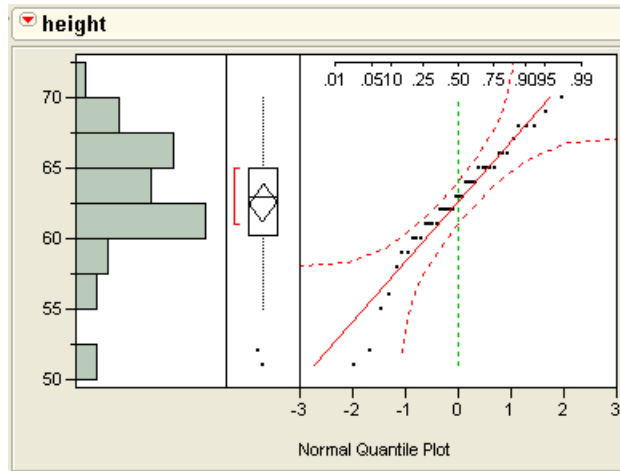


Normal Quantile Plot

The **Normal Quantile Plot** option adds a graph to the report that is useful for visualizing the extent to which the variable is normally distributed. If a variable is normal, the normal quantile plot approximates a diagonal straight line. This kind of plot is also called a quantile-quantile plot, or Q-Q plot.

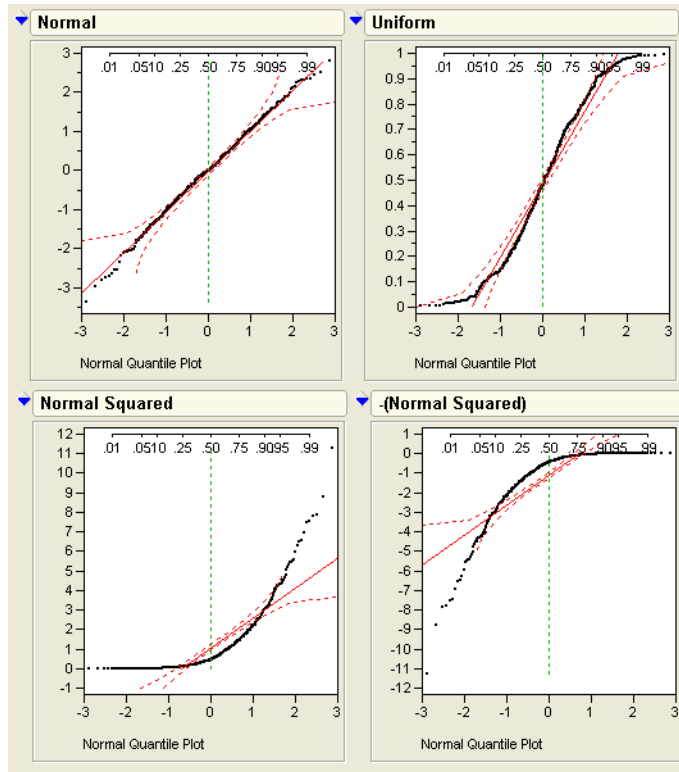
The Normal Quantile plot also shows Lilliefors confidence bounds, reference lines, and a probability scale as illustrated in the plot shown here (Conover 1980).



The y -axis of the Normal Quantile plot shows the column values. The x -axis shows the expected normal scores for each value. The examples in Figure 3.8 show normal quantile plots for simulations of 400 points from four different distributions:

- The plot called **Normal** is the normal quantile plot for a normal distribution and appears as a diagonal linear pattern.
- The second example is for a uniform distribution, a flat distribution that produces an S-shaped quantile plot. A very peaked distribution produces an inverted S-shaped quantile plot (not shown).
- Squaring a normal distribution yields a new distribution that is skewed to the right. This produces the concave normal quantile plot that is labeled **Normal Squared**.
- A distribution that is skewed to the left produces the convex pattern similar to the one shown in the example labeled **-Normal Squared**.

One other pattern not shown here is a *staircase* pattern, which is indicative of data that have been rounded or have discrete values.

Figure 3.8 Normal Quantile Plot Comparison


The normal quantile values are computed by the formula

$$\Phi^{-1}\left(\frac{r_i}{N+1}\right)$$

where Φ is the cumulative probability distribution function for the normal distribution, r_i is the rank of the i th observation, and N is the number of non-missing observations. These normal scores are Van Der Waerden approximations to the expected order statistics for the normal distribution.

Outlier Box Plot

The outlier box plot is a schematic that lets you see the sample distribution and identify points with extreme values, sometimes called *outliers*. Box Plots show selected quantiles of continuous distributions.