T-Tests in SPSS

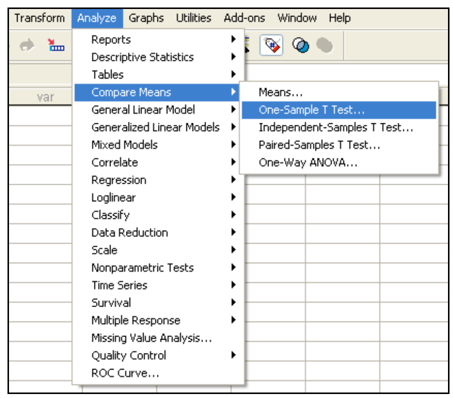
Average systolic blood pressure of a normal male is supposed to be about 129. Measurements of systolic blood pressure on a sample of 12 adult males from a community whose dietary habits are suspected of causing high blood pressure are listed below:

115	134	131	143
130	154	119	137
155	130	110	138

Do the data justify ($\alpha = 0.01$) the suspicions regarding the blood pressure of this community?

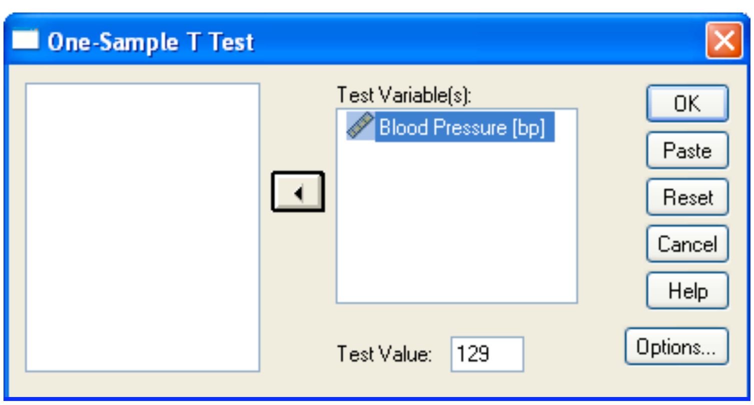
1. Enter the values into a variable *(see left figure, below)*. Be sure to create a Normal Q–Q Plot first to assess the normality of the sample data *(see separate handout on Normal Q–Q Plots)*.

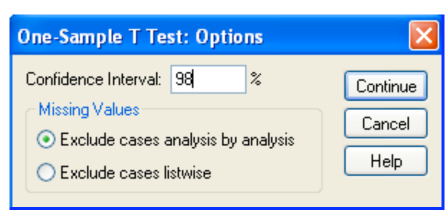
	bp
1	115
2	130
3	155
4	134
5	154
6	130
7	131
8	119
9	110
10	143
11	137
12	138



2. Select Analyze → Compare Means → One-Sample T Test… *(see right figure, above)*.

3. Select "Blood Pressure" as the test variable and enter "129" (the null-hypothesized value) as the test value. Click the "Options…" button and enter the appropriate confidence level (98%, since $\alpha = 0.01$ for this one-tailed test), if needed. Click "Continue" to close the options and then click "OK" *(see the two figures, below)*.





4. Your output should look like this.

T-Test

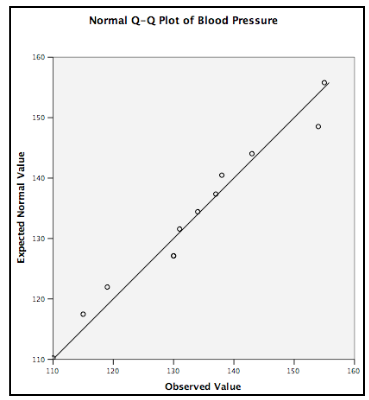
One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Blood Pressure	12	133.000	13.94144	4.0245

One-Sample Test

	Test Value = 129					
					98% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Blood Pressure	.9939	11	.3416	4.0000	-6.9390	14.9390

5. You should use the output information in the following manner to answer the question.



Step 0: **Check Q–Q Plot**
Since the points lie along the diagonal line, the sample data is approximately normally distributed. Thus, we may continue with performing the *T*-procedures.

Step 1: **Hypotheses**

$H_0: \ \mu = 129$

$H_a: \ \mu > 129$

Step 2: **Significance Level**

$\alpha = 0.01$

Step 3: **Rejection Region**

Reject the null hypothesis if *p*-value ≤ 0.01.

($t_{\alpha, df=n-1} = t_{0.01, df=11} = 2.72$ Reject the null hypothesis if $T \geq 2.72$.)

Step 4: **Test Statistic**

One-Sample Test

	Test Value = 129					
					98% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Blood Pressure	.9939	11	.3416	4.0000	-6.9390	14.9390

From the output, $T = 0.9939$ with 11 degrees of freedom.

$$p\text{-value} = \frac{1}{2}\left(Sig.(2 - tailed)\right) = \frac{1}{2}(0.3416) = 0.1708$$

[Note: Sig.(2-tailed) is the p-value for a two-tailed hypothesis test.]

Step 5: **Conclusion**
Since *p*-value = 0.1708 > 0.01 = α (0.9939 < 2.72), we fail to reject the null hypothesis.

Step 6: **State conclusion in words**
At the α = 0.01 level of significance, there is not enough evidence to conclude that there is high blood pressure in this community's males. [Since we failed to reject the null hypothesis, no confidence interval is needed.]