Lecture 7 - Regression

Regression allows you to predict variables based on another variable. Let's begin with the example used in the text in which mental health symptoms are predicted from stress.

- **Open** *symptoms and stress.sav*.
- Select **Analyze/Regression/Linear**.

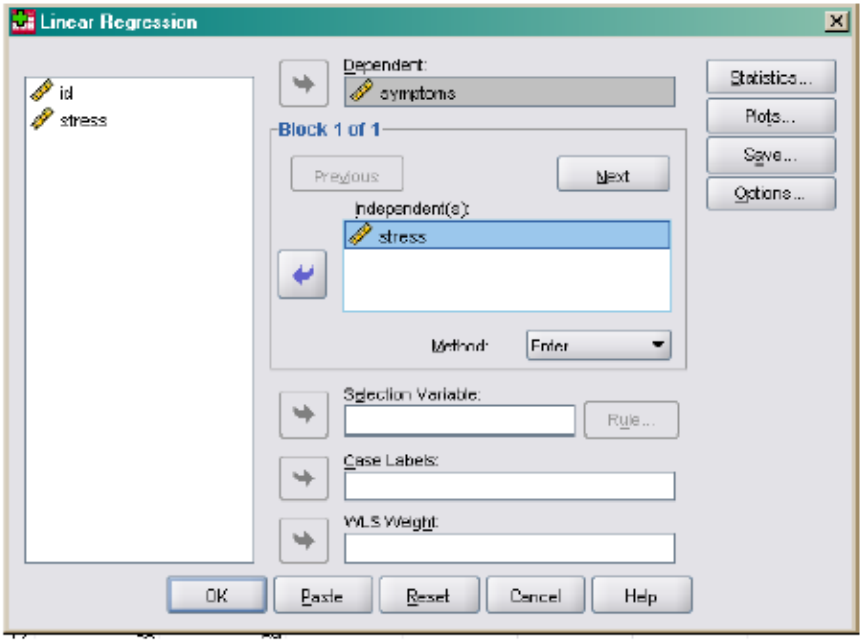


Figure 1

- Select symptoms as the **Dependent** variable and stress as the **Independent** variable.

Then, click on **Statistics** to explore our options. The following dialog box will appear.

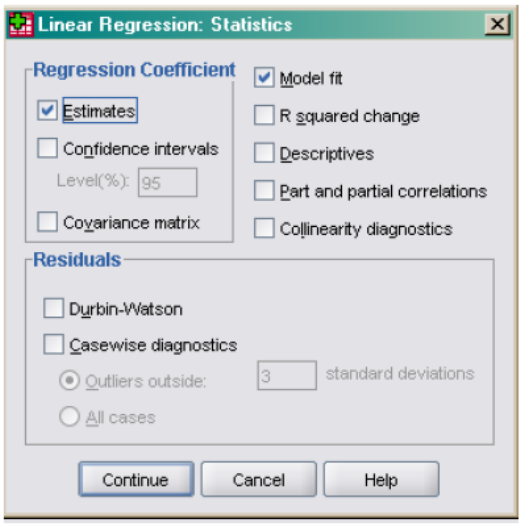


Figure 2

- As you can see there are many options. **Estimates** and **Model Fit** are selected by default.

Leave them that way. Then select **Descriptives** and **Part and partial correlations**. SPSS

will then calculate the mean and standard deviation for each variable in the equation and the correlation between the two variables. Then, click **Continue**.

✔ At the main dialog box, click on **Plots** so we can see our options.

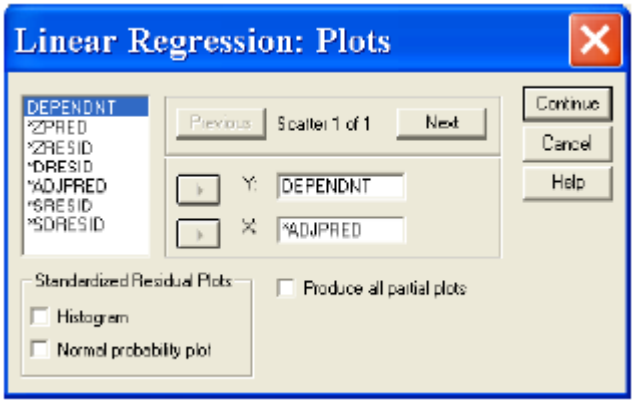


Figure 3

✔ It looks like we can create scatterplots here. Click **Help** to see what the abbreviations represent. I'd like to plot the Dependent variable against the predicted values to see how close they are. Select **Dependnt** for **Y** and **Adjpred** for **X**. Adjpred is the adjusted prediction. Used **Help/Topics/Index** to find out what this means for yourself. Then, click **Continue**.

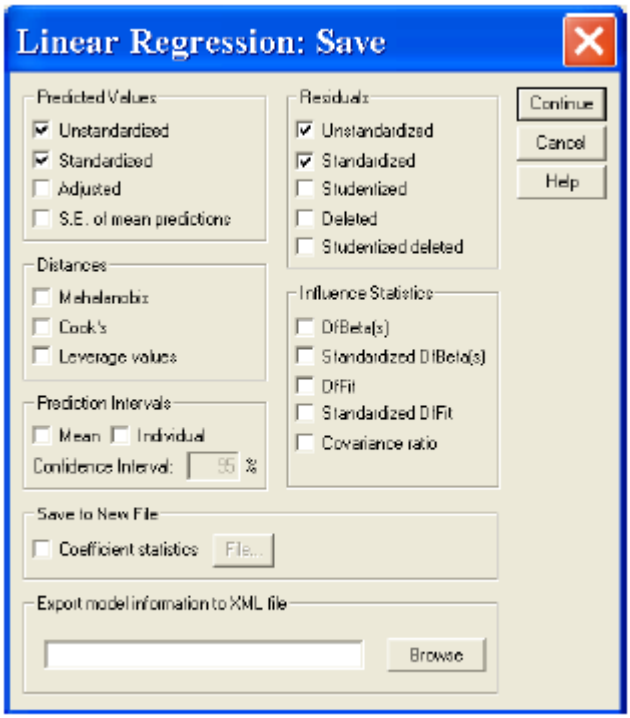
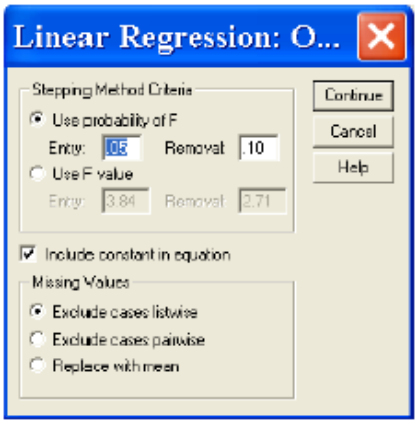


Figure 4

✔ In the main dialog box, click **Save**, and the dialog box to the left will appear. For **Predicted Values**, select **Unstandardized** and **Standardized**. For **Residuals**, also select **Unstandardized** and **Standardized**. Now, SPSS will save the predicted values of symptoms based on the regression equation and the residual or difference between the predicted values and actual values of symptoms in the data file. This is a nice feature. Remember, the standardized values are based on z score transformations of the data whereas the unstandardized values are based on the raw data. Click **Continue**.

✔ Finally, click on **Options**.



✔ **Including a constant in the equation** is selected by default. This simply means that you want both a slope and an intercept (the constant). That's good. We will always leave this checked. Excluding cases listwise is also fine. We do not have any missing cases in this example.

Descriptive Statistics

	Mean	Std. Deviation	N
SYMPTOMS	90.70	20.27	107
STRESS	21.47	13.10	107

Correlations

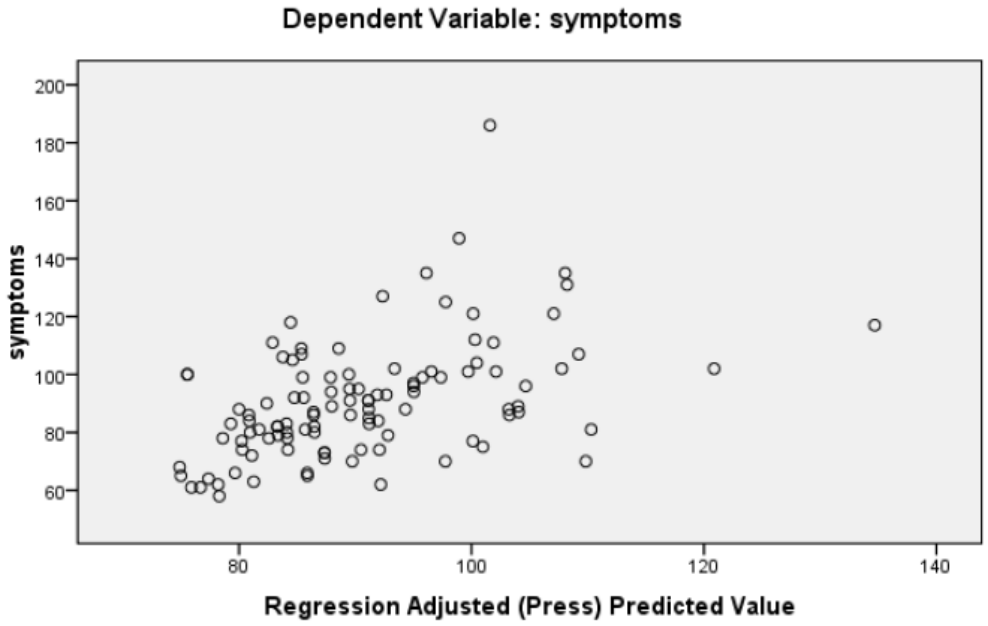
		SYMPTOMS	STRESS
Pearson Correlation	SYMPTOMS	1.000	.506
	STRESS	.506	1.000
Sig. (1-tailed)	SYMPTOMS	.	.000
	STRESS	.000	.
N	SYMPTOMS	107	107
	STRESS	107	107

Thank you for trying PDF Suite

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	73.890	3.271		22.587	.000			
	STRESS	.783	.130	.506	6.012	.000	.506	.506	.506

a. Dependent Variable: SYMPTOMS



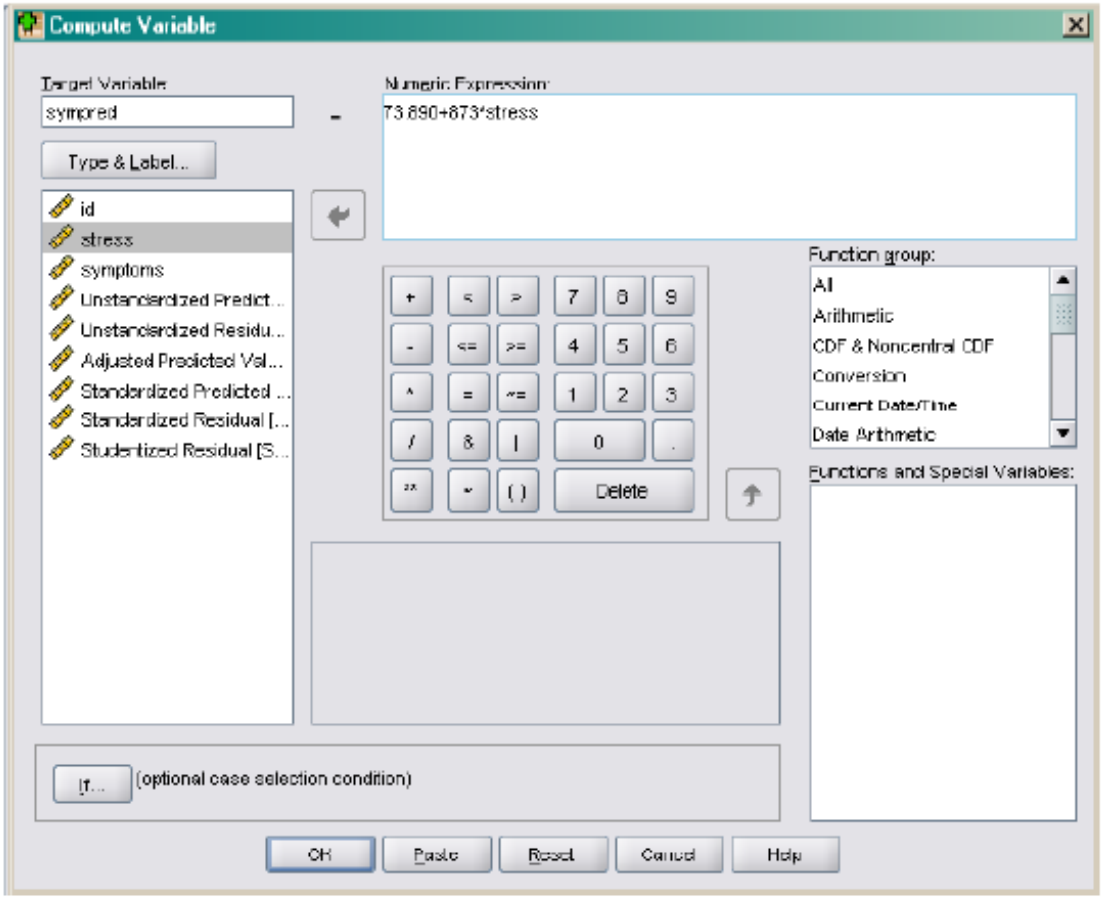
✔ Take a moment to identify all of the key pieces of information. Find the regression coefficients used to calculate the regression equation. One difference is that the text did not include the scatterplot. What do you think of the scatterplot? Does it help you see that predicting symptoms based on stress is a pretty good estimate

✔ Now, click **Window/Symptoms and stress.sav** and look at the new data (residuals and predicted values) in your file. A small sample is below. Note how they are named and labeled.

	id	stress	symptoms	pre_1	res_1	zpr_1	zre_1
1	1	30	99	97.3830	Unstandardized Predicted Value		09207
2	2	27	94	95.03368	-1.03368	.42248	-.05886
3	3	9	80	80.93762	-.93762	-.95202	-.05339
4	4	20	70	89.55188	-19.5519	-.11204	-1.11328

Let's use what we know about the regression equation to check the accuracy of the scores created by SPSS. We will focus on the unstandardized predicted and residual values. This is also a great opportunity to learn how to use the Transform menus to perform calculations based on existing data.
We know from the regression equation that:
Symptoms Predicted or = 73.890 + .783* Stress. Yˆ
We also know that the residual can be computed as follows:
Residual = Y-or Symptoms – Symptoms Predicted Values. Yˆ
We'll use SPSS to calculate these values and then compare them to the values computed by SPSS.

✔ In the Data Editor window, select **Transform/Compute**.



✔ Check the Data Editor to see if your new variable is there, and compare it to pre_1. Are they the same? The only difference I see is that our variable is only expressed to 2 decimal places. But, the values agree.

✔ Follow similar steps to calculate the residual. Click on **Transform/Compute**. Name your **Target Variable** sympres and **Label** it symptoms residual. Put the formula symptoms-sympred in the **Numeric Expression** box by double clicking the two pre-existing variables and typing a minus sign between them. Then, click **Ok**.

✔ Compare these values to res_1. Again they agree. A portion of the new data file is below.

	id	stress	symptoms	pre_1	res_1	zpr_1	zre_1	sympred	sympres
1	1	30	99	97.38302	1.61698	.65157	.09207	9	
2	2	27	94	95.03368	-1.03368	.42248	-.05886	95.03	-1.03
3	3	9	80	80.93762	-.93762	-.95202	-.05339	80.94	-.94
4	4	20	70	89.55188	-19.5519	-.11204	-1.11328	89.55	-19.55

Symptoms Predicted

Now that you are confident that the predicted and residual values computed by SPSS are exactly what you intended, you won't ever need to calculate them yourself again. You can simply rely on the values computed by SPSS through the Save command.

Thank you for trying PDF Suite