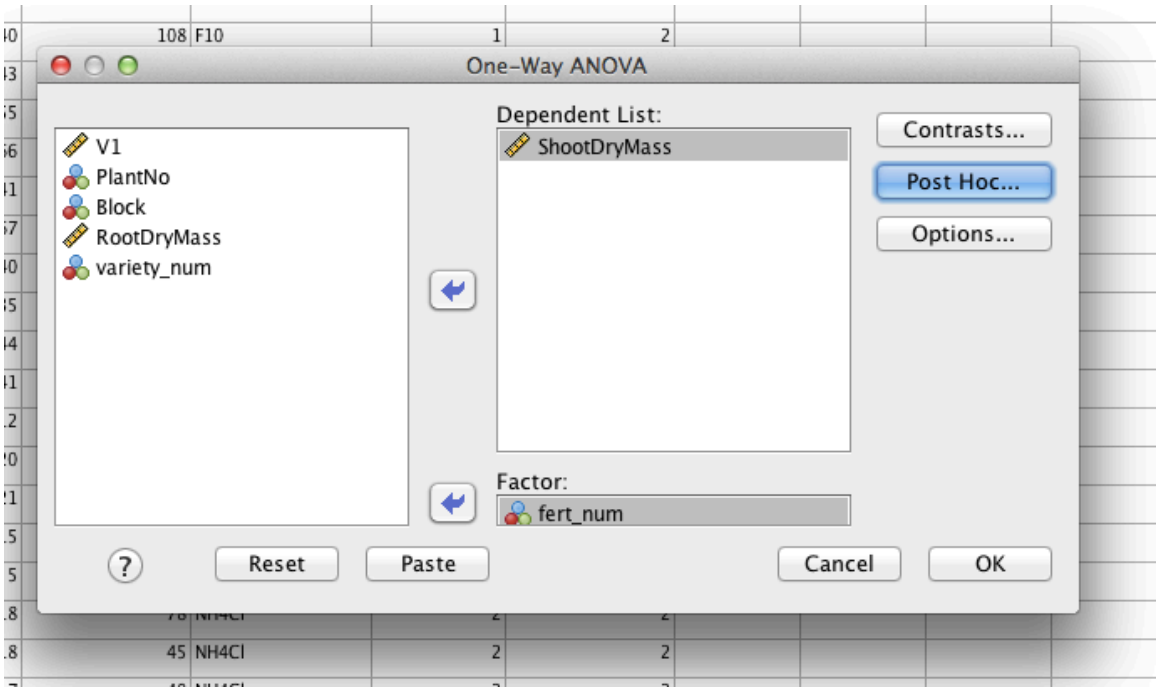
SPSS Tutorial 4: ANOVA

1. The dataset for this tutorial is called **rice_data.sav** (a *.sav file is an SPSS dataset, if you want to use other software, you can use **rice_data.txt** instead, though some information will be lost (variable descriptions, variable level definitions, etc.))

2. First we'll do a one-way ANOVA with shoot dry mass (ShootDryMass) as the outcome variable, and fertilizer type (fert_num) as the grouping variable. The function can be found under the menu Analyze->Compare Means->One-way ANOVA. Put the ShootDryMass variable as the dependent variable, and fert_num as the independent variable:



Then click on the "Post Hoc" button and make sure "LSD", "Bonferroni", and "Scheffe" are selected. Press "Continue" and "OK", and the ANOVA table and post-hoc test table should appear in the output window.

ANOVA

ShootDryMass

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7018.778	2	3509.389	2.820	.066
Within Groups	85869.000	69	1244.478		
Total	92887.778	71			

Post Hoc Tests

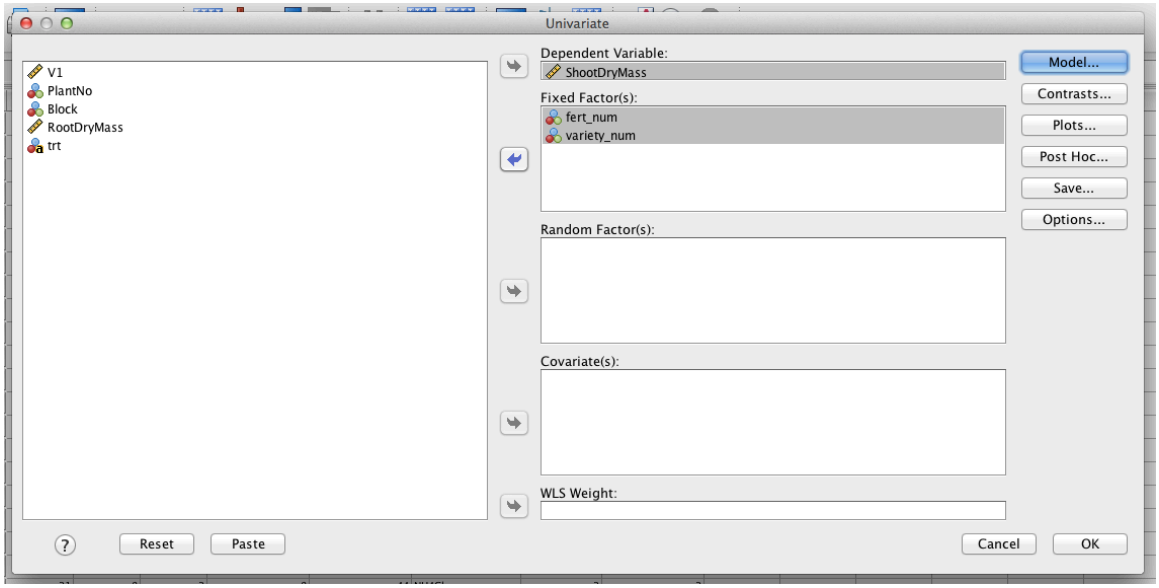
Multiple Comparisons

Dependent Variable: ShootDryMass

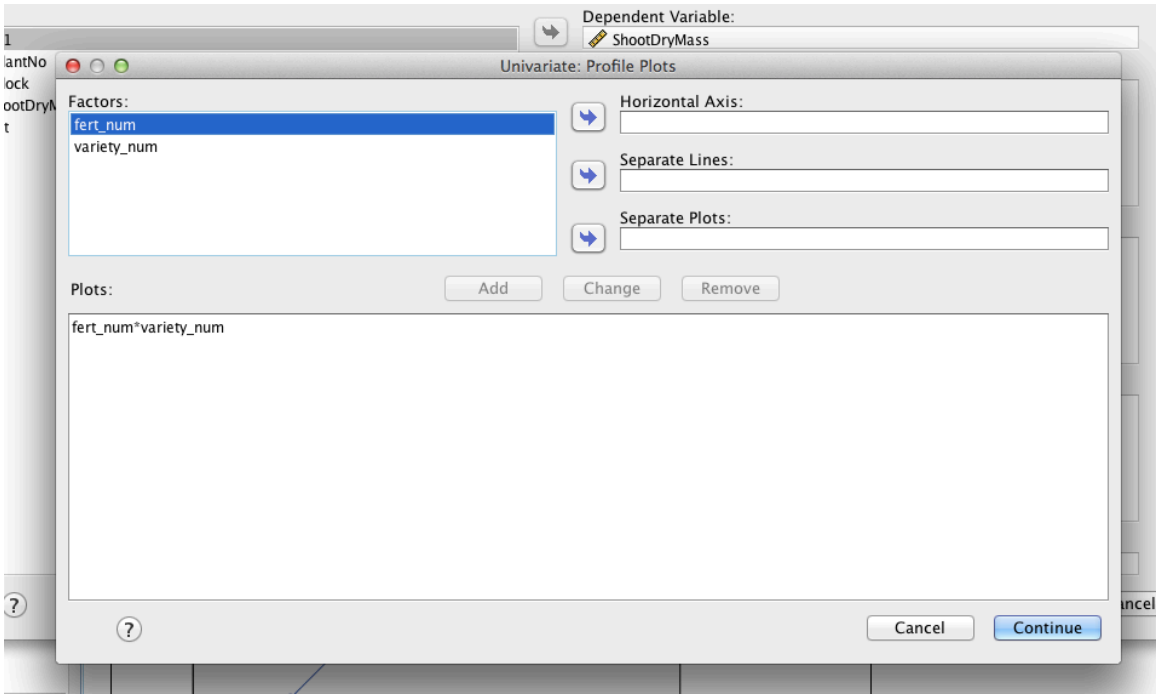
	(I) fert_num	(J) fert_num	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Scheffe	F10	NH4Cl	9.417	10.184	.654	-16.06	34.89
		NH4NO3	-14.583	10.184	.364	-40.06	10.89
	NH4Cl	F10	-9.417	10.184	.654	-34.89	16.06
		NH4NO3	-24.000	10.184	.069	-49.48	1.48
	NH4NO3	F10	14.583	10.184	.364	-10.89	40.06
		NH4Cl	24.000	10.184	.069	-1.48	49.48
LSD	F10	NH4Cl	9.417	10.184	.358	-10.90	29.73
		NH4NO3	-14.583	10.184	.157	-34.90	5.73
	NH4Cl	F10	-9.417	10.184	.358	-29.73	10.90
		NH4NO3	-24.000*	10.184	.021	-44.32	-3.68
	NH4NO3	F10	14.583	10.184	.157	-5.73	34.90
		NH4Cl	24.000*	10.184	.021	3.68	44.32
Bonferroni	F10	NH4Cl	9.417	10.184	1.000	-15.57	34.40
		NH4NO3	-14.583	10.184	.470	-39.57	10.40
	NH4Cl	F10	-9.417	10.184	1.000	-34.40	15.57
		NH4NO3	-24.000	10.184	.064	-48.99	.99
	NH4NO3	F10	14.583	10.184	.470	-10.40	39.57
		NH4Cl	24.000	10.184	.064	-.99	48.99

*. The mean difference is significant at the 0.05 level.

3. Next we'll to a two-way ANOVA. The ShootDryMass variable will still be the dependent variable, and this time both the fertilizer type and rice variety will be the grouping variables. To run this ANOVA, look under the menu Analyze->General Linear Model->Univariate. Then select ShootDryMass as the dependent variable, and fert_num and variety_num as fixed factors.



Click on “Plots” and put fert_num as the horizontal axis, and variety_num as separate lines. Then click “Add” and you should see a line called “fert_num*variety_num” appear in the “Plots” area below. Then click “Continue” and “OK”.



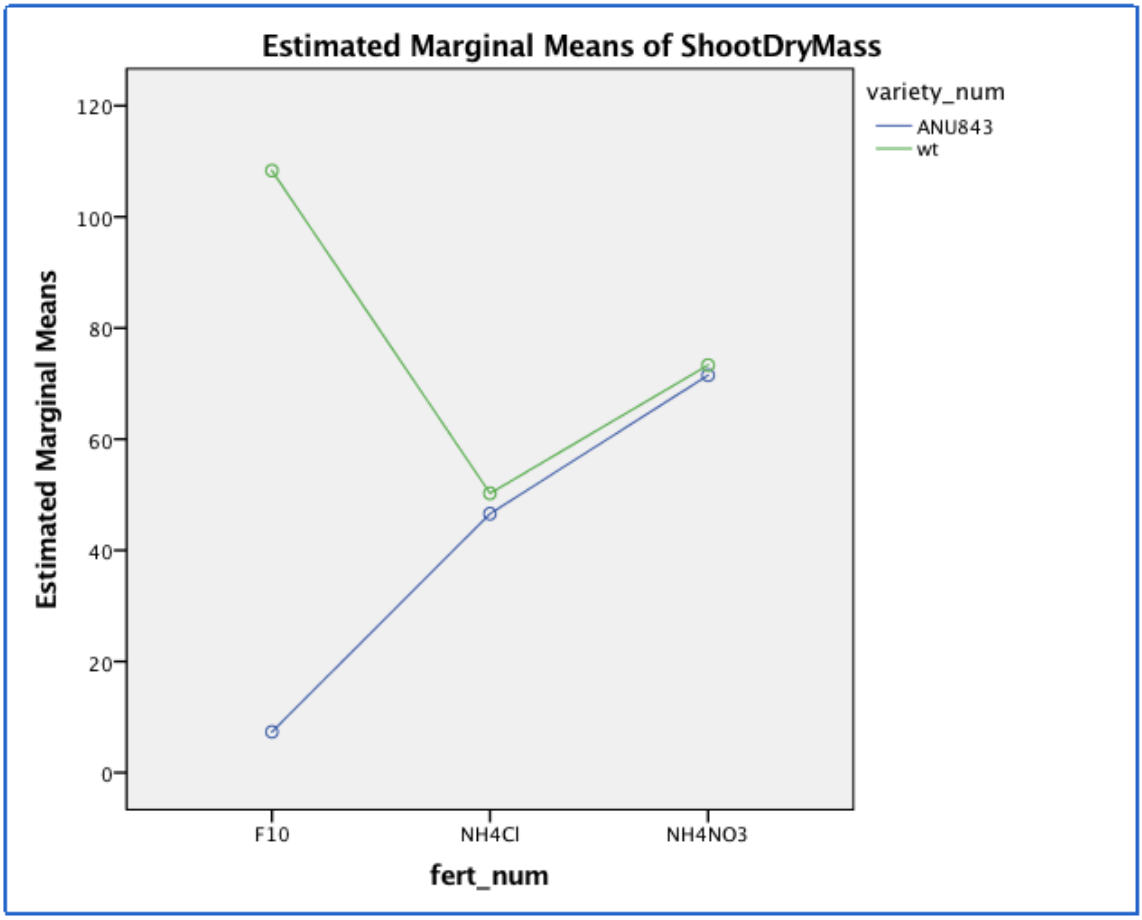
The ANOVA table and plot should appear in the output window.

Tests of Between-Subjects Effects

Dependent Variable: ShootDryMass

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	68325.611[a]	5	13665.122	36.719	.000
Intercept	255374.222	1	255374.222	686.206	.000
fert_num	7018.778	2	3509.389	9.430	.000
variety_num	22684.500	1	22684.500	60.955	.000
fert_num * variety_num	38622.333	2	19311.167	51.890	.000
Error	24562.167	66	372.154		
Total	348262.000	72			
Corrected Total	92887.778	71			

a. R Squared = .736 (Adjusted R Squared = .716)



4. Repeat the two-way ANOVA, but this time use RootDryMass as the dependent variable. Interpret the results.