

Unexpected ways Sleep Deprivation Makes Life Tougher

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Scientists are gaining new insights into just how lack of sleep can upset our emotional equilibrium.

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Researchers have found that people who are sleep-deprived have difficulty reading the facial expressions of other people, particularly when the expressions are more subtle. They are less able to discern, for example, whether a spouse is annoyed or just serene.

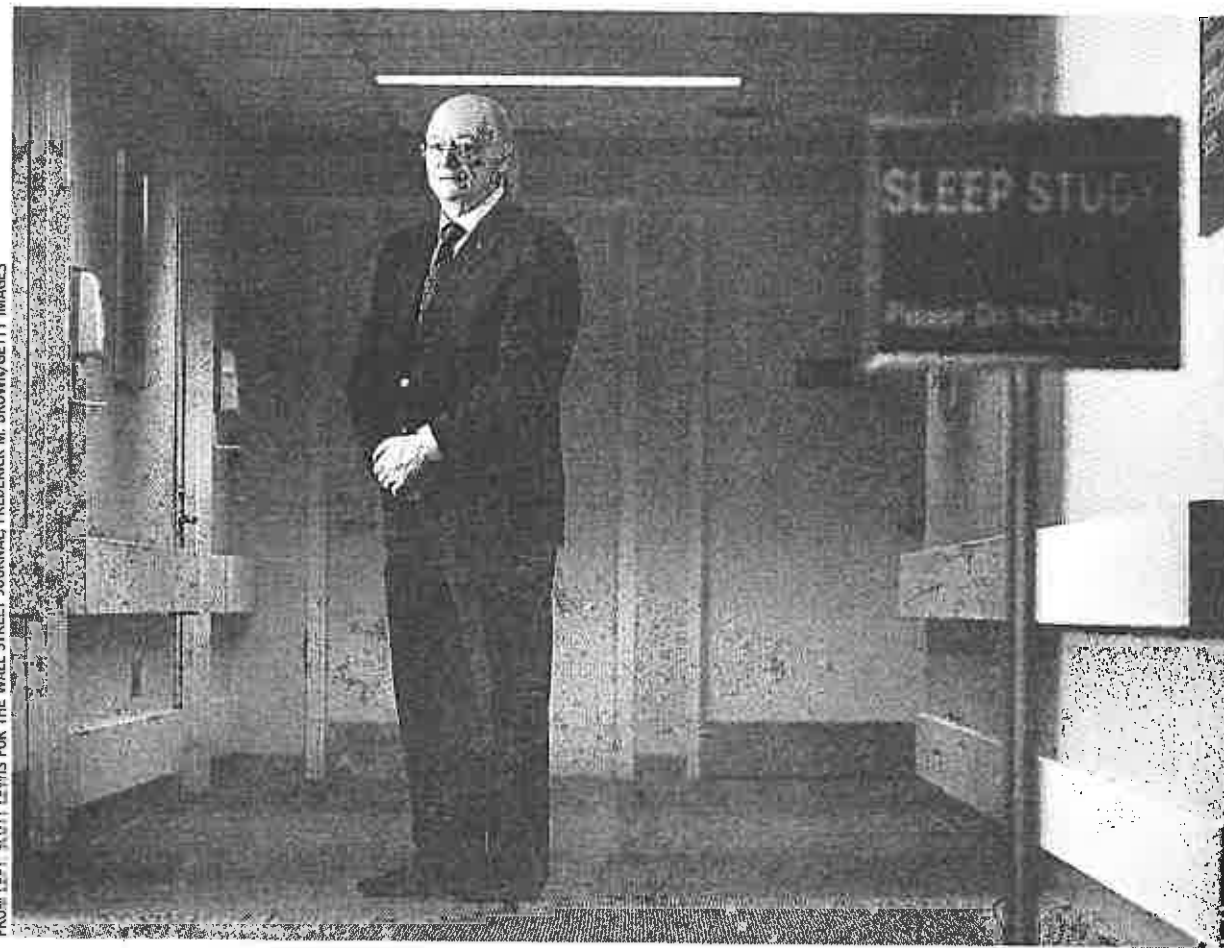
People also are less emotionally expressive when they haven't gotten enough sleep. They smile less, for example, even when they feel something is funny. Using neuroimaging, scientists are discovering certain patterns of brain activity that may be behind the emotional volatility that can be caused by lack of sleep.

"Few things come unbinged as quickly and profoundly as our emotional stability...when we are not getting enough sleep," says Matthew Walker, professor of neuroscience and psychology at the University of California, Berkeley. Fatigue-induced misinterpretations and miscues can wreak havoc on relationships.

Experts generally recommend that healthy adults get between seven and nine hours of sleep a night. But more than one-third of U.S. adults say they sleep less than seven hours a night on average, according to data from a 2014 survey of more than 444,000 people analyzed by the Centers for Disease Control and Prevention. Nearly 12% of respondents said they slept five hours or less a night.

In one 2014 study published in *Experimental Brain Research*, 49 healthy young adults were divided into two groups. One spent a night without any sleep, while the other was able to sleep normally.

The next day, the subjects were presented with images of faces



FROM LEFT: SCOTT LEWIS FOR THE WALL STREET JOURNAL; FREDERICK M. BROWN/GETTY IMAGES



David F. Dinges of the University of Pennsylvania, left, and Matthew Walker of UC Berkeley, above, have studied how sleep deprivation affects emotional well-being.

deprivation can amplify activity in the amygdala, a part of the brain that plays a key role in processing emotions, and weaken activity of the prefrontal cortex, which is critical for regulating emotions.

Dr. Walker at Berkeley has found that when sleep-deprived subjects are shown disturbing images—like tarantulas or homes on fire—while in an MRI scanner, their amygdalae are 60% more reactive, compared with the amygdalae of people who aren't sleep-deprived and seeing the same pictures.

This amygdala hyper-reactivity can start to occur at about 6½ hours of sleep or less, he says. REM sleep in particular appears to be critical for processing emotional experiences.

"I've called this overnight the apy," Dr. Walker says.

Most research has focused on sleep deprivation's negative impact on cognition and performance. This is of particular concern for the military and industries like medicine, trucking and aviation.

faces.

Other studies have found that sleep-deprived people are less able to accurately identify angry and happy faces, too, particularly when the expressions are subtle. While many sleep deprivation studies have subjects go without an entire night of sleep, scientists say the results likely are applicable to the more real-world experience of chronically getting an insufficient amount of shut-eye.

Sleep deprivation can have public-safety implications, says Namni Goel, a sleep researcher at the University of Pennsylvania Perelman School of Medicine. Military personnel and police officers, she

pled with what we know that you become more impulsive when sleep-deprived and risk-taking goes up, that can have deadly consequences," Dr. Goel says.

David F. Dinges, a professor in the psychiatry department at Penn, has scientific evidence that sleep-deprived people tend to overreact to minor things.

In one 2012 study, he and colleagues had one group of subjects go without sleep for one night; the other slept normally. The next day the participants did a series of tasks, including math problems. Some were easy and others more difficult. They also received feedback on their performance—some-

ious and depressed. But after the easy problems, the sleep-deprived subjects had higher levels of stress, anger and anxiety than those in the rested group.

"Sleep deprivation lowers your threshold for stress. You're basically less able to emotionally cope with it. That would explain rage responses to small things," Dr. Dinges says.

Catherine Shearon finds that on days when she's gotten under six hours of sleep the night before, she's more irritable and on edge. "I'm sharp with people and impatient," says the 54-year-old from Ottawa, who works in educational sales and is also a part-time per-