



A Good Night's Sleep Is Tied to Interruptions, Not Just Hours

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Good sleep isn't just about how long you sleep. Continuity may be equally important.

Getting up in middle of the night multiple times to soothe a crying baby or go to the bathroom impacts your mood and cognitive abilities the next day, new research has found.

In a study published last month in the journal *Sleep*, researchers from Johns Hopkins University School of Medicine found that **individuals forced to awaken multiple times during the night showed a greater decline in positive mood than those forced to go to bed later. They also had less slow-wave or deep sleep, the third stage of non-rapid eye (NREM) movement sleep.**

Research from the University of Pittsburgh has shown that the cognitive performance of elderly individuals was impaired when their sleep was disrupted, but not when they slept a shorter amount of time straight through. And a study done in Israel published last year found that a fragmented night of sleep for a full eight-hours impacted mood and attention as much as sleeping just four hours a night.

The recent *Sleep* study included healthy individuals without any diagnosed sleep problems. The 62 subjects were brought into the lab and randomized into three groups: a group whose sleep was repeatedly disrupted; a group whose bedtime was delayed; and a control group, said Patrick H. Finan, an assistant professor in the department of psychiatry and behavioral sciences at Johns Hopkins and lead author of the study.

The subjects were given eight hours to sleep in the lab for three consecutive nights.

Those in the disrupted group were awakened each hour for 20 minutes for seven of the eight hours. They were woken up for a full hour for the eighth hour, which took place at a different time of night on each of the nights.

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While both groups' moods dropped after the first night, those in the forced-awakenings group continued to show a decline in mood. Those in the delayed-bedtime group saw their moods stabilize over the three days.

“This is initial evidence that consolidated sleep—even if it’s shorter sleep than one’s accustomed to—is less detrimental to positive mood than disrupting sleep throughout the night,” said Dr. Finan.

The researchers also measured the participants' brain waves as they slept using polysomnography. They found that participants in the sleep-disruption group had less slow-wave sleep, especially after the first night, when compared with those in the restricted-sleep group. The forced-awakenings group lost 42% of their slow-wave sleep after the first night, compared with just a 19% loss in the other group.

In a study published in 2014 in the journal *Psychology and Aging*, Kristine Wilckens, an assistant professor of psychiatry at the University of Pittsburgh School of Medicine and co-researchers had 59 young adults and 53 older adults wear accelerometers on their arms that measured whether they were sleeping or not over the course of a week. The researchers found in both groups that when individuals didn't have continuous sleep, they performed worse on a series of tests that measured cognitive function, such as memory recall and verbal fluency. The total sleep time, however, didn't have an impact on cognitive performance of older individuals in the group.

“The question that we ended up having is, ‘OK does this mean that older adults need less sleep but they need it to be continuous, they need it to be consolidated?’ ” said Dr. Wilckens.

A study published last year in the journal *Sleep Medicine* found that even one night of fragmented sleep negatively impacts mood, attention span and cognitive ability to the same degree as restricting sleep to four hours in a night.

Researchers at Tel Aviv University had 61 adults take assessments measuring their sustained attention. They self-reported their mood after a normal night's sleep and then again after a night of either four hours in bed or eight hours in bed—with four awakenings. Participants were awakened every 90 minutes with a phone call and then had to complete a 10-minute task via email before going back to sleep.

Both conditions resulted in more errors in the sustained attention test and an increase in depression, fatigue and confusion compared with a normal night of sleep.

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The study highlights the heavy burdens experienced by people whose sleep is interrupted, such as parents of young babies who wake up several times a night, said Avi Sadeh, a psychology professor at Tel Aviv University and lead researcher on the study.

In recent years, there has been a realization that the quality of sleep is equally important as the health impact of getting enough sleep, said Matthew Walker, a professor of neuroscience and psychology at the University of California at Berkeley.

Quality, he said, is defined by both continuity of sleep, as well as the electrical power of sleep.

“One of our measures of sleep quality is how powerful the brain waves are at night,” said Dr. Walker. “With non-rapid-eye-movement sleep, the greater the power of the waves, the better the quality of that sleep, which transmits better benefits.”

The electrical quality of sleep generally declines with age. “We can start to see this decline even in your 30s and it deteriorates dramatically with age,” said Dr. Walker.

Dr. Walker said it is possible to wake up in middle of the night and be unaware of the awakenings. “Often when we wake up at night those awakenings are quite brief—maybe just last a handful of seconds,” he said.

Fragmented sleep can also be caused by disorders such as sleep apnea and insomnia, or by the ingestion of too much caffeine or alcohol.

“Alcohol causes sleep fragmentation,” said Dr. Walker. “It makes you wake up many more times during the night. And it blocks your rapid eye movement (REM) sleep.” REM sleep is critical for a broad collection of functions, including memory, creativity and the regulation of the cardiovascular and immune systems.

Dr. Walker said studies have shown that quality of sleep can be improved by moderate exercise that doesn’t take place too close to bedtime. Regulating the temperature of your bedroom can also help. Studies have found that keeping the bedroom at a cooler temperature—no higher than 70 degrees—helps the brain and body drop to its core temperature, which helps initiate and maintain sleep.

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Blocking out sound and light can also decrease disruptions. Some experts also recommend removing your smartphone from the bedroom.

Lorie Eber is a Precision Certified Professional, Mayo Clinic Certified Wellness Coach, NASM Certified Personal Trainer, Gerontologist and author. Lorie Eber Wellness Coaching provides corporate, group and one-on-one guidance and support to teach clients the skills they need to live a healthy lifestyle.

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