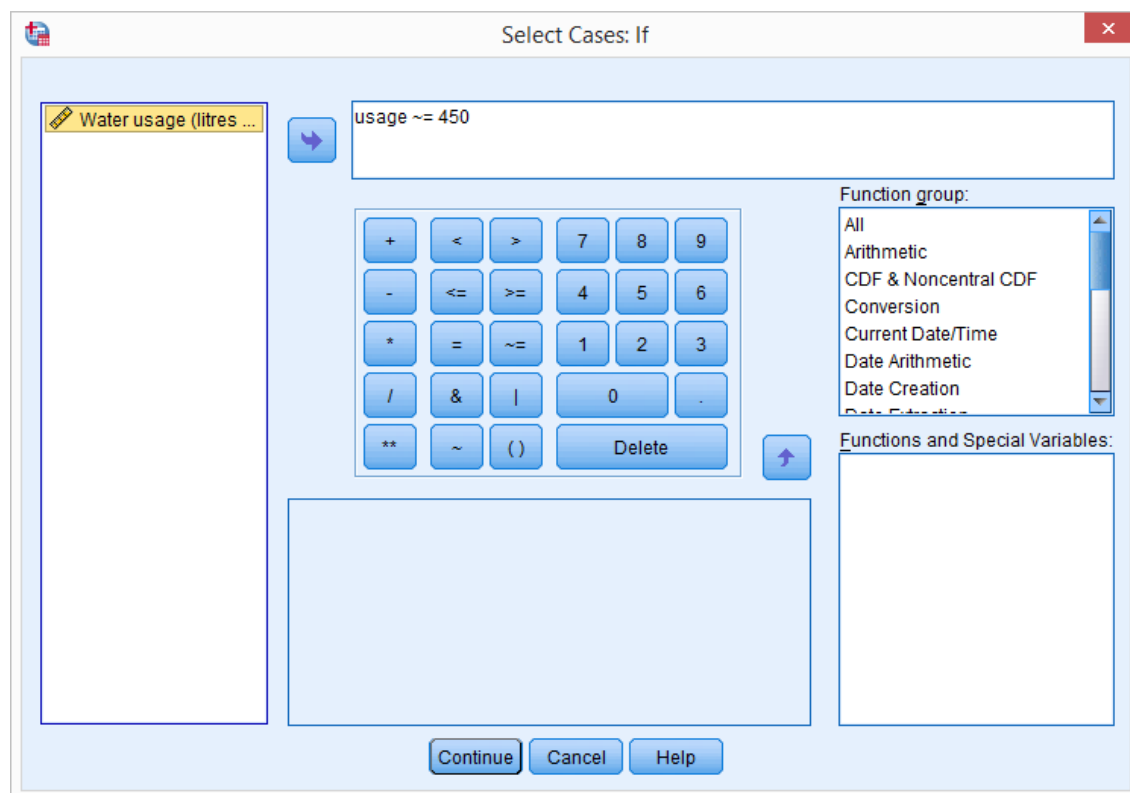


Module 5: Sign (Binomial) test

The Sign (Binomial) test requires as part of its calculation the number of observations that are both smaller and bigger than the median under the null hypothesis; ties are excluded.

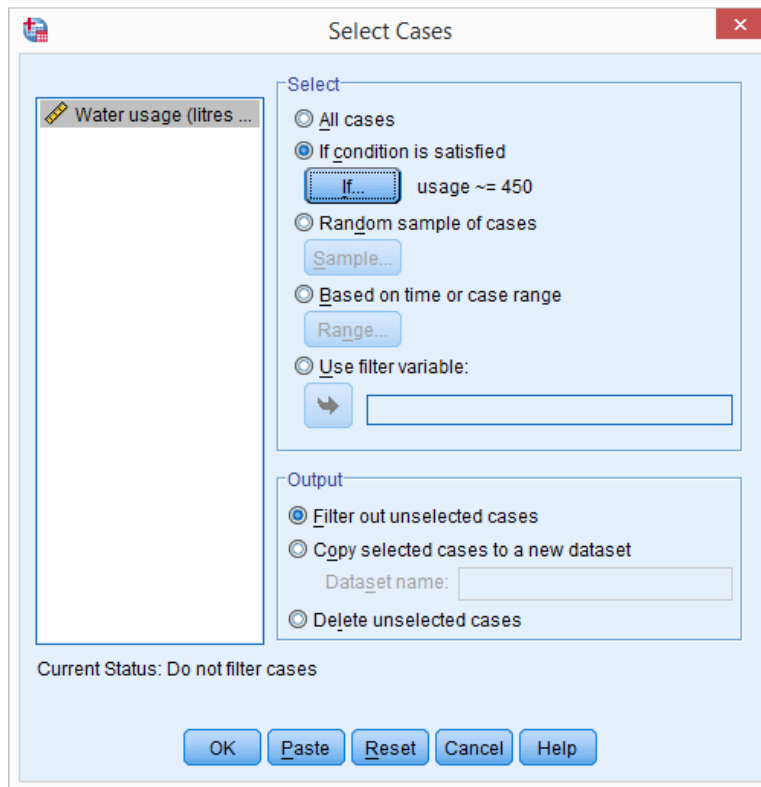
The SPSS command however does not automatically exclude any ties for you, so the first part of the analysis is to do that.

Data > Select Cases and then select the radio button **If condition is satisfied**. Now click the **If** button below this and enter the condition that selects only those values not equal (\neq in SPSS syntax) to the median under the null hypothesis.



Select **Continue**

The **Select Cases** dialogue box should now look like this:



Select OK

Any ties in the data set will now be excluded; we can see in our data set that the 16th observation has been excluded as it has a value of 450 litres per day.

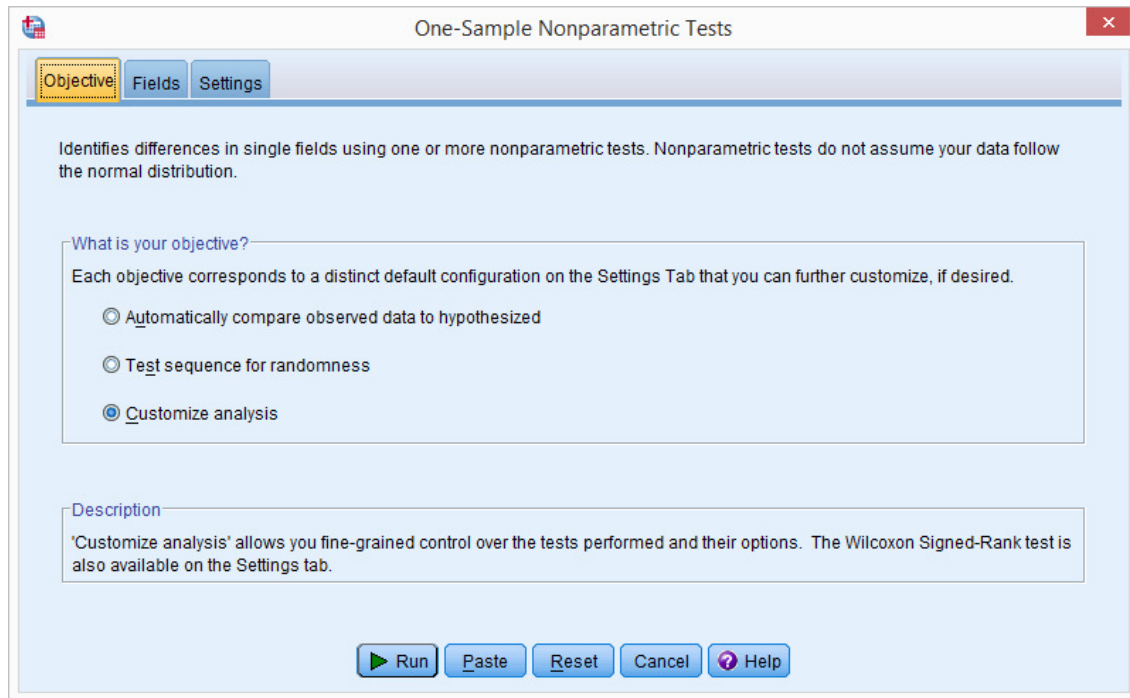
The screenshot shows the IBM SPSS Statistics Data Editor window for 'water usage.sav'. The data is displayed in a table with columns 'usage' and 'filter_\$'. The 16th observation is highlighted in blue and has a value of 450 in the 'usage' column and 0 in the 'filter_\$' column, indicating it has been excluded. The status bar at the bottom indicates 'Filter On'.

	usage	filter_\$
10	459	1
11	536	1
12	500	1
13	550	1
14	564	1
15	473	1
16	450	0
17	330	1
18	600	1
19	559	1
20	500	1

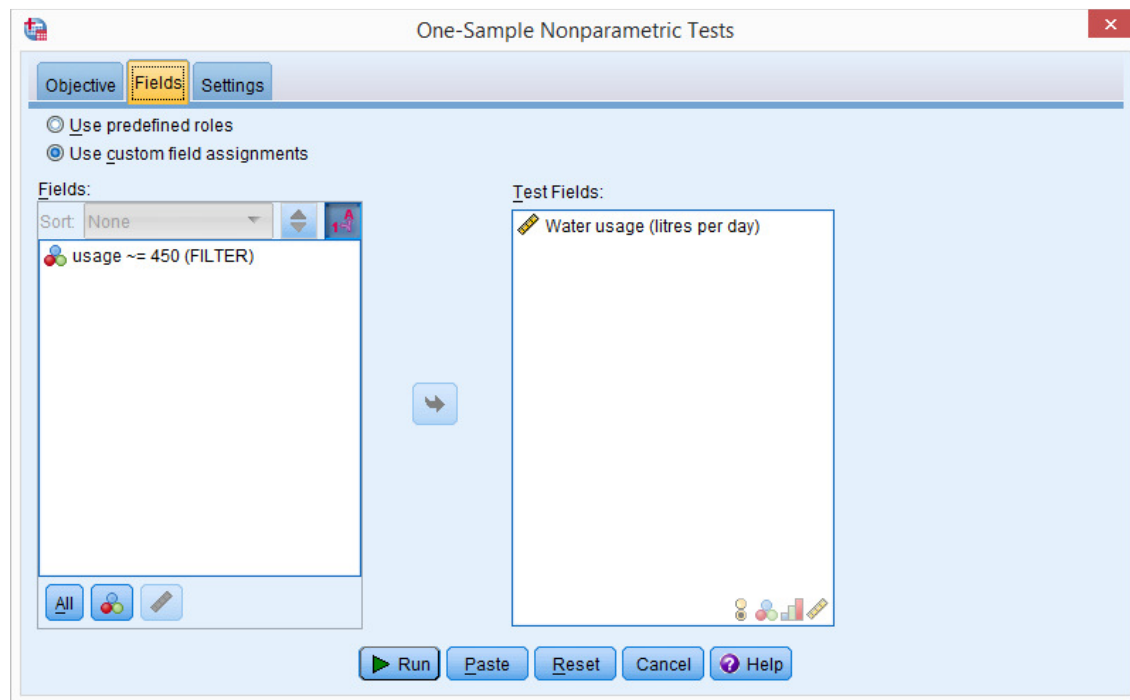
Note to reuse the full data set again repeat the above procedure but select **Reset**.

The test is now performed by choosing **Analyze > Nonparametric Tests > One-Sample** and complete the dialog boxes as shown below.

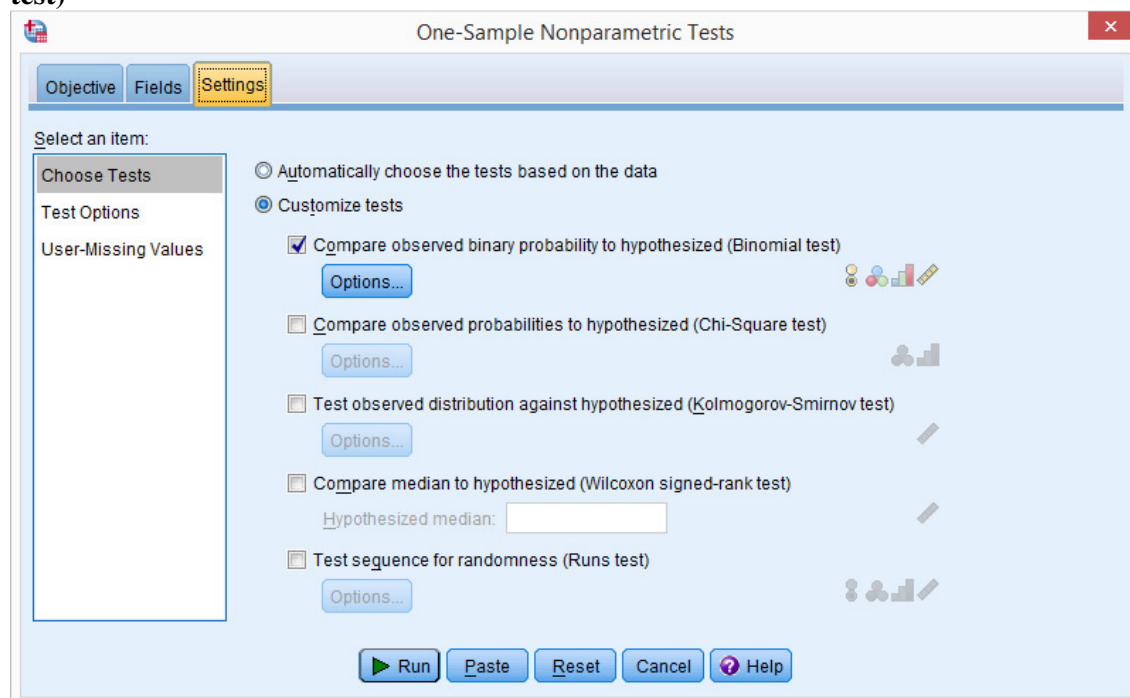
From the **Objective** tab Select **Customize analysis**



In the **Fields** tab move our variable of interest into **Test Fields**



In the **Settings** tab tick **Compare observed binary probability to hypothesized (Binomial test)**



Select **Options** and change the **Cut point** to the median under the null hypothesis

Binomial Options

Hypothesized proportion: 0.5

Confidence Interval

- ☒ Clopper-Pearson (exact)
- ☐ Jeffreys
- ☐ Likelihood ratio

Define Success for Categorical Fields

- ☒ Use first category found in data
- ☐ Specify success values

Success Values:

Value

Define Success for Continuous Fields

Success is equal to or less than

- ☐ Sample midpoint
- ☒ Custom cut point

Cut point: 450

OK Cancel Help

After selecting **OK** and then **Run** the following is the only immediate output.

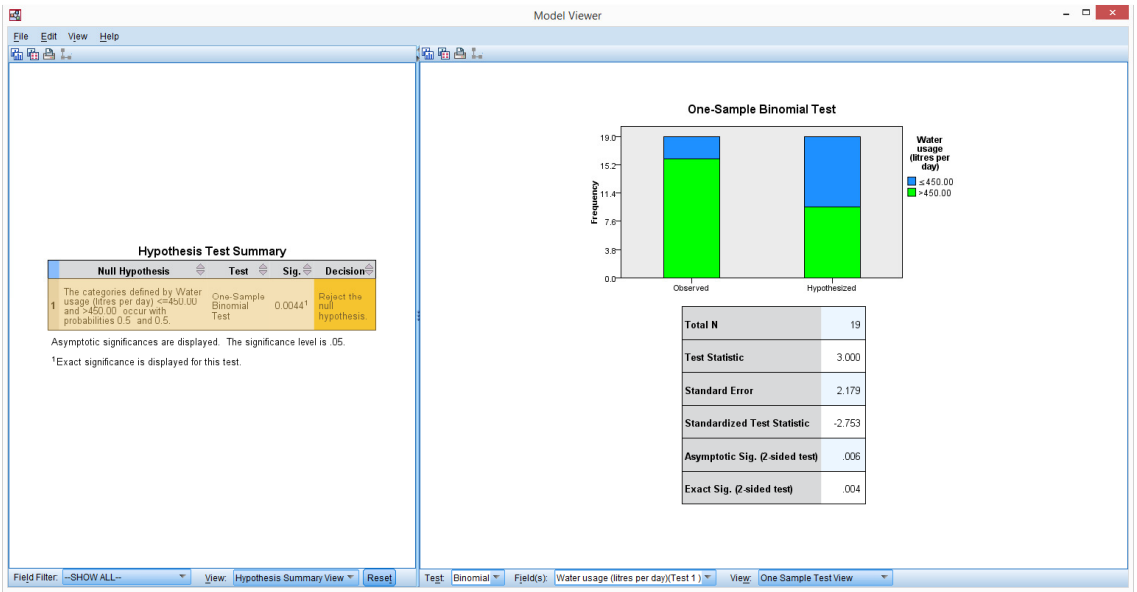
Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The categories defined by Water usage (litres per day) ≤ 450.00 and > 450.00 occur with probabilities 0.5 and 0.5.	One-Sample Binomial Test	.004 ¹	Reject the null hypothesis.

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

¹Exact significance is displayed for this test.

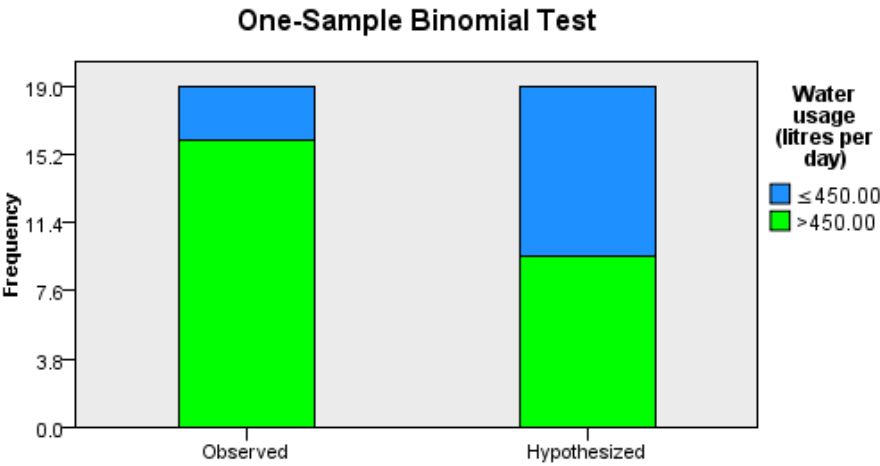
From the above we see that the p-value is less than 0.05 thus we reject H_0 in favour of H_1 which indicates that the median water usage is not 450 litres per day.

To get more you have to double click on the above in the SPSS Output window. This opens the Model Viewer window which is an interactive tool for displaying the available model views and editing the look of the model views.



The output in the right hand panel gives us more information on the test. The left hand panel is referred to as the Main view whilst the right hand panel is referred to as the Auxiliary view.

Edit > Copy Main View or **Edit > Copy Auxiliary View** if you want to paste them into say a Word document.



Total N	19
Test Statistic	3.000
Standard Error	2.179
Standardized Test Statistic	-2.753
Asymptotic Sig. (2-sided test)	.006
Exact Sig. (2-sided test)	.004