

# The Endless Scroll: How to Tell if You're a Tech Addict

*Don't let your apps, games, and smartphone control you. Once you understand what's happening in your brain while you use technology, you can do something about it.*

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Brian was cleaning his bedroom when he came across an old iPhone. The screen was cracked, but he found a charger, plugged the smartphone in, and turned it on. The college junior told himself it was just for nostalgia's sake. Then he discovered an old tablet, too. He started tapping on apps and soon figured out how to get a Wi-Fi hotspot working, so he could get around the blocks on his home router. Brian's current phone and laptop had blocks on them too, but these old devices didn't. He was online.

Brian caught up on YouTube videos, scrolled through subreddits, and played a few old games. Soon he fell back into a comfortable internet routine he'd been repeating for years. A couple nights later, Brian fell asleep just before sunrise. He'd spent hours playing a mindlessly fun tower defense game. He woke up to find his parents had confiscated the old iPhone, which he'd left strewn out on his bed. His mom found the iPad in his baseball bag the next day.

Brian is a tech addict.

He's recounting his recent relapse in a session at the [Center for Internet and Technology Addiction](#) (CITA) in Hartford, Connecticut. Brian is in his sixth week of treatment since taking a leave of absence from college, where he's an engineering student. (Brian consented to having PCMag to sit in; his name has been changed to protect his privacy.)

Dr. David Greenfield sits calmly at his desk during the session. He's surrounded by stacks of patient files; brain and neurotransmitter diagrams hang on the wall behind him. Greenfield founded the CITA around the turn of the millennium, during the first internet boom. He started as an electronics technician to put himself through med school, fixing people's TVs and stereos. That fascination with technology, combined with his work in addiction, came to a head one night in the late 90s after he'd spent hours in front of his computer on AOL and dial-up internet. Dr. Greenfield, who's also an Assistant Clinical Professor of Psychiatry at the University of Connecticut School of Medicine, has been studying behavioral addiction and the psychology of tech use for more than two decades since.

In this session, Dr. Greenfield is trying to help Brian find what sparked his recent device binge by breaking down the behavioral progression that followed.

"This relapse you had, was there any emotional trigger? Any psychological trigger?" Dr. Greenfield asks. "When you fired up YouTube and started watching videos again... After you figured out a way to get in the back doors, what was that like?"

Brian is a loquacious, articulate young man with a tendency to go off on tangents. While his primary addiction is gaming, he's also a compulsive internet user with a predilection for Reddit, Twitch, and YouTube. At home and isolated, he tells Dr. Greenfield, he felt like he was "dying a little bit inside from the tech withdrawal" when he went digging for old devices.

Brian explains: "I think part of it had to do with being at home, not having a job, and not really having too many people to interact with. I didn't have that many high school friends, and they weren't around. Usually I would have filled that absence with video games, but since that wasn't there, it's sort of like, what the hell do I do with my day? So when I typed YouTube into the search bar, I was excited. It's not that I beat the system, but that I get to see what I've missed."

He doesn't know where the old iPhone and tablet are now. He tells Dr. Greenfield he's relieved they're "out of my hands."

Patients like Brian, who seek treatment for behavioral addictions to technology, are at the extreme end of a spectrum. But the ubiquity of digital devices and unfettered 24/7 internet access has changed how all of us spend our time. Seventy-seven percent of Americans go online daily, and 26 percent are online "almost constantly," according to the latest [Pew Research Center survey](#). PCMag's own [survey](#) of more than 650 readers' tech habits found that approximately 64 percent of respondents sometimes or often feel they're using their smartphone too much. Sixty-six percent sleep with it within reach

of their beds ([take the survey here](#)). Tech has changed how we talk to each other, how we engage with the world, and how we think.

There are countless ways this has transformed our lives for the better. We're more connected to one another. We're more organized and efficient at work and elsewhere. We know so much more than we used to (as do the companies whose businesses rest on the data users [grant them](#)). And if we don't know something, the answer is just a quick search away.

Apps, games, touch screens, and websites are designed to be as intuitive and enjoyable as possible, smoothing our pathway to continual tech usage. As we spend more of our time looking at screens and immersed in digital experiences, it's worth questioning what's happening in our brains when we starting tapping and scrolling on a smartphone. How are the feedback loops in apps, devices, games, and social media designed to keep users engaged? How does tech use affect our attention, sleep, and habits? What separates healthy tech use from addiction, and how is it treated?

This story is about how technology habits escalate into addiction, and how addicts are treated at recovery facilities like the CITA. But it's also about understanding how technology affects the way we all think and behave.

We spoke to psychologists and researchers, UX designers, and everyday users about how tech influences our behavior. We also spoke to the tech industry itself, but that turned into a [whole other story](#). None of our sources are anti-technology. On the contrary, most agree that cutting technology out of your life entirely in our hyper-connected world is unrealistic. Instead, consumers should modulate tech use and encourage healthy habits—particularly for the next generation of children growing up with devices in their hands.

Once you recognize the universal behaviors and psychological forces at play behind our screens, it's easier to introduce proactive strategies into your life to balance them. One of the most pervasive dangers in our digital world is also built into its design: the frictionless ease of passively consuming technology without a second thought.

## What Is Tech Addiction?

People shy away from the word *addiction*. It has loaded connotations, as psychologist and NYU marketing professor Adam Alter acknowledges, but he believes it's the appropriate term. Alter is the author of *Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked*. The [book](#) breaks down what addiction is and how our environments and cues, both physical and virtual, can play a large part in engineering the circumstances that breed it.

The American Society of Addiction Medicine (ASAM) **characterizes addiction** by five factors, regardless of whether it's behavioral or substance-related:

1. The inability to consistently abstain
2. Impairment in behavioral control
3. Craving
4. Diminished recognition of significant behavior and interpersonal relationship problems
5. A dysfunctional emotional response

Given the stigma of addiction, Alter prefers a simpler definition: It's an experience you return to compulsively. It feels positive in the short term, but over time it undermines your well-being—emotional, financial, physical, psychological, or social, and often, a combination. One of the points Alter makes in *Irresistible* is that we're all just one product or experience away from developing behavioral addictions, if something strikes the right neurological note.

"There's a myth that there's something different about people with addictions from people without addictions," Alter told me. "Right now, if you are a person who doesn't have an addiction, does that make you in some qualitative or categorical way different from people who do? The more I've studied this, the more I realized that just isn't true."

It's also important to distinguish how addiction relates to obsession and compulsion. Alter said an obsession is mental. It can exist purely inside your head and involve no behavior at all. Compulsion is the uncontrollable impulse to do something. Addiction involves both to varying degrees, resulting in behaviors you repeat over and over again.

Dr. Larry Rosen warns against using the terms *addiction*, *obsession*, and *compulsion* interchangeably, but said they can all stem from anxiety. Dr. Rosen, a professor and psychologist at California State University, has been researching the psychology of technology for more than three decades. His latest **book** is *The Distracted Mind: Ancient Brains in a High-Tech World*, which untangles what's happening in our prefrontal cortexes when we're texting, tweeting, posting, snapping, and scrolling.

Rosen and his colleague Dr. Nancy Cheever have researched compulsive tech use and smartphone anxiety in several studies, mostly among college students. One of Dr. Cheever's experiments, titled "**Out of sight is not out of mind**," looked at how separation from your smartphone affects your anxiety. (Some call this "nomophobia"—no mobile phobia—irrational anxiety or distress when you can't use your phone.) Cheever brought two groups of

students into a room and either turned off their phones or took the phones away, as they sat in the lecture hall with a busy-work assignment.

Cheever measured the students' anxiety at various points within an hour. All participants showed increased anxiety over time, but Cheever was able to split the group into light, moderate, and heavy tech users based on the changes in their anxiety levels. Whether the phones were turned off or taken out of the room didn't matter much, though; it was simply that participants were disconnected.

"When we grab our phone, we start to feel less anxious. It's a learned behavior over time," said Rosen.

In another recurring study of Rosen's, groups of students installed an app called **Instant** on their phones, which tallies the number of times they unlock their phone and the amount of time spent with it unlocked. Rosen tested whether students' tech use could serve as a predictor of their course performance—but different patterns emerged.

He found that a typical 25-year-old unlocked their phone 56 times a day with an average usage time of 220 minutes per day. That's just shy of 4 minutes per unlock. A year later, a similar group unlocked only about 50 times a day, but spent an average of 262 minutes per day using the phone.

"Time spent jumped so much in a year that we asked them about different social media accounts," said Rosen. "The typical student had highly active accounts on six social media sites. That's a big commitment. One thing we realized was different between the first time we measured it in 2016 and the second time we measured it in 2017 was the explosion of Instagram and Snapchat."

Smartphone anxiety and spending more time on devices are not addiction, but they create a ripe environment for it. The line is crossed when that behavior begins to take away from other areas of your life.

"What **research** shows is that when you get an alert or notification and you're not allowed to access it immediately, there is a jump in your neurochemistry. That jump is anxiety," said Rosen. "The symptoms are pretty straightforward when they expand to smartphones and social media. You find you need to do more and more of the activity to feel the same amount of pleasure. You lie about your use of a technology. You deny it. You hide it. It interferes with your relationship with your spouse, your family, your friends. All of those fit technology or internet addiction."

In a recent **60 Minutes** segment called "Brain Hacking," Cheever and Rosen monitored Anderson Cooper's cortisol levels; cortisol is the "fight or flight"

hormone most closely linked to stress. Cooper's anxiety spiked every time he got a text he couldn't check.

Not everyone agrees that technology is inherently addictive. There's a wide spectrum of behavior from simply being dependent upon technology to using it compulsively. But psychologists are already on a path to recognize tech addiction formally.

**DSM-5**, the American Psychiatric Association's most recent diagnostic manual released in 2013, includes a provisional diagnosis for Internet Gaming Disorder. In January, the World Health Organization (WHO) also **classified** gaming addiction as a disorder. And for the first time ever, the US National Institutes of Health (NIH) is studying internet addiction.

Conducted at the University of Connecticut School of Medicine, the federally funded study (which began in 2017 and will run through next year) is looking specifically at online gaming addiction in adolescents ages 13 to 18. It's led by Dr. Nancy Petry, who was part of the APA's Substance Use and Related Disorders workgroup, which added the provisional gaming diagnosis to the DSM-5. The NIH research could open a path to list internet gaming addiction, at least, as an official disorder.

Dr. Greenfield believes we'll see a diagnosis for broader tech and internet use in the next DSM, whether it's classified as addiction, compulsion, distraction, or something else. In 1999, he ran the first large-scale study on internet use with ABC News, surveying 17,000 people. The results became the basis of his book *Virtual Addiction*. Greenfield's work at the CITA focuses on education, research, and treatment around why digital technologies are abused, the neurobiology of compulsive tech use, and how to find the right life balance.

He's been treating people for internet and tech issues since the late 90s, long before there was any kind of official diagnosis. "If patients show up in your office with a problem, you don't say come back when we've got a diagnosis, we can't treat you. If they have a problem, you treat it," he said.

Alter agreed: "I think a lot of the definitional debates are a little bit beside the point, whether you call something A or B, obsession or addiction or compulsion. When people want to argue with me about it, I say let's look at the actual, concrete, down-to-earth behaviors we're talking about. Do these concern you? Most of those people say, 'Yeah, I guess they do.'"

## How Tech Pulls You in

"Put addiction aside," Dr. Greenfield said. "What if you're just too wired, and it's just stressing you out? We're losing sleep or gaining weight. Maybe it's

impacting our relationships and intimacy. We feel constantly overwhelmed, because we're hypervigilant in responding to a million channels of information and communication, all of which emanate out of a device that we hold in our hands, that's with us 24/7. You would no sooner leave your house without your phone than you would leave without your underwear or your belt. It's become an accessory to our life in a way that we've never seen before; it's a conduit through which we function and experience our lives. That has never existed in the history of humankind."

Dr. Greenfield uses an analogy: that the internet is the world's largest slot machine, and the smartphone is the smallest. The analogy comes from psychologist Natasha Dow Schüll, also an NYU professor. Adam Alter writes about her research in *Irresistible*. Schüll spent 13 years studying gamblers and slot machines in Las Vegas and developed a term as a result: *ludic loop*, the zone of comfort you enter when engaged in a repetitive activity that gives you occasional rewards.

Schüll interviewed slot machine players and found that it wasn't necessarily the burst of dopamine they got from winning that kept them playing. Rather, it was a lulled feeling, like "being enveloped by a warm blanket," as Alter described it; sitting for hours pulling levers and hitting buttons. Schüll later wrote a **book** called *Addiction by Design: Machine Gambling in Las Vegas*.

Ludic loops occur when you pick up a smartphone and start scrolling. You flick through Facebook or Twitter, read some posts, check your email or **Slack**, watch a few Instagram stories, send a Snap or two, reply to a text, and end up back on Twitter to see what you've missed. Before you know it, 20 or 30 minutes has gone by; often longer. These experiences are designed to be as intuitive as possible; you can open and start using them without spending too much time figuring out how they work.

"That's what's going on for a lot of us," Alter explained. "That's also why these companies, once they get you in that state, can get you to continue to play. There's so much inertia there that it's such an easy thing to keep doing."

Most products are created the same way: You build version one, test it in the market, tweak, and release an updated product. With digital products, this process can occur exponentially faster. Often it's a small change; say, a new layout on an Amazon shopping page, or that likes and retweets in your Twitter feed can update in real time as you scroll. Each new version of Android and iOS rolls out features and improvements.

At companies like Apple, Amazon, Google, Facebook, Twitter, and Snapchat, software engineers and UX designers drive user engagement by introducing small changes over time to remove friction. They build in feedback and reward systems (likes or retweets, for example), external cues (notifications),

and elements as simple as watching those blinking dots as you're waiting for an iMessage reply.

Think about how the **advent of the Like button** changed Facebook use. For the first few years of the social network's existence, Facebook was just a place where you could peruse information and share things about yourself.

"[Likes] introduced a whole new level of bidirectional feedback where I could post something and then you could tell me what you thought of it. That seems trivial, but it's the way humans work," said Alter. "We are endlessly fascinated by how other people feel about us. On Facebook and Instagram and Snapchat and Twitter, you're creating content and waiting for feedback. Some of it will be the kind of feedback you're seeking and some of it won't. But the thrill of getting exactly the kind of feedback you want is so appealing that we just keep returning to the experience over and over again."

What Facebook did, and what has now become a mainstay of how we often interact online, is feed a self-perpetuating social feedback engine. When Napster creator and Facebook cofounder Sean Parker **made headlines** last year with comments about Facebook exploiting a vulnerability in human psychology, one of the concepts he mentioned was the "social-validation feedback loop."

User behavior data helps make these experiences even more immersive, or "stickier." Game and UX designers can remove what users don't like and double down on what they do. Alter explained that when you have billions of data points and people compulsively using a product, you can throw everything at the wall. Tech companies can make infinite tweaks and see how millions of users respond to them instantaneously. One way to do this is *color coding*, a process perfected in highly addictive games like World of Warcraft.

"Color coding is where you're trying to work out which of two versions of a mission works best," said Alter. "You tag the code associated with one version of the mission red and the code associated with a different version yellow. Let's say you're wondering whether a quest is more engaging if you're trying to save someone versus trying to find an artifact. So you run an A/B test releasing version A to five million people and version B to five million people. You measure different metrics, like how many people return to the mission more than once and how long they spend. If you discover version A works better, you go with the red code and put aside the yellow. And you keep doing that until you have the tenth, twentieth, or thirtieth generation of a game."

Once users are in that optimized loop, behavioral feedback engines and reward cycles keep us not only motivated, but having fun.

# The Hook Model

Nir Eyal, the author of *Hooked: How to Build Habit-Forming Products*, has an interesting background. In the late '00s, he ran a startup called AdNectar, which worked in the advertising and online games spaces to help apps and social networks monetize virtual goods; think FarmVille and other Facebook games. This was in the early days of the iPhone, before mobile games were king. In-app purchases were a booming industry on social platform games, until Facebook changed its rules and essentially collapsed it.

The era was immortalized through games like *Cow Clicker*, developed by game designer Ian Bogost to satirize how addictive these seemingly monotonous social games could be.

AdNectar was acquired in 2011, but the experience taught Eyal how products are designed to manipulate behavior. He began researching the way digital experiences use behavioral design to form user habits, and he wrote *Hooked* to "make that psychology around habit design something you could actually use as a product maker, and hopefully use it for good," he explained.

The core of Eyal's book is what he calls the Hook Model. It's a four-step cycle that deconstructs how digital products keep users engaged: Trigger→ Action→ Variable Reward→ Investment. It's a cycle for what Eyal calls "manufacturing desire."

Once you know how to spot the triggers and feedback mechanisms, the Hook Model can break down how users engage with essentially any app, game, social network, or online experience. Eyal pointed out how the Hook Model works with a social app.

"The external trigger would be some kind of notification: a ping, a ding. Something that tells you what to do next," Eyal explained. "The action is to open the app and start scrolling the feed... You see variable rewards or intermittent reinforcement. It's a slot machine-type effect. Some content is interesting, some isn't.

"Then, the investment is every time you like or comment on something, post or upload something, friend somebody, you're investing in the service and making it better and better with use. Through successive cycles of these hooks, the company no longer requires the external triggers, because people are internally triggered. Meaning when I'm feeling lonely, when I'm seeking connection, when I'm in some kind of uncomfortable emotional state, I look for satisfaction in the app."

Eyal said it's not up to product designers to create that itch or internal trigger, but to find a human need and build around it. The ultimate goal of a habit-forming product is to be something that we use with little or no conscious thought. It becomes part of our day-to-day lives.

Eyal believes, for the most part, that this is good. It's why your grandmother, who never used a computer before, can just pick up an iPad and figure out how it works. Today Eyal works as a UX consultant, but he won't work with companies that don't pass what he calls the **Regret Test**: if your product is something users would regret using, you shouldn't build it.

"I work with companies that are looking for ways to persuade their users, not coerce their users. It's a big difference," he said. "Persuasion is helping people do things they want to do. Coercion is making people do things they don't want to do. Coercion is unethical, and I don't work with any companies that would do that."

For users, though, regret can stem simply from overuse. Aside from the hooks and feedback loops, maybe the most important aspect of digital experiences for users to be aware of is the lack of mechanisms or rules that tell you it's time to stop.

Alter defined a "stopping cue" as a moment that suggests it's time to move onto a new experience, like the end of a book chapter or a TV episode. The endlessly scrolling information in a social feed is similar to endless-runner games such as **Flappy Bird** or **Temple Run**: They have no stopping cues. When you're tapping from app to app on a smartphone or tablet, life happening around you or sheer willpower may be all that causes you to look up.

Binge-watching works the same way. In 2012, **Netflix introduced Post-Play**, which starts the next episode automatically when you finish a show, rather than having you manually press Continue. The company removed a stopping cue to make the experience more engaging. Users can **disable Post-Play**, but most don't. It's convenient.

In concert, all the behavioral mechanisms built into modern internet and technology experiences—the intuitiveness, hooks and triggers, feedback loops and rewards, lack of stopping cues—can allow our brains to coast along in comfortable autopilot. It's an effect Alter has dubbed *automatic mindlessness*.

"The endlessness of a game or the bottomlessness of a feed is consciously built into these programs and platforms," according to Alter, who said it's up to users to create their own stopping cues. Using **Netflix** as an example, one thing he recommends is to set an alarm on your smartphone. Then move the

phone far away from you. If you want to sit down and watch two 45-minute episodes, set it for an hour and a half so you need to get up and turn it off before you can keep watching.

"I could, of course, turn off the alarm and keep watching. But the point is, I've created a barrier. That barrier makes it less likely that I'll mindlessly continue," said Alter. "If I do continue, I'm doing it mindfully, which is much better."

## Treating Tech Addiction

The first tech device Brian ever owned was a Nintendo Gameboy. Then he got a Sony PSP, and after that, a Microsoft Xbox 360. The Call of Duty series introduced him to multiplayer gaming, and that soon brought **gaming PCs** into his life. Games were an escape for Brian; he didn't have to work as hard to form social connections as he did in the small, cliquy classes at the private schools he attended.

Throughout middle and high school, Brian was able to keep up good grades and a relatively active social life, but he was spending more and more time online. The stumbling blocks appeared when he started college. He had to meet new people, in a new setting, with a lot less parental oversight. Pastimes became routines, and impulses turned into hours online.

"I was cutting everything down to the wire. It was, you know, I can probably get one game of this in. I can watch one video. I can probably run to class in about three minutes, let me finish this. Then the next thing I know, another video is starting."

By the time Brian got to junior year in college, his tech habits had fallen into an unsustainable pattern. He took a medical leave of absence from school at his parents' behest to get treatment at the CITA. After a five-day "intensive" program to help him detox and begin retraining his mind, the blocks and filters were installed on his devices and home router. He says they've helped, despite the relapse. Brian's been returning to the CITA for sessions once or twice a week. The CITA is focused on both treating Brian's addictive behaviors and rebuilding his social skills.

"Especially in the late stages before I flunked out, it was down to a routine," Brian explained. "Get up. Play video games or watch a video. Order some food in. Continue. I would go out, get some more food, come back at like two in the morning, game sometimes until the sun rose. and then sleep until I woke up again and repeated the process."

Brian lied by omission in his previous session. He had gotten back online with his old devices, but he didn't bring up the relapse until this week, after he'd

been caught. He admits he has the capacity to lie a lot where his tech use is concerned.

After talking about the relapse, Dr. Greenfield has Brian take him through the whole sequence of events again and how he felt during the experience—but this time, he monitors Brian's neurophysiological feedback. He turns Brian's chair around toward the Eye Movement Desensitization and Reprocessing (EMDR) machine sitting along the back wall of the the office.

The doctor is hooking Brian up to two machines, actually. The EMDR machine is about bilateral sensory stimulation. It consists of a light board in front of Brian with illuminated dots roving back and forth in an almost soothing pattern. He also puts on a pair of headphones emitting steady rhythmic sounds. **EMDR therapy** is designed to focus your mind on external stimuli to make it easier to process images and memories that might be traumatic. It's used most commonly in treating post-traumatic stress disorder (PTSD), but Dr. Greenfield has been using it for 20 years to treat behavioral addictions.

The other machine is one he added recently for something called "heart coherence therapy" or polyvagal treatment. Dr. Greenfield puts a few vital sensors on Brian's ears to monitor his vagal nerve (a part of the autonomic and sympathetic nervous systems) and heart rate. The goal is to gather data to indicate Brian's coherence level—how his parasympathetic or sympathetic nervous system is functioning.

"What we want is more coherence and less heart rate variability, which indicates a smoother tone in his nervous system," Dr. Greenfield explains. The coherence data is just another tool to help him make sense of what's happening in the minds of his tech addiction patients.

Brian is hooked up. "I want to go back to moment that you saw that first device. Remember that? Bring up an image of that; the feeling of it," Dr. Greenfield says. The dashboard on his screen begins showing Brian's vitals as his eyes move back and forth with the EMDR.

"Sort of like a tingling sensation in my chest, you know, puts a smile on my face. And makes me feel happy," Brian responds.

Dr. Greenfield explained that the goal of this process is to help Brian activate the resources in his mind for managing those triggers when they occur, while decreasing anxiety responses. Brian has gone through some variation of this process for the past six weeks.

## The Intensive

When he first took a leave of absence from school and his parents sought out the CITA for treatment, Brian started with a five-day "intensive," short for **Intensive Outpatient Treatment Program** (IOTP). The center offers a number of different treatment options, but the intensive is the most drastic program.

The accelerated treatment can be done in either a five-day program (four hours of treatment per day) or a two-day program (10 hours per day) for patients dealing with internet, gaming, online gambling, social media, porn, or personal device addictions. Intensives are a time-sensitive option for people who don't have the option of doing a full residential treatment program, or, as in Brian's case, they're an initial shock to the system followed by regular sessions. The way Dr. Greenfield treats tech addiction is rooted in breaking down behavior patterns and then retraining your mind.

The treatment plan depends on the patient's needs. It starts with identifying addiction patterns and underlying issues and why they're harmful, then helping the patient gain an understanding of the hormonal and neurochemical cycles behind those triggers. During the session with Brian, Dr. Greenfield often mentioned dopamine. The much talked-about neurotransmitter is most often associated with feeling pleasure but in actuality is part of **far more complicated** motivation and rewards cycles underpinning tech use. Greenfield likes to refer to smartphones as "portable dopamine pumps."

Once a level of awareness and understanding is established, the goal is to desensitize those triggers, often by putting blocks and filters on internet use in place. Dr. Greenfield also uses a counseling method called *motivational interviewing* to assess how ready a patient is to change their behavior. The goal, he said, is to "gently cajole" them into higher levels of motivation for managing emotions and feelings such as anxiety, boredom, fear, frustration, pride, and accomplishment, without the need for technology.

"The methods I use for treating internet addiction are not that far afield from treating any addiction, because you're involving the same reward circuitry in the brain," said Greenfield.

Dr. Greenfield treats both families and individuals. He said the typical treatment is somewhere between 3 and 6 months, often starting with an intensive and continuing for several months with regular follow-ups. At the moment, the CITA doesn't do inpatient and long-term residential treatment for internet and tech addiction, but a few other centers do.

One is a 10-day inpatient internet addiction treatment and recovery **program** at Bradford Regional Medical Center in Pennsylvania run by Dr. Kimberly Young, who founded her own **Center for Internet Addiction** back in 1995. The Bradford program, launched in 2013, is the first

in the US offering cognitive behavioral therapy (CBT) and harm reduction therapy (HRT) treatment for tech addiction. The [Illinois Institute for Addiction Recovery](#) has also begun offering residential treatment for internet and video game addictions.

The other major treatment center is [reSTART Life](#), located outside of Seattle. ReSTART has been treating problematic gaming and internet use since 2009. Programs last 8 to 12 weeks for an intensive program and 9 to 12 months for its "sustainable therapeutic" extended care program. The center also offers a variety of additional services, including counseling sessions and family and parental coaching.

Adam Alter visited reSTART while researching *Irresistible* and spoke to founders Cosette Rae and Hilarie Cash about the center's treatment plan, which takes a very different approach to the CITA's. Rae told Alter she prefers not to use the word addiction because of its negative connotation; she prefers the concept of "technology sustainability" instead. ReSTART offers two programs: one for adolescents ages 13 to 18 and another for adults ages 18 to 30.

The reSTART treatment plan works in groups instead of individual therapy. It starts with a complete tech detox phase lasting about three weeks, followed by a few more weeks living together in the rustic locale. Patients cook, clean, exercise and hike, play games, and manage their emotions away from technology.

The next phase of reSTART's treatment sees patients move into halfway houses nearby. They get jobs or go back to school while returning to the center for regular check-ins. In the final phase, they return to normal life. Alter said many stay in the area, away from the old environments that help breed their gaming or internet addictions.

One important caveat to these treatments is the cost. Gaming, internet, and other tech addictions are not recognized as clinical disorders, meaning facilities like the CITA and reSTART are not covered by insurance. Prices vary depending on the type and duration of treatment, but programs can cost many thousands of dollars, particularly for residential treatment. As for the CITA, Dr. Greenfield said the small facility of five employees simply can't afford the low insurance reimbursements the center would get.

"We're a small business, and we operate on a very low overhead. If you crunch those numbers and look at the overhead that we have, it would just not be sustainable," he said.

In the United States, only a few treatment centers employ a variety of different approaches, but tech addiction is a global issue. In other countries,

including Australia, China, Japan, India, Italy, Japan, Korea, and Taiwan, tech addiction is recognized as an official disorder and addressed through government-funded treatment initiatives.

Treatment approaches differ around the world, but in China and South Korea, the methods can be quite serious and sometimes radical. China classified internet addiction as a clinical disorder way back in 2008, and 2014 state estimates said approximately 24 million Chinese children and teens were suffering from gaming or internet addictions.

The country has opened a number of **military-style boot camps** to curb the behaviors, using exercise, drills, regular brain scans, and medication. The controversial methods used in these boot camps have led to several deaths, including an 18-year-old who died **last year** as a result of alleged beating. His parents had dropped him off at the camp only two days before.

South Korea designated internet addiction as a public health crisis a few years back, and it funds **rehab centers** across the country. The facilities offer stress reduction classes and counseling services, and they encourage a variety of **non-tech activities**. Ultimately, there are so many different approaches because tech addiction treatment—like the evolving devices and digital experiences it treats—is still in its collective infancy.

## Retraining Our Minds

Brian is sitting with Michael Shelby, the CITA's IT consultant. As part of Brian's detox and treatment process, Shelby installed blocking and monitoring software on Brian's smartphone and laptop using the **Qustodio\$49.95 at Qustodio** parental control app and on the family's home router through the **Circle With Disney\$89.99 at Amazon** security appliance. After his session with Dr. Greenfield ended, Brian met with Shelby to work out a few kinks with the blocks.

On his desktop screen, Brian still can see icons for all his apps and games, even though they're blocked. He said it helps to see the Steam logo and know he's not going to open it.

Shelby said the blocks and monitoring are specialized depending on the patient. In Brian's case, it's games and sites like Reddit and YouTube. The patient always has a "gatekeeper" to monitor their usage; Brian's parents serve in that role for him. Shelby shows the gatekeepers how to allow or block sites with Qustodio and Circle and also how to disavow a new device on a network. Brian suspects that's how his parents might've known about that second device hidden in his baseball bag.

"The blocks are not a moat; they not an impenetrable wall. They're a speed bump," explained Shelby. "If someone is truly determined to figure out a way to get around it, they will. There has to be a certain degree of internal motivation where they understand that there's a problem. [Brian] made things easy, but I'd say with 25 or 30 percent of the cases we see, patients come in kicking and screaming and clutching their machines."

Shelby has worked with Dr. Greenfield for the past 14 years, and also runs his own tech firm, which does network design, penetration testing, security training, and traditional IT support. He's blunt and straightforward, joking with Brian as they look at his laptop. He said most patients keep the blocks on for about a year, but in some cases it can be a lot longer.

The other important aspect of the monitoring software is giving patients a detailed breakdown of how much time they're spending on different apps and websites, since tech use can often create a sense of dissociation in how much time you've spent looking at a screen. The monitoring aspect of the CITA's treatment is a feedback mechanism to counter that thinking.

"This digital detox we assist with helps the person rewire or sort of rebuild the neural pathways that have been hijacked by this behavior that's done without thinking," said Shelby. "We want the person to regain control over the decision-making process, so it's no longer a knee-jerk response. It's no longer automatic; it's conscious."

That idea of a tech break or a digital detox comes up often in tech addiction treatment, but it's a useful strategy for any tech user who's feeling overloaded by apps and devices. That might mean putting your phone away for an hour at dinner, leaving it in the car and taking a walk, turning notifications off on the weekend, or taking a physical break from your devices for days or longer.

Dr. Greenfield also said we've become a "boredom-intolerant culture," using tech to fill every waking moment—sometimes at the expense of organic creativity or connecting with someone else in a room. When was the last time you took public transportation or sat in a waiting room without pulling out a smartphone?

"The new normal is mindful, sustainable use of our technology," said Dr. Greenfield. "Since it's not going anywhere, the goal is to have conscious awareness of when we're using it, how we're using it, and how and when not to use it."

## Taking Back Control

Adam Alter talks about the concept of *behavioral architecture*. It's about designing the space around you to consciously change how you interact with

technology. With behavioral architecture, you arrange your digital and physical space to maximize the likelihood of desirable behaviors and minimize undesirable ones.

An easy example is thinking about how close your smartphone is to you. For most of us, it's probably within reach at any given moment. Alter said for at least several hours a day, you should purposely keep your phone further away from you.

The Center for Humane Technology recommends **taking control** of your digital environment in the same way. It suggests, for example, turning off all your app notifications except for people, and keeping only utility apps and tool icons on your home screen. Another tip is to use the search bar to access an app rather than tapping on it without thinking about it. Even that small change in behavioral architecture lets you pause for a moment and think about whether you're opening the app for a reason.

When it comes to sleep, using apps like **f.lux** or Night Shift on iOS devices to **reduce blue light** before bed is good, but setting physical boundaries is better. One of the first recommendations from many of the sources we spoke to for this story is to keep your smartphone out of reach at night. Ideally, you can get a separate alarm clock and charge it in another room entirely. If you wake up in the middle of the night, your phone shouldn't be within reach to keep you awake and distracted.

Distraction is an ever present problem when we're always plugged in. Alerts and notifications are powerful external triggers, and for many it's difficult to ignore that email, message, tweet, or snap. The hook can be as simple as seeing a tiny red dot next to an app, hinting at how many notifications you've missed. *The Distracted Mind* author Larry Rosen says this can set up a system where we self-interrupt: feeling phantom vibrations or hearing notification dings that didn't actually happen.

"First and foremost, we have to stop checking in too often, and that's not easy," said Rosen. "Our brains are dragging us there; either through internal or external signals. First off, just turn off your notifications for everything. You can also take all of your social media apps, put them in a folder, and stick them on the last of your home screens. Just seeing that little app icon stimulates you to check it."

Behavioral architecture can apply here, too. Often, devices distract us because we let them. We set our phones to notify us. Rosen recommends simple ways to take back that control. If you want to take a tech break, tell people you'll be checking in less frequently, and you'll get back to them as soon as you can, he says. Set a timer and give yourself a few minutes to

check what you want to check, then close the apps. When you're on a desktop, don't just minimize your sites; close them.

Check out our tips for [how to wean yourself off smartphones and social media](#) for some more concrete steps you can take to regain control of how you use technology.

When you're trying to complete a specific task, the need to check in can be particularly counterproductive. Experts use different names and labels for it. "Inbox Zero," for instance, is the never-ending quest to check all your unread emails and notifications, in a mail app or newer apps like Slack.

Nir Eyal sometimes calls this "killing the message monster." In fact, the UX consultant's next book is called *Indistractable*, about how digital distractions are killing productivity and what to do about it. Eyal stressed that he's not an advocate for the tech industry but that users are in control of how they interact with technology. If your notification settings are all still set to defaults, he said, that's not the tech company's problem.

"I think it's important to realize as consumers that we can't keep blaming the companies. To those saying, 'Oh, they're making addictive products,' I say, 'OK, what are you going to do about it?' Take 10 minutes and change a notification setting. Either delete the apps or turn off notifications from the things that constantly distract you. If you uninstall the app, there's nothing Mark Zuckerberg can do about it."

Another option for more sustainable tech use: apps and extensions that help you cut out digital distractions and retake control. [Meditation apps](#) like Calm and Headspace are designed to help you de-stress and focus your mind. Moment for iOS and [RescueTime](#) for Mac and Windows work the same way as Brian's monitoring software, helping you break down exactly how much time you're spending on apps and devices. [Freedom](#) temporarily blocks apps and websites for set periods of time.

Extensions can also help you use sites like Facebook and YouTube in more targeted ways. [Distraction Free YouTube](#) removes recommended videos from sidebars to keep you from getting sucked in. [News Feed Eradicator](#) blurs out Facebook posts for users who want to use the app only as a utility for things like events and groups. The [Facebook Demetricator](#) extension hides like, comment, and share numbers to keep you from fixating on feedback and rewards cycles.

You can motivate yourself with gamification, too. An app, [Forest](#), plants virtual seeds that grow into trees the longer you stay off your phone.

From tech addicts learning to lead healthier lives to everyday users who want to cut out the noise and reshape their digital habits, proactive strategies and tools are everywhere. Google even announced **new controls** coming in Android P including an app timer and a wind-down feature. Your Android phone will tell you how much time you've been spending on your smartphone, in which apps, and remind you to take breaks.

**Thrive** is another new app designed to help you focus, and it centralizes many of these concepts in a single experience. The app was created by Thrive Global, the health and wellness startup launched by Arianna Huffington last year. Huffington spoke to PCMag about Thrive and the right way to use technology.

"What we are doing is helping people use their phones intentionally. It's about being in control of our time and our life. Technology is just a tool—it's not inherently good or bad. It's about how we use it and what it does for our lives," Huffington said. "So phones can be used to enhance our lives or consume them. And though it sounds paradoxical, there's actually more and more technology that helps us unplug from technology. That kind of human-centered technology is one of the next tech frontiers."

The Thrive app, currently available for Android and Samsung devices (an iOS app is coming this summer) puts a user into Thrive Mode to block all apps, notifications, calls, and texts except for "VIPs" you've designated. Everyone else gets an auto-reply letting them know you're focusing, and when you'll be available again. There's also an app control panel to monitor your usage and set goals for how much you use specific apps.

Huffington explained how the app uses "microsteps," or making small behavior changes to ultimately create new habits in your day-to-day life. She also talked about the bi-directionality of "Thrive Mode" to create ripple effects across other users.

"If you're in Thrive Mode for the next hour and I text you, I'll get a text back that you're in Thrive Mode, which creates a new kind of FOMO. It makes me wonder: 'What is she doing while she's disconnecting? What am I missing out on?' I'll be intrigued and want to try it myself," said Huffington. "In that way, using it will have a multiplier effect that begins to create new cultural norms around how we use technology. Instead of only valuing always being on, we begin to value regularly unplugging and recharging."

The more profound question in all of this is whether we want the next decade of human technological behavior to stay stagnant, or if our attitudes and habits should evolve along with the tech we're using. We're already seeing the advent of new tech like voice interfaces and virtual reality experiences, both of which could drastically alter our relationship with technology.

Artificially intelligent **voice assistants** such as Alexa, Cortana, Google Assistant, and Siri eliminate a lot of the external or visual hooks that pull you onto a screen. This kind of interface also has the potential to help us use tech more proactively. AI assistants are already connected to your calendar; what if Siri or Google Assistant said something like "Here's what your day looks like. You've got a break in your schedule here. Do you want to schedule a device break and spend some time outside?"

VR is the other side of the coin. Common Sense Media recently released **Virtual Reality 101**, research co-authored with researchers at Stanford University's Virtual Human Interaction Lab on the potential positive and negative effects of VR experiences on kids' cognitive, social, and physical well-being. Adam Alter said that for the iGen and generations to come, VR brings a whole new set of concerns about escaping into digital worlds rather than living in the real one. The core issues are the same as those faced by tech addicts today.

"I think it's really important that kids are exposed to social situations in the real world, rather than just through a screen where there's this delayed feedback. It's about seeing your friend when you talk to them; seeing the reactions on their face," said Alter. "The concern is that putting people in front of screens during the years where they really need to interact with real people may never fully acquire those social skills. It's the fact that the screen exists."

Brian applied to go back to college for the summer semester. He said he's going back with a new attitude, a newfound confidence to succeed and become an engineer. Dr. Greenfield thinks Brian should keep the app and device blocks on at least through college. Brian agrees. He doesn't know if he'll ever be able to return to video gaming.

He's got a few weeks or more left of treatment, but despite the relapse he says he feels like he's made a lot of progress. He's optimistic about going back to school. Before Brian's treatment is finished, he'll sit with Dr. Greenfield and put together a "real-time living" list of things he likes to do that don't involve a screen.

"The bottom line is, do you feel better in the last six weeks since you came in for treatment?" Dr. Greenfield asks.

"I would like to believe I am," Brian responds. "I'm still not at the point where I'd like to be, but for now I think it's enough to put me on the right track, especially going back to college. I have a feeling once the social part of college kicks in, it should be smooth sailing. I don't see myself buying another device."

