Homework 2

Your name here

Your date here

Let's see how one would perform and report a t-test. We're going to use the sleep data again (see Class 2 supplement).

(sleep\_t\_test <- t.test(formula = extra ~ group, data = sleep, paired = TRUE))

##   
## Paired t-test  
##   
## data: extra by group  
## t = -4.062, df = 9, p-value = 0.002833  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## -2.4599 -0.7001  
## sample estimates:  
## mean of the differences   
## -1.58

How would we report this test?

In order to test whether there was a difference in the effect of the two soporific drugs, a two-tailed t-test for paired samples was performed. We found a significant effect of drug (*t*(9) = -4.0621, p = 0.0028), suggesting that the second drug (mean sleep increase: 2.33 h) had a stronger soporific effect than the first drug (mean sleep increase: 0.75 h).

# Assignment

These example data are from [<http://statistic-on-air.blogspot.co.uk/2009/07/paired-students-t-test.html>]

A school athletics department has taken a new instructor, and want to test the effectiveness of the new type of training proposed by comparing the average times of 10 runners in the 100 meters. Below are the times in seconds before and after training for each athlete.

Before training: 12.9, 13.5, 12.8, 15.6, 17.2, 19.2, 12.6, 15.3, 14.4, 11.3

After training: 12.0, 12.2, 11.2, 13.0, 15.0, 15.8, 12.2, 13.4, 12.9, 11.0

Perform a t-test on these data. Report it as demonstrated above. Note that you can't use the formula specification of the t-test command here. The following code chunk already has the data pre-entered for your convenience.

a <- c(12.9, 13.5, 12.8, 15.6, 17.2, 19.2, 12.6, 15.3, 14.4, 11.3)  
b <- c(12.0, 12.2, 11.2, 13.0, 15.0, 15.8, 12.2, 13.4, 12.9, 11.0)  
(athletes\_t\_test <- t.test(x = a, y = b, paired = TRUE))

##   
## Paired t-test  
##   
## data: a and b  
## t = 5.267, df = 9, p-value = 0.0005158  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## 0.9185 2.3015  
## sample estimates:  
## mean of the differences   
## 1.61

n order to test whether there was a significant effect of the training, a two-tailed t-test for paired samples was performed. We found a significant effect of the training (*t*(9) = 5.2671, p = 5.1582 × 10-4), suggesting that training was effective (mean running time before training: 14.48 s; mean running time after training: 12.87 s).