

Statistical Models in SPSS

➤ Tutorial 1: Linear Regression

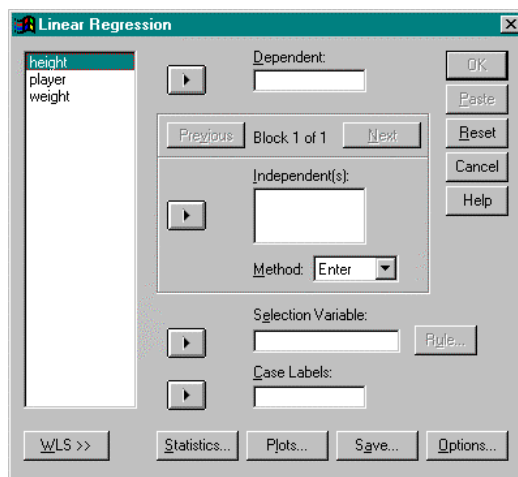
The Regression submenu on the Statistics menu of the Data Editor provides regression techniques. The following tutorial will introduce how to perform linear regression using SPSS. The output contains goodness of fit statistics and the coefficients for the variables.

Problem

Using the data in ~/SPSS/nba.txt, compute a least squares regression line to investigate if a player's height can predict his weight.

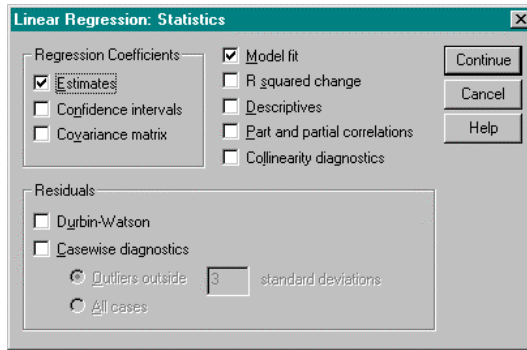
Solution

1. From the Statistics menu, select Regression. From the Regression drop down menu, select Linear... This will open the Linear Regression dialog box.



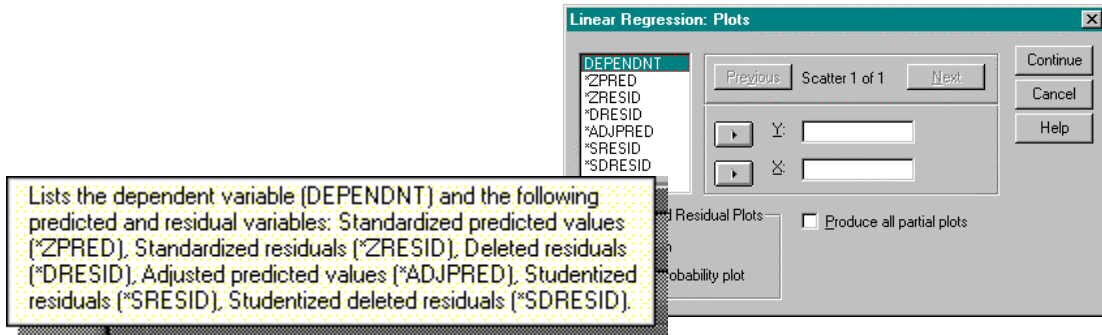
2. From the variable list, select weight. Left click on the right arrow button between the variable list and the Dependent box to move the variable, weight, to this box.
3. From the variable list, select height. Left click on the right arrow button between the variable list and the Independent(s) box to move the variable, height, to this box.
4. Select the method the independent variables are entered into the analysis. From the Method drop-down menu, there is a choice of enter, stepwise, remove, backward, and forward. In this case, we will use the enter method.
5. To limit the analysis to a subset of cases having a particular value for a variable, enter this variable into the Selection Variable box. In this case, this option is not used.
6. Determine the variable that will identify the points on plots. Select the variable and left click on the right arrow between the variable list and the Case Labels box. In this case, this option is not used.

- To display statistics, click on the Statistics... button. This will open the Linear Regression: Statistics dialog box.



Select the appropriate statistics to be displayed and click on the Continue button when done. In this case, this option is not used.

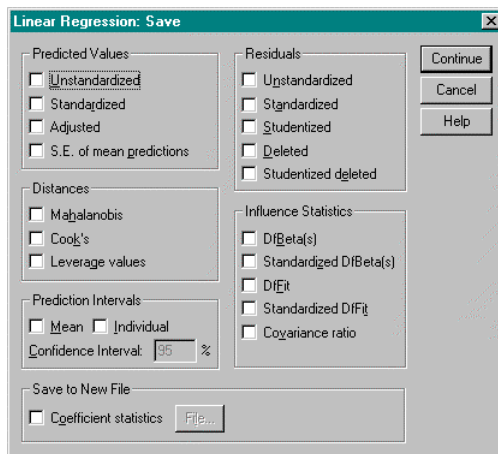
- To display specific plots, click on the Plots... button. This will open the Linear Regression: Plots dialog box.



From the variable list, select the variable that will be displayed on the Y axis. Left click on the right arrow button between the variable list and the Y box. Do this also for the X axis. When done, click on the Next button. If more plots are needed, follow the same procedure. In this case, this option is not used.

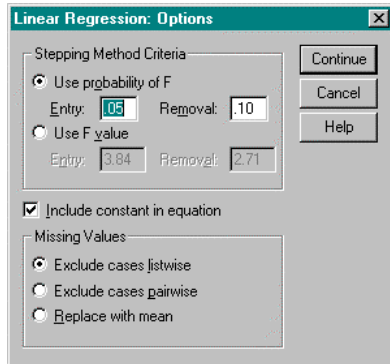
When done defining the plots, click on the Continue button.

- To indicate which statistics should be displayed, click on the Save button. This will open the Linear Regression: Save dialog box.



Select the appropriate statistics. To save the coefficient statistics, click on the box and indicate the file to which you want them saved. In this case, this option is not used.

- To indicate the stepping method criteria, click the Options... button. This will open the Linear Regression: Options dialog box.



Select the method to be used. When the selection is made, click on the Continue button.

- Click OK. This will close the Linear Regression dialog box. SPSS activates the Output Navigator to display the results of the analysis.

Window Output

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.856 ^a	.733	.732	15.6474

a. Predictors: (Constant), HEIGHT

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	274466.5	1	274466.5	1120.997	.000 ^a
	Residual	100140.1	409	244.841		
	Total	374606.6	410			

a. Predictors: (Constant), HEIGHT
b. Dependent Variable: WEIGHT

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-309.103	15.918		-19.418	.000
	HEIGHT	6.720	.201	.856	33.481	.000

a. Dependent Variable: WEIGHT

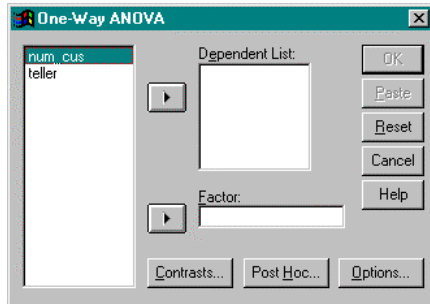
➤ Tutorial 2: Analysis of Variance

Problem

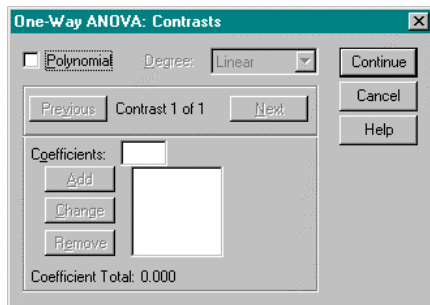
Using the data in ~/SPSS/teller1.txt, test if the mean number of customers served per hour by each of the four tellers is the same.

Solution

1. From the Statistics menu, select Compare Means. From the Compare Means drop down menu, select One-Way ANOVA... This will open the One-Way ANOVA dialog box.



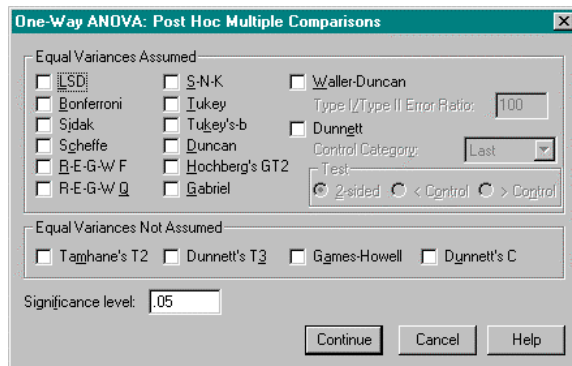
2. From the variable list, select num_cus. Left click on the right arrow button between the variable list and the Dependent List box to move the variable, num_cus, to this box.
3. From the variable list, select teller. Left click on the right arrow button between the variable list and the Factor box to move the variable, teller, to this box.
4. Click on the Contrasts... button. This will open the One-Way ANOVA: Contrasts dialog box.



To partition between-groups sum of squares into polynomial trend components, select the Polynomial box and select the highest degree of the polynomial to be modelled. In this case, this option will not be used.

To enter a numeric coefficient value for each level, click Add. However, the number of coefficients must equal the number of groups or the analysis is not performed. Because the levels in this problem are already numeric, this option does not need to be used.

- Click on the Post Hoc... button. This will open the One-Way ANOVA: Post Hoc Multiple Comparisons dialog box.



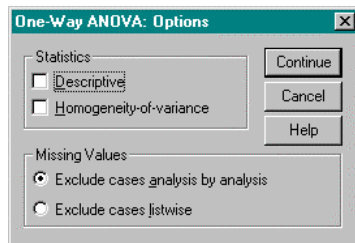
If equal variances are assumed between the different factor levels, select the type of comparison method to be used.

If equal variance are not assumed between the different factor levels, select the type of comparison method to be used.

To get a description on each of the methods listed, right click on the word. A description window will appear.

Click the Continue button when done.

- Click on the Options... button. This will open the One-Way ANOVA: Options dialog box.



To display descriptive statistics, select Descriptive in the Statistics area. In this case, select this option.

To exclude cases that have missing values for the variable involved in that test, select Exclude cases analysis by analysis. In this case, select this option.

However, to exclude cases that have missing values for any of the variables used in any of the analyses, select Exclude cases listwise.

Click the Continue button when done.

- Click OK. The One-Way ANOVA dialog box closes and SPSS activates the Output Navigator. The means of the dependent variable for each category of the independent variable can be found under "Descriptives".

Window Output

Output1 - SPSS Output Navigator

File Edit View Insert Format Statistics Graphs Utilities Window Help

SPSS Output

- Oneway
 - Title
 - Notes
 - Descriptives
 - ANOVA

Oneway

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NUM_CUS TELLER 1.00	5	21.6000	3.3615	1.5033	17.4262	25.7738	18.00	26.00
2.00	5	14.8000	1.6432	.7348	12.7598	16.8402	13.00	17.00
3.00	5	15.0000	3.8079	1.7029	10.2720	19.7280	11.00	21.00
4.00	5	22.0000	2.9155	1.3038	18.3800	25.6200	19.00	26.00
Total	20	18.3500	4.5105	1.0086	16.2390	20.4610	11.00	26.00

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
NUM_CUS	Between Groups	238.550	3	79.517	8.596	.001
	Within Groups	148.000	16	9.250		
	Total	386.550	19			

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