



Adolescents who sleep for longer – and from an earlier bedtime – than their peers tend to have improved brain function and perform better at cognitive tests, researchers from the UK and China have shown.



Photo Ahtziri Lagarde, Unsplash

But the study of adolescents in the US also showed that even those with better sleeping habits were not reaching the amount of sleep recommended for their age group.

Sleep plays an important role in helping our bodies function. It is thought that while we are asleep, toxins that have built up in our brains are cleared out, and brain connections are consolidated and pruned, enhancing memory, learning, and problem-solving skills. Sleep has also been shown to boost our immune systems and improve our mental health.

During adolescence, our sleep patterns change. We tend to start going to bed later and sleeping less, which affects our body clocks. All of this coincides with a period of important development in our brain function and cognitive development. The American Academy of Sleep Medicine says that the ideal amount of sleep during this period is between eight- and 10-hours' sleep.

Professor Barbara Sahakian from the Department of Psychiatry at the University of Cambridge said: “Regularly getting a good night’s sleep is important in helping us function properly, but while we know a lot about

sleep in adulthood and later life, we know surprisingly little about sleep in adolescence, even though this is a crucial time in our development. How long do young people sleep for, for example, and what impact does this have on their brain function and cognitive performance?”

Studies looking at how much sleep adolescents get usually rely on self-reporting, which can be inaccurate. To get around this, a team led by researchers at Fudan University, Shanghai, and the University of Cambridge turned to data from the Adolescent Brain Cognitive Development (ABCD) Study, the largest long-term study of brain development and child health in the United States.



Photo minh đồ, Unsplash

As part of the ABCD Study, more than 3,200 adolescents aged 11-12 years old had been given FitBits, allowing the researchers to look at objective data on their sleep patterns and to compare it against brain scans and results from cognitive tests. The team double-checked their results against two additional groups of 13-14 years old, totalling around 1,190 participants. The results are published in Cell Reports.

The team found that the adolescents could be divided broadly into one of three groups:

- Group One, accounting for around 39% of participants, slept an average (mean) of 7 hours 10 mins. They tended to go to bed and fall asleep the latest and wake up the earliest.
- Group Two, accounting for 24% of participants, slept an average of 7 hours 21 mins. They had average levels across all sleep characteristics.
- Group Three, accounting for 37% of participants, slept an average of 7 hours 25 mins. They tended to go to bed and fall asleep the earliest and had lower heart rates during sleep.

Although the researchers found no significant differences in school achievement between the groups, when it came to cognitive tests looking at aspects such as vocabulary, reading, problem solving and focus, Group Three performed better than Group Two, which in turn performed better than Group One.

Group Three also had the largest brain volume and best brain functions, with Group One the smallest volume and poorest brain functions.

Professor Sahakian said: “Even though the differences in the amount of sleep that each group got was relatively small, at just over a quarter-of-an-hour between the best and worst sleepers, we could still see differences in brain structure and activity and in how well they did at tasks. This drives home to us just how important it is to have a good night’s sleep at this important time in life.”

First author Dr Qing Ma from Fudan University said: “Although our study can’t answer conclusively whether young people have better brain function and perform better at tests because they sleep better, there are a number of studies that would support this idea. For example, research has shown the benefits of sleep on memory, especially on memory consolidation, which is important for learning.”



Photo Joshua Chehov, Unsplash

The researchers also assessed the participants' heart rates, finding that Group Three had the lowest heart rates across the sleep states and Group One the highest. Lower heart rates are usually a sign of better health, whereas higher rates often accompany poor sleep quality like restless sleep, frequent awakenings and excessive day-time sleepiness.

Because the ABCD Study is a longitudinal study – that is, one that follows its participants over time – the team was able to show that the differences in sleep patterns, brain structure and function, and cognitive performance, tended to be present two years before and two years after the snapshot that they looked at.

Senior author Dr Wei Cheng from Fudan University added: “Given the importance of sleep, we now need to look at why some children go to bed later and sleep less than others. Is it because of playing videogames or smartphones, for example, or is it just that their body clocks do not tell them it’s time to sleep until later?”

The research was supported by the National Key R&D Program of China, National Natural Science Foundation of China, National Postdoctoral Foundation of China and Shanghai Postdoctoral Excellence Program. The ABCD Study is supported by the National Institutes of Health.

*Reference:*

*Ma, Q et al. Neural correlates of device-based sleep characteristics in adolescents. Cell Reports; 22 Apr 2025; DOI: 10.1016/j.celrep.2025.115565*

*Source: University of Cambridge*