Comparing for differences between two paired samples

Dependent variable: continuous (NB. discrete data can be used – such as counts, length measured in days, etc. – however binary data cannot)

Independent variable: one categorical variable with two levels

Data: repeated / paired / matched (e.g. individuals measured before and after a trial)

Check data:

- Look at plot (e.g. individual values plot, box plot) for any general trends or 'bunching' of data that may violate assumptions
- Boxplot to check for outliers and Outlier Test – deal with these as required.

Check assumptions (see checking data sheet for further detail):

- Data are quantitative
- Samples are independent
    - Note: In this case we know the groups are NOT independent – here we check that the samples within each group are independent of one another.
- Differences are normally distributed (i.e. calculate the difference for each individual sampled, then check normality of this set of differences)

If no assumption is violated:

PARAMETRIC DATA = Paired t-test

- Stat
- Basic Statistics
- Paired t
    - Check 'Each sample is in a column' is selected if data are in separate columns
    - Put each variable into a 'Sample' box, it doesn't matter which one goes in which box
- P-value: <0.05 indicates a significant difference between the paired groups
  >0.05 indicates no significant difference between the paired groups

"There was [no / a] significant difference between the [*dependent variable*] at [*independent variable level 1*] (mean = …, SD = …) and [*level 2*] (mean = …, SD = …) (t(df) = …; P[</=] …)." **Remember to state the direction of the difference when it is significant*.

e.g. The mean test score was significantly lower before (mean = 20.8, SD = 5.7) compared to after (mean = 28.5, SD = 6.1) extra tuition (t(78) = -8.86; P<0.001).

If normality or equal variances assumptions are violated:

NON-PARAMETRIC DATA = Wilcoxon matched-pairs test

1. *Calculate the difference between the paired data: differences:*
   - Name a new column (it is a good idea to indicate which column is subtracted from which in the name of your new column, e.g. 'Before-After')
   - Calc
   - Calculator
     - Select your new column name for 'Store result in variable:'
     - Select one column, press '-', then select the other column (make sure this matches the order you have stated in the column name to make interpretation easier)
2. *Carry out a one-sample Wilcoxon test on the differences:*
   - Stat
   - Nonparametrics
   - 1-Sample Wilcoxon
     - Make sure Test median is set to 0
     - Select your new column as the 'Variables:'
   - P-value: <0.05 indicates the difference calculated is significantly different from 0
     >0.05 indicates the difference calculated is not significantly different from 0

"There was [no difference / a significant median increase/decrease] (median difference = …) in the [Response variable] from [Predictor level 1] to [level 2], W = …; P[</=] …."

e.g. There was a statistically significant median increase (median difference = 16.5) in HDL from 2000 to 2010 (W = 1.00; P<0.05)."

**Note: Some statistical software will also give you z-score; it is important to report the z-score if available. Minitab does not produce a z-score, so we don't report it.*