Research Methods

Multiple Regression

In this workshop you will practice running a multiple regression analysis. This is used to assess the combined effect of several independent variables in predicting or explaining the score for one dependent variable.

In this workshop we will use the example of predicting intentions to quit smoking, using the principles of the Theory of Planned Behaviour.

In this example, we would have three independent (predictor) variables [Attitude, Subjective Norm, and Perceived Behavioural Control] and one dependent (criterion) variable [Intention]. Through using regression analysis, we can analyse the ability of all three IV's to predict levels of intention to quit smoking.

Step 1)

Create each of the four variables in the 'variable view' and then input the data shown below in the 'data view'.

	Attitude	SubNorm	PBC	Intentions
1	4.60	2.33	6.67	6.33
2	5.00	4.33	6.67	7.00
3	2.00	4.67	5.00	2.67
4	2.80	2.00	7.00	1.00
5	2.40	1.67	6.67	1.00
6	3.00	5.00	4.67	4.67
7	3.00	4.33	4.33	4.67
8	3.80	5.67	6.33	5.00
9	2.40	1.00	7.00	1.67
10	1.20	1.67	7.00	1.00
11	1.80	1.00	7.00	1.00
12	2.80	1.00	7.00	3.00
13	5.20	2.00	6.67	5.67
14	1.00	1.00	7.00	1.00
15	4.40	3.33	5.33	4.67
16	2.20	2.00	7.00	2.00
17	3.20	4.33	5.00	6.00
18	3.20	3.33	5.00	5.00
19	4.20	3.33	7.00	4.67
20	3.80	3.33	7.00	5.67
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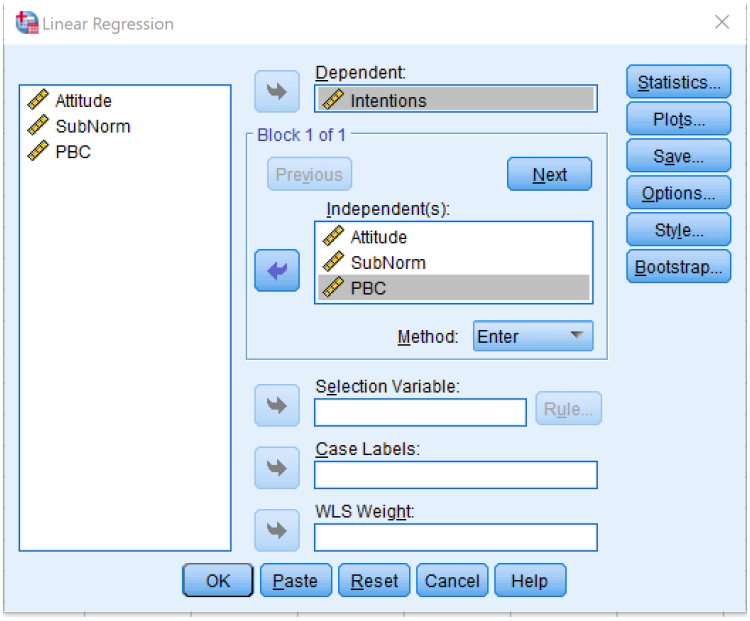
Remember that your data is unlikely to look like this to start off with! It is likely that you will have other steps to complete to get these variables to this point.

Step 2)

Next, we can begin to run the regression analysis for these variables.

On the **'Analyze'** menu select the **'Regression'** menu, and the **'Linear'** option.

In the Linear Regression interface, place the appropriate variables into the Dependent and Independent boxes. The *Intentions* variable is the dependent variable.



Step 3)

Click the 'Statistics' button and ensure that 'Estimates', 'Confidence intervals', 'Model fit', and 'Descriptives' are selected. Click Continue.

Step 4)

Click the 'Plots' button and move '*ZRESID' into the Y axis box and '*ZPRED' into the X axis box. Underneath 'Standardized Residual Plots', select both Histogram and Normal Probability plot. Click Continue.

Finally, select 'OK' to run the regression analysis.

SPSS Output:

Descriptive Statistics

Basic descriptive information (mean and standard deviation) for each of the variables

Correlations

This table shows the simple bivariate correlations between all variables. Here you want to check whether any of the IV's are correlated with the DV, but also whether any of the IV's are correlated with one another.

Model Summary

The **adjusted R-squared** value in this table tells you the amount of variance of the dependent variable that is explained by the model (it's adjusted to account for sample size and the number of variables included in the analysis). This value gets converted to a percentage (%).

The maximum is 1.0 which would suggest 100% of the variance was explained (0.14 would represent that 14% was explained for example). Calculate the amount of variance explained in the current data from this value.

ANOVA

The information contained within this table tells us whether the model is significantly predictive of scores in the DV. A significant model overall will show a sig. value of less than .05. This part of the analysis gets reported as a typical ANOVA.

Coefficients

Tells us how much each of the IV's contributes to the overall explanation of the model.

The **Beta Value** shows how much each change in the IV shows a change in the DV. The larger the Beta value, the more that IV contributes to the scores of the DV. Each Beta value also has an associated significance value.

> (Note. A minus sign on the Beta value indicates that there is a negative correlation between the independent and dependent variables – i.e. as the independent variable shows an increase the dependent variable shows a decrease in value, and vice-versa. A negative association can of course still be a significant or large factor in explaining the model).

Using these values from these output tables consider whether the overall model is significant (ANOVA table significance) in predicting the dependent variable, how much variance in the DV is explained (adjusted R-squared), and how much each of the predictor variables contributes to the model (Beta and significance values).

The results section:

Use your SPSS books to look at how to report a multiple regression analysis appropriately and write the full results section here.