

Chapter 20: Multilevel linear models

Self-test answers



SELF-TEST Using what you know about ANOVA, conduct a one-way ANOVA using **Surgery** as the predictor and **Post_QoL** as the outcome.

Select **Analyze Compare Means** ▸ **One-Way ANOVA...** and complete the dialog box as follows:

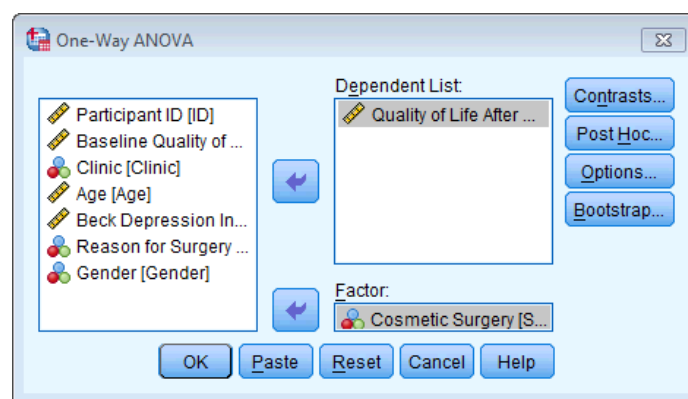


Figure 1



SELF-TEST Using what you know about ANCOVA, conduct a one-way ANCOVA using **Surgery** as the predictor, **Post_QoL** as the outcome and **Base_QoL** as the covariate.

Select **Analyze General Linear Model** ▸ **Univariate...** and complete the dialog box as follows:

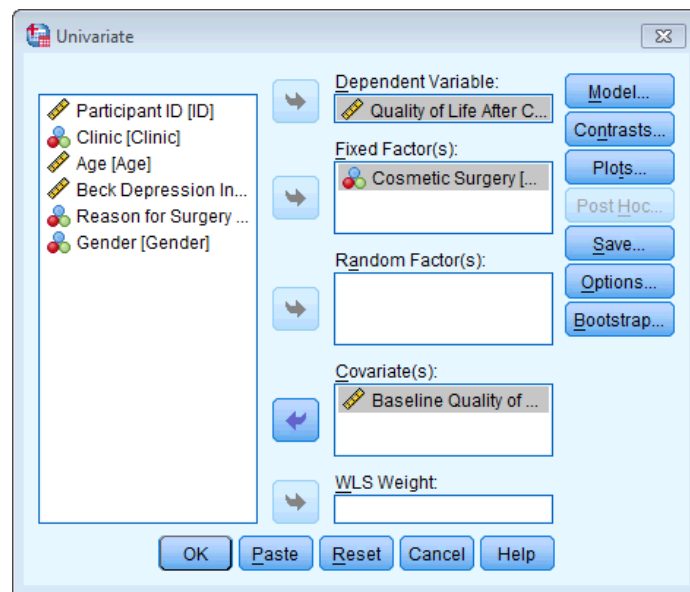


Figure 2

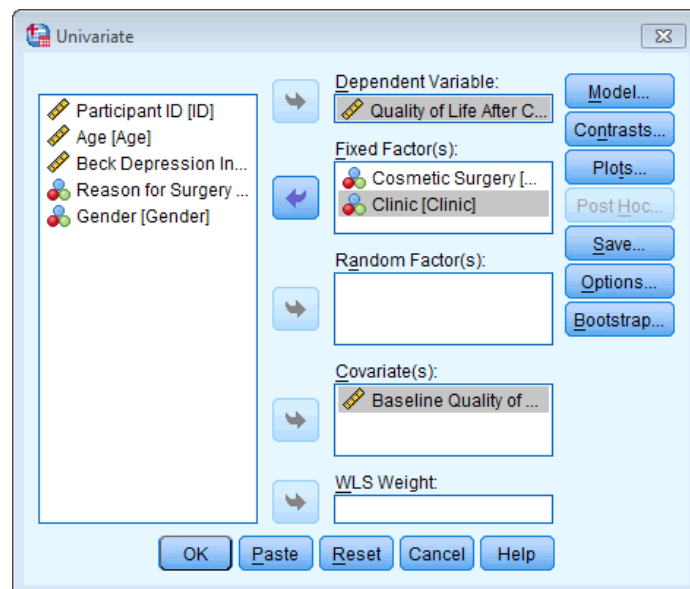


Figure 3



SELF-TEST Split the file by **Reason** and then run a multilevel model predicting **Post_QoL** with a random intercept, and random slopes for **Surgery**, and including **Base_QoL** and **Surgery** as predictors.

First, split the file by **Reason** by selecting  **Data...**  **Split File...**. The completed dialog box should look like this:

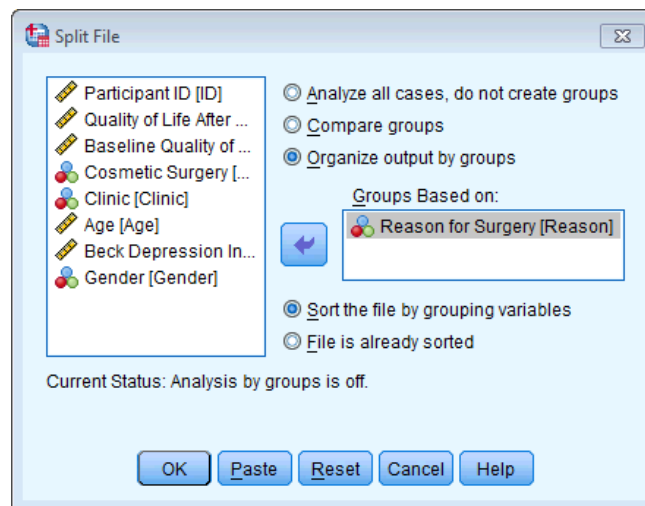


Figure 4

Next, we need to run the multilevel model. Select **Analyze Mixed Models** and specify the contextual variable by selecting **Clinic** from the list of variables and dragging it to the box labelled *Subjects* (or click on).

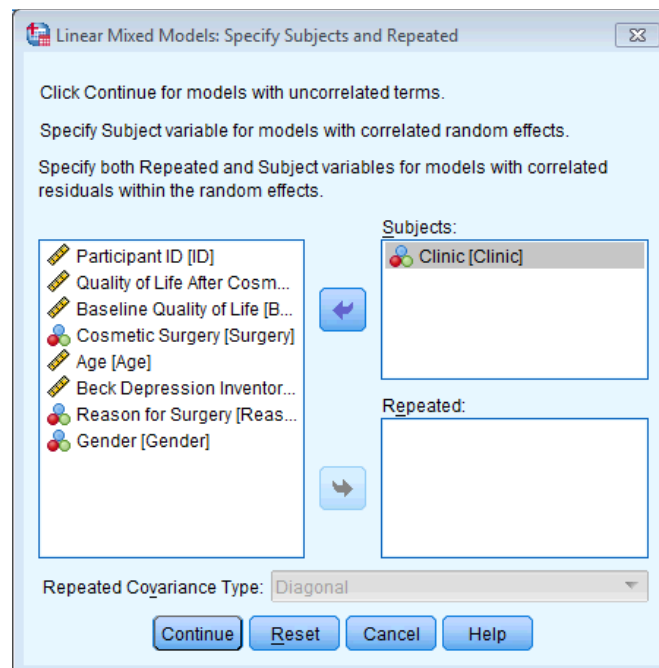


Figure 5

Click on **Continue** to move to the main dialog box. First we must specify our outcome variable, which is quality of life (QoL) after surgery, so select **Post_QoL** and drag it to the space labelled *Dependent variable* (or click on). Next we need to specify our predictors. Therefore, select **Surgery** and **Base_QoL** (hold down *Ctrl* and you can select both of them simultaneously) and drag them to the space labelled *Covariate(s)* (or click on).

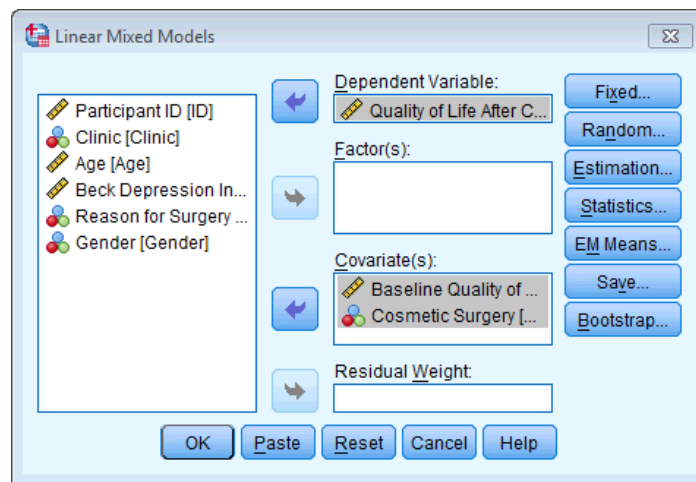


Figure 6

We need to add the predictors as fixed effects to our model, so click on **Fixed...**, hold down *Ctrl* and select **Base_QoL** and **Surgery** in the list labelled *Factors and Covariates*. Then make sure that **Factorial** is set to **Main effects** and click on **Add** to transfer these predictors to the *Model*. Click on **Continue** to return to the main dialog box.

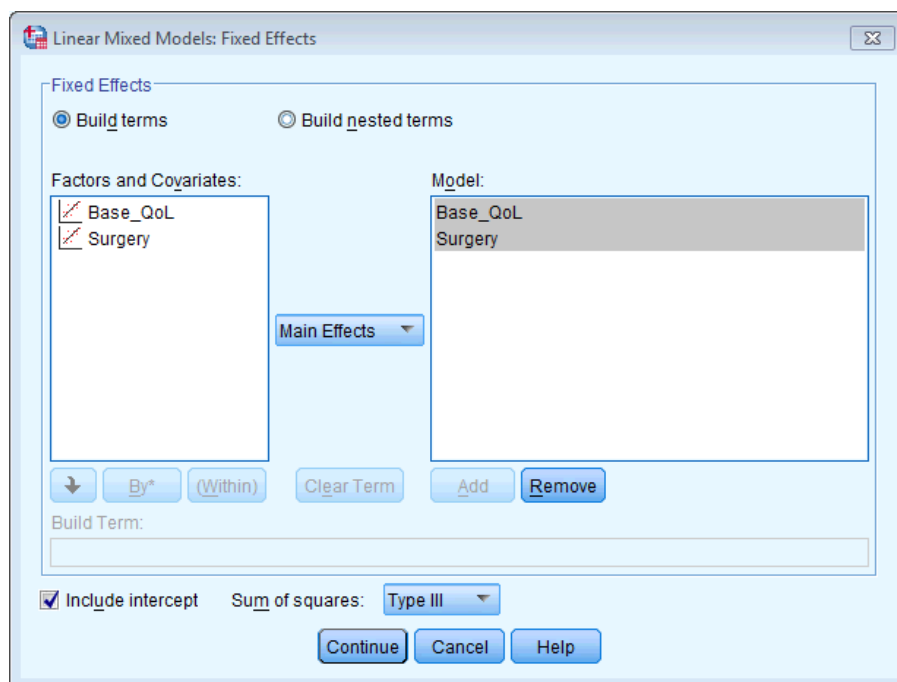


Figure 7

We now need to ask for a random intercept and random slopes for the effect of **Surgery**. Click on **Random...** in the main dialog box. Select **Clinic** and drag it to the area labelled *Combinations* (or click on **+**). We want to specify that the intercept is random, and we do this by selecting **Include intercept**. Next, select **Surgery** from the list of *Factors and Covariates* and add it to the model by clicking on **Add**. The other change that we need to make is that we need to estimate the covariance between the random slope and random

intercept. This estimation is achieved by clicking on **Variance Components** to access the drop-down list and selecting **Unstructured**.

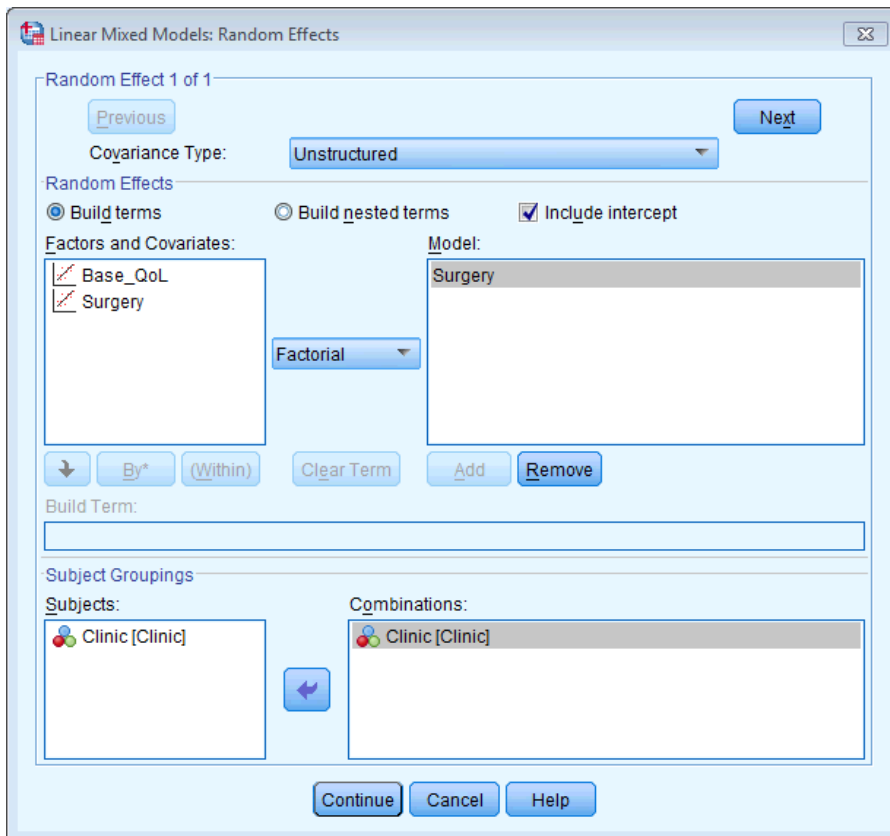


Figure 8

Click on **Estimation...** and select **Maximum Likelihood (ML)**. Click on **Continue** to return to the main dialog box. In the main dialog box click on **Statistics...** and request *Parameter estimates* and *Tests for covariance parameter*. Click on **Continue** to return to the main dialog box. To run the analysis, click on **OK**.



SELF-TEST Use the *compute* command to transform **Time** into **Time** minus 1.

Access the *compute* command by selecting **Transform** **Compute Variable...**. In the resulting window enter the name **Time** into the box labelled *Target Variable*. Select the variable **Time** and drag it across to the area labelled *Numeric Expression*, then click on **-** and then type '1'. The completed dialog box is below:

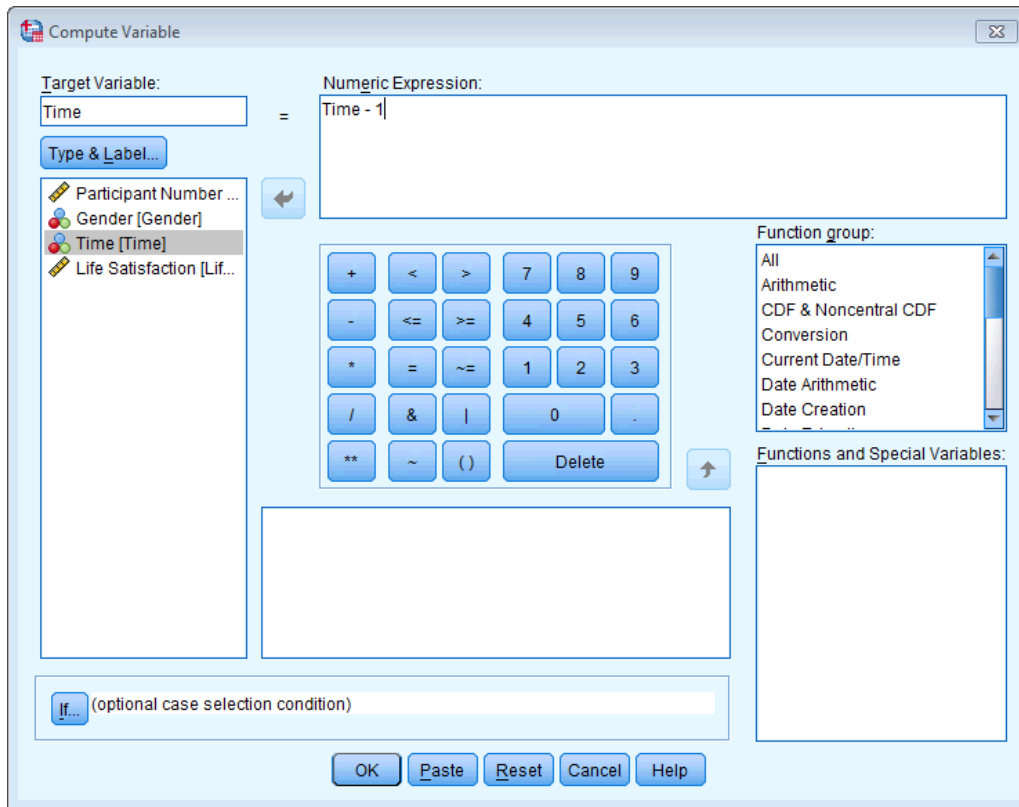


Figure 9