



LET YOUR MIND WANDER

The **new science of daydreaming** will induce 'aha' moments — if you can handle the **solitude**.

BY MICHAEL HARRIS



ALL ILLUSTRATIONS BY AGSANDREWISHUTTERSTOCK

Dr. Edith Bone has decided not to cry. On this autumn afternoon in 1956, her seven years of solitary confinement have come to a sudden end. Beyond the prison gates, the Hungarian Revolution's final, scattered shots are echoing down the streets of Budapest. Inside the gates, Bone emerges through the prison's front door into the courtyard's bewildering sunlight. She is 68 years old, stout and arthritic.

Bone was born in Budapest in 1889 and proved an intelligent — if disobedient — child. She wished to become a lawyer like her father, but this profession was closed to women. Her options were schoolmistress or doctor; she accepted the latter.

The Great War began soon after her graduation, and so she went to work in a military hospital. Perhaps it was there, seeing the suffering of the poorer classes, that her communist sympathies bloomed: She watched an illiterate Romanian soldier, a shepherd before the war, as he cried at the window for days, cradling a shattered arm and worrying about his lost children. He was only one broken man among many.

After the war, Bone devoted herself to political work in England for 16 years, and it was this foreign connection that would excite the suspicions of authorities when she returned to communist Budapest in 1949. Secret police stopped her at the airport on her way back to England.

Inside headquarters, a slim man presented himself, decked in fine clothing and smooth manners. He took her into a little office and told her they knew she was a spy, an agent of the British secret service. "Until you tell us what your instructions were, you will not leave this building."

Bone replied: "In that case I shall probably die here, because I am not an agent of the secret service." What followed — her seven years and 58 days of solitary confinement — is the stuff of horror films. She was held in filthy, freezing cells; the walls either dripped with water or were furred with fungus. She was generally half-starved and always isolated except when confronted by guards. Twenty-three ill-trained officers interrogated her with insults and threats — once for a 60-hour stretch. For one period of six months, she was plunged into total darkness.

And yet her captors received no false

confessions, no pleas for mercy; their only bounty was the tally of her insolent replies. It became a kind of recreation for Bone to annoy the prison authorities on the rare occasions when she saw them.

But Bone's most extraordinary stratagem was not the way she toyed with her captors, it was the way she held sway over her self — the dogged maintenance of her own sanity. From within that enforced void she slowly, steadily, built for herself an interior world that could not be destroyed or stripped from her. She recited poetry, for starters, translating the verses she knew by heart into each of her six languages. Then she began composing her own doggerel poems. One, made up during those six months without light, praised the saving grace of her mind's "dark-born magic wand."

Inspired by a prisoner she remembered from a Tolstoy story, Bone took herself on imaginary walks through all the cities she'd visited. She strolled the streets of Paris and Rome and Florence and Milan; she toured the Tiergarten in Berlin and Mozart's residence in Vienna. Later, while her feet wore a narrow furrow into the concrete beside her bed, she set out in her mind on a journey home to London. She walked a certain distance each day and kept a mental record of where she'd left off. She made the trip four times, each time stopping when she arrived at the Channel, as it seemed too cold to swim.

Bone's guards were infuriated, but she proved to be proficient in the art of being alone. They cut her off from the world and she exercised that art, choosing peace over madness, consolation over despair, and solitude over imprisonment. Far from being destroyed, Bone emerged from prison, in her words, "a little wiser and full of hope."

I found her story remarkable. As I became more familiar with her attitude toward solitary confinement — and her bottomless capacity to endure it — I felt a creeping kind of envy coming over me. I wasn't envious of her circumstances, of course. But I was envious of her faculties. Even the handful of solitary hours it took to read her story were difficult for me to endure.

How to be alone. And why.

There must be an art to it, I thought. A certain practice, or alchemy, that turns loneliness into solitude, blank days into blank canvases. A lost little art that, year by year, fades in the bleaching light of the future.

SHOCK OVER THOUGHT

"I'm sorry, Julie, but it's just a fact — people are terrified of being in their heads," I say. "I read this study where subjects chose to give themselves electric shocks rather than be alone with their own thoughts."

It's the summer of 2015 and the University of British Columbia's half-vacated grounds droop with bloom. Julie — an old friend I've run into on campus — gives me a skeptical side-eye and says she's perfectly capable of being alone with her thoughts. Proving her point, she wanders out of the rose garden in search of caffeine. I glower at the plants.

The study was a real one. It was published in 2014 in *Science* and was authored by University of Virginia professor Timothy D. Wilson and his team. Their research revealed that, left in our own company, most of us start to lose it after six to 15 minutes. The shocks are preferable, despite the pain, because anything — anything — is better than what the human brain starts getting up to when left to its own devices.

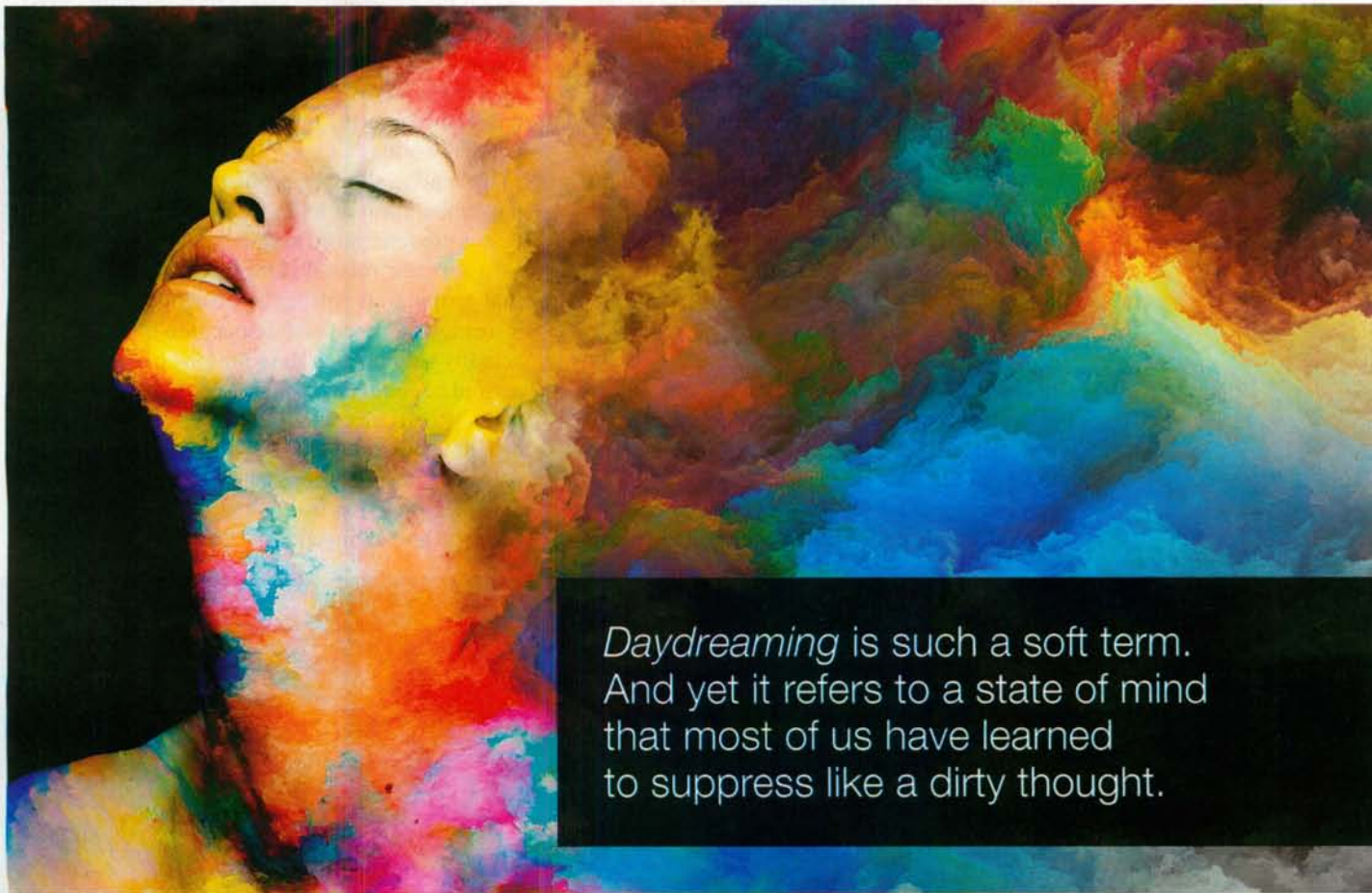
Or so we assume.

What the brain in fact gets up to in the absence of antagonizing external stimuli (buzzing phones, chirping people) is daydreaming. I am purposefully making it sound benign. *Daydreaming* is such a soft term. And yet it refers to a state of mind that most of us — myself included — have learned to suppress like a dirty thought. Perhaps we suppress it out of fear that daydreaming is related to the sin of idle hands. From at least medieval times onward, there's been a steady campaign against idleness, that instigator of evil.

Today, in the spaces where I used to daydream, those interstitial moments on a bus, in the shower, or out on a walk, I'm hounded by a guilt and quiet desperation — a panicked need to block my mind from wandering too long on its own. The mind must be put to use.

I've come to UBC to ask if daydreaming matters, and why. The campus is home to the Cognitive Neuroscience of Thought Laboratory, and one of their specialties is "undirected thought processes," which is shoptalk for daydreaming and mind-wandering.

Their research is fueled by volunteers who subject themselves to fMRI brain scans mid-daydream. Today's brain — let's call her Haley — arrives and is promptly asked whether she has any metal in her body (MRI machines are, among other things, enormously powerful magnets). She reports that she's metal-free and so is handed a pair of earplugs — things are going to get frighteningly loud.



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Haley is positioned on the sliding bed, and the technologist fits a “birdcage” over her head. It’s the birdcage that actually does the scanning. The giant gray doughnut she’s now being slid into is only needed to create a uniform magnetic field; it’s the brain’s deviations from that field that the birdcage maps.

When the technologist turns on the scanner, it is deafening. Eventually her mind grows accustomed to the noise and does what any mind without new stimuli will do — it wanders. Her daydreaming moments are plotted and the data takes six hours to process. Then, bingo: a portrait of a daydream, in electric blue and red.

OUT OF THE BLUE

Ultimately, such images give us only a very raw notion of what’s happening in the mind of a daydreamer. Despite the 90-minute session’s \$900 price tag, what it produces is a child’s drawing, a base attempt to represent the dance of 86 billion neurons. (If I showed you a brain scan from a besotted person or a terrified one, what would you really learn about love or fear?) A floppy-haired Ph.D. student called Matt Dixon describes it to me this way: “You know, it’s like we’re getting a distant snapshot of something — it’s real but it’s

fuzzy. In this image, we see what’s happening in the brain every two seconds, but the brain is actually changing every hundredth of a millisecond.”

We do get some telling intimations. We now know that when the brain drops its focus on the outside world but remains awake and alert (in other words, when it begins to daydream), it activates something called the default mode network, or DMN. The default mode is anything but a comatose experience. A review of research on the DMN led by Mary Helen Immordino-Yang at the University of Southern California found that a particular style of neural processing is suppressed when we pay direct attention to things, and it emerges when the brain switches to default mode. This daydreaming DMN activity processes personal memories and leads to identity formation.

Daydreaming constitutes an intense and heterogeneous set of brain functions. Yet this industrious activity plays out while the conscious mind remains utterly unaware of the work. Our thoughts (sometimes really *great* thoughts) emerge without our anticipation or understanding. They emerge from the blue. Daydreaming can be pointless fantasizing, complex planning or the generation of creative ideas. But, whatever their

utility, its products arrive unbidden. You could call it an involuntary process, like the pumping of a heart.

Studying spontaneous thought and mind-wandering was unpopular when the UBC lab's founder, Kalina Christoff, was a student. And she still sees the work of her peers biased against it: "Our culture puts a premium on control in all things," she tells me. A lack of control is considered inferior, and so thinking that's uncontrolled becomes suspect.

Those idle hands again.

CENSOR NOTHING

Christoff is a petite woman with a calm gaze to match her methodic voice — and such sureness has served her well. Even as an undergrad, her interests diverged from her peers. While they wanted to study analytical thought, she preferred

watch for those epiphanies, which she didn't need an MRI machine to witness. "What impressed me was the complete lack of traditional logic as people wandered toward their solutions," she tells me. The wandering mind also solves problems in the real world.

We tend to think of problem-solving as the implementation of logical steps toward an answer that is predetermined and inevitable. In this way, we assert control over things. But Christoff found that people were solving her insight problems, instead, by a process of association that was actually very poetic. The solutions participants arrived at could never have been deduced via strict logic. (Rebus puzzles are common examples of insight problems, e.g., what is meant by "sta4nce"? Answer: "for instance.") Christoff found hardly anyone around her was interested in this dark space of human ingenuity.



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to give people "insight problems" — problems with no clear answer — that required an "aha moment" in order to be solved. Christoff might, for example, give a participant a glass tube with a ball of wax lodged inside, then hand the participant a pile of objects and tell her to remove the wax without breaking the glass. The participant must "aha" herself to an answer by arriving at a fresh use for a paper clip or a scrap of paper. Christoff loved to

"It was uncharted territory," she says.

After earning a Ph.D. at Stanford University and doing postdoc work at the University of Cambridge, Christoff went to UBC and founded her lab. As the initial brain-scan data flooded in, it made her imagine the mind as a sort of muscle system that relied on opposing forces. To bend your arm, for example, you flex one muscle while relaxing another — straightening your

arm requires the reverse. Similarly, Christoff's new vision of a well-tuned mind included an interplay between concentration and stream of consciousness. Overexercise one or the other and you impair the functioning of the whole apparatus. "In our culture, we're always encouraged to practice concentrating," she tells me, "but we're discouraged from the wide-ranging modes of thought we experience in solitude."

Given enough solitude and enough time, the mind shifts into default mode and pans through connections that at first seem wholly random. It explores problems with a curiosity and openness we might never choose to entertain. But this randomness is crucial. "The power of the wandering mind," Christoff says, "is precisely the fact that it censors nothing. It can make connections you would never otherwise make."

Daydreaming is an inherently creative process, she says, because the daydreamer is open to bizarre new options. Fresh insights and methods that don't already exist in the larger culture are revealed through this solitary style of brainwork. By contrast, analytical thinking, logical thinking, is all about the exclusion and critiquing of ideas so that the brain can become a guided laser that operates with surgical precision. The conscious, analytical style of thinking that our schools train us to use always silences the bizarre or unpopular ideas that the daydreaming mind might try on.

"Analytical thinking is ideal for weighing options in a well-defined problem," Christoff says. But that power is also its weakness. "Analytical thinking is antithetical to inspiration," she adds.

LONE GENIUSES

Albert Einstein famously noticed this separation of duties in the mind. He believed that the daydreaming mind's ability to link things is, in fact, our only path toward fresh ideas. There is a kind of assembly line, one could argue, with knowledge and conversation pouring in at the start and, later down the track, a stretch of silence and daydreaming. Both ends of the factory are necessary to produce the crucial product — insight.

Isaac Newton labored over his own research in almost complete isolation. A lonely childhood gave way to a disaffected time at Cambridge, where absurd Aristotelian physics was still being taught. But then, in 1665, the plague struck Cambridge and — in perhaps the only wonderful thing to come of that disaster — Newton was obliged to retreat to the isolation of his family's farmhouse in Woolsthorpe. It was there, forcibly removed from the university's community, that Newton discovered the laws of motion and gravity. It was there, in a garden and not in a lecture hall, that he saw a falling apple and wondered why.

Physicists like Einstein and Newton are among our most fundamental thinkers, and they were peculiarly aware of what solitude brings to serious thought. Felicity Mellor, a researcher at Imperial College London, criticizes the new generation of advanced study institutes for emphasizing collaboration and social atmospheres at the expense of such solitary contemplation. Peter Higgs, the Nobel Prize-winning godfather of the Large Hadron Collider, backs Mellor up, saying his trailblazing work would be impossible today because the peace and solitude he enjoyed in the 1960s has vanished. We can only imagine how premature sharing could deflate a unified field theory or mangle an explanation for the origination of gamma-ray bursts.

What is true for institutions is also true for individuals. We all have daily proof that moments alone allow the drifting, unfocused mind to be inspired. Like others, I'm hit by my better ideas first thing in the morning, even lying in bed, before the world has poured any noise or hassle onto me. A novel thought might strike me in the shower. It's as though the brain is allowed to have its genius moment before our lumbering, bureaucratic *idea of thinking* puts on a tie and gets in the way.

As we continue to chat about all this, Christoff moves toward surprisingly philosophical places: "If our mode of life leaves us feeling empty sometimes," she tells me, "it may be because we aren't left to our own devices, we aren't allowed to mull things over. We're deprived of that sense of meaning and happiness that mind-wandering can produce." An extended stare out the rain-streaked window may be as key to consolidating our thoughts as REM sleep.

Alison Gopnik, an acclaimed psychology professor at the University of California, Berkeley, has pushed this notion even further. She argues that the rush of pleasure we get from an "aha moment" is the equivalent of an orgasm for the thinking mind. The pleasure of an orgasm, after all, is just a motivating bit of trickery that our bodies employ to make sure we procreate; similarly, the pleasure of an "aha" may be built into our DNA to ensure that we learn more about the world. This is a deeply encouraging thought. If we've evolved to take great pleasure from the moment when fresh connections are forged, then letting our mind wander is no longer a guilty indulgence — it is crucial to our success and survival.

Our blueprint demands it. **D**

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