

SPSS Directions - Graphical Assessment of Normality

These directions may seem super-simplistic to some of you. They are not meant to be insulting! They are just to take into account the many different levels of computer experience in this class.

Open SPSS. To do this, either double-click on the SPSS icon, or select *Start, Programs, SPSS 11.0 for Windows (Student Version)*. Several options for entering data will appear. Choose the one that says "Type in data."

Enter data from the octopus mantle length data (page 5-16 in your notes). Enter the actual mantle lengths and the normal scores and Z-scores. Name your columns. You can do this by double-clicking on the top of the column. SPSS has a bunch of rules about what you can name your columns. It is not case sensitive, so everything will appear in lower case, and it doesn't like symbols or spaces. Also, column names can be a maximum of 8 letters long. While you're naming your columns, you should make sure that they are the right data type - in this case they should be "numeric" - and you may want to increase the number of decimal places SPSS should keep track of, particularly for the Z-scores.

Derive summary statistics for the mantle data. Go to *Analyze, Descriptive Statistics*. Transform the data to their normal scores by subtracting the sample mean and dividing by the sample standard deviation. Go to *Transform, Compute*.

Make a histogram of the data. Go to *Graphs*, and choose *Histogram*. Several options will appear. Play with them until you get a histogram that makes some sense! To do that, choose the column of data you'd like to graph, specifically the mantle lengths (raw data). Note that there is an option to include a normal curve on your graph. Is this data normally distributed? left skewed? right skewed?

Create a box plot of the data. Go to *Graphs, Box Plot*

Create several scatter plots of the data. Go to *Graphs, Scatterplot, Simple*, and choose your x and y variables. Do this several ways using the mantle lengths, normal scores, and Z -scores. Note how the shapes of the graphs change depending on what values are on which axes. Also note the "stretch and squish" evident in the plot of the normal scores and Z values.

Make a Q-Q plot of the data. Go to *Graphs, Q-Q plot*, and choose the mantle length data. Compare this plot to the Q-Q plots in the notes. What do you notice? (Don't worry about the detrended normal scores.)

Transform your data. Go to *Transform, Compute*. Using the arrows, move the mantle data into the equation editor box. We will use the transformation $y = \log_{10}(x + 1)$. You will need to choose LOG10 from the list of operators in the box and use the up arrow to move it. When you are writing this equation, do NOT put in an equal sign - this is not Excel! Once you have calculated the transformed values, you can name your new variable. Then make another histogram and Q-Q plot. What do you notice?

One sample t-test

Perform a one sample t-test on the transformed octopus data. Go to *Analyze, Compare means*, and choose the option dealing with a single mean. Define your variable, using the arrow to select the appropriate variable (this is easy if you only have one!). You can enter a value to test the sample mean against if you are not testing it against zero.

NOTE: Data Entry

For a χ^2 test you must have one coded data entry per observation (e.g. 1=Brown M&M). SPSS counts the number of 1's that you have and proceeds with the analysis. You cannot enter the data as the counts of each category.