

HEALTH & MEDICINE

Later school starts linked to better teen grades

Low-income students also may find it easier to get to school, the new data show



If school starts later in the morning, teenagers are more ready to learn. In a new study, students wore wrist activity trackers that pinpointed when they fell asleep and woke up. The results confirmed the benefit of later start times.

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By **Silke Schmidt**

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If you think school starts too early in the day, you're not alone. Experts have long argued for later start times in middle and high school. A new study used activity trackers worn on the wrist to see how such a delay affected kids in a real school. And it showed kids slept more, got better grades and missed fewer days of class when their school day started somewhat later.

Explainer: The teenage body clock

Adolescents are different from younger kids. Most don't feel ready for bed until after 10:30 p.m. That's because puberty shifts everyone's *circadian* (Sur-KAY-dee-uhn) rhythms. These are the 24-hour cycles our bodies naturally follow. Among their tasks: They help regulate when we fall asleep and when we waken.

The shift in our body clocks may not be as obvious as puberty's physical changes. But it's just as important.

The shift is related to melatonin (Mel-uh-TONE-in), the hormone that helps us fall asleep. "When puberty begins, a teenager's body doesn't secrete that hormone until later in the evening," notes Kyla Wahlstrom. She is an expert on human development and education at the University of Minnesota, in Minneapolis. She was not involved in the new study.

Explainer: What is a hormone?

Even with their shifted rhythms, teenagers still need 8 to 10 hours of sleep each night. If they fall asleep late, they'll need more snooze time in the morning. That's why doctors, teachers and scientists have recommended for

many years that school should start later.

Some school districts have listened. For the 2016–2017 academic year, the high-school start time in Seattle, Wash., changed from 7:50 to 8:45 a.m. The new study analyzed the results of that delay.

A real-world experiment

The researchers looked at sleep patterns in high school sophomores a few months before the schedule change. Then they studied the following year's sophomores eight months after the change. In all, about 90 students at two schools took part in the study. The teachers were the same each time. Only the students differed. This way, the researchers could compare students of the same age and grade.

Instead of just asking students how long they slept, researchers had students wear activity monitors on their wrists. Called Actiwatches, they're similar to a Fitbit. These, however, are designed for research studies. They track movements every 15 seconds to gauge whether someone is awake or sleeping. They also record how dark or light it is.

Students wore an Actiwatch for two weeks before and after the change in the school start time. They also completed a daily sleep diary. Actiwatch data showed that the new schedule gave students 34 extra minutes of sleep on school days. That made it more similar to sleep periods on weekends, when the students didn't have to follow a set schedule.

"In addition to getting more sleep, the students were closer to their natural sleep pattern on weekends," says Gideon Dunster. "That was a really important finding."

Dunster is a graduate student in biology at the University of Washington in Seattle. He and biologist Horacio de la Iglesia led the new study.

The Actiwatch light-tracking showed that students didn't stay up later after the shift in school start times. This light analysis was a new feature of the study, notes Amy Wolfson. She is a psychologist at Loyola University Maryland, in Baltimore. She didn't work on the Seattle study. But she notes that other studies have shown that more exposure to light at night is not healthy.

Besides getting more Zzzz's, students who could sleep in later also got better grades. On a scale of 0 to 100, their median scores increased from 77.5 to 82.0.

Explainer: Correlation, causation, coincidence and more

The study doesn't prove that the schedule change boosted their grades. "But many, many other studies have shown that good sleep habits help us learn," says Dunster. "That's why we concluded that the later start times improved academic performance."

The Seattle team published its new findings December 12 in *Science Advances*.

Links between snoozing and learning

Teens who don't sleep well may find it harder to absorb new material the next day. What's more, people who don't sleep well also can't process well what they had learned the day before. "Your sleep puts everything you've learned into 'file folders' in your brain," Wahlstrom says. That helps us forget unimportant details, but preserve important memories. Every night, a fluid also flushes out molecular wastes that can damage the brain.



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Tired students are less likely to learn in class. Overnight, as they sleep, they also are less likely to cement to memory what they had learned in class.

And there's another link between sleep and grades. Kids won't learn if they don't make it to class. That's why teachers and principals worry about kids missing school or being tardy.

To see if later start times affected attendance, the researchers looked at the two schools separately. One had 31 percent of students from lower-income families. In the other school, 88 percent came from lower-income families.

In the wealthier school, there wasn't much change in missed school hours. But at the school with more low-income kids, the new start time boosted attendance. During the academic year, the school

recorded an average of 13.6 absences and 4.3 tardies for the first period. Before the schedule change, those yearly numbers were 15.5 and 6.2.

The researchers don't know what is behind this difference. It's possible that lower-income kids rely more on the school bus. If they sleep late and miss the bus, it may be too hard to get to school. They may not own a bike or car and their parents may already be at work.

Lower-income kids sometimes get worse grades than their wealthier peers. Wahlstrom says there are many reasons why this might happen. Anything that helps reduce this achievement gap is a good thing. That includes better class attendance.

Wolfson thinks it's fantastic that the activity trackers confirmed what sleep researchers had known for a long time. "I hope all this will have an impact on school districts around the country," she says. "Moving school start times to 8:30 a.m. or later is an effective way to improve health, academic success and safety for adolescents."

Power Words

[More About Power Words](#)

academic Relating to school, classes or things taught by teachers in formal institutes of learning (such as a college).

adolescent Someone in that transitional stage of physical and psychological development that begins at the onset of puberty, typically between the ages of 11 and 13, and ends with adulthood.

average (in science) A term for the arithmetic mean, which is the sum of a group of numbers that is then divided by the size of the group.

biology The study of living things. The scientists who study them are known as biologists.

body clock (also known as biological clock) A mechanism present in all life forms that controls when various functions such as metabolic signals, sleep cycles or photosynthesis should occur.

development (in biology) The growth of an organism from conception through adulthood, often undergoing changes in chemistry, size and sometimes even shape.

gauge A device to measure the size or volume of something. For instance, tide gauges track the ever-changing height of coastal water levels throughout the day. Or any system or event that can be used to estimate the size or magnitude of something else. (v. to gauge) The act of measuring or estimating the size of something.

graduate student Someone working toward an advanced degree by taking classes and performing research. This work is done after the student has already graduated from college (usually with a four-year degree).

high school A designation for grades nine through 12 in the U.S. system of compulsory public education. High-school graduates may apply to colleges for further, advanced education.

hormone (in zoology and medicine) A chemical produced in a gland and then carried in the bloodstream to another part of the body. Hormones control many important body activities, such as growth. Hormones act by triggering or regulating chemical reactions in the body.

link A connection between two people or things.

median (in mathematics) The value or quantity that lies at the midpoint of a group of numbers that had been listed in order from lowest to highest.

melatonin A hormone secreted in the evening by a structure in the brain. Melatonin tells the body that it is nearing time to sleep. It plays a key role in regulating circadian rhythms.

monitor To test, sample or watch something, especially on a regular or ongoing basis.

peer (noun) Someone who is an equal, based on age, education, status, training or some other features. (verb) To look into something, searching for details.

physical (adj.) A term for things that exist in the real world, as opposed to in memories or the imagination.

psychologist A scientist or mental-health professional who studies the human mind, especially in relation to actions and behaviors.

puberty A developmental period in humans and other primates when the body undergoes hormonal changes that will result in the maturation of reproductive organs.

secrete (noun: secretion) The natural release of some liquid substance — such as hormones, an oil or saliva — often by an organ of the body.

waste Any materials that are left over from biological or other systems that have no value, so they can be disposed of as trash or recycled for some new use.

CITATIONS

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