

ASK THE EXPERTS

What causes insomnia?

—H. YORK, BUILTH WELLS, WALES

Henry Olders, an assistant professor of psychiatry at McGill University who conducts sleep research, provides this answer:

People can lose sleep for a variety of reasons, including medications, alcohol, caffeine, stress and pain. When the underlying cause is removed, these bouts usually get better on their own. For some people, however, sleep problems turn into insomnia, the chronic inability to either fall asleep or stay sleeping. Research suggests that attitudes about sleep, and the resulting slumber patterns and behaviors, make certain individuals vulnerable to insomnia.

Many insomniacs feel they lack sufficient sleep, but evidence is mounting that they are getting at least as much as they require and possibly more. Insomniacs tend to go to bed early, stay there late and sleep during the day—all of which contribute to the problem.

Why would anyone spend more time asleep than he or she needs? Charles M. Morin of Laval University in Quebec found that insomniacs hold stronger beliefs than normal sleepers do about the detrimental effects of insomnia to physical and mental health and that they perceive their sleep as less controllable and predictable. Individuals with insomnia are more likely to be concerned about not sleeping and to think about problems, events of the day and noises in the environment before falling asleep. Simply put, if you are convinced that you need eight hours of sleep a night, you will arrange your bedtime and rising time so that you spend eight hours in bed. If you require only six hours of sleep, however, you will spend two hours tossing and turning.

How much sleep do you need? And how can you tell if you are getting the right amount? Although eight hours a night is a figure repeated so often that it has almost become an article of faith, the reality is that sleep need is highly individual. Large-scale epidemiological studies have demonstrated that sleeping seven hours a night is associated with the lowest mortality risk (for factors including heart disease, cancer and accidental death) compared with longer or shorter periods of shut-eye. In addition, it is probable that as we age, we need less sleep.



To help treat insomnia, practice “sleep hygiene.” This includes adjusting the levels of noise, light and temperature so that you are comfortable; not reading or watching television in bed; avoiding excess food, alcohol, nicotine, caffeine and other stimulants before you turn in; completing exercise at least three hours before lights out; and then determining your optimum bedtime. The longer you are awake, the more slow-wave (delta) sleep you will have; slow-wave sleep is what leads to feeling rested and refreshed. Limiting the time you spend in bed may also help. Together these nonpharmacological approaches are more effective and longer-lasting than medications for insomnia.

Why is the sky blue?

—M. NASRALLAH, AMMAN, JORDAN

Anthony D. Del Genio of the NASA Goddard Institute for Space Studies and adjunct professor of earth and environmental sciences at Columbia University explains:

We can thank the scattering effect, which disperses nearly 10 times as much blue light in the atmosphere as light of longer wavelengths (such as red). Sunlight is a mixture of all colors. As sunlight passes through the atmosphere, it acts as a mixture of electromagnetic waves that causes the oscillation of charged particles (electrons and protons) in air molecules. This oscillation produces electromagnetic radiation at the same frequencies as the incoming sunlight, but the radiation is scattered in every direction.

The blue component of visible light has shorter wavelengths and higher frequencies than red. Thus, blue light makes charged particles oscillate faster than red light does. The result is that the scattered blue light is almost 10 times as prevalent as red light. Violet light is scattered even more than blue, but less violet light enters the atmosphere, and our eyes are more sensitive to blue.

A planet with no atmosphere cannot have a bright sky, because there is no scattering effect. Photographs taken by astronauts on the moon show a midnight-black sky. SA

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