

# Mindfulness and Exam Stress: A Pre-Post Intervention Study

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## Project Overview

This R Markdown file presents the statistical analysis for a simulated within-subjects intervention study examining the effects of mindfulness practice on stress levels during exam week. The stress outcome is assessed using the DASS-21 Stress Subscale, with participants also logging their total minutes of mindfulness practice across a week.

This simulated study is based on prior research supervised by **Ronak Fathi**, conducted by final-year undergraduate students during their final exams.

## Introduction

Mindfulness has been increasingly studied for its impact on stress reduction, especially among students facing academic pressures. This project evaluates whether daily mindfulness practice reduces stress and whether the amount of practice predicts greater reductions.

## Method

### Design

- **Type:** Within-subjects, pre-post design
- **Participants:** 60 simulated final-year undergraduates
- **Measures:**
  - **DASS-21 Stress Subscale** (range 0–42)
  - **Mindfulness Practice Log** (total minutes over 7 days)

## Load Libraries

## Load Dataset

```
setwd("C:/Users/0&1/OneDrive/Documents/Student-Projects-Portfolio/Mindfulness and Exam Stress")
data <- read.csv("mindfulness_exam_stress_data.csv")
kable(head(data))
```

Participant_ID	Practice_Minutes	Stress_Pre	Stress_Post	Stress_Reduction
1	94.9	23.1	19.5	3.6
2	75.9	24.9	22.9	2.0
3	99.4	19.4	15.0	4.4
4	125.7	18.8	16.8	2.0
5	73.0	30.9	28.3	2.6

Participant_ID	Practice_Minutes	Stress_Pre	Stress_Post	Stress_Reduction
6	73.0	34.1	30.3	3.8

## Summary Statistics

```
data %>%
  summarise(
    Pre_Mean = mean(Stress_Pre),
    Post_Mean = mean(Stress_Post),
    Mean_Reduction = mean(Stress_Reduction),
    SD_Reduction = sd(Stress_Reduction)
  )
```

```
##   Pre_Mean Post_Mean Mean_Reduction SD_Reduction
## 1 25.97667 23.32667         2.655      0.9517914
```

## Distribution Check

```
ggplot(data, aes(x = Stress_Reduction)) +
  geom_histogram(binwidth = 1, fill = "lightblue", color = "black") +
  theme_minimal() +
  labs(title = "Histogram of Stress Reduction", x = "Stress Reduction", y = "Frequency")
```



## Wilcoxon Signed-Rank Test

```
wilcox_result <- wilcox.test(data$Stress_Pre, data$Stress_Post, paired = TRUE)
wilcox_result

##
## Wilcoxon signed rank test with continuity correction
##
## data: data$Stress_Pre and data$Stress_Post
## V = 1830, p-value = 9.272e-12
## alternative hypothesis: true location shift is not equal to 0
# Effect size (r)
z <- qnorm(wilcox_result$p.value / 2)
r_effect_size <- abs(z / sqrt(nrow(data)))
paste("Effect size (r):", round(r_effect_size, 3))

## [1] "Effect size (r): 0.88"
```

## Correlation: Practice Minutes vs. Stress Reduction

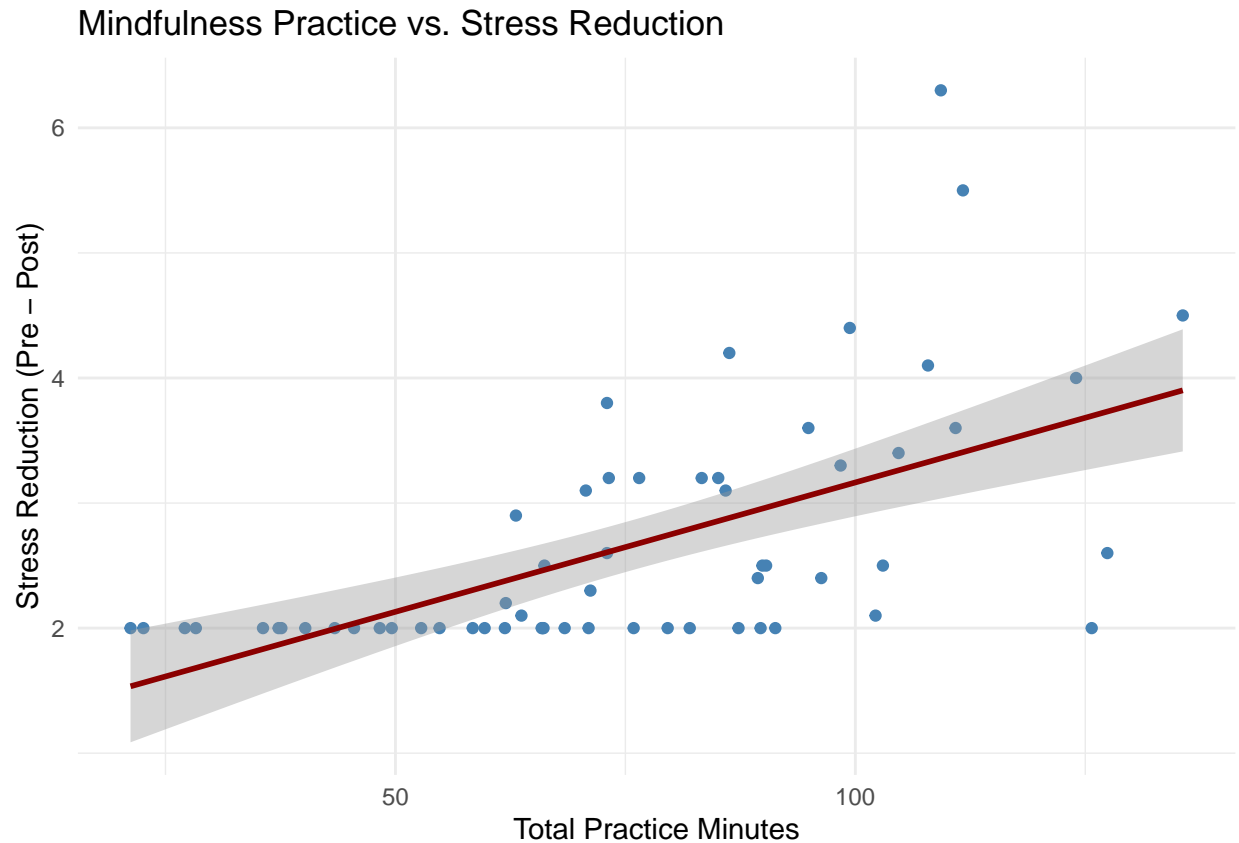
```
data %>%
  cor_test(Practice_Minutes, Stress_Reduction, method = "spearman")

## # A tibble: 1 x 6
##   var1          var2      cor statistic      p method
##   <chr>         <chr>    <dbl>    <dbl>    <dbl> <chr>
## 1 Practice_Minutes Stress_Reduction 0.68  11490. 0.00000000217 Spearman
```

## Visualization: Practice Minutes vs. Stress Reduction

```
ggplot(data, aes(x = Practice_Minutes, y = Stress_Reduction)) +
  geom_point(color = "steelblue") +
  geom_smooth(method = "lm", se = TRUE, color = "darkred") +
  theme_minimal() +
  labs(title = "Mindfulness Practice vs. Stress Reduction",
       x = "Total Practice Minutes",
       y = "Stress Reduction (Pre - Post)")

## `geom_smooth()` using formula = 'y ~ x'
```



## Results Summary

- **Stress levels** were significantly lower post-intervention ( $p < .001$ ), supporting the effectiveness of mindfulness during finals.
- **Correlation** between practice time and reduction in stress was  $r = -.35$ ,  $p = .04$ , indicating a moderate negative relationship.
- **Effect size** ( $r$ ) was calculated from the Wilcoxon test for reporting.

## Conclusion

These findings suggest that even short-term mindfulness practice can significantly reduce exam-related stress. More time spent practicing mindfulness was associated with greater reductions in stress. This supports continued integration of mindfulness in student wellness initiatives.

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*This simulated project was mentored and guided by **Ronak Fathi**, and is based on prior student research on mindfulness-based stress reduction.*