

Chi-Square Goodness-of-Fit Test

The chi-square goodness-of-fit test is used to determine if a distribution of scores for one nominal variable meets expectations. The data collected is counts or frequency of occurrence at a particular level of the nominal variable. To explore this test, consider the following example.

Example:

Sickness is claimed to be a random event, thus one would expect that the proportion of sick days taken would be equally spread throughout the work week. We would like to test this claim for a particular company in Phoenix, Arizona. The following is a sample of the number of individuals who called in on the different days last year.

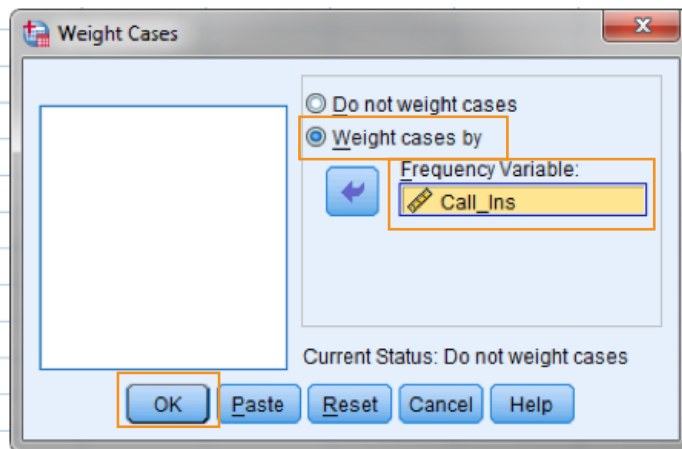
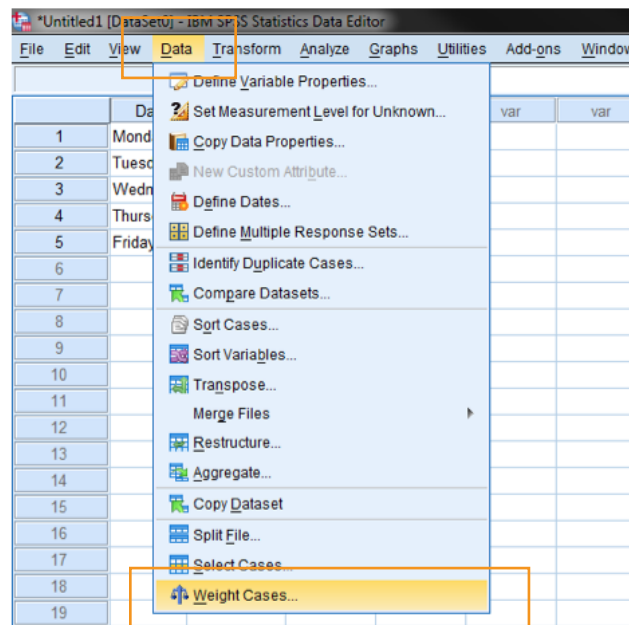
Monday	Tuesday	Wednesday	Thursday	Friday
20	24	37	23	29

	Day	Call_Ins	var	var
1	Monday	20		
2	Tuesday	24		
3	Wedne...	37		
4	Thursday	23		
5	Friday	29		

The analysis can be performed in SPSS. To do this, first we must enter the data into the data editor. You will need two columns. One for the nominal variable, Day, and one for the count, Call_Ins.

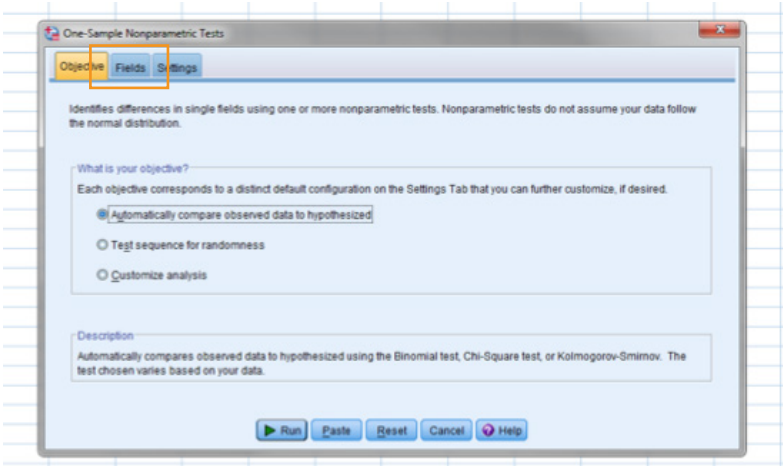
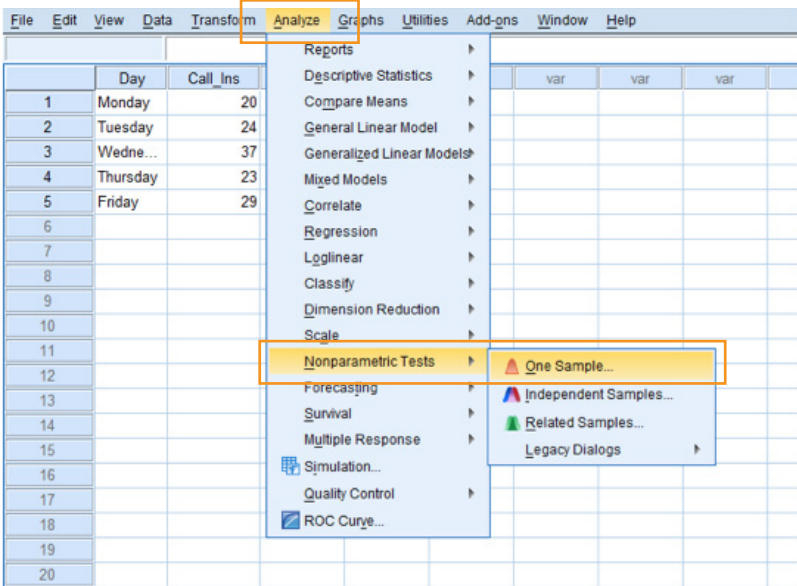
*Untitled1 [DataSet0] - IBM SPSS Statistics Data Editor											
	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	Day	String	9	0		None	None	6	Left	Nominal	Input
2	Call_Ins	Numeric	8	0		None	None	8	Right	Unknown	Input
3											
4											

When frequencies are entered into SPSS such as the case here with the number of call_ins per day of the week, you must tell SPSS that are being entered rather than raw data. To do this the **Weight Case** command must be used. Click on **Data** then **Weight Cases**.



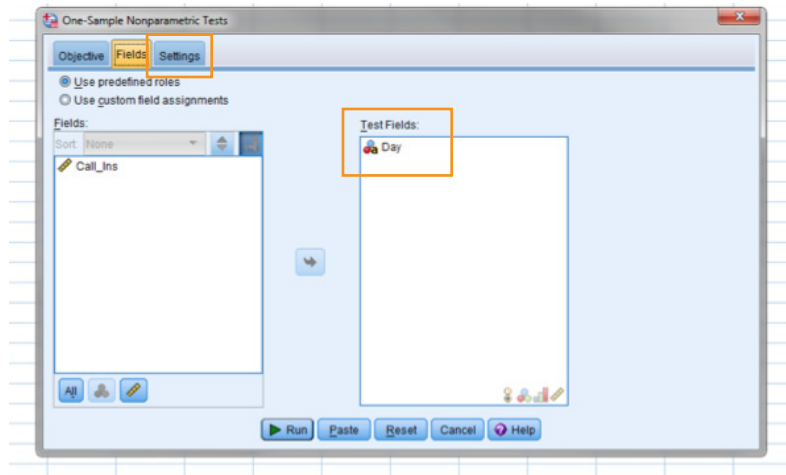
In the pop up window, select **weight cases by** and then move the Call_Ins variable over to **Frequency variable**. Then click **OK**.

Now the analysis can begin by selecting **Analysis – Nonparametric Tests – One Sample**.

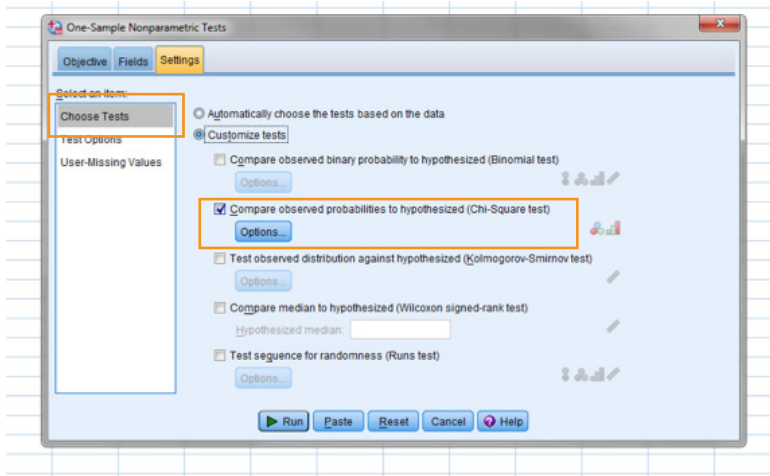


There are three tabs in the One-sample Nonparametric Tests window. Select the **Fields** tab.

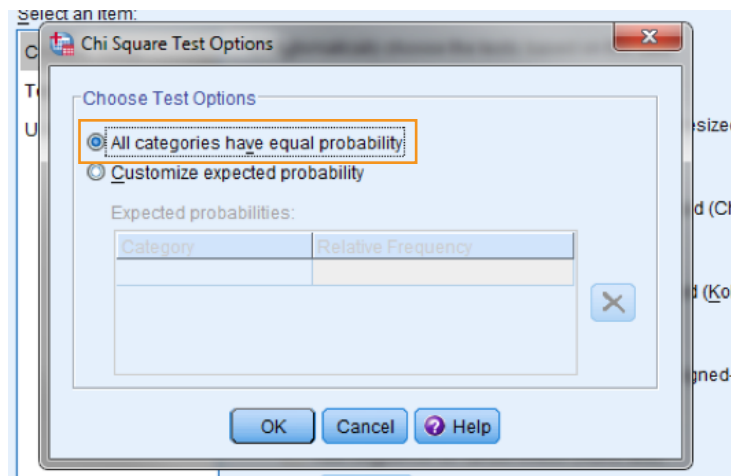
Ensure that Day is in the Test Fields box and then select the **Settings** tab.



Select **Customize tests**. Choose **Compare observed probabilities to hypothesized (Chi-Square test)**. Then click on the **options** box.



The default is **All categories have equal probability**. This is what is needed for this test, as we are interested in determining if the number of call-ins is the same for each day of the week. Click **OK** and then **Run**.



*Output1 [Document1] - IBM SPSS Statistics Viewer

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

Output

- Log
- Nonparametric Tests
 - Title
 - Notes
 - Active Dataset
 - Model Viewer

WEIGHT BY Call_Ins.
EXECUTE.
*Nonparametric Tests: One Sample.
NPTESTS
/ONESAMPLE TEST (Day) CHISQUARE(EXPECTED=EQUAL)
/MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
/CRITERIA ALPHA=0.05 CILEVEL=95.

➔ **Nonparametric Tests**

[DataSet0]

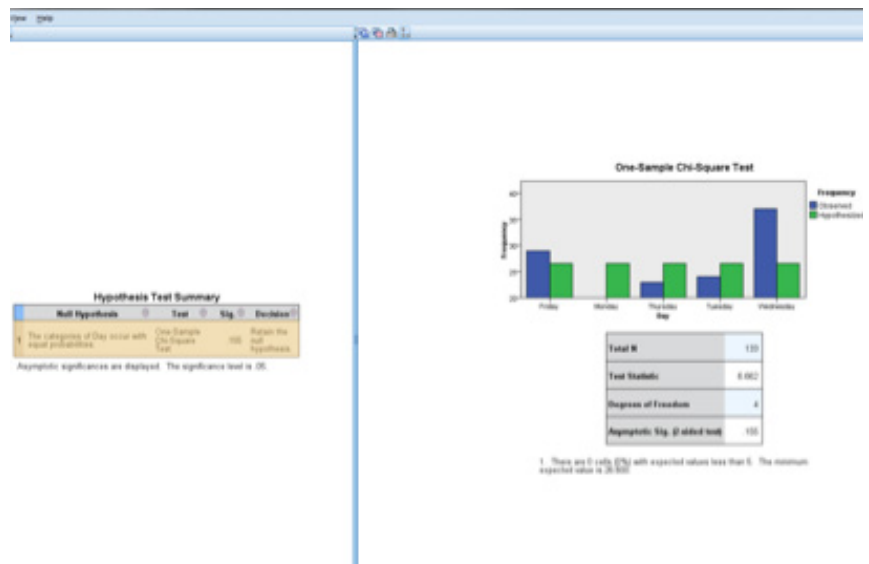
Hypothesis Test Summary

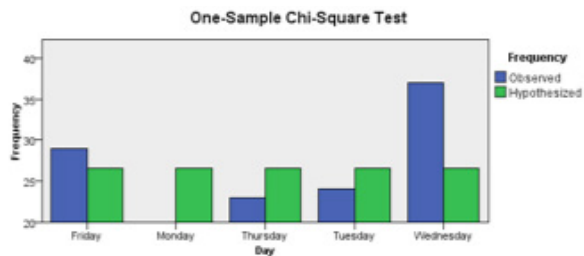
	Null Hypothesis	Test	Sig.	Decision
1	The categories of Day occur with equal probabilities.	One-Sample Chi-Square Test	.155	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

The output window will populate with the results of the test.

Double click on the Hypothesis Test Summary to get a more detailed output.





Total N	133
Test Statistic	6.662
Degrees of Freedom	4
Asymptotic Sig. (2-sided test)	.155

1. There are 0 cells (.0%) with expected values less than 5. The minimum expected value is 26.600.

The chi-square test statistic is 6.662 with a p-value of .156. Since this p-value is greater than the assumed level of significance of 0.05, this is not a significant result. This suggest there is not a statistically significant difference in the number of call_ins on the different days of the week at a level of significance of 0.05.