# Graphic Representation of Data

* Use graphs and charts to represent the relationships in quantitative information
* Use a graph type based on the type of relationship
* Types of relationships
* Nominal comparison
  + Deviation
  + Distribution
  + Correlation
* Time series
* Ranking
* Part-to-whole

## Nominal comparison

* Bar graphs work really well for this type of relationship; especially if the scale is large and to highlight the differences between the values
* With a large set of data replace the bars with simple   
  data points, known as a dot plot

## Time series

* The most common graphs to show time series are lines (with continuous data) and vertical bars (with discrete data).
* Dot plots may also be used
* Always have time measurements along the x-axis (from left to right), with quantitative values plotted along the y-axis

## Ranking

* Rankings are all about communicating the ordering—from highest to lowest, or vice versa.
* Bar graphs (vertical and horizontal) visually rank relationships; use ordering to highlight the highest values (descending order) or the lowest values (ascending order)

## Part-to-whole

* Pie charts are the most common graph types used for part-to-whole relationships.
* A stacked bar chart is also a good option; especially to compare the composition of two separate stacked bars, with the same categorical subdivisions.

## Line Charts

* Line charts are very easy to understand, and should be kept that way.
* Too many lines on one chart can tend to look too busy; therefore, it is best to keep the chart to four or fewer clearly labeled lines
* If you need more than four categories, you can use the practice of paneling

## Bar Charts

* Bar graphs are easy to understand what is going on. Resist over complicating things.
* Bar graphs must always have a zero baseline because the length of the bars provides comparison against each other. Truncating the scale, distorts the story
* Ordering is often important, especially if you are showing a ranking relationship. Either the lowest- or highest-value subcategories at the top. Alphabetical ordering is another option
* Use half the width of one of the bars as the space between bars
* Stacked bars are useful to display part-to-whole relationships and can be oriented either vertically or horizontally

## Pie Charts

* Pie charts display part-to-whole comparisons
* Useful for communicating big ideas quickly, but not very useful in comparing values between pies
* More than five slices can make it difficult to fully grasp what is going on with the data.
* Try another graph, such as bars or stacked bars
* The largest section should always start at the top, and go clockwise from 12 o’clock. The second largest section should always start at the top and go counterclockwise

## References

Visualize This; Nathan Yau

Show Me the Numbers: Designing Tables and Graphs to Enlighten; Stephen Few

Graph Design for the Eye and Mind; Stephen M. Kosslyn

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Designing Science Presentations: A Visual Guide to Figures, Papers, Slides, Posters, and More; Matt Carter