

By Meghan Walsh

In July 2022, an unassuming 39-year-old Princeton professor made headlines when he was awarded the Fields Medal, one of the most distinguished honors in mathematics. Through his ability to appreciate both the big picture and exquisite detail, June Huh has been able to connect geometry and combinatorics in pioneering and poetic ways. But his mundane day-to-day routine seemed to captivate people almost as much as his contributions to human knowledge did.

Huh does only three hours a day of focused work, which may include tinkering on a math problem or preparing a classroom lecture. “Then I’m exhausted,” he told *Quanta Magazine*. (Huh didn’t respond to an interview request, which I’d like to think is in strict accordance with his dedication to minimizing distractions.) “Doing something that’s valuable, meaningful, creative takes away a lot of your energy.” Outside of those few hours, Huh prioritizes recovery, honoring his cognitive capacity in the same way an athlete takes care of the body.

The father of two has said he starts each day going to the gym, then walks his sons to school on his way to the Princeton campus. He often takes a late-morning nap on the couch in his office, which contains his desk and chair, a yoga mat, a vacuum cleaner, and little else. When he needs to give his mind a break, he directs the vacuum back and forth, or lies motionless on the yoga mat. He takes a headphone-free walk after lunch (he says he finds it too taxing to move his attention from one stimulus to another). After spending the evening with his family, Huh is in bed around 9 p.m. Rinse. Repeat—ad infinitum.

To many of us, this may seem monastic and/or entirely unrealistic. But experts say there are valuable lessons to be learned from Huh’s austerity. Leaders of companies—and economies—that depend upon intellectual output may want to consider the mathematician’s formula for productivity.

In recent years, those paying attention have begun to notice a vague but significant drain on output: a collective inability to pay attention. Our focus, they say, ping-pongs among tasks, tabs, and apps. But even when we’re not being interrupted by email and Slack notifications—even when we are able to set aside quiet time to read a report, analyze the numbers, or write that press release—our

minds continue to oscillate between thoughts and impulses. That's because modern life and modes of working are changing the ways our brains function—and not for the better. “The knowledge worker's inability to concentrate is the most underrated and serious challenge facing business today,” says Maura Thomas, who has written a number of books on attention management and consulted for organizations ranging from L'Oréal to NASA.

Emerging data suggests that such alarm may be justified. Gloria Mark, a professor of informatics at the University of California, Irvine, has been observing employees in the field for almost two decades. In 2004, she found that people worked for an average of two and a half minutes before switching tasks, whether from an email to a spreadsheet or a conversation with a colleague. By 2012, that time was down to 75 seconds. Today, workers spend an average of 47 seconds—less than a minute!—per task before shifting focus.

That's not even the most troubling part, though. Mark, whose latest book, *Attention Span: A Groundbreaking Way to Restore Balance, Happiness and Productivity*, was published earlier this year, has found that when a person's attention is interrupted, it takes them roughly 25 minutes to return to the original task—a phenomenon known as the switch cost effect. “People know they are falling down this rabbit hole of distraction and multitasking craziness, but they don't know how to get out,” Mark says.

It's easy to blame technology for our diminishing attention span, but experts say it's more complicated than that. A new field of research, neuroergonomics, studies the forces attacking our cognitive functioning; these range from sleep deprivation to air pollution to the media we consume, to—the scourge of every knowledge worker's existence—digital communication. Experts call it a concentration crisis: We've overloaded our brains, they say, and in the process structurally changed them. And if it may not be possible to immediately improve air quality, it may be feasible to, at the very least, take a nap. Maybe.

Lee Watson is the CEO of Alloy Engineering, an industrial fabricator with roughly 190 employees. At his desk, Watson faces three glowing monitors. There was a time, he says, when he'd have email up on one screen, a budget Excel file on another, and The Wall Street Journal on the third. "I was all over the place," he admits.

The part of the brain that manages attention has to balance various demands. It must be able to zoom out, reflect, and construct long-term goals. On a micro level, it has to prioritize what to focus on, storing and retrieving all the relevant information as it switches from one task to another, or from one form of processing to another—such as reasoning, learning, creating, or communicating. All of these demands contribute to cognitive load. Juggling lots of disparate tasks uses a ton of energy, though, leaving very little for high-level functioning.

Amelia Haynes, a neuroscience research manager at Korn Ferry, compares the brain to a muscle. "When we get aroused and briefly give our attention to one thing and then another, it's like doing one bicep curl, then one squat," she says. "You have to do a full set to get results." But even when we ignore email and other distractions, the simple act of resisting temptation is mentally exhausting. Our brains have evolved to perk up in response to novelty, making all the pings and dings difficult to ignore.

In a recent survey of workers by project management software company Asana, 33 percent said their attention spans were shorter than a year prior. That's not particularly surprising, considering the pandemic. But what about over a longer time period? Are we actually losing our capacity for sustained attention?

In his book *Stolen Focus: Why You Can't Pay Attention—and How to Think Deeply Again*, author Johann Hari sets out to answer that question and discovers a body of research that contends the answer is yes. He cites the work of Sune Lehmann, a data scientist and professor at the Technical University of Denmark, who analyzed a number of very large data sets and found some interesting trends. Over the last 10 years, Lehmann learned, the time internet users have spent talking about a specific topic on Twitter, Reddit, and Google has gotten progressively shorter. But when he scanned books going back all the way to the 1880s, he

discovered “how long the public collectively discusses specific subjects” has, in fact, been continuous.

One of the deepest ways humans engage with complex information, as Hari points out, is through books. Books train the brain to focus for a sustained period. But studies show that the more we read on-screen, the less we read on the page. More than half of the US population doesn’t read a single book over the course of a typical year. When we do read books, we read them as we do our devices—skimming, scanning, and scrolling. This means that simply printing out the dense report you need to comb through won’t make a difference. Your brain has been rewired to read in the manner it’s accustomed to (of course, as Haynes emphasizes, with deliberate effort it can be rewired once again to sustain linear focus).

But digital technology is just the latest manifestation of the trend toward everything, everywhere all at once. The average length of movie shots has decreased from 12 seconds in 1930 to less than 4 seconds. We both walk and talk faster than in the past. Some theorize that as the pace of modern life has accelerated over the last century, our attention spans have become manic. And the outcome is that rather than diving in deep, most people are staying in the shallows of the mind.

In its research, Asana found that 60 percent of knowledge workers’ time is spent on coordination and communication rather than skilled, strategic output. Asana calls this “work about work.” That figure wouldn’t be a big deal, except that all those surface-level tasks and all that artificial urgency create undue stress. And guess what? Even mild levels of sustained stress cause structural changes in the brain that affect our attentional stamina.

Watson says his triad of monitors isn’t going anywhere, but he also realizes company culture starts from the top, which is why he had the IT department disable email notifications for the entire company (except for a select few). If he writes an email at 3 a.m., which he often does, he schedules it to be delivered during business hours, so his employees don’t feel pressure to be constantly plugged in. And these days he makes an effort to focus on one thing at a time,

taking a break to recharge before moving on. “At first, I wanted to protect my team’s work-life balance, but now I’m improving my productivity,” he says.

Email is regularly shown to be one of the main culprits of worker distraction and stress. On average, people check their inboxes 74 times a day. But few studies document what happens when email is eliminated. In a moment of persuasive mastery, Mark, the professor at Irvine, convinced the head of a company where she was conducting field research to cut off email for an entire workweek and allow her to strap heart-rate monitors to workers.

For the first few days, the workers continued to compulsively check their inboxes, even though their email was deactivated. But by the end of the experiment, they were able to focus for significantly longer—and their stress levels were significantly lower. In interviews, the study participants said they finished the week “feeling liberated,” like they “could work at a human pace.”

Office workers can’t simply decide to stop checking email. But more and more business leaders are starting to take the concentration crisis seriously.

Organizational environments can be designed to be more or less distracting. A number of companies have found success cutting the workweek down to four days to reduce stress and give people more cognitive recovery time. Others, like Asana, have implemented meeting-free days. The deep work movement is spreading.

At the same time, the field of neuroergonomics is providing insight into various ways to optimize brain function, such as giving the mind adequate time to recover between tasks. That includes both mindless activities—like Huh’s vacuuming and going on walks—and plenty of rest.

In *Stolen Focus*, Hari highlights research out of Harvard University that shows that people who stay awake for 19 hours become as cognitively impaired as if they were drunk. The National Sleep Foundation says the amount of shut-eye Americans get has dropped by 20 percent in the last 100 years. During sleep is when the brain clears out all the metabolic waste created by thinking, stores information for the long term, and makes new connections—the foundation of creativity. Cristiano Guarana, a professor at the Kelley School of Business at Indiana University who studies the intersection of sleep quality and business

leadership, conducted a meta-analysis confirming that people who are tired make more mistakes, have less impulse control, and can't sustain attention on a specific task. The problem is that people are not aware of how profoundly a poor night's sleep affects them. "There is a massive amount of self-deception that's happening," Guarana says.

Mindfulness, paradoxically, is the first step in reasserting control over the mind. Whether you're a CEO or engineer, personal agency starts with reflecting on how you're utilizing the brain's limited stamina. We are happiest when we finish the day feeling like we did something worthwhile. In fact, researchers have found the greatest contributor to job satisfaction is making progress in meaningful work.

"We don't fully participate in our moments anymore, because we are doing things superficially," says Thomas, the attention-management consultant. "We live a life of reaction and distraction, instead of intention and choice."