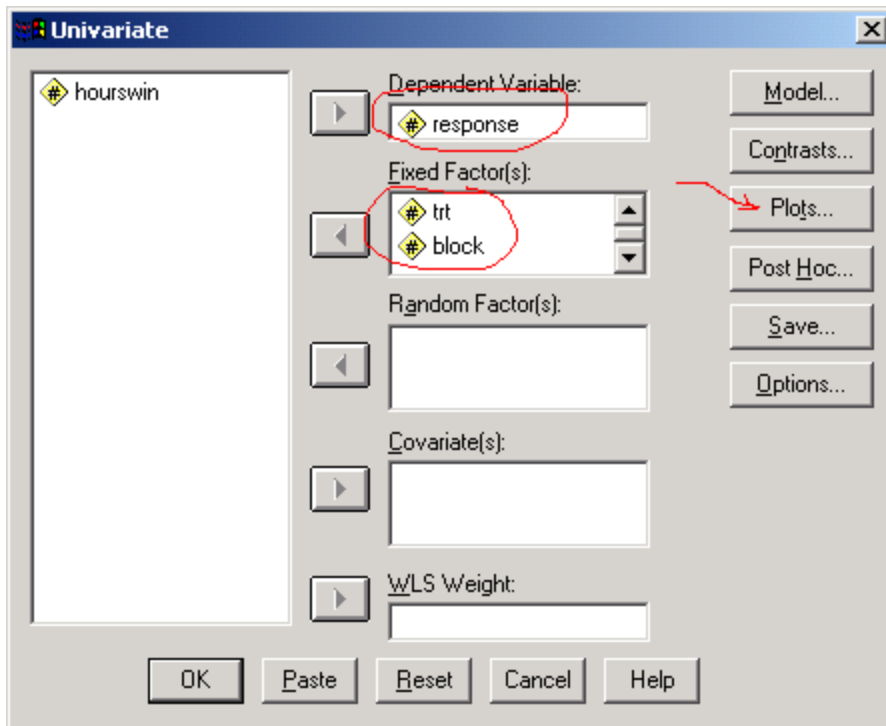


BLOCKING

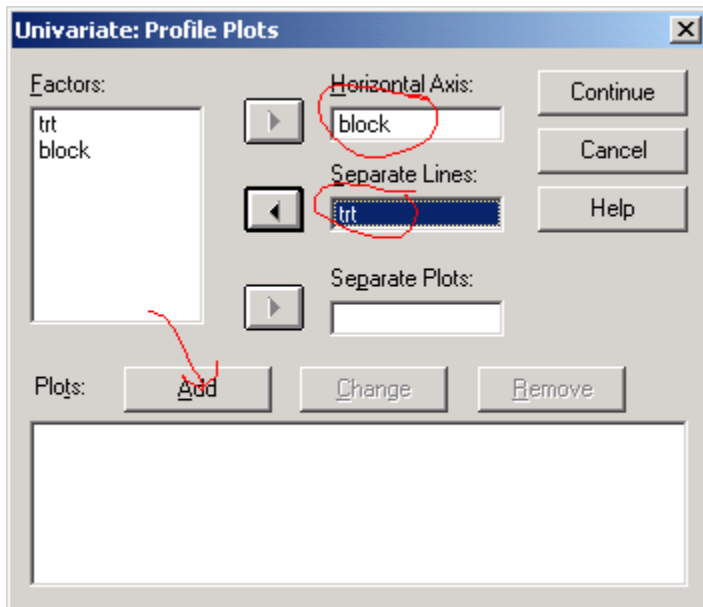
With blocking design we will always assume there is no BLOCK by TREATMENT interactions in our models [this is the assumption of additivity]. There are several ways to check this assumption, but we will rely on a graphical evaluation. We create an interaction plot [profile plot] for block and treatment and check to see if the lines are approximately parallel. Ideally the lines would be perfectly parallel under the assumption of additivity, but as the data are random we would not expect perfect parallelism. The methods for creating the graphs for the different blocking designs are listed below

RBD (1 independent variable & 1 blocking variable)

We begin by bringing up the Univariate window [Analyze-General Linear Model – Univariate] and moving the factors to their appropriate locations.



We then bring up the plot window by clicking on the plot button. I suggest placing the block variable on the horizontal axis and the treatment on the vertical axis, though switching them will not change the results of the evaluation.

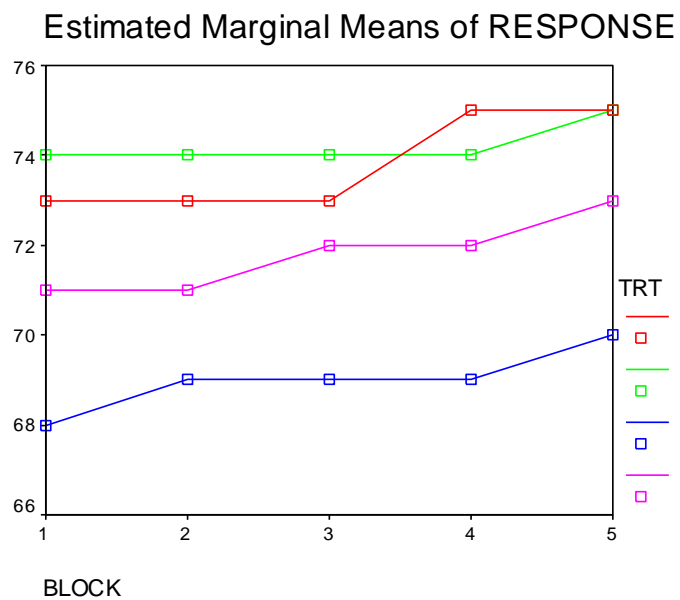


After selecting the plots we hit the continue button and then the OK button on the Univariate window and SPSS will output the results. If you have correctly setup the design you will notice that the ANOVA table will be incomplete.

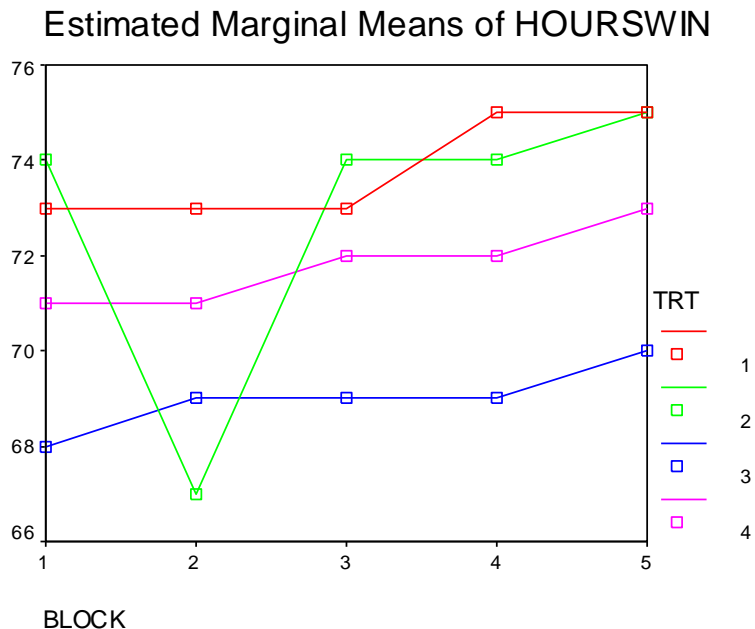
Tests of Between-Subjects Effects

Dependent Variable: RESPONSE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
TRT	84.800	3	28.267	.	.
BLOCK	7.700	4	1.925	.	.
TRT * BLOCK	2.700	12	.225	.	.
Error	.000	0			
Corrected Total	95.200	19			



The lines on the graph look approximately parallel so our assumption of additivity appears to be valid and we may continue with the analysis. We would only reject the assumption of additivity if there were dramatic evidence that the assumption was incorrect. Below is an obvious example of BLOCK*TREATMENT interaction. We can see that treatment 2 on the 2nd block acts significantly different than the rest of the treatments. In this case we would not be able to use our analysis and a more complicated model would be required.



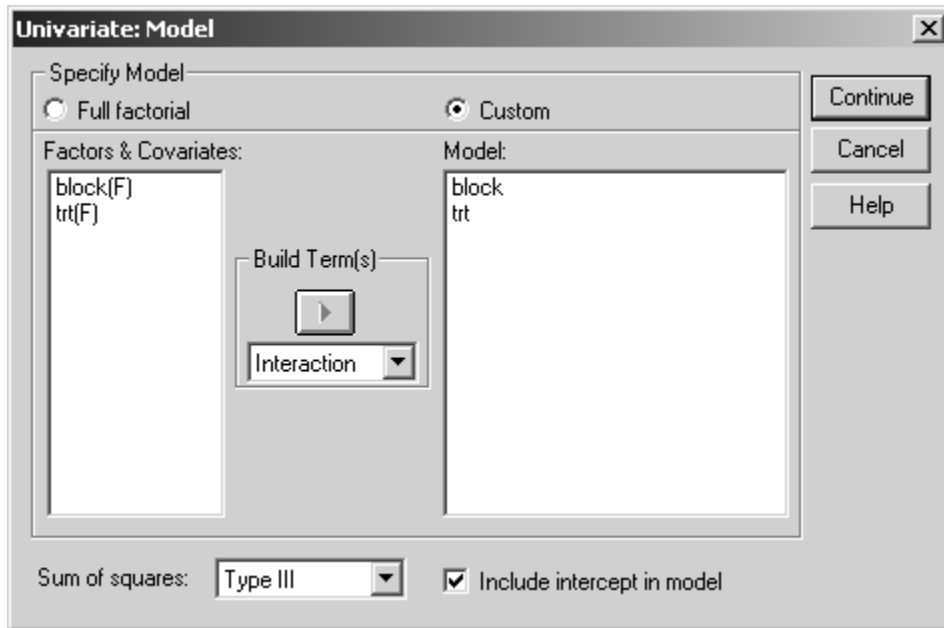
NOTE - if your interaction plots are perfectly parallel you should be suspicious that you have done something wrong. Make sure that the interaction term is in the model when you are doing these plots

Once you have established that there is not a significant BLOCK*TREATMENT interaction, you can proceed with your statistical analysis.

ANALYZING THE DATA

To run a RBD on SPSS, you need to remove the BLOCK*TREATMENT interaction term in the model [which SPSS automatic includes]. We begin by bringing up the Univariate window once again [Analyze-General Linear Model – Univariate] and moving the factors to their appropriate locations. Then, we can go two ways:

1. Click on the Model window in the top right corner. Click on the custom button at the top. Then, click on the treatment factor by itself and click on the “Build Term” arrow to include it in the model. Do the same for the block. If you want to include any interactions (we’ll do this later), click on both at once before you press the arrow. Click continue when you are finished.



2. Click on the paste button at the bottom of the screen and then remove the interaction term from the design line [crossed out in the figure below].

```

UNIANOVA
  hourswin BY trt block
  /METHOD = SSTYPE(3)
  /INTERCEPT = INCLUDE
  /PLOT = PROFILE( block*trt )
  /CRITERIA = ALPHA(.05)
  /DESIGN = trt block tr*block .

```

After you have removed the interaction term you need to run the program by clicking on the black triangle below the run command.

Don't forget to remove or strike the unnecessary lines in the ANOVA in the SPSS output