Computer input and output to accompany *Statistical Methods for the Social and Behavioural Sciences: A Model-Based Approach* by David B. Flora

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SPSS syntax and output for Chapter 4: Interactions in Multiple Regression

Much of the material in this document builds on the SPSS syntax and output for Chapters 1 to 3. If necessary, refer back to those documents for reminders.

Begin by importing the space-delimited ‘drink.txt’ data (for the heavy alcohol use example) into SPSS:

**GET DATA /TYPE=TXT**

**/FILE="drink.txt"**

**/DELIMITERS=" "**

**/FIRSTCASE=2**

**/VARIABLES=**

**ID AUTO**

**coa AUTO**

**alcuse AUTO**

**ext AUTO**

**numalc AUTO**

**/MAP.**

Preliminary descriptive statistics (Table 4.1).

**EXAMINE VARIABLES=coa alcuse ext numalc**

**/PLOT=NONE**

**/STATISTICS=DESCRIPTIVES.**

The variable 'coa' is the dichotomous parental alcoholism variable, with 1 = child of alcoholic, 0 = control.  
'alcuse' is the heavy alcohol use variable.  
'ext' is externalizing behaviour.  
'numalc' indicates the number of alcoholic parents (0, 1, or 2) for each case.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Case Processing Summary** | | | | | | |
|  | Cases | | | | | |
| Valid | | Missing | | Total | |
| N | Percent | N | Percent | N | Percent |
| coa | 165 | 100.0% | 0 | 0.0% | 165 | 100.0% |
| alcuse | 165 | 100.0% | 0 | 0.0% | 165 | 100.0% |
| ext | 165 | 100.0% | 0 | 0.0% | 165 | 100.0% |
| numalc | 165 | 100.0% | 0 | 0.0% | 165 | 100.0% |

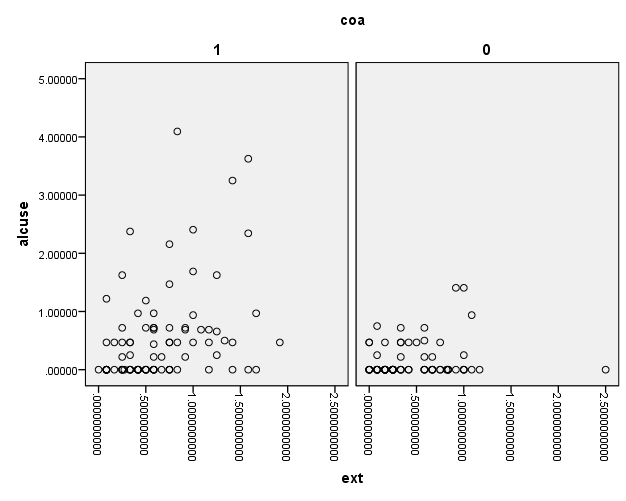
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Descriptives** | | | | |
|  | | | Statistic | Std. Error |
| coa | Mean | | .55 | .039 |
| 95% Confidence Interval for Mean | Lower Bound | .47 |  |
| Upper Bound | .62 |  |
| 5% Trimmed Mean | | .55 |  |
| Median | | 1.00 |  |
| Variance | | .249 |  |
| Std. Deviation | | .499 |  |
| Minimum | | 0 |  |
| Maximum | | 1 |  |
| Range | | 1 |  |
| Interquartile Range | | 1 |  |
| Skewness | | -.184 | .189 |
| Kurtosis | | -1.990 | .376 |
| alcuse | Mean | | .3630682 | .05253463 |
| 95% Confidence Interval for Mean | Lower Bound | .2593367 |  |
| Upper Bound | .4667996 |  |
| 5% Trimmed Mean | | .2529461 |  |
| Median | | .0000000 |  |
| Variance | | .455 |  |
| Std. Deviation | | .67481960 |  |
| Minimum | | .00000 |  |
| Maximum | | 4.09375 |  |
| Range | | 4.09375 |  |
| Interquartile Range | | .46875 |  |
| Skewness | | 2.994 | .189 |
| Kurtosis | | 10.714 | .376 |
| ext | Mean | | .563682277000 | .0345397130000 |
| 95% Confidence Interval for Mean | Lower Bound | .495482420000 |  |
| Upper Bound | .631882135000 |  |
| 5% Trimmed Mean | | .530073462000 |  |
| Median | | .500000000000 |  |
| Variance | | .197 |  |
| Std. Deviation | | .4436706460000 |  |
| Minimum | | .0000000000 |  |
| Maximum | | 2.5000000000 |  |
| Range | | 2.5000000000 |  |
| Interquartile Range | | .5833333330 |  |
| Skewness | | 1.164 | .189 |
| Kurtosis | | 1.791 | .376 |
| numalc | Mean | | .60 | .046 |
| 95% Confidence Interval for Mean | Lower Bound | .51 |  |
| Upper Bound | .69 |  |
| 5% Trimmed Mean | | .56 |  |
| Median | | 1.00 |  |
| Variance | | .351 |  |
| Std. Deviation | | .593 |  |
| Minimum | | 0 |  |
| Maximum | | 2 |  |
| Range | | 2 |  |
| Interquartile Range | | 1 |  |
| Skewness | | .406 | .189 |
| Kurtosis | | -.678 | .376 |

Scatterplot of alcohol use by externalizing, separately for COAs and controls. The **SCATTERPLOT** syntax is the same as in previous chapters, but now the **/PANEL** option is included to indicate that separate panels should be made with columns () based on the ‘coa’ variable:

**GRAPH**

**/SCATTERPLOT ext WITH alcuse**

**/PANEL COLVAR=coa.**



In the graph above, the axis labels indicate the *variable names* (‘alcuse’ and ‘ext’). One could go into the “Variable view” data spreadsheet and assign more meaningful *variable labels* (“Alcohol use” and “Externalizing”), then the plot would have axis labels corresponding to these variable labels. Likewise, for the ‘coa’ variable, one could go into “Variable view” and assign *value labels* to make it clear that coa = 0 corresponds to “Controls” and coa = 1 corresponds to “COAs.”

**Modeling an interaction with a dichotomous moderator**

Specify and estimate the regression of alcohol use on externalizing, parental alcoholism, and their interaction.

First, to represent the interaction term, create a new variable that’s the product of ‘ext’ and ‘coa’:

**COMPUTE extcoa = ext\*coa.**

**EXECUTE.**

Then this new variable can be included as a predictor in the **REGRESSION** command:

**REGRESSION**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext coa extcoa.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .441a | .194 | .179 | .61135550 |
| a. Predictors: (Constant), extcoa, ext, coa | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 14.508 | 3 | 4.836 | 12.939 | .000b |
| Residual | 60.175 | 161 | .374 |  |  |
| Total | 74.683 | 164 |  |  |  |
| a. Dependent Variable: alcuse | | | | | | |
| b. Predictors: (Constant), extcoa, ext, coa | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | .104 | .107 |  | .978 | .329 |
| ext | .102 | .173 | .067 | .588 | .557 |
| coa | .002 | .155 | .001 | .011 | .991 |
| extcoa | .567 | .224 | .391 | 2.530 | .012 |
| a. Dependent Variable: alcuse | | | | | | |

The output above provides values matching those in Table 4.2.

To create the plot of alcohol use by externalizing showing implied simple regression lines for COAs and controls (Figure 4.2), follow the instructions given in the Chapter 1 SPSS syntax to add a fitted regression line to a scatterplot.

**Probing an interaction with simple-slope analysis**

Recode parental alcoholism for the purpose of simple-slope analysis and create a new product variable to represent the interaction:

**RECODE coa (1=0) (0=1) INTO ncoa.**

**COMPUTE extncoa = ext\*ncoa.**

**EXECUTE.**

Then specify and estimate the interaction model using the re-coded COA variable. Results should match those in Table 4.3:

**REGRESSION**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext ncoa extncoa.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .441a | .194 | .179 | .61135550 |
| a. Predictors: (Constant), extncoa, ext, ncoa | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 14.508 | 3 | 4.836 | 12.939 | .000b |
| Residual | 60.175 | 161 | .374 |  |  |
| Total | 74.683 | 164 |  |  |  |
| a. Dependent Variable: alcuse | | | | | | |
| b. Predictors: (Constant), extncoa, ext, ncoa | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | .106 | .113 |  | .940 | .349 |
| ext | .669 | .143 | .440 | 4.687 | .000 |
| ncoa | -.002 | .155 | -.001 | -.011 | .991 |
| extncoa | -.567 | .224 | -.302 | -2.530 | .012 |
| a. Dependent Variable: alcuse | | | | | | |

Get Bonferroni-corrected simultaneous confidence interval for simple slope of externalizing among COAs. The confidence level is set to 97.5%, as explained in Chapter 4:

**REGRESSION**

**/STATISTICS CI(97.5)**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext ncoa extncoa.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Coefficientsa** | | | |
| Model | | 97.5% Confidence Interval for B | |
| Lower Bound | Upper Bound |
| 1 | (Constant) | -.149 | .361 |
| ext | .346 | .992 |
| ncoa | -.353 | .349 |
| extncoa | -1.074 | -.060 |
| a. Dependent Variable: alcuse | | | |

Get Bonferroni-corrected simultaneous confidence interval for simple slope of externalizing among controls:

**REGRESSION**

**/STATISTICS CI(97.5)**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext coa extcoa.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Coefficientsa** | | | |
| Model | | 97.5% Confidence Interval for B | |
| Lower Bound | Upper Bound |
| 1 | (Constant) | -.137 | .345 |
| ext | -.289 | .493 |
| coa | -.349 | .353 |
| extcoa | .060 | 1.074 |
| a. Dependent Variable: alcuse | | | |

**Regression diagnostics for the interaction model**

Histogram of Studentized residuals and scatterplot of Studentized residuals against predicted values (Figure 4.3):

**REGRESSION**

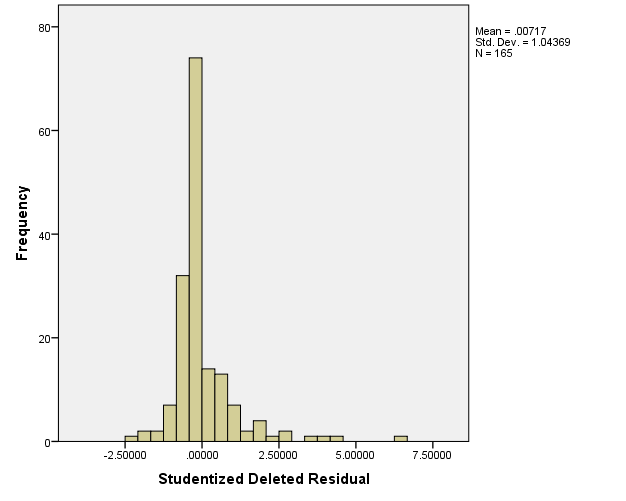
**/DEPENDENT alcuse**

**/METHOD=ENTER ext coa extcoa**

**/SAVE PRED SDRESID.**

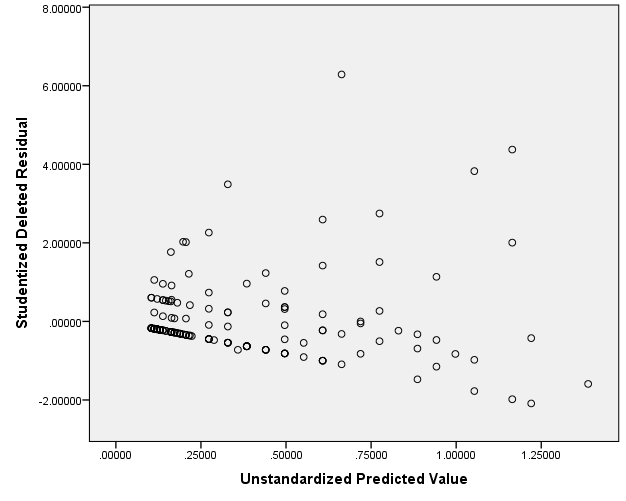
**GRAPH**

**/HISTOGRAM=SDR\_1.**



**GRAPH**

**/SCATTERPLOT=PRE\_1 with SDR\_1.**



**Modeling an interaction with a three-category moderator**

Create dummy variables for number of alcoholic parents:

**RECODE numalc (0=0) (1=1) (2=0) INTO d1.**

**RECODE numalc (0=0) (1=0) (2=1) INTO d2.**

**EXECUTE.**

Create product variables to represent interaction between ‘ext’ and the dummy variables:

**COMPUTE extd1 = ext\*d1.**

**COMPUTE extd2 = ext\*d2.**

**EXECUTE.**

Then follow hierarchical regression strategy in Chapter 4 to compare a model without interactions to a model with interactions between externalizing and the dummy variables created above:

**REGRESSION**

**/STATISTICS COEFF R CHANGE**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext d1 d2**

**/METHOD=ENTER extd1 extd2.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model Summary** | | | | | | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
| R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .426a | .182 | .167 | .61602875 | .182 | 11.932 | 3 | 161 | .000 |
| 2 | .466b | .217 | .193 | .60635076 | .035 | 3.590 | 2 | 159 | .030 |
| a. Predictors: (Constant), d2, ext, d1 | | | | | | | | | |
| b. Predictors: (Constant), d2, ext, d1, extd2, extd1 | | | | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | -.057 | .088 |  | -.653 | .515 |
| ext | .451 | .111 | .297 | 4.064 | .000 |
| d1 | .262 | .101 | .194 | 2.587 | .011 |
| d2 | .688 | .218 | .232 | 3.163 | .002 |
| 2 | (Constant) | .104 | .106 |  | .986 | .326 |
| ext | .102 | .171 | .067 | .593 | .554 |
| d1 | -.048 | .158 | -.035 | -.301 | .764 |
| d2 | .273 | .380 | .092 | .718 | .474 |
| extd1 | .574 | .226 | .393 | 2.541 | .012 |
| extd2 | .812 | .580 | .182 | 1.399 | .164 |
| a. Dependent Variable: alcuse | | | | | | |

Results above for R2 and significance test for R2 change match those in Chapter 4. Results for 'ch4mod3' match values in Table 4.5.

**Simple-slope analysis with three-category moderator**

Create new dummy variables from 'numalc' so that reference category is 1-alcoholic parent and create new product variables:

**RECODE numalc (0=1) (1=0) (2=0) INTO d12.**

**RECODE numalc (0=0) (1=0) (2=1) INTO d22.**

**COMPUTE extd12 = ext\*d12.**

**COMPUTE extd22 = ext\*d22.**

**EXECUTE.**

Specify and estimate the interaction model with new dummy variables. Results should match Table 4.6:

**REGRESSION**

**/STATISTICS COEFF R CHANGE**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext d12 d22 extd12 extd22.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | .057 | .118 |  | .480 | .632 |
| ext | .675 | .147 | .444 | 4.600 | .000 |
| d12 | .048 | .158 | .035 | .301 | .764 |
| d22 | .321 | .384 | .108 | .835 | .405 |
| extd12 | -.574 | .226 | -.306 | -2.541 | .012 |
| extd22 | .238 | .573 | .053 | .415 | .679 |
| a. Dependent Variable: alcuse | | | | | | |

Create new dummy variables from 'numalc' so that reference category is 2-alcoholic parents and create new product variables:

**RECODE numalc (0=1) (1=0) (2=0) INTO d13.**

**RECODE numalc (0=0) (1=1) (2=0) INTO d23.**

**COMPUTE extd13 = ext\*d13.**

**COMPUTE extd23 = ext\*d23.**

**EXECUTE.**

Specify and estimate the interaction model with new dummy variables. Results should match Table 4.7:

**REGRESSION**

**/STATISTICS COEFF R CHANGE**

**/DEPENDENT alcuse**

**/METHOD=ENTER ext d13 d23 extd13 extd23.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | .377 | .365 |  | 1.033 | .303 |
| ext | .913 | .554 | .601 | 1.648 | .101 |
| d13 | -.273 | .380 | -.202 | -.718 | .474 |
| d23 | -.321 | .384 | -.238 | -.835 | .405 |
| extd13 | -.812 | .580 | -.433 | -1.399 | .164 |
| extd23 | -.238 | .573 | -.163 | -.415 | .679 |
| a. Dependent Variable: alcuse | | | | | | |

**Modeling an interaction with a continuous moderator**

Import the tab-delimited ‘hasslesNA.txt’ data (for the psychological symptoms and daily hassles example) into SPSS:

**GET DATA /TYPE=TXT**

**/FILE="X:\book\spss\HasslesNA.txt"**

**/DELIMITERS="\t"**

**/ARRANGEMENT=DELIMITED**

**/FIRSTCASE=2**

**/VARIABLES=**

**hassles AUTO**

**support AUTO**

**symptoms AUTO**

**/MAP.**

Descriptive stats for hassles example:

**CORRELATIONS**

**/VARIABLES=hassles support symptoms.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Correlations** | | | | |
|  | | hassles | support | symptoms |
| hassles | Pearson Correlation | 1 | -.167 | .577 |
| Sig. (2-tailed) |  | .218 | .000 |
| N | 56 | 56 | 56 |
| support | Pearson Correlation | -.167 | 1 | -.134 |
| Sig. (2-tailed) | .218 |  | .326 |
| N | 56 | 56 | 56 |
| symptoms | Pearson Correlation | .577 | -.134 | 1 |
| Sig. (2-tailed) | .000 | .326 |  |
| N | 56 | 56 | 56 |

**EXAMINE VARIABLES= hassles support symptoms**

**/PLOT=NONE**

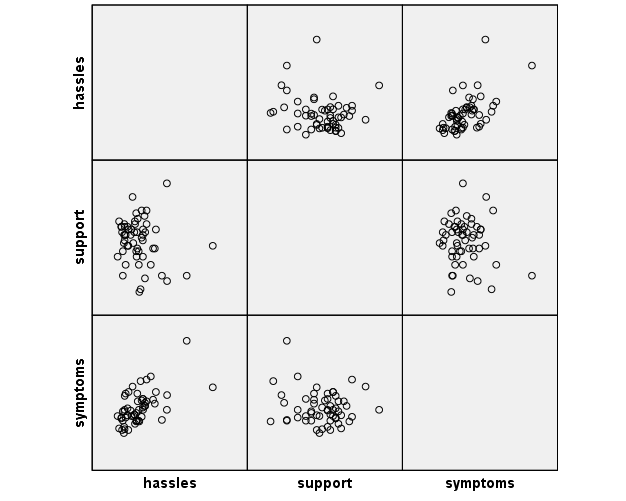
**/STATISTICS=DESCRIPTIVES.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Descriptives** | | | | |
|  | | | Statistic | Std. Error |
| hassles | Mean | | 170.20 | 16.615 |
| 95% Confidence Interval for Mean | Lower Bound | 136.90 |  |
| Upper Bound | 203.49 |  |
| 5% Trimmed Mean | | 156.91 |  |
| Median | | 154.50 |  |
| Variance | | 15459.833 |  |
| Std. Deviation | | 124.338 |  |
| Minimum | | 16 |  |
| Maximum | | 717 |  |
| Range | | 701 |  |
| Interquartile Range | | 136 |  |
| Skewness | | 2.075 | .319 |
| Kurtosis | | 6.485 | .628 |
| support | Mean | | 28.96 | 1.091 |
| 95% Confidence Interval for Mean | Lower Bound | 26.78 |  |
| Upper Bound | 31.15 |  |
| 5% Trimmed Mean | | 29.02 |  |
| Median | | 31.00 |  |
| Variance | | 66.617 |  |
| Std. Deviation | | 8.162 |  |
| Minimum | | 10 |  |
| Maximum | | 50 |  |
| Range | | 40 |  |
| Interquartile Range | | 9 |  |
| Skewness | | -.265 | .319 |
| Kurtosis | | .284 | .628 |
| symptoms | Mean | | 90.43 | 2.807 |
| 95% Confidence Interval for Mean | Lower Bound | 84.80 |  |
| Upper Bound | 96.05 |  |
| 5% Trimmed Mean | | 88.98 |  |
| Median | | 87.50 |  |
| Variance | | 441.231 |  |
| Std. Deviation | | 21.006 |  |
| Minimum | | 58 |  |
| Maximum | | 177 |  |
| Range | | 119 |  |
| Interquartile Range | | 26 |  |
| Skewness | | 1.430 | .319 |
| Kurtosis | | 3.981 | .628 |

The scatterplot matrix in Figure 4.4 can be made by a simple expansion of the previous syntax for creating a scatterplot with only two variables. Unfortunately, although Figure 4.4 shows the univariate distribution of each variable in the diagonal panels, doing so is not possible with SPSS:

**GRAPH**

**/SCATTERPLOT(MATRIX)=hassles support symptoms.**



Specify and estimate interaction model.

As before, to represent the interaction term, create a new variable that’s the product of ‘hassles’ and ‘support’:

**COMPUTE intx = hassles\*support.**

**EXECUTE.**

Then this new variable is included as a predictor in the **REGRESSION** command:

**REGRESSION**

**/STATISTICS R ANOVA COEFF CI**

**/DEPENDENT symptoms**

**/METHOD=ENTER hassles support intx.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .623a | .388 | .353 | 16.893 |
| a. Predictors: (Constant), intx, support, hassles | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 9427.898 | 3 | 3142.633 | 11.012 | .000b |
| Residual | 14839.816 | 52 | 285.381 |  |  |
| Total | 24267.714 | 55 |  |  |  |
| a. Dependent Variable: symptoms | | | | | | |
| b. Predictors: (Constant), intx, support, hassles | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | 45.751 | 17.372 |  | 2.634 | .011 | 10.892 | 80.609 |
| hassles | .233 | .066 | 1.377 | 3.514 | .001 | .100 | .366 |
| support | 1.008 | .589 | .392 | 1.712 | .093 | -.173 | 2.190 |
| intx | -.005 | .002 | -.879 | -2.144 | .037 | -.010 | .000 |
| a. Dependent Variable: symptoms | | | | | | | | |

Results above match values in Table 4.9.

**Probe the interaction with a continuous moderator**

First, create a new variable by centering 'support' at a low value (e.g., 25th percentile = 25 for 'support') and create a new product variable to represent the interaction:

**COMPUTE suppl = support-25.**

**COMPUTE intxl = hassles\*suppl.**

**EXECUTE.**

Then estimate the regression model again:

**REGRESSION**

**/STATISTICS COEFF CI**

**/DEPENDENT symptoms**

**/METHOD=ENTER hassles suppl intxl.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | 70.960 | 4.487 |  | 15.815 | .000 | 61.957 | 79.964 |
| hassles | .106 | .019 | .628 | 5.547 | .000 | .068 | .144 |
| suppl | 1.008 | .589 | .392 | 1.712 | .093 | -.173 | 2.190 |
| intxl | -.005 | .002 | -.484 | -2.144 | .037 | -.010 | .000 |
| a. Dependent Variable: symptoms | | | | | | | | |

Results above match values in Table 4.10.

Next, center 'support' at a medium value (e.g., 50th percentile = 31 for 'support') and create a new product variable to represent the interaction:

**COMPUTE suppm = support-31.**

**COMPUTE intxm = hassles\*suppm.**

**EXECUTE.**

Then estimate the regression model again:

**REGRESSION**

**/STATISTICS COEFF CI**

**/DEPENDENT symptoms**

**/METHOD=ENTER hassles suppm intxm.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | 77.011 | 4.128 |  | 18.657 | .000 | 68.728 | 85.294 |
| hassles | .076 | .021 | .448 | 3.609 | .001 | .034 | .118 |
| suppm | 1.008 | .589 | .392 | 1.712 | .093 | -.173 | 2.190 |
| intxm | -.005 | .002 | -.521 | -2.144 | .037 | -.010 | .000 |
| a. Dependent Variable: symptoms | | | | | | | | |

Results above match values in Table 4.11.

Finally, center 'support' at a high value (e.g., 75th percentile = 34 for 'support') and create a new product variable to represent the interaction:

**COMPUTE supph = support-34.**

**COMPUTE intxh = hassles\*supph.**

**EXECUTE.**

Then estimate the regression model again:

**REGRESSION**

**/STATISTICS COEFF CI**

**/DEPENDENT symptoms**

**/METHOD=ENTER hassles supph intxh.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | |
| B | Std. Error | Beta | Lower Bound | Upper Bound |
| 1 | (Constant) | 80.036 | 4.985 |  | 16.054 | .000 | 70.032 | 90.040 |
| hassles | .060 | .025 | .358 | 2.414 | .019 | .010 | .111 |
| supph | 1.008 | .589 | .392 | 1.712 | .093 | -.173 | 2.190 |
| intxh | -.005 | .002 | -.561 | -2.144 | .037 | -.010 | .000 |
| a. Dependent Variable: symptoms | | | | | | | | |

Results above match values in Table 4.12.

The plot of simple regression lines implied at the low, medium, and high levels of social support (Figure 4.5) is not reproducible in SPSS without considerable complexity. SPSS users typically take the linear equations of the model-implied regression lines for the representative levels of the continuous moderator and enter these equations as formulas in an Excel spreadsheet, then get Excel to compute values based on the formulas which are then graphed as straight lines. Much better graphs can be produced using R software.

But, as reported in Chapter 4, there is a case with a large value for Cook's distance:

**REGRESSION**

**/DEPENDENT symptoms**

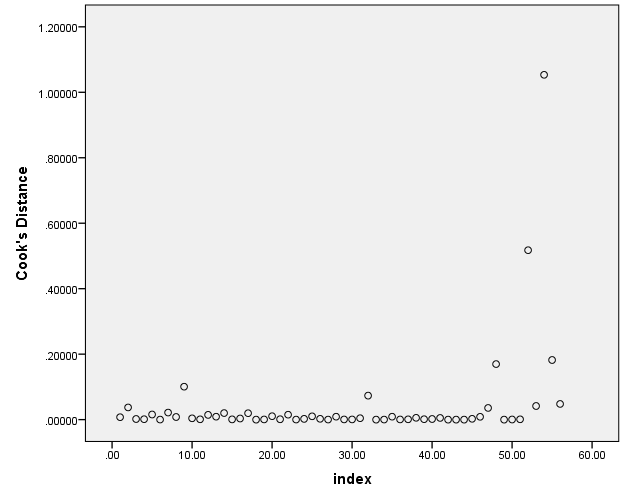
**/METHOD=ENTER hassles support intx**

**/SAVE COOK.**

**COMPUTE index=$casenum.**

**GRAPH**

**/SCATTERPLOT=index with COO\_1.**



We can figure out which case that is by sorting the active data by the Cook’s distance values according to the COO\_1 variable:

**SORT CASES BY COO\_1(D).**

The **D** in parentheses indicates that the data will be sorted in descending order according to COO\_1, then we can easily see in the Data View that the top case (index = 54) is the one with Cook's distance = 1.05. This case has an extremely high value for the 'symptoms' outcome.

The syntax below filters out this case from the active dataset (i.e., only cases with a value of 'symptoms' less than 177 are retained):

**COMPUTE filter\_$=(symptoms < 177).**

**VALUE LABELS filter\_$ 0 'Not Selected' 1 'Selected'.**

**FILTER BY filter\_$.**

**EXECUTE.**

Now re-estimate the model with this filter applied:

**REGRESSION**

**/DEPENDENT symptoms**

**/METHOD=ENTER hassles support intx**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 65.265 | 17.704 |  | 3.686 | .001 |
| hassles | .119 | .074 | .783 | 1.605 | .115 |
| support | .408 | .592 | .187 | .688 | .494 |
| intx | -.002 | .003 | -.344 | -.656 | .515 |
| a. Dependent Variable: symptoms | | | | | | |

In the output above, the interaction is no longer significant, consistent with the results presented in Chapter 4 for the model with the influential case removed.