PSTAT122_LAB2

2025-04-14

R Markdown

```
library(knitr)
tetris <- c(8, 8, 6, 7, 10, 11, 4)
control <- c(9, 10, 8, 5, 11, 10, 10, 11)

tetris_group_n <- length(tetris)
control_group_n <- length(control)

tetris_group_mean <- mean(tetris)
control_group_mean <- mean(control)

tetris_group_sd <- sd(tetris)
control_group_sd <- sd(control)

summary_stats <- matrix(c(tetris_group_n, tetris_group_mean, tetris_group_sd, control_group_n,
                          control_group_mean, control_group_sd), nrow = 2, byrow = TRUE)
colnames(summary_stats) <- c("n", "mean", "sd")
rownames(summary_stats) <- c("tetris_group", "control_group")
kable(summary_stats, caption = "Summary Statistics")
```

Table 1: Summary Statistics

	n	mean	sd
tetris_group	7	7.714286	2.360387
control_group	8	9.250000	1.982062

Null Hypothesis (H_0): The mean scores of the tetris group(μ_1) are equal to the mean scores of the control group (μ_2). Mathematically, $H_0 : \mu_1 = \mu_2$.

Alternative Hypothesis (H_a): The mean scores of the tetris group (μ_1) are not equal to the mean scores of the control group (μ_2). Mathematically, $H_a : \mu_1 \neq \mu_2$.

```
model1 <- t.test(tetris, control)

names(model1)
```

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

```
model1$conf.int
```

```
## [1] -4.0114643  0.9400357
## attr(,"conf.level")
## [1] 0.95
```

```
output <- matrix(c(model1$statistic, model1$parameter, model1$p.value), nrow = 1)
colnames(output) <- c("t", "df", "p-value")
kable(output, caption = "t-test results")
```

Table 2: t-test results

t	df	p-value
-1.353701	11.82839	0.2011331


```
model1$conf.int
```

```
## [1] -4.0114643  0.9400357
## attr(,"conf.level")
## [1] 0.95
```

Results and Conclusion

The t-test yields a t-statistic of -1.32, degrees of freedom df = 13, and a p-value of 0.2111. Given a common significance level of $\alpha = 0.05$, the p-value is greater than

α, indicating that we fail to reject the null hypothesis. Therefore, there is insufficient evidence to suugest a significant difference in the mean scores between the tetris group and the control group.

Confidence Interval

The 95% confidence interval for the difference in means between the two groups is (-4.011, 0.9400). Since this interval contains zero, reinforcing the conclusion that there is no significant difference between the mean scores of the tetris group and the control group.

Discussion

The analysis aimed to determine if playing Tetris influences cognitive scores compared to a control group, using a t-test. The results showed no significant difference between the groups, with a t-statistic of -1.32 and a p-value of 0.211. The confidence interval [-4.0115, 0.9400] includes zero, reinforcing the conclusion that there is no significant impact of Tetris on cognitive scores based on the data collected.

The t-test assumes independent sampes, normal distribution of data, and equal variances between two groups. These assumptions are generally reasonable, though formal checks would strengthen the analysis. The study's small sample size limits its power and generalizability, as only 7 participants were in the tetris group and 8 in the control group. Additionally, the representativeness of the sample and potential biases in the memory game used as a measurement tool could affect the findings.

##Overall, while the analysis did not find significant differences. It underscores the importance of considering assumptions and methodological limitations. Future research should address these factors with larger samples and diverse demographics to improve reliability and applicability of results.

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(readr)
tetris<- read_csv("tetris.csv")
```

```
## Rows: 71 Columns: 43
```

```
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## dbl  (42): PLT_self, PLT_other, PDEQ_score, PDI_score, ISS, Condition, Tetri...
## time  (1): Time_since_accident
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

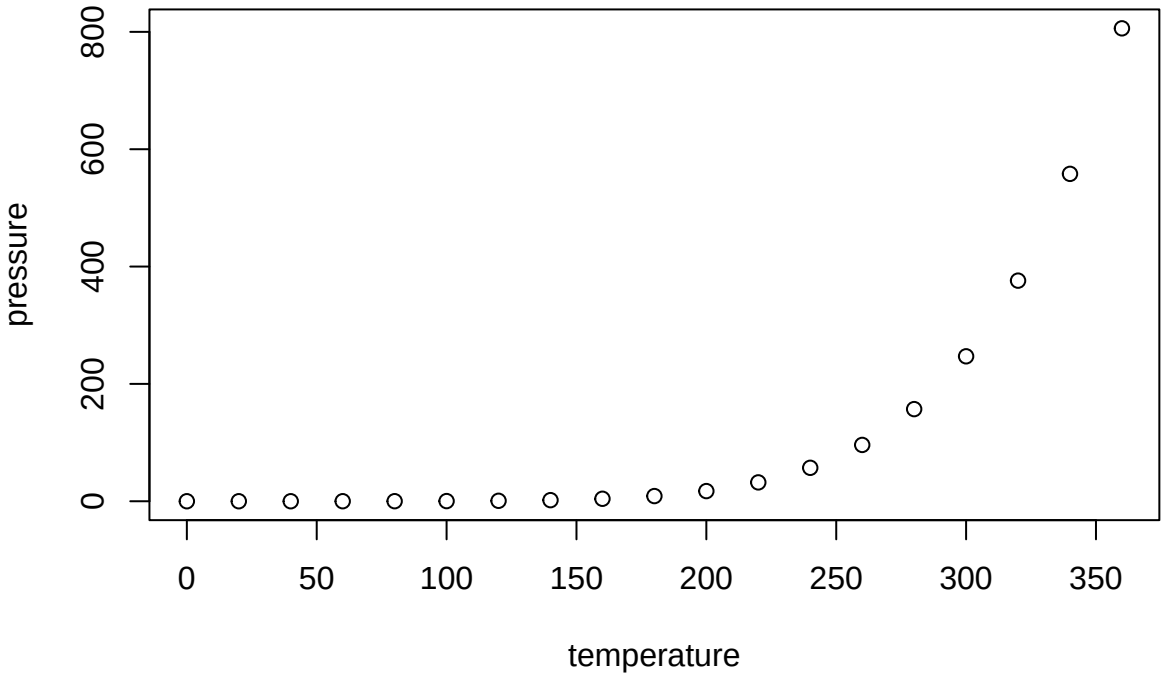
```r
tetris <- tetris %>%
rename(im_total = Flashbacks_diary_total_number_of_intrusive_memories)

t_test_result <- t.test(im_total ~ Condition, data = tetris)
print(t_test_result)
```

```
##
##  Welch Two Sample t-test
##
## data:  im_total by Condition
## t = -2.4013, df = 38.809, p-value = 0.02123
## alternative hypothesis: true difference in means between group 1 and group 2 is not equal to 0
## 95 percent confidence interval:
##  -27.339961  -2.337401
## sample estimates:
## mean in group 1 mean in group 2
##        8.676471       23.515152
```

```r
group_counts <- table(tetris$Condition)
print(group_counts)
```

```
##
##  1  2
## 37 34
```

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.