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Exam Scores & Gender

Executive Summary

The objective of this research is to find out two questions. Firstly, it aims to discover whether anxiety influences exam performance differently among males and females. Secondly, it explores the correlation between study hours and exam scores across genders. To provide evidence for our investigation, our team has generated several graphs utilizing the “Exam Anxiety.dat” dataset and has done additional research from reputable sources. By project completion, our goal is to clarify and discover the extent to which anxiety and study hours contribute to exam outcomes, answering which factor significantly influences test scores.

Research Question

How does having a high anxiety level affect exam results between males and females?

How does the number of revisions or studying hours affect exam results between males and females?

Variables

Exam Scores: Test scores that individuals earned (Numeric)

Anxiety: This can be defined as an unpleasant state of tension (1) and it is measured by a score in the “Exam Anxiety.dat” dataset (Numeric)

Revise: This can be defined as studying hours for the exam and it is measured by a score in the “Exam Anxiety.dat” dataset (Numeric)

Gender: Male or Female (String)

Graphs

Figure 1 presents a statistical overview concerning all the male participants within the dataset. This summary highlights four key variables: Revise (study), Exam, Anxiety, and Gender. It is important to note the mean values associated with these variables, which will be graphically represented in further analysis. The male category comprises 52 subjects with respective average scores for Revise (18.33), Exam (56.69), and Anxiety (74.38).

Code	Revise	Exam	Anxiety	Gender
Min. : 1.00	Min. : 1.00	Min. : 2.00	Min. :10.00	Length:52
1st Qu.: 25.75	1st Qu.: 7.75	1st Qu.: 40.00	1st Qu.:68.97	Class :character
Median : 48.50	Median :14.00	Median : 62.50	Median :79.04	Mode :character
Mean : 51.00	Mean :18.33	Mean : 56.69	Mean :74.38	
3rd Qu.: 75.75	3rd Qu.:22.25	3rd Qu.: 80.00	3rd Qu.:84.69	
Max. :102.00	Max. :98.00	Max. :100.00	Max. :97.58	

Figure 1: Statistical Summary of Male

Figure 2 displays a statistical overview of all female participants in the dataset. This summary highlights four key variables similar to Figure 1. It is essential to note the mean values of these variables as they will be graphically depicted with further analysis. The female category comprises 51 subjects with respective average scores for Revise (21.41), Exam Performance (56.45), and Anxiety (74.303).

Code	Revise	Exam	Anxiety	Gender
Min. : 2.00	Min. : 0.00	Min. : 5.00	Min. : 0.056	Length:51
1st Qu.: 27.00	1st Qu.: 9.50	1st Qu.: 37.50	1st Qu.:71.387	Class :character
Median : 53.00	Median :18.00	Median : 60.00	Median :78.238	Mode :character
Mean : 53.02	Mean :21.41	Mean : 56.45	Mean :74.303	
3rd Qu.: 78.00	3rd Qu.:27.00	3rd Qu.: 75.00	3rd Qu.:84.686	
Max. :103.00	Max. :84.00	Max. :100.00	Max. :95.970	

Figure 2: Statistical Summary of Female

Figures 3 & 4 depict histograms representing the distribution of anxiety scores experienced by males and females. On the left (Figure 3), the graph illustrates the anxiety score distribution among males in the dataset, while the graph on the right (Figure 4) portrays the anxiety distribution among females. Both graphs display similar characteristics, notably a left-skewed distribution which indicates that higher anxiety scores are more common. Furthermore, the most frequently occurring anxiety scores for both genders fall within the range of 70.0-80.0. However, outliers suggest instances where lower anxiety scores are observed among both genders.

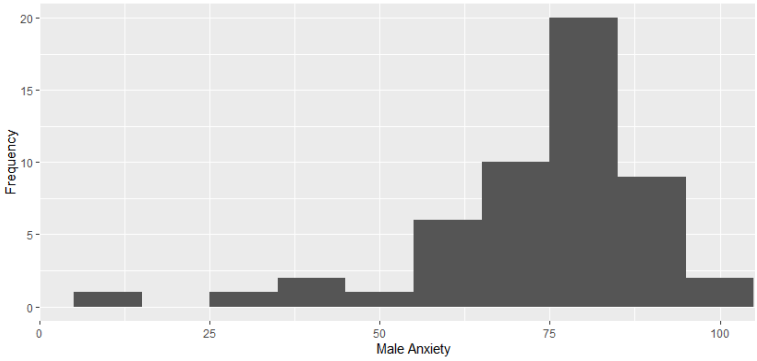

Figure 3: Male Anxiety

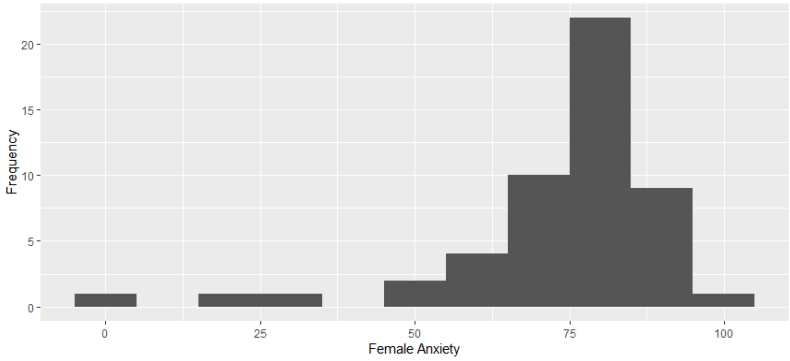

Figure 4: Female Anxiety

Figure 5 presents a line chart featuring error bars indicating the distribution of data around the mean anxiety values for males and females. The overlapping of bars between both genders suggests that the difference in anxiety levels is not statistically significant. The red line represents the contrast in mean anxiety between genders, revealing no alarming distinction. This observation aligns with the average anxiety scores depicted in Figures 1 and 2, where male anxiety averages at 74.38 and female anxiety at 74.303. Furthermore, a study conducted by researchers Saputra and Widayanti concluded that gender differences did not show a significant influence on academic anxiety. (3)

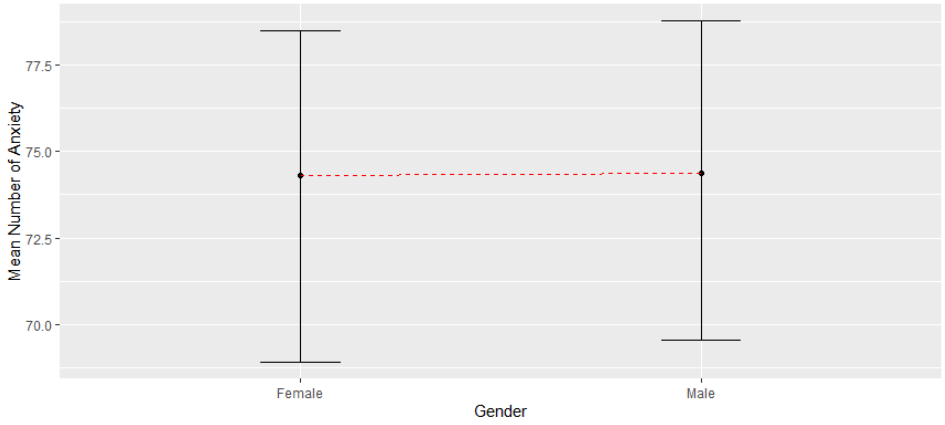

Figure 5: Line chart with error bars comparing female and male mean anxiety

Figure 6 illustrates the correlation between test takers' anxiety and exam scores. Hambree's comprehensive analysis in 1988 of 562 studies revealed a consistent pattern: higher test anxiety corresponds to lower performance. (2) This negative relationship holds true for both genders, indicating that anxiety levels significantly impact academic outcomes. Essentially, as confidence in the subject matter increases, test scores tend to improve. These findings underscore that test anxiety is a leading factor contributing to poor academic performance among students.

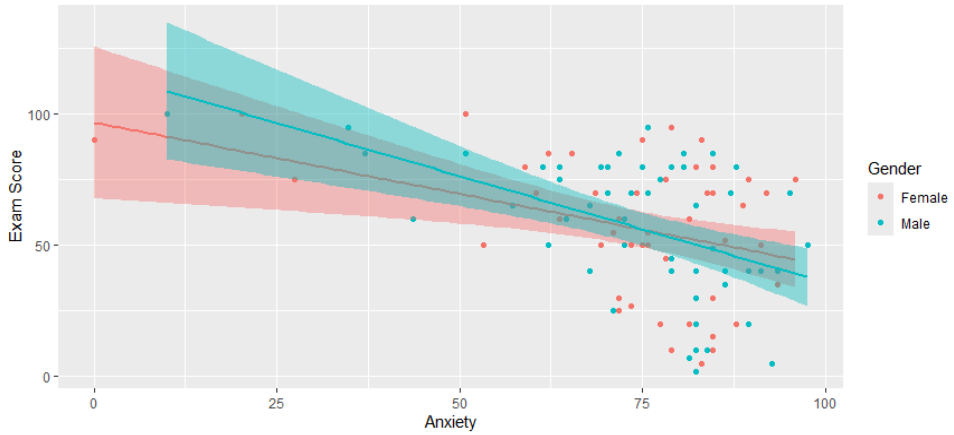

Figure 6: Grouped Scatter plot comparing anxiety with exam scores between male and female

Figure 7 shows a comparison between male and female revision hours. Revision hours mean the hours spent studying before an exam. This bar chart indicates that females on average spend more time studying than males. This supports Unwalla's analysis (6) concluding that females tend to be more self-disciplined, and attentive when it comes to their study habits than males. Although females do study more hours than males, it doesn't necessarily mean that they would have a higher score. As shown in Figure (1), and Figure (2) is the mean of each of the anxiety, revision, and exam grades for both the males and females. The male's exam mean is 56.69 while the females are 56.45 which shows that even with the females studying more hours as a whole the actual increase in exam scores is very little and insignificant.

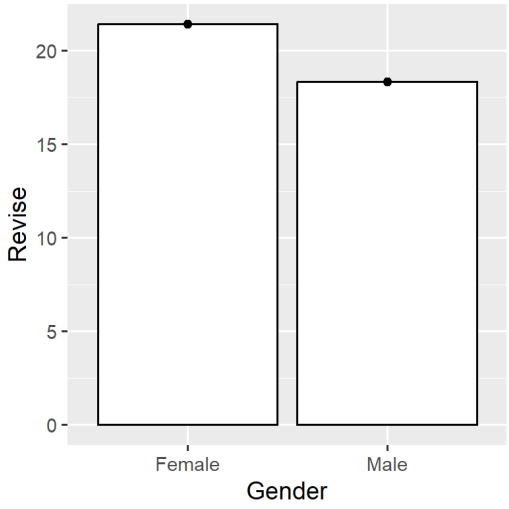

Figure 7: Bar chart comparing the revision/studying hours with the mean between males and females

Figure 8 displays the relationship between studying hours and exam scores. This positive relationship holds for both genders, indicating that studying hours greatly affect exam scores. In short, test scores tend to improve the higher the studying hours. Between the genders, it is shown that the female line has a higher positive correlation between studying hours and exam scores than the males.

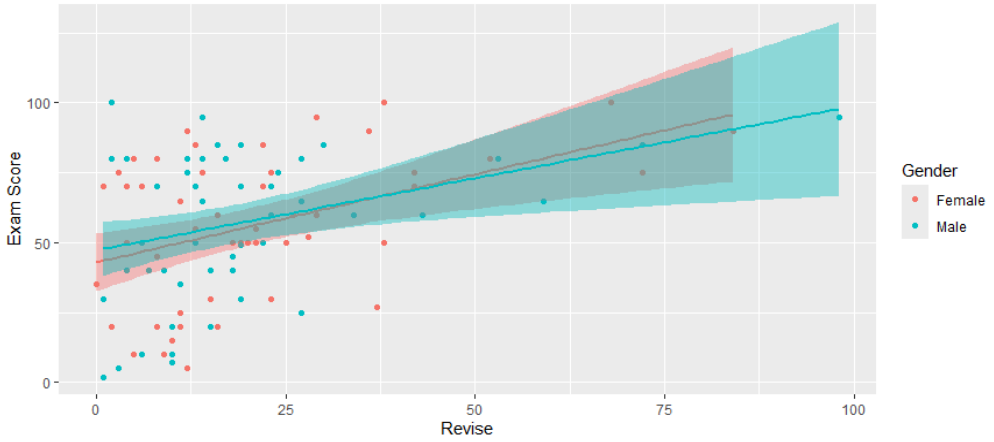

Figure 8: Grouped scatter plot showing the relationship between revision hours and exam scores between males and females

By looking at Figure 9 we can see that there is a high correlation between revision hours and the anxiety level of students. With the majority of the data being in a high anxiety but low revision hours section, this signifies that there could be a strong relationship in how revision hours affect the anxiety of students. In this case, the lower amount of revision hours a student achieved led to a higher anxiety level for that student. This is backed up even further as there are a few outliers showing that a high amount of revision tends to equal lower anxiety levels. The only major outlier is seen with the male data point with both low anxiety and low revision hours, but there is only 1 out of 100 demonstrating this.

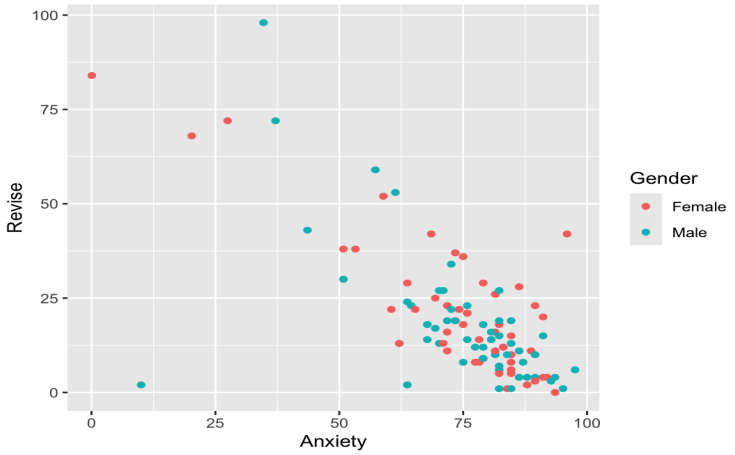

Figure 9: Scatterplot comparing anxiety with revision/studying hours between male and female

Results

As a result, the research data shows that having a higher anxiety level does not ultimately lower test results between males and females according to the data. Of the male subjects, the average anxiety score was 74.38 which led them to have an average test score of 56.69. Of the female subjects, the average anxiety score was 74.303 which resulted in an average test score of 56.45. Secondly, the research shows that having higher studying hours does not impact test scores between males and females according to the data. Of the male subjects, the average revision score was 18.33, leading them to have an average test score of 56.69. Of the female subjects, the average revision score was 21.41, resulting in an average test score of 56.45.

Conclusion

Through interpreting the data collected, the results strongly favor that higher anxiety levels lead to lower exam results. On the other hand, there was little correlation between a higher amount of revision hours and a higher exam result. In conclusion, we have found that anxiety affects exam results at a higher level than the number of revision hours affecting exam results.

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