotting the data series on noncomparable scales gives an unfair representation of the data.



Both stock A and stock B increased by \$20. Stock A doubled in value while stock B increased by 20% in the same period. Yet the pictures show that both lines have the same slope.

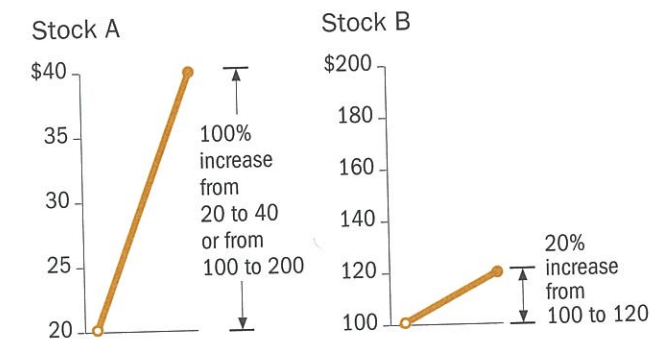
Unless the readers calculate the percentage changes of both lines, they will draw the wrong conclusion.

The charts above wrongly suggest that investors in stock A and stock B are getting the same return on their investments.

Fair comparison

When contrasting two or more sets of data, use comparable scales.

Relative performance should be obvious to the reader from the slopes of the lines. The ranges of the y-axis on both charts should represent the same percentage change.



In this example, the range of the y-axis scale from \$20 to \$40 is the same percentage change as from \$100 to \$200.

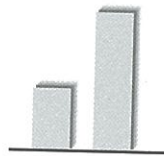
Even though both stock A and stock B increased by \$20, investors in stock A are five times better off than investors in stock B during that period.

When data series are in similar ranges, it is best to plot them on the same chart for easy and immediate comparison.

Vertical Bars

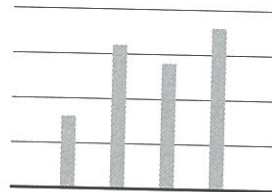
Form and shading

Don't create shadows behind bars. A bar chart is not a piece of fine art. The shadow contains no information or data.



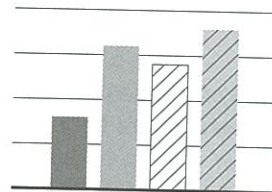
Bars too narrow

Vertical bars measure discrete quantities. When the bars are too narrow, your eyes focus on the negative space, the space between the bars, which carries no data.



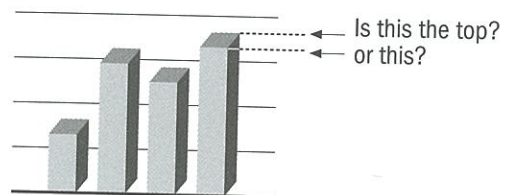
Distracting shades

Since all the bars measure the same variable, different shades have no relevance to the data. They only distract the readers from comparing the bars.



Where is the top of the bar?

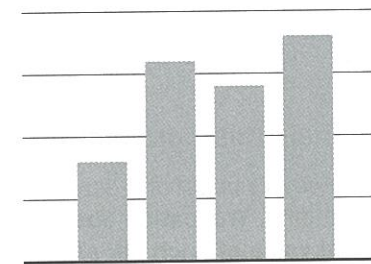
Three-dimensional vertical bars are flat out wrong. The reader is left to guess where the top of the bar meets the grid. Rendering the bars in 3-D adds no information.



Let the bar stand on its own

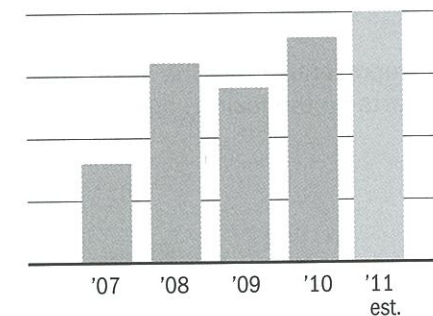
The width of the bars should be about twice the width of the space between the bars.

All the bars in a single chart should be the same color and shade since they measure the same variable.

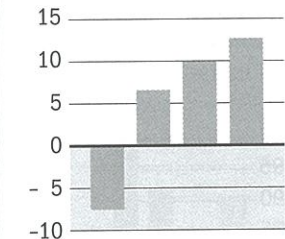


Projections and estimates

A lighter-shaded bar can be used to distinguish projections and estimates from actual values.



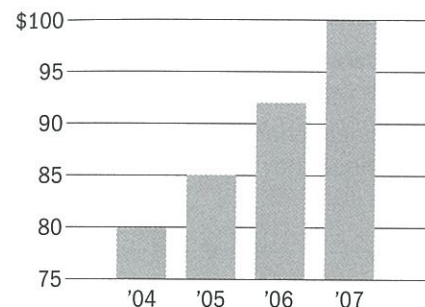
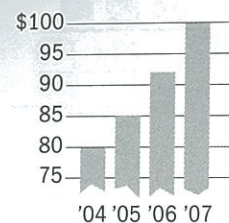
A gray background can be used to identify the negative zone of a bar chart.



Vertical Bars

Zero baseline

Even if you make the bottoms of the bars jagged to signify that the chart doesn't start at a zero baseline, it is difficult to compare the total value of each bar.



Truncation equals misrepresentation

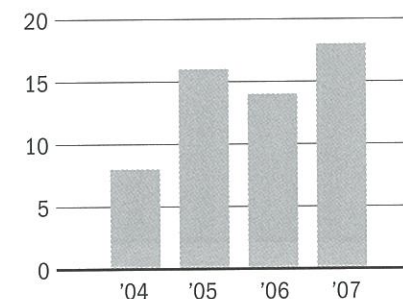
A bar chart that doesn't begin at a zero baseline is misleading. **Truncation obscures the discrete total value of each bar** and makes comparison of the data difficult.

In the above example, the chart appears to show that revenue in 2007 was five times that of 2004 — while in reality, revenue in 2007 rose only 25% from 2004. But the only way a reader would know that is to calculate the figures — which defeats the purpose of the chart.

For better representation of the same data, see the charts on the facing page.

Start at the zero baseline — No exceptions!

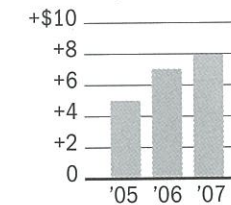
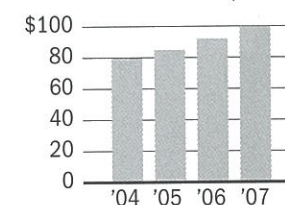
Vertical bars are used to depict **discrete quantities**, particularly for measuring distinct sets of data, such as revenue and income, over a period of time.



Alternative charting

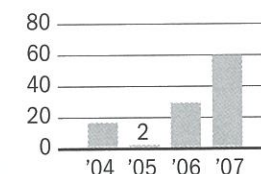
If the data points are close in value and the bars are indistinguishable in height, it may be more effective to plot the point changes or percentage changes.

Year	Revenue	Change from a year ago
2004	\$ 80 million	
2005	85	+\$ 5 million
2006	92	+ 7
2007	100	+ 8



Draw the zero baseline thicker and heavier than the rest of the grid lines.

Always label the value of a vertical bar if it is close to zero.

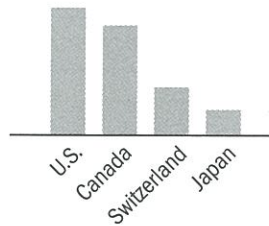


Vertical Bars

Multiple bars and legends

Don't label vertical bars with type at an angle on the x-axis. Instead, plot the data as horizontal bars.

Illegible text

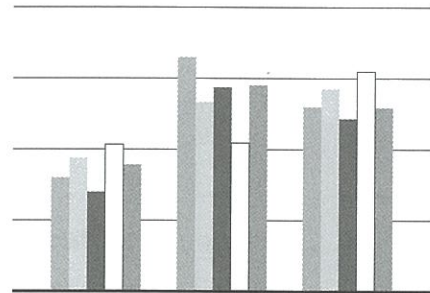


Alternative charting



No zebra pattern

Alternating light and dark bars make the reader dizzy. Comparison of the data is impossible.



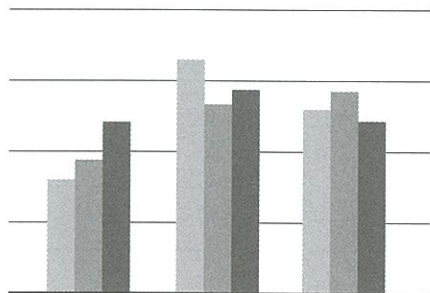
No backward legend

Listing the elements of a legend in a different order from the sequence of the bars is confusing.

A legend gives the readers the key to the information. It should not be positioned below the chart.

Legend C
Legend B
Legend A

Good location, but backward order

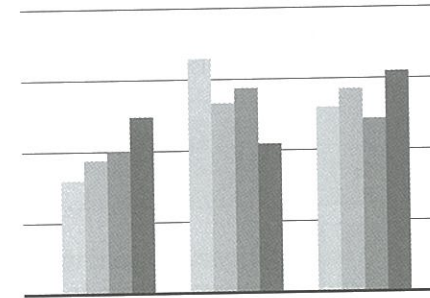


Legend A Legend B Legend C

Right order, but bad location

From lightest to darkest

The shading of the bars should move from lightest to darkest for easy comparison.



The right sequence

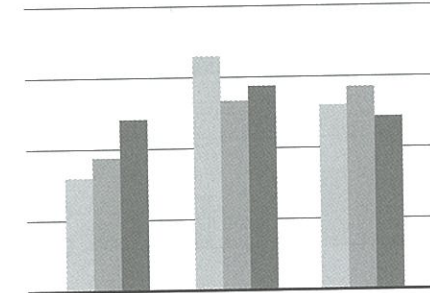
A legend can be used in a multiple-bar chart since labeling directly on a chart can be messy.

The order of the elements in a legend should be in the same sequence as the bars for easy reference. Why make your reader do extra work?

Two ways to display a legend:

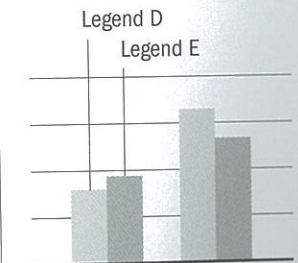
Legend A
Legend B
Legend C

Legend A Legend B Legend C



Keep multiple-bar charts to four or fewer categories. It is difficult for the reader to visually compare and contrast five or more bars. This principle applies even if color is available. Rainbow color bars are even more difficult to follow.

Direct labeling is practical with two categories in a multiple-bar chart. With three or four categories, a legend should be used for a cleaner presentation.



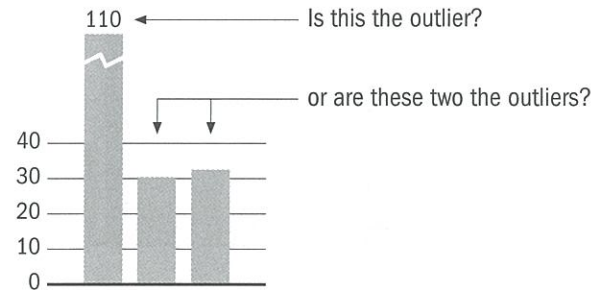
Vertical Bars

Broken bars and outliers

Don't shorten a broken bar to make it a similar height to the rest of the bars. An outlier should be well above all the other bars and still look like an outlier.

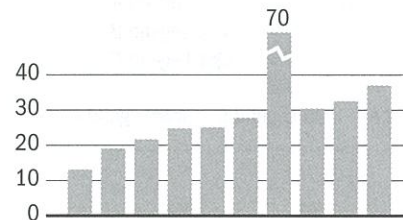
Data sample too small

Don't break a bar if the data series has fewer than a dozen data points. The data sample is too small to judge which data point is the outlier.

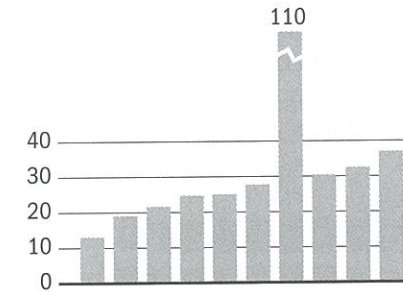


Values too close

Don't break a bar if its value is only about two times the next largest value. Just extend the scale and plot it as a regular bar.

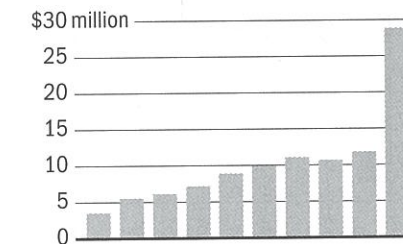


Use broken bars sparingly



A broken bar may be used to display an outlier in a vertical bar chart. However, before you break a bar confirm that ...

- ☒ The data source provided the correct value for the outlier.
- ☒ There are at least ten bars and only one outlier.
- ☒ The outlier is about three times or more the size of the next largest value.
- ☒ The outlier is not the point of the story. For instance, last year's revenue was three times the normal level. A broken bar for that data point would diminish the visual impact of that exceptional performance.



Choose a y-axis scale so that all the bars except the outlier are comfortably positioned in the chart.

Always label the data point of the broken bar.

Horizontal Bars

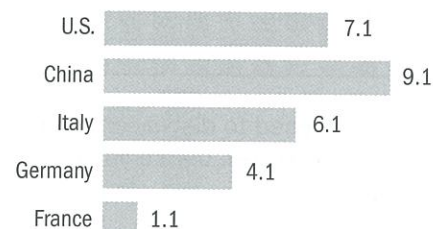
Ordering and regrouping

Just as in a vertical bar chart, do not use different shades or 3-D rendering in a horizontal bar chart.

Similar to a vertical multiple-bar chart, a horizontal multiple-bar chart should be kept to four or fewer categories. The shading of the bars should be assigned from lightest to darkest so the reader can easily compare and contrast the data.

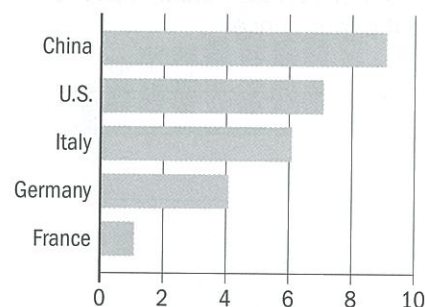
No random lineup

Don't plot horizontal bars in a random order. The main quality of a horizontal bar chart is the ranking of items by the same attribute. Plotting the bars in an arbitrary sequence defeats the purpose.



Avoid grid lines and scale

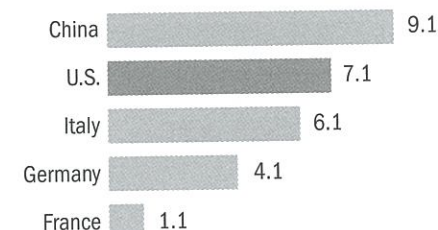
Horizontal bars are not as easy to compare as vertical bars. Using a scale and grid lines would make it even harder to discern the relative lengths of the bars. Direct labeling is cleaner and clearer.



The right order

A horizontal bar chart is most useful when ranking the items by the same characteristic, such as ranking the countries by sales of a product.

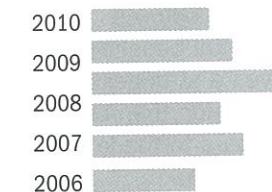
The bars should be ranked from the largest to the smallest or vice versa. A specific bar can be highlighted with a different shade.



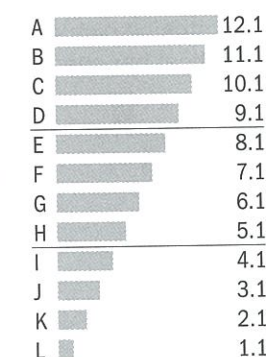
The exception to the rule of ranking by value is when a specific order, such as alphabetical order, is necessary to facilitate easier reading. An example would be plotting a chart with 50 states.



When plotting horizontal bars over time, the bars should be ordered from the most recent data point and go back in time.



For a long list of horizontal bars, label the data points flush right and use thin rules to separate the bars in groups of three to five to help the readers read across.

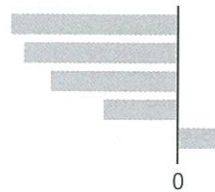


Horizontal Bars

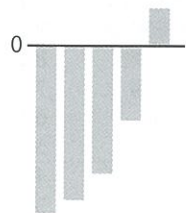
Negative bars

Avoid using horizontal bars if most of the values are negative. It is best to use vertical bars unless the labels do not fit underneath the bars. A picture with the bars below a horizontal baseline leaves a stronger impression than one with bars to the left of a zero line.

Negative values in a horizontal bar chart

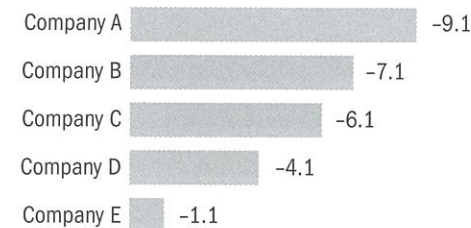


A more striking picture as a vertical bar chart



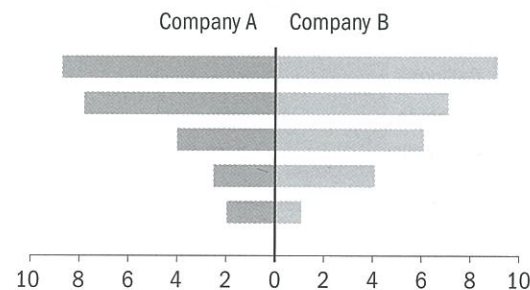
Wrong direction

Never plot horizontal bars with negative values on the right side of the zero line, even if there are no positive numbers in the data set.



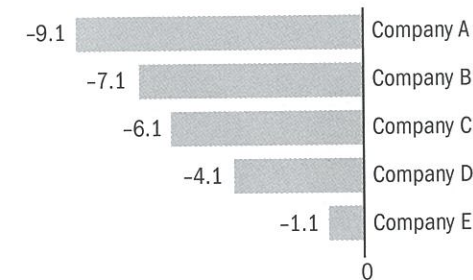
No two-way horizontal bars

Demographics charts sometimes plot the number of males on one side and females on the other. However, in most applications, the left side of the baseline is reserved for negative numbers. It is hard to compare two sets of bars on opposite sides. It is better to plot the two data series as a multiple-bar chart.

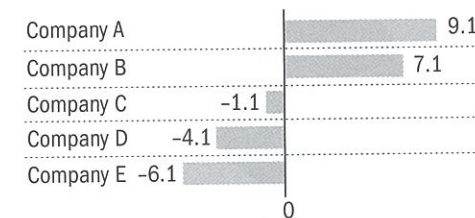
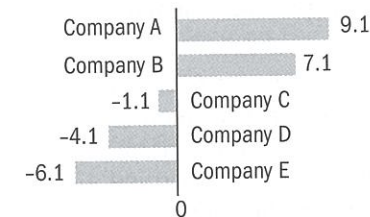


Left is negative, right is positive

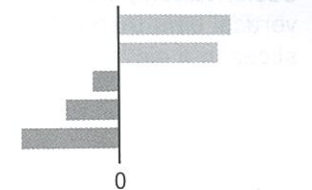
Always keep the negative numbers on the left side of the zero line, even if the entire data set consists of negative values. The right side of the baseline is reserved for positive numbers only. A zero baseline can be added to reinforce the negative zone.



Align the labels on either side of the baseline or keep them all flush left.



It is acceptable to shade the negative bars to further distinguish them from the positive bars.

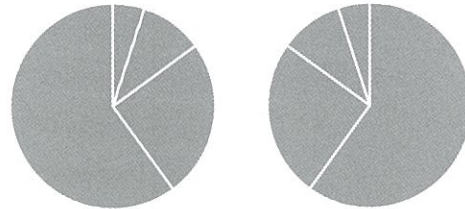


Slicing and dicing

Pie charts should not be used to illustrate complicated relationships among many segments. It is easier to compare two vertical bars than two slices in a pie.

Less effective order

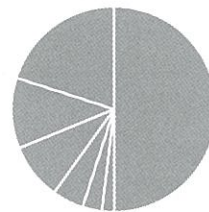
It's intuitive to read top to bottom and clockwise. **Never chart segments clockwise from smallest to largest.** By ordering the slices from smallest to largest in clockwise direction or vice versa, the least important segment has the most prominent position.



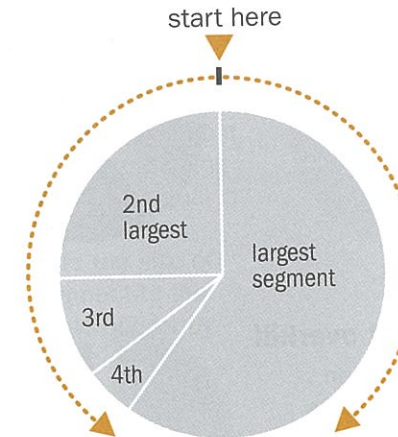
Too many slices

It's difficult to compare and contrast many segments. **A pie chart shouldn't have more than five slices.**

If there are more than five, combine the smaller and less significant segments to create the fifth slice and label it "Other." If all segments have to be represented separately, use a stacked or segmented bar chart instead. See page 79.



Larger segments on top

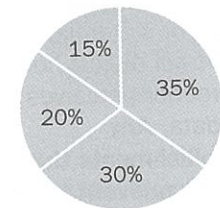


Reading a pie chart is like reading a clock. It's intuitive to start at 12 o'clock and go clockwise.

Therefore, it is most effective to **place the largest segment at 12 o'clock on the right to emphasize its importance.**

The best way to order the rest of the segments is to place the second biggest slice at 12 o'clock on the left; the rest would follow counterclockwise. The smallest slice will fall near the bottom of the chart, in the least significant position.

The only exception to the ordering is when all the slices are close in value. In this case, start at 12 o'clock on the right and go clockwise from largest to smallest.



Just like in bar and line charts, direct labeling helps the reader to quickly identify individual segments and focus on the comparison between them.

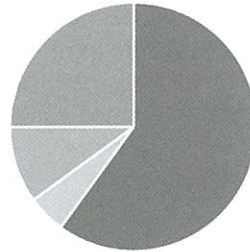
Pies

Dressing up the slices

Pie charts are not as effective in presenting complex data as line or bar charts, but they are good visual tools for showing portions of a whole. Avoid the temptation to dress up a pie by using different colors or 3-D effects, which will distort how the reader perceives the data. **Any embellishments that are not relevant to the data have no place in a chart.**

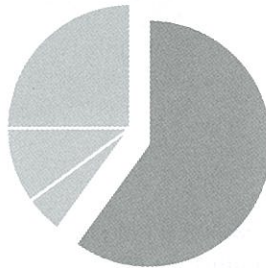
Distracting shades and colors

A pie with multiple shades or colors distracts the reader from immediate comparison of the segments.



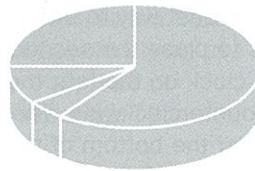
Special effect overkill

Don't use more than one trick to highlight a segment, for instance, don't both shade and pull out the slice you want to emphasize.



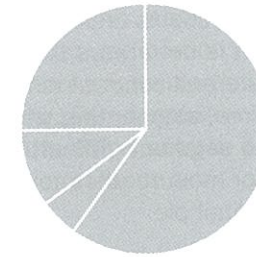
Incorrect data representation

Since the area is used to represent each segment's relative value, a pie with three-dimensional rendering misrepresents each segment's proportion to the whole.



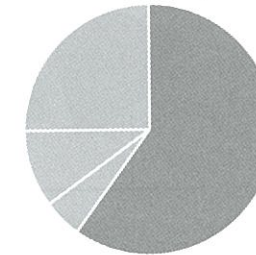
Keep the shading simple

It is generally easier to compare different lengths than different sizes of segments of a pie. Therefore, keep it simple when shading the slices. The goal is for the reader to compare the size of any segment to the whole pie efficiently.

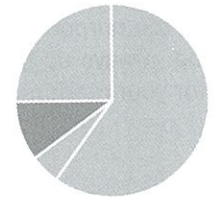


Highlight the important slice

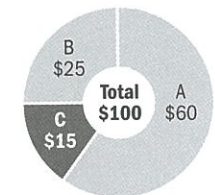
Use different shading to highlight one or two important segments.



The highlighted segment doesn't have to be the largest slice. However, do not reorder the segments.



A donut pie chart can be used to display the total value inside the pie.



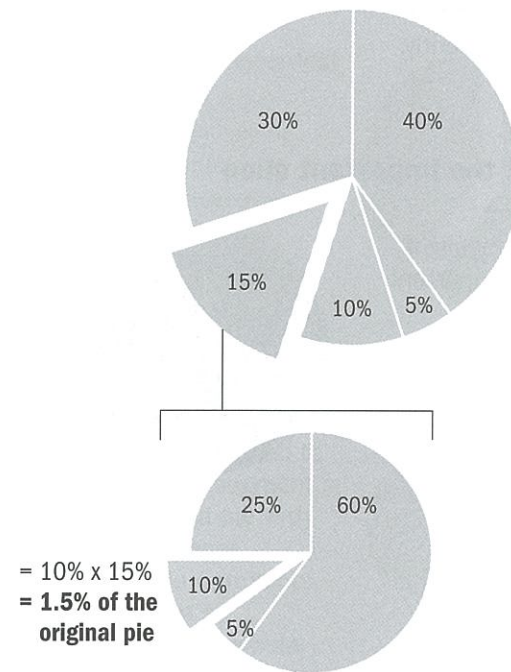
Pies

Slicing a slice

The function of charts is to give an immediate impression of a visual message. Asking readers to do the math in their heads totally defeats the purpose of charting. Always do the work for your readers.

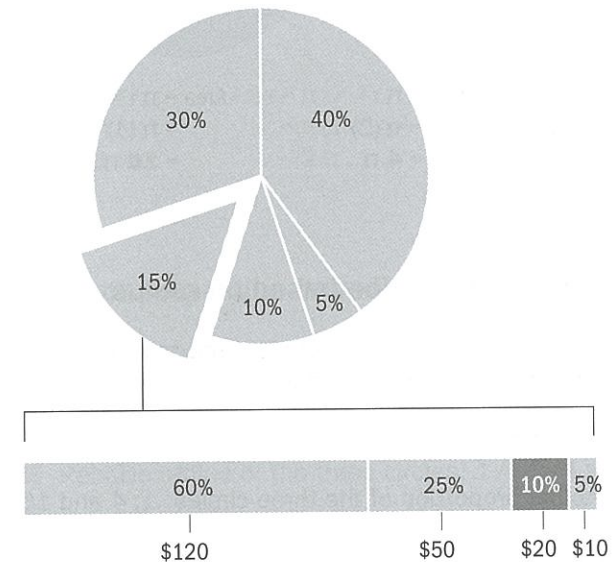
Stop slicing already!

While pie charts are commonly used in the business world, it is not always the ideal format in which to compare and contrast different segments visually. Therefore, **segmenting within a slice makes the second segment difficult to grasp**. It's too much work for most readers to compare the final slice to the original pie.

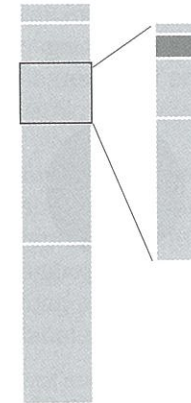


Go for a bar, instead of another pie

A segmented bar chart in general is more efficient than a pie chart at showing portions of a whole. It also allows for more segments than a pie without looking confusing. Be sure to label both the percentages and the actual values. It helps to put the segments in real terms.



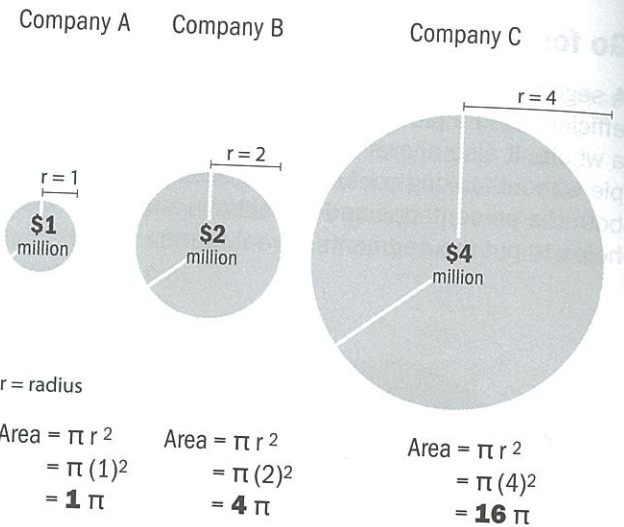
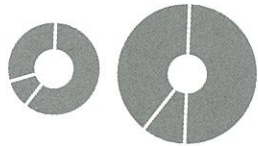
One segmented bar within another is also a fine choice.



Pies

Proportional pies

Don't chart proportional pies in donut-pie chart style. The white circles inside the pies distort the ratio of the remaining area of the two pies.

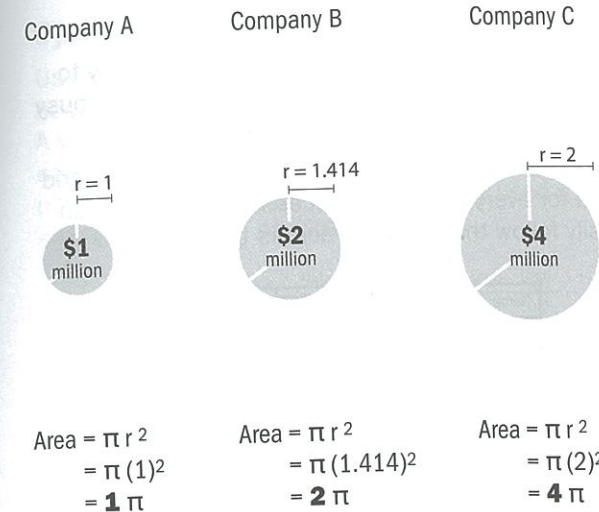


Incorrect proportion based on radius

A common mistake is to represent the relative size of the circles based on their radii.

- Relative radius of the three circles: 1, 2 and 4
- Actual proportion of the three circles: 1, 4 and 16

In this example, the circles are drawn based on their relative radii. The picture grossly overstates company C, since the area of the circle that represents company C is 16 times that of company A. In reality, company C is only four times that of company A.



Correct proportion based on area

Remember geometry?

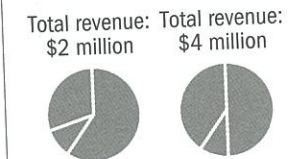
Area = πr^2 . Proportional pies should always be calculated based on surface area.

- Relative radius of the three circles: 1, 1.414 and 2
- Actual proportion of the three circles: 1, 2 and 4

Based on the area of the circles, the three pies correctly represent the relative size of the three companies — \$1 million, \$2 million and \$4 million.

Proportional pies concisely display two levels of information: the relative aggregate values between two or more pies, and the share of the segments within each pie.

Two pies of the same size can be used to represent different aggregate values, as long as they are clearly labeled.



Tables

Grid lines

Don't resort to a table unless a huge amount of data has to be included and space is limited. Rows of numbers do not have any visual impact. It requires a lot of work for the reader to compare and contrast the data.

Unhelpful grids

A large table using grid lines or alternating gray to separate each entry can be very daunting. The busy grid lines distract the reader from the data.

In a small table, alternating gray background or grid lines for every entry is unnecessary. The eyes can easily follow the numbers across the table.

Name	Data	Data	Data	Data	Data	Data
Company A	0.0	0.0	0.0	0.0	0.0	0.0
Company B	0.0	0.0	0.0	0.0	0.0	0.0
Company C	0.0	0.0	0.0	0.0	0.0	0.0
Company D	0.0	0.0	0.0	0.0	0.0	0.0
Company E	0.0	0.0	0.0	0.0	0.0	0.0
Company F	0.0	0.0	0.0	0.0	0.0	0.0
Company G	0.0	0.0	0.0	0.0	0.0	0.0
Company H	0.0	0.0	0.0	0.0	0.0	0.0

Name	Data	Data	Data	Data	Data	Data
Company A	0.0	0.0	0.0	0.0	0.0	0.0
Company B	0.0	0.0	0.0	0.0	0.0	0.0
Company C	0.0	0.0	0.0	0.0	0.0	0.0
Company D	0.0	0.0	0.0	0.0	0.0	0.0
Company E	0.0	0.0	0.0	0.0	0.0	0.0
Company F	0.0	0.0	0.0	0.0	0.0	0.0
Company G	0.0	0.0	0.0	0.0	0.0	0.0
Company H	0.0	0.0	0.0	0.0	0.0	0.0

Name	Data	Data	Data	Data	Data	Data
Company A	0.0	0.0	0.0	0.0	0.0	0.0
Company B	0.0	0.0	0.0	0.0	0.0	0.0
Company C	0.0	0.0	0.0	0.0	0.0	0.0
Company D	0.0	0.0	0.0	0.0	0.0	0.0
Company E	0.0	0.0	0.0	0.0	0.0	0.0
Company F	0.0	0.0	0.0	0.0	0.0	0.0
Company G	0.0	0.0	0.0	0.0	0.0	0.0
Company H	0.0	0.0	0.0	0.0	0.0	0.0

Optimal visual guides

Use thin rules after every three to five entries to help the reader follow the numbers across a table. A wide table needs a rule every three lines. A narrow table with two columns of numbers does not require any guides. Shading can be used to highlight a column of data or an entry.

Name	Data	Data	Data	Data	Data	Data
Company A	0.0	0.0	0.0	12.0	0.0	0.0
Company B	0.0	0.0	0.0	11.0	0.0	0.0
Company C	0.0	0.0	0.0	10.0	0.0	0.0
Company D	0.0	0.0	0.0	9.0	0.0	0.0
Company E	0.0	0.0	0.0	8.0	0.0	0.0
Company F	0.0	0.0	0.0	7.0	0.0	0.0
Company G	0.0	0.0	0.0	6.0	0.0	0.0
Company H	0.0	0.0	0.0	5.0	0.0	0.0
Company I	0.0	0.0	0.0	4.0	0.0	0.0
Company J	0.0	0.0	0.0	3.0	0.0	0.0
Company K	0.0	0.0	0.0	2.0	0.0	0.0
Company L	0.0	0.0	0.0	1.0	0.0	0.0

Chart in a table

Whenever space is available in a table, it is always helpful to chart the column of data that is the main message.

Name	Data	Data	Data	Data	Data
Company A	0.0	0.0	<div></div>	12.0	0.0
Company B	0.0	0.0	<div></div>	11.0	0.0
Company C	0.0	0.0	<div></div>	10.0	0.0
Company D	0.0	0.0	<div></div>	9.0	0.0
Company E	0.0	0.0	<div></div>	8.0	0.0
Company F	0.0	0.0	<div></div>	7.0	0.0
Company G	0.0	0.0	<div></div>	6.0	0.0
Company H	0.0	0.0	<div></div>	5.0	0.0
Company I	0.0	0.0	<div></div>	4.0	0.0
Company J	0.0	0.0	<div></div>	3.0	0.0

Expressing quantitative and descriptive information in a tabular form is often the simplest method of presenting copious amounts of data. However, it should be used judiciously and as a last resort in most cases. **A chart is more memorable than a table of numbers.**

Tables

Numbers alignment and ordering

For a table with multiple data series, do not present the comparative data horizontally. It is easier for the reader to analyze data vertically.

Comparative data presented horizontally

	Company A	Company B	Company C
Sales	1	2	3
Profit/loss	11	12	13
Employees	210	220	230

Comparative data presented vertically

Name	Sales	Profit/loss	Employees
Company A	1	11	210
Company B	2	12	220
Company C	3	13	230

Never align whole numbers flush left

Name	Data
Company A	1000
Company B	900
Company C	80
Company D	7

Never align decimals flush left or flush right

Name	Data
Company A	10.82
Company B	9.49
Company C	8
Company D	7.4

Name	Data
Company A	10.82
Company B	9.49
Company C	8
Company D	7.4

Never order entries randomly

Name	Data
Company A	4.1
Company C	5.1
Company D	2.1
Company B	3.1

Align whole numbers flush right

Name	Data
Company A	1000
Company B	900
Company C	80
Company D	7

Always align decimal numbers on the decimal point

Round off all figures to the same number of places after the decimal point, even whole numbers.

Example

Round off to one decimal point and align along the decimal point. Add ".0" after a round whole number so the decimals line up.

Name	Data
Company A	10.8
Company B	9.5
Company C	8.0
Company D	7.4

Order entries logically

In alphabetical order		Ranked by values	
Name	Data	Name	Data
Company A	4.1	Company C	5.1
Company B	3.1	Company A	4.1
Company C	5.1	Company B	3.1
Company D	2.1	Company D	2.1

For small numbers, it is acceptable to center whole numbers.

Name	Data
Company A	10
Company B	9
Company C	8
Company D	7

In a table, it is only necessary to display the unit, such as a dollar sign or a percentage sign, once with the first entry. Just be sure to keep the numerals aligned.

Name	Data
Company A	\$10
Company B	9
Company C	8
Company D	7

Name	Data
Company A	10%
Company B	9
Company C	8
Company D	7

Pictograms

Choice of icons

Avoid using partial icons in a pictogram. The purpose of a pictogram is to create a snapshot of the data. Partial icons add confusion.

The only exception is when using a square as an icon. A square works even if a small sliver of the unit is used.



A truncated person or airplane is not only illegible but also disturbing.



Bad icons

Even though a pictogram is more visually engaging than a bar chart, it is less effective for comparing a large amount of data. A pictogram should be used only when comparing a few simple data series.

Icons in pictograms are not meant to be works of art. Icons that are visually interesting do not necessarily make good symbols for pictograms. A symbol with **too many details** hinders the readers from comparing the underlying data. When these symbols are used in multiples, they create a cluttered and busy picture.



Distracting variations

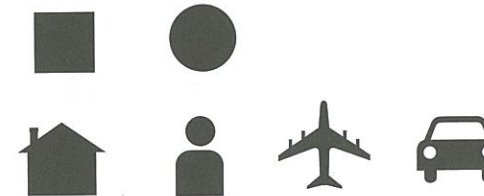
Don't use different versions of a symbol to represent the variables. The combinations can be very distracting and it is hard for the readers to compare the underlying data. The focus should be the information and not the drawing.



Good icons

Icons or symbols are used to depict quantitative information in pictorial graphs. Pictograms can give a quick snapshot of quantity and volume, but are not suited to chart massive amounts of data. A bar chart is far more effective than a pictogram when comparing discrete quantities of several complex data series.

Icons used in pictograms should be simple. When these symbols are used in multiples, they still maintain a clear picture and present the data in an attractive and efficient way.



One symbol, various shades

Use one symbol with different shades to represent the variables. The readers can focus on comparing and contrasting the data and not on the different styles of the icon.



A test for determining a good icon:

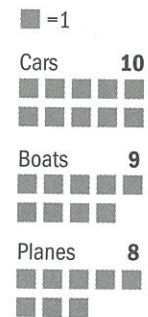
- ☒ Simple.
- ☒ Symmetrical.
- ☒ Clear and crisp even when reduced to a small size.
- ☒ Roughly fits in a square.



Pictograms

Comparing quantities

If the data points are close together, do not use a pictogram. It is difficult to contrast and discern subtle differences in a busy picture.



No shrinking houses or people

Don't chart quantitative information based on the area or height of an icon. Human eyes can't draw meaningful comparisons from irregular shapes. Stretching an icon in any dimension to represent the value only makes a chart look amateurish.

House vs. McMansion?



Dwarf vs. giant?



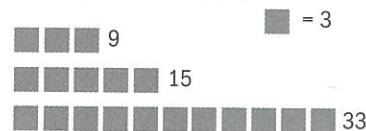
Avoid partial icons and awkward units

Avoid using partial icons. If most of the data points have to be represented by partial icons, a bar chart is more effective.

Confusing partial icons



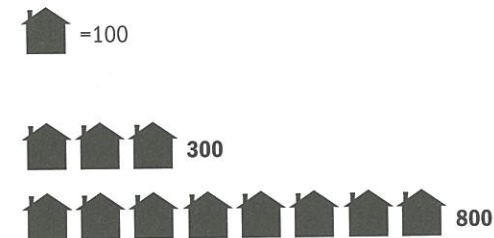
Awkward increments



Comparing with multiple units

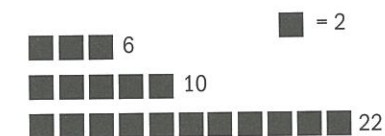
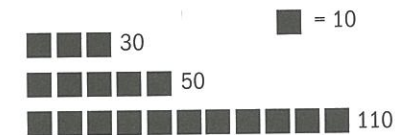
A pictogram takes the form of a bar chart and uses icons or symbols to visualize the data. Multiple units of a symbol are used to represent the discrete quantities.

An effective pictogram is visually engaging and gives a quick comparison of the variables.



Natural units

In an effective pictogram, most data points should be multiples of a complete icon. Each icon should represent a natural counting increment, such as 1, 2, 5, 10, 50 and 100.



Always label the data values of a pictogram. Don't make the readers count.

Icons should be organized in groups of 5 or 10 to facilitate easy visual counting.

Unnatural grouping



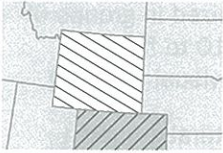
Effective grouping



Maps

Mapping and shading

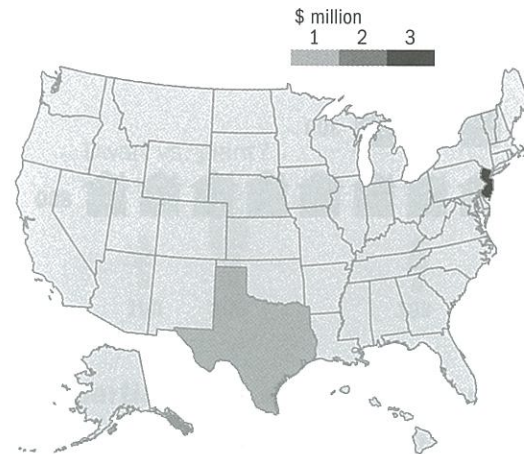
Don't use patterns or cross-hatching to highlight an area. Use solid shades of black or another color.



No mapping unless geography is relevant

Do not use a map to compare quantities or volume, unless geography is relevant to the message.

Suppose sales in New Jersey are three times that in Texas. Even if New Jersey is shaded black and Texas in light gray, the picture gives a different impression of the relative size of the business. A bar chart showing the sales figures is more effective.

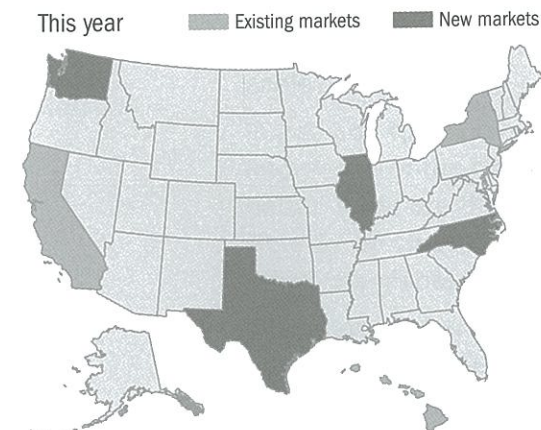
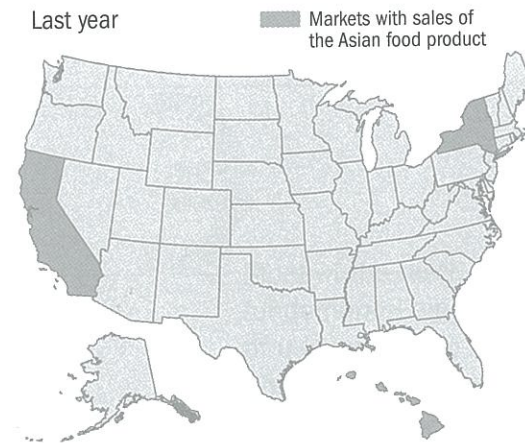


Mapping change

For most business applications, a series of shaded maps can be very effective for comparing different conditions or showing change over time.

Example

Two maps show the market penetration of an Asian food product. The distribution grows with an increased presence of Asian consumers.



Data maps can be powerful tools that analyze massive amounts of demographic information down to the metropolitan statistical area level. Highly sophisticated software and database expertise are required to execute such data maps.

Keep the outlines of a map simple, whether it is county, state or country. They are like the grid lines in a line or bar chart. They frame the information, but they are not the message.