If is true then T ~
Reject if T > = 2.57 or T < - = -2.57
Observed values are : n=6,
Observed .
Hence T is not greater than 2.57 or less than -2.57. Hence **no evidence to reject** .
Conclude that on average there is not a significant difference in the growth hormone level when exercise is taken compared to that when there is no exrecise.

Comments:

1. Here all the subjects showed an increase in hormone level on days when they had taken exercise. All the differences were positive. This would suggest that hormone levels tended to be increased after exercise. But…
2. The average difference between exercise and non-exercise is **not significant,** using a two-sided 5% test. This result is due to:

    i) small sample size.
    ii) Large amount of variability.
    iii) 2-sided nature of test.
    iv) 'rigid' interpretation of significance levels.

Certainly the results are worth exploring further.

Comparison of 2-independent samples v matched pairs.

A matched pair design is equivalent to a **randomised block design** (see later). It will be more **efficient** if there is a large amount of variability between blocks.
In the example 2.4. the variability can be described as:

between blocks (subjects)
within blocks (exercise/non-exercise)

The 'between blocks' variation can be removed from the analysis of treatment effects and hence the effect of the treatment is isolated and tested more efficiently. A further discussion of the efficiency of experimental design is in Chapter 4.

2.4 SPSS output

2.4.1 Two independent samples:

Assuming the data are in two separate columns, one for the variable to be tested and one for the grouping variable, choose

Analyze
Compare Means
Independent-Samples T Test

This opens the Independent-samples T Test dialog box.

1. Click on the variable to be tested, then click > to move it to the Test Variable(s) box.
2. Click on the Grouping variable, then click on > to move it to the Grouping Variable box.
3. Click on **Define Groups** to open the Define Groups dialog box.