

## WEEK 6 | DIGITAL ADDICTION

*It is very common for humans to develop things with the best of intentions and for them to have unintended, negative consequences.*

–Justin Rosenstein

### I. ADDICTION

More and more, *addiction* is the term researchers are using to describe the allure digital technology appears to have on people—and the data seems to support this conclusion. It's not just that users spend, on average, over 300 minutes on their devices (150 minutes of which are spent on social media). It's also the frequency that people use their devices. The average user checks their smartphone 50-80 times per day, with some as high as 150 per day. Other research shows that people touch, swipe, or tap their phones 2,617 times a day.<sup>1</sup> If you are awake 16 hours per day, that means you are checking your smartphone anywhere from 5-10 times per hour, or every 6-12 minutes. It's almost as if we can't help but look.

The addictive effects of digital technology have become so clear that the World Health Organization in 2018 added “gaming disorder” to its International Classification of Diseases. What is “gaming disorder,” you may ask? It's simply the inability to stop gaming. In doing so, the WHO “is recognizing the serious and growing problem of digital addiction.”<sup>2</sup>

Psychologists describe addiction as the combination of two key forces: habit formation and self-control problems.<sup>3</sup> Habit formation refers to the phenomenon in which “today's consumption increases tomorrow's demand,” while self-control problems describe when a person consumes “more today than they would have chosen for themselves in advance.”<sup>4</sup> These two forces are central to addiction and have been consistently linked to classical addictive goods like drugs, alcohol, cigarettes, and sugar. While it may not surprise us that these forces are at play in illicit drug use, recent research is showing that these powerful forces are at play in our use of technology as well.

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<sup>1</sup> Paul Lewis, “Our Minds Can Be Hijacked: The Tech Insiders Who Fear a Smartphone Dystopia,” in *The Guardian* (October, 2017), <https://www.theguardian.com/technology/2017/oct/05/smartphone-addiction-silicon-valley-dystopia>

<sup>2</sup> Raian Ali, Emily Arden-Close, and John McAlaney, “Digital Addiction: How Technology Keeps Us Hooked,” in *The Conversation* (June, 2018).

<sup>3</sup> Faruk Gul and Wolfgang Pesendorfer. 2007, “Welfare without Happiness,” in *American Economic Review* 97 (2): 471–476; B. Douglas Bernheim and Antonio Rangel, 2004, “Addiction and Cue-Triggered Decision Processes,” in *American Economic Review* 94 (5): 1558.

<sup>4</sup> Hunt Allcott, Matthew Gentzkow, and Lena Song, “Digital Addiction,” in *NBER Working Paper Series*, 2021.

A recent study titled “Digital Addiction” sought to empirically evaluate if these forces are truly present among smartphone users, and to delineate to what degree each force exerts its impact. They observed numerous addictive behaviors linked to smartphone use, including: smartphones 1) used longer than intended, 2) used to distract from anxiety, 3) used to fall asleep, 4) being difficult to put down, 5) causing loss of sleep, 6) used to procrastinate, 7) used mindlessly, 8) causing a decreased sense of personal well-being.<sup>5</sup>

The outcomes of this study are shocking and demonstrate the degree to which the devices in our pockets exert control over us. They found that, indeed, self-control problems were a significant part of the problem. Users reported that 31% of their social media use is due to self-control problems, meaning “About one in three minutes spent on social media is time we neither hoped to use beforehand nor feel good about in retrospect.”<sup>6</sup>

While the data appears to indicate that self-control problems are a significant factor at play in digital addiction, habit formation “amplifies the effect of self-control problems, as the increase in current consumption also increases future marginal utility.”<sup>7</sup> In other words, digital technologies like Facebook, Instagram, Twitter, Snapchat, web browsers, and Youtube have been designed to capitalize on the user’s innate lack of self-control, intensifying the addiction to the product. Tristan Harris, a former product philosopher at Google, puts it like this: “You could say it’s my responsibility” to exert self-control when it comes to digital use, “but that’s not acknowledging that there’s a thousand people on the other side of the screen whose job is to break down whatever responsibility I can maintain.”<sup>8</sup> The deck is stacked against us.

## II. ATTENTION

The devices, apps, social media platforms, and websites that absorb so much of our time are developed around a simple premise: we are now in an attention economy. As one author in the *Berkely Economic Review* writes, “Economics is the study of how scarce resources are allocated; whether that is housing, food, or money. However, in an era of endless amounts of information at the hands of our fingertips, what is the scarcity? Unlike the first three examples that can be empirically quantified and measured, our intangible yet extremely valuable attention is the limiting factor: we are in the age of the attention economy.”<sup>9</sup>

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<sup>5</sup> Hunt Allcott, Matthew Gentzkow, and Lena Song, “Digital Addiction,” in *NBER Working Paper Series*, 2021, 4

<sup>6</sup> Derek Thompson, “Social Media Is Attention Alcohol,” in *The Atlantic* (September, 2021).

<sup>7</sup> *Ibid.*, 5.

<sup>8</sup> Quoted in Bianca Bosker, “The Binge Breaker,” in *The Atlantic* (November, 2016), <https://www.theatlantic.com/magazine/archive/2016/11/the-binge-breaker/501122/>

<sup>9</sup> Ally Mintzer, “Paying Attention: The Attention Economy,” in *Berkely Economic Review* (March, 2021), <https://econreview.berkeley.edu/paying-attention-the-attention-economy/>

It was the psychologist, economist, and Nobel Laureate Herbert A. Simon who first coined the term “attention economy.” He recognized that our attention is the “bottleneck of human thought,” limiting both what we can perceive and what we can do in a given environment. He also posited that “a wealth of information creates a poverty of attention,” meaning the more information we are confronted with, the less we are able to focus on any one thing.

In 1997, theoretical physicist Michael Goldhaber, noting the rise in the many free online services that were being offered, predicted that the world was moving away from a material-based economy to an attention-based economy. As manufacturing became more automated—or production was transitioned to poorer countries where production costs would be lower—more and more jobs in the western world would be centered around working with information. In this environment, Goldhaber astutely observed, the scarce, limiting resource would not be information, but people’s attention. In order to be competitive in this market, companies would have to vie for people’s attention. Those companies who developed and employed technologies best able to capture and keep someone’s attention would find themselves in an advantageous position to profit.

As one author notes, “Our attention has always been limited, valuable, and scarce. But what distinguishes the present day is that technological advances have made an overwhelming amount of information available, strategically aimed at capturing our attention. As for the general public, it has never been easier to garner such personal levels of attention through means like social media.”<sup>10</sup> Programmers and software designers are learning to leverage our own physiology and psychology against us in order to keep our attention.

#### A. The Orienting Response

The internet is designed to grab us and keep us, producing the mental state author Michael Harris describes as “continuous partial attention.”<sup>11</sup> In other words, even when we are not actively engaging with it, the websites and social media platforms we frequent are actively working to recapture our attention. He points out that computer and television screens prompt what is called an “orienting response,” a basic brain function that quickly and automatically redirects our attention. This is why we find it so difficult to *not* glance at our screens when they pop up in our field of vision.<sup>12</sup>

Researchers believe that this response was critical for people to survive in a world where danger could be right around the corner and where rapid, almost subconscious responses to threats could

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<sup>10</sup> Ibid.

<sup>11</sup> Michael Harris, *The End of Absence: Reclaiming What We’ve Lost in a World of Constant Connection* (New York: Penguin, 2014), 10.

<sup>12</sup> Michael Harris, *The End of Absence: Reclaiming What We’ve Lost in a World of Constant Connection* (New York: Penguin, 2014), 120.

be the difference between life and death. Though we do not really live in that type of environment anymore, the mechanism remains and is being leveraged by programmers to recapture our attention when they have lost it.

This orienting response can be over-stimulated. Douglas Gentile, a researcher at Iowa State, has found that amount of time young children spend in front of screens—sometimes as much as ten hours per day—may be interfering with brain development. He writes, “We’re now finding that babies who watch television in particular end up more likely to have attention deficit problems when they reach school age. It’s pretty obvious: If you spend time with a flickering, flashing thing, it may leave the brain expecting that kind of stimulation.”<sup>13</sup>

This state of continuous partial attention means we are always, on some level, distracted. Continuous partial attention has been shown to severely limit people’s ability to focus and may even lower IQ. The mere presence of a cell phone, even when turned off, “damages cognitive capacity.”<sup>14</sup>

## B. The Hook Model

Nir Eyal, a student of the Persuasive Technologies Lab at Stanford University and the Author of *Hooked: How to Build Habit-Forming Products*, notes that companies have always sought to increase sales by reinforcing their customer’s behavior, often by linking their product to the promise of a reward. These basic feedback loops, however, are insufficient to keep customers coming back in the world of the internet, where an infinite number of distractions quickly pull customers attention away. A new, more powerful mechanism is needed.

The answer, according to Eyal, is the Hook Model. “The Hook Model,” he writes, “goes beyond reinforcing behavior; it creates habits, spurring users to act on their own, without the need for expensive external stimuli like advertising. The Hook Model is at the heart of many of today’s most habit-forming technologies. Social media, online games, and even good ol’ email utilize the Hook Model to compel us to use them.”<sup>15</sup>

How does it work? It makes use of a powerful cognitive mechanism first discovered by B.F. Skinner in the 1950s called a “carriable schedule of rewards,” or “intermittent reinforcement.” In his research on behavior, Skinner observed that mice “responded most voraciously to random rewards.”<sup>16</sup> The mice would press a lever and receive a reward at random, either a small treat,

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<sup>13</sup> Cited in Michael Harris, *The End of Absence: Reclaiming What We’ve Lost in a World of Constant Connection* (New York: Penguin, 2014), 121.

<sup>14</sup> Lewis, “Our Minds Can Be Hijacked.”

<sup>15</sup> Nir Eyal, “Variable Rewards: Want to Hook Your Users? Drive Them Crazy,” from *Nir and Far*, Eyal’s personal blog, <https://www.nirandfar.com/want-to-hook-your-users-drive-them-crazy/>

<sup>16</sup> Ibid.

large treat, or nothing at all. When compared to mice that received the same treat everyone time, the mice that received variable rewards “seemed to press the lever compulsively.”<sup>17</sup>

Eventually, the reward-seeking actions that technology companies have capitalized on to capture attention turn to instinct. Our brains, Eyal notes, are wired to continuously search for the next reward. Recent research has found that the dopamine system—dopamine is the neurotransmitter that produces the feeling of pleasure—does not work to produce satisfaction but to keep us searching for new rewards by inducing a semi-stressful response we call *desire*. In other words, we are never satisfied. Variable rewards leverage the way our dopamine system functions, manipulating our desires to keep us coming back for more. “Variable rewards seem to keep the brain occupied, removing its defenses and providing an opportunity to plant the seeds of new habits.”<sup>18</sup>

Thus, Eyal argues, “When you’re feeling uncertain, before you ask why you’re uncertain, you Google. When you’re lonely, before you’re even conscious of feeling it, you go to Facebook. Before you know you’re bored, you’re on YouTube. Nothing tells you to do these things. The users trigger themselves.”<sup>19</sup>

The nature of the rewards we seek also plays a significant role in these technologies’ ability to manipulate us. Eyal identifies three basic reward categories that drive human behavior: the tribe, the hunt, and the self:

- 1) The Tribe: We are social creatures by nature, and our brains seek rewards that make us feel accepted and included in the social fabric of our environment. Social media platforms have been designed to provide social rewards—likes, comments, etc.—on a variable schedule to create the habitual impulse to check our profiles, seeking from those likes and comments the social acceptance we crave.
- 2) The Hunt: Just as powerful as our need for social acceptance is our need for physical sustenance. There was a time when “the hunt” was for food, shelter, and other survival necessities. Now, we hunt for deals and information, and “New shopping startups,” Eyal writes, “make the hunt for products entertaining by introducing variability to what the user may find next.”<sup>20</sup> Companies produce ads “Using intriguing images and short, attention-grabbing text,” producing “a variable reward mechanism designed to keep you hunting for your next discovery.”<sup>21</sup>

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<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

<sup>19</sup> Quoted in Ian Leslie, “The Scientists Who Make Apps Addictive,” *The Economist* (October, 2016), <https://www.economist.com/1843/2016/10/20/the-scientists-who-make-apps-addictive>

<sup>20</sup> Eyal, “Variable Rewards.”

<sup>21</sup> Ibid.

- 3) The Self: Self-gratification is a powerful desire every human being is intimately familiar with. We are naturally inclined towards sensory stimulation, a physiological reality developers exploit with bright colors, vivid images, and a host of other design details. One of our deepest desires is mastery over the world around us. Thus, Game mechanics, found everywhere from Zynga games to business productivity apps like to-do lists, provide a variable rewards system built around our need to control, dominate, and complete challenges. Slaying new messages in your inbox stimulates neurons similar to those stimulated by playing StarCraft.”<sup>22</sup>

Eyal, an expert in this field, says that “Almost all of the technologies mentioned above combine the three types of variable rewards, increasing their effectiveness in creating user habits.”<sup>23</sup> Even something as seemingly innocuous as email

is addictive because it provides all three reward types at random intervals. First, we have a social obligation to answer our emails (the tribe). We are also conditioned to know that an email may tell us information about a potential business opportunity (the hunt). . . finally, our email seems to call for us to complete the task of removing the unopened item notification in a sort of challenge to gain control over it (the self).<sup>24</sup>

Tech companies have become masters of manipulation, using our own physiology and psychology against us to grab and keep hold of our attention. Habits are formed and deeply ingrained until we become addicted to their products. As one author writes, “The seconds of anticipation for the ‘pull to refresh’ mechanism on smartphone apps, such as Twitter, is similar to pulling the lever of a slot machine and waiting for the win.

### C. FoMO

The “Tribe” rewards referred to above lie behind the well-known—and humorous—social phenomenon known as F.o.M.O., or Fear of Missing Out. “Technology is designed to utilize the basic human need to feel a sense of belonging and connection with others. So, a fear of missing out, commonly known as FoMO, is at the heart of many features of social media design.”<sup>25</sup>

The social apparatuses of groups, forums, chatrooms, and messenger apps promote active participation in a variety of ways. They notify us of others’ presence and activity in real time, notifying us when a message is received and read. This feature not only creates in us a sense

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<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

<sup>24</sup> Ibid.

<sup>25</sup> McAlaney, “Digital Addiction.”

curiosity, even anxiety, wondering whether we have received a response yet, but it also promotes a sense of responsibility to answer message right away because others know when we have received their messages.

Other mechanisms, such as “social proof” (20,000 users retweeted an article, encouraging you to get online and read it) and “reciprocity” (invite more friends to get extra points, and once your friends are a part of the network it becomes much more difficult for you or them to leave) also prove effective in compelling a user to habitually engage on the social media platform.<sup>26</sup>

#### D. Emotional Manipulation

Technologies like smartphones, social media platforms, and search engines like Google often prey on our most base emotional instincts. Craig Gay notes that “Information and images are. . . presented in such a way as privilege our impulses over our conscious intentions, often appealing to sensuality, anger, outrage, and other strong emotional responses.”<sup>27</sup>

James Williams, the former Google strategist, writes that “The attention economy incentivizes the design of technologies that grab our attention, [with the result that] [w]e’ve habituated ourselves into a perpetual cognitive style of outrage, by internalizing the dynamics of the medium.”<sup>28</sup> In other words, the values of the technologies—shock over sobriety, simplicity over nuance, emotion over logic—have been transposed onto its us, its users. This function of social technologies has been linked to the increasing political and social polarization rampant in our society, something we will discuss in more detail in a later lesson.

### III. CONCLUSION

Nir Eyal, one of pioneers at the forefront of producing addictive, habit-forming technologies, has acknowledged that “The technologies we use have turned into compulsions, it not full-fledged addictions. It’s the impulse to check a message notification. It’s the pull to visit YouTube, Facebook, or Twitter for just a few minutes, only to find yourself still tapping and scrolling an hour later. . . just as their designers intended.”<sup>29</sup> This is very real issue that many of us have likely experienced, and it has real and significant consequences. Felicia Wu Song, a cultural sociologist of media and technologies at Westmont College, writes,

While our psychological longings to belong and to be ‘in the know’ can hardly resist the scent of real-time news updates delivered by our devices, our propensity to check our technologies are further fed by the *infinite novelty* that is designed

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<sup>26</sup> McAlaney, “Digital Addiction.”

<sup>27</sup> Craig M. Gay, *Modern Technology and the Human Future* (Downer’s Grove, IL: IVP, 2018), 50.

<sup>28</sup> Quoted in Lewis, “Our Minds Can Be Hijacked.”

<sup>29</sup> Nir Eyal, quoted in Lewis, “Our Minds Can Be Hijacked.”

into our current digital media and services. From the moment a young person gets her smartphone, she knows that she is gaining access to a mode of life that is perpetually filled with possibility. Her social media feeds are ceaselessly ‘refreshed,’ her games and apps are always ‘updating,’ and there are always new texts, snaps, and ‘stories’ to tend. . . . When the mobile, social and infinitely novel aspects of the contemporary digital experience are mixed together, the result is a psychological cocktail of pleasures, anxieties, and felt expectations. . . . There is a soft tyranny that persistently feeds our desires to check one’s email, peek at one’s Instagram, tweet one more remark, and respond to one more text. Indeed, with our devices in our possession, the promise of fulfillment, completion, and emotional connection feels ever within our reach. These key features are what make the digital experiences of today so difficult to resist, and frankly, much more difficult to even differentiate from our ‘real lives’ because they are so intimately enmeshed in delivering us our daily sense of reality.<sup>30</sup>

Song gets at the heart of what these alluring, attention-grabbing technologies do: they constantly distract us, drawing our attention away from the things that actually matter, the things we would report to actually care about. They hinder us from being present with people. As creatures made by the Creator to thrive in community, these technologies offer a faux-community that becomes an obstruction to engaging in true community—and it is to our detriment.

We also see the subtle psychological lie these technologies make: that they offer us the satisfaction we are seeking, that they can meet our social, psychological, perhaps even or spiritual needs. In many ways, these technologies offer us a forbidden fruit that promises something transcendent but fails to deliver on its promise. As Christians, we know that only fellowship with God—and fellowship with other Christians (1 John 1:3)—can meet the deepest needs of our hearts. By allowing ourselves to be infinitely distracted, we miss out on all God has for us.

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<sup>30</sup> Felicia Wu Song, *Restless Devices* (Downers Grove, IL: IVP, 2021), 21–22.