

Why Do Some People Sleepwalk?

By The Editors

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—Carlos Navarro, via e-mail

Neurologist Antonio Oliviero of the National Hospital for Paraplegics in Toledo, Spain, explains:

Sleep disorders such as sleepwalking arise when normal physiological systems are active at inappropriate times. We do not yet understand why the brain issues commands to the muscles during certain phases of sleep, but we do know that these commands are usually suppressed by other neurological mechanisms. At times this suppression can be incomplete—because of genetic or environmental factors or physical immaturity—and actions that normally occur during wakefulness emerge in sleep.

People can perform a variety of activities while asleep, from simply sitting up in bed to more complex behavior such as housecleaning or driving a car. Individuals in this trance-like state are difficult to rouse, and if awoken they are often confused and unaware of the events that have taken place. Sleepwalking most often occurs during childhood, perhaps because children spend more time in the “deep sleep” phase of slumber. Physical activity only happens during the non-rapid eye movement (NREM) cycle of deep sleep, which precedes the dreaming state of REM sleep.

Recently my team proposed a possible physiological mechanism underlying sleepwalking. During normal sleep the chemical messenger gamma-aminobutyric acid (GABA) acts as an inhibitor that stifles the activity of the brain’s motor system. In children the neurons that release this neurotransmitter are still developing and have not yet fully established a network of connections to keep motor activity under control. As a result, many kids have insufficient amounts of GABA, leaving their motor neurons capable of commanding the body to move even during sleep. In some, this inhibitory system may remain underdeveloped—or be rendered less effective by environmental factors—and sleepwalking can persist into adulthood.

Sleepwalking runs in families, indicating that there is a genetic component. The identical twin of a person who sleepwalks often, for example, typically shares this nocturnal habit. Studies have also shown that frequent sleepwalking is associated with sleep deprivation, fever, stress and intake of drugs, especially sedatives, hypnotics, antipsychotics, stimulants and antihistamines.

To clarify the many mysteries of sleepwalking, we need to find out more about the brain mechanisms that control sleep and arousal states. Future research will have to focus not only on what is happening while sleepwalkers are sleeping but also on the characteristics of their waking brains.

Why do we get “brain freeze” when we eat something cold?

—Christina Zuniga, via e-mail

Mark A. W. Andrews, professor of physiology and director of the Independent Study Pathway at the Lake Erie College of Osteopathic Medicine, replies:

This commonly experienced pain, also known as an ice cream headache, results from quickly eating or drinking very cold substances. Officially termed sphenopalatine ganglioneuralgia (talk about a painful mouthful!), it is the direct result of the rapid cooling and rewarming of the blood vessels in the palate, or the roof of the mouth. A similar but painless blood vessel response causes the face to appear “flushed” after being outside on a cold day. In both instances, the cold temperature causes blood vessels to constrict and then experience extreme rebound dilation as they warm up again.

In the palate, this dilation is sensed by nearby pain receptors, which then send signals back to the brain via the trigeminal nerve, one of the major nerves of the facial area. This nerve also senses facial pain, so as the signals are conducted the brain interprets the pain as coming from the forehead—the same “referred pain” phenomenon seen in heart attacks. Brain-freeze pain may last from a few seconds to a few minutes, which is blissfully short as compared with the duration of its cousin, the migraine headache. Research suggests that the same vascular mechanism and nerve implicated in brain freeze cause the aura (sensory disturbance) and pulsatile (throbbing pain) phases of migraines. Interestingly, it is impossible to give yourself an ice cream headache in cold weather—only in a warm ambient temperature will it hurt to wolf down a banana split.

Fortunately, abstaining from ice cream is not necessary. Placing the tongue hard against the palate may help, as will eating cold foods more slowly or warming food in the front of your mouth before swallowing.

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