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# The Definitive Answer to What Sleep Deprivation Is Actually Doing to You

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Sleep deprivation is a rampant problem in modern America, with most people experiencing some level of regular disruption to their sleep schedule. A combination of highly demanding jobs, constant stimulation and 24/7 everything has made skipped sleep so common that the Centers for Disease Control and Prevention now considers it an unrecognized epidemic.

But that "unrecognized epidemic" is about more than just feeling tired. It can actually lead to a number of entirely unnecessary, chronic conditions. Here are 10 things sleep deprivation can do to you:

It's killing your productivity: Skimping on sleep to catch up on work isn't only a bad idea — it's a battle you can't win.

Harvard Medical School's Division of Sleep Medicine reports that sleep deprivation has severe effects on mental functioning:

Not getting enough sleep — whether for just one night or over the course of weeks to months — has a significant effect on our ability to function. Sleep deprivation negatively impacts our mood, our ability to focus, and our ability to access higher-level cognitive functions.

Harvard scientists estimated in 2011 that sleep deprivation costs the U.S. economy about \$63.2 billion in lost productivity annually. According to the Wall Street Journal, another study by Singapore Management University researchers found that every hour of lost sleep translated to an additional 8.4 minutes of online procrastination the next day.

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Image Credit: Getty

In fact, it makes you worse at pretty much everything: In *Sleepless in America*, National Transportation Safety Board member Mark Rosekind puts it in stark terms: "Every aspect of who you are as a human, every capability is degraded, impaired, when you lose sleep. What does that mean? Your decision-making, reaction time, situational awareness, memory, communication, and those things go down by 20% to 50%."

# WHAT HAPPENS WHEN YOUR BRAIN DOESN'T SLEEP?

## LOST MEMORIES

The **hippocampus**, a moon-shaped structure in the temporal lobe, exhibits a distinct pattern of neural activity when the waking mind encodes (learns) new information. Scientists believe our brain later "replays" the same activity pattern while we're sleeping to help the info stick. Lose sleep, lose long-term memories.

## ANGER

Sleep loss primes us to focus on negative experiences, misinterpret facial expressions and pick fights. Emotional volatility may partly be a product of interrupted communication between brain regions. fMRI of the well-rested brain shows connectivity between the **amygdala**, a limbic system structure critical to emotional processing, and the **medial prefrontal cortex**, which helps regulate feelings (i.e., tells us to chill). Sleep deprivation cuts this connection, letting your revved-up amygdala (and your mood) run wild.

## IMPAIRED WIT

When you skimp on sleep, the clever commentary may not flow so easily. Sleep loss affects cognitive processes like divergent thinking, which helps us switch topics nimbly during conversation. Scientists found that activity in the **inferior frontal gyrus** increases when sleep-deprived people tried to list uses for different objects, suggesting the brain draws on divergent thinking to compensate for strained cognitive functioning.

## HALLUCINATIONS

The well-rested brain filters stimuli (noise, light, smell, etc.) to separate what matters from what doesn't and prevent sensory overload. When the brain can't filter the information coming in, chaos ensues. After pulling an all-nighter, people may begin to anticipate things that aren't there, including objects.

## HEAD IN THE CLOUDS

We all lose focus now and then, but brain activity linked to attention lapses changes when people sacrifice sleep. After a good night's rest, these lapses correspond to altered thalamus function and less-active frontal and parietal networks, which basically means we tune out when we're bored. But when sleep-deprived people space out, they also exhibit impaired visual sensory processing, suggesting a whole other level of disengagement with the world. In short: Losing sleep turns you into Phoebe from Friends.

## FALSE MEMORIES

The sleep-starved brain may fail to encode memories successfully in the first place, thanks to altered function in the **hippocampus**, as well as **prefrontal cortex** and **parietal lobe** regions. One study found that people are more likely to incorporate misinformation into memories of events observed after a night without sleep.

## CEREBRAL SHRINKAGE

Healthy adults getting poor sleep lose volume in the **frontal**, **temporal** and **parietal** lobes, one study showed. Researchers don't yet understand if sleep loss causes shrinkage or vice versa.

## SLOURED SPEECH

The **temporal lobe**, the brain region associated with language processing, is highly active in well-rested people but inactive in their exhausted and enunciation-challenged counterparts.

## CRONUT BINGES

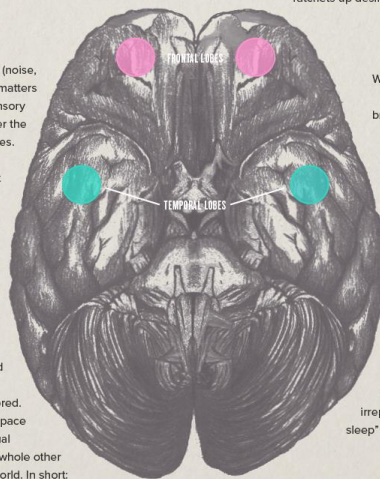
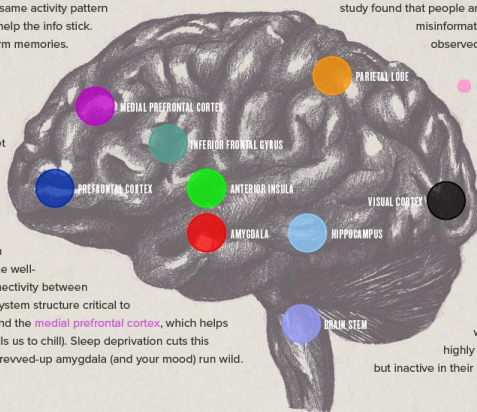
Sleep loss corresponds with decreased activity in the **frontal lobe**, which controls decision-making, and more activity in the **amygdala**, a key player in fear detection. Together, these neural changes create a brain mechanism that dulls judgment and ratchets up desire — the ideal mind-state for scarfing down fistfuls of bacon.

## RISKY DECISIONS

When sleep-deprived people prepare to make economic decisions, the brain's reward center in the **prefrontal cortex** lights up, suggesting they expect to win (e.g., make money). But when risky choices don't pan out, people's brain activity decreases in the region related to punishment and aversion (the **anterior insula**), suggesting they don't care about losing money as much as they would on a good night's sleep.

## BRAIN DAMAGE

Add all-nighters to the list of things that kill brain cells — in this case, in the **brain stem**. The damage may be irreparable, making "catching up on lost sleep" a poor excuse for snoozing till noon on the weekends.



**Mic**

Sources for infographic: Research from *The Journal of Neuroscience*, *International Scholarly Research Notes*, *Experimental Brain Research*, *Psychological Bulletin*, *UC Berkeley Walker Sleep Lab*, *PNAS*, *International Journal of Occupational Medicine and Environmental Health*, *The Centers of Disease and Prevention*, *SLEEP*, *PLoS One*, *Psychological Science*, *Frontiers in Human Neuroscience*, *NeuroImage*

Source: Mic

...including your ability to gauge if you're getting enough sleep: "Studies show that over time, people who are getting six hours of sleep, instead of seven or eight, begin to feel that they've adapted to that sleep deprivation — they've gotten used to it," sleep researcher Phil Gehrman told WebMD. "But if you look at how they actually do on tests of mental alertness and performance, they continue to go downhill. So there's a point in sleep deprivation when we lose touch with how impaired we are."

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It destroys your body: According to Healthline, not getting enough sleep is linked to heart disease, weakened immune response, diabetes, illnesses and weight gain. Regularly sleeping less than five hours a night increases the chance of death from all causes by about 15%. Not hitting the sack when your body needs a rest is also linked to higher blood pressure, pancreatic stress and even damaged brain cells.



Image Credit: Getty

But it also wrecks your mind: A few years ago, University of Sydney researchers surveyed about 3,000 adolescents and young adults and discovered that for each hour of neglected sleep, levels of psychological distress rose by about 5% the next day. In some people who suffered from anxiety, the researchers believe sleep deprivation may have triggered the development of serious psychological disorders like depression and bipolar disorder. The National Sleep Foundation reports that the link between depression and sleep deprivation is complex, and one can cause the other.

One thing is for sure: It's not pleasant to go without rest for long periods of time. So much so that it can be used as a form of torture, and was inflicted on U.S. detainees in the war on terror until 2009.

It makes you eat more: Sleeplessness is associated with higher calorie consumption the next day. A 2010 study in Sleep monitored 240 adolescents and found those who slept less than eight hours



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a night consumed 2% more calories from fat and 3% more calories from carbs the next day. Harvard's School of Public Health says there's a general connection between lack of sleep and obesity, with potential causes ranging from lack of exercise and more opportunities to snack during the night to hormonal disruption.

**It kills sex drive:** According to WebMD, being too tired to get it on isn't just an excuse:

Sleep specialists say that sleep-deprived men and women report lower libidos and less interest in sex. Depleted energy, sleepiness and increased tension may be largely to blame.

**It can make you into an auto crash statistic:** Sleep deprivation can cause people to drive as erratically as drunk drivers. The National Highway Traffic Safety Administration estimates that drowsy drivers cause around 100,000 police-reported crashes annually, resulting in around 1,550 deaths, 71,000 injuries and \$12.5 billion in damage.



Image Credit: Getty

**But it's not just driving:** Harvard's Division of Sleep Medicine says that sleep-deprived technicians played a role in the 1979 near-disaster at Three Mile Island and the 1986 meltdown at Chernobyl, while a lack of sleep may have helped cause the Exxon Valdez oil spill and the explosion of NASA's Challenger spacecraft. The division also argues that some of the 50,000 to 100,000 annual deaths resulting from medical errors could be the result of sleepy medical personnel.

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You probably can't handle it: A lucky few known as "short sleepers" have a beneficial genetic mutation in a gene called hDEC2 that allows them to get by with very limited amounts of sleep each night. But the rest of us will have to remain jealous. Research has demonstrated that up to 95% of people who claim to do just fine on next to no sleep are probably wrong, meaning they're actually just sleep-deprived.