Lunch Analysis

Performance and Lunch

Math Scores

```
# Perform t-test for math scores between students with standard lunch and free/reduced lunch
t_test_math_lunch <- t.test(math_score ~ lunch, data = data)
print(t_test_math_lunch)
```

```
##
##  Welch Two Sample t-test
##
## data:  math_score by lunch
## t = -11.148, df = 681.31, p-value < 2.2e-16
## alternative hypothesis: true difference in means between group free/reduced and group standard is no
## 95 percent confidence interval:
##  -11.951112  -8.371662
## sample estimates:
## mean in group free/reduced     mean in group standard
##                   60.07849                   70.23988
```

Reading Scores

```
# Perform t-test for reading scores between students with standard lunch and free/reduced lunch
t_test_reading_lunch <- t.test(reading_score ~ lunch, data = data)
print(t_test_reading_lunch)
```

```
##
##  Welch Two Sample t-test
##
## data:  reading_score by lunch
## t = -6.6688, df = 696.64, p-value = 5.255e-11
## alternative hypothesis: true difference in means between group free/reduced and group standard is no
## 95 percent confidence interval:
##  -7.869649 -4.289754
## sample estimates:
## mean in group free/reduced     mean in group standard
##                   65.76453                   71.84424
```

Writing Scores

```
# Perform t-test for writing scores between students with standard lunch and free/reduced lunch
t_test_writing_lunch <- t.test(writing_score ~ lunch, data = data)
print(t_test_writing_lunch)
```

```
##
##  Welch Two Sample t-test
```

```
##
## data:  writing_score by lunch
## t = -7.246, df = 701.62, p-value = 1.134e-12
## alternative hypothesis: true difference in means between group free/reduced and group standard is no
## 95 percent confidence interval:
##  -8.652993 -4.963503
## sample estimates:
## mean in group free/reduced     mean in group standard
##                   64.21512                   71.02336
```

Based on the Lunch Analysis, we can answer the following questions:

1. **Is there a difference in performance between students who have standard lunch and those who have free/reduced lunch?**

   The analysis indicates that there is a significant difference in the academic performance between students who have standard lunch and those who have free/reduced lunch:

   - **Math Scores**: The t-test results show a statistically significant difference in the mean math scores between the two groups (p-value $<$ 2.2e-16). Students with standard lunch have a higher mean math score (70.23988) compared to students with free/reduced lunch (60.07849).
   - **Reading Scores**: The t-test results show a statistically significant difference in the mean reading scores between the two groups (p-value = 5.255e-11). Students with standard lunch have a higher mean reading score (71.84424) compared to students with free/reduced lunch (65.76453).
   - **Writing Scores**: The t-test results show a statistically significant difference in the mean writing scores between the two groups (p-value = 1.134e-12). Students with standard lunch have a higher mean writing score (71.02336) compared to students with free/reduced lunch (64.21512).

2. **Does the type of lunch have any impact on academic performance?**

   The analysis clearly indicates that the type of lunch (standard or free/reduced) has a significant impact on the academic performance of students across all three subjects:

   - The t-test results show that the differences in mean scores between the two lunch groups are statistically significant for math, reading, and writing.
   - Students who have standard lunch consistently outperform their peers who have free/reduced lunch in all three subjects.

These findings suggest that the type of lunch a student receives is an important factor that is associated with their academic performance. Students who have access to standard lunch, which is likely indicative of a higher socioeconomic status, tend to perform better academically compared to students who receive free or reduced-price lunch, which is often associated with a lower socioeconomic background.

In summary, the Lunch Analysis demonstrates that there is a significant difference in the academic performance of students based on the type of lunch they receive. Students with standard lunch outperform their peers with free/reduced lunch in math, reading, and writing. This suggests that the type of lunch can be a proxy for socioeconomic status and may have an impact on a student's academic outcomes.