

Dreams: The Mysteries of Sleep

Dreams are fascinating and enigmatic. What can psychology and science tell us about what – and why – we dream?

Why do we dream?

Dreams elude explanation. Researchers spend countless hours analyzing brain activity data during sleep to try to pinpoint the purpose and mechanics of our usually fragmented, sometimes fantastical sleep stories. Psychologists pore over dream journals and discuss symbolism with patients, trying to coax meaning out of dreams' mish-mashed imagery.

Theories abound, all attempting to answer this question. On one side of the debate are those who think dreams are random images, and on the other are those who think there is deeper significance to what we see in our mind's eye. Sigmund Freud thought of dreams as wish fulfillment, stories with hidden meanings that could reveal much about a person's psyche. Others wondered if dreams help us to manage our moods, to organize our memories, or simply to create contexts for the random streams of consciousness that our brain receives as our bodies sleep.

While some have turned away from earlier Freud-like theories, Harvard researchers turned up a theory that bridges the gap between science and psychology. They found that when people were told to not think of something, those thoughts were more likely to pop up later in their dreams. This lends some scientific credence to the idea that we deal with things in our sleep that we'd rather forget about while we're awake. It also takes some steam away from those who figure dreams are just random streams of nerve signals.

Maybe it's a little of both – maybe there is significance in the randomness. Ernest Hartmann, MD (of the Sleep Disorders Center at Newton Wellesley Hospital in Massachusetts), proposes that the neurological processes that create dreams also create a uniquely effective therapeutic zone.

In Hartmann's view, the brain is always processing a spectrum of connections – from hyper-focused moments of concentration to spaced-out flashes to the boundlessness of dreams. At the same time, the brain processes a range of emotions – from simple feelings to complex emotions. And when you're in the depths of REM sleep, your brain's emotion centre is very active. So, like in a therapist's office, dreams let you create connections in what Hartmann calls "a safe place."

As with most theories about dreams, though, Hartmann's is also still unproven. For now, dreams remain a mostly unsolved mystery of sleep.

Do we dream every night?

Yes, we dream every night. But dreams are complicated, and their contents can confound us. It's no wonder so many of us forget a lot of what we dream. Some people even claim that they never dream. But aside from those who have experienced certain kinds of brain injuries, everyone dreams whenever they sleep. It's been estimated that more than 2 hours out of each night's sleep are spent dreaming or in a dreamlike state.

It's long been believed that we only dream during the rapid eye movement, or REM, cycle of sleep. Actually, there's evidence that people dream during non-REM sleep, but the content of these dreams tends to be more mundane and low-key. As we sleep, we pass through one stage then another, from non-REM to REM, then repeat the cycle throughout the night. After about 70 minutes of non-REM sleep, we head into our first, brief 5 minutes or so of REM sleep. Then we switch back to non-REM, and again back to REM. Each time, the non-REM time becomes shorter while the REM time expands. The time just before we wake tends to be the longest, most active dreaming phase.

The richer, more compelling, or just plain odd dreams seem to occur during the REM cycle, and it's this stage of sleep that the body seems to seek. If you lose a half hour of REM sleep one night, you'll likely make up for with 35% more REM time the next night, a phenomenon known as REM rebound.

How do dreams happen?

A few of these scenarios may ring a bell: flying, falling, climbing to great or frightening heights, trying to run from a threat through a sludge of quicksand, sharing an embrace with a mysterious stranger or a co-worker, or popping up suddenly in your grade two classroom and then getting turned upside-down by a twister. How do we get to these places? How do dreams happen?

First we have to fall asleep, of course. Scientists believe *adenosine*, a natural compound, accumulates in our blood during our waking hours, compelling us toward sleepy state. Gradually, the heart rate and breathing slow, and muscles all across the body relax more and more.

At about the 90-minute mark, after most people have fallen through deeper, slow wave sleep, they switch into a cycle of sleep characterized by *rapid eye movement (REM)*. REM sleep is where the most vivid and frequent dreams happen.

The body lies mostly still through the REM cycle, but the brain is nearly as active as when it's fully awake. Motor signals from the brain to the body are inhibited by certain neurotransmitters which, for all intents and purposes, temporarily paralyze us. It's lucky for us that these neurotransmitters kick in. Without them, we'd all be running from monsters in our pajamas or trying to fly out of our beds. Your eyes, however, remain responsive to these signals. They still dart back and forth, implying activity – dreams – occurs during sleep.

Those dream images are thought to originate in the visual centre of the cerebral cortex, the brain's grey matter and the mind's hub for memory, awareness, consciousness, and thought. While the part of your visual cortex that takes in new images sleeps right along with you, the part that interprets images stays wide awake. So, basically, your brain gets down to business, trying to make sense of all the bits of memory and imagination.

So, temporary paralysis, rapid eye movement, certain parts of the brain shutting down while others light up – why does our body work so hard to let us dream? Read on...

What causes nightmares?

Nightmares flash across our minds, vivid and frightening, and our hearts pound. And unlike most dreams, nightmares often awaken us. Some distinctive moment of fear or panic jolts us into consciousness and out of the anxious dreamscape.

Young children experience the most frequent nightmares, with 20% to 50% of children between the ages of 5 and 10 years experiencing occasional nightmares. Luckily, most will grow out of them. Still, everyone has a nightmare now and then, and some have them often enough to be diagnosed with *dream disorder*. A nightmare theme may recur again and again, known as a *repeating nightmare*. Nightmares are also a common symptom of post-traumatic stress disorder (PTSD).

It's thought that stress or trauma can trigger nightmares. But what makes them startling enough to wake us out of the depths of sleep? Two different brain regions could provide some answers.

REM sleep, named for the rapid eye movement that is the hallmark of this phase of sleep, provides the setting for the most vivid of dreams and of nightmares. It's a sleep stage that is deep yet active. During REM, our *limbic system*, the brain's centre of emotion, lights up with activity. At the same time, our *prefrontal cortex*, the region of reason and logic, dozes. So, you have wide-awake emotion while reason is asleep at the wheel. No wonder you can dream yourself into the most outrageous situations and just shrug it off. In the case of nightmares, though, your mind can take you into some pretty terrifying territory.

Aside from stress or trauma, nightmares may arise from:

- eating right before going to sleep
- fever
- grief
- certain medications or withdrawal from a drug
- drinking too much alcohol
- sleep or breathing disorders (e.g., sleep apnea)

Anti-anxiety and anti-depressant medications are sometimes prescribed for people dealing with nightmares, especially when a nightmare is due to a medical condition (e.g., post-traumatic stress disorder). Hypnosis and therapy provide relief to some people. You may sleep more soundly with some of these self-care tips:

- Follow a regular fitness routine. Steady levels of activity could help you fall asleep more quickly and more soundly.
- Practice relaxation techniques to reduce muscle tension.
- Avoid food or caffeine too near to your bedtime.
- Talk to friends or family about your nightmares.
- Follow a good sleeping routine. Go to bed at the same time every day and wake up at the same time every day.
- Keep the temperature of your bedroom at a comfortable level.

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