Ahmedabad University

Study on Extracurricular Activities and Academic Performance of a College Student

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MAT 502 - Advanced Statistics
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Motivation

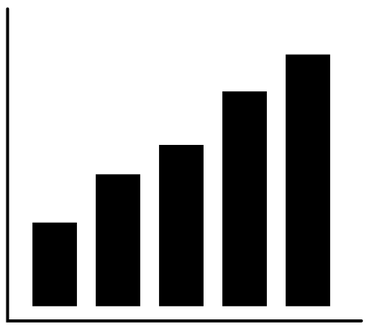
By studying the impact of different extracurricular activities on academic performance, educators can identify the most effective activities for enhancing academic success.

Objective

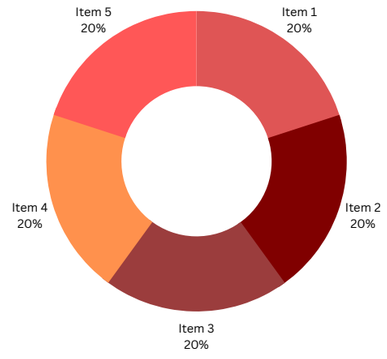
Our objective is to use statistical tests and methods to determine relation between extracurricular activities and academic performance of a college student. We want to test two hypotheses related to this case study.

Data Collection

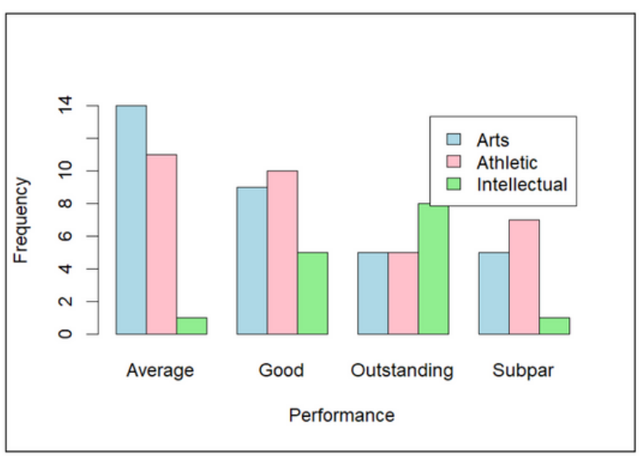
We conducted a survey of 81 college students and asked them some questions and prepared an excel file for analysis purposes. This is a method of convenience sampling. The questions were based on extracurricular activities and their academic performance. Most of the students didn't think there is an effect of extracurricular activities on their academic performance in any way. We have used RStudio for statistical analysis and Hypothesis testing.



Hypothesis Testing

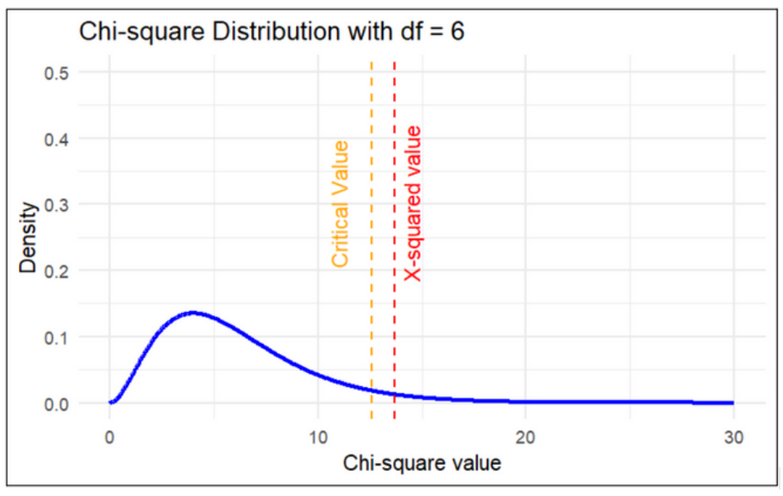


Chi-square

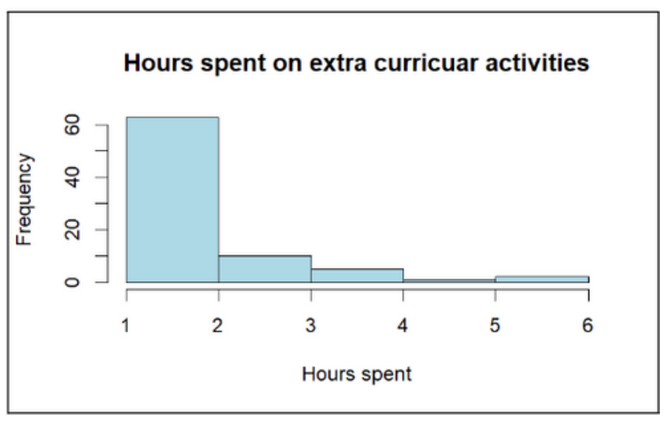


A Chi-square test of independence is used to determine if there is a significant relationship between two categorical variables. A Chi-square test is needed to determine if there is any association between the type of extracurricular activity and the academic performance of a college student.

The critical value is used to calculate the p-value, which is the probability of observing a test statistic as extreme as the one calculated from the sample, assuming the null hypothesis is true. The X-squared value obtained from the test measures the degree of association between the categorical variables.

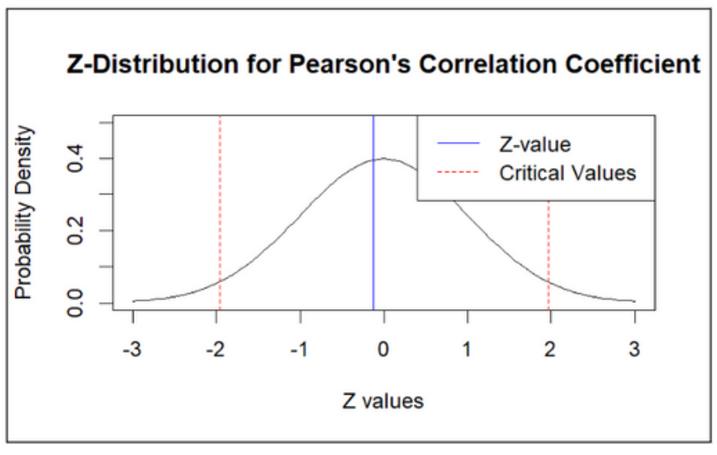


Pearson correlation



We use the z-test to test the significance of Pearson's correlation coefficient. In this case, the distribution of the Pearson correlation coefficient can be approximated by a normal distribution using Fisher's z-transformation.

We calculated the z-statistic using the Fisher's transformation formula z = 0.5 * log((1+r)/(1-r)), where r is the Pearson correlation coefficient. The critical value is obtained using the q-norm function, which calculates the z-score corresponding to the given probability level.



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