

# Computer Lab Project No. 8

## Hypothesis Testing

Today's topic is hypothesis testing. The general procedure is very similar to the calculation of confidence intervals. The built-in hypothesis tests of StatCrunch use the  $P$ -value method instead of the critical value method.

### Info

1. Start StatCrunch, and if you want to test a hypothesis concerning a given sample, then load it into StatCrunch.
2. Click on "Stat" in the menu bar.
3. If you want to use the  $t$ -distribution for the hypothesis test, then choose "T statistics" in the submenu, and if you want to use the normal distribution, then choose "Z statistics". These choices apply if you want to test hypotheses concerning the mean of a population, with  $\sigma$  unknown or known. If you want to test a hypotheses about a proportion of a population, choose "Proportions".
4. In the next submenu, choose "One sample", "Two sample" or "Paired" (only in the T-statistics submenu).
5. In the following submenu, choose either "with data" or "with summary". Note that the test statistic depends only on the sample mean, the sample size and the standard deviation (either of the sample or of the population). If you choose "with summary", you'll have to enter these values, instead of providing the entire sample.
6. If you chose "with data", then you'll have to select the column(s) that contain(s) the data in the next popup window. You can ignore the other text fields and click "Next>".
7. Choose "Hypothesis Test" (this is the default), enter the desired significance level and the null hypothesis, and choose the relation symbol in the alternative hypothesis.
8. If you wish, you can check the box "Store output in data table".
9. Click "Compute!".

### Do now

1. Test the claim that a proportion is 0.6, given a data sample of 40 successes among 100 trials, with the alternative hypothesis that the proportion is not 0.6.
2. Load the data set containing body temperatures (in edition 14 of the textbook, that's data set 5) into the StatCrunch table. Test the claim that the mean body temperature is less than 98.6 degrees, for each column containing body temperatures (there are four).
3. Now load the data set on body measurements (in ed. 14, that's data set 1). Test the hypothesis that the mean female pulse rate is higher than the mean male pulse rate, using two-sample  $t$ -statistics.

Here is how you can set up the data:

- (a) Load data set 1 (Body data) into the StatCrunch table.

- (b) Start the two sample T test, and use as sample 1 the pulse rates WHERE the sex is 0 (female) and as sample 2 the pulse rates WHERE the sex is 1. It works the same way as last time when you calculated confidence intervals.

Now perform the hypothesis test!

## **Finish**

Create a pdf document titled "Lab8-Firstname-Lastname.pdf" containing the results of your hypothesis tests (four about body temperatures and one about pulse rates), and your conclusions (that is, your interpretation of the P-value in each case), in your own words. Submit this pdf file via Blackboard as your Lab 8 assignment.