

BRAIN

Evening screen time can sabotage sleep

Blue light from electronic gadgets can confuse the body about when it needs to sleep



For better sleep, scientists suggest banning screens close to bedtime.

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Screentime before bedtime may leave people feeling groggy in the morning. Cell phones, computers and TVs emit blue light. And exposure to that bluish light during the two hours before bed can keep us from getting a good night's rest, a new study finds.

It cut down the number of minutes people slept. It also left them feeling groggy in the morning.

It's been known for quite a while that "blue light is bad for sleep," observes Shadab Rahman. He was not involved in the new study. His work at Brigham and Women's Hospital in Boston, Mass., does, however, study how light affects the body's internal "clock." Its natural cycles tell us when to sleep and when to get up in the morning. These cycles are known as our circadian (Sur-KAY-dee-un) rhythms. The light of day and the dark of night both work to help keep this internal clock running on a roughly 24-hour cycle.

Explainer: The teenage body clock

Computers, televisions, tablets and other electronic devices give off all colors of light. And, he notes, evidence has been emerging that these screens — and especially the blue light they give off — can

disrupt the body's clock. Data show that this blue light tends to make us more alert at night. That makes it harder to fall asleep get all the rest we need.

Because electronic devices are all around us, it's hard to avoid their blue light. We use the screens constantly, notes Amit Shai Green. He is a PhD student at the University of Haifa in Israel. He also is an author of the new study.

Green and his team recruited 19 people — all in their 20s — for a sleep study. All spent two hours on a computer right before bedtime. But they didn't all experience the same light exposures.

The researchers had tweaked the computer screens. Some gave off intense blue light. Others gave off soft blue light, intense red light or soft red light. Red light hasn't been shown to affect sleep the way blue light does. For the new experiment, the researchers used red light as a *control* against which to compare any effects on sleep of blue light.

While the recruits slept, the researchers recorded how many times the participants woke up throughout the night and how long they slept overall. The scientists also charted when each person was in a phase of sleep known as REM (short for rapid eye movement). This is the stage when dreaming occurs. Lastly, each recruit reported how rested he or she felt the next morning.

Looking at screens that gave off intense blue light cut someone's sleep by about 16 minutes, compared to when they had used screens with red light. Those exposed to blue light also woke up more often at night than if they had been exposed to red light.

The researchers shared their findings May 26 in *Chronobiology International*.

Blue-light blues

The normal blue light emissions from the computer screen also affected how much of a sleep-related hormone each volunteer made. Called melatonin (Mel-ah-TOE-nin), it tends to make people feel sleepy. Our bodies usually secrete it into the blood around 9 p.m. When our bodies make less melatonin, we may still feel too alert at bedtime to fall asleep when the body is tired.

People using screens that emitted plenty of blue light didn't make as much melatonin as when they used screens with a higher output of red light.

Explainer: What is a hormone?

Melatonin tends to help cool the body at night. That seems to explain why body temps didn't drop as expected after the recruits had used devices emitting lots of blue light. The next day, these participants were sleepy and found it hard to stay focused.

Using screens before bed damages the body's biological clock, Green says. More and more people are using screens as kids and adolescents. At this age, their brains are still developing the ability to learn and pay attention. That makes the new results worrisome, Green says.

Rahman says the new work makes a good point about how blue light from screens can be bad for our bodies. However, he points out, the light in this study was extremely bright. It was far more bright than what a normal computer, tablet or TV would emit. Also, the screens were about 22 inches (about 56 centimeters) across. Tablets and phones are much smaller. So it's hard to say how their blue light impacts on sleep might compare to those from using a device as large as the ones in this study.

Still, Rahman says the results remind us to think about how we use screens before bed. He recommends powering down electronics two hours before going to sleep. Read a book instead, he says. Talk with your family and friends. Write in a journal.

If you have to do homework before bed, he says, dim the screen and the lights. Making it darker can help you wind down. If you drift off, maybe it's because you need the rest. And you never know — maybe the answer to that final algebra problem will come to you in your sleep.

Power Words

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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.

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

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.

circadian rhythms Biological functions, such as cycles of body temperature and sleeping or wakefulness, that occur on a roughly 24-hour schedule.

chronobiology The field of research that focuses on the natural biological clocks in plants and animals, how they direct the natural biochemical rhythms in these organisms and what types of events or environmental exposures can disrupt or alter biological clocks.

control A part of an experiment where there is no change from normal conditions. The control is essential to scientific experiments. It shows that any new effect is likely due only to the part of the test that a researcher has altered. For

example, if scientists were testing different types of fertilizer in a garden, they would want one section of it to remain unfertilized, as the control. Its area would show how plants in this garden grow under normal conditions. And that gives scientists something against which they can compare their experimental data.

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.

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.

PhD (also known as a doctorate) A type of advanced degree offered by universities — typically after five or six years of study — for work that creates new knowledge. People qualify to begin this type of graduate study only after having first completed a college degree (a program that typically takes four years of study).

REM sleep A period of sleep that takes its name for the rapid eye movement, or REM, that occurs. People dream during REM sleep, but their bodies can't move. In non-REM sleep, breathing and brain activity slow, but people can still move about.

screentime The amount of time that people spend looking at electronic screens, including computer screens, cell phones and televisions.

CITATIONS

Journal: A. Green et al. [Evening light exposure to computer screens disrupts human sleep, biological rhythms, and attention abilities](#). *Chronobiology International*. Vol. 34, May 26, 2017, p. 855. doi: 10.1080/07420528.2017.1324878.