

ADS2 Practical 5: Choose T tests in different occasions

Chaochen Wang, Wanlu Liu

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Work through this guide alone or in groups. Facilitators are here to help. The time it takes to complete this practical can vary between individuals - this is OK. Do not worry if you do not finish within the session.

Learning Objectives

1. Calculate t-statistic and p-value of t-test in R

You have learnt the three types of t-tests. Please write a piece of code to calculate the t-statistics and p-values in different types of t-tests:

- 1) One sample t-test. The input includes a numeric vector X and a theoretical mean.
- 2) Two-sample independent t-test of two numeric vectors X and Y.
- 3) Paired sample t-test of two numeric vectors X and Y.

Hint: To find out the p-value from a t-statistic, you can use the function `pt`.

2. Perform the right t-tests in the following occasions.

1) The “ToothGrowth” dataset comes with R package. Please read the instruction of the dataset. (`?ToothGrowth`) and import the data by the function `data`.

a. Let us assume that the average tooth length of normal guinea pigs is 8.5, then do you think vitamin C has a significant effect on tooth growth overall? Which t-test do you perform? You can use your own code in section 1 or you can apply the function `t.test`.

b. We want to know if the delivery methods could lead to significant differences. Please perform t-tests to support your conclusions. Does the dosage level matter?

2) Import another dataset “iris”. Apply a t-test to see if the average sepal length of setosa and versicolor is significantly different. How do you set the argument `var.equal`? Why?

3) The blood pressure data record the blood pressure of patients before and after a treatment (<https://github.com/Opensourcefordatascience>). You can import the dataset from the CSV file. Now you can apply t-tests to see if the treatment is useful. Which t-test do you use?