

Running chi-square test of independence in a 2x2 contingency table (summarized data)

Example 1: In a recent study, 69 women and 111 men were asked to disclose their political party of preference between Labour and Conservative and the frequency with which each party was chosen was recorded for both groups. Test if 'preference for party' is independent of gender of the person.

Party	Gender	
	M	F
L	50	70
C	19	41

The chi-square test for independence can be run in SPSS as follows:

1) Input data is

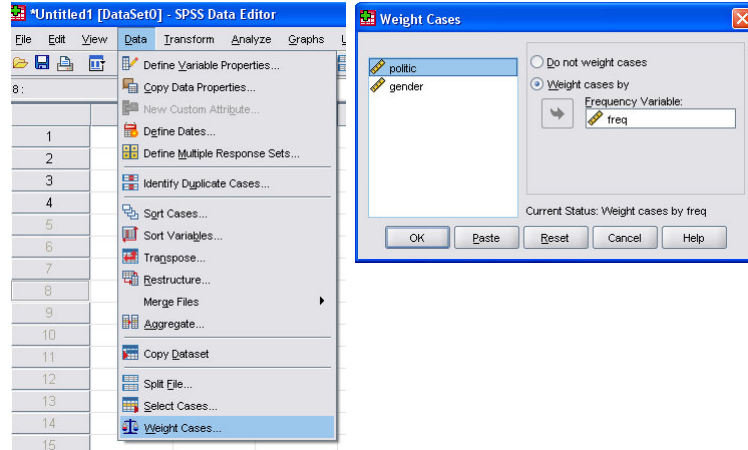
	Gender	
	M	F
L	50	70
C	19	41

Type input data in SPSS as follows:

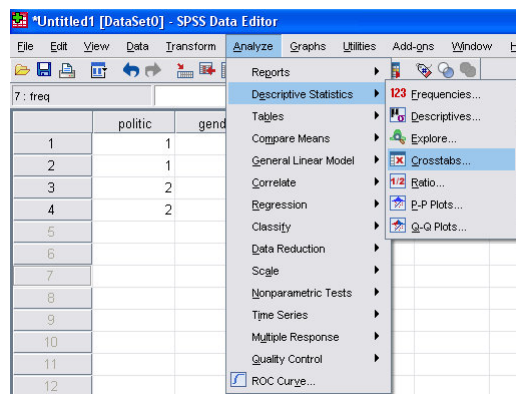
The screenshot shows the SPSS Data Editor window titled '*Untitled1 [DataSet0] - SPSS Data Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, and Utilities. The toolbar contains various icons for file operations and data manipulation. The data grid shows the following input data:

	politic	gender	freq
1	1	1	50
2	1	2	70
3	2	1	19
4	2	2	41
5			

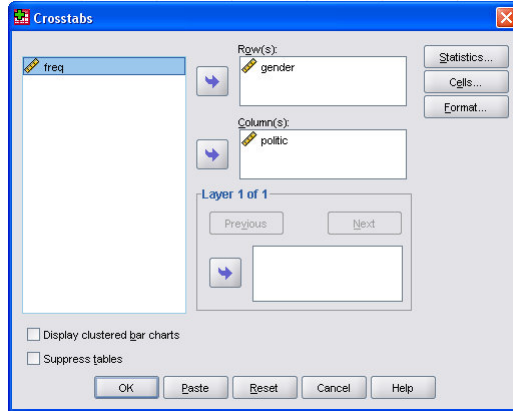
To tell SPSS that the 3rd column contains the frequencies, apply weight to cases:
Data/Weight Cases



In SPSS: Analyze/Descriptive Statistics/Crosstabs



In SPSS: Analyze/Descriptive Statistics/Crosstabs.
 Click on Statistics/select "chi-square"
 Then choose the following inputs, and click on OK.



This will give
 produce the
 following output:

gender * politic Crosstabulation

Count	politic			Total
	1	2		
gender	1	50	19	69
	2	70	41	111
Total		120	60	180

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.692 ^a	1	.193		
Continuity Correction ^b	1.296	1	.255		
Likelihood Ratio	1.716	1	.190		
Fisher's Exact Test				.255	.127
Linear-by-Linear Association	1.683	1	.195		
N of Valid Cases ^b	180				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 23.00.

b. Computed only for a 2x2 table

.127 > .05
 Do not reject null.

Example 2 (Chi-square test for raw data)
 Results of a survey are given in the data file
 manners.sav (on CD that comes with spss book)

In this survey, people were asked what is more important
 to society:

- (1) Allowing people freedom of expression/tolerate bad
 manners
- (2) Enforcing good manners/limit freedom of expression

Test

H_0 : Answer to the question on manners is independent of
 the Sex of person,

H_1 : null is false

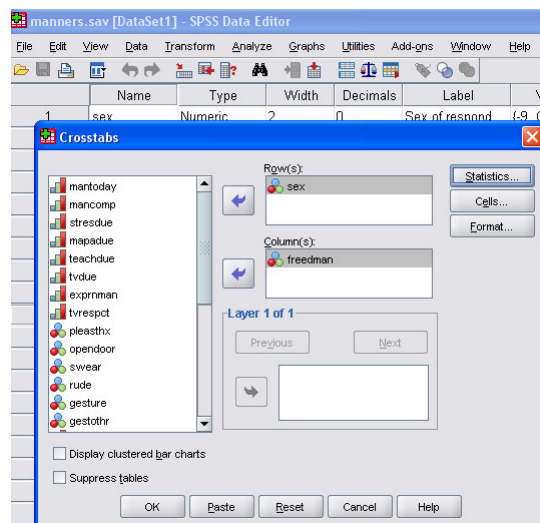
STATS24x7.com © 2010 ADI-NV, INC.

7

Example 2: To run chi-square test of independence on
 RAW DATA (continued)

Open the data file
 manners.sav in SPSS,
 Then
 Analyze/Descriptive/
 Crosstabs/Statistics
 (select chi-square)

Select Row and Column
 variables, then click on
 OK to obtain:



STATS24x7.com © 2010 ADI-NV, INC.

8

**Sex of respondent * Which is more important to society:
Crosstabulation**

Count		Which is more important to society:			Total
		Allowing people freedom of expression/tolerate bad manners	Enforcing good manners/limit freedom of expression		
Sex of respondent	Male	268	195	463	
	Female	232	240	472	
Total		500	435	935	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.161 ^a	1	.007		
Continuity Correction ^b	6.815	1	.009		
Likelihood Ratio	7.171	1	.007		
Fisher's Exact Test				.009	.005
Linear-by-Linear Association	7.154	1	.007		
N of Valid Cases ^b	935				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 215.41.
b. Computed only for a 2x2 table

CONCLUSION from SPSS output on Slide 12 ?

CHI-SQUARE TEST OF HOMOGENEITY OF PROPORTIONS
 can also be run in SPSS in a similar manner.

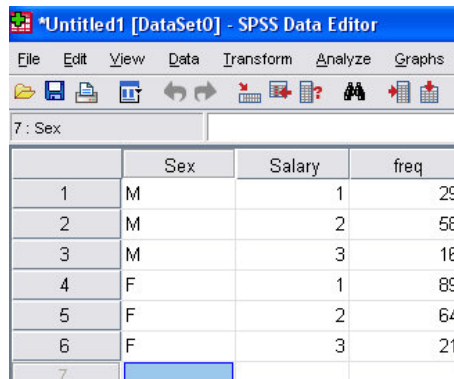
Example 3:

A total of 277 travel professionals were asked their opinion on 'fairness' of his/her salary. The following data was collected from this survey:

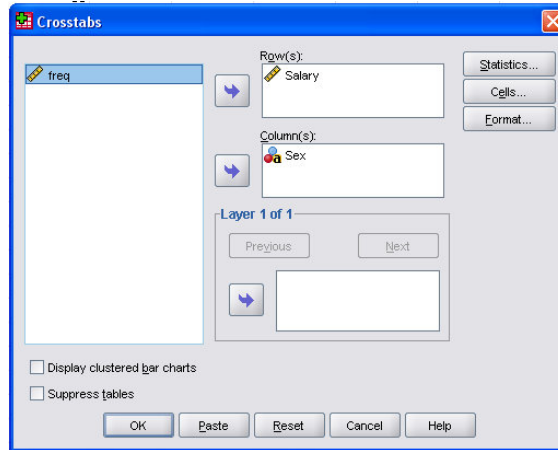
	Males	Females	TOTAL
Salary too low	29	89	118
Equitable/fair	58	64	122
Paid well	16	21	37
TOTAL	103	174	277

Do you think that probabilities of choosing the 3 answers are equal for Males and Females?

(1) Type data in SPSS as follows.



(2) Analyze/Descriptive Statistics/Crosstabs, then select variables as shown below.
 (3) Click on Statistics and select chi-square., then click OK.



Salary * Sex Crosstabulation

Count		Sex		Total
		F	M	
Salary	1	89	29	118
	2	64	58	122
	3	21	16	37
	Total	174	103	277

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.215 ^a	2	.001
Likelihood Ratio	14.551	2	.001
N of Valid Cases	277		

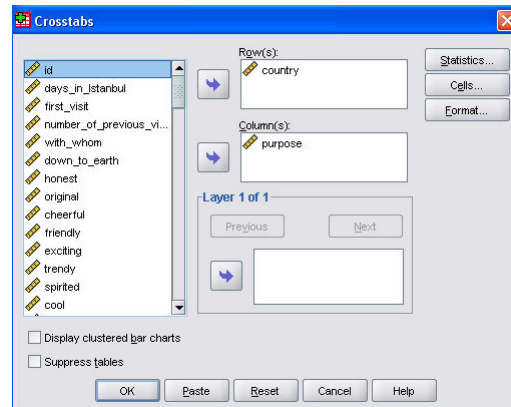
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.76.

CONCLUSION from SPSS output on Slide 17 ?

Note that calculations for chi-square test of homogeneity are identical to the calculations in the case of chi-square test of independence.

Example 4: Use data file image.sav and test if “country of visitor “ and “purpose of visit” are independent.

- (1) Analyze/Descriptive Statistics/Crosstabs, then select variables as shown below.
- (2) Click on Statistics and select chi-square., then click OK.



country * purpose Crosstabulation							
Count		purpose					Total
		relaxation	fun	new things	business	other	
country	usa	8	7	23	4	3	45
	uk	1	12	21	0	2	36
	europa	48	21	55	3	12	139
	east asia	14	13	13	5	1	46
	Total	71	53	112	12	18	266

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.415 ^a	12	.000
Likelihood Ratio	41.617	12	.000
Linear-by-Linear Association	5.840	1	.016
N of Valid Cases	266		

a. 6 cells (30.0%) have expected count less than 5. The minimum expected count is 1.62.

CONCLUSION?

STATS24x7.com © 2010 ADI-NV, INC. 17