

Sign (Binomial) Test

Purpose: Sign (Binomial) Test is a nonparametric statistical procedure often performed for testing the median of a distribution. It can be used for data from non-normal populations.

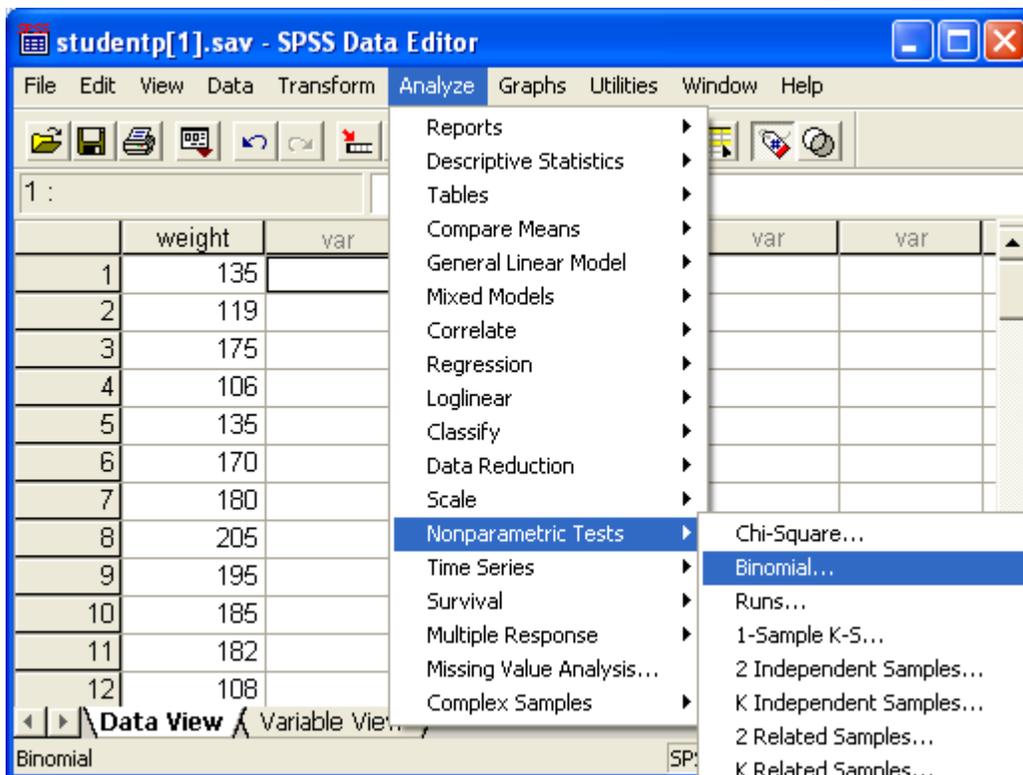
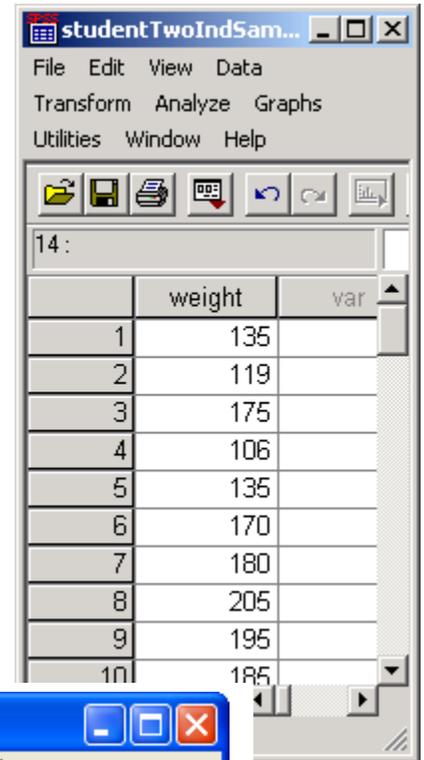
Example: To test whether the median weight of student population is different from 140 lb.

Data: A random sample of 22 students' weights from student population. Data file [studentp.sav](http://www.cc.yzu.edu/~ghchang/stat/studentp.sav) The web address for this file is <http://www.cc.yzu.edu/~ghchang/stat/studentp.sav>.

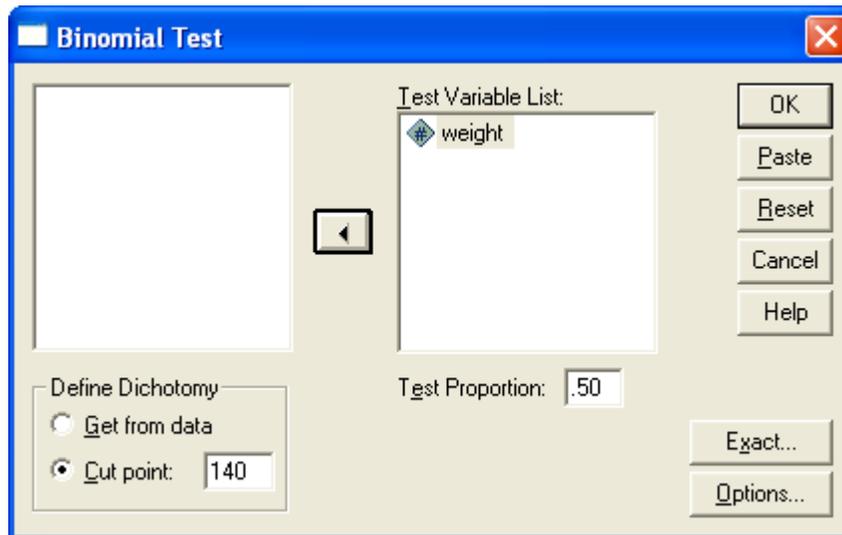
135	119	106	135	180	108	128	160	143	175	170
205	195	185	182	150	175	190	180	195	220	235

To perform Sign (Binomial) Test for the data above:

1. **Create data file:** Enter the data in SPSS, using the variable "weight" that takes up one column as shown in the picture on the right. (If there is data value that is equal to the median under null hypothesis, that would be 140, should be dropped and not to be entered.)
2. **Perform Sign Test:** In SPSS application window, click through the following menu selections **Analyze / Nonparametric Tests / Binomial** as shown in the following picture. The Binomial Test dialog box will appear on the screen.



In the Binomial dialog box, select and put weight in the Test Variable List box. Since the test is for testing whether the median value is 140 or not, the Cut point should be specified as 140. So, **Cut point bullet** should be checked and **140** should be entered in the **Cut point box**. Since the median value is to be tested therefore, in the **Test Proportion** box, the value **.05** should be entered to declare that the cut point 140 is the 0.5 quantile or the 50th percentile as stated in the null hypothesis. After selecting the test variable and specifying the test value, then click OK, SPSS will produce output for Binomial Test in the output window.



Interpret SPSS Output:

For two-tailed test: The statistics for the test are in the following table. The *p*-value of the two-tailed test is **.052** as indicated in the last column under the title Exact Sig. (2-tailed).

For one-sided test: The table below also indicates that there were 6 observations less than or equal to 140 and 16 observations that were greater than zero. This suggests that there were more data values that were greater than median value of 140, so median value is likely to be higher than 140. If a one-sided test is needed, the data support that the median is higher than 140 and the *p*-value would be half of 0.052 which would be 0.026 in supporting “median is greater than 140”.

More values higher than 140 suggests that Median is likely higher than 140

Binomial Test

	Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
weight	Group 1	<= 140	6	.27	.50
	Group 2	> 140	16	.73	
Total		22	1.00		.052

p-value

Remark: From the set up of the binomial test, one can see that it can be also used to test any percentile value by entering the specific percentile (quantile) in the Test Proportion box.