二零二六 THE KTI VIBE
VOL 4. Nov 2026



THE ART OF

WONDER

TABLE OF CONTENTS

Is Dopamine Really the Brain's Happiness Chemical?	**3-5**
Why Do We Dream?	**6-10**
Can You Trust Your Eyes?	**11**
少年	**12**



Copyright © Knowledge Tree Institute Inc.

Author:Tianhe Si

Is Dopamine Really the Brain's Happiness Chemical?

In popular culture and mass media, dopamine is frequently labeled the "pleasure molecule" or a "reward chemical." Whenever we enjoy a delicious meal, scroll through short-form videos, or achieve a goal, it is common to hear people say, "My dopamine is flowing, so I feel happy." From a neuroscience perspective, however, this characterization is not only inaccurate but fundamentally misleading.

To begin with, dopamine is not synonymous with "happiness" or "pleasure." The chemicals in the brain that truly generate the experience of pure pleasure—or "liking"—are more closely associated with endogenous opioids (endorphins) and endocannabinoids. Dopamine does not function to make you feel happy while you are enjoying a reward; rather, it drives you to seek out that reward in the first place. It is a neurotransmitter linked to "craving," "motivation," and "anticipation," rather than the sense of fulfillment felt at the end of the process. Consequently, reducing dopamine to a mere "pleasure molecule" overlooks its core function: the driving of desire.

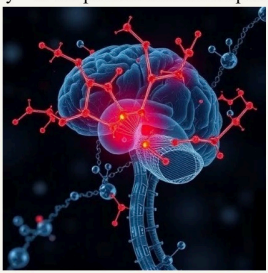


Wanting vs. Liking

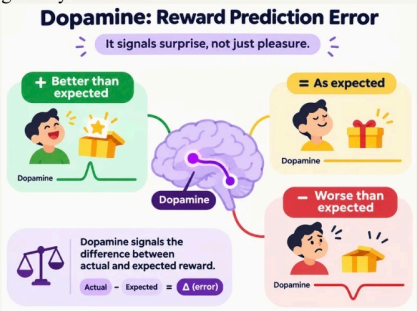
In neuroscience, there is a classic and significant distinction: "wanting" versus "liking." The dopamine system primarily regulates "wanting"—that is, incentive salienc or the driving force of craving—whereas the actual experience of pleasure ("liking") is governed by a separate, independent neural system.

Copyright © Knowledge Tree Institute Inc.

This dissociation is most clearly illustrated in addictive behaviors. As tolerance develops in individuals struggling with substance addiction or compulsive behaviors, they may no longer derive any genuine pleasure from the act (a significant decline in "liking"). Yet, due to long-term alterations in their dopamine circuitry, their craving for and pursuit of the stimulus become intensely amplified (an extreme expansion of "wanting"). In other words, one may lose the ability to find pleasure in something, while remaining unable to resist the urge to pursue it. This compulsive drive—a state of being compelled to seek out something that no longer brings joy—is the precise result of dopamine's regulatory influence.



The Brain's Learning Signal



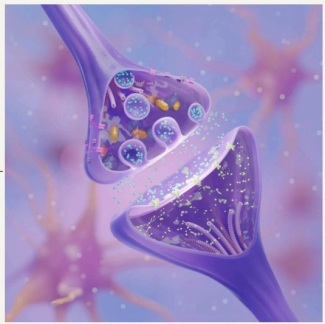
In the processes of learning and decision-making, dopamine plays a central role by serving as a messenger for "Reward Prediction Error" (RPE). Dopamine neurons are not concerned with the absolute magnitude or quality of a reward; rather, they focus on the discrepancy between the reward actually received and the reward the brain anticipated.

When an outcome exceeds expectations—a "positive prediction error"—dopamine neurons fire in a sudden burst, effectively signaling to the brain: "Well done—remember this!" Conversely, when a reward falls short of expectations—a "negative prediction error"—dopamine levels plummet, signaling that the plan has gone awry and that strategies must be adjusted. If the outcome aligns perfectly with expectations, dopamine neurons continue to fire at their baseline rate. This dynamic error signal forms the physiological foundation for reinforcement learning in the brain, enabling us to continuously refine our behavior and adapt to the world around us.

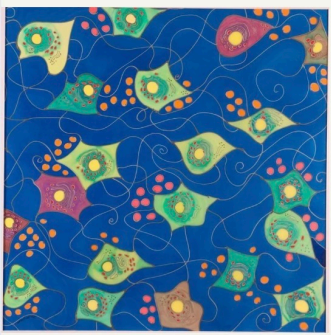
Copyright © Knowledge Tree Institute Inc.

Author:Tianhe Si

More Than Reward



Although dopamine is widely recognized for its role in reward and motivation, its function in human physiology and psychology extends far beyond this. Within the brain's basal ganglia, neurons in the substantia nigra—part of the nigrostriatal pathway—continuously release dopamine, which serves as a vital lubricant and regulator for motor control. A significant loss of these dopaminergic neurons leads to physical rigidity, tremors, and slowness of movement—the core pathological mechanism underlying Parkinson's disease.



Furthermore, dopamine projects extensively to the prefrontal cortex, where it helps regulate higher-order cognitive functions, including working memory, the allocation of attention, impulse control, and decision-making. Conditions such as the difficulty in sustaining attention seen in attention-deficit/hyperactivity disorder (ADHD), as well as certain cognitive impairments associated with schizophrenia, are closely linked to abnormalities in dopamine signaling. In this sense, dopamine acts as a grand bridge connecting physical movement, psychological motivation, and higher-level cognition.

Dopamine does not simply make us happy. It helps shape what we seek, learn, and do next.

Copyright © Knowledge Tree Institute Inc.

Author:Tianhe Si

Why Do We Dream?



Imagine waking up after a strange dream. You were walking through your school hallway when the floor suddenly turned into an ocean. Your classmates were floating through the air, and your teacher was speaking a language you had never heard before. Yet somehow, while you were dreaming, everything seemed perfectly normal.

A few seconds after waking up, you begin to wonder: Why did my brain create such a strange story?

Dreams have fascinated humans for thousands of years. Some people believe dreams reveal hidden emotions, while others see them as meaningless images created during sleep. Modern psychology offers a more scientific approach. By studying brain activity, sleep cycles, and memory, researchers have developed several theories about why we dream.

Although scientists have not discovered one definitive answer, two important explanations—the Activation-Synthesis Theory and the Consolidation Theory—help us understand what might happen inside our brains while we sleep.

The Brain Never Truly Turns Off

We often think of sleep as a period when the brain shuts down to rest. In reality, our brains remain active throughout the night.Sleep follows a series of repeating stages, including three stages of Non-Rapid Eye Movement (NREM) sleep and one stage of Rapid Eye Movement (REM) sleep.



During NREM Stage 1, we begin transitioning from wakefulness into light sleep. In Stage 2, brain activity includes short bursts called sleep spindles and large waves known as K-complexes. By Stage 3, the brain produces slow delta waves associated with deep sleep and physical recovery.

Copyright © Knowledge Tree Institute Inc.

Author:Tianhe Si

Then comes REM sleep.During REM sleep, brain activity becomes more similar to the activity observed when we are awake. Our eyes move rapidly beneath our eyelids, and vivid dreams commonly occur. However, most skeletal muscles become temporarily inactive, preventing us from physically acting out our dreams.

Psychologists sometimes call REM sleep "paradoxical sleep" because the brain is highly active while the body remains mostly still.

A complete sleep cycle lasts approximately 90 minutes, although the exact duration varies. As the night progresses, deep NREM sleep generally becomes shorter, while REM periods tend to grow longer.This means that some of our longest periods of vivid dreaming occur later in the night.

But why does the brain produce these experiences in the first place?

Theory One: The Brain Is Trying to Make Sense of Random Activity

The Activation-Synthesis Theory proposes that dreams may arise when the brain attempts to interpret spontaneous neural activity during sleep.

Think of your brain as a storyteller receiving a collection of unrelated pictures. One picture shows your classroom, another shows the ocean, and a third shows a flying person.Instead of leaving these images disconnected, your brain tries to combine them into a single story.The result might be a dream in which your classroom suddenly becomes an underwater world.



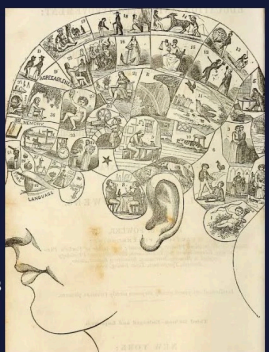
According to this theory, the brain uses memories, emotions, and familiar experiences to organize neural signals into something that feels meaningful.This could help explain why dreams often contain unusual situations that would make little sense in real life.

Copyright © Knowledge Tree Institute Inc.

For example, you might dream that you are taking an exam in a restaurant or talking to someone who suddenly changes into another person. The events may seem strange after waking up, but during the dream, your brain accepts them as part of the story.

The theory suggests that not every dream needs to contain a hidden message. Some dream content may reflect the brain's attempt to organize internally generated activity.However, activation-synthesis does not fully explain why certain memories or emotional experiences repeatedly appear in dreams.

Theory Two: Dreams May Help Us Process Memories



Imagine studying for an important chemistry exam. You spend hours reviewing chemical reactions, solving problems, and trying to remember new concepts.Later that night, you dream about being in your chemistry classroom. The questions look unfamiliar, and the experiment you are conducting changes unexpectedly.

Could this dream be connected to what you studied during the day?

The Consolidation Theory suggests that dreaming may be related to how the brain processes, organizes, and strengthens memories.During waking hours, we experience an enormous amount of information. We attend classes, interact with people, learn new skills, and experience different emotions.Not all this information needs to remain equally important.Sleep supports memory consolidation, the process through which newly learned information becomes more stable and can contribute to long-term memory.

According to the consolidation perspective on dreams, the brain may incorporate fragments of recent experiences into dream content while processing memories.This might help explain why people sometimes dream about activities they have recently practiced or situations that have been emotionally significant to them.The important distinction is that scientists have evidence connecting sleep with memory processing, but that does not prove every dream directly strengthens a memory.

The theory offers a possible explanation for dreaming, rather than a complete answer to every dream we experience.

Copyright © Knowledge Tree Institute Inc.

Author:Tianhe Si

Two Theories, One Mysterious Experience

At first, these two theories may seem contradictory.Activation-Synthesis Theory emphasizes the brain's attempt to create meaning from spontaneous neural activity.Consolidation Theory emphasizes the relationship between dreaming and the processing of memories and experiences.

Yet both theories recognize something important: dreaming is connected to an active brain, not a brain that has completely switched off.A dream may include familiar memories, emotions, and imagined situations. Researchers continue to investigate how these elements interact and what functions, if any, particular dream experiences serve.Rather than asking which theory explains every dream, it may be more useful to ask what each theory can explain—and what questions remain unanswered.

What Happens When We Lose REM Sleep?

Another interesting phenomenon may offer clues about the importance of REM sleep.Psychologists call it REM rebound.When someone experiences less REM sleep than usual, they may spend more time in REM sleep during later opportunities to sleep.In other words, the brain appears to compensate for some of the REM sleep that was lost.This phenomenon suggests that REM sleep is regulated and serves important biological functions.REM sleep is associated with processes involving memory and emotional regulation, although researchers are still investigating its exact contributions.

The connection is especially interesting because sleep deprivation affects more than how tired we feel.Insufficient sleep can reduce attention, memory, reaction time, and decision-making abilities. It can also contribute to irritability and difficulty managing emotions.These effects show why sleep is essential for healthy brain functioning.

However, REM rebound does not prove that dreaming itself is responsible for all these benefits. The importance of REM sleep and the purpose of dreaming are related questions, but they are not identical.

Copyright © Knowledge Tree Institute Inc.

So, Why Do We Dream?

Author:Tianhe Si

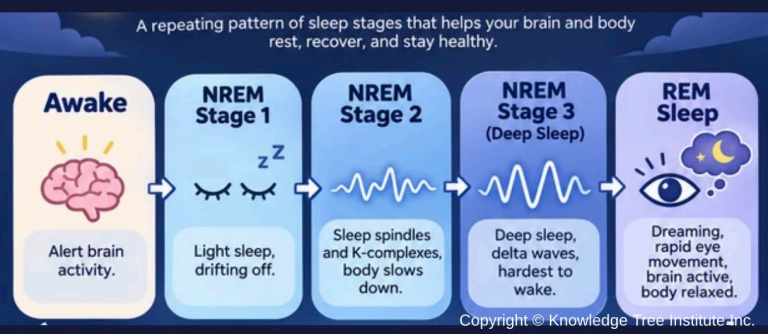
The next time you wake up from a strange dream, it means that your brain was doing far more than simply resting.It was moving through different stages of sleep, producing changing patterns of neural activity, and participating in processes important for memory, recovery, and emotional functioning.

Perhaps your dream reflected fragments of memories being processed. Perhaps your brain was constructing a story from spontaneous neural signals. Or perhaps the answer involves several mechanisms that scientists do not yet fully understand.

Dreams remind us that consciousness is more complicated than the simple difference between being awake and being asleep.Even when our eyes are closed and our bodies are resting, the brain remains remarkably active.And sometimes, that activity creates an entire world that exists only until we wake up.

The mystery of dreaming is not simply why we see strange things at night. It is how the sleeping brain can transform neural activity into experiences that feel so real.

THE SLEEP CYCLE



Author:Tianhe Si

Can You Trust Your Eyes?

You have a hole in your vision right now. Surprisingly, you probably cannot see it. Even stranger, you can stare directly at something and still fail to notice it. How is that possible? Aren't our eyes supposed to show us exactly what is happening around us? The truth is that our eyes do not simply record reality. Our brains interpret it. Although we usually trust what we see, vision is not as simple or accurate as a camera recording the world.

When light enters our eyes, it reaches the ‘retina’, where special cells called ’rods‘ and ’cones‘ convert light into neural signals through a process called ‘transduction’. These signals travel through the optic nerve to the brain's visual cortex. However, the brain does not receive a complete photograph. Instead, it must organize and interpret the information to create our visual experience. For example, every human eye has a ‘blind spot’, where the optic nerve exits the retina. Because this area contains no light-detecting cells, it cannot detect images. Yet we rarely notice a missing piece in our vision. This happens because the brain uses surrounding visual information to fill in the gap, while the other eye often helps compensate. In other words, the brain can create a continuous picture even when some information is missing.

But incomplete visual information is not the only reason our perception can be misleading. In a famous psychology experiment, participants watched a video of people passing basketballs and were asked to count the passes. During the video, a person wearing a gorilla costume walked through the scene. Surprisingly, many participants failed to notice the gorilla. This phenomenon is called ‘inattentional blindness’. When we concentrate on one task, our limited attention may prevent us from noticing other visible objects. A related phenomenon, ‘change blindness’, occurs when we fail to notice changes in a scene, such as an object disappearing between two images. These experiments demonstrate that receiving visual information does not guarantee that we will consciously notice it.

So, can we trust our eyes? Usually, yes. Our visual system is remarkably effective at helping us understand and navigate the world. However, vision is not a perfect recording of reality. Our brain combines sensory information, attention, and previous experiences to construct what we perceive. Sometimes, this process produces mistakes, causing us to overlook objects or experience a complete image despite missing information. The most important lesson is simple: We do not see everything our eyes receive. We see what our brains manage to construct.

Copyright © Knowledge Tree Institute Inc.

Author:Yibin Ma

少年

少年是什么？是下课时和同学漫天乱弹小纸团攻击“对方”；是下课折纸炮吓同学；是上语文课偷偷写数学作业；是一去不返的时光。

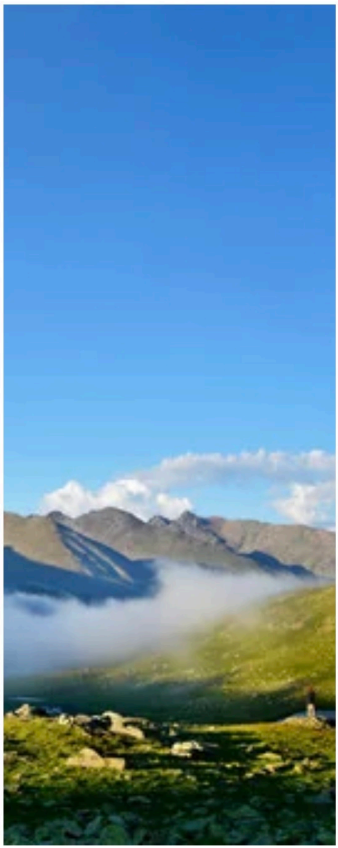


在青春时期，我并非不能重复少年时的行为。虽然上物理课我还是会写英语作业，但是有东西变了。是我的内心。人生如梦，弹指间少年时期一去不返，现存所有的仅剩一点激情和无尽理性。



我怀念初一时参加外语节，也怀念当时和她的时光。如果能重来，我应该会有所不同。 在少年时期我并没有看见我的快乐，但在青春时期，我好似忽略享受，为何我要用青春去怀念少年，再用成年怀念青春？人是奇怪的，没法活在当下。我只能努力奋斗，不留遗憾。不知何时才能享受青春。

Copyright © Knowledge Tree Institute Inc.



I READ
I TRAVEL
I BECOME

知识树月刊

$5/Month (1 Issue)
$36/Year (12 issues)
订阅或捐款via Zelle 至:
office@knowledgetreeinstitute.com

Knowledge
Tree Institute
Where we grow together

杂志广告请接洽

(510) 518 - 0687

Email:
office@knowledgetreeinstitute.com