

# Dreams: Full of meaning or a reflex of the brain?

October 3 2013, by Melissa Healy

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Credit: Maurajbo/Wikipedia.

It's a question that has long fascinated and flummoxed those who study human behavior: From whence comes the impulse to dream? Are dreams generated from the brain's "top" - the high-flying cortical structures that allow us to reason, perceive, act and remember? Or do they come from the brain's "bottom" - the unheralded brainstem, which quietly oversees such basic bodily functions as respiration, heart rate, salivation and temperature control?

At stake is what to make of the funny, sexual, scary and just plain

bizarre mental scenarios that play themselves out in our heads while we sleep. Are our subconscious fantasies coming up for a breath of air, as Sigmund Freud believed? Is our brain consolidating lessons learned and pitching out unneeded data, as neuroscientists suggest? Or are dreams no more meaningful than a spontaneous run of erratic heartbeats, a hot flash, or the frisson we feel at the sight of an attractive passer-by?

A study published this week in the journal *Brain* suggests that the impulse to dream may be little more than a tickle sent up from the brainstem to the brain's sensory cortex.

The full dream experience - the complex scenarios, the feelings of fear, delight or longing - may require the further input of the brain's higher-order cortical areas, the new research suggests. But even people with grievous injury to the brain's prime motivational machinery are capable of dreams, the study found.

The latest research looked for sleep-time "mentation" - thoughts, essentially - in a small group of very unusual patients. These patients - 13 in all - had suffered damage within their brains' limbic system, the seat of our basic desires and motivations - for sex, for food, for pleasurable sensations brought on by drugs and friendship and whatever else turns us on.

As a result of that damage, they had a neuropsychological syndrome called auto-activation deficit, or AAD: Even while fully conscious, they could sit completely idle and mute for hours if they were not prodded to action or speech by caregivers. In fact, they were more than unmotivated to do anything; when asked about their thoughts, they would frequently report that their mind was completely blank. When prompted, they could often do math, sing a song or conjure up memories. But left on their own, these patients might have no spontaneous [thoughts](#) at all.

Do these people dream? The answer might suggest the answer to the question of where dreams come from.

Indeed, they do dream - or at least some of them did, in an experiment that compared the nighttime mentations of normal, healthy subjects with subjects who suffered from AAD. When awakened from [rapid eye movement](#) (REM) sleep - the sleep stage at which dreams are thought to be most common and complex - four of the patients with AAD - 31 percent of them - reported mentations.

That was a lot less dreaming than was happening in the healthy subjects, 92 percent of whom reported dreams - and much more colorful and bizarre ones - when they were awakened from REM sleep.

In the AAD patients, the dreams were rarer, shorter and less complex: they said they dreamed of things like shaving, taking a walk or seeing a relative. But even these rudimentary dreams cast them in situations that, in a conscious state, they were unlikely to think of unprompted.

That these inert patients could generate dreams was a "most unexpected result," said the study's authors, a team of French neurologists, neuroscientists and sleep specialists based in several institutes in Paris. It supports the hypothesis that "dreams are generated through bottom-up processes," they concluded.

The "top-down theory" - that dreams originate from the brain's higher-order cortex, the place from which imagination springs - "is not supported here," the authors said, "as [patients](#) with AAD who have a mental emptiness and no imagination during wakefulness do report some dream mentations upon emerging from [sleep](#)."

Of course, the dreams of healthy subjects may be embellished by input from the cortical areas that are the seats of perception, memory, emotion

and reason, the authors said: That is demonstrated by the vastly richer dreams described by normal subjects.

A lot of dream research in humans has been based on subjects with bizarre damage to the [brain](#). People who have had frontal lobotomies, for instance, report an abrupt cessation of dream activity - an observation that had rallied the top-down view of the dream impulse.

It's an imperfect method of research, since such subjects are rare and no two have exactly the same injuries. So, while the rest of us [dream](#) away unbothered, this intriguing debate is likely to remain open for some time to come.

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