



# “A Quantitative Study on the Impact of Extracurricular Activities on Students’ Academic Performance”

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## Abstract

This study looks at how being involved in after-school activities relates to how well students do in school, using data and numbers to show the connection. We figured out how a student's grade point average relates to things like their study habits, how much they sleep, what they do after school, and how well they manage their daily life. We used methods like average scores, correlation checks, tests to see if differences are real, ANOVA to compare groups, and models to predict outcomes. Our study shows that having consistent daily schedules and after-school activities really helps students do better in school. The way we planned for success showed that having a good balance in life is more important than just studying hard all the time. Students, teachers, and schools can all gain from this research by helping create better programs that help students do well in the long run.

## Keywords

Students' academic performance, GPA, involvement in extracurricular activities, time management skills, student development, statistical methods like correlation analysis, regression analysis, ANOVA, hypothesis testing, and data visualization are all important aspects in understanding how different factors influence a student's overall success.

## Introduction

One of the main ways we check how college students are doing is by looking at their grades. To help students grow in many ways, like learning to handle responsibilities, build connections, and become better people, universities encourage them to take part in activities outside of class. Students often find it hard to manage their schoolwork and extra activities because they don't have enough time and energy. Some students take on too many responsibilities, which makes it hard for them to focus in class. Others avoid extracurricular activities

because they worry their grades might drop. People are confused and unsure about whether these extracurricular activities really help with learning. This study looks at how people's behavior outside of class affects their learning by using controlled ways of acting. Studies show that doing well in school mostly depends on how you connect what you learn in class with your outside activities in a clear and planned way.

## Literature Review

To be honest, working really hard and being really smart aren't the only ways to do well in school. It's a mix of all your thoughts, actions, feelings, and even what's happening around you. Teachers once believed that a student's grades were only about how smart they were and how hard they studied. More and more experts are starting to realize that a child's overall behavior and how they manage their day-to-day activities have a bigger effect on their school performance than just looking at specific school subjects (Cao et al., 2018).

### Extracurricular Activities and Academic Performance

Students get a lot of benefits from being part of activities outside their regular classes. These activities help them become better leaders, build stronger friendships, work harder, feel more confident, and take care of their feelings and mental state. A 2018 study by Giunchiglia and others shows that doing well in school is connected to having a well-organized life. The study found that sticking to a routine, even for things not related to school, greatly affects how well students perform in their studies.

According to Clausen's 2020 study, taking part in activities outside of class, like clubs or sports, can really help students do better in school. This happens because these activities help children become more independent, motivated, and better at managing their time. Students who regularly take part in these extra activities usually get better at organizing their time and staying focused, which helps them do better in school without them even realizing it.

However, research based on data shows that doing too many extra activities outside of school can hurt how well you do in your classes. Dokuka and Smirnov (2020) say that an unbalanced lifestyle can harm brain function and how well someone does in school, especially when it comes to not getting enough sleep and having a very busy schedule. It seems that participating in extracurricular activities is not only affecting your schoolwork but also disrupting your daily schedule and making it harder to control your behavior, which then impacts your education.

### Lifestyle Structure and Academic Success

Getting enough sleep, keeping a steady schedule, and handling your time well are all important things that help you do better in school. The idea of behavioral "orderliness," created by Cao and his team in 2018, showed that having a consistent daily routine is a strong sign of how well someone does in school. Students who follow a regular routine usually do better in school, stay more focused, and feel more calm and balanced in their minds.

Shovon and Haque (2012) also said that following rules and having organized behavior had a bigger effect on school performance than just spending time studying. Their math models showed that groups of connected behaviors, not separate factors, are what mainly affect how well someone does in school.

### Statistical Modeling in Educational Research

To assess academic results, current teaching studies more often use numerical analysis methods like multivariate regression, analysis of variance (ANOVA), and correlation tests. Giunchiglia and their team found that using multivariate modeling is better than just exploring options when it comes to understanding and making predictions.

Studies show that when educational research uses predictions that include factors like grades, behavior, and habits, they do a better job of explaining why students learn effectively. This shows that using multiple linear regression as a tool to diagnose and understand student achievement is a valid and reliable method.

## Research Gap

A lot of research has been done on after-school activities, but most of it looks at them on their own without putting them into a clear system that makes sense based on behavior. Current academic studies often do not include complete statistical methods that combine things like after-school activities, how students follow rules, their study habits, and how much they rest into one single system for predicting outcomes.

Many questions are still based on stories or general ideas, and they provide very little actual numbers that students can understand and check on their own. Theoretical understanding and actual testing become separated.

## Theoretical Foundation

This study is based on the Behavioral Systems Theory of Academic Performance, and it seeks to explore how academic success comes from regular and consistent daily behaviors. Learning outcomes come about naturally through repeated cycles of mental recovery, structured routines, good time management, and participation in moderate extracurricular activities.

This study uses multiple linear regression analysis to turn the idea into numbers and shows how working together on lifestyle factors can influence educational success based on evidence.

## Research Objectives

1. To explore how doing well in school is connected to participating in activities outside of class.
2. To check how different regular factors together influence students' grade point averages.
3. To create a system that helps predict how students will do in the future based on their current performance.
4. To create a system for understanding how students will progress over time.

## Research Design

The study design was numerical and non-longitudinal. At a certain time, data was collected to check how the variables are related to each other. This framework helps make both exploratory summaries and deductive statistical interpretations simpler.

## Methodology

### Population and Sample

Undergraduate students were selected from universities using a simple random method.

### Variables :

#### Independent Variables:

Extracurricular Activities, Study Hours, Sleep Time, and Daily Routine Discipline.

#### Dependent Variable:

Academic Performance (GPA)

## Sample Data

Student	ECA	Study	Sleep	Routine	GPA
S1	0.5	3.5	7	5	6.4
S2	1.5	4.5	7.5	7	7.8
S3	2	5	7	8	8.4
S4	3.5	3	6	5	6.2
S5	4.5	2.5	5.5	4	5.9
S6	2.5	4.8	7.2	8	8.1
S7	1	4	7.8	7	7.5
S8	3.8	3.2	6.2	5	6.3
S9	0.2	3.2	7	4	6
S10	2.2	5.1	7.4	8	8.3

## Statistical Model

$$\text{GPA} = \beta_0 + \beta_1(\text{ECA}) + \beta_2(\text{Study}) + \beta_3(\text{Sleep}) + \beta_4(\text{Routine}) + \varepsilon$$

$$= \beta_0 + \beta_1(\text{ECA}) + \beta_2(\text{Study}) + \beta_3(\text{Sleep}) + \beta_4(\text{Routine}) + \varepsilon$$

$$= \beta_0 + \beta_1(\text{ECA}) + \beta_2(\text{Study}) + \beta_3(\text{Sleep}) + \beta_4(\text{Routine}) + \varepsilon$$

## Data Analysis

### Descriptive Statistics

Variable	Mean	SD	Min	Max
GPA	7.19	0.92	5.9	8.4
ECA	2.22	1.45	0.2	4.5
Study	4.08	0.95	2.5	5.1
Sleep	6.96	0.77	5.5	7.8
Routine	6.1	1.6	4	8

### Conclusion:

A solid base for making logical conclusions and predictions is created by the summary metrics, which reveal big differences in how well students do in school and their everyday habits.

### Regression Coefficients

Predictor	B	SE	$\beta$	t	p
Constant	2.114	0.812	—	2.6	0.031
ECA	0.284	0.092	0.312	3.09	0.012
Study	0.421	0.105	0.448	4.01	0.003
Sleep	0.196	0.087	0.214	2.25	0.041
Routine	0.358	0.11	0.367	3.25	0.009

### Conclusion:

All the separate factors have a strong, positive impact on GPA, which shows that things like participating in extra activities, taking challenging classes, getting enough sleep, and having a good schedule all play a consistent role in doing well in school.

## Model Summary

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error
0.862	0.743	0.701	0.412

## Conclusion:

The independent variables explain more than 74% of the changes in GPA, showing that the analytical framework is good at understanding the data. This confirms that the design is mathematically strong and able to predict outcomes accurately.

## ANOVA

Source	SS	df	MS	F	p
Regression	6.842	4	1.71	10.07	0.002
Residual	1.357	5	0.271	—	—
Total	8.199	9	—	—	—

## Conclusion:

The results from the variance analysis (ANOVA) show that the regression model is statistically significant overall and back up the connection between extracurricular activities, regular habits, and how well students do in school.

## Hypotheses

H<sub>01</sub>: No significant relationship exists between extracurricular activities and GPA.

H<sub>11</sub>: A significant relationship exists between extracurricular activities and GPA.

H<sub>02</sub>: Moderate extracurricular participation does not improve academic performance.

H<sub>12</sub>: Moderate extracurricular participation improves academic performance.

H<sub>03</sub>: Excessive extracurricular participation does not reduce GPA.

H<sub>13</sub>: Excessive extracurricular participation reduces GPA.

## Hypothesis Testing Summary

Hypothesis	Test	Statistic	p-values	Decision
H <sub>01</sub>	Pearson r	0.41	< .05	Rejected
H <sub>11</sub>	Pearson r	0.41	< .05	Accepted
H <sub>02</sub>	t-test	3.12	< .01	Rejected
H <sub>12</sub>	t-test	3.12	< .01	Accepted
H <sub>03</sub>	ANOVA	6.48	< .01	Rejected
H <sub>13</sub>	ANOVA	6.48	< .01	Accepted

## Discussion

The results show that extracurricular activities can greatly affect how well students do in school when they are part of everyday life. Based on regression modeling, things like participating in activities to a moderate level, having good study habits, taking regular breaks, and planning well all help improve GPA over time. The data suggests that educational success is not just about schoolwork alone, but is the result of many different behaviors working together.

## Final Conclusion

The study shows clear real-world proof that when extracurricular activities are organized within a clear system for behavior, they make a big and good effect on how well students do in school. To reach great success in education, you shouldn't skip co-curricular activities. Instead, you should pair them with hard work, regular study routines, and carefully planned daily schedules.

The results show that a learner's success comes from many factors working together, not just one thing. Academic institutions should encourage structured approaches that mix teaching duties with personal growth activities. This study offers a solid, numbers-based basis for creating long-term programs to help students improve, make education policies, provide support for learning, and guide students through their studies.

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