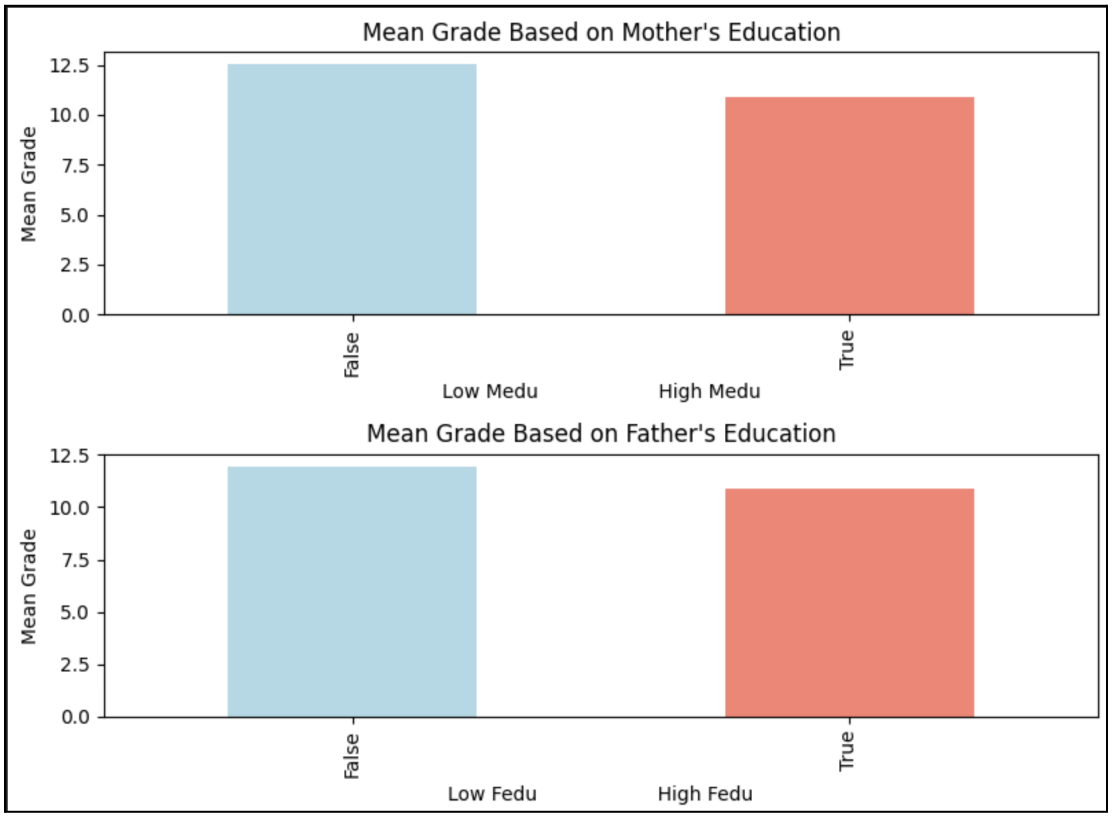
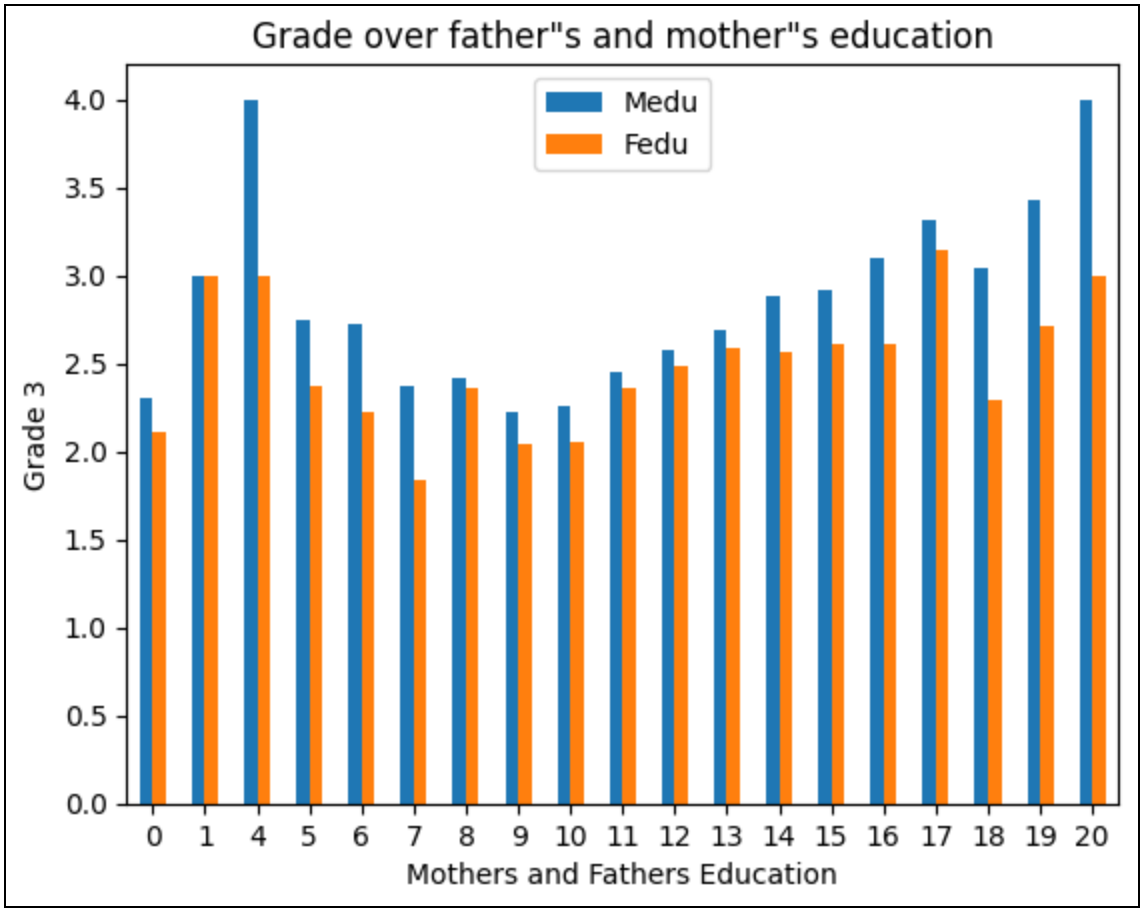
Social Activity and Grades Effect with Various Columns

In our investigation, we analyzed various social factors from different columns, including Parents' Education, Job Background, Address, Internet Facility, Going Out, Romantic, Attendance, and Extracurricular Activities. We aimed to assess the correlations among these social factors and their potential impact on the overall quality of education experienced by students. By exploring how these aspects interrelate, we sought to gain insights into the multifaceted dynamics of a student's social life and its influence on their educational outcomes.

Parents Education Analysis





Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in the student's grades. compared with the Parents' education.

Results:

- **T-statistic for Mother:** -6.41
- **P-value for Mother:** 2.25e-10 (very close to zero)

Results:

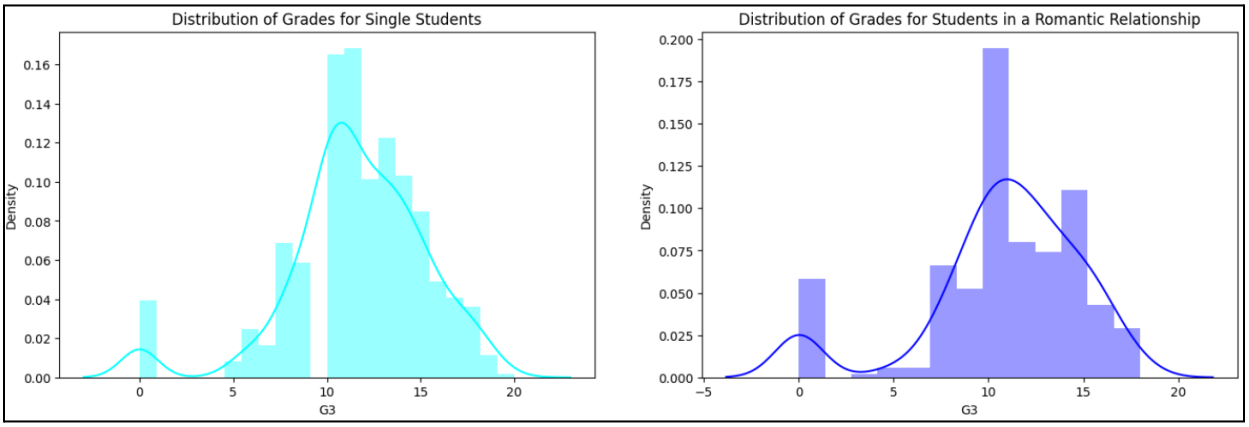
- **T-statistic for Father:** -4.44

- **P-value for Father:** 1.00e-05 (very close to zero)

Conclusion: We reject the null hypothesis. There is a significant difference as there is a difference in the students' grades when compared with the parents' education. Hence, the interpretation of the above can provide the results that parent's education being more results in the grades being higher.

Interpretation: The t-test for the mother's education level suggests a significant difference in mean grades between the two groups (low and high Medu). The negative t-statistic indicates that students with lower maternal education tend to have lower mean grades. The t-test for the father's education level shows a significant difference in mean grades between the two groups (low and high Fedu). The negative t-statistic implies that students with lower paternal education tend to have lower mean grades.

Relationship Status Analysis



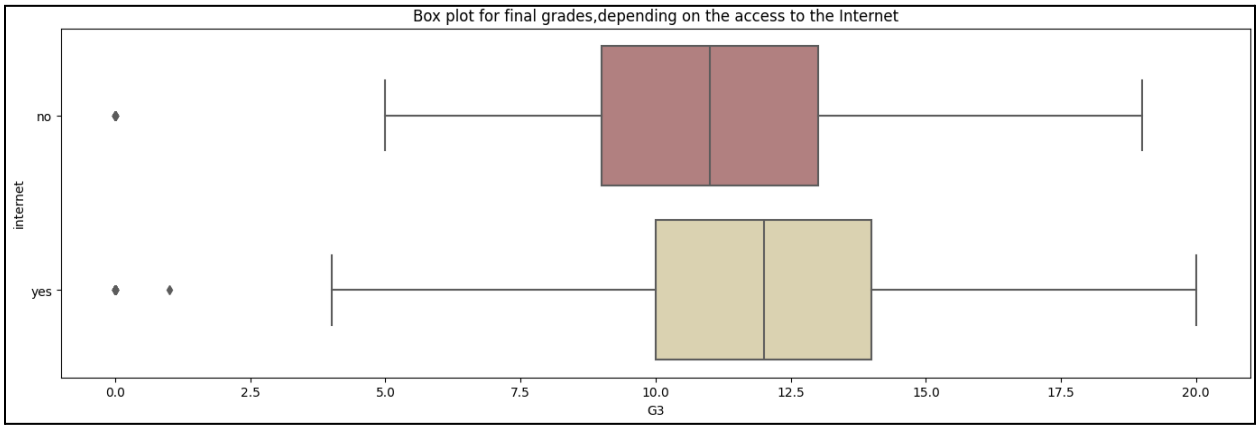
Statistical Test: T-test to compare the means of two groups.
Null Hypothesis: There is no significant difference in the grades of the students.
Results:

- **T-statistic for Relationship:** 3.19
- **P-value for Relaitionship:** 0.00146

Conclusion: With a t-statistic of 3.19 and a p-value of 0.00146, we reject the null hypothesis. There is a significant difference in the grades of students. The evidence suggests that romantic relationship status is associated with variations in academic performance.

Interpretation: Students in a romantic relationship have, on average, different grades compared to those who are single. The rejection of the null hypothesis implies that romantic relationship status is a factor that influences academic outcomes in this dataset.

Internet Facility Analaysis



Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in the final grades between students with and without internet access.

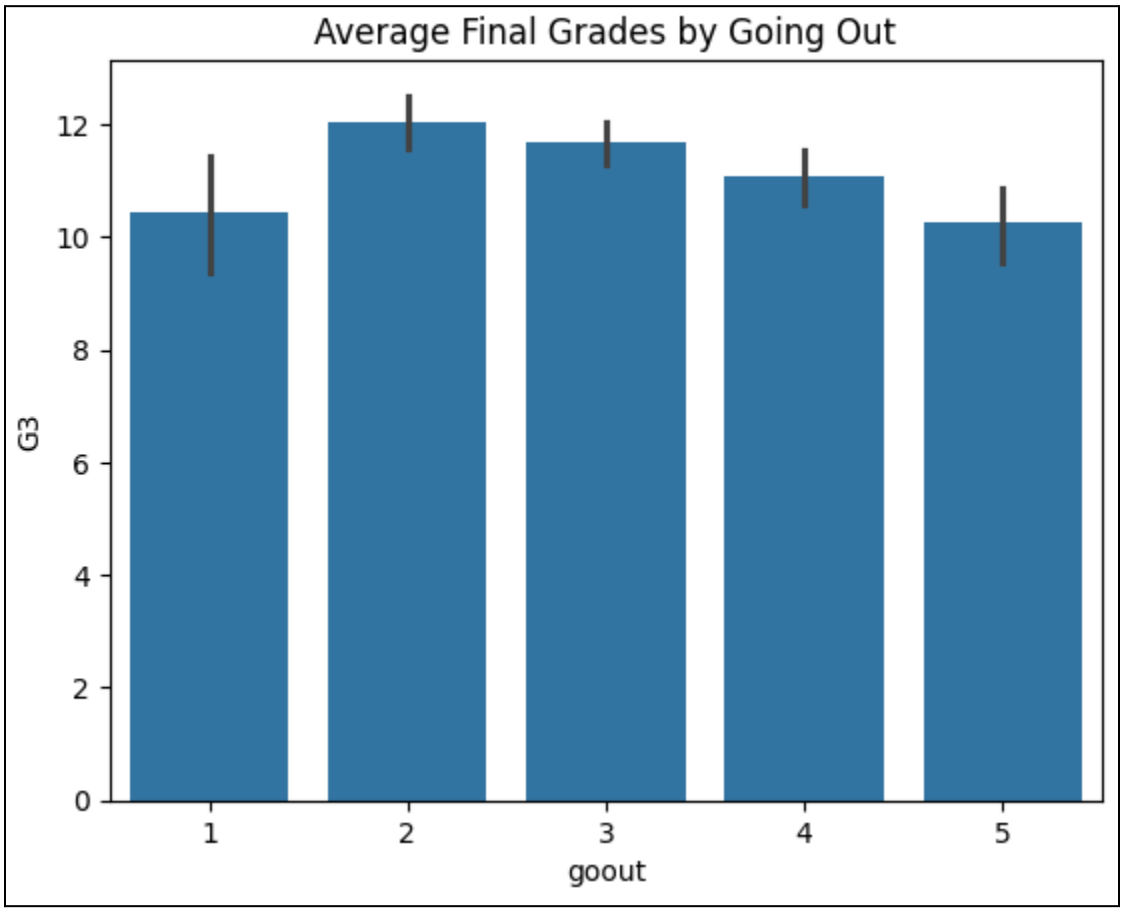
Results:

- **T-statistic for Internet Analysis:** 3.48.
- **P-value for Internet Analysis:** 0.00053

Conclusion: With a t-statistic of 3.48 and a p-value of 0.00053, we reject the null hypothesis. There is a significant difference in the final grades between students with and without internet access. The evidence suggests that internet access is associated with variations in student academic performance.

Interpretation: On average, students with internet access have different final grades compared to students without internet access. The positive t-statistic indicates that, on average, students with internet access tend to have higher grades. The low p-value provides strong evidence against the null hypothesis, supporting the idea that internet access is a factor influencing student academic performance.

Students Hanging Out Analysis:



Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in the final grades between the two groups (representing different categories of 'goout'.

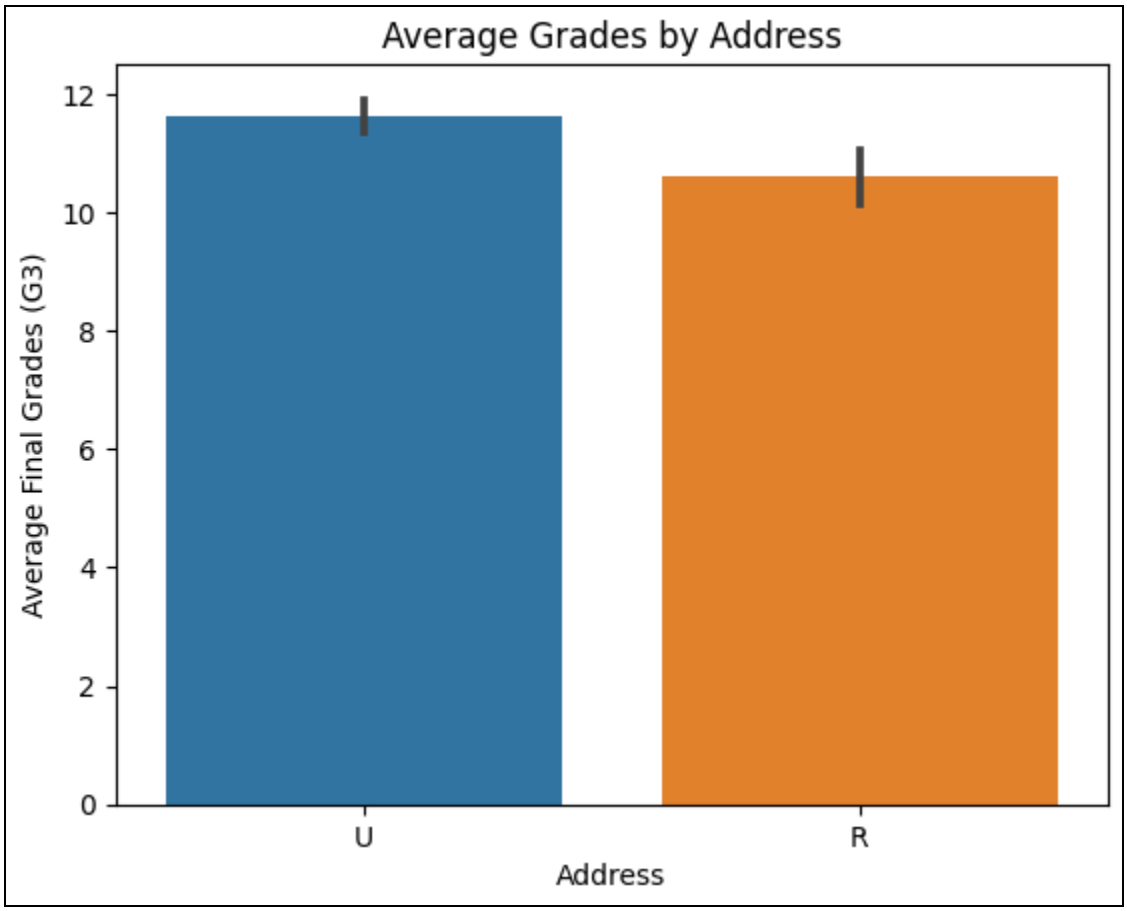
Results:

- **T-statistic for Hanging Out:** 3.48.
- **P-value for Hanging Out:** 0.00053

Conclusion: With a t-statistic of -3.00 and a p-value of 0.00291, we reject the null hypothesis. There is a significant difference in the final grades between the two groups. The evidence suggests that the 'goout' category is associated with variations in student academic performance.

Interpretation: On average, students in the two different 'goout' categories have different final grades. The negative t-statistic indicates that, on average, students in one group tend to have lower grades compared to the other group. The low p-value provides strong evidence against the null hypothesis, supporting the idea that the 'goout' category is a factor influencing student academic performance.

Address Analysis



Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in the final grades between students from urban and rural areas.

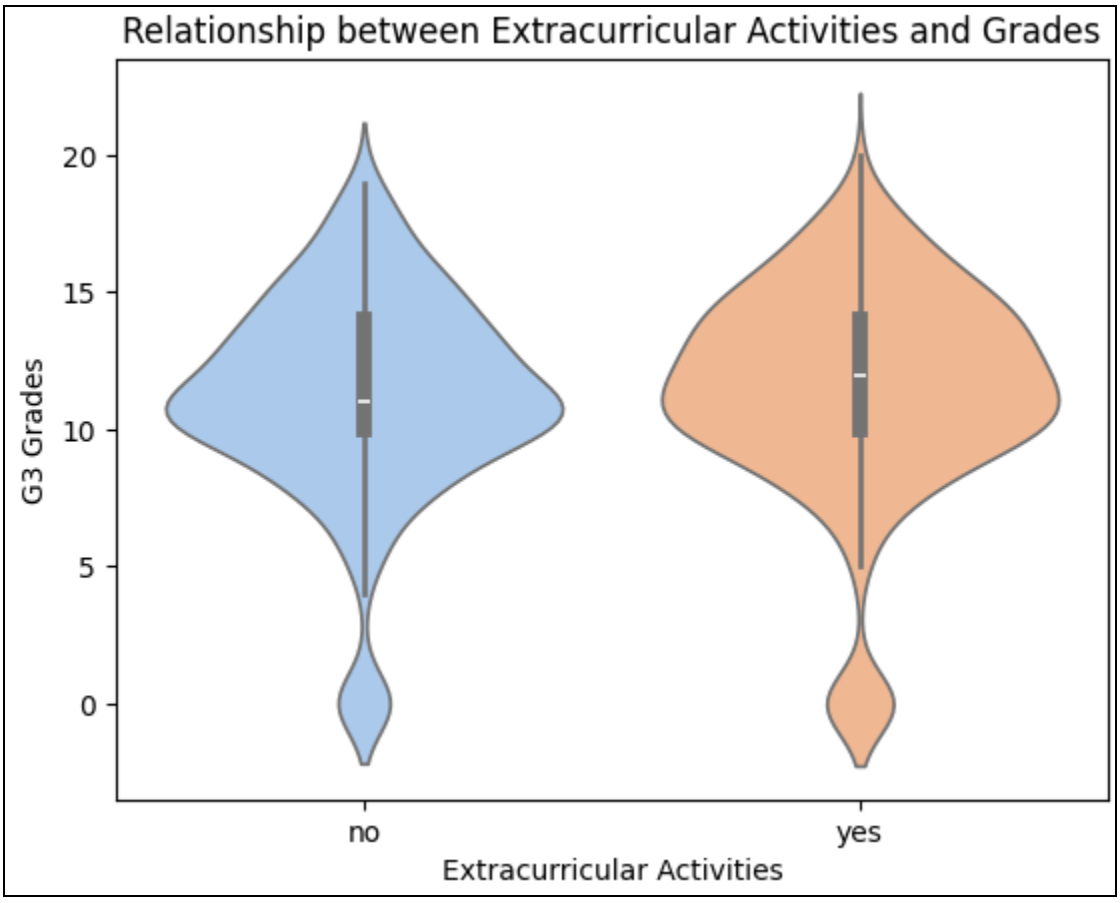
Results:

- **T-statistic for Address:** 3.83.
- **P-value for Address:** 0.00014

Conclusion: With a t-statistic of 3.83 and a p-value of 0.00014, we reject the null hypothesis. There is a significant difference in the final grades between students from urban and rural areas. The evidence suggests that the students' address (urban or rural) is associated with variations in academic performance.

Interpretation: On average, students from urban and rural areas have different final grades. The positive t-statistic indicates that, on average, students from urban areas tend to have higher grades compared to students from rural areas. The low p-value provides strong evidence against the null hypothesis, supporting the idea that the students' address is a factor influencing academic performance.

Extracurricular Activities



Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in the final grades between students with and without extracurricular activities.

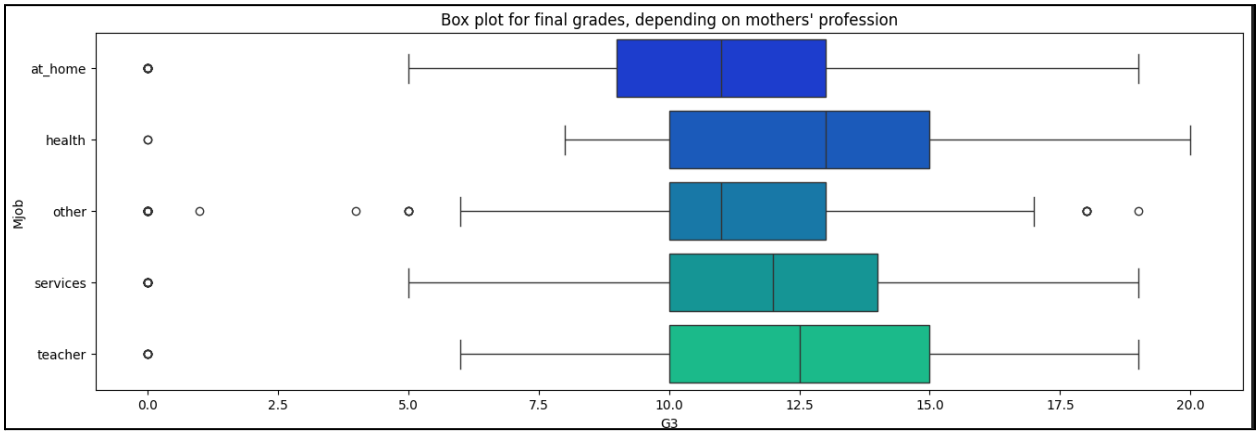
Results:

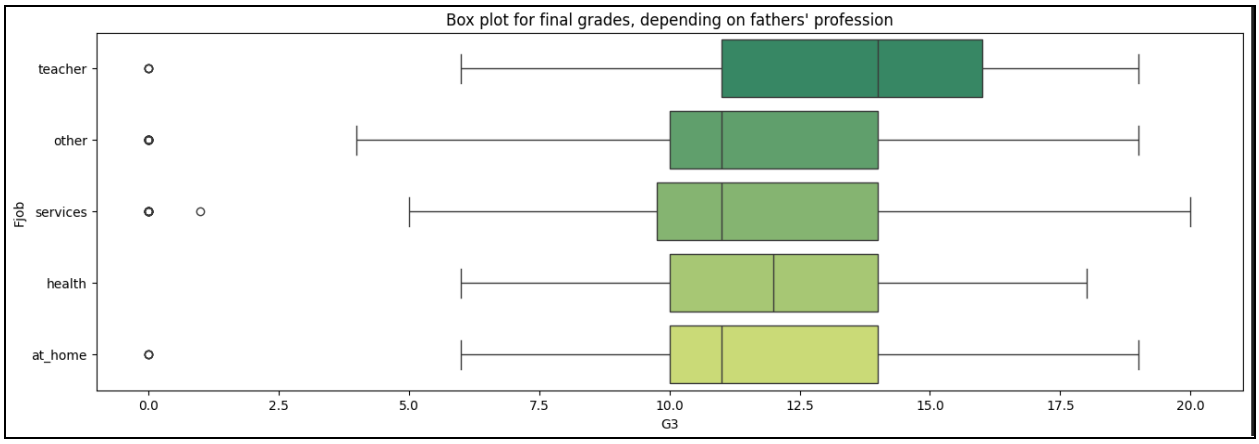
- **T-statistic:** 1.10
- **P-value:** 0.272

Conclusion: With a t-statistic of 1.10 and a p-value of 0.272, we fail to reject the null hypothesis. There is no significant difference in the final grades between students with and without extracurricular activities. The evidence does not provide enough support to conclude that extracurricular activities are associated with variations in academic performance.

Interpretation: On average, students with and without extracurricular activities have similar final grades. The t-statistic close to zero and the relatively high p-value suggest that there is not enough evidence to suggest a meaningful difference in academic performance between these two groups. The lack of significance may indicate that extracurricular activities, as measured in this dataset, do not play a significant role in influencing final grades.

Parents Profession:





Results:

Kruskal-Wallis test H-statistic: 38.72
Kruskal-Wallis test p-value: 7.95e-08 (very close to zero)

Results:

Kruskal-Wallis test H-statistic: 19.93
Kruskal-Wallis test p-value: 0.00051

Conclusion: In both cases, we reject the null hypothesis, suggesting that there are significant differences in the final grades based on the professions of both mothers and fathers. This implies that the profession of parents may play a role in influencing the academic performance of students. The low p-values obtained from the Kruskal-Wallis test provide evidence against the null hypothesis, leading to the rejection of the idea that there is no difference in final grades based on parental professions.

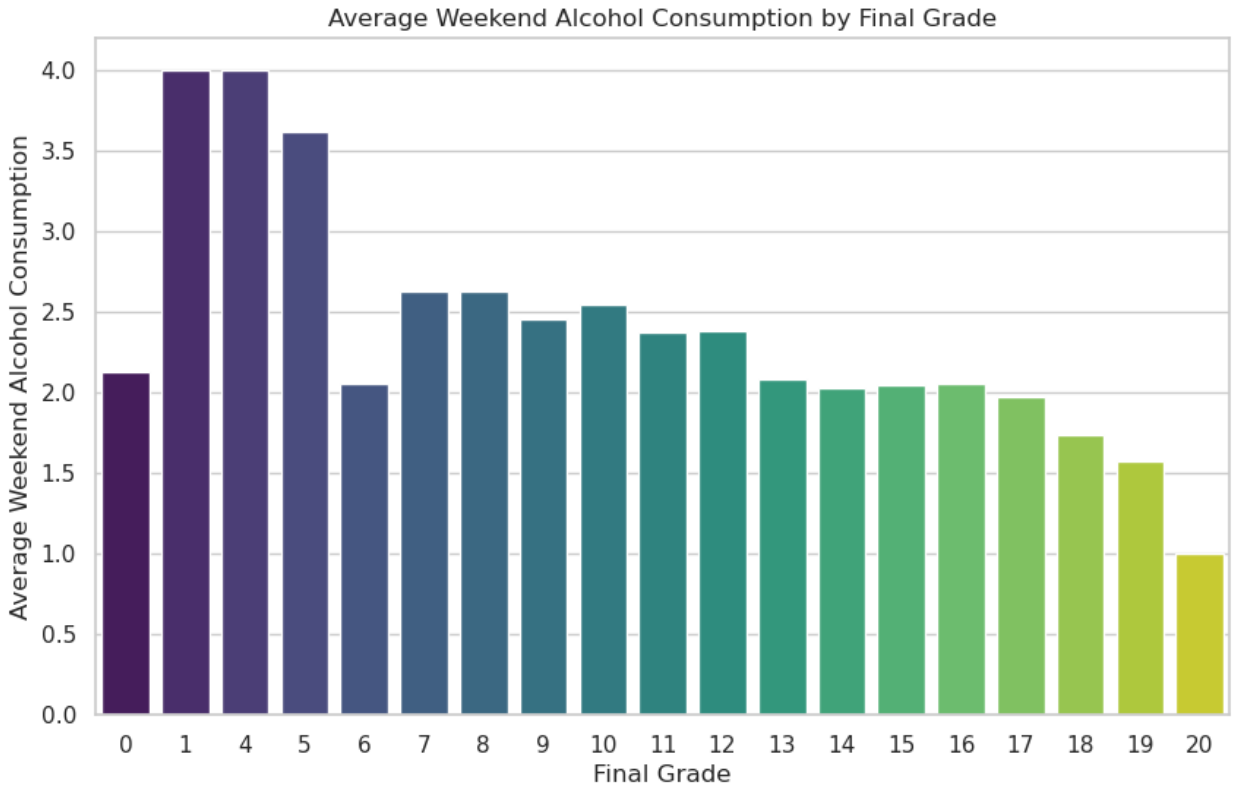
Interpretation: The Kruskal-Wallis test indicates a significant difference in the distributions of grades among different mothers' professions. The extremely low p-value (close to zero) suggests strong evidence against the null hypothesis of no difference in grade distributions. The Kruskal-Wallis test also shows a significant difference in the distributions of grades among different fathers' professions.
Although the p-value is not as extreme as in the mothers' case, it is still very low (0.00051), indicating evidence against the null hypothesis.

Alcohol Consumption Analysis

In our investigation, we categorized alcohol consumption into two groups: high consumers (score of 4 and above) and low consumers (score of 3 and below). We aimed to explore the potential impact of both Weekend Alcohol Consumption (Walc) and Weekday Alcohol Consumption (Dalc) on students' final grades.

Weekend Alcohol Consumption Analysis

We initiated an independent T-test to examine the relationship between Weekend Alcohol Consumption and final grades.



Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in final grades between low and high-alcohol consumers.

Results:

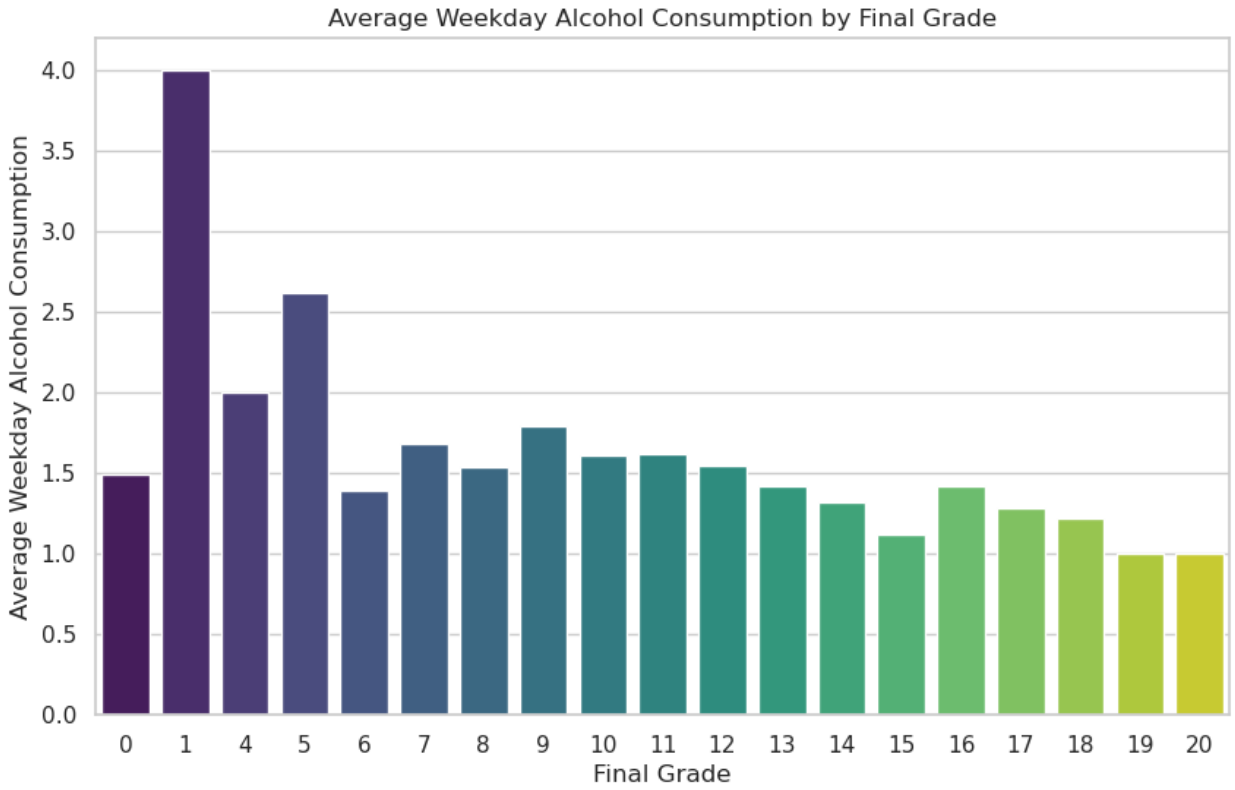
- **T-statistic:** 3.6132

- **P-value:** 0.0003

Conclusion: We reject the null hypothesis. There is a significant difference in final grades between low and high weekend alcohol consumers. This suggests that students with high weekend alcohol consumption tend to have different academic performance compared to those with low consumption.

Weekday Alcohol Consumption Analysis

We extended our analysis to Weekday Alcohol Consumption, applying a similar T-test to evaluate its relationship with final grades.



Statistical Test: T-test to compare the means of two groups.

Null Hypothesis: There is no significant difference in final grades between low and high alcohol consumers.

Results:

- **T-statistic:** 2.9103
- **P-value:** 0.0037

Conclusion: Once again, we reject the null hypothesis. There is a significant difference in final grades between low and high weekday alcohol consumers. This implies that students with higher weekday alcohol consumption exhibit varying academic performance compared to those with lower consumption.

Key Insight: Both weekend and weekday alcohol consumption significantly impact students' final grades. These findings underscore the importance of considering alcohol consumption habits in understanding and addressing factors influencing academic performance. As educators and policymakers, it becomes crucial to develop targeted interventions and support systems for students with higher alcohol consumption, fostering an environment conducive to improved educational outcomes.