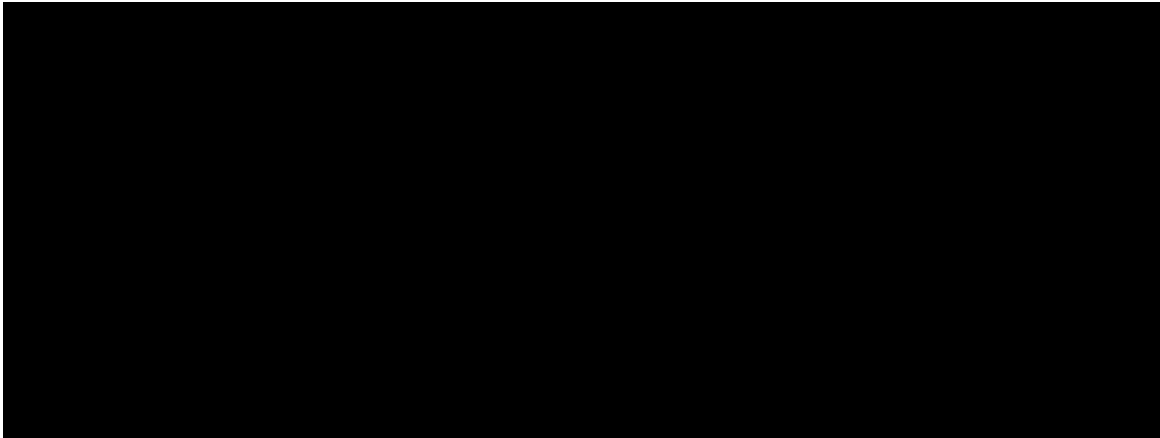


## Falling asleep in class? Blame Biology

**By Madison Park-CNN** -- Parents flick the light switch, flap the sheets and prod their groggy teenagers to get to school on time. Then, when the teenagers get to school, they slump over their desks to snooze.



Starting high school an hour later increased the number of hours teenagers slept and decreased car accident rates.

Sleepy teenagers may not be able to help it, researchers say. Blame it on the early school start time and their circadian rhythms: the mental and physical changes that occur in a day.

Teenagers need eight to 10 hours of sleep, compared with the six to eight hours recommended for adults. Teenagers also tend to go to bed and wake later than adults. These biological tendencies clash with early morning high school schedules, leaving them sleepy in class.

Research conducted at the University of Kentucky in Lexington found that when Fayette County high schools delayed their start time by an hour, the percentage of students getting at least eight hours of sleep per night jumped from 35.7 to 50 percent.

The study, published Monday in the *Journal of Clinical Sleep Medicine*, surveyed 10,000 students in the Kentucky county before and after their schools changed the start time from 7:30 to 8:30 a.m.

Students have the most difficulty staying awake and functioning during early morning classes.

"It's as if they are jet lagged, like they've just flown into Atlanta from San Diego," said Dr. Barbara Phillips, a co-author in the study. "For people who live in Atlanta, it might be 8 a.m. For a teenager, it feels like it's 5 o'clock in the morning. They're sleepy and don't do well."

Sleep deprivation can compromise immune systems, ruin moods and decrease focus, said the lead author, Dr. Fred Danner.

"A mistake we make is [thinking] that sleep is optional," he said. People assume they can just toughen up or take caffeine. "It may be that's the modern world, but we have old bodies. You can't fool Mother Nature."

Danner and Phillips said there are even more dangerous consequences of sleep deprivation for students: car accidents.

They found that two years after the change in Fayette County's school start time, the crash rate for teen drivers dropped 16.5 percent. Meanwhile, crash rates increased 7.8 percent in the rest of the state, where the school schedules had not been adjusted.

"Sleep deprivation increases chances of a crash because it decreases vigilance," Phillips said.

Research conducted in the Minneapolis, Minnesota, school district in August 2001 found that when the system changed its starting time from 7:15 to 8:40 a.m., attendance improved and students reported getting an extra hour of sleep per weeknight.

Based on years of teenage sleep research, the Centers for Disease Control and Prevention is encouraging districts to start [high schools](#) later.

Citing a "deleterious impact of school times on our teenagers," Dr. Janet B. Croft, a senior epidemiologist at the CDC, called high school start times "an unrealistic burden on children and their families."

"It's not problems with concentration," she said. "It can change lives to change school start times. They can't concentrate that early when driving that early in the dark. They stay sleepy all the day."

Going to bed earlier is not effective, because a teenager's melatonin levels, hypothalamus and internal clock are changing during puberty.

"Teenagers are going through physiological changes that make it physically difficult to fall asleep before 11," Croft said.

Constant text messaging, Web surfing and digital distractions could also be keeping teenagers up into the wee hours of the night.

Cells in the hypothalamus respond to light and dark signals. The bright lights inside homes and the glow of monitors are sending more light signals, which might be why some teenagers are unable to sleep before 11 p.m.

"We know their core circadian rhythm changes when they hit puberty," Phillips said. "Biologically, their circadian rhythm changes when they go through adolescence, just as it changes when we age. I do know it's biological, mediated by melatonin."

The [National Sleep Foundation](#) suggests using dimmer lights in the house at night to help teenagers get to sleep earlier and using bright lights when trying to wake them

## Health Library

[MayoClinic.com: 10 Tips for better sleep](#)

[MayoClinic.com: Why is your teen so tired?](#)

Teenagers can't sleep in the same way they did as children, when they fell asleep between 8:30 and 10 p.m. and woke after eight or nine hours of continuous sleep.

Younger children are better able to handle waking earlier than teenagers, prompting some sleep experts to recommend that younger children go to school earlier and teenagers go later to accommodate staggered bus schedules and biological needs.

Though high schools in cities such as Tulsa, Oklahoma; Denver, Colorado; and Minneapolis have adopted later start times, there are no statistics to track the number of schools pulling back their start times.

Neither the National School Boards Association nor the National Association of Secondary School Principals has taken a position on adjusting high school schedules; they have recommended a localized approach.

"You want to make sure it gets results, and you want to look at data," said Patte Barth, director of the Center for Public Education. "When you make the change, it's vitally important to involve the community. It's not just shifting time up. It affects after-school activities, extracurricular activities, jobs -- and parents may have some concerns."

CNN's Caitlin Hagan contributed to this report.

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