

اختبار كاي تربيع Chi – Square Test

1) A test conducted to determine the quality of fit or congruence of a single variable with a given distribution Do the blood groups of the investigated sample agree with the distribution of blood groups for a given city?

اختبار كاي تربيع Chi – Square Test

2) A test conducted to determine whether there is a relationship (independence) between two nominal variables or a nominal variable and the other ordinal.

* Is there a relationship between income level and educational level?

*Or is there a relationship between educational attainment level and family income?

*Or is there a relationship between gender (male - female) and smoking (smoker - non-smoker)

Example: A researcher chose a sample of 800 people from a city and their distribution according to blood type was shown in the following table

O	AB	B	A	فصيلة الدم
350	100	150	200	عدد الأشخاص

Is this distribution consistent with the distribution of the following standard ratios:

O	AB	B	A	فصيلة الدم
%45	%15	%15	%25	النسبة القياسية

Null Hypothesis

**The blood group distribution of the sample is
consistent with the standard distribution
(there is no difference)**

Alternative Hypothesis

**The blood group distribution of the sample is not
consistent with the standard distribution
(there is difference)**

IBM SPSS Statistics Data Editor window showing a variable list in Variable View.

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Blood	Numeric	8	2		{1.00, A}...	None	8	Right	Nominal	Input
2	Frequency	Numeric	8	2		None	None	8	Right	Scale	Input
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Variable View tabs: Data View | Variable View

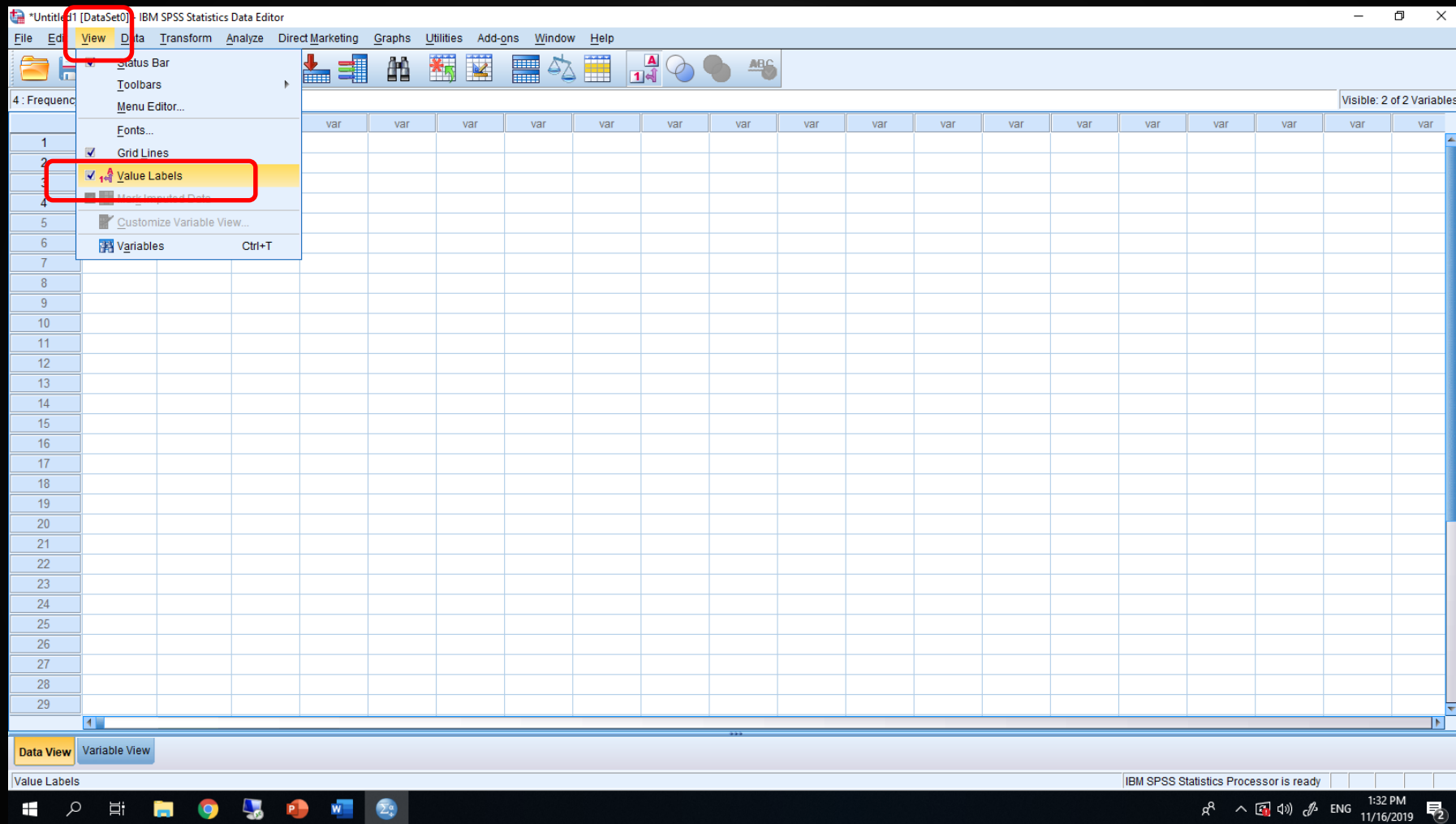
IBM SPSS Statistics Processor is ready

Windows taskbar: 11/16/2019 1:30 PM

IBM SPSS Statistics Data Editor window showing a dataset with 20 rows and 20 columns. The first column is labeled 'Blood' and the second column is labeled 'Frequency'. The data is as follows:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	
5																			
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The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help) and a toolbar. The status bar at the bottom indicates 'IBM SPSS Statistics Processor is ready' and the date/time '11/15/2019 1:31 PM'.



IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

4 : Frequency

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Define Variable Properties...
Set Measurement Level for Unknown...
Copy Data Properties...
New Custom Attribute...
Define Dates...
Define Multiple Response Sets...
Validation
Identify Duplicate Cases...
Identify Unusual Cases...
Sort Cases...
Sort Variables...
Transpose...
Merge Files
Restructure...
Aggregate...
Orthogonal Design
Copy Dataset
Split File...
Select Cases...
Weight Cases...

var var var var var var var var var var var var var var var var

Visible: 2 of 2 Variables

Data View Variable View

Weight Cases... IBM SPSS Statistics Processor is ready

11/16/2019 1:34 PM

IBM SPSS Statistics Data Editor window showing a dataset with 29 rows and 20 columns. The first two columns are labeled 'Blood' and 'Frequency'. The data is as follows:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	
5																			
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A 'Weight Cases' dialog box is open, showing the 'Blood' variable selected. The 'Weight cases by' option is chosen, and the 'Frequency Variable' is set to 'Frequency'. The 'Current Status' is 'Do not weight cases'. Buttons include OK, Paste, Reset, Cancel, and Help.

IBM SPSS Statistics Processor is ready

11/16/2019 1:35 PM

IBM SPSS Statistics Data Editor window: *Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

Menu bar: File, Edit, View, Data, Transform, **Analyze**, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help

Toolbar: Icons for saving, printing, and other file operations.

4. Frequency: 350.00

	Blood	Frequency
1	1.00	200.0
2	2.00	150.0
3	3.00	100.0
4	4.00	350.0
5		
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Visible: 2 of 2 Variables

Analyze menu path: Analyze > Nonparametric Tests > Legacy Dialogs > Chi-square...

Bottom status bar: Chi-square... | IBM SPSS Statistics Processor is ready | Weight On

Windows taskbar: Windows Start button, Search, Task View, File Explorer, Google Chrome, Microsoft Word, and system tray with date/time (11/16/2019, 1:35 PM).

IBM SPSS Statistics Data Editor window showing a dataset with 4 rows and 20 columns. The first two columns are labeled "Blood" and "Frequency". The data is as follows:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	

The "Chi-square Test" dialog box is open, showing the "Test Variable List" with "Blood" and "Frequency" selected. The "Expected Range" section has "Get from data" selected. The "Expected Values" section has "All categories equal" selected. The "Values" field is empty. The "Add", "Change", and "Remove" buttons are visible. The "OK", "Paste", "Reset", "Cancel", and "Help" buttons are at the bottom.

IBM SPSS Statistics Processor is ready | Weight On | 1:36 PM 11/16/2019

IBM SPSS Statistics Data Editor window showing a dataset with 4 rows and 20 columns. The first two columns are labeled 'Blood' and 'Frequency'. The data is as follows:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	

The 'Chi-square Test' dialog box is open, showing the following settings:

- Test Variable List: Blood
- Expected Range: ☒ Get from data
- Expected Values: ☒ All categories equal

The bottom of the window shows the 'Data View' tab selected, and the status bar indicates 'IBM SPSS Statistics Processor is ready'.

IBM SPSS Statistics Data Editor window showing a dataset with 4 rows and 20 columns. The first column is labeled 'Blood' and the second column is labeled 'Frequency'. The data is as follows:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	

The 'Chi-square Test' dialog box is open, showing the following settings:

- Test Variable List: Blood
- Expected Range: ☒ Get from data, ☐ Use specified range (Lower: , Upper:)
- Expected Values: ☐ All categories equal, ☒ Values: 25 (Add, Change, Remove buttons are present)

The bottom status bar shows 'IBM SPSS Statistics Processor is ready' and 'Weight On'. The system tray at the bottom right shows the date and time: 11/16/2019 1:38 PM.

IBM SPSS Statistics Data Editor window showing a dataset with 4 rows and 20 columns. The first column is labeled 'Blood' and the second column is labeled 'Frequency'. The data is as follows:

Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1.00	200.00																		
2.00	150.00																		
3.00	100.00																		
4.00	350.00																		

The 'Chi-square Test' dialog box is open, showing the following settings:

- Test Variable List:** Blood
- Expected Range:** ☒ Get from data
- Expected Values:** ☒ All categories equal
- Values:** 25, 15

The 'Data View' tab is selected at the bottom of the window.

IBM SPSS Statistics Data Editor window showing a dataset with 4 rows and 20 columns. The first two columns are labeled 'Blood' and 'Frequency'. The data is as follows:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	

The 'Chi-square Test' dialog box is open, showing the following settings:

- Test Variable List:** Blood
- Expected Range:** ☒ Get from data
- Expected Values:** ☒ All categories equal
- Values:** 25, 15, 15

The 'Data View' tab is selected at the bottom of the window. The status bar indicates 'IBM SPSS Statistics Processor is ready' and 'Weight On'.

IBM SPSS Statistics Data Editor window showing a frequency table and the Chi-square Test dialog box.

Frequency Table:

	Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	
5																			
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Chi-square Test Dialog Box:

- Test Variable List:** Blood
- Expected Range:**
 - ☒ Get from data
 - ☐ Use specified range
 - Lower:
 - Upper:
- Expected Values:**
 - ☐ All categories equal
 - ☒ Values:
 - 25
 - 15
 - 15
 - 45

Buttons: OK, Paste, Reset, Cancel, Help, Exact..., Options...

IBM SPSS Statistics Data Editor window showing a dataset with 29 rows and 20 columns. The first column is labeled 'Blood' and the second column is labeled 'Frequency'. The data is as follows:

Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	200.00																	
2	2.00	150.00																	
3	3.00	100.00																	
4	4.00	350.00																	
5																			
6																			
7																			
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The 'Chi-square Test' dialog box is open, showing the 'Test Variable List' with 'Blood' selected. The 'Expected Range' section has 'Get from data' selected. The 'Expected Values' section has 'All categories equal' selected. The 'Values' list contains 25, 15, 15, and 45. The 'Exact...' button is also visible.

IBM SPSS Statistics Processor is ready. Weight On. 1:39 PM 11/16/2019

IBM SPSS Statistics Data Editor window showing a dataset with 4 rows and 20 columns. The first column is labeled 'Blood' and the second column is labeled 'Frequency'. The data is as follows:

Blood	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1.00	200.00																		
2.00	150.00																		
3.00	100.00																		
4.00	350.00																		

The 'Chi-square Test' dialog box is open, showing 'Frequency' as the Test Variable List. The 'Chi-square Test: Options' sub-dialog box is also open, showing the 'Statistics' section with 'Descriptive' checked and 'Quartiles' unchecked. The 'Missing Values' section shows 'Exclude cases test-by-test' selected. The 'Expected Range' section shows 'Get from data' selected. The 'Continue' button is highlighted.

IBM SPSS Statistics Processor is ready | Weight On | 1:39 PM | 11/16/2019

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Blood	800	2.7500	1.25078	1.00	4.00

Chi-Square Test

Frequencies

Blood

	Observed N	Expected N	Residual
A	200	200.0	.0
B	150	120.0	30.0
AB	100	120.0	-20.0
O	350	360.0	-10.0
Total	800		

Test Statistics

	Blood
Chi-Square	11.111 ^a
df	3
Asymp. Sig.	.011

Statistical decision

The resulting probability value of the test is 0.011, which is a value less than 0.05 (the level of significance), so we accept the alternative hypothesis that the distribution of blood groups for the sample does not agree with the standard distribution (there are differences)

Example: Within the literacy projects, the Ministry of Education conducted a training program to motivate the uneducated to change their attitudes towards the importance of education according to the following percentages that depended on training in 2018/2019:

سلي	محايد لم يتغير	ايجابي	تأثير التدريب
%12	%65	%23	النسبة المعتمدة

In 2019 / 2020, this training was conducted on 90 people, and the results of changing their attitudes after the training were as follows

المجموع	سلي	محايد لم يتغير	ايجابي	تأثير التدريب
90	4	34	52	عدد الأشخاص

Is it possible to judge that this year's program differs from the previous program or agrees with it?

Null Hypothesis

**This year's program is consistent with the
previous program
(there is no difference)**

Alternative Hypothesis

**This year's program does not match the previous
program
(there is difference)**

IBM SPSS Statistics Data Editor window titled "Untitled1 [DataSet0]". The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help) and a toolbar with icons for file operations, data manipulation, and analysis.

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Change	Numeric	8	2		{1.00, Positi...	None	8	Right	Nominal	Input
2	Frequency	Numeric	8	2		None	None	8	Right	Scale	Input
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At the bottom, the "Data View" tab is selected, and the status bar indicates "IBM SPSS Statistics Processor is ready". The system tray shows the date and time as 11/16/2019, 2:03 PM.

IBM SPSS Statistics Data Editor window showing a dataset with 29 rows and 20 columns. The first column is labeled 'Change' and the second is 'Frequency'. The data is as follows:

Change	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	52.00																	
2	2.00	34.00																	
3	3.00	4.00																	
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The 'Chi-square Test' dialog box is open, showing the following settings:

- Test Variable List:** Change
- Expected Range:** ☒ Get from data
- Expected Values:** ☒ All categories equal
- Values:** 23, 65, 4

The bottom status bar shows 'IBM SPSS Statistics Processor is ready' and 'Weight On'.

IBM SPSS Statistics Data Editor window showing a dataset with 29 rows and 20 columns. The first column is labeled 'Change' and the second is 'Frequency'. The data is as follows:

	Change	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	52.00																	
2	2.00	34.00																	
3	3.00	4.00																	
4																			
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The 'Chi-square Test' dialog box is open, showing 'Frequency' as the Test Variable List. The 'Chi-square Test: Options' sub-dialog box is also open, showing 'Descriptive' and 'Quantiles' under Statistics, and 'Exclude cases test-by-test' under Missing Values. The 'Expected Range' section is set to 'Get from data'.

IBM SPSS Statistics Processor is ready. Weight On. 2:05 PM 11/16/2019

*Output2 [Document2] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Output

- Log
- NPar Tests
 - Title
 - Notes
 - Active Dataset
 - Descriptive Statist
 - Chi-Square Test
 - Title
 - Frequencies
 - Change
 - Test Statistics

/MISSING ANALYSIS.

→ **NPar Tests**

[DataSet0]

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Change	90	1.4667	.58444	1.00	3.00

Chi-Square Test

Frequencies

Change

	Observed N	Expected N	Residual
Positive	52	22.5	29.5
NA	34	63.6	-29.6
Negative	4	3.9	.1
Total	90		

Test Statistics

	Change
Chi-Square	52.446 ^a
df	2
Asymp. Sig.	.000

a. 1 cells (33.3%) have expected frequencies less than 5. The minimum expected cell frequency is 3.9.

IBM SPSS Statistics Processor is ready

2:05 PM 11/16/2019

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Change	90	1.4667	.58444	1.00	3.00

Chi-Square Test

Frequencies

Change

	Observed N	Expected N	Residual
Positive	52	22.5	29.5
NA	34	63.6	-29.6
Negative	4	3.9	.1
Total	90		

Test Statistics

	Change
Chi-Square	52.446 ^a
df	2
Asymp. Sig.	.000

Statistical decision

The resulting probabilistic value of the test is equal to 0.000, which is a value less than 0.05 (the level of significance), so we accept the alternative hypothesis that this year's program does not correspond to the previous program (there are differences)

اختبار كاي تربيع Chi – Square Test

1) A test conducted to determine the quality of fit or congruence of a single variable with a given distribution Do the blood groups of the investigated sample agree with the distribution of blood groups for a given city?

اختبار كاي تربيع Chi – Square Test

2) A test conducted to determine whether there is a relationship (independence) between two nominal variables or a nominal variable and the other ordinal.

* Is there a relationship between income level and educational level?

*Or is there a relationship between educational attainment level and family income?

*Or is there a relationship between gender (male - female) and smoking (smoker - non-smoker)

Example: The following table shows the relationship between the level of education and smoking for a sample of 50 people. It is required to know whether the level of education and smoking are independent variables or is there a relationship between them?

Education level Smoking	Illiterate	Intermediate education	high education	Total
Smoker	10	9	5	24
Non smoker	13	7	6	26
Total	23	16	11	50

Null Hypothesis

Education level and smoking are two independent variables

(there is no relation between them)

Alternative Hypothesis

Education level and smoking are two dependent variables

(there is a relationship between them)

IBM SPSS Statistics Data Editor window titled "Untitled1 [DataSet0]". The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help) and a toolbar with icons for file operations, data manipulation, and analysis.

The main area displays the Variable View table, which defines the structure of the dataset. The first variable, "Smoking", is configured with the following properties:

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Smoking	Numeric	8	2		None	None	8	Right	Nominal	Input
2											
3											
4											
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The bottom status bar indicates "IBM SPSS Statistics Processor is ready". A watermark "Activate Windows" is visible in the background.

IBM SPSS Statistics Data Editor window showing the 'Value Labels' dialog box for the 'Smoking' variable.

The background table structure is as follows:

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Smoking	Numeric	8	2		None	None	8	Right	Nominal	Input
2											
3											
4											
5											
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The 'Value Labels' dialog box is open, showing the following content:

Value Labels

Value:

Label:

Spelling...

1.00 = "Smoking"

2.00 = "Not Smoking"

Buttons: Add, Change, Remove, OK, Cancel, Help

At the bottom of the window, the status bar indicates: IBM SPSS Statistics Processor is ready.

Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Value Labels

Value:

Label:

1.00 = "Not Education"
2.00 = "Basic"
3.00 = "University"

OK Cancel Help

Spelling...

Activate Windows
Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Smoking	Numeric	8	2		1.00 = "Smoking"	None	8	Right	Nominal	Input
2	Education	Numeric	8	2		None	None	8	Right	Ordinal	Input
3											
4											
5											
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Data View Variable View

IBM SPSS Statistics Data Editor window showing the Variable View for a dataset named "Untitled1 [DataSet0]". The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help) and a toolbar with various icons for file operations, data manipulation, and analysis.

The Variable View table displays the following columns: Name, Type, Width, Decimals, Label, Values, Missing, Columns, Align, Measure, and Role. The first three rows are highlighted in yellow:

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Smoking	Numeric	8	2		{1.00, Smok...	None	8	Right	Nominal	Input
2	Education	Numeric	8	2		{1.00, Not E...	None	8	Right	Ordinal	Input
3	Frequency	Numeric	8	2		None	None	8	Right	Scale	Input
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6											
7											
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25											

The bottom status bar indicates "IBM SPSS Statistics Processor is ready". A watermark "Activate Windows" is visible in the background.

*Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

4 : Smoking

Visible: 3 of 3 Variables

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	10.00																
2	1.00	2.00	9.00																
3	1.00	3.00	5.00																
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Data View Variable View

IBM SPSS Statistics Processor is ready

IBM SPSS Statistics Data Editor

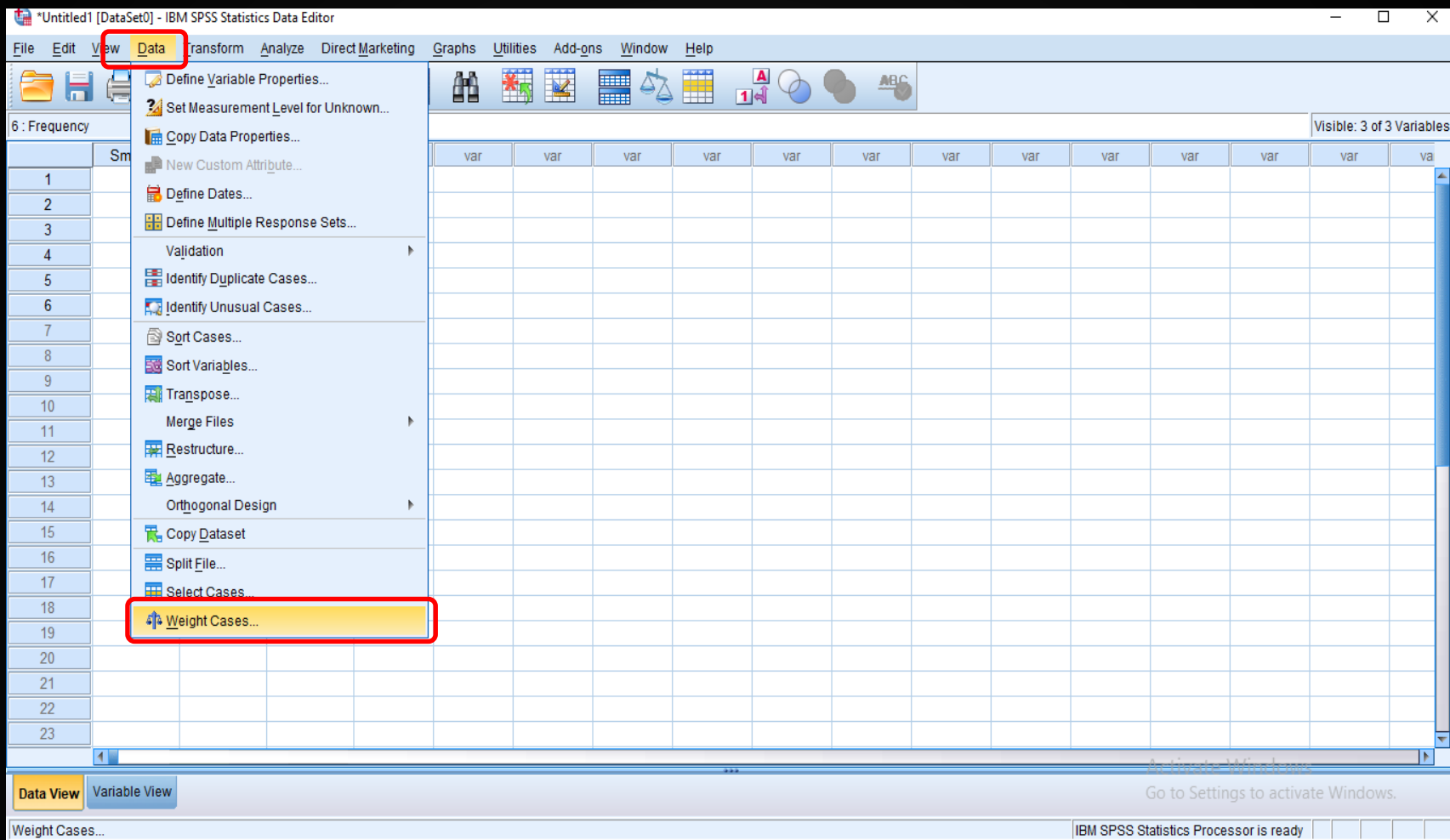
File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Visible: 3 of 3 Variables

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	10.00																
2	1.00	2.00	9.00																
3	1.00	3.00	5.00																
4	2.00	1.00	13.00																
5	2.00	2.00	7.00																
6	2.00	3.00	6.00																
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Data View Variable View

IBM SPSS Statistics Processor is ready



IBM SPSS Statistics Data Editor window showing a dataset with 23 rows and 18 columns. The first four columns are labeled 'Smoking', 'Education', 'Frequency', and 'var'. The 'Frequency' column contains values: 13.00, 7.00, 6.00, 10.00, 9.00, 5.00, and then empty cells for rows 7-23. A 'Weight Cases' dialog box is open, showing the 'Weight cases by' option selected. The 'Frequency Variable' field is empty. The 'Current Status' is 'Do not weight cases'. The 'OK' button is highlighted.

Weight Cases

☒ Do not weight cases
☒ Weight cases by

Frequency Variable:

Current Status: Do not weight cases

OK Paste Reset Cancel Help

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00														
2	1.00	2.00	7.00														
3	1.00	3.00	6.00														
4	2.00	1.00	10.00														
5	2.00	2.00	9.00														
6	2.00	3.00	5.00														
7																	
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23																	

IBM SPSS Statistics Data Editor window showing a dataset with 23 rows and 18 columns. The first three columns are labeled "Smoking", "Education", and "Frequency". The "Frequency" column contains values: 13.00, 7.00, 6.00, 10.00, 9.00, 5.00, and then several empty cells. A "Weight Cases" dialog box is open, showing the "Frequency" variable selected in the list on the left. The "Weight cases by" radio button is selected, and the "Frequency Variable" field is empty. The "Current Status" is "Do not weight cases".

6 : Frequency 5.00 Visible: 3 of 3 Variables

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00														
2	1.00	2.00	7.00														
3	1.00	3.00	6.00														
4	2.00	1.00	10.00														
5	2.00	2.00	9.00														
6	2.00	3.00	5.00														
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22																	
23																	

Weight Cases

☐ Do not weight cases
☒ Weight cases by

Frequency Variable:

Current Status: Do not weight cases

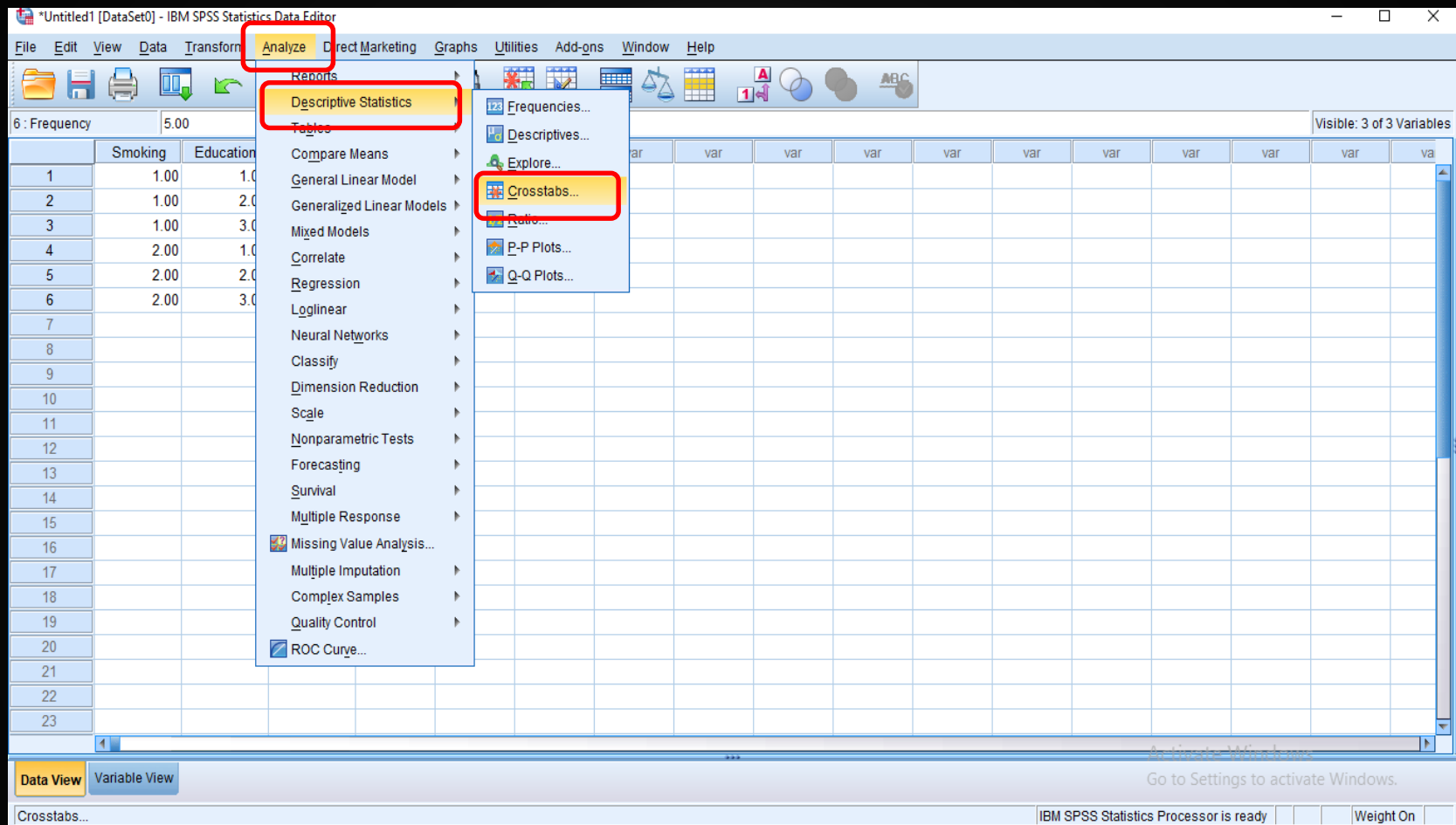
OK Paste Reset Cancel Help

IBM SPSS Statistics Data Editor window showing a dataset with 23 rows and 18 columns. The first three columns are labeled "Smoking", "Education", and "Frequency". The "Frequency" column contains values: 13.00, 7.00, 6.00, 10.00, 9.00, 5.00, and then several empty cells. The "Smoking" column contains values: 1.00, 1.00, 1.00, 2.00, 2.00, 2.00, and then several empty cells. The "Education" column contains values: 1.00, 2.00, 3.00, 1.00, 2.00, 3.00, and then several empty cells. The status bar at the bottom indicates "IBM SPSS Statistics Processor is ready".

A "Weight Cases" dialog box is open, showing the "Weight cases by" option selected. The "Frequency Variable" is set to "Frequency". The "OK" button is highlighted.

Current Status: Do not weight cases

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00														
2	1.00	2.00	7.00														
3	1.00	3.00	6.00														
4	2.00	1.00	10.00														
5	2.00	2.00	9.00														
6	2.00	3.00	5.00														
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20																	
21																	
22																	
23																	



IBM SPSS Statistics Data Editor window showing a Crosstabs dialog box overlaid on a data table.

The data table has columns: Smoking, Education, Frequency, and several empty columns labeled 'var'. The data is as follows:

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00													
2	1.00	2.00	7.00													
3	1.00	3.00	6.00													
4	2.00	1.00	10.00													
5	2.00	2.00	9.00													
6	2.00	3.00	5.00													
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The Crosstabs dialog box is configured as follows:

- Row(s): Smoking
- Column(s): Education
- Layer 1 of 1: Frequency
- Display clustered bar charts: ☐
- Suppress tables: ☐
- Buttons: OK, Paste, Reset, Cancel, Help

IBM SPSS Statistics Processor is ready. Weight On.

IBM SPSS Statistics Data Editor window showing a dataset with columns: Smoking, Education, Frequency, and several empty variable columns. The data is displayed in a table with 23 rows. The 'Frequency' column contains values: 13.00, 7.00, 6.00, 10.00, 9.00, 5.00, and then empty cells for rows 7 through 23.

The 'Crosstabs' dialog box is open, showing the following configuration:

- Row(s): Smoking
- Column(s): (Empty)
- Display clustered bar charts: ☐
- Suppress tables: ☐
- Buttons: OK, Paste, Reset, Cancel, Help

The 'Education' variable is highlighted in the list of variables on the left, and the 'Smoking' variable is moved to the Row(s) list. The 'Frequency' variable is also highlighted in the list of variables on the left.

At the bottom of the window, the status bar indicates: IBM SPSS Statistics Processor is ready | Weight On

*Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

6 : Frequency 5.00 Visible: 3 of 3 Variables

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00													
2	1.00	2.00	7.00													
3	1.00	3.00	6.00													
4	2.00	1.00	10.00													
5	2.00	2.00	9.00													
6	2.00	3.00	5.00													
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Crosstabs

Row(s): Smoking

Column(s): Education

Layer 1 of 1

Previous Next

☐ Display clustered bar charts

☐ Suppress tables

OK Paste Reset Cancel Help

Exact Statistics... Cells... Format... Bootstrap...

Data View Variable View

IBM SPSS Statistics Processor is ready Weight On

*Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

6 : Frequency 5.00 Visible: 3 of 3 Variables

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00													
2	1.00	2.00	7.00													
3	1.00	3.00	6.00													
4	2.00	1.00	10.00													
5	2.00	2.00	9.00													
6	2.00	3.00	5.00													
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Crosstabs

Crosstabs: Statistics

Frequency

☒ Chi-square ☒ Correlations

Nominal

☐ Contingency coefficient ☐ Gamma

☐ Phi and Cramer's V ☐ Somers' d

☐ Lambda ☐ Kendall's tau-b

☐ Uncertainty coefficient ☐ Kendall's tau-c

Nominal by Interval

☐ Eta ☐ Kappa

☐ Risk ☐ McNemar

☐ Cochran's and Mantel-Haenszel statistics

Test common odds ratio equals: 1

Display cluster ☐ Suppress table ☐

Continue Cancel Help

OK Paste Reset Cancel Help

Exact... Statistics... Cells... Format... Bootstrap...

Data View Variable View

IBM SPSS Statistics Processor is ready Weight On

Go to Settings to activate Windows.

IBM SPSS Statistics Data Editor window showing a dataset with 23 rows and 18 columns. The first three columns are labeled "Smoking", "Education", and "Frequency". The data is as follows:

	Smoking	Education	Frequency
1	1.00	1.00	13.00
2	1.00	2.00	7.00
3	1.00	3.00	6.00
4	2.00	1.00	10.00
5	2.00	2.00	9.00
6	2.00	3.00	5.00
7			
8			
9			
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22			
23			

The "Crosstabs" dialog box is open, showing the "Statistics" tab. The "Chi-square" and "Correlations" options are checked. The "Continue" button is highlighted with a red rectangle.

IBM SPSS Statistics Processor is ready | Weight On

*Output1 [Document1] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Output

- Log
- Crosstabs
 - Title
 - Notes
 - Active Dataset
 - Case Processing
 - Smoking * Educat
 - Chi-Square Tests

Crosstabs

[DataSet0]

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Smoking * Education	50	100.0%	0	0.0%	50	100.0%

Smoking * Education Crosstabulation

Count

		Education			Total
		Not Education	Basic	University	
Smoking	Smoking	13	7	6	26
	Not Smoking	10	9	5	24
Total		23	16	11	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.653 ^a	2	.721
Likelihood Ratio	.654	2	.721
Linear-by-Linear Association	.073	1	.787
N of Valid Cases	50		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 1.11.

Activate Windows
Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.000 ^a	2	1.000
Likelihood Ratio	.000	2	1.000
Linear-by-Linear Association	.000	1	1.000
N of Valid Cases	6		

a. 6 cells (100.0%) have expected count less than 5. The minimum expected count is 1.00.

Statistical decision

The resulting probabilistic value of the test is 1.00, which is a value greater than 0.05 (the level of significance), so we accept the null hypothesis that there is no relationship between the level of education and smoking and that they are two independent variables

Example: The following table shows the relationship between gender (male - female) and exercise for a sample of 300 respondents. It is required to know whether gender and sport are independent variables, or is there a relationship between them?

Gender Sport	Gender		Total
	Male	Female	
Playing	70	85	155
Not playing	90	55	145
Total	160	140	300

Null Hypothesis

**Gender (male-female) and sport are two
independent variables
(there is no relation between them)**

Alternative Hypothesis

**Gender (male - female) and sport are two
dependent variables (there is a relationship
between them)**

*Untitled2 [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Gender

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	2		None	None	8	Right	Nominal	Input
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
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18											
19											
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22											
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24											

Activate Windows
Go to Settings to activate Windows.

Data View Variable View

IBM SPSS Statistics Processor is ready.

SPSS Statistics Data Editor window titled "Untitled2 [DataSet1] - IBM SPSS Statistics Data Editor". The menu bar includes File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, and Help. The toolbar contains icons for file operations, data manipulation, and analysis.

	Name	Type	Width	Decimals	Label	Value	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	2		None	None	8	Right	Nominal	Input
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
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The "Value Labels" dialog box is open, showing the "Value Labels" section. It includes input fields for "Value:" and "Label:", a "Spelling..." button, and a list area with "Add", "Change", and "Remove" buttons. At the bottom are "OK", "Cancel", and "Help" buttons.

At the bottom of the window, the "Data View" tab is selected, and the "Variable View" tab is highlighted. A watermark "Activate Windows" is visible in the bottom right corner.

IBM SPSS Statistics Data Editor window showing the Variable View for a variable named "Gender". The variable is defined as Numeric, with a width of 8 and 2 decimal places. The "Values" column is highlighted in yellow, and the "Missing" column is set to "None". The "Columns" column is set to 8, "Align" is Right, "Measure" is Nominal, and "Role" is Input.

The "Value Labels" dialog box is open, showing the following settings:

- Value:
- Label:
- Buttons: Add, Change, Remove, Spelling...
- List of value labels: 1.00 = "Male", 2.00 = "Female"
- Buttons: OK, Cancel, Help

The "OK" button is highlighted with a red box. The "Value Labels" dialog box is also highlighted with a red box.

At the bottom of the window, the "Variable View" tab is selected. The status bar at the bottom right indicates "Activate Windows" and "Go to Settings to activate Windows."

IBM SPSS Statistics Data Editor window titled "Untitled2 [DataSet1]". The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help) and a toolbar with various icons for file operations, data manipulation, and analysis.

The main data grid shows the following variables:

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	2		{1.00, Male}...	None	8	Right	Nominal	Input
2	Sport	Numeric	8	2		None	None	8	Right	Nominal	Input
3											
4											
5											
6											
7											
8											
9											
10											
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The "Sport" variable is highlighted with a red box. The "Measure" column for "Sport" is set to "Nominal", also highlighted with a red box. The "Role" column for "Sport" is set to "Input".

At the bottom, the "Data View" tab is selected, and the "Variable View" tab is also visible. A watermark "Activate Windows" is present in the bottom right corner.

IBM SPSS Statistics Data Editor window titled "Untitled2 [DataSet1]". The menu bar includes File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, and Help. The toolbar contains icons for file operations, data manipulation, and analysis.

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	2		(1.00, Male)	None	8	Right	Nominal	Input
2	Sport	Numeric	8	2		None	None	8	Right	Nominal	Input
3											
4											
5											
6											
7											
8											
9											
10											
11											
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The "Value Labels" dialog box is open, showing the "Value Labels" tab. The "Value" field is empty, and the "Label" field is empty. The "Add" button is highlighted. The list of value labels shows "1.00 = 'Play'" and "2.00 = 'Not play'". The "OK", "Cancel", and "Help" buttons are at the bottom.

Activate Windows
Go to Settings to activate Windows.

*Untitled2 [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Frequency

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Gender	Numeric	8	2		{1.00, Male}...	None	8	Right	Nominal	Input
2	Sport	Numeric	8	2		{1.00, Play}...	None	8	Right	Nominal	Input
3	Frequency	Numeric	8	2		None	None	8	Right	Scale	Input
4											
5											
6											
7											
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1

Data View Variable View

Activate Windows
Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready.

SPSS Statistics Data Editor window: "Untitled2 [DataSet1]"

Menu: File, Edit, View, Data, Transform, Analyze, Direct Marketing, Graphs, Utilities, Add-ons, Window, Help

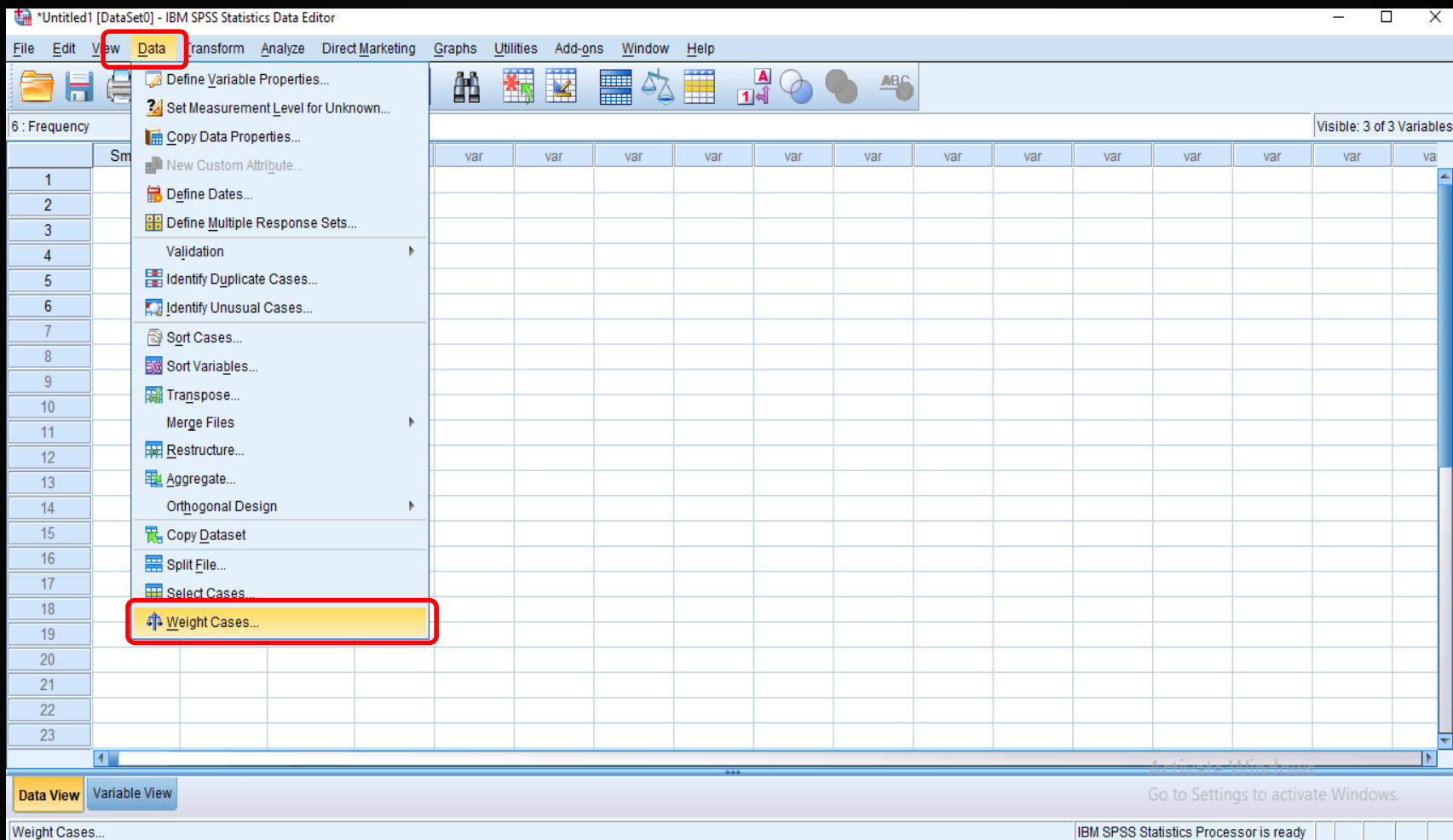
Toolbar: [Icons for file operations, data manipulation, and analysis]

4: Frequency | 55.00 | Visible: 3 of 3 Variables

	Gender	Sports	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	70.00																
2	1.00	2.00	90.00																
3	2.00	1.00	85.00																
4	2.00	2.00	55																
5																			
6																			
7																			
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Buttons: Data View, Variable View

Status Bar: IBM SPSS Statistics Processor is ready



IBM SPSS Statistics Data Editor window showing a dataset with 23 rows and 18 columns. The first four columns are labeled 'Smoking', 'Education', 'Frequency', and 'var'. The 'Frequency' column contains values: 13.00, 7.00, 6.00, 10.00, 9.00, 5.00, and then empty cells for rows 7-23. A 'Weight Cases' dialog box is open, showing the 'Weight cases by' option selected. The 'Frequency Variable' field is empty. The current status is 'Do not weight cases'.

Weight Cases

☒ Do not weight cases
☒ Weight cases by

Frequency Variable:

Current Status: Do not weight cases

OK Paste Reset Cancel Help

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00														
2	1.00	2.00	7.00														
3	1.00	3.00	6.00														
4	2.00	1.00	10.00														
5	2.00	2.00	9.00														
6	2.00	3.00	5.00														
7																	
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IBM SPSS Statistics Data Editor window showing a dataset with 23 rows and 17 columns. The first three columns are labeled "Smoking", "Education", and "Frequency". The "Frequency" column contains values: 13.00, 7.00, 6.00, 10.00, 9.00, 5.00, and then several empty cells. A "Weight Cases" dialog box is open, showing the "Frequency" variable selected in the list on the left. The "Weight cases by" radio button is selected, and the "Frequency Variable" field is empty. The "Current Status" is "Do not weight cases".

Weight Cases

☐ Do not weight cases

☒ Weight cases by

Frequency Variable:

Current Status: Do not weight cases

OK Paste Reset Cancel Help

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00														
2	1.00	2.00	7.00														
3	1.00	3.00	6.00														
4	2.00	1.00	10.00														
5	2.00	2.00	9.00														
6	2.00	3.00	5.00														
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Data View Variable View

Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

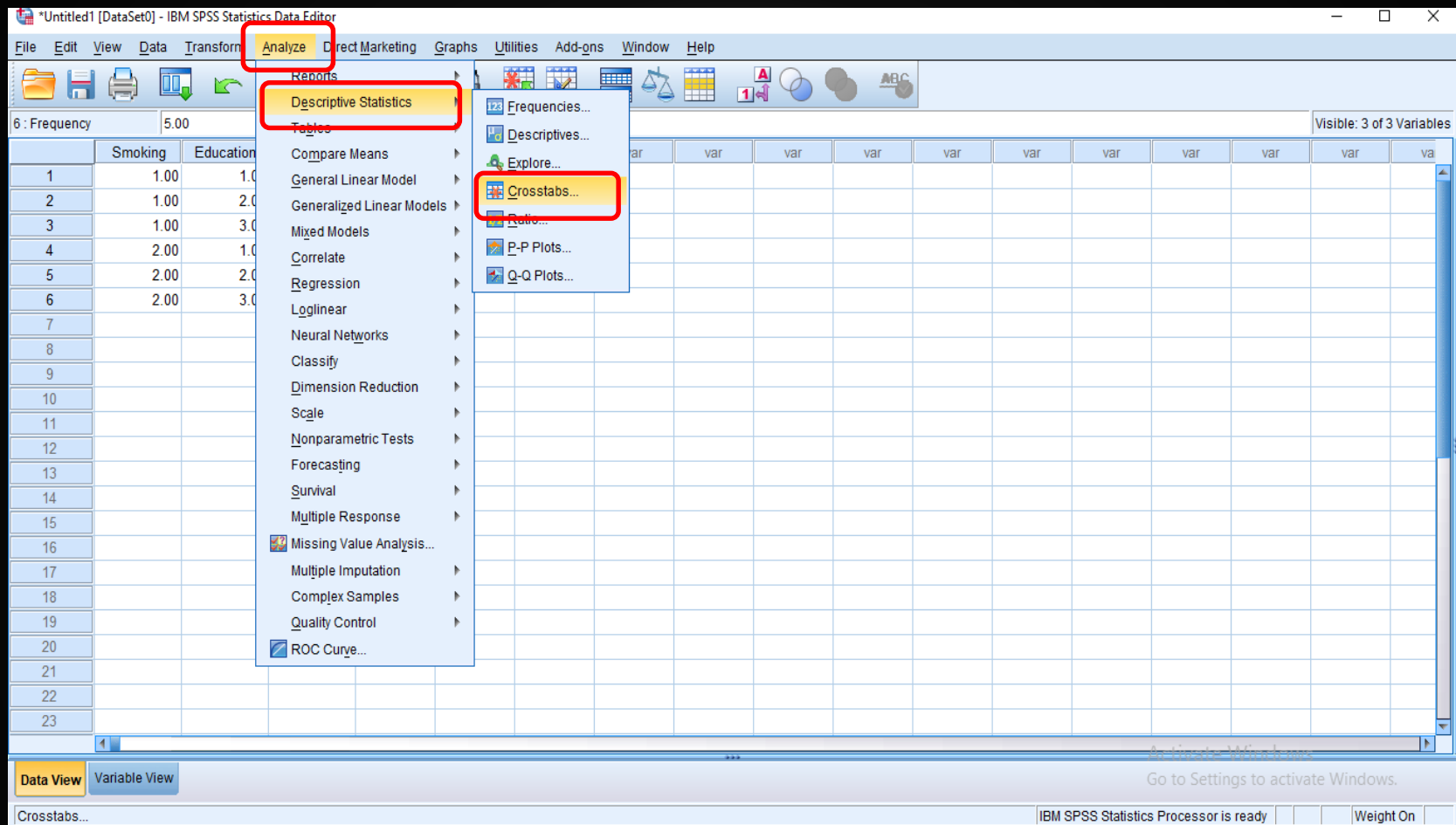
IBM SPSS Statistics Data Editor window showing a dataset with 3 variables: Smoking, Education, and Frequency. The 'Frequency' variable is highlighted in yellow in the data grid.

The 'Weight Cases' dialog box is open, showing the 'Weight cases by' option selected. The 'Frequency Variable' is set to 'Frequency'. The 'OK' button is highlighted.

Current Status: Do not weight cases

	Smoking	Education	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	13.00													
2	1.00	2.00	7.00													
3	1.00	3.00	6.00													
4	2.00	1.00	10.00													
5	2.00	2.00	9.00													
6	2.00	3.00	5.00													
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23																

IBM SPSS Statistics Processor is ready



*Untitled2 [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

4 : Frequency 55.00 Visible: 3 of 3 Variables

	Gender	Sport	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	70.00													
2	1.00	2.00	85.00													
3	2.00	1.00	90.00													
4	2.00	2.00	55.00													
5																
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15																
16																
17																
18																
19																
20																
21																
22																
23																

Crosstabs

Frequency

Row(s): Gender

Column(s): Sport

Layer 1 of 1

Previous Next

Display layer variables in table layers

☐ Display clustered bar charts

☐ Suppress tables

OK Paste Reset Cancel Help

Exact... Statistics... Cells... Format... Bootstrap...

Activate Windows

Go to Settings to activate Windows.

Data View Variable View

*Untitled2 [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

4 : Frequency 55.00 Visible: 3 of 3 Variables

	Gender	Sport	Frequency	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	70.00												
2	1.00	2.00	85.00												
3	2.00	1.00	90.00												
4	2.00	2.00	55.00												
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															

Crosstabs

Crosstabs: Statistics

Frequency

☒ Chi-square ☒ Correlations

Nominal

☐ Contingency coefficient ☐ Gamma

☐ Phi and Cramer's V ☐ Somers' d

☐ Lambda ☐ Kendall's tau-b

☐ Uncertainty coefficient ☐ Kendall's tau-c

Nominal by Interval

☐ Eta ☐ Kappa

☐ Risk

☐ McNemar

☐ Cochran's and Mantel-Haenszel statistics

Test common odds ratio equals: 1

☐ Display cluster ☐ Suppress table

Continue Cancel Help

OK Paste Reset Cancel Help

Exact... Statistics... Cells... Format... Bootstrap...

Activate Windows Go to Settings to activate Windows.

Data View Variable View

IBM SPSS Statistics Processor is ready. Weight On

*Output1 [Document1] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Gender Male 70 85 155
Female 90 55 145
Total 160 140 300

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.605 ^a	1	.003		
Continuity Correction ^b	7.939	1	.005		
Likelihood Ratio	8.652	1	.003		
Fisher's Exact Test				.004	.002
Linear-by-Linear Association	8.576	1	.003		
N of Valid Cases	300				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 67.67.
b. Computed only for a 2x2 table

Symmetric Measures

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval Pearson's R	-.169	.057	-2.966	.003 ^c
Ordinal by Ordinal Spearman Correlation	-.169	.057	-2.966	.003 ^c
N of Valid Cases	300			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

Activate Windows
Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

Less than 0.05 .
significance level

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	8.605 ^a	1	.003		
Continuity Correction ^b	7.939	1	.005		
Likelihood Ratio	8.652	1	.003		
Fisher's Exact Test				.004	.002
Linear-by-Linear Association	8.576	1	.003		
N of Valid Cases	300				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 67.67.

b. Computed only for a 2x2 table

Statistical decision

The resulting probability value of the test is 0.03, which is a value less than 0.05 (the level of significance), so we accept the alternative hypothesis that there is a relationship between gender (male - female) and exercise and that they are two dependent variables

*Output1 [Document1] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Gender Male Play 70 Not play 85 Total 155
 Female 90 55 145
 Total 160 140 300

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.605 ^a	1	.003		
Continuity Correction ^b	7.939	1	.005		
Likelihood Ratio	8.652	1	.003		
Fisher's Exact Test				.004	.002
Linear-by-Linear Association	8.576	1	.003		
N of Valid Cases	300				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 67.67.
 b. Computed only for a 2x2 table

Symmetric Measures

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval Pearson's R	-.169	.057	-2.966	.003 ^c
Ordinal by Ordinal Spearman Correlation	-.169	.057	-2.966	.003 ^c
N of Valid Cases	300			

a. Not assuming the null hypothesis.
 b. Using the asymptotic standard error assuming the null hypothesis.
 c. Based on normal approximation.

Activate Windows
 Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

The correlation coefficient indicates the existence of a relationship between the two variables, regardless of the degree, strength and type of correlation

Symmetric Measures

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.	
Interval by Interval	Pearson's R	-.169	.057	-2.966	.003 ^c
Ordinal by Ordinal	Spearman Correlation	-.169	.057	-2.966	.003 ^c
N of Valid Cases	300				

Example: The following table shows the relationship between gender (male - female) and the number of traffic violations committed as a result of being busy with the mobile while driving for a sample of 136 respondents, and it is required to know whether gender and the commission of a traffic violation as a result of using a mobile phone while driving are independent variables or is there a relationship between them?

Traffic Violation Gender	Low	Medium	High	Total
Male	20	18	16	54
Female	26	32	24	82
Total	46	50	40	136

Null Hypothesis

**Gender (male - female) and the number of traffic violations committed as a result of being busy with mobile are two independent variables
(there is no relationship between them)**

Alternative Hypothesis

Gender (male - female) and the number of traffic violations committed as a result of being busy with mobile are two dependent variables (there is a relationship between them)

*Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

6 : Frequency 40.00 Visible: 3 of 3 Variables

	Gender	Traffic	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	20.00														
2	1.00	2.00	18.00														
3	1.00	3.00	16.00														
4	2.00	1.00	26.00														
5	2.00	2.00	50.00														
6	2.00	3.00	40.00														
7																	
8																	
9																	
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21																	
22																	
23																	

Data View Variable View

Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

*Output1 [Document1] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Output

- Log
- Crosstabs
 - Title
 - Notes
 - Active Dataset
 - Case Processing
 - Gender * Traffic C
 - Chi-Square Tests
 - Symmetric Measu

Crosstabs

[DataSet0]

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Traffic	136	100.0%	0	0.0%	136	100.0%

Gender * Traffic Crosstabulation

Count

		Traffic			Total
		Low	Med	High	
Gender	Male	20	18	16	54
	Female	26	32	24	82
Total		46	50	40	136

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.562 ^a	2	.755
Likelihood Ratio	.562	2	.755
Linear-by-Linear Association	.127	1	.722
N of Valid Cases	136		

^a .0 cells (.0%) have expected count less than 5. The minimum expected count is 15.88.

Activate Windows
Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.562 ^a	2	.755
Likelihood Ratio	.562	2	.755
Linear-by-Linear Association	.127	1	.722
N of Valid Cases	136		

a. 0 cells (.00%) have expected count less than 5. The

Statistical decision

The resulting probabilistic value of the test is 0.755, which is a value greater than 0.05 (the level of significance), so we accept the null hypothesis that there is no relationship between gender (male - female) and the number of traffic violations committed as a result of being busy with the mobile, meaning that they are two independent variables

Example: The following table shows the relationship between the level of education and employment for a sample of 1000 people. It is required to know whether the level of education and employment are independent variables or is there a relationship between them?

Education level Working	Less than Secondary	Graduate	Postgraduate	Total
Work	50	450	80	580
With out work	350	50	20	420
Total	400	500	100	1000

Null Hypothesis

The level of education and employment are two independent variables

(there is no relation between them)

Alternative Hypothesis

Education and employment level are two dependent variables

(there is a relationship between them)

*Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Education	Numeric	8	2		{1.00, Basic...	None	8	Right	Ordinal	Input
2	Work	Numeric	8	2		{1.00, yes}...	None	8	Right	Nominal	Input
3	Frequency	Numeric	8	2		None	None	8	Right	Scale	Input
4											
5											
6											
7											
8											
9											
10											
11											
12											
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29											
30											
31											

Data View Variable View

IBM SPSS Statistics Processor is ready

ENG 1:05 PM 11/16/2019

Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

6 : Frequency 20.00 Visible: 3 of 3 Variables

	Education	Work	Frequency	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var	var
1	1.00	1.00	50.00																
2	1.00	2.00	350.00																
3	2.00	1.00	450.00																
4	2.00	2.00	50.00																
5	3.00	1.00	80.00																
6	3.00	2.00	20.00																
7																			
8																			
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27																			
28																			
29																			

Data View Variable View

IBM SPSS Statistics Processor is ready

1:06 PM 11/16/2019

أقل من مستوى
الدلالة 0.05

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	569.992 ^a	2	.000
Likelihood Ratio	634.004	2	.000
Linear-by-Linear Association	416.260	1	.000
N of Valid Cases	1000		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 42.00.

Statistical decision

The resulting probability value of the test is 0.00, which is a value less than 0.05 (the level of significance), so we accept the alternative hypothesis that there is a relationship between the level of education and employment and that they are two dependent variables

The correlation coefficient indicates the existence of a relationship between the two variables, regardless of the degree, strength and type of correlation

Symmetric Measures

		Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Interval by Interval	Pearson's R	-.646	.025	-26.700	.000 ^c
Ordinal by Ordinal	Spearman Correlation	-.690	.024	-30.129	.000 ^c
N of Valid Cases		1000			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Example: The given questionnaire is required to know whether the gender (male - female) and the educational level of the 30 respondents are independent variables, or is there a relationship between them?

Nationality			Education level			
Egyptian	1		1	Less than Secondary		
Arab	2		2	Secondary		
foreigners	3		3	Graduate		
			4	Postgraduate		
Gender						
1	Male				City	
2	Female			1	Cairo	
				2	Alex	
				3	Aswan	
				4	Hurghada	

X1				X2			
1	Strongly Disagree			1	Strongly Disagree		
2	Disagree			2	Disagree		
3	Not Sure			3	Not Sure		
4	Agree			4	Agree		
5	Strongly Agree			5	Strongly Agree		
X1		Satisfication with place		X2		Satisfication with services	
X4				X3			
1	Strongly Disagree			1	Strongly Disagree		
2	Disagree			2	Disagree		
3	Not Sure			3	Not Sure		
4	Agree			4	Agree		
5	Strongly Agree			5	Strongly Agree		
X4	performance satisfaction			X3	Satisfaction with the employees		

Number	City	Gender	Education level	Nationality	X1	X2	X3	X4	
1	1	1	1	3	1	5	4	2	2
2	2	3	2	2	1	3	3	3	3
3	3	2	2	1	1	5	4	4	4
4	4	1	2	1	2	4	5	5	1
5	5	2	1	2	1	5	5	5	2
6	6	1	1	2	3	4	4	2	1
7	7	1	2	3	1	5	5	4	2
8	8	4	1	2	2	4	2	2	5
9	9	1	2	4	1	3	5	3	5
10	10	2	1	3	1	5	4	5	2
11	11	1	1	2	1	1	5	2	2
12	12	2	2	1	2	2	2	2	2
13	13	1	2	2	1	4	2	2	2
14	14	2	2	2	3	5	3	3	3
15	15	1	1	2	2	3	2	2	2
16	16	3	1	1	1	4	1	1	1
17	17	3	2	4	3	5	1	5	5
18	18	1	2	1	2	5	5	4	4
19	19	2	1	1	3	3	3	5	5
20	20	1	2	1	2	3	3	5	4
21	21	3	1	3	1	5	5	5	2
22	22	2	1	4	1	4	4	2	1
23	23	1	2	3	1	5	5	4	2
24	24	4	1	4	2	4	2	2	5
25	25	2	2	2	1	3	5	3	5
26	26	3	1	3	2	5	4	5	2
27	27	1	2	4	1	1	5	2	2
28	28	1	2	2	3	5	1	2	4
29	29	2	1	3	1	5	3	5	5
30	30	3	1	4	2	5	3	3	2

Anova Total2019.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

29 : q4 1.00 Visible: 7 of 7 Variables

	q1	q2	q3	q4	x1	x2	x3	var	var	var	var	var	var	var	var	var
1	1.00	1.00	4.00	1.00	5.00	4.00	2.00									
2	2.00	2.00	2.00	1.00	3.00	3.00	3.00									
3	1.00	2.00	1.00	1.00	5.00	4.00	4.00									
4	2.00	2.00	1.00	2.00	5.00	5.00	5.00									
5	1.00	1.00	2.00	1.00	1.00	5.00	5.00									
6	1.00	1.00	4.00	3.00	4.00	4.00	4.00									
7	1.00	2.00	4.00	1.00	4.00	4.00	4.00									
8	1.00	1.00	4.00	2.00	4.00	3.00	4.00									
9	1.00	2.00	4.00	1.00	5.00	5.00	5.00									
10	2.00	1.00	3.00	1.00	4.00	2.00	4.00									
11	1.00	2.00	2.00	1.00	2.00	2.00	2.00									
12	2.00	2.00	1.00	2.00	2.00	2.00	2.00									
13	1.00	1.00	1.00	3.00	2.00	2.00	2.00									
14	2.00	1.00	2.00	1.00	3.00	5.00	3.00									
15	1.00	1.00	2.00	3.00	3.00	5.00	3.00									
16	3.00	1.00	3.00	1.00	4.00	4.00	5.00									
17	2.00	1.00	4.00	3.00	5.00	5.00	5.00									
18	2.00	1.00	1.00	1.00	5.00	5.00	4.00									
19	2.00	1.00	1.00	2.00	2.00	4.00	5.00									
20	1.00	2.00	2.00	2.00	3.00	3.00	3.00									
21	4.00	2.00	1.00	3.00	3.00	2.00	3.00									
22	1.00	1.00	4.00	2.00	4.00	4.00	3.00									
23	2.00	1.00	1.00	3.00	5.00	3.00	5.00									

1

Data View Variable View

Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

Education level Gender	Less than Secondary	Secondary	Graduate	Postgraduate	Total
Male					
Female					
Total					

Null Hypothesis

**Gender (male-female) and Education level are two independent variables
(there is no relation between them)**

Alternative Hypothesis

Gender (male - female) and Education level are two dependent variables (there is a relationship between them)

Anova Total2019.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Visible: 7 of 7 Variables

	q1	q2	q3	q4	x1	x2	x3	var	var	var	var	var	var	var	var	var
1	1.00	1.00	4.00	1.00	5.00	4.00	2.00									
2	2.00	2.00	2.00	1.00	3.00	3.00	3.00									
3	1.00	2.00	1.00	1.00	5.00	4.00	4.00									
4	2.00	2.00	1.00	2.00	5.00	5.00	5.00									
5	1.00	1.00	2.00	1.00	1.00	5.00	5.00									
6	1.00	1.00	4.00	3.00	4.00	4.00	4.00									
7	1.00	2.00	4.00	1.00	4.00	4.00	4.00									
8	1.00	1.00	4.00	2.00	4.00	3.00	4.00									
9	1.00	2.00	4.00	1.00	5.00	5.00	5.00									
10	2.00	1.00	3.00	1.00	4.00	2.00	4.00									
11	1.00	2.00	2.00	1.00	2.00	2.00	2.00									
12	2.00	2.00	1.00	2.00	2.00	2.00	2.00									
13	1.00	1.00	1.00	3.00	2.00	2.00	2.00									
14	2.00	1.00	2.00	1.00	3.00	5.00	3.00									
15	1.00	1.00	2.00	3.00	3.00	5.00	3.00									
16	3.00	1.00	3.00	1.00	4.00	4.00	5.00									
17	2.00	1.00	4.00	3.00	5.00	5.00	5.00									
18	2.00	1.00	1.00	1.00	5.00	5.00	4.00									
19	2.00	1.00	1.00	2.00	2.00	4.00	5.00									
20	1.00	2.00	2.00	2.00	3.00	3.00	3.00									
21	4.00	2.00	1.00	3.00	3.00	2.00	3.00									
22	1.00	1.00	4.00	2.00	4.00	4.00	3.00									
23	2.00	1.00	1.00	3.00	5.00	3.00	5.00									

Data View Variable View

Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

Anova Total2019.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform **Analyze** Direct Marketing Graphs Utilities Add-ons Window Help

Reports
Descriptive Statistics
Tables
Compare Means
General Linear Model
Generalized Linear Models
Mixed Models
Correlate
Regression
Loglinear
Neural Networks
Classify
Dimension Reduction
Scale
Nonparametric Tests
Forecasting
Survival
Multiple Response
Missing Value Analysis...
Multiple Imputation
Complex Samples
Quality Control
ROC Curve...

Custom Tables...
Multiple Response Sets...

Visible: 7 of 7 Variables

	q1	q2	var	var	var	var	var	var	var	var	var
1	1.00	1.00									
2	2.00	2.00									
3	1.00	2.00									
4	2.00	2.00									
5	1.00	1.00									
6	1.00	1.00									
7	1.00	2.00									
8	1.00	1.00									
9	1.00	2.00									
10	2.00	1.00									
11	1.00	2.00									
12	2.00	2.00									
13	1.00	1.00									
14	2.00	1.00									
15	1.00	1.00									
16	3.00	1.00									
17	2.00	1.00									
18	2.00	1.00									
19	2.00	1.00									
20	1.00	2.00									
21	4.00	2.00	1.00	3.00	3.00	2.00	3.00				
22	1.00	1.00	4.00	2.00	4.00	4.00	3.00				
23	2.00	1.00	1.00	3.00	5.00	3.00	5.00				

1

Data View Variable View

Go to Settings to activate Windows.

Custom Tables... IBM SPSS Statistics Processor is ready

Drag Education level variable

Drag Gender variable

Anova Tot [2019.sav [DataSet1]] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Custom Tables

Table Titles Test Statistics Options

Variables:

- City [q1]
- Sex [q2]
- Education [q3]
- nation [q4]
- General [x1]
- Night [x2]
- Travel [x3]

Columns

Rows

Define

N% Summary Statistics...

Categories and Totals...

Summary Statistics

Position: Columns Hide

Source:

Category Position: Default

OK Paste Reset Cancel Help

Visible: 7 of 7 Variables

	q1	q2	q3
1	1.00	1.00	4.00
2	2.00	2.00	2.00
3	1.00	2.00	1.00
4	2.00	2.00	1.00
5	1.00	1.00	2.00
6	1.00	1.00	4.00
7	1.00	2.00	4.00
8	1.00	1.00	4.00
9	1.00	2.00	4.00
10	2.00	1.00	3.00
11	1.00	2.00	2.00
12	2.00	2.00	1.00
13	1.00	1.00	1.00
14	2.00	1.00	2.00
15	1.00	1.00	2.00
16	3.00	1.00	3.00
17	2.00	1.00	4.00
18	2.00	1.00	1.00
19	2.00	1.00	1.00
20	1.00	2.00	2.00
21	4.00	2.00	1.00
22	1.00	1.00	4.00
23	2.00	1.00	1.00

Data View Variable View

Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

Anova Total2019.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Custom Tables

Table Titles Test Statistics Options

Variables: City [q1] Sex [q2] Education [q3] nation [q4] Genaeral [x1] Night [x2] Travel [x3]

Columns

Sex	
M	F
Count	Count
nnnn	nnnn

Rows

Define

Summary Statistics

Position: Columns Hide

Source: Column Variables

Category Position: Default

OK Paste Reset Cancel Help

Visible: 7 of 7 Variables

Data View Variable View

Go to Settings to activate Windows.

IBM SPSS Statistics Processor is ready

IBM SPSS Statistics Data Editor window showing a dataset named "Anova Total2019.sav [DataSet1]". The main data grid displays 29 rows and 17 columns. The first five columns are labeled q1, q2, q3, q4, and x1, followed by x2, x3, and several columns labeled "var". The data values are numerical, ranging from 1.00 to 5.00.

A "Custom Tables" dialog box is open, showing the configuration for a pivot table. The "Variables" list on the left includes City [q1], Gender [q2], Education [q3], nation [q4], Genaeral [x1], Night [x2], and Travel [x3]. The "Columns" section shows a table structure with "Gender" as the column header, split into "M" and "F", and "Count" as the row header. The "Rows" section shows "Education" as the row header, split into "Before ...", "Secondary", "University", and "post ...".

The "Define" section includes options for "Summary Statistics" (Position: Columns, Source: Column Variables) and "Categories and Totals" (Position: Columns, Source: Column Variables). The "Category Position" is set to "Default".

The "Data View" tab is selected at the bottom of the window.

25-6-2021.sav [DataSet2] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Visible: 8 of 8 Variables

	Q1	Q2
1	1.00	1.00
2	1.00	2.00
3	1.00	2.00
4	2.00	2.00
5	1.00	1.00
6	3.00	1.00
7	1.00	2.00
8	2.00	1.00
9	1.00	2.00
10	1.00	1.00
11	1.00	1.00
12	2.00	2.00
13	1.00	2.00
14	3.00	2.00
15	2.00	1.00
16	1.00	1.00
17	3.00	2.00
18	2.00	2.00
19	3.00	1.00
20	2.00	2.00
21	1.00	1.00
22	1.00	1.00
23	1.00	2.00
24	2.00	1.00
25	1.00	2.00
26	2.00	1.00
27	1.00	2.00
28	3.00	2.00
29	1.00	1.00

*Output3 [Document3] - IBM SPSS Statistics Viewer

File Edit View Data Transform Insert Format Analyze Direct Marketing Graphs Utilities Add-ons Window Help

Output
Log
Custom Tables
Title
Notes
Active Dataset
Table 1

DATASET ACTIVATE DataSet2.
* Custom Tables.
CTABLES
/VARIABLES=Q3 Q2 DISPLAY=LABEL
/TABLE Q3 BY Q2 [COUNT F40.0]
/CATEGORIES VARIABLES=Q3 Q2 ORDER=A KEY=VALUE EMPTY=INCLUDE.

→ Custom Tables

[DataSet2] C:\Users\Dr.Al Faisal\Documents\25-6-2021.sav

		Gender	
		Male	Female
		Count	Count
Education Level	Less than Secondary	2	5
	Secondary	5	5
	Graduate	5	2
	Postgraduate	3	3

IBM SPSS Statistics Processor is ready

Data View Variable View

IBM SPSS Statistics Processor is ready

Type here to search

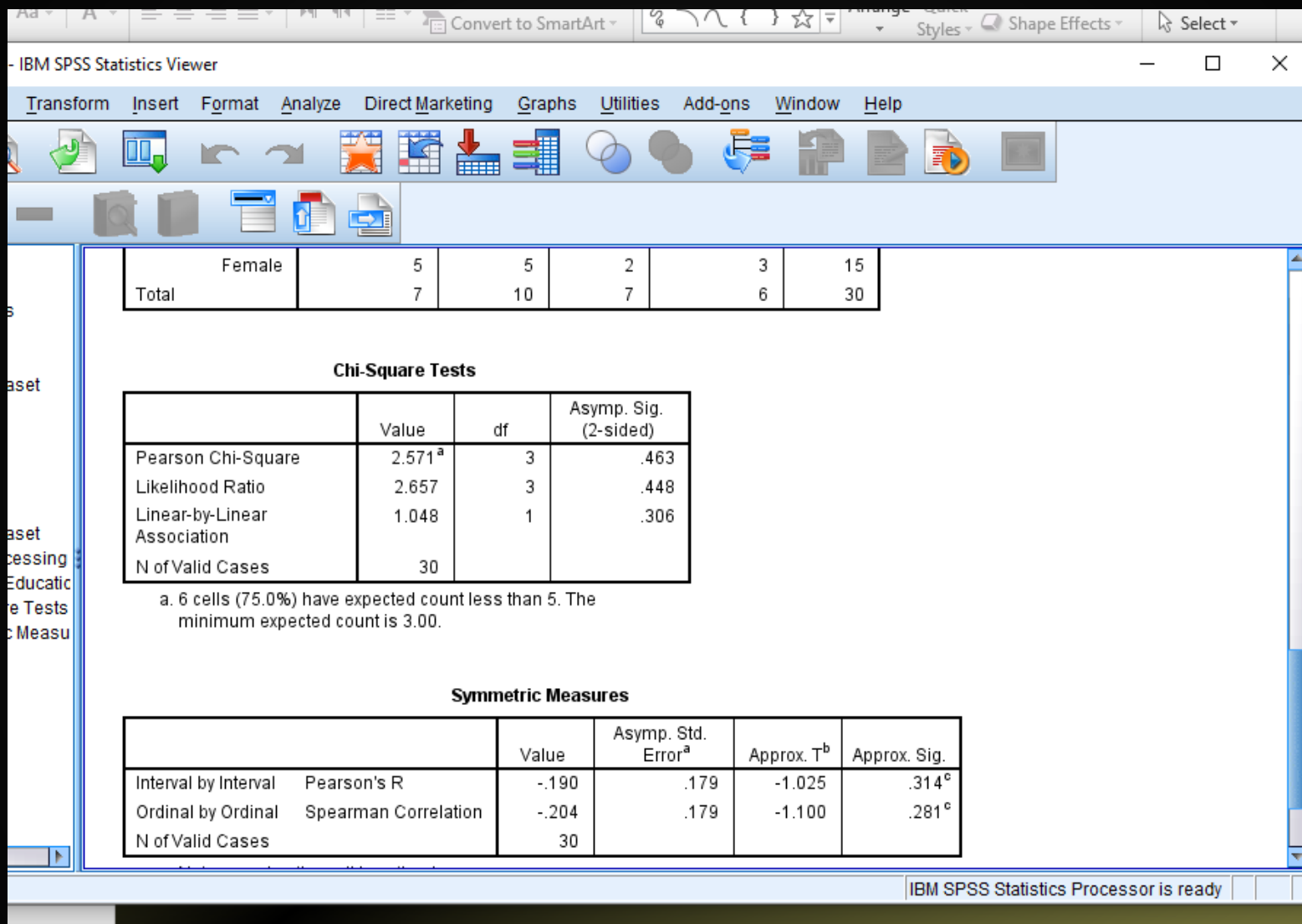
33°C Sunny 2:10 PM 6/27/2021

		Gender	
		Male	Female
		Count	Count
Education Level	Less than Secondary	2	5
	Secondary	5	5
	Graduate	5	2
	Postgraduate	3	3

Education level Gender	Less than Secondary	Secondary	Graduate	Postgraduate	Total
Male					
Female					
Total					

Education level Gender	Less than Secondary	Secondary	Graduate	Postgraduate	Total
Male	2	5	5	3	15
Female	5	5	2	3	15
Total	7	10	7	6	30





Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.571 ^a	3	.463
Likelihood Ratio	2.657	3	.448
Linear-by-Linear Association	1.048	1	.306
N of Valid Cases	30		

a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is 3.00.

Statistical decision

The resulting probabilistic value of the test is 0.463, which is a value greater than 0.05 (the level of significance), so we accept the null hypothesis that there is no relationship between gender (male - female) and educational level, that is, they are two independent variables

