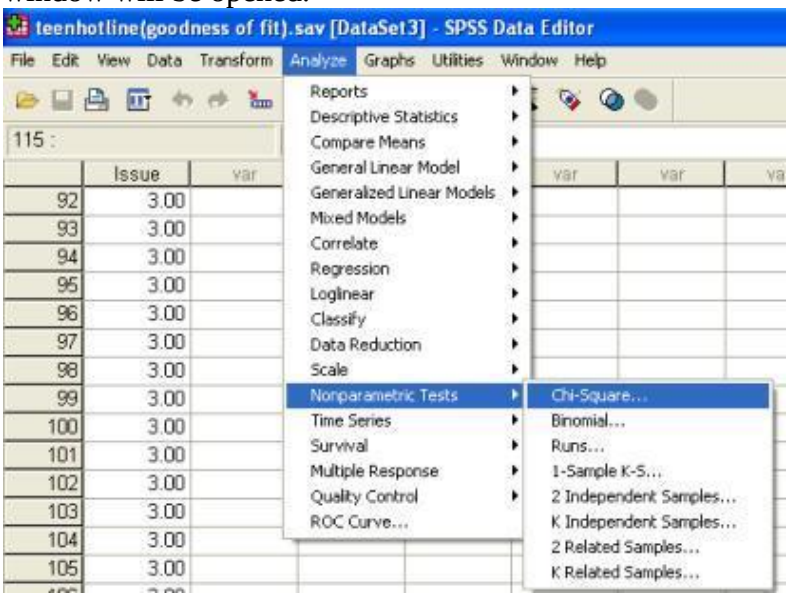
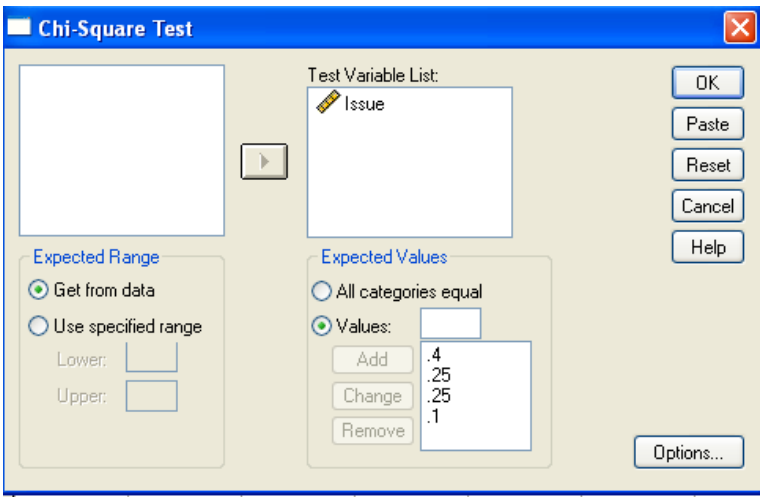
Goodness of Fit Test

Problem: Volunteers at a teen hotline have been assigned based on the assumption that 40% of all calls are drug related, 25% are sex related, 25% are stress related, and 10% concern educational issues. For this investigation each call is classified into one category based on the primary issue raised by the caller. The data is available at U:_MT Student File Area\hjkim\STAT380\SPSS tutorial\teenhotlines.sav. To test

$$H_o : p_1 = 0.4, p_2 = 0.25, p_3 = 0.25, p_4 = 0.1, \quad H_A : H_0 \text{ is false}$$

By clicking on the Analysis and Nonparametric Tests and Chi-square tests button, the crosstabs window will be opened.





We then move the variables into the appropriate areas (Test Variable List) and assign the Expected Values. Click ok. The Chi-square table will appear in the output window.

Issue

	Observed N	Expected N	Residual
Drugs	52	48.0	4.0
Sex	38	30.0	8.0
Stress	21	30.0	-9.0
Education	9	12.0	-3.0
Total	120		

Test Statistics

	Issue
Chi-Square(a)	5.917
df	3
Asymp. Sig.	.116

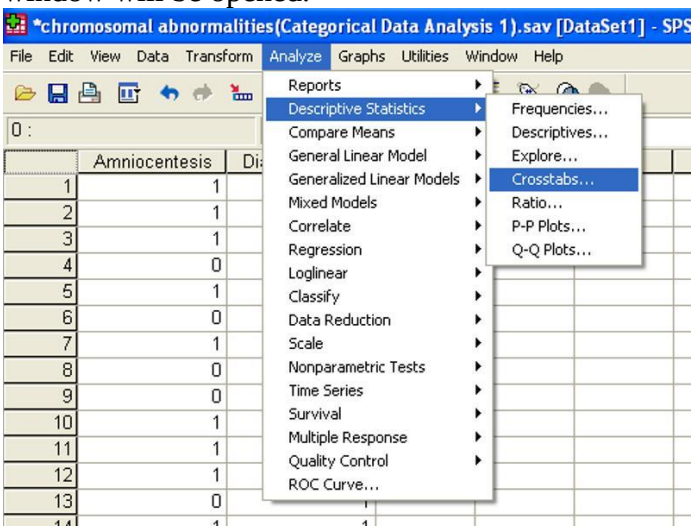
a 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 12.0.

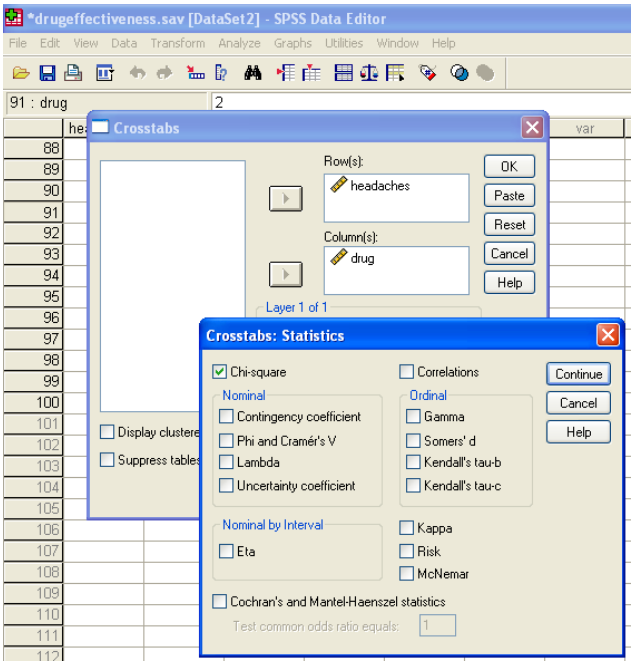
Here, the test statistics is 5.917 and the degrees of freedom is 3 and the p-value is .116. We fail to reject the null hypothesis because the p-value is larger than .05. We do not have significant evidence, α=0.05, to show that the distribution of topic issues in the class placed to the teen hotline is not as assumed.

Test of Independence

Problem: A new drug is being compared to an existing drug for its effectiveness in relating headache pain. One hundred subjects who suffer from chronic headaches are randomly assigned to either Group 1: Existing Drug, or Group 2: New Drug. Subjects do not know which drug they are taking in this experiment. Among 50 subjects assigned to Group 1, 28 reported relief from headache pain and among 50 subjects assigned to Group 2, 34 reported relief. Is there evidence of a significant relationship between the Drug and headache pain relief? (Compare the question in chapter 7.4. Is the proportion of subjects reporting relief under the New Drug significantly different from the proportion under the Existing Drug? See page 308.)

By clicking on the Analysis and Descriptive statistics and Crosstabs button, the crosstabs window will be opened.





We then move the variables into the appropriate areas (Row(s) or Column(s)). Click Statistics option at the bottom of the window. Crosstabs: Statistics window will appear. Then choose Chisquare at the top right corner. Click Continue and OK. The following table will appear in the output window.

headaches * drug Crosstabulation

Count

		drug		Total
		Exiting drug	New Drug	Exiting drug
Headaches	0	28	34	62
	1	22	16	38
Total		50	50	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.528(b)	1	.216		
Continuity Correction(a)	1.061	1	.303		
Likelihood Ratio	1.533	1	.216		
Fisher's Exact Test				.303	.151
Linear-by-Linear Association	1.513	1	.219		
N of Valid Cases	100				

a Computed only for a 2x2 table
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 19.00.

Here, the test statistics is 1.528 and p-value is .216. Thus, we fail to reject the null hypothesis. We do not have significant evidence to show that the Drug and headache relief are not independent.