

A11.3 (CD-ROM TOPIC) USING SPSS FOR ANOVA

Using SPSS for the One-Way Anova

To use SPSS for the one-way analysis of variance, open the **PARACHUTE.SAV** file.

1. You first need to stack the data with strength in one column and supplier number in a different column. Copy the strength into a new column with the strength for supplier 1 in rows 1–5, the strength for supplier 2 in rows 6–10, the strength for supplier 3 in rows 11–15, and the strength for supplier 4 in rows 16–20. Label this column **strength**. Then, in a different column (labeled **supplier**), enter **1** in rows 1–5, enter **2** in rows 6–10, enter **3** in rows 11–15, and enter **4** in rows 16–20.
2. Select **Analyze** → **Compare Means** → **One-Way ANOVA**. In the One-Way ANOVA dialog box (see Figure A11.9), enter **strength** in the Dependent List: edit box and **supplier** in the Factor: edit box. Select the **Post Hoc** button.
3. In the One-Way ANOVA: Post Hoc Multiple Comparisons dialog box (see Figure A11.10), select the **Tukey** check box. Click the **Continue** button to return to the One-Way ANOVA dialog box.
4. Select the **Options** button. In the One-Way ANOVA: Options dialog box (see Figure A11.11), select the **Homogeneity of variance test** check box. Click the **Continue** button to return to the One-Way ANOVA dialog box. Click the **OK** button.

Figure A11.12 illustrates SPSS output. Note that SPSS uses a version of the Levene test that is based on absolute differences from the mean rather than the median.

Using SPSS for Randomized Block Designs

To illustrate the use of SPSS for the randomized block design, open the **FFCHAIN.SAV** file. Note that the first three columns have the data stacked with rating, restaurant, and raters in separate columns. Select **Analyze**→**General Linear Model**→**Univariate**.

1. In the Univariate dialog box (see Figure A11.13), enter **rating** in the Dependent Variable: edit box. Enter **raters** and **restaura** in the Fixed Factor(s): edit box. Select the **Model** button.
2. In the Univariate: Model dialog box (see Figure A11.14), select the **Custom** option button. In the Model edit box, enter **raters** and **restaura**. Select **Main effects** in the drop-down list box. Deselect the Include intercept in model check box. Click the **Continue** button to return to the Univariate dialog box.

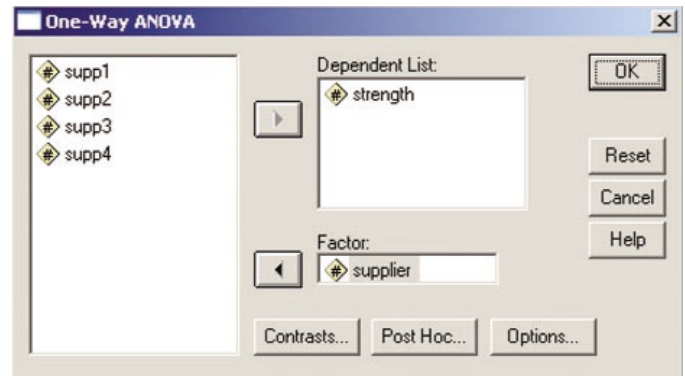


FIGURE A11.9 SPSS One-Way ANOVA Dialog Box

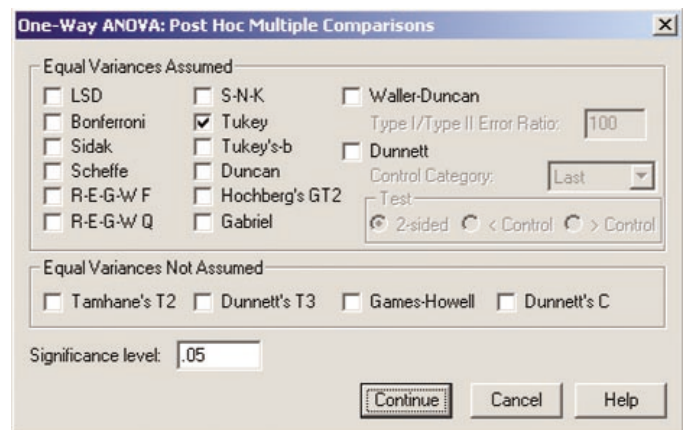


FIGURE A11.10 SPSS One-Way ANOVA: Post Hoc Multiple Comparisons Dialog Box

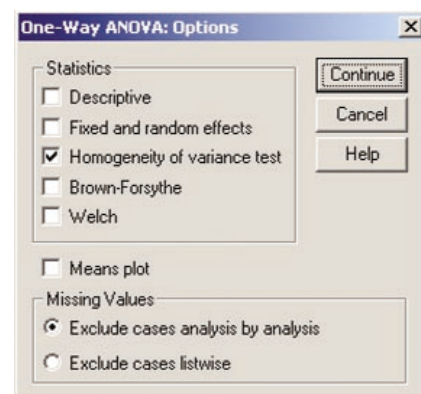


FIGURE A11.11 SPSS One-Way ANOVA: Options Dialog Box

Test of Homogeneity of Variances

strength			
Levene Statistic	df1	df2	Sig.
.430	3	16	.734

ANOVA

strength					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	63.285	3	21.095	3.462	.041
Within Groups	97.504	16	6.094		
Total	160.789	19			

Multiple Comparisons

Dependent Variable: strength
Tukey HSD

(I) supplier	(J) supplier	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-4.74000*	1.56128	.036	-9.2069	-.2731
	3.00	-3.32000	1.56128	.187	-7.7869	1.1469
	4.00	-1.64000	1.56128	.723	-6.1069	2.8269
2.00	1.00	4.74000*	1.56128	.036	.2731	9.2069
	3.00	1.42000	1.56128	.800	-3.0469	5.8869
	4.00	3.10000	1.56128	.234	-1.3669	7.5669
3.00	1.00	3.32000	1.56128	.187	-1.1469	7.7869
	2.00	-1.42000	1.56128	.800	-5.8869	3.0469
	4.00	1.68000	1.56128	.708	-2.7869	6.1469
4.00	1.00	1.64000	1.56128	.723	-2.8269	6.1069
	2.00	-3.10000	1.56128	.234	-7.5669	1.3669
	3.00	-1.68000	1.56128	.708	-6.1469	2.7869

*. The mean difference is significant at the .05 level.

FIGURE A11.12 SPSS Analysis of Variance for the Parachute Example

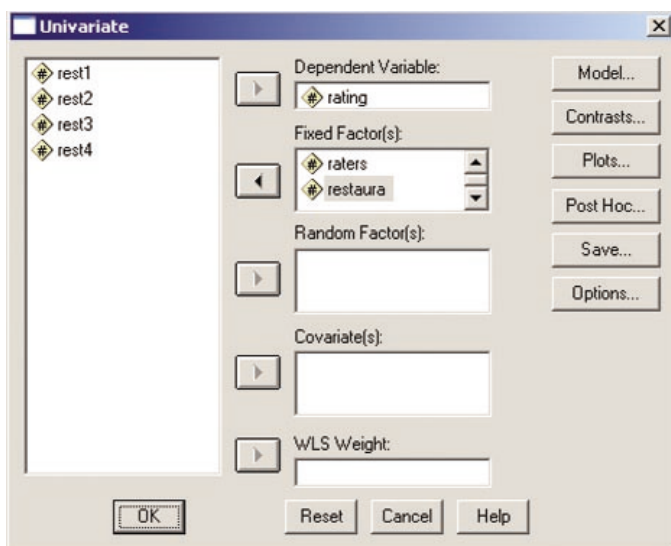


FIGURE A11.13 SPSS Univariate Dialog Box

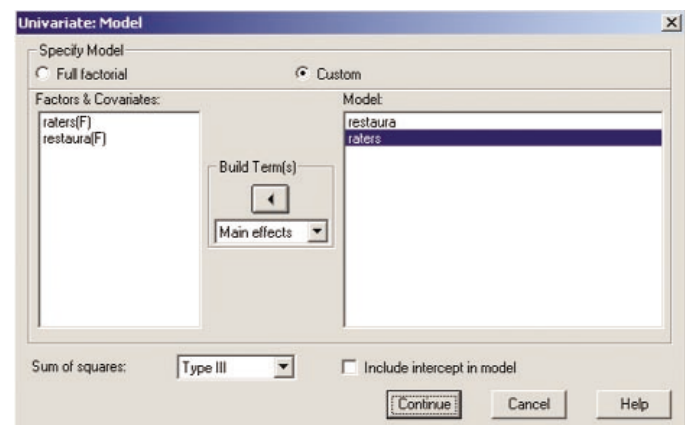


FIGURE A11.14 SPSS Univariate: Model Dialog Box

3. Select the **Post Hoc** button. In the Univariate: Post Hoc Multiple Comparisons for Observed Means dialog box enter **restaura** in the Post Hoc Tests for: edit box. Select the **Tukey** check box. Click the **Continue** button to return to the Univariate dialog box. Click the **OK** button.

Figure A11.15 provides SPSS output for the fast-food-chain data.

Tests of Between-Subjects Effects

Dependent Variable: rating

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Model	150436.208 ^a	9	16715.134	1115.375	.000
raters	283.375	5	56.675	3.782	.020
restaura	1787.458	3	595.819	39.758	.000
Error	224.792	15	14.986		
Total	150661.000	24			

a. R Squared = .999 (Adjusted R Squared = .998)

FIGURE A11.15 SPSS Output for the Fast-Food-Chain Study

Using SPSS for Factorial Designs

To illustrate the use of SPSS for a factorial design, open the **PARACHUTE2.SAV** file. Note that the first three columns have the data stacked with strength, looms, and suppliers in separate columns. Select **Analyze**→**General Linear Model**→**Univariate**.

1. In the Univariate dialog box (see Figure A11.16), enter **strength** in the Dependent Variable: edit box. Enter **loom** and **supplier** in the Fixed Factor(s): edit box. Select the **Model** button.
2. In the Univariate: Model dialog box (see Figure A11.17), select the **Full Factorial** option button. Click the **Continue** button to return to the Univariate dialog box.
3. Select the **Post Hoc** button. In the Univariate: Post Hoc Multiple Comparisons for Observed Means dialog box, enter **supplier** in the Post Hoc Tests for: edit box. Select the **Tukey** check box. Click the **Continue** button to return to the Univariate dialog box. Click the **OK** button.

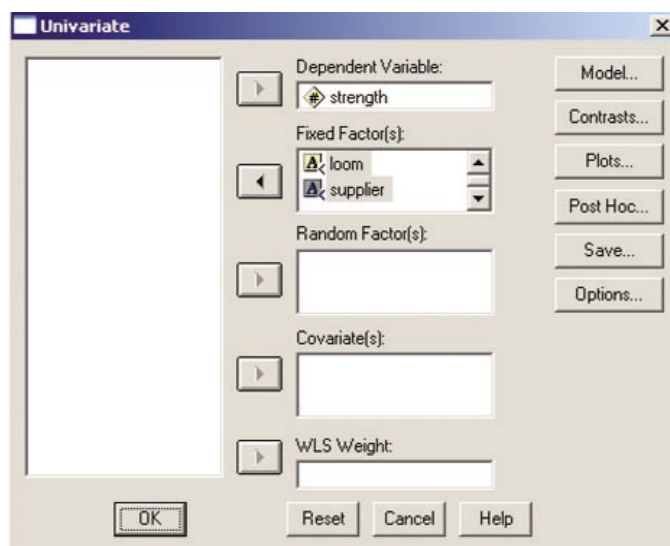


FIGURE A11.16 SPSS Univariate Dialog Box

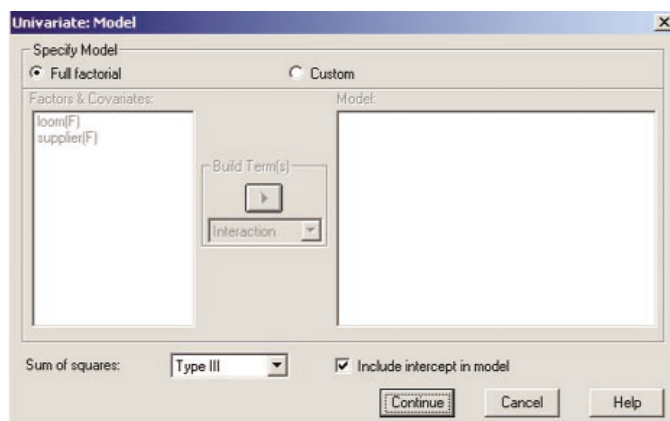


FIGURE A11.17 SPSS Univariate: Model Dialog Box

Figure A11.18 illustrates SPSS output for the two-way ANOVA for the parachute manufacturing example.

Tests of Between-Subjects Effects

Dependent Variable: strength

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	141.608 ^a	7	20.230	2.349	.047
Intercept	18537.330	1	18537.330	2152.438	.000
loom	6.972	1	6.972	.810	.375
supplier	134.349	3	44.783	5.200	.005
loom * supplier	.287	3	.096	.011	.998
Error	275.592	32	8.612		
Total	18954.530	40			
Corrected Total	417.200	39			

a. R Squared = .339 (Adjusted R Squared = .195)

FIGURE A11.18 SPSS Two-way ANOVA Output for the Parachute Manufacturing Example