A Research on the Relationship between Sleeping time and Concentration in class

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Proposal

1,*Introduction*

Our group's aim is to investigate whether there is a relationship between sleeping time and concentration in class among BNDS students. We have observed that many students struggle to maintain focus throughout the day, often choosing to concentrate only on certain subjects that they find challenging or important, while neglecting others. This phenomenon is quite common among students, and we are interested in exploring its underlying causes.

One possible hypothesis is that students' lack of sleep may be affecting their ability to focus in class. We want to test the validity of this hypothesis using statistical methods. To do so, we are conducting a study to investigate whether there is a relationship between sleeping time and students' ability to concentrate in class.

Our study will involve collecting data on students' sleeping habits and concentration levels using a questionnaire. We will use statistical methods such as correlation analysis and regression analysis to examine the relationship between these variables.

By conducting this study, we hope to shed light on the factors that affect students' ability to concentrate in class and provide insights on how to improve their overall academic performance. This research has important implications for both students and educators, and we believe that our findings will be of great value to the BNDS community and beyond.

2,Background research

There is a common belief that people who get enough sleep will have better energy levels the next day. However, due to academic stress and work pressure, many students and workers burn the midnight oil and still wake up early the next morning.
Sleeping is one of the most important physiological activities for humans as it is the golden hour for replenishing energy and growth. However, students who stay up late also behave differently

in class the next day. Some are very energetic, some are very tired, and some show no significant changes from their normal sleep patterns. The reason for this may be twofold. First, when the brain is overworked, it can become highly stimulated and less tiring. Second, because students are required to attend class on time, this external constraint can force a high degree of concentration.

Because the effect of sleep on mental state varies from person to person, we aim to explore whether the amount of sleep one gets affects their mental state the following day.

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3,Sampling and Experimental design

(1), Variables: Students' Sleeping time and the Sleepiness of studentss(measured by The Epworth Sleepiness Scale – ESS)

(2) , Type of study: This is a observational study, since we need to ask students how much time they slept last night and their concentration in class.

(3) Data collection: We use a online questionnaire to collect our data.

(4) Method: After collecting the data, we will use chi-square independent test to determine whether there is a relationship between the two variables.

4,Procedures

We use a sleepiness level test(ESS) questionnaire, which is a widely recognized measurement of people's sleepiness, and analyzed the scores obtained from different participants to see if there was a direct relationship between the two variables.

For each question in the questionnaire, each selection have marks from 0 to 3("never" earns 0 and "often" earns 3). After the volunteers finish it, we will sum up the whole score to estimate their lethargy.

Example:

Then, we make a table with participants' sleeping time on the horizontal axis and their ESS score distribution on the vertical axis in order to use the chi-square independence test.

	5Hour Sleeping	6Hour sleeping	7Hour Sleeping	8Hour Sleeping
1-5	6	6	6	8
6-10	5	10	10	6
11-15	6	19	14	7
16-20	5	9	8	5
21-25	8	6	7	5

5,Calculations and analysis

To determine whether there is a relationship between students' sleeping time and their sleepiness during the day(ESS score), we are going to set up a hypothesis test.

H0: The variables are independent, t here is no significance relationship between Sleeping time and the students' sleepiness(ESS score).

Ha:The variables are not independent.

To verify whether the two are related, we chose to use the Chi-Square independent test.

Conditions:

(1) The sample was randomly selected from different schools G11 students.

(2) All the expected value for all 9 cells were all at least 5, as seen in the following table that lists expected counts in parentheses beside the observed counts:

	5Hour Sleeping	6Hour sleeping	7Hour Sleeping	8Hour Sleeping
1-5	6(5)	6(8.33)	6(7.5)	8(5.16)
6-10	5(5.96)	10(9.94)	10(8.94)	6(6.16)
11-15	6(8.85)	19(14.74)	14(13.27)	7(9.14)
16-20	5(5.19)	9(8.65)	8(7.79)	5(5.37)
21-25	8(5)	6(8.33)	7(7.5)	5(5.17)

$$X^2 = \sum \frac{(O-E)^2}{E} = \boxed{8.222}$$

The p-value is p(X2>=8.222)=0.76, based on (4-1)(5-1)=12 degree of freedom.

Since p-value> α=0.05, we fail to reject the null hypothesis. we have enough evidence to prove H0 is correct, that is, sleeping time and following day concentration in class are independent.

6. Problems in the Project/Suggestions for Future

When collecting data through a questionnaire, there is a risk that the sample we collect may not accurately represent the true characteristics of grade 11 students. Students who are willing to fill out questionnaires may have subjective biases and may exaggerate or minimize their level of sleepiness, which could affect the data we collect. Therefore, in order to conduct more reliable research, we need to increase the sample size and develop more scientifically valid questions to measure mental focus.

Moreover, there are potential variables that could affect the data we collect. For example, some students may consume coffee or tea every day, which can make them feel more alert even if they have slept very little. Additionally, many students may sleep for longer periods on weekends, which can allow them to cope with less sleep during school days without feeling sleepy. In future research, we should ask participants whether they consume coffee or not and adjust their scores accordingly to better reflect the actual situation.

7,Conclusion

Based on the hypothesis test, we realized that sleeping time and the following day concentration does not have a strong relationship with each other. The reason might be that everyone's internal clock is different and energy lasts for different amounts of time. For example, some people may enter a more excited state because they don't rest for a long time, while others may tire out quickly because they don't get enough rest. However, the data still clearly shows that students who sleep 8 hours a day have a lower score, which means they are more concentrate than students who sleep 6 or 7 hours a day.

8,Reference

[1]Johns MW: A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep. 1991, 14 (6): 540-5.