

DailyCheck#3

2025-04-07

R Markdown

#The test statistic for a two-sample t-Test:

$$t_0 = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

```
coffee <- c(8.5, 7.0, 7.25, 10.5, 6.0)
control <- c(9.5, 10.25, 7.5, 8.5, 8.75)
mean(coffee)
```

```
## [1] 7.85
```

```
mean(control)
```

```
## [1] 8.9
```

```
t.test(coffee, control)
```

```
##
## Welch Two Sample t-test
##
## data: coffee and control
## t = -1.164, df = 6.5601, p-value = 0.285
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -3.212427 1.112427
## sample estimates:
## mean of x mean of y
##      7.85      8.90
```

```
coffee_n <- length(coffee)
control_n <- length(control)

coffee_mean <- mean(coffee)
control_mean <- mean(control)

coffee_sd <- sd(coffee)
control_sd <- sd(control)
```

```
#Create summary statistics matrix
```

```
summary_stats <- matrix(c(coffee_n, coffee_mean, coffee_sd, control_n, control_mean, control_sd),
                        nrow = 2, byrow = TRUE)

#Set column and row names
colnames(summary_stats) <- c("n", "mean", "sd")
rownames(summary_stats) <- c("coffee", "control")

library(knitr)
kable(summary_stats, caption = "Summary Statistics")
```

Table 1: Summary Statistics

| | n | mean | sd |
|---------|---|------|----------|
| coffee | 5 | 7.85 | 1.728439 |
| control | 5 | 8.90 | 1.039832 |

```
#Perform a t-test
model1 <- t.test(coffee, control)
names(model1)

## [1] "statistic" "parameter" "p.value" "conf.int" "estimate"
## [6] "null.value" "stderr" "alternative" "method" "data.name"

#Create a matrix for t-test result
output <- matrix(c(model1$statistic, model1$parameter, model1$p.value), nrow = 1)
colnames(output) <- c("t", "df", "p-value")
#Display the t-test results
kable(output, caption = "t-Test results")
```

Table 2: t-Test results

| t | df | p-value |
|-----------|----------|-----------|
| -1.163975 | 6.560057 | 0.2850141 |

```
lower_bound <- round(model1$conf.int[1], 2)
upper_bound <- round(model1$conf.int[2], 2)
conf_int_sentence <- paste("The 95% confidence interval for the difference in mean sleep hours between the two groups is (",
                           lower_bound, " and ", upper_bound, ").")
conf_int_sentence
```

```
## [1] "The 95% confidence interval for the difference in mean sleep hours between the two groups is (-3.21, 1.11)."
```

#The 95% confidence interval is (-3.21, 1.11). #This interval suggests that there is no statistically significant difference between the two groups since the interval includes zero.

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.