M8 Problem Set: Dependent t-test for TAs

Pablo E. Gutiérrez-Fonseca

2024-03-23

Now we will move on to the Butterfly Babies Data. Assume that we want to test to see if there is a difference between butterfly wing length for the parents treated with pesticides (generation 1) and their offspring (generation 2).
Use an alpha level of 0.05 Write a concise one paragraph summary of this analysis.

#1. Import libraries and load packages

```
library(tidyverse)
library(lessR)
library(readxl)
library(BSDA)
```

#2. importing our data

```
butterflies <- read_excel("butterflies_babies.xlsx")
```

```
t.test(wing_length ~ Generation, data=butterflies,
       alternative = "two.sided",
       mu = 0,
       paired = TRUE,
       var.equal = TRUE,
       conf.level = 0.95)
```

```
##
##  Paired t-test
##
## data:  wing_length by Generation
## t = -6.4211, df = 39, p-value = 0.0000001348
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -52.22632 -27.20503
## sample estimates:
## mean of the differences
##               -39.71567
```

Cohen's

```
# Calcular la diferencia entre Generation_2 y Generation_1
difference <- butterflies$wing_length[butterflies$Generation == "Generation_2"] -
              butterflies$wing_length[butterflies$Generation == "Generation_1"]
```

```r
# Calcular la desviación estándar de la diferencia
sd_difference <- sd(difference)

# Calcular Cohen's d
cohens_d <- mean(difference) / sd_difference

# Imprimir Cohen's d
print(cohens_d)
```

```
## [1] 1.015271
```