

Cognitive Performance and Daily Life Activities Influenced By Sleeping Hours of Adults

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ABSTRACT

The present study has explored the adult engineering students sleeping hours affect their performance in arithmetic and verbal test. There are only a few studies related to cognitive function and sleeping hours. This study focused on how students sleeping hours affect their cognitive performance like arithmetic and verbal. The subjects were 55 healthy engineering students there are 30 males and 25 females were taken for experiment. The result shows that the number of errors increased as the number of hours slept decreased. Also, the errors were not restricted to a single person but spread out over many subjects. This shows that reduction in a number of hours slept caused most of the subjects to commit a greater number of errors of both numerical and verbal types. A 7-hour sleeping was enabled 46 of the subjects to attend all the classes whereas 9 of them missed classes in between the day and not the early morning ones. The cause of absenteeism was due to personal reasons. Based on this experiment decreasing the number of sleep student unable to attend all classes and also they do not comport with physically and mentally.

Keywords: *Sleep, Students, Engineering, Arithmetic Performance, Verbal Test Performance.*

There is a general conception among people that sleeping at least 7 to 8 hours before an exam allows the brain to comprehend questions better. The aim of this experiment is to find the correlation between number of hours of sleep and verbal performance.

The test questions were a mix of arithmetic and verbal problems in order to find the variance in performance when different types of questions were presented to the subject. Insufficient sleep reduces general awareness and concentration, resulting in slowed cognitive dispensation. Functions of the brain and cognitive performance will impair by inadequate sleep. They are not able to routine their next day activities in effectively which is by insufficient sleep. Inadequate

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Received: December 30, 2016; Revision Received: January 19, 2017; Accepted: January 30, 2017

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sleep notably suffers the prefrontal cortex, which is responsible for higher order functions including creativity, language, working memory and logical reasoning. Yoo et al, verified that a single night of less duration sleep will affect the hippocampus and it leads to memory problem and knowledge retention. Healthy People 2020 have revealed that adults having sufficient sleep will have positive effects and it will improve quality of life, health, wellness, productivity and public safety.

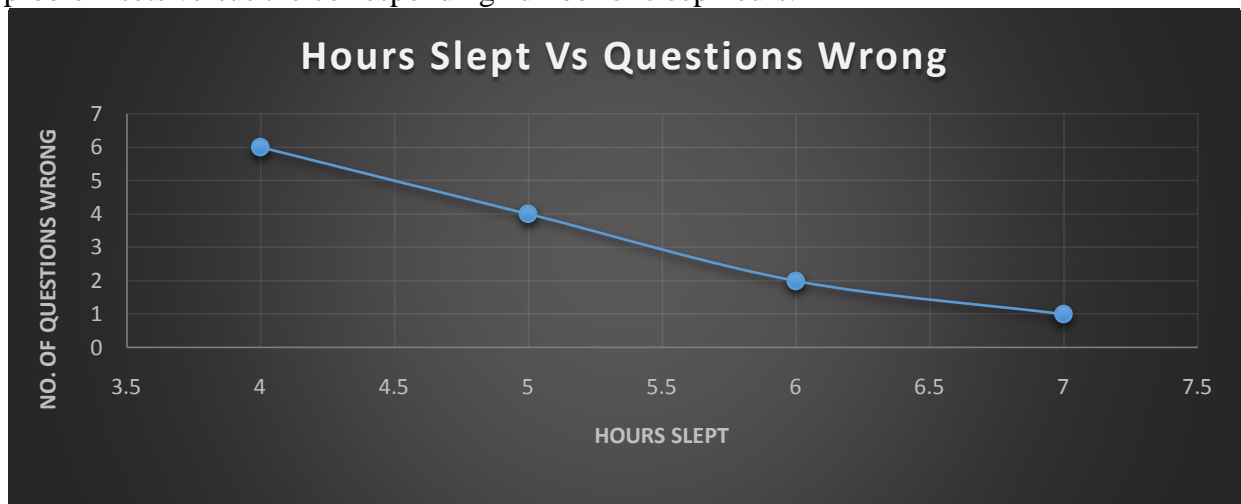
METHODOLOGY

Fifty Five Student volunteered for this experiment. Each one of them was asked to sleep a particular number of hours at night. The next day, they were made to give the test in the morning at 10 AM. Then a one-week break was given to each one of them before repeating the experiment on that same day for a different number of hours. Sunday night was chosen for sleeping the given number of hours and Monday morning was chosen as the time of the test. This selection was based on the convenience of the subjects. The time duration for completion of the tests was chosen as 5 minutes. Only pen and paper was allowed for calculations. The number of hours was chosen as 4, 5, 6 and 7. Less than 4 hours was not considered as it may have caused the subjects to not feel well the next day, also it will affect the study. The responses were collected in cognitive laboratory and mistakes were identified in each observation. The number and the type of errors were noted.

For the second analysis, Fifty five volunteers were asked to sleep for 4 hours and 7 hours on different Sundays. For the 4-hour slot, they slept from morning 3 am to 7 am in order to decide if they could attend classes from 8 am. For the 7-hour slot, they slept from 12 am to 7 am. They were asked to provide the details of absenteeism from classes the next day. This data was tabulated and a graph was plotted. The study response was 100% as all of them gave the tests as and when required. There are 30 males and 25 females were taken for the comparison and also they come under the age group of 20 to 25 years.

RESULTS AND DISCUSSIONS

Observation 1: The following graph is plotted between the numbers of mistakes in each of the problem sets versus the corresponding number of sleep hours.



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The type of mistakes committed was categorized as word problem and numerical.

Table 1: Single subject performance in four trails (Experiment).

Trail	Word Problem error	Numerical error
1	1	5
2	3	1
3	0	2
4	1	0

Table.1 shows that single subject was experimented in four trails and each trail did for each day. This trail has done to know the difference between four days variation of sleep and verbal and arithmetic performance. Trail was helped to move further observation (Experiment) and strengthen the procedure of experiment.

Table 2: Sleep hours and Cognitive performance.

Sleep Hours	Word problem error (N=55)	Arithmetic error (N=55)	Total
4	6	9	15
5	3	5	8
6	2	1	3
7	0	0	0

From the graph, it can be clearly seen that the number of errors increased as the number of hours slept decreased. Also, the errors were not restricted to a single person but spread out over many subjects. This shows that reduction in number of hours slept caused most of the subjects to commit greater number of errors of both numerical and verbal types.

Upon analysis, the main reasons found for making numerical errors were:

1. Forgetting basic rules such as DMAS (division multiplication addition subtraction).
2. Lack of focus when many numbers are presented in a single question. This leads to jumbling up of the numbers which look similar to each other.
Eg. 0.05 and 0.55.
3. Substitution of wrong values from the question to the answer.
4. Calculation errors.

The reasons for errors in word problems were:

1. Reading the questions incorrectly.
2. Only focussing on the numbers in the questions and not the wordings.
Eg. Giving the answer in hours instead of minutes as stated by the question in boldface.

From the above results clearly states that there is a strong relationship between sleeping hours and cognitive performance. Sleep is taking main role to Consolidating memory and learning

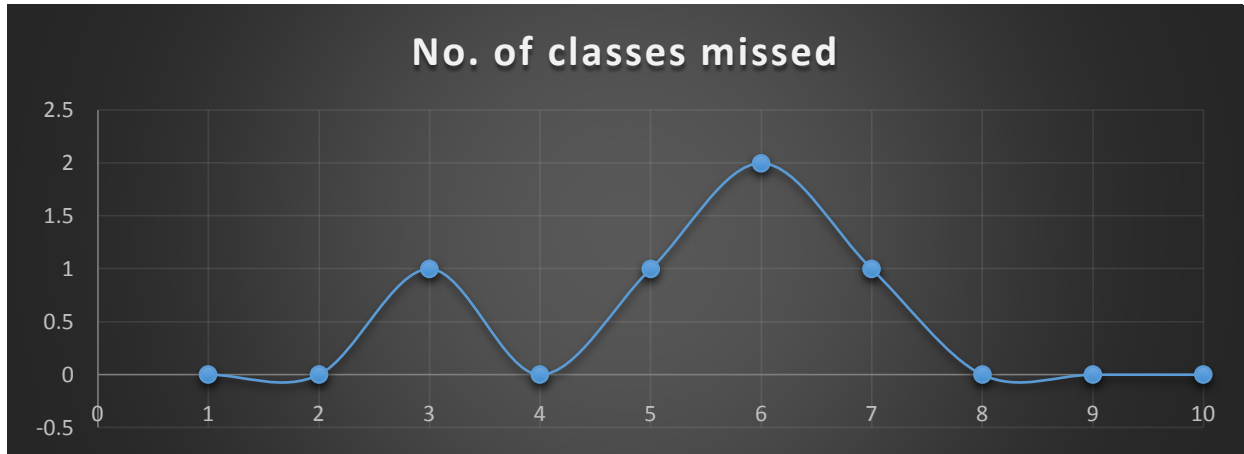
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process in the cognition. All other higher mental process Tasks are most of the time depending on the sleep hours.

Observation 2:

The graph below shows the number of classes missed by each person when they slept for 7 hours the previous night.

Descriptions: N= 55 (0 = 0, 0.5 = 5, 1 = 15, 1.5 = 30, 2 = 45, 2.5 = 55)



The graph below shows the number of classes missed by each person when they slept for 4 hours the previous night.



Each set comprised of 10 questions, shown below are snippets of the same.

INFERENCE

When the subjects slept for 4 hours the previous night, the number of classes missed the next day increased greatly as compared to when they slept for 7 hours. 40 of them missed the first one or two classes and then went for the rest of the classes, so it clearly states that 80% of subjects having the problem when they slept four hours in the previous night. A couple of the subjects missed all the classes for the day. Only 13 subjects were able to attend all the classes. A 7-hour sleeping was enabled 46 of the subjects to attend all the classes whereas 9 of them missed classes in between the day and not the early morning ones. The cause of absenteeism was due to personal reasons. Based on this experiment decreasing the number of sleep student unable to

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attend all classes and also they do not comport with physically and mentally. We did not find any difference between male and female subjects from the experiment.

LIMITATION OF THE STUDY

This study has several limitations, because this is only focused on the engineering students group and the sample size is small. This study should be extended to all students groups like medical, business, arts and science, etc. Further extension of this study should be including neuroimaging techniques for knowing the brain activities related to sleep, verbal and arithmetic performance.

CONCLUSION

All these values indicate that a sound sleep is critical for performing activities of the next day. The respondents also indicated that inadequate sleep made one be unable to stay focused on a task the following day, influenced short-term and long term retention of newly learned content and resulted in daytime sleepiness. Engineering students should avail necessary awareness about sleeping habits and mandatory of sleep. This awareness surely enhances their academic performance as well as extracurricular activities.

Acknowledgments

The author appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interests

The author declared no conflict of interests.

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How to cite this article: Maharishi R, Rathnasabapathy M (2017), Cognitive Performance and Daily Life Activities Influenced By Sleeping Hours of Adults, *International Journal of Indian Psychology*, Volume 4, Issue 2, No. 86, ISSN:2348-5396 (e), ISSN:2349-3429 (p), DIP:18.01.028/20170402, ISBN:978-1-365-68609-2