

When should you use a log scale in charts?

Authored by
stats writer

May 12, 2024

RECOMMENDED CITATION

stats writer (2024). *When should you use a log scale in charts?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=143957>

A log scale, also known as a logarithmic scale, is commonly used in charts to display data that covers a wide range of values. It compresses the data on the y-axis, making it easier to visualize and compare large differences in values. This type of scale is particularly useful when the data being presented has a large range of values or when there is a significant difference between the smallest and largest values. It allows for a more accurate representation of the data and can help in identifying patterns and trends that may not be apparent on a linear scale. Log scales are commonly used in scientific and financial charts, as well as in data analysis and visualization. In summary, a log scale should be used in charts when presenting data with a wide range of values, to improve the accuracy and clarity of the information being conveyed.

When Should You Use a Log Scale in Charts?

There are two common scenarios where it's a good idea to use a log scale when creating charts:

Scenario 1: A few values are significantly larger than all other values.

By using a log scale, it's easier to visualize the smaller values on the chart.

Scenario 2: You want to analyze percent change instead of raw change.

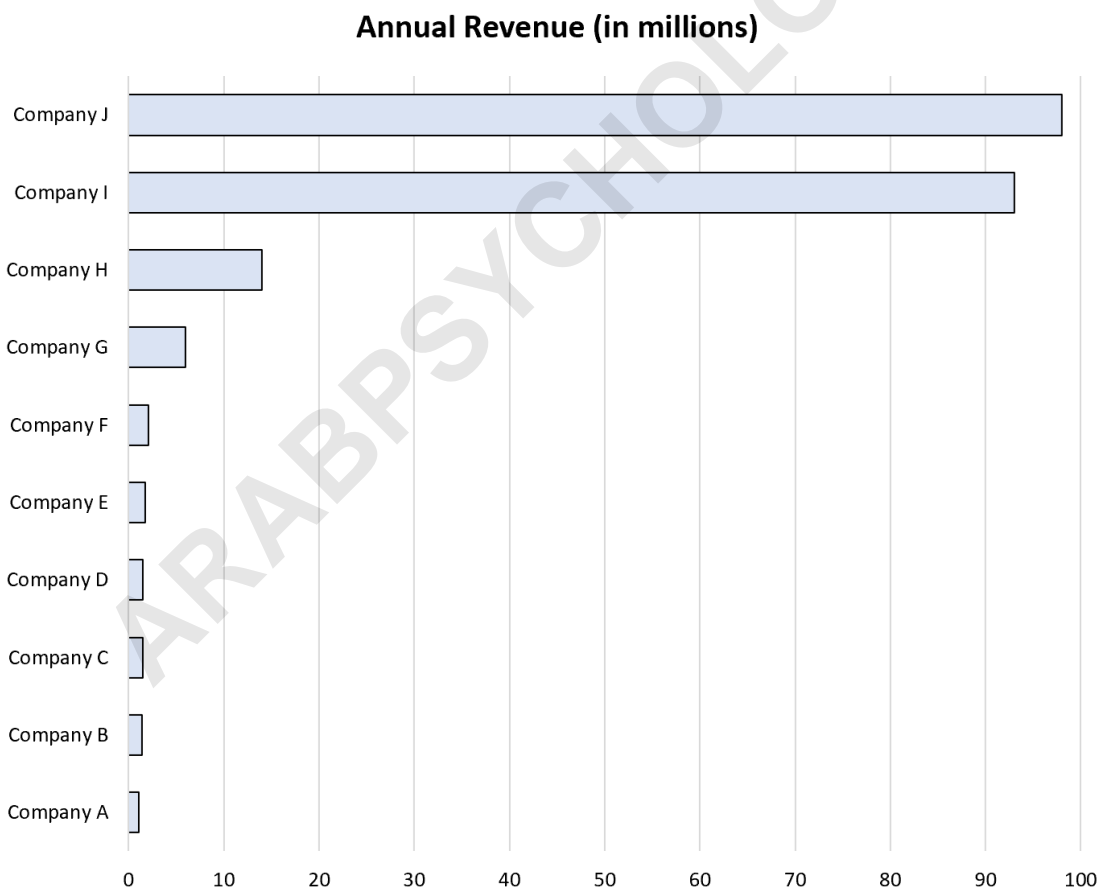
By using a log scale, it's easier to visualize percentage change in values over time.

The following examples illustrate when each scenario may occur in the real world.

Scenario 1: Using a Log Scale When a Few Values Are Much Larger than All Others

Suppose we would like to visualize the annual revenue of 10 different companies in which 2 of the companies have revenues that are significantly larger than all of the other companies.

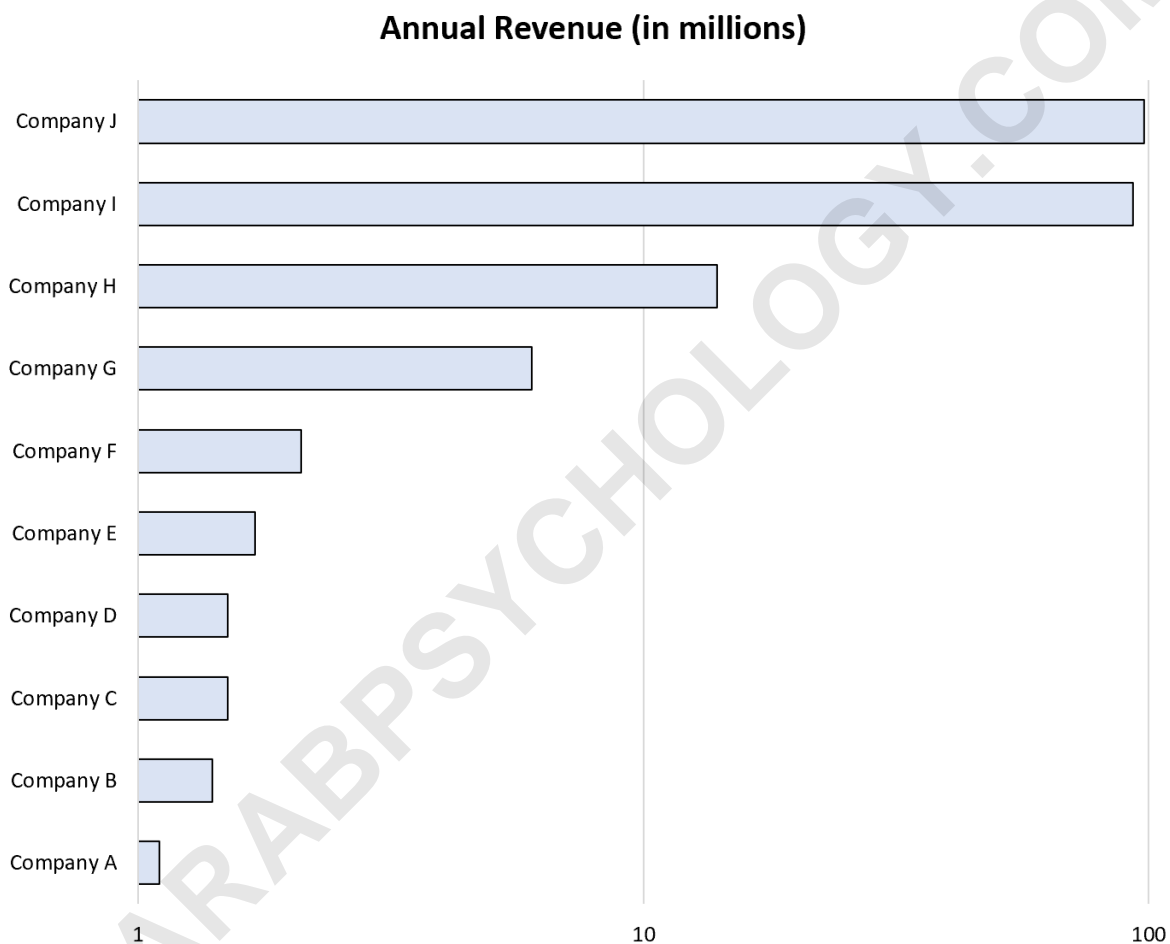
Here's what a bar chart would look like if we visualized the revenues on a linear scale:



Notice that it's extremely difficult to read the smaller

values on the chart and it's tough to see the differences between the smaller values.

Here's what the same bar chart would look like on a log scale:

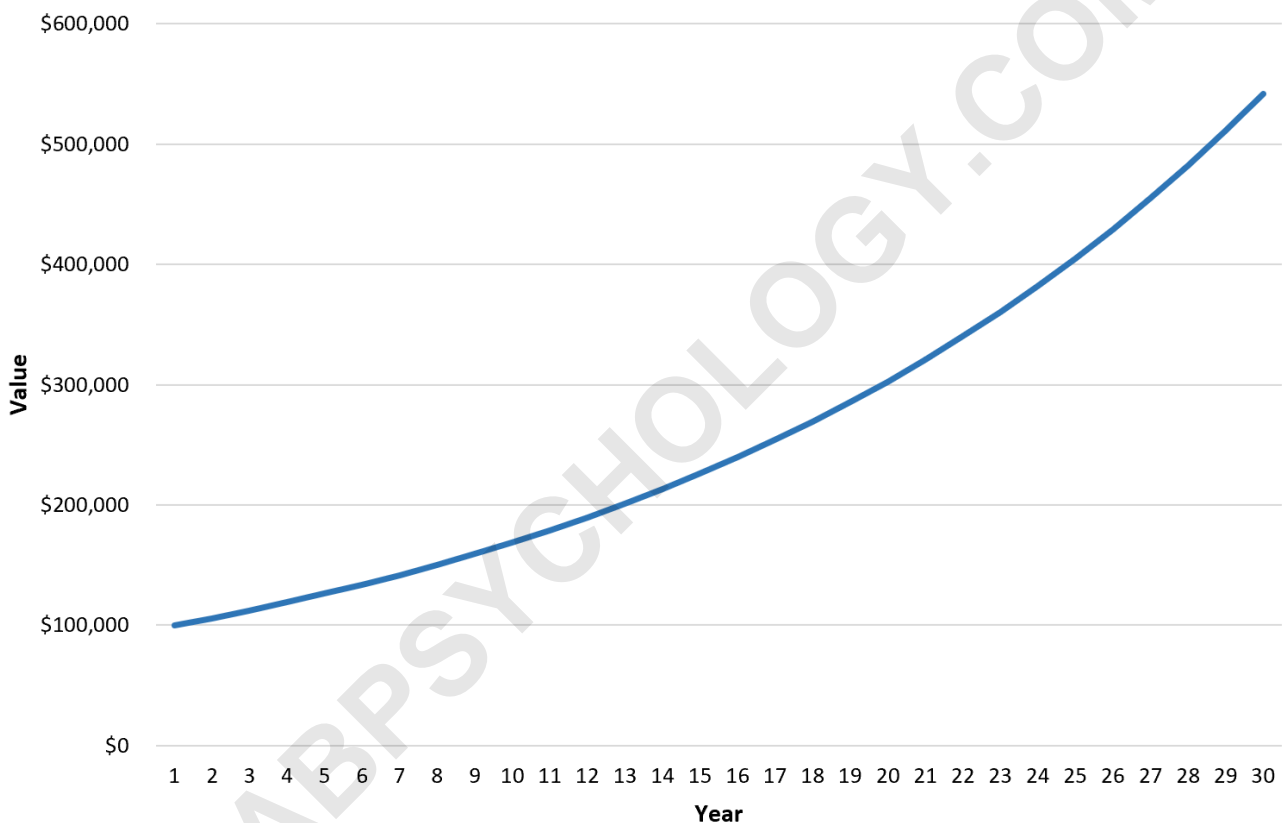


Notice how it's much easier to differentiate the smaller values using a log scale compared to a linear scale.

Scenario 2: Using a Log Scale to Visualize Percent Change

Suppose we make a \$100,000 investment in a stock that grows at 6% per year.

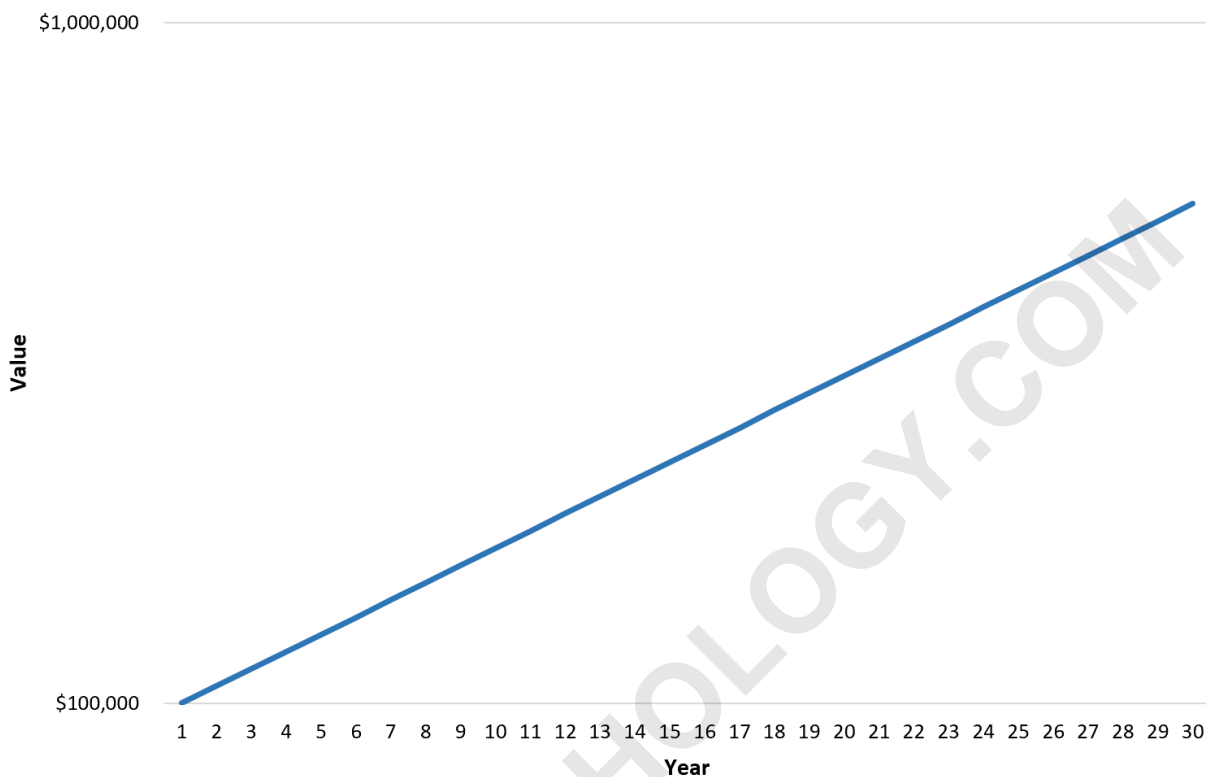
Here's what a line chart of the investment would look like over a 30-year period on a linear scale:



This chart is useful for visualizing how much the investment value changes in raw dollars each year, but suppose we're more interested in understanding the percentage growth of the investment.

In this case, it would be useful to convert the y-axis to a

log scale:



Using this chart, we can see that the percentage change in the investment value has been constant every year during the 30-year period.

Note: Using a log scale can be a useful way to visualize the percentage change of any variable during a time period when the variable experiences exponential growth since the change in values near the end of the time period tend to dwarf the change in values near the beginning.

The following tutorials explain how to create charts with log scales in various statistical software:

ARABPSYCHOLOGY.COM