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Pierre Berthon, Leyland Pitt, and Colin Campbell

Abstract

We spend our days looking at them, talking to them, and touching them. We sleep with them, work with them, and play with them. They increasingly consume our time, attention, and money: we are addicted to our digital devices—or, more precisely, the digital experiences they enable. This addiction is both akratic (we are aware of the negative consequences) and engineered (designed on purpose). Marketers are complicit in this engineering: through digital networks and big data they ubiquitously monitor and experiment on consumers. This knowledge is used to create ever-more addictive digital experiences enabled by devices, their platforms, and their content. In this article, the authors explore marketing's role in the rise of the phenomenon: from product design, through advertising and big data, to the dynamics of ubiquitous distribution and “free” pricing. The authors then turn to policy solutions and discuss how informing, guiding, and restricting can help ameliorate the problem and promote the public good. The article concludes by outlining multiple areas for marketing and public policy research.

Keywords

apps, attention, devices, digital addiction, internet addiction

Attention, attention, attention.

— Peter Baumann, *Machines of Desire*

Today marketers can reach consumers almost everywhere: in the kitchen, in the office, in the car, on the subway, and in bed—indeed, anywhere consumers happen to have a networked digital device. Not only can they reach consumers, they increasingly know—through big data and predictive modeling—an astonishing amount about consumers' behaviors and preferences. This knowledge is being used to create platforms (e.g., Facebook, YouTube, Twitter, Snapchat), and content (e.g., news, stories, videos, games) that work in tandem with our devices (e.g., smartphones, computers, wearables, smart speakers) to shape ever more addictive digital experiences. Digital experiences increasingly consume people's time, attention and money. For example, U.S. teenagers spend nine hours a day using media devices; the average adult spends over two hours a day on social media and five hours on their smartphones (Common Sense Media 2015). We touch our digital devices hundreds of times a day and can feel anxious when separated from them even for a few seconds; the mere presence of a switched-off smartphone significantly decreases our ability to focus on a task at hand (Ward et al. 2017). For many consumers, digital experiences are becoming vices.

Addictive digital experiences go by many names. Some are general, such as “computer addiction” (e.g., Shaffer, Hall, and Vander Bilt 2000), “internet addiction” (e.g., Young 1998), and “digital addiction” (e.g., Montag and Wall 2016). Others are more specific, such as “internet gaming addiction” (e.g., Chappell et al. 2006) and “smartphone addiction” (e.g., Kim, Milne, and Bahl 2018; Samaha and Hawi 2016). However, all involve the compulsive overuse of digital experiences to the detriment of the individual.

Various forms of digital addiction are increasingly being formally recognized and treated around the world. The World Health Organization now defines and tracks gaming disorder in its *International Statistical Classification of Diseases* (ICD-11 2018). Its U.S. counterpart, the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) highlights internet gaming

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disorder in a special section for conditions urgently needing more research. While experts debate whether behavioral addictions such as digital addiction are “true” addictions (e.g., substance addictions; Alavi et al. 2012), in practice, treatment centers are springing up across the United States (Wilkerson 2015). Indeed, emerging research is revealing more and more similarities between behavioral and substance-based addictions (Kuss and Griffiths 2012; Olsen 2011). In some countries, such as China, internet addiction is much more widely recognized and treated (Golub and Lingley 2008).

A 2014 meta-analysis of 31 nations found a global prevalence estimate of internet addiction to be 6.0% of the population. This ranged from a high of 10.9% in the Middle East to a low of 2.6 in Western and Northern Europe; the U.S. figure was 8% (Cheng and Li 2014). Following Mann’s (2005) notion of “availability as a law of addiction,” increased access to the internet worldwide will likely result in rising rates of digital addiction.

In this article, we purposefully frame our analysis at the broader level of digital addiction because product, platform, and content in most cases all work together intricately to foster addiction. We begin by first reviewing the meaning of addiction and the conditioning-based mechanisms through which it operates. This understanding of how addiction functions enables clearer insight into the potential for marketers to either knowingly or unknowingly contribute to digital addiction. We explicate these potentials by breaking down how marketers’ decisions—specifically in terms of marketing’s 4 Ps (product design, advertising and promotion, distribution, and price)—both create and sustain addiction to digital experiences. We frame each of these analyses with understanding of how addiction is known to operate. Specifically, we discuss that while product design is at the heart of addiction, each of the other factors works to enhance and deepen its effects. Finally, we turn to addressing possible means of reducing addiction to digital experiences. We begin by reviewing existing industry efforts to reduce addiction, before developing a more comprehensive set of potential responses. For all 4 Ps, we present policy solutions in terms of three broad strategies: informing (educate and disclose), guiding (shape and incentivize), and restricting (ban and remove). We conclude by detailing research opportunities for marketing and public policy scholars.

What Is Addiction?

Defining Addiction

At a broad level, addiction is defined as the repetition of behavior with known harmful consequences (American Psychiatric Association 2018; Kovac 2013). Addiction occurs when a once-pleasurable behavior transforms into an illogical and craved necessity, despite awareness of the associated harm such behavior causes (Orford 2001). Addiction can occur with any activity that a consumer can develop an excessive appetite for. This includes addictions that are substance or drug-based, such as pharmaceuticals, illegal drugs, and smoking, as well

as those that are behavioral, such as gambling, sex, eating, exercise, or stealing (Orford 2001). While behavioral addictions are often considered separately from addictions involving drugs or chemicals, research is now beginning to consider them under the same umbrella (Grant et al. 2010; Petry 2006; Rogers and Smit 2000; Volkow and Wise 2005; Wang et al. 2004). In fact, given that nondrug addictions fall within existing definitions of addiction (Holden 2001; Hyman et al. 2006) and exhibit similar psychological, behavioral, and physiological effects (Olsen 2011; Orford, Daniels, and Somers 1996), there were calls to include behavioral addictions such as internet or online gaming addiction in recent updates to the DSM-5 (Tao et al. 2010; Van Rooij et al. 2011). “Internet gaming disorder” is included in the DSM-5 in a section of “disorders requiring further research.” Indeed, emerging neuroimaging research has found that behavioral addictions activate many of the same regions of the brain as drug-based addictions (Kuss and Griffiths 2012; Olsen 2011). This suggests that behavioral or nondrug addictions share more in common with drug-based addictions than previously recognized.

Technological addiction, or what we term “digital experience addiction,” refers to any behavioral addiction involving machine–human interaction (Griffiths 1998; Widyanto and Griffiths 2007). Internet addiction, one of the most commonly researched types of technological addiction, was first proposed as a disorder in 1996 (Young 2015). Early diagnostic tools for internet addiction were based on those used to identify problem gambling due to similarities between the two addictions (Young 1998). Because the internet can be used for productive and business purposes, internet usage is divided into essential and non-essential use when evaluating internet addiction. Suggesting the importance of the phenomenon, a 2014 study (Laconi, Rodgers, and Chabrol 2014) aimed at evaluating existing scales for the construct identified 45 assessment tools. Technological addiction is identified in more specialized contexts such as online video games (Van Rooij et al. 2011), smartphones (Kwon et al. 2013; Kim, Milne, and Bahl 2018), and online social networks (Barnes, Pressey, and Scornavacca 2019). Because this article focuses on addiction to digital experiences, it encompasses these more specific subtypes. The negative consequences of addiction to digital experiences are well documented (for a comprehensive review of the clinical research, see Kuss and Lopez-Fernandez [2016] and Cash et al. [2012]). We briefly summarize the effects identified in these articles in Table 1.

Causes of Addiction

Addiction is a complex, multifaceted problem, with a wide variety of causes examined in the literature (West 2001; Young 2015). We briefly outline these causes to highlight the multiple ways in which marketers may intentionally or unintentionally influence them. While genetics causes some individuals to be more predisposed to addiction than others, twin studies have found that genetics are not the sole cause of addiction (Goldman and Bergen 1998; Kovac 2013)—physiological changes also play a role in the formation of addiction. Chemical

Table 1. Summary of the Negative Effects of Addiction to Digital Experiences.

Level	Negative Effects of Addiction to Digital Experiences
Psychological	<ul style="list-style-type: none"> • Narcissism • Low self-confidence and self-esteem • Poor concentration, ADHD, and atrophy of critical thinking • Mood swings • Anxiety and depression • Stress
Physical	<ul style="list-style-type: none"> • Sleep disturbance • Accidents caused by distracted driving, cycling, and walking • The effects of sedentary digital addiction lifestyle (e.g., obesity, diabetes)
Societal	<ul style="list-style-type: none"> • Relationship problems • Impaired childhood socialization and learning of language • Decline in quality and civility of public discourse
Economic	<ul style="list-style-type: none"> • Productivity costs • Opportunity costs • Treatment costs

Notes: Based on Kuss and Lopez-Fernandez (2016) and Cash et al. (2012).

responses in the brain can change as the body experiences an event repeatedly. This can result in sensitization that creates a stronger desire for a particular behavior or substance (Kuss and Griffiths 2012; Olsen 2011; Robinson and Berridge 2000). Addictive behavior is more likely if people are not aware of the full ramifications of their actions (Herrnstein and Prelec 1992) or are simply more prone to risk taking, believing that negative effects will not occur in their case (Orphanides and Zervos 1995). Relatedly, addicted consumers can be viewed as drastically discounting or undervaluing the longer-term negative consequences of an action (Becker and Murphy 1988; Bickel and Marsch 2001; Bickel and Yi 2008). The media, marketing, and popular culture further normalize behaviors and substances as well as serve as reminders or cues for those who are addicted (Blake 2007; Carter 2007; Grist 2007; Sulkinen 2007; Martin et al. 2013). While causes of addiction have typically been examined separately, more recent work has explicitly called for more holistic understanding of these processes. This includes taking into account psychological and cognitive understanding of an individual, as well as their social context (Everitt et al. 2010; Kovac 2013).

How Addiction Develops

Having reviewed understanding of the variety of factors causing addiction, we next turn to explicating the process through which addiction develops. We review this process to better inform our discussion of how marketers' efforts affect this process in the case of digital experiences. While many different factors can play a role in causing addiction (West 2001; Young 2015), the development of addiction typically occurs from patterns of behavior that are carried out over time (Kovac 2013;

McCusker 2001; Skog 2003; Tiffany 1990). Habitual behaviors, the building blocks of addiction, can occur with either minimal self-awareness or deliberate decision making (Sandor 2009; Stephens and Marlatt 1987; Wiers and Stacy 2006). The presence of a habit alone may cause an urge to continue a behavior even though it may be known to be detrimental (Loewenstein and Elster 1992; Orford 2001). However, over time, repeated behaviors become paired with cues and stimuli related to the behavior (Kovac 2013; Martin et al. 2013; Orford 2001; Robinson and Berridge 2000). This can occur either unconsciously, as is the case with classical conditioning, or with conscious linking of a behavior to particular outcomes, as is the case with operant conditioning.

Classical conditioning results in environmental stimuli such as people, places, or routines becoming automatically associated with a particular addictive behavior (Glautier 1994; Robinson and Berridge 2000). For instance, waiting in line or using public transport may become so linked with use of a mobile phone that being in such contexts results in a consumer automatically and unconsciously pulling out their phone. From an operant conditioning perspective, addiction can be strengthened when rewards are actively understood to be connected to a given behavior (Li 2000; Littleton 2000; O'Brien 1975). An example in the digital context is dating apps, in which usage is linked to meeting potential mates. The clear connection between the behavior of using the app and a positive outcome makes it more likely that the app will be used in the future. Operant conditioning can further occur through negative reinforcement, wherein a negative state is removed through use. For instance, use of an app could relieve boredom or help avoid unwanted social contact. As is often the case with drug addiction, both positive and negative reinforcement may be jointly present, intensifying addiction (Robinson and Berridge 2000). The rewards can occur continually or be variable. The most addictive forms of variable rewards are those that occur after a random number of trials, as is the case with gambling (Ferster and Skinner 1957). In some cases, classical and operant conditioning can combine to more powerfully drive addiction: conditioned environmental cues can remind or initiate (Bargh 1996; Drummond 2001; Martin et al. 2013), while known rewards further drive the likelihood of behavior (Orford 2001). In addition, the rapidity of digital devices can speed this cycle (Siemens and Kopp 2011). Put together, addiction is fostered when a particular behavior is cued, rewarded in some way, and not cued to end. Having reviewed both the causes of and process through which addiction develops, we next explore the effects of marketers.

Marketing's Role in Addiction to Digital Experiences

Marketers have innocently, then knowingly, promoted addictive offerings for as long as commerce has existed (Martin et al. 2013). Examples include sugar, tobacco, cocaine, opioid pain medication, and gambling (e.g., Brandt 2007; Cotte and Latour 2009; Seiders and Petty 2004; Siemens and Kopp 2011). In

terms of digital experiences, we are in the midst of the transition between consumer innocence and knowledge of their addictive nature. Companies are just beginning to acknowledge the negative consequences of selling products that are addictive by design.

However, the role that marketing has played in the creation of addictive digital experiences has expanded as a result of technology. Although marketing has played several roles for products such as sugar and tobacco, its largest impact was exposure: getting the products into the minds and hands of the consumer. The products themselves are already addictive. In contrast, with digital experiences, in addition to exposure, marketers play a much more active role in designing the products themselves. Specifically, marketers use information about the customer to actively design more addictive offerings and employ information collected through digital experiences for further marketing. It is true that marketers have used data and research to improve their offerings for years. However, with digital experiences, improving an offering is easier and faster to do than ever before: more data is available; experiments are easier and almost costless to run; and, thanks to programming, the cycle of testing and redesign can operate almost instantaneously. Altogether, the combination of these forces can drastically increase the addictive potential of digital experiences.

We next discuss marketing practices for digital experiences in terms of product design, advertising and promotion, distribution, and price. With product design, we discuss the ways in which marketers' efforts create addictive digital experiences. We then discuss how each of the three other marketing-mix variables play complementary roles in enabling and deepening the addictive nature of digital experiences. To aid understanding, we draw on our previous discussion of the building blocks of addiction.

Product Design

We begin by discussing the heart of addiction to digital experiences: design. Tech companies have received criticism for marketing offerings that are purposefully designed to be habit forming and ultimately addictive (Harris 2017). Insights from behavioral psychology and neuroscience suggest that digital experiences such as wearables, games, and social media apps are tenaciously designed for compulsive use. These design principles all foster addiction by cueing repeated behavior, reinforcing use with rewards, and maximizing time spent with a product or service (e.g., Alter 2017; Doan, Strickland, and Gentile 2012; Eyal 2014).

While many situations may cue engagement in digital experiences, the effect of notifications is likely the strongest. Notifications can be auditory, haptic (e.g., a digital watch "tapping" its wearer), or visual. They are present in all types of digital experiences and serve as a reminder for users to start or resume a particular behavior and make it difficult to forget about a digital experience, contributing to addiction. Notifications are closely tied to the effect of rewards. Notifications represent an instance of variable-ratio reinforcement, which

has long been used and perfected in the gambling industry to hook users (Ferster and Skinner 1957; Griffiths 1993). As the name suggests, the unpredictable nature of a notification—be it in the form a text message, email, alert, or "like"—keeps the user coming back for more, promoting addiction. The neuroscience behind this is well researched (for a review, see Kuss and Griffiths [2012]): each time an alert is received or action is taken, the mesolimbic dopamine circuits in our brains are activated and a dose of the neurotransmitter released. This little anticipation "high" is then typically mismatched with what we actually do receive, resulting in a craving for more. Over time, we become habituated to the dopamine, which drives an ever-increasing interaction with a digital experience and deepens addiction.

Many companies use social manipulation to create rewards that keep users hooked. Humans are wired to seek social approval (Crowne and Marlowe 1960) and will act in ways to maximize positive social feedback. A prominent example of the use of social rewards is that of Snapchat's engineering of gamified "streaks" in which users are manipulated, through social reciprocity, to obsessively interact on Snapchat for long periods of time—in some cases, for more than 1,000 days without break (Sattelberg 2018). LinkedIn and Facebook "likes" and Instagram photo tagging similarly use social approval and reciprocity to bind users' attention.

The effect of the dopamine hit of anticipation is compounded when combined with tactics that maximize usage, such as continuous scrolling (Harris 2017). Similar to how casinos avoid natural light and clocks, by removing discrete pages and loading content into an infinite stream, natural stopping points are taken away. Feeds are optimized based on algorithms to show users content they are likely to find interesting. This can result in social media becoming "echo chambers" in which users' views are simply reinforced with content that affirms, rather than challenges, their beliefs. Without a cue to end, users keep scrolling in anticipation of some future "better" article, song, video, news story, or romantic prospect. This promotes addictive usage. Even when good material is found, apps enable posts to be tagged for later retrieval so that users can continue scrolling without interruption. Simply, apps are designed to maximize anticipation, rather than reward. Tech companies do not want users satisfied; they want to keep them in a state of dissatisfaction, with the anticipation of future deferred satisfaction. Technically, this is known as a Zeigarnik loop, where anticipation drives continuous consumption and satisfaction is endlessly deferred (e.g., social media newsfeeds; McGraw and Fiala 1982). All of these design choices likely enhance the addictive potential of a digital experience.

The removal of natural cues to end a behavior such as chapters or other end points has the effect of inducing immersion, a prerequisite to the psychological state of flow (Csikszentmihalyi and Csikszentmihalyi 1992), hyperfocus (Webb et al. 2005), and perseveration (Helm-Estabrooks 2004). Whereas the first state is generally seen as positive, its two close relatives, hyperfocus and perseveration, have a dark side. In these states, a

person performing a behavior loses control and is captured, endlessly repeating the behavior. Tech companies engineer user experiences to maximize immersion so that the user spends as much time as possible on their app or platform (Cooper 2017). Phrases such as “the Reddit hole” reflect the success of these strategies, as users intend to go online for a few minutes and instead find that they have spent hours.

Finally, due to the networked nature of digital experiences, tech companies have access to real-time data on how consumers are using their devices. This data, combined with predictive algorithms, can be used to (re)design even more addictive offerings. Moreover, companies are increasingly conducting clandestine, real-world experiments on their customers. Cues such as notifications can be designed to hit users at more conducive times. Feeds can be optimized to minimize stopping and deliver the right dose of rewarding content. With access to entire populations and unencumbered by institutional review boards (IRBs), companies monitor and conduct experiments that are simply not possible for independent third parties such as universities, which face sampling issues and strong ethical oversight. Facebook and OkCupid have received particularly negative press when the degree of their experimentation on their users was leaked, with some experts arguing that their actions were illegal (Fung 2014). As it stands, tech companies have little or no oversight (ethical or legal) as to what they do with their customer interactions.

Advertising and Promotion

While advertising and promotions are not the core cause of addiction to digital experiences, they help both initiate and sustain such addictions (Martin et al. 2013). First, advertising often acts as a cue (Martin et al. 2013) to begin using a digital offering. This is especially true of digital experiences tied to wearables or phones, such that glamorized ads create yearning for the latest new gadget and normalize its usage in everyday situations. This facilitates the subtle formation of habits, a common means through which consumers are onboarded into addiction (Kovac 2013; McCusker 2001; Skog 2003; Tiffany 1990). Such ads only speak of the benefits of new features and neglect to mention any potential drawbacks. As discussed previously, discounting of the consequences of a behavior in favor of immediate benefits is a cause of addiction (Becker and Murphy 1988; Bickel and Marsch 2001; Bickel and Yi 2008).

While subtle, digital experiences are often designed to function in a way that advertises them to friends and colleagues. Although the effect is likely limited to awareness, at the most basic level, apps such as Gmail and Apple’s mail (e.g., “Sent from an iPhone”) append tags to messages alerting recipients to the service. More subtly, many digital experiences are designed as closed systems (e.g., Facebook and Snapchat), requiring users to join the service to communicate or interact with others. This approach feeds the power of network effects: the more users there are on a system, the harder it is to ever stop using it, and the greater the likelihood that it can deliver rewards to each user. More interactions then equate to even more notifications,

app opens, and rewards, all strengthening addictive habits (Glautier 1994; Robinson and Berridge 2000). Many digital products and services are more overt, actively incentivizing users for signing up new users.

Advertising subtly minimizes cues to end a digital experience. At a broad level, advertising normalizes (over)use of digital experiences (Blake 2007; Carter 2007; Grist 2007; Sulkunen 2007; Martin et al. 2013). Consumers engaged in experiences linked to digital devices are depicted as empowered, young, and hip. In the digital experiences themselves, advertising is often quite subtle; many firms follow the style of native advertising and blend the ads into the environment (Campbell and Grimm 2019). For instance, except for a small disclosure, ads on social media typically look exactly the same as posts from friends. Making ads less noticeable and less disruptive minimizes the friction a user experiences, prompting greater usage and encouraging habit formation. Finally, the massive amounts of data available online enable digital ads to be more precisely targeted. With advertising as their primary source of revenue (e.g., Chen, Fan, and Li 2016), tech companies are incentivized to know as much as possible about a person: the more they know about the individual, both physically and psychologically, the more they can target compelling advertising messages. All of this data can result in digital ads that are more relevant and interesting than offline ads, minimizing user interruption and even potentially acting as a reward.

Place and Distribution

While availability alone does not cause addiction, the presence of cues can initiate behaviors that deepen addiction (Bargh 1996; Drummond 2001; Martin et al. 2013). The food industry has been charged with making high-sugar beverages and high-fat, low-nutrition foods available everywhere—a strategy that is empirically proved to increase consumption and negatively affect health (Seiders and Petty 2004; Tardoff 2002). A similar charge can be leveled at tech companies, much like gambling became easier with the advent of the internet (Cotte and Latour 2008; Siemens and Kopp 2011; Watson et al. 2004). Our digital devices are our ubiquitous companions, and the networks that links billions of these devices together (internet; fiber; asymmetric digital subscriber line; 3G, 4G, and 5G networks) are omnipresent. We are offered free Wi-Fi in restaurants, cafés, bars, planes, and trains, very ironically in all those places that are conducive to, and essential for, social interaction. The ubiquity of these networks in social places has changed social presence to social absence as we forgo physical interaction for virtual interaction (Turkle 2017). Notifications can be delivered across computers, tablets, watches, phones, smart home speakers, and more. Perhaps more concerningly, children are increasingly targeted: schools are given free Wi-Fi, and even school buses are increasingly networked by sponsoring companies (Hughes 2018). Facebook’s apparent philanthropic aim to provide free internet access via satellite in Africa has come under sharp criticism, with digital

campaigners and internet freedom advocates viewing it as digital colonialism (Shearlaw 2016).

An omnipresent internet certainly brings a host of benefits. However, it is important to recognize that internet availability can also enable addiction. Notifications can be delivered anywhere, bringing cues that can trigger possible immediate rewards. Such constant availability and triggering of random rewards can strengthen the cue–reward link and deepen addiction (Ferster and Skinner 1957). The more places digital experiences become available, the greater variety of rewards these experiences can deliver. This includes both explicit rewards such as location-based promotions and offers or the ability to see new dating profiles in a different area. In some cases, the rewards of having easy access to digital experiences can be more implicit. For instance, ubiquitous internet connection can enable a user to create a spontaneous and well-received social media post. Connection sometimes provides an escape for socially awkward situations, rewarding users by removing them from a stressor. Because the internet is available at all times and locations, digital experiences can be consumed in times of weakness or anxiety.

To continue the nutrition analogy, just as the food industry has been criticized for contributing to obesity by offering ever-increasing portion sizes (Seiders and Petty 2004; Young and Nestle 2002), the tech industry is attempting to capture our attention with ever-increasing bandwidth (data transfer rate). Bandwidth is important because more data throughput enables more immersive interactions, and the more immersive the digital experience, the greater the chance of getting hooked (Doan, Strickland, and Gentile 2012). The most immersive experience, virtual reality (VR), demands very high data transfer rates. Some see VR as the equivalent of heroin in the digital world (Kotler 2014), and the term “jolting” has been coined for addictive hyper-real VR trips (Cox 2014). More immersive experiences remove even more natural cues to end an experience.

Price and Cost

Access to an offering has two components: availability and price. As we have discussed, in terms of availability, tech companies have made access to the digital world omnipresent: it is accessible everywhere, all the time. While pricing alone does not cause addiction, it can certainly assist in developing and reinforcing addiction. This is particularly true given that the cost to the consumer of many digital experiences is essentially zero, making onboarding use of new tools frictionless. Most of the internet’s content (e.g., news, reviews, videos) is free, as are many platforms (e.g., Facebook, Reddit, Instagram) and apps (e.g., *Super Mario*, *Candy Crush*). Again, the analogy to the food industry is informative, in that criticism has been leveled at companies for pricing the most addictive foods (i.e., those high in fat, high in sugar, and low in nutrition) the lowest, while healthy foods command a significant premium (e.g., French 2003). In the same way, the most addictive, least productive digital experiences (e.g., games, social media, music, videos) are free and thus easy to begin using, whereas more serious

material (e.g., e-books, newspapers, many online courses) is behind premium-fee walls and thus prompts evaluation before use.

When digital experiences involve a cost, several mechanisms make the costs less foreboding and less effortful. This not only encourages trial and onboarding, making habits easier to develop, but makes continued use easier. Many digital experiences have so-called “freemium” models wherein small transactions—typically a few cents to a few dollars—are charged for additional content or features. One of the most common uses of microtransactions can be found in games such as *Fruit Pop*, *Battlefield*, and *Clash of Clans*. They are particularly insidious for two reasons. First, once a person is hooked on a game, the underlying algorithm changes so that they cannot win unless extra resources, abilities, or game currency are paid for, a tactic often referred to as “pay-to-win” game development strategy (Kimppa et al. 2016). Second, these transactions are seamless; no credit card is needed, as the gaming app is linked to a person’s Apple or Android account. There has been a loud outcry from parents whose children have racked up large bills on their accounts (e.g., Ledbetter 2016), with lawmakers urging the Federal Trade Commission to investigate so-called “free” games (Kang 2011). Research finds that the less cash-like a transaction is, the more consumers spend (Prelec and Simester 2001; Siemens and Kopp 2011).

In addition to the cost of microtransactions, a major cost of digital experiences is that of attention (Wu 2017). This is summarized by the oft-quoted phrase, “If you’re not paying for it, you become the product” (e.g., Goodson 2012), which actually predates the internet and emerged from the advertising-funded media offerings of the 1970s. The goal of most tech companies is to keep users on the device/app/platform for as long as possible so that they can learn as much about them as they can and then sell this information to third-party advertisers. So, users pay with their attention, time, and all the associated psychological consequences (e.g., Carr 2011). Many consumers are unaware of the often hidden costs of microtransactions and the increased attention that digital experiences can cost them. The absence of warnings is likely to make consumers prone to use or overuse digital experiences, facilitating addiction.

The Industry’s Response to Criticism to Date

Such has been the outcry against addictive experiences by parents (e.g., Molina 2018), students (e.g., Moscaritolo 2018), investors (e.g., Popken 2018), and tech industry insiders themselves (e.g., Harris 2017) that two of the largest players, Apple and Google, have responded. We focus our discussion on them because most other players in the digital experience industry, notably social media platforms, have done little to curb addiction. In addition, as gatekeepers to consumers, these firms have the greatest potential to effect change. Apple made changes to iOS 12 and Google to Android P (Dignan 2018) that include apps that show users how much time they have spent on their phones and which programs have consumed the most time. Users can then set daily limits on how long an app

remains active. When a time limit is reached, the user either stops using the app or must manually reset, extend, or turn off the time limit.

This strategy mirrors that of the response of manufacturers of addictive games, where periodic “time to take a break” messages are displayed. Ironically, research suggests that these messages can sometimes have the opposite effect, challenging the user to play for longer or instilling feelings of guilt whereby users seek further gaming escape. When the user does eventually exit, they are offered a further smorgasbord of equally additive games (e.g., Alter 2017). Thus, these initiatives are unlikely to dramatically change how most people use their devices, apps, or platforms. For example, both Apple and Google’s operating systems have, for many software iterations, allowed users to customize or turn off notifications. Nevertheless, the vast majority of users still opt for the dopamine hit that accompanies each alert. Moreover, experts are split as to the effectiveness of these changes. As one notes, “There’s literally no evidence that knowing how much you consume changes how you consume” (Tsukayama 2018). Indeed, empirical research suggests that information is necessary, but not sufficient to change behavior (e.g., Worsley 2002). Simply put, Apple and Google have taken a minimum first step. After all, it is in these tech giants’ financial interest to keep consumers hooked on the experiences they offer. If they did indeed act aggressively to “unhook” consumers, there are plenty of other competitors to take their place. Thus, we argue that public policy solutions are required to address digital addiction, just as in other areas, from nutrition to gambling.

In summary, the industry’s response to the problem of digital addiction has been minimal and, for competitive reasons in the long run, unlikely to be sufficient for the challenge. Although there is always the possibility that self-regulation may achieve some changes, a pressing need remains for public policy intervention.

Public Policy and Self-Regulatory Responses to Addiction

Digital experience addiction is a growing problem with a host of negative personal, social, and economic side effects. Despite its impact, digital addiction has received relatively little attention at the public policy level in the United States. This is in sharp contrast to other domains (e.g., drugs, gambling) and other countries such as China and South Korea (cf. Cao and Su 2007; Park, Kim, and Cho 2008). In this section, we consider changes in public policy strategies or self-regulatory efforts that can help ameliorate digital addiction. These are summarized in Table 2. For analytical purposes, each of the elements of marketing strategy (product design, place and distribution, advertising and promotion, and price and cost) are addressed by three groupings of public policy strategy: inform (educate and disclose), guide (shape and incentivize), and restrict (ban and remove) (cf. Moonman and Price 1989). Because product design lies at the heart of addiction, our suggestions focus more on affecting its underlying

mechanisms. Our discussion of the other three elements of marketing strategy instead focuses on reducing their ability to enhance and strengthen addiction. We discuss these efforts in light of the three facets (introduced previously) describing how addiction operates: onboarding or reminding users, rewarding usage, and lacking end cues. Moreover, we provide examples of how public policy could ameliorate one or more of the costs (personal, physical, social, and economic) of addictive devices.

Public Policy and Product Design

In terms of product design, one of the least controversial public policy strategies would be that of informing the consumer by way of mandatory labeling. Although this would not entirely prevent addiction to digital experiences, warning labels would likely prompt more conscious decision making on the part of consumers and reduce the automaticity often inherent to addiction (Andrews 2011; Argo and Main 2004; Kees et al. 2010). Furthermore, awareness might introduce a new market for “healthier” apps and devices. This follows in the intervention strategy taken by legislators in many industries such as the auto industry (declaration of fuel economy, emissions, etc.) and the food industry (labeling of calories, nutrition, etc.) (for comprehensive reviews of these topics, see Andrews [2011] and Seiders and Petty [2004]). Research is already under way (e.g., Ali et al. 2015) exploring what type of labeling would be most useful to consumers and including real-time feedback on product use with recommended daily allowances, information on consequences (personal, social, and economic), and suggestions as to (nondigital) alternative activities. For apps, labeling could even include the amount of time an average user spends on the app each day. More controversially, for the producer, firms might be legally required to disclose the types of behavioral strategies they employ in a particular digital offering to encourage consumers to habitually use the product.

Firms might be required to adhere to certain types of product design to reduce the cue–reward loop that is fundamental to forming addiction (Kovac 2013; Martin et al. 2013; Orford 2001; Robinson and Berridge 2000). Such changes could include opt-in (rather than opt-out) selections because consumers are prone to accept default choices, default do-not-interrupt settings, and the demetrication of social feedback. The number of “likes” could be changed to a simple binary smiley face (based on average sentiment rather than absolute number of likes). Digital services might be forced to open up their systems and allow users to respond to messages or invitations without using the website or app and thus avoid being sucked into another session. Another strategy would be to mandate natural “stopping points” in the use of digital offerings. Thus, endless games and infinite scrolls would be punctuated with natural breaks, in the same way that books have chapters (e.g., Alter 2017), providing users with cues for self-control (Cotte and Latour 2008; Siemens and Kopp 2011). Further guidance on product design would be to mandate that tech companies

Table 2. Potential Public Policy Solutions to Addiction to Digital Experiences and Related Questions for Future Research.

Marketing Area Targeted	Public Policy Action	Examples	Related Questions for Future Research
Product design	Inform	Mandate labeling <ul style="list-style-type: none"> • Real-time feedback on product use with recommended daily allowances; information on consequences (personal, social, and economic) • Suggestions of alternatives • Mandate disclosure of product design • Mechanisms used to keep a person habitually using a digital experience 	<ul style="list-style-type: none"> • To what extent do product warnings affect consumer behavior? Where should the warnings appear and how should they be designed to maximize effectiveness but minimize burden on firms? • To what extent would labeling result in a new segment of “healthier” apps and digital experiences? • How should default noninterrupt settings be implemented: entirely, based on certain times, or capped per day? How large would the effect of such settings be on consumers? Are there certain classes of notifications that should be allowed? • To what extent would demetricizing social media reduce usage and/or improve consumer satisfaction? • How effective would mandatory “stopping points” be in regulating excessive use? How often should they appear and for how long? • Which APIs and protocols should be established to allow consumers to interact with digital services without entering an app or feed? • How should independent oversight be established of firm experiments on consumers? Who should manage this, and based on what protocols? • Research is needed to ascertain which digital experiences are most addictive and develop generalizable criteria for assessing which should be banned. • Research is needed to understand the effect of different forms of behavioral manipulation. Which are most effective? Does the effect vary in terms of whether an addiction is being started or reinforced? What effect does removal of such manipulation have on consumer use of digital experiences?
	Guide	Stipulate changes to digital experience design <ul style="list-style-type: none"> • Default noninterrupt settings • Demetricize such that social media sites and apps are prohibited from showing the number of “likes” • Mandate “stopping points” in digital experiences • Mandate communication without using an app or digital service • Independent oversight (IRBs) of experimentation on consumers 	
	Restrict	Ban certain digital experiences <ul style="list-style-type: none"> • Ban certain types of addictive/predatory apps • Ban certain types of behavioral manipulation 	
Advertising and promotion	Inform	Educate population <ul style="list-style-type: none"> • Inform and persuade through direct-to-consumer messaging • Inclusion of disclosures in ads for digital experiences • Inform users of how much their attention is worth to firms 	<ul style="list-style-type: none"> • How should public awareness ad campaigns be designed to maximize effectiveness? • To what extent do disclosures affect consumers? Should they be designed similarly to other existing forms of disclosure, or are new forms needed for a digital environment? • To what extent does consumer awareness of time spent using a digital product affect their behavior? When should such messages be delivered for maximum impact? • Who are the most effective front-line specialists to educate? How should they be educated and what advice should they be offering? • What digital hygiene information should be offered? Where are the most effective outlets to convey such information? • To what extent would banning ads to children or vulnerable populations reduce addiction? • What technological mechanisms are needed to operationalize such a ban?
	Guide	Train frontline specialists <ul style="list-style-type: none"> • Train and inform teachers, health care workers, and IT workers • Teach digital hygiene (how to mindfully use digital experiences in a healthy and balanced way) • Teach mindfulness when using digital experiences 	
	Restrict	Restrict advertising to vulnerable populations <ul style="list-style-type: none"> • Limit the advertising to children of addictive apps such as games 	

(continued)

Table 2. (continued)

Marketing Area Targeted	Public Policy Action	Examples	Related Questions for Future Research
Place and distribution	Inform	Display warnings and advice in certain locations and at certain times: <ul style="list-style-type: none"> • Dangers of using devices that emit blue light during night hours • Dangers of the presence of smartphones on concentration 	<ul style="list-style-type: none"> • How should such messages be designed for maximum impact? Should they appear on the physical product or in the digital products themselves? • How should such messages be framed to increase impact? • What interventions can be made that would nudge consumers to make better choices about device usage? • Where behavior cannot be avoided, what approaches can be used to minimize harm? • How would consumers respond to digital restrictions or bans in certain locations or devices such as cars? How should such restrictions be designed? In terms of time, location, or caps? • Would more subtle restrictions such as slowing internet at night, or fading out the color of displays be more effective? • Research is needed to both detect when consumers have reduced willpower and how to effectively restrict harmful behavior.
	Guide	Shape behavior <ul style="list-style-type: none"> • Ground-level signaling for “phone pedestrians” (“distracted walking”) 	
	Restrict	Situational restriction <ul style="list-style-type: none"> • Certain areas and times disable or block internet/wireless access (e.g., schools during teaching hours) • Limit advertising and in-app purchasing during times when users may have reduced willpower • Mandate that certain tech devices should be able to communicate with each other, so that certain devices cannot operate in certain modes when they are together. For example, cars could communicate with phones so that when the car is in motion the phone’s communication apps are disabled. 	
Price and cost	Inform	Mandate disclosure of product business model <ul style="list-style-type: none"> • Mandate the full disclosure of the business model underpinning a particular digital experience (we make our money through in-app purchases, we monetize your time, attention and data for marketing purposes) • Force ratings of the addictiveness of different digital experiences to be disclosed at purchase (similar to how cleanliness ratings are shown in the windows of restaurants) 	<ul style="list-style-type: none"> • To what extent does displaying the average cost of in-app purchases or time spent in a digital experience affect consumers? How should these metrics be calculated and presented? • To what extent do ratings of addictiveness affect consumer decisions in terms of both purchase and usage? Should these rating be shown at purchase, during usage, or both? • How much of an incentive is needed for companies to participate in such programs? • How effective are these programs at reducing addiction and promoting digital well-being? • How many additional steps are necessary for such an intervention to be effective? • What other mechanisms might be able to achieve a similar effect? • What tax rate would cause change in how devices and apps are designed? • At what point should such a tax kick-in? • Which apps or devices should be taxed? • Would such a tax be feasible given likely industry push back? • What criteria should be used to determine which business models are restricted? • What loopholes might be possible that need to be accounted for?
	Guide	Incentivize <ul style="list-style-type: none"> • Tax breaks for organizations that offer and implement digital hygiene programs for employees Tangibilize payment <ul style="list-style-type: none"> • Replace “frictionless billing” such as in app purchases, with “friction billing” whereby the consumer has to complete multiple steps to pay Tax <ul style="list-style-type: none"> • Tax producers in proportion to the amount of time a user spends in their digital experiences 	
	Restrict	Mandate minimum pricing <ul style="list-style-type: none"> • Ban certain “freemium” business models 	

Notes: APIs = application program interfaces; IT = information technology.

implement independent IRBs, perhaps in a similar way that the Food & Drug Administration oversees drug testing (Woodcock and Woosley 2008).

The most extreme public policy intervention would be to restrict certain types of digital experiences. This might be on an age basis or a universal ban. The most obvious products to ban

would be the most addictive—for example, certain types of compulsion loop games—and the most predatory—for example, loot boxes, which are essential in game gambling. Loot boxes are virtual “treasure chests” that, when redeemed, may or may not contain items useful in a game. Their similarity to slot machines has led some countries (e.g., Japan) to ban them (Hood 2017). Finally, certain types of behavioral manipulation, such as artificial social pressure or certain design elements (e.g., notifications, scroll algorithms, rewards), might be prohibited.

Public Policy and Advertising and Promotion

In terms of direct-to-consumer messaging, there are significant opportunities for broad-based informational campaigns educating consumers of the dangers of digital experiences. The objective of such campaigns is to improve citizens' knowledge of the psychological, physical, social, and economic consequences of overconsumption of digital offerings and alert them to their addictive nature (Fiore and Baker 2009; Martin et al. 2013). Such educational campaigns could use broadcast media such as TV, radio, and print, as well as digital experiences themselves. Disclosures could be included in ads for digital products and services, similar to prescription drug ads in the United States or those on food packaging (Andrews 2011; Grubbs Hoy and Andrews 2004; Seiders and Petty 2004; Seiders and Petty 2007). This could include explicit information on how much time a user spends using an app or service, as well as how much a company is making from a user's attention and information. Informational campaigns alone have had limited impact on people's behavior in other health areas, such as smoking, obesity, and road safety (e.g., Andrews and Netemeyer 1996; Rindfleisch and Crockett 1999). However, awareness and knowledge are first steps, after which emphasis could be switched to management and prevention.

In terms of guidance, a targeted and effective strategy would be to educate frontline specialists, an approach that has proved to be effective in other health areas (Brownstein et al. 2005). “Digital hygiene,” or how to mindfully use digital devices in a healthy and balanced way, might be taught in schools in a similar manner to healthy eating (e.g., Young 1997). Research suggests that mindfulness may be an effective tool in combating overeating (Bahl et al. 2013) as well as fighting digital addiction, particularly among younger consumers (Kim, Milne, and Bahl 2018). In organizations, information technology workers, who deliver and manage so much of our digital world, could be trained to monitor and advise, just as school chefs are trained in nutrition and obesity prevention (e.g., Gerritsen 2016).

In terms of restriction, legislators might consider banning the advertising of addictive media to vulnerable populations such as children. This would follow the model adopted in countries such as the United Kingdom and Norway, which restrict or ban mass media advertising to children (Caraher, Landon, and Dalmeny 2006; Seiders and Petty 2007). Because of their immaturity, children may be less likely to make thoughtful decisions and thus more susceptible to addiction.

Public Policy and Place and Distribution

There are significant opportunities to inform and educate consumers of the dangers of digital experiences in specific times and places to reduce automatic usage. At night, consumers could be made aware of the link between blue light and interruption of sleep patterns and circadian rhythms as well as longer-term macular degeneration that can occur as a result of looking at an electronic screen (e.g., Chang et al. 2015). In locations that require higher focus (e.g., government offices, schools, universities), citizens could be made aware of the cognitive drain that even a switched-off cell phone can have on concentration (Ward et al. 2017). Schoolchildren and parents could be made aware of the link between online gaming and poor scholastic achievement (Skoric 2009). Public service announcements during prime-time TV could alert families and couples to the relationship costs that digital devices can have (e.g., Przybylski and Weinstein 2013). Leveraging geolocation data, devices could have options to automatically disable notifications in certain types of locations and enabling users to better self-control (Siemens and Kopp 2011).

In terms of guidance, one prime area for public policy intervention might be in the area of what the World Health Organization calls “distracted walking.” Just as the hands-on use of cellular phones in cars while driving (distracted driving) has been outlawed in many countries, distracted walking refers to accidents that occur when citizens use their smartphones while walking in public places. Rather than ban phones in these busy areas, government intervention could shape behavior. For example, in many German cities the street crossing “walk” and “do not walk” signals are duplicated at ground level so as to be in the line of sight of people looking at their mobile devices (e.g., May 2018).

In terms of legal restrictions, one area that has already seen government action is that of “distracted driving.” This has ranged from “no texting and driving” laws to outright bans on using mobile devices while driving (e.g., Bogost 2018). Legislators could go further, mandating device-to-device communication protocols, whereby various tech devices are able to communicate and control each other. Cars could communicate with phones so that when a car is in motion, the driver's communication apps are disabled. It might be helpful for regulators to ban the practice of using data from people who have opted in to build profiles on proximal users, such as how social media apps routinely upload users' contact lists to suggest new friends on their network. Such practice not only is questionable from a privacy perspective but also serves to propagate use of such digital services.

More broadly, efforts could be made to disrupt the cues and immersion that foster addiction. Following Mann's (2005) notion of availability as a law of addiction, legislators might consider the more controversial banning of Wi-Fi or network access in certain situations, such as in schools, during study hours (cf. Martin et al. 2013; Seiders and Petty 2004). While this might seem extreme, it echoes existing bans on minors accessing alcohol and tobacco. This strategy is already pursued

by several schools (e.g., Waldorf). Moreover, it is informative to note that Silicon Valley chief executive officers—the very people who oversee the design and sales of our digital devices—overwhelmingly send their children to such schools (Richtel 2011). Similar efforts could force natural stopping points as well or present screen usage reminders such as “You have been watching 4 hours continuously, would you like to continue?” Wireless routers could automatically slow or disable internet connections near bedtime. In terms of direct government intervention, in 2011 South Korea introduced a law preventing children under 16 years old from playing online games at night (Kim and Shin 2013), and in China there is a three-hour online gaming limit for people under 18 years old (Dickie 2005). Advertising and in-app purchasing could be limited during times when users may have reduced willpower, similar to how Gmail detects drunk emailing (Snyder 2008). Some digital experiences, such as gaming apps, might allow users to self-exclude, similar to how casinos enable consumers to effectively ban themselves for periods of time (Cotte and Latour 2008; Martin et al. 2013; Watson et al. 2004).

Public Policy and Price and Cost

In terms of pricing and the costs of digital offerings, a first step would be to better inform the consumer of the actual cost of consumption (i.e., make pricing transparent). For example, one strategy would be to mandate the full disclosure of the business model underpinning a particular digital experience (“we make our money through in-app purchases”; “we monetize your time, attention, and data”). An analogy here is the legal requirement for clear information on interest rates and fees in financial services such as credit cards (e.g., Shaffer 1999). Digital products could disclose, on average, what in-app purchases typically end up costing and how much time consumers spend using these apps. Similar to how restaurants in some jurisdictions have to post their Health Department cleanliness rating, apps and digital products could be forced to show an addictiveness rating. This rating could be done through self-regulation efforts or an outside body, or it could be crowdsourced in the same way consumer app reviews are collected.

In terms of guidance, regulators could structure tax incentives for organizations that offer and implement digital hygiene programs for employees and even, potentially, parents. These types of incentives could be implemented by national taxation authorities designating digital hygiene programs as tax deductible. Similar incentives could be made for producers of digital products and services that create less addictive offerings. Finally, and most controversially, regulators could impose taxes directly on the most addictive offerings, as they have done in the case of tobacco products; alcohol; and, in some cases, prescription drugs (Fiore and Baker 2009). However, the history of such taxes on other addictive offerings (e.g., tobacco) suggests that this would be only a long-term political possibility, due to the industry lobbying that inevitably accompanies such initiatives.

Another more feasible guidance strategy would be to replace “frictionless billing” (e.g., in-app purchases) with “friction billing” whereby the consumer must complete multiple steps to pay. Time delays in online gambling are shown to improve mental accounting (Siemens and Kopp 2011). Research has shown that the more tangible a payment is, the less likely a customer is to compulsively spend (Prelec and Simester 2001; Siemens and Kopp 2011).

Another way of changing the price/cost dynamic is to highlight the customer’s role in how their data is used, to the point of even being recompensed for the use of their data. As we have mentioned, many of the “free” offerings are purposely made addictive because producers can monetize attention and consumer data. Requiring firms to allow consumers the ability to choose what types of data they share with providers is likely to have an industry-wide effect of a return to paid offerings. Indeed, the recent introduction of the General Data Protection Regulation act in Europe, which restricts and controls data collection from consumers, will provide a real-world experiment as to the consequences of such an intervention (Cornock 2018; Kolah 2018). A further step would be for companies to pay consumers for their data (e.g., Kaiser 2018); however, this may result in greater lock-in to digital offerings.

Finally, in term of restriction, regulators could restrict predatory “freemium” business models. As with other taxes, this is unlikely to be popular with producers (Jha and Peto 2014) and, ironically, consumers, many of whom like the idea of “free” offerings and lack understanding of the long-term costs. However, as consumers become more informed about digital addiction, this is likely to change.

Digital Addiction: Research Opportunities

Addiction to digital experiences presents academics in the pure and social sciences, and marketing scholars in particular, with a host of avenues for fruitful research that can assist public policy makers in their decision making and subsequent actions. In many instances there is an urgent need for regulators to take control of a phenomenon that confronts society with several serious problems. In this section, we identify multiple research avenues to which scholars might wish to give attention, and in this way we contribute to a better understanding of addiction to digital experiences.

Operationalizing and Assessing the Efficacy of Potential Interventions

First and foremost, research is needed to help inform development and implementation of the potential interventions proposed previously. Multiple questions need to be answered (these are summarized in the fourth column of Table 2). At a broad level, these questions are centered on several common themes. Research is needed on how possible interventions can and should be operationally implemented. While several of the public policy ideas we propose are based on similar interventions in nonaddictive device contexts, it is unknown to what

extent they will be effective in the context of digital addiction. Although research suggests that substance and behavioral addictions are similar physiologically (Kuss and Griffiths 2012; Olsen 2011), there are likely differences in the efficacy of different measures. It may be the case that approaches used with problem gambling, a similar behavioral addiction, will be more effective than those used with a substance addiction such as drug abuse (Cotte and Latour 2008; Siemens and Kopp 2011). Research can help inform which addiction interventions and preventative measures can be imported to a digital addiction context.

Once different possible interventions are underway, researchers can begin working to optimize them (e.g., Grubbs Hoy and Andrews 2004). While a great deal of research exists related to other forms of addiction (Andrews 2011; Kees et al. 2010) and can certainly help inform this process, there are likely differences. Research exploring such optimizations is needed and is a theme evident across the questions outlined in Table 2. Relatedly, following optimization efforts, research can shift to assessments between them. Interventions should be compared on the basis of both their cost and efficacy. It is highly likely that some interventions may be effective but costly, whereas others may be minimally effective but economical. Some may even exacerbate the problem (Andrews, Burton, and Kees 2011; Martin et al. 2013). Research that helps strike a balance between cost and efficacy will enable the most efficient use of public or industry resources in tackling the problem.

Finally, several questions concern possible pushback to such interventions. These could stem from consumers, who may question the need for such efforts or be upset by possible increases in cost. Consumers may prefer more user control rather than blanket mandates (Moller, Ryan, and Deci 2006). Such concerns are valid and warrant response, which partially includes the efficacy research described previously. Part of the response concerns an assessment of the cost–benefit ratio that interventions impose on consumers. Their costs, both financial and nonfinancial, must be weighed against the societal gains they brought about. Such consideration is important in addressing potential legal concerns that might be introduced by companies or industry organizations, similar to what has occurred in response to other policy interventions (Seiders and Petty 2004). The United States has a long history of framing such behaviors as a moral weakness and a matter of willpower (Bernhard 2007). Even when a problem is acknowledged, there is a tendency for endless debate as to who is responsible: the federal government looks to the states, the states look to the industry, and the industry points to the consumer's freedom of choice (Korn, Gibbins, and Azmier 2003). It is important to note that the very industry causing the problem is likely to be the biggest opponent of the political process of intervention. The manufacturers of digital experiences are among the wealthiest and most powerful organizations the world has ever seen, and it is unlikely that they will stay their lobbying hand in the face of public policy intervention. It may ultimately be gatekeepers such as Google and Apple that force app

developers to abide by best practices, conventions, or warnings related to addiction. In addition to the research questions more specific to our proposed public policy interventions outlined in Table 2, there are broader research questions for marketing academics to address. We discuss these next.

Developing Better Measures of Addiction to Digital Experiences

As the old adage goes, if one wants to manage something, one needs to measure it. Although multiple medical screening scales exist for the identification of digital addiction (Kwon et al. 2013; Laconi, Rodgers, and Chabrol 2014; Tao et al. 2010; Young 1998), they were developed with the goal of identifying severe cases. Better measurement, and the development of public policy initiatives to manage digital addiction will benefit from researchers developing a wider array of measures of the phenomenon. This includes shorter and less direct measures of addiction to digital experiences, which could be useful in identifying consumers in earlier stages of addiction.

These measures might be behavioral measures, such as gauging the levels and patterns of usage of digital experiences. Ironically, data from the addictive devices themselves may be key. Heart rate and other biometric data available from wearables may prove useful, especially when paired with machine learning techniques. Marketing scholars have long been adept at developing psychometrically robust measures of constructs, generally following the guidelines proffered by Churchill (1979). In cases where it is desirable to measure digital experience addiction without resorting to medical screening criteria, reliable and valid scales would be of considerable benefit to policy makers, in addition to their use as measures in further scholarly research. Combined with behavioral and biometric data, psychometric measures of addiction to digital experiences have the additional benefit of providing strong checks on face validity. Such insight would make it possible to discern whether the nature of digital experience addiction varies between platforms, devices, and content types.

Empirically Testing the Effect of Marketing on Addiction to Digital Experiences

An advantage of having measures of digital experience addiction in its various forms is that they will enable researchers to identify the antecedents and consequences (such as physical and mental health) of the construct more precisely. Larger questions underpin the research directions outlined in Table 2. A wider variety of ways to measure digital experience addiction will enable researchers to identify whether there are common predictors for the condition, and to determine the trajectory through which addiction develops over time. Is it more effective to try and prevent initial adoption of addictive digital experiences? Or are such efforts futile given their omnipresence? Should efforts instead be focused on managing addiction rather than preventing it?

Likewise, we previously summarized the effect of marketing addiction to digital experiences in terms of cues to begin or restart usage, the effects of rewards in reinforcing addictive behaviors, and the removal of cues to end usage. Exploring how each of these factors drives addictions would be valuable, particularly in relation to interventions. Are some of the factors more effective to target than others? For instance, is it better to mitigate the cues that trigger an addictive episode or the rewards provided in one? Or simply better to create more natural stopping points for users to reflect on their own behavior? Such insights will provide valuable evidence to policy makers who need to understand addiction to digital experiences, develop strategies to control and contain this addiction, and legislate accordingly.

Exploring Marketing's Role in Promoting Self-Directed Treatment

For substance addictions such as alcoholism and behaviors such as compulsive gambling, group structures have evolved in many societies that enable sufferers to engage with their fellows as a form of treatment. These include Alcoholics Anonymous for alcoholics and Gamblers Anonymous for problem gamblers. That these groups are viewed as successful in society is evidenced, for example, by the fact that many courts in the United States impose mandatory attendance at Alcoholics Anonymous meetings on those convicted for alcohol-impaired driving offences as part of sentencing. Marketing scholars should investigate how well support groups would work for digital experience addicts, and how best to organize and run them. Policy makers should consider the role governments might have in establishing these, and the extent to which mandatory attendance at meetings might be desirable for those who cause damage to society and not just to themselves. While impaired driving due to smart phone use is an obvious example, other instances might include parents of children who are injured while they (the parents) are digitally distracted, or pedestrians who cause injury to others due to their impaired walking. It might also include psychological harm caused by parents neglecting their children in favor of their digital devices.

Conclusion

Addiction to digital experiences is controversial. Not all heavy use of devices and digital experiences is negative; indeed, there are many circumstances in which heavy use of devices does not have a negative effect and is not addictive as defined. Just as an enthusiastic wine connoisseur or wine writer, who tastes and drinks more than two standard drinks a day, is not an alcoholic, neither are professional traders who need to regularly check their smartphone to track trades; the same goes for individuals who regularly check their smartwatch to monitor a cardiac problem. However, the negative effects of the overconsumption of digital offerings are incontrovertible. Moreover, we are in the early stages of what is likely to become a digital experience addiction epidemic if evidence from South Korea, the

most connected country in the world (Kelleher 2017), is anything to go by. As bandwidth improves and the digital world begins to reach and surpass the resolution of the real world, the phenomenon is likely to increase at an exponential rate. Yet we are in a Faustian bargain. In the modern world, it is almost impossible to live without digital experiences and the very real benefits they accrue. Consumers on their own struggle to maintain equanimity with regard to their digital experiences, and companies are competitively incentivized to learn how to make their offerings as addictive as possible. Thus, public policy intervention is likely to be both unavoidable and beneficial to society.

Addiction to digital experiences is a consumer behavior; however, it is one purposefully engineered by the tech industry. The tech industry is ironically similarly addicted to this engineering, as many firms' business models are based on the harvesting of human attention. Faced with this double-bind, the negative consequences of addiction to digital experiences are unlikely to be addressed on the market level at which they occur. Thus, at a meta-level, public policy intervention is inevitable. Marketing scholars can play a pivotal role in understanding this emerging form of consumer behavior, and their insights will play an important part in guiding effective public policy.

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