

Using Sleep as a Tool for Creativity

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✓ Fact Checked

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STORY AT-A-GLANCE

- › Overwhelming evidence shows adequate sleep is essential for optimal productiveness and creativity
- › Dreaming, which occurs during the rapid eye movement (REM) sleep cycle, promotes creativity and creative problem-solving. At this time, new information is integrated into older data and novel connections between the old and the new are built, allowing new solutions to emerge
- › Dreaming is also important for psychological well-being and can be likened to overnight therapy, as it eases the emotional sting of painful experiences
- › When you upset your circadian rhythm, the results cascade through your system, raising blood pressure, dysregulating hunger hormones and blood sugar, increasing the expression of genes associated with inflammation, immune excitability, diabetes, cancer risk and stress, and much more
- › Your glymphatic system also only activates during deep sleep, thereby allowing your brain to clear out toxins, including harmful proteins linked to brain disorders such as Alzheimer's

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While many still approach sleeping as a waste of valuable time and hence something to be done as little as possible, overwhelming evidence shows sleeping more can actually boost both productiveness and creativity.¹

In the video below, professor Matthew Walker, Ph.D., founder and director of the University of California Berkeley's Center for Human Sleep Science and author of the book "Why We Sleep: The New Science of Sleep and Dreams," explains what happens in your brain while you dream – and why this is so important.

What Happens During Dream Sleep?

"Dreaming is essentially a time when we all become flagrantly psychotic," Walker says. The reasons for this rather extreme-sounding diagnosis are fivefold:

1. When dreaming, you see things that aren't there, so you're basically hallucinating
2. While in the dream, you believe things that cannot possibly be true, which means you're delusional
3. While dreaming, you are confused about time, place and the identity of the people involved, so you're suffering from disorientation
4. Emotions fluctuate wildly while dreaming, a condition known as being affectively labile
5. Lastly, upon waking, you forget most if not all of your dream experience, so you're suffering from amnesia

Any one of these, if experienced while awake, would be cause to seek psychiatric treatment. During sleep, however, these states appear to be part of completely normal biological and psychological processes. What then are the functions and benefits of dreaming?

How Dreaming Benefits Creativity

According to Walker, dream sleep, which occurs during the rapid eye movement (REM) sleep cycle, has at least two known brain benefits: creativity and psychological well-being. Starting with the former, during REM sleep in general, and dreaming specifically, information you've recently learned is integrated together with a catalog of

autobiographical data from previous experiences, building novel connections between the old and the new.

"It's almost like group therapy for memories," Walker says, adding, "Through this informational pattern alchemy at night, we create a revised mind-wide web of association. And you can start to divine new novel insights into previously unsolved problems, so that you wake up the next morning with new solutions."

In fact, sleep increases by about 250%, your ability to gain insights that would otherwise remain elusive. Tests also reveal that simply dreaming about performing an activity increases your actual physical performance tenfold. As old and new memories are integrated to form a new whole, new possible futures are also imagined. (This is what you actually perceive as "the action" of your dream.) The sum total of these processes allows you to see the meaning of life events.

According to research,^{2,3} non-REM sleep and REM sleep appear to contribute to creative problem-solving in different albeit complementary ways. It seems the non-REM sleep portion known as slow-wave sleep (which is vastly different from the light phase non-REM sleep that makes up most of the night) is a time during which your brain replays memories that are thematically related in one way or another and organizes new information into useful categories or thematic schemas.

Then, during REM sleep, your brain starts to combine these categories and create novel points of connection between them, however farfetched or unlikely – hence the "impossible" aspects of many dreams. On the other hand, this random linking of information is also how many new inventions are conceived.

One example is that of Otto Loewi, who was awarded the Nobel Prize in Medicine for his discovery that the primary language of nerve cell communication is chemical, not electrical, as previously thought. The elegantly simple scientific experiment that led to Loewi's award-winning discovery came to him in a dream.^{4,5}

The chemical responsible for nerve cell communication is now known as acetylcholine, which is also the chemical responsible for the randomization of data connections during

dreaming, as it disrupts the connection between the hippocampus, where memories of events and places are stored, and the neocortex, where facts, ideas and concepts are stored and the actual replay of memories take place.

How Dreaming Improves Psychological Well-Being

The second benefit can be likened to overnight psychotherapy – a finding explored in Walker's paper,⁶ "Overnight Therapy? The Role of Sleep in Emotional Brain Processing." The act of dreaming actually "takes the painful sting out of difficult, even traumatic emotional experiences," Walker says, allowing us to wake up the next morning feeling better about those stressful or hurtful experiences.

In a sense, "you can think of dream sleep as emotional first aid," he adds, noting that "It's not time that heals all wounds, but it's time during dream sleep that provides you with emotional convalescence."

One of the reasons for this is because REM sleep is the only time when your brain is completely devoid of noradrenaline, which triggers anxiety when elevated. In a nutshell, by reactivating an emotionally upsetting event in the absence of this key stress chemical allows the memory to be processed in a calmer, more relaxed state. In a previous article published by Greater Good Magazine, a UC Berkeley publication, Walker writes:

"How do we know this is so? In one study in my sleep center, healthy young adult participants were divided into two groups to watch a set of emotion-inducing images while inside an MRI scanner. Twelve hours later, they were shown the same emotional images – but for half the participants, the 12 hours were in the same day, while for the other half the 12 hours were separated by an evening of sleep.

Those who slept in between the two sessions reported a significant decrease in how emotional they felt in response to seeing those images again, and their

MRI scans showed a significant reduction in reactivity in the amygdala, the emotional center of the brain that creates painful feelings.

Moreover, there was a reengagement of the rational prefrontal cortex of the brain after sleep that helped maintain a dampening influence on emotional reactivity. In contrast, those who remained awake across the day showed no such dissolving of emotional reactivity over time."

Other Important Health Benefits of Sleep

The benefits of sleep don't end there. In this lecture, Walker discusses sleep more generally, and how sleep can impact virtually every area of your physical and mental health. For example, sleep is required for:

- **Maintaining metabolic homeostasis in your brain** – Wakefulness is associated with mitochondrial stress and without sufficient sleep, neuron degeneration sets in, which can lead to dementia.^{7,8,9} Animal research reveals inconsistent, intermittent sleep results in considerable and irreversible brain damage.

Mice lost 25% of the neurons located in their locus coeruleus,¹⁰ a nucleus in the brainstem associated with arousal, wakefulness and certain cognitive processes. In a similar vein, research published in the journal *Neurobiology of Aging*¹¹ suggests people with chronic sleep problems develop Alzheimer's disease sooner than those who sleep well.

- **Maintaining biological homeostasis** – Your body contains an array of body clocks that regulate everything from metabolism to psychological functioning.

When you upset your circadian rhythm by not getting enough sleep, the results cascade through your system, raising **blood pressure**, dysregulating hunger hormones and blood sugar, increasing the expression of genes associated with inflammation, immune excitability, diabetes, cancer risk and stress,¹² and much more.

While the master clock in your brain synchronizes your bodily functions to match the 24-hour light and dark cycle, each and every organ, indeed, each cell has its own biological clock. The Nobel Prize for medicine last year was actually awarded for the discovery of these body clocks.

Even half your genes have been shown to be under circadian control, turning on and off in cyclical waves. All of these clocks, while having slightly different rhythms, are synchronized to the master clock in your brain. Needless to say, when these clocks become desynchronized, a wide array of health problems can ensue.

- **Removal of toxic waste from your brain through the glymphatic system** – This system ramps up its activity during deep sleep, thereby allowing your brain to clear out toxins, including harmful proteins linked to brain disorders such as Alzheimer's.

By pumping cerebral spinal fluid through your brain's tissues, the glymphatic system flushes the waste from your brain, back into your body's circulatory system. From there, the waste eventually reaches your liver, where it can be eliminated.^{13,14,15,16}

This short list should clue you in to many of the possible health ramifications of insufficient sleep. Considering the fact that sleep plays a key role in everything from gene expression and hormone regulation to brain detoxification and cognition, it becomes clear that there aren't many facets of your being that can skate by unscathed when you skimp on sleep.

For a more comprehensive information about the health problems linked to insufficient sleep, see "[Sleep – Why You Need It and 50 Ways to Improve It.](#)"

The Fascinating Science of Sleep and Dreams

In this video, Joe Rogan interviews Walker about his book, and about the importance of sleeping and dreaming in general. According to Walker, "Humans are the only species that deliberately deprive themselves of sleep for no apparent reason," and based on his studies, he is convinced no one can make it on five hours or less of sleep without suffering some level of short-term impairment or long-term illness.

There is an exceptionally rare genetic mutation known as advanced phase sleep syndrome that allows some to thrive with minimal sleep, but you're far more likely to be struck by lightning than have this rare genetic mutation. In addition to more long-term health effects, Rogan and Walker also discuss more acute symptoms of sleep deprivation, such as wild hallucinations, delusions, mood swings and paranoia.

In a very real sense, when you forgo sleep for extended periods of time, your brain enters the REM cycle while you're awake, and as noted at the beginning, you are essentially psychotic when you're dreaming. While this is perfectly healthy during sleep, it becomes extremely problematic during wakefulness.

Less extreme cases of sleep deprivation typically involve short-temperedness, moodiness, illogical thinking and irrational behavior. The reason for this is because activity in your prefrontal cortex – the "CEO of the brain" that rules rationality and logical thinking – is dampened. If you frequently feel emotionally off-kilter or struggle with a short fuse, chances are you might manage your emotions a whole lot better were you to get more sleep on a nightly basis.

To Optimize Your Health, Make Sleep a Priority

Research (cited by Walker in the Rogan interview) has shown that a single night of sleeping just four hours lowered the amount of natural killer cells – powerful immune fighters that target malignant cells – by 70%. In other words, a single night of sleep deprivation throws you into what Walker calls "a remarkable state of immune deficiency" that raises the risk that cancer cells will multiply in your body.

The International Agency for Research on Cancer also lists shift work as a probable carcinogen, due to its disruptive effects on your circadian rhythm.¹⁷ Even losing just a single hour of sleep, which happens each year at the switchover to daylight saving time, can result in acute health problems. Nationally, there's a 24% increase in heart attacks at this time. Meanwhile, in the fall, when we all gain an hour of sleep, there's a 21% decrease in heart attacks.

The scientific facts underscore my belief that there is no substitute for, nor any excuse for not getting, a full night's rest. If you think you "don't have the time" to sleep for seven or eight hours because you have too much work on your plate, please reconsider.

Time and again, researchers have shown that sleeping MORE actually boosts productivity and creativity. Conversely, when you're working on an inadequate amount of sleep, attention, logic, efficiency and productivity go down the drain and emotional reactivity escalates.

Given its importance, I encourage you to take a few moments today to evaluate your sleep habits. Are you getting enough sleep? If not, what's one change you can make to improve the length and/or quality of your sleep? If you need help getting started, read through "Sleep – Why You Need It and 50 Ways to improve It," hyperlinked earlier.

Sources and References

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