

A GOOD NIGHT'S REST: HOW MUCH ARE STUDENTS SLEEPING?

BACKGROUND
From the moment you close your eyes each night, hundreds of intricate biological processes begin to work in parallel throughout your body and brain, not all of which are fully understood by science. It's easy to forget the important role that sleep plays in each of our lives, and this is where our problem lies: The majority of school-aged youth fail to get enough sleep each night. This is a serious problem. Dozens of studies over the years have linked sleep deprivation to a diverse array health problems, including obesity, heart disease and stroke¹, as well as depression and anxiety². Furthermore, a lack of sleep has also been found to impact academic performance: a study performed by the Journal of Sleep Research found that students with a sleep deficit generally suffered lower marks at school³. Fortunately, theories are starting to arise as to what might be contributing to this sleep loss. Among the strong correlations that have been made, technology use is high on the list. So, how do our students stack up?
Just how much are our students actually sleeping, and are there any factors affecting it?

AIM
To analyse how much time students in high school are receiving enough sleep, and whether the amount of sleep they receive is affected by technology use and grade level.

DATA COLLECTION
An anonymous survey was distributed and filled out by 94 students from grades 8 through 12, all on one day. In addition to age and gender, the survey asked the participants to record how long they had slept the previous night, what they were doing before going to sleep, whether they had any devices charging in their room, and whether they personally believed that they generally received enough sleep. Though there was a relatively even balance between male and female respondents, there were significantly more participants year 10 and year 8. There were no outliers, save for two trolls who were identified via absurd responses, and subsequently removed from the analysis in order to avoid contamination of data.

HYPOTHESIS
It is predicted that the majority of students will be receiving less sleep than the 9 hours recommended, and that higher grade levels, due to greater technology usage as well as a greater workload, will all have measurably lower amounts of sleep.

GRADE + GENDER

It would be expected that as students progress through school, the workload would get harder and that they would lose more sleep to assessment. Similarly, one might expect that there would be a difference between genders, with different behavioural traits and habits.

The chart to the right shows the spread of data for each grade. Interestingly, there is no obvious correlation through grades, as the IQR and median both fluctuate seemingly without a pattern. Of note, however, is a relatively linear downwards trend in the bottom of the range from year 9 onwards.

Another interesting correlation appears when we look at the difference between mean and median, as in the table to the left. The median stays relatively constant at around 8 hours, however it becomes sharply negatively skewed when the mean takes a large dip between grade in grades 11 and 12. This might be attributed to the increased difficulty of college, where some students are unable to maintain healthy sleep practices.

The chart to the right shows the difference between males and females across grades. It explains the previous observation, in that female sleep rates are significantly higher than that of males in college.

The pie charts in the frame to the far right show the stark differences between males and females when it comes to rating one's own sleep against actual fact. 69% of males and 42% of females believed that they had had enough sleep, when in actual fact, the numbers were 34% and 32% respectively.

Grade	Mean	Med
8	7.7	8
9	8.7	9
10	7.7	8
11	6.5	7.5
12	6.6	8

Male Opinion on Enough Sleep
● Yes ● No
31% 69%

Female Opinion on Enough Sleep
● Yes ● No
58% 42%

Students Having Enough Sleep
● Yes ● No
67% 33%

TECHNOLOGY

The usage of internet-enabled devices has increased dramatically in the last decade, especially among the teenage demographic. Given that existing studies have linked technology to sleep deprivation, our empirical data should show a similar correlation.

The chart to the right depicts the average amount of sleep that each person in the survey received in relation to the devices that they had stored or charging in their bedroom. Those who had no devices listed received the greatest average amount of sleep — approximately 30mins more.

Total Sleep by Type of Activity

Also of note is that the greater the average amount of sleep, the more portable the associated device is. This may be because people with more permanent installations like games consoles feel inclined to use them extensively.

The above chart depicts the difference in mean sleep for people who engaged in technology-related activities before sleeping and those who didn't. The observed difference is jarring, with students engaging in non-tech-related activities receiving 1.1 more hours of sleep on average.

OVERALL SLEEP

Studies have found that the right amount of sleep for a teenager is approximately nine hours and fifteen minutes. Despite this, people between the ages of 13 and 18, on average, receive about two hours less, at seven hours and fifteen minutes⁴. Though the sample size of this particular study is not large enough to fully iron out any fluctuations, it demonstrates similar results to those observed previously. The overall average for the sample was 7.7 hours, which equates to about 30 minutes more than than the average observed in earlier studies.

The histogram to the right depicts frequency vs. hours slept. The data matches standard distribution, albeit with a negative skew. This skew is also evident when comparing the mean and median, 7.7 and 8 hours respectively. The difference in the two values indicates that there are more people receiving substantially less sleep, pulling down the mean, without affecting the median.

This is reflected in the pie charts to the left, which show that only 33% of people surveyed received the appropriate amount of sleep. Interestingly enough, 51% of people surveyed believed that they were receiving enough sleep, showing that many teens do not even realise that they are not receiving enough sleep.

CONCLUSION:

Considering how critical a role sleep plays in our biological function, it is alarming to see how many of the surveyed students are not receiving enough sleep. As predicted, keeping devices in the bedroom and the use of technology before bed had a negative impact on the amount of sleep that a given student received. As such, it is recommended to refrain from using technology before bed. Contrary to the hypothesis, however, the grade level of a student played far less of a role in the amount of sleep they received. Perhaps most interesting of all, however, was the severe overestimation by the male population as to whether they had had the correct amount of sleep, particularly when compared with their female counterparts. Perhaps this is arrogance, or maybe males simply feel the impacts of minor sleep deprivation to a lesser degree. Were this study were to be repeated, a more even sample between grades would be desirable; as would sleep information across a number of nights. If anything is to be learnt from this survey, it is that the teenage population needs to be more conscientious of their sleep patterns, and (somewhat ironically) put more effort into sleeping. Though you may think you get your forty winks, perhaps it's worth trying out forty one.

REFERENCES:

- <https://www.nhlbi.nih.gov/health-topics/sleep-deprivation-and-deficiency>
- https://www.health.harvard.edu/newsletter_article/sleep-and-mental-health
- <https://www.sleepfoundation.org/sleep-topics/teens-and-sleep>
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