

REGULATING HABIT-FORMING TECHNOLOGY

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Tech developers, like slot machine designers, strive to maximize the user’s “time on device.” They do so by designing habit-forming products—products that draw consciously on the same behavioral design strategies that the casino industry pioneered. The predictable result is that most tech users spend more time on device than they would like, about five hours of phone time a day, while a substantial minority develop life-changing behavioral problems similar to problem gambling.

Other countries have begun to regulate habit-forming tech, and American jurisdictions may soon follow suit. Several state legislatures today are considering bills to regulate “loot boxes,” a highly addictive slot-machine-like mechanic that is common in online video games. The Federal Trade Commission has also announced an investigation into the practice. As public concern mounts, it is surprisingly easy to envision consumer regulation extending beyond video games to other types of apps. Just as tobacco regulations might prohibit brightly colored packaging and fruity flavors, a social media regulation might limit the use of red notification badges or “streaks” that reward users for daily use.

It is unclear how much of this regulation could survive First Amendment scrutiny; software, unlike other consumer products, is widely understood as a form of protected “expression.” But it is also unclear whether well-drawn laws to combat compulsive technology use would seriously threaten First Amendment values. At a very low cost to the expressive interests of tech companies, these laws may well enhance the quality and efficacy of online speech by mitigating distraction and promoting deliberation.

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INTRODUCTION

Tech products from Facebook to *Candy Crush* apply well-tested behavioral techniques to make their products as habit-forming as possible. Industry gurus, until recently, bragged openly about these practices in industry bestsellers with titles like *Hooked: How to Build Habit-Forming*

*Products*¹ and *Evil by Design*.² A tech consultancy called Dopamine Labs went so far as to advertise that: “Dopamine makes your app addictive. Lift your engagement and revenue up to 167% by giving your users our perfect [hits] of dopamine. . . . High ROI. PhD tested, CEO approved.”³

These efforts appear to have paid off. One recent study discovered that average Americans use their smartphones 76 times a day and *touch* their phones 2617 times per day.⁴ Among young adults, five hours of phone use a day is typical.⁵ And in 2018, the World Health Organization (WHO) took an unprecedented step by including “gaming disorder,” a behavioral addiction, among its International Classification of Diseases.⁶

Regulators have begun to pay attention. Washington State’s gambling laws have been interpreted to cover certain casino-themed mobile games.⁷ Congress and several state legislatures are exploring legislation to restrict the use of “loot boxes,”⁸ a de facto slot machine that drives revenue in video games,⁹ and the Federal Trade Commission (FTC) has promised to

1. NIR EYAL WITH RYAN HOOVER, *HOOKED: HOW TO BUILD HABIT-FORMING PRODUCTS* (2014).

2. CHRIS NODDER, *EVIL BY DESIGN: INTERACTION DESIGN TO LEAD US INTO TEMPTATION* (2013).

3. Jonathan Shieber, *Meet the Tech Company That Wants to Make You Even More Addicted to Your Phone*, TECHCRUNCH (Sept. 8, 2017), <https://techcrunch.com/2017/09/08/meet-the-tech-company-that-wants-to-make-you-even-more-addicted-to-your-phone/> [<https://perma.cc/LS2A-NGZJ>].

4. Michael Winnick, *Putting a Finger on Our Phone Obsession*, DSCOUT (June 16, 2016), <https://blog.dscout.com/mobile-touches> [<https://perma.cc/6GKR-ZFPU>].

5. Carolyn Gregoire, *You Probably Use Your Smartphone Way More Than You Think*, HUFFINGTON POST (Nov. 2, 2015, 4:13 PM), https://www.huffingtonpost.com/entry/smartphone-usage-estimates_us_5637687de4b063179912dc96 [<https://perma.cc/L5HA-SWRQ>].

6. The WHO defines “gaming disorder” as a “pattern of gaming behavior (‘digital-gaming’ or ‘video-gaming’) characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences.” *Gaming Disorder*, WORLD HEALTH ORG. (Sept. 2018), <https://www.who.int/features/qa/gaming-disorder/en/> [<https://perma.cc/4P6D-UPQZ>].

7. *Kater v. Churchill Downs Inc.*, 886 F.3d 784, 785 (9th Cir. 2018). Other states’ gambling laws, however, have been interpreted more narrowly. *See generally* *Mason v. Mach. Zone, Inc.*, 851 F.3d 315, 319–20 (4th Cir. 2017) (applying Maryland law); *Phillips v. Double Down Interactive LLC*, 173 F. Supp. 3d 731, 737–39 (N.D. Ill. 2016) (applying Illinois law); *Soto v. Sky Union, LLC*, 159 F. Supp. 3d 871, 877–81 (N.D. Ill. 2016) (applying California law).

8. *See, e.g.*, Press Release, Josh Hawley, U.S. Senator, Senator Hawley to Introduce Legislation Banning Manipulative Video Game Features Aimed at Children (May 8, 2019), https://www.hawley.senate.gov/sites/default/files/2019-05/2019-05-08_Video-Game-Bill_One-Pager_0.pdf [<https://perma.cc/RVX4-PXTD>]; *see also* Assemb. 2194, 2017–2018 Leg., Reg. Sess. (Cal. 2018); S. 3024, 29th Leg., Reg. Sess. (Haw. 2018); H.R. 2727, 29th Leg., Reg. Sess. (Haw. 2018); H.R. 2686, 29th Leg., Reg. Sess. (Haw. 2018); H.R. 4460, 90th Leg., Reg. Sess. (Minn. 2018). Other bills have called for investigations into the practice by gambling and law enforcement authorities. *See, e.g.*, S. 333, 120th Gen. Assemb., 2d Reg. Sess. (Ind. 2018); S. 6266, 65th Leg., Reg. Sess. (Wash. 2018).

9. *See infra* Part II.A.3.

investigate that same practice.¹⁰ International regulators have gone further, with South Korea requiring online gaming platforms to deter extended play and to kick minors off after midnight.¹¹

In principle, these efforts might someday extend beyond gaming to a much wider world of habit-forming technology. A growing number of tech insiders have expressed strong reservations about social media's addictive potential, with some calling for the industry to be regulated "like tobacco or alcohol."¹² It is easy to imagine a legislative push to protect minors, at least, from tech products that are understood to encourage compulsive use. And as tech products become more sophisticated and intrusive, we may eventually see calls to protect adults from certain aggressive forms of behavioral manipulation.

This Article outlines the various forms that these regulatory interventions might take. These include light-touch, limited-range policies that are already under official consideration in American jurisdictions.¹³ They also include aggressive policies that seem unthinkable today, but that over the long-term may appear proportionate as tech companies become more sophisticated at manipulating user behavior.¹⁴

Even the more modest policies will raise quick constitutional challenges if enacted. Social media,¹⁵ video games,¹⁶ and even computer code itself¹⁷ have received First Amendment protection in past case law. One might

10. Brian Crecente, *Federal Trade Commission Chairman Pledges to Investigate Video Game Loot Boxes*, VARIETY (Nov. 27, 2018, 3:01 PM), <https://variety.com/2018/gaming/news/ftc-loot-box-investigation-1203038178/> [<https://perma.cc/23C3-YBQ3>].

11. See Sohn Ji-Young, *WHO's Labeling of Gaming Addiction as a Disorder Sparks Concern in Korea*, JAKARTA POST (Jan. 4, 2018, 2:01 PM), <https://www.thejakartapost.com/life/2018/01/04/whos-labeling-of-gaming-addiction-as-a-disorder-sparks-concern-in-korea.html> [<https://perma.cc/ZZP8-LGG8>]; Carolyn Sun, *South Korea's Video Game Addiction*, NEWSWEEK (Oct. 17, 2011, 1:00 AM), <https://www.newsweek.com/south-koreas-video-game-addiction-68309> [<https://perma.cc/Y2CR-5R8X>]. South Korea's online gaming platforms must screen users by requiring them to submit a national ID number. Huu Kim Le, *Internet Gaming Shutdown Law aka "Cinderella Curfew"*, CGI CLINIC (July 18, 2015), <https://cgiclinic.com/south-korea-special-shutdown-law-aka-cinderella-curfew/> [<https://perma.cc/3HHF-Z5ET>].

12. Alex Hern, *Facebook Should Be "Regulated Like Cigarette Industry," Says Tech CEO*, GUARDIAN (Jan. 24, 2018, 7:32 AM), <https://www.theguardian.com/technology/2018/jan/24/facebook-regulated-cigarette-industry-salesforce-marc-benioff-social-media> [<https://perma.cc/RQ34-GLGN>] ("[T]echnology has addictive qualities that we have to address, and that product designers are working to make those products more addictive, and we need to rein that back as much as possible." (quoting Marc Benioff, chief executive officer of Salesforce)); Roger McNamee, *Why Not Regulate Social Media Like Tobacco or Alcohol?*, GUARDIAN (Jan. 29, 2018, 4:32 AM), <https://www.theguardian.com/media/2018/jan/29/social-media-tobacco-facebook-google> [<https://perma.cc/P6BG-Q9CN>].

13. See *infra* Parts II.A.1, II.A.3 (proposing labeling strategies and bans on video game "loot boxes").

14. See *infra* Part II.A.4 (proposing mandatory design features to slow down and de-intensify the user experience).

15. See, e.g., *Packingham v. North Carolina*, 137 S. Ct. 1730, 1735 (2017).

16. See, e.g., *Brown v. Entm't Merchs. Ass'n*, 564 U.S. 786, 790 (2011).

17. See, e.g., *Universal City Studios, Inc. v. Corley*, 273 F.3d 429, 446–52 (2d Cir. 2001).

assume from this record that even the most modest attempts to regulate habit-forming design should fail First Amendment scrutiny.

Instead, the question is wide open—courts have hardly begun to address the First Amendment status of software’s technical and nonexpressive components. Is the choice to use an “infinite scroll” in the Facebook News Feed a form of “speech”? What about Twitter’s strategic deployment of a “loading” wheel to build anticipation after a Twitter user “pulls to refresh”? And if they are speech, then how should courts balance the equities? It is forbidden to burden speech on the basis that the speech is too persuasive.¹⁸ Is it any better to burden habit-forming design—sometimes called “persuasive technology”¹⁹—because it succeeds in building user habits?

Courts’ answers to these questions will carry heavy consequences for media policy at large. On the one hand, most free content online is monetized by a huge behavioral advertising ecosystem that includes Google, Facebook, and scattered smaller advertising networks.²⁰ The business model requires enormous amounts of data, which in turn requires users to spend enormous amounts of time on their devices. Policies that cut into that time may improve users’ health while impairing their access to information.

On the other hand, the addiction-driven nature of social media probably harms the quality of public discourse and deliberation. First, developers’ efforts to drive constant user engagement encourage an emotional, hair-trigger style of public expression.²¹ Second, by training users to respond to stimuli out of habit rather than by considered choice, social media engineers prime the public discussion for manipulation by “trolls” and saboteurs.²² A

18. See *Sorrell v. IMS Health Inc.*, 564 U.S. 552, 578 (2011) (“That the State finds expression too persuasive does not permit it to quiet the speech or to burden its messengers.”).

19. See, e.g., B.J. FOGG, *PERSUASIVE TECHNOLOGY: USING COMPUTERS TO CHANGE WHAT WE THINK AND DO 1* (2003) (defining “persuasive technology” as “any interactive computing system designed to change people’s attitudes or behaviors”).

20. See *infra* Part I.B.

21. See M. J. Crockett, *Moral Outrage in the Digital Age*, 1 *NATURE HUM. BEHAV.* 769, 769 (2017); Maksym Gabielkov et al., *Social Clicks: What and Who Gets Read on Twitter?*, *PERFORMANCE EVALUATION REV.*, June 2016, at 179, 182 (reporting that “a majority (59%) of the URLs mentioned on Twitter are not clicked at all”); Michela Del Vicario et al., *Echo Chambers: Emotional Contagion and Group Polarization on Facebook*, *SCI. REP.* 8–9 (Dec. 1, 2016), <https://www.nature.com/articles/srep37825.pdf> [<https://perma.cc/BM9U-DRHY>] (demonstrating that users on Facebook tend to organize into echo chambers where higher involvement produces more negative emotion); Rui Fan et al., *Anger Is More Influential Than Joy: Sentiment Correlation in Weibo*, *PLOS ONE* (Oct. 15, 2014), <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0110184> [<https://perma.cc/RN8E-FHP6>] (finding that connected users of Weibo, a Twitter-like platform in China, share significantly more sentiment correlation along lines of anger than of joy or sadness).

22. See DIPAYAN GHOSH & BEN SCOTT, *NEW AM., #DIGITALDECEIT: THE TECHNOLOGIES BEHIND PRECISION PROPAGANDA ON THE INTERNET 17* (2018); Craig Timberg & Elizabeth Dvoskin, *Russians Got Tens of Thousands of Americans to RSVP for Their Phony Political Events on Facebook*, *WASH. POST* (Jan. 25, 2018), <https://www.washingtonpost.com/news/the-switch/wp/2018/01/25/russians-got-tens-of-thousands-of-americans-to-rsvp-for-their-phony-political-events-on-facebook/> [<https://perma.cc/392P-9Q3G>].

population better able to resist its news and social media interfaces may well produce a political culture that is hardier and more stable.²³

Part I discusses the economic incentives that have made addictive design such a pervasive phenomenon in the tech world. Then, it briefly discusses some techniques that tech designers use to encourage habit formation, along with the harms, both mundane and profound, that these habits cause. Part II lays out the prospects for regulation: what the range of possible strategies would be and which institutions may be equipped to implement some of them. Part III turns to a broad discussion of the First Amendment considerations.

I. THE RISE OF HABIT-FORMING DESIGN

A. *Why Drive Compulsive Use?*

Over the past twenty years or so, consumers have come to expect low prices—and more often no price at all—for most of the software and media they consume online. This is basic economics: the internet has reduced the marginal cost of distributing (and copying) content to practically zero, and prices have followed close behind.

Zero-price markets force content producers and distributors to extract value from users in ways that do not offend the zero-price expectation up front.²⁴ Most firms have two options: micropayments and advertising. These techniques make up for a lack of up-front payment by collecting value over a long and limitless series of consumer interactions. Hence the obsession at companies like Facebook and Twitter with “driving engagement”—more interactions lead to more user “engagement,” which leads to more value the firm stands to capture.²⁵

23. Hunt Allcott et al., *The Welfare Effects of Social Media* 20–22 (Stanford Inst. for Econ. Policy Research, Working Paper No. 19-002, 2019), <https://siepr.stanford.edu/sites/default/files/publications/19-002.pdf> [<https://perma.cc/7RVR-LMX7>] (finding that study subjects who quit Facebook for one month indicated less attention and knowledge of news but also demonstrated less political polarization).

24. Rafet Sifa et al., *Profiling in Games: Understanding Behavior from Telemetry, in SOCIAL INTERACTION IN VIRTUAL WORLDS* 337, 345 (Kiran Lakkarahu et al. eds., 2018) (“The rise of F2P games has notably added to the industry’s focus on behavior analysis. These are games with no up-front cost to the customer, with revenue depending on In-App Purchases (IAPs) (and sometimes associated branded products). Revenue is thus dependent on the ability of the developer to convince some portion of the customer base to purchase virtual items for real money. In order to be successful as a business model, these games require continued analysis of player behavior . . .”).

25. See *The State of Intellectual Freedom in America: Hearing Before the Subcomm. on the Constitution & Civil Justice of the H. Comm. on the Judiciary*, 115th Cong. 6 (2018) (statement of Ari Ezra Waldman, Director, Innovation Center for Law and Technology, New York Law School) (“The more we like, the more we comment, the more pictures we upload, and the more we simply browse the internet, the more Facebook knows about us, . . . and the more money it can charge those who want to target us for advertisements.”); SIVA VAIDHYANATHAN, *ANTI-SOCIAL MEDIA: HOW FACEBOOK DISCONNECTS US AND UNDERMINES DEMOCRACY* 56–62 (2018) (describing Facebook’s data-driven advertising model).

In the casino industry—another sector where few would pay up front for what they get at the end of the day²⁶—the imperative to drive the slot machine gambler’s engagement for hours on end has a more straightforward name: “time on device.”²⁷

1. Time on Device: The Advertising Model

Advertising is a time-worn technique for drawing in revenue without charging a high price to the customer. The newspaper and magazine industries collect most of their revenue from advertisers, and broadcasters depend on them.²⁸ The concept today is ultimately the same as in the mid-nineteenth century when the “penny presses” invented it: content producers draw consumers’ attention and “sell” their ad exposure to the merchant.²⁹

Advertising-based business models have always valued “time on device,” whether the device is a television or a magazine. Twentieth-century mass media strove to keep viewers’ and listeners’ attention through cliff-hangers, promotions, call-in contests, and the like.³⁰ Advertisers targeted audiences demographically. TV networks would use soap operas to drive demand for soap and other household products that women of the day were more likely to purchase.³¹ *Rolling Stone* magazine, at least in its early days, ran advertisements aimed at young adults.³²

Today’s online advertising industry has grown much more sophisticated. Modern ad networks target individuals based on real-time behavioral profiling.³³ In many cases, ad networks monitor the individual’s response to

26. See *Slot Machine Payback Statistics*, AM. CASINO GUIDE, <https://www.americancasinoguide.com/slot-machine-payback-statistics.html> [<https://perma.cc/YLT2-7YE6>] (last visited Aug. 22, 2019) (showing that slot machines around the country have 85 to 97 percent rates of return per pull).

27. Brad Plumer, *Slot-Machine Science: How Casinos Get You to Spend More Money*, VOX (Mar. 1, 2015, 6:27 AM), <https://www.vox.com/2014/8/7/5976927/slot-machines-casinos-addiction-by-design> [<https://perma.cc/P44F-T9ZU>].

28. See generally *Newspapers Fact Sheet*, PEW RES. CTR. (June 13, 2018), <https://www.journalism.org/fact-sheet/newspapers/> [<https://perma.cc/PX6X-UDLB>]; Matt Stieb, *One Company Is Making Money from News and It Rhymes with ‘Shmoogie’*, N.Y. MAG. (June 9, 2019), <http://nymag.com/intelligencer/2019/06/google-posts-usd4-7-billion-profit-in-2018-from-news-industry.html> [<https://perma.cc/Y7C6-N5T9>].

29. See Sonja R. West, *The “Press,” Then & Now*, 77 OHIO ST. L.J. 49, 93 (2016).

30. See Emily Nussbaum, *Tune in Next Week: The Curious Staying Power of the Cliffhanger*, NEW YORKER (July 22, 2012), <https://www.newyorker.com/magazine/2012/07/30/tune-in-next-week> [<https://perma.cc/4XE7-5AAM>].

31. *Soap Opera*, AD AGE (Sept. 15, 2003), <https://adage.com/article/adage-encyclopedia/soap-opera/98883/> [<https://perma.cc/F9GM-BHGR>].

32. Nick Ravo, *Rolling Stone Turns a Prosperous 20*, N.Y. TIMES (Aug. 23, 1987), <https://www.nytimes.com/1987/08/23/business/rolling-stone-turns-a-prosperous-20.html> [<https://perma.cc/76PU-UUUV>].

33. See *Adknowledge Rolls Out Enhanced Behavioral Targeting Model to Increase Advertiser Conversions*, BUS. WIRE (July 24, 2007), <https://www.globenewswire.com/news-release/2007/07/24/1050231/0/en/Adknowledge-Rolls-Out-Enhanced-Behavioral-Targeting-Model-to-Increase-Advertiser-Conversions.html> [<https://perma.cc/KBZ5-WEZB>] (“Adknowledge, a CPC auction-style ad network, analyzes behavioral data in real time, uncovering interest and response patterns to deliver targeted advertisements more likely to match consumer preferences.”); *Following \$6m Investment, SALESmanago Brings Next Gen*

an ad: Did the individual follow through by visiting the merchant's website, viewing the advertised items, putting the item in a "cart" or a "save for later" list, or consummating the purchase?³⁴

This fine-grained control over consumer behavior vastly improves the "yield" of an online ad placement,³⁵ and it has to. Many web users use ad-blockers.³⁶ Users who do not use ad-blockers are not generally inclined to click; studies have demonstrated that internet ads are among the least effective forms of advertising.³⁷ And if nobody clicks, then advertisers must strive harder to put "relevant" ads in front of consumers.

Marketing Automation to eCommerce & B2C, PR NEWSWIRE (June 6, 2016, 9:00 AM), <https://www.prnewswire.com/news-releases/following-6m-investment-salesmanago-brings-next-gen-marketing-automation-to-ecommerce--b2c-300279516.html> [https://perma.cc/D2N6-WP5J] ("The complete individual profiles of customers with such behavioral and transactional data are then used in real time to build automatic predictive offers that are delivered individually in all marketing channels . . ."); Michael Learmonth, *Search-Titan Google Makes Display Play with ROI Tool: Campaign Insights Aims to Give Click King Bigger Share of \$4.7B Business*, AD AGE (Oct. 19, 2009), <https://adage.com/article/digital/google-search-titan-makes-display-play-roi-tool/139756> [https://perma.cc/BBA4-PY4Q] (describing Google's "Campaign Insights" program, which relies on automated A/B testing to determine what kinds of ad displays prompt users to search for a brand or product); *Proving There Is More to Location Targeting in Mobile, xAd Launches Proprietary SmartFencing™, SmartLocation™ Technologies*, BUS. WIRE (Nov. 8, 2012, 8:00 AM), <https://www.businesswire.com/news/home/20121108005317/en/Proving-Location-Targeting-Mobile-xAd-Launches-Proprietary> [https://perma.cc/NZB3-6L2U] ("xAd's local search and display ad network reaches over 85 million mobile consumers each month and is the only network with the ability to not only ensure accurate local targeting—but enhance it through the use of real-time and historical local search behaviors and other available data variables.").

34. Tim Peterson, *Google Tool Can Calculate What That Mobile Ad Is Really Worth*, ADWEEK (Mar. 26, 2013), <https://www.adweek.com/digital/google-tool-can-calculate-what-mobile-ad-really-worth-148155/> [https://perma.cc/2TEC-N29M]. This progression of steps toward a final transaction is called a "conversion funnel." *Id.* Data analytics tools help merchants to optimize it by locating at which point in the funnel consumers are jumping out and then fixing the "leak." See *Create and Manage Funnels*, FACEBOOK ANALYTICS, <https://www.facebook.com/help/analytics/935921203105136> [https://perma.cc/AKU4-9TTE] (last visited Aug. 22, 2019).

35. See HOWARD BEALES, *THE VALUE OF BEHAVIORAL TARGETING 3* (2009), https://www.networkadvertising.org/pdfs/Beales_NAI_Study.pdf [https://perma.cc/B5AX-CRLR] (showing behaviorally targeted advertising has over twice the clickthrough rate of "run-of-network" advertising, and significantly greater conversions). Some critics have dismissed this account as "investor storytime," arguing that ad networks excel not at *driving* sales but at showing ads to people who are just about to make a purchase anyway. See Ethan Zuckerman, *The Internet's Original Sin*, ATLANTIC (Aug. 14, 2014), <https://www.theatlantic.com/technology/archive/2014/08/advertising-is-the-internets-original-sin/376041/> [https://perma.cc/NFH7-KVZV?type=image]. But note that in either case, the incentive to drive compulsive engagement is the same.

36. Lauren Johnson, *IAB Study Says 26% of Desktop Users Turn On Ad Blockers*, ADWEEK (July 26, 2016), <https://www.adweek.com/digital/iab-study-says-26-desktop-users-turn-ad-blockers-172665/> [https://perma.cc/2MYC-8SXB].

37. Derek Thompson, *A Dangerous Question: Does Internet Advertising Work At All?*, ATLANTIC (June 13, 2014), <https://www.theatlantic.com/business/archive/2014/06/a-dangerous-question-does-internet-advertising-work-at-all/372704/> [https://perma.cc/NHF9-NPMT].

Today's advertisers therefore have two reasons to drive time on device. First, the user must be exposed to as many ads as possible. The more time on device, the more ad exposures. The second requirement—one that emerged in the internet era—is to target the ads as closely as possible to the individual user. This targeting requires advertisers to collect as much data as possible about the user—not only demographic data, but minute-by-minute data about the user's location, mood, and desires.³⁸ The more time on device, the richer the dossier.

Behaviorally targeted advertising underwrites free online media on the web and in apps. Facebook and Google run the largest advertising networks, tracking user behavior and using the data to place ads on their own sites and across the web.³⁹ They may also buy or otherwise obtain data from other sources, such as brick-and-mortar customer reward programs,⁴⁰ credit bureaus,⁴¹ or from other app developers who collect data for the purpose of selling it.⁴²

Advertisers pay Facebook, Google, and the other ad networks to place ads, and the ad networks split this payment with the owners of the website or app where the ad is placed. Everyone's revenue stream—that of the content producers, app developers, and social and search platforms that place ads—depends on maximizing time on device.

2. The Microtransactions Model

Only a few years ago, the video game industry captured most of its revenue at the point of sale. Gamers might purchase a game in the store on a physical medium, or they might pay up front for a downloadable copy from an online gaming platform, often after having the chance to play through the beginning

38. See Kurt Wagner, *This Is How Facebook Uses Your Data for Ad Targeting*, VOX (Apr. 11, 2018, 6:00 AM), <https://www.vox.com/2018/4/11/17177842/facebook-advertising-ads-explained-mark-zuckerberg> [<https://perma.cc/5L6V-32YX>].

39. See Nathan Ingraham, *Facebook Buys Data on Users' Offline Habits for Better Ads*, ENGADGET (Dec. 30, 2016), <https://www.engadget.com/2016/12/30/facebook-buys-data-on-users-offline-habits-for-better-ads/> [<https://perma.cc/LG76-XUDR>].

40. Brick-and-mortar retailers can use an automated process, Facebook's Offline Conversions API, to pair their own point-of-sale data on a person with Facebook's geolocal and other data on the same person. Facebook can then provide the retailer with a "lookalike" audience of potential buyers who might be susceptible to similar marketing strategies. See Thorin Klosowski, *How Facebook Uses Your Data to Target Ads, Even Offline*, LIFEHACKER (Apr. 11, 2013, 11:00 AM), <https://lifehacker.com/5994380/how-facebook-uses-your-data-to-target-ads-even-offline> [<https://perma.cc/9FQK-4AS2>]; Tim Peterson, *Facebook Will Target Ads to People Based on Store Visits, Offline Purchases, Calls to Businesses*, MARKETING LAND (Sept. 21, 2017, 11:00 AM), <https://marketingland.com/facebook-will-target-ads-people-based-store-visits-offline-purchases-calls-businesses-224668> [<https://perma.cc/4AAN-2QFX>].

41. Ingraham, *supra* note 39 (listing Experian and TransUnion as U.S. data partners with Facebook).

42. Julia Angwin et al., *Facebook Doesn't Tell Users Everything It Really Knows About Them*, PROPUBLICA (Dec. 27, 2016, 9:00 AM), <https://www.propublica.org/article/facebook-doesnt-tell-users-everything-it-really-knows-about-them> [<https://perma.cc/7Q66-LK2U>].

part of the game—a “demo”—for free.⁴³ For the most part, this business model continued the straightforward retail model for books and other physical media that held through the twentieth century. Prices for console cartridge video games in the 1990s ran from roughly \$60 to \$80 in 2019-adjusted terms.⁴⁴

Similar products at similar price points continue to exist for traditional gamers who are willing to pay up front for serious console or PC games—2018’s *Red Dead Redemption 2*, for instance, a big-budget production that sells for nearly \$60.⁴⁵ A new category of casual mobile gamers has emerged as well. Light “free-to-play” (F2P) games now make up most of the market.⁴⁶ Rather than charging up front, these games’ developers monetize their products mostly through in-app purchases or advertising.⁴⁷ In principle, they could sell in-game behavioral data to third-party advertising networks as well, though it is unclear whether such a market has emerged.⁴⁸

There is a clear need for F2P casual games to maximize user engagement. A banner ad in a video game will typically pull only about \$2 or \$3 per thousand user impressions.⁴⁹ Making any significant amount of money from ad impressions requires users to spend massive amounts of time on the game, and even then, an ad-based strategy may not always be lucrative.

Most of the gaming sector has therefore moved to a hybrid monetization model that rests at least partially on in-app “micropayments” from players—small fees that players spend over time to gain small in-game advantages.⁵⁰

43. See generally Patrick Klepek, *The Real Stories Behind E3’s Glossy Game Demos*, KOTAKU (June 10, 2016, 3:28 PM), <https://kotaku.com/the-real-stories-behind-e3-s-glossy-game-demos-1710169104> [<https://perma.cc/KFP2-34JB>].

44. Kyle Orland & Jonathan Gitlin, *Why Retail Console Games Have Never Been Cheaper, Historically*, ARS TECHNICA (June 30, 2013, 4:00 PM), <https://arstechnica.com/gaming/2013/06/why-retail-console-games-have-never-been-cheaper-historically/> [<https://perma.cc/ZW49-P5LK>].

45. *Red Dead Redemption 2—PlayStation 4*, AMAZON, <https://www.amazon.com/Red-Dead-Redemption-2-PlayStation-4/dp/B01M5DZ525?th=1> [<https://perma.cc/PS27-DH95>] (last visited Aug. 22, 2019).

46. TTT, *The Future of Gaming: How Micro-Transactions Are Disrupting the Industry*, MEDIUM (Aug. 20, 2018), <https://medium.com/trustnote/the-future-of-gaming-how-microtransactions-are-disrupting-the-industry-c7f5bab1081b> [<https://perma.cc/WE2T-RN6U>].

47. “Reward-based monetization,” a third strategy, is arguably distinct from advertising and in-app purchases, but the differences are irrelevant for purposes of this Article. Under this strategy, developers dispense in-game rewards to players who complete some action that is valuable to a paying merchant. These actions include installing a separate app, watching a video ad, or completing a survey. See Michael Sprague, *New Study: The Data Behind Reward-Based Monetization in F2P Games*, MEDIUM (May 31, 2016), <https://medium.com/tapresearch/new-study-the-data-behind-reward-based-monetization-in-f2p-games-66bb31d3ac7e> [<https://perma.cc/88GU-HGLF>].

48. See generally Sifa et al., *supra* note 24, at 350.

49. Yaniv Nizan, *42 Ways to Monetize Your Mobile Game*, GAMEANALYTICS (Oct. 9, 2013), <https://gameanalytics.com/blog/42-ways-to-monetize-your-mobile-game.html> [<https://perma.cc/R6EW-FS43>].

50. See Andrei Klubnikin, *Microtransactions in Games: The Good, the Bad, and the Ugly*, GAMEANALYTICS (Feb. 14, 2018), <https://gameanalytics.com/blog/microtransactions-games-good-bad-ugly.html> [<https://perma.cc/HFT5-Y6PS>]; see also SWRVE, MONETIZATION

F2P games lean heavily on micropayments, and certain big-budget traditional games do as well, typically as a means to lower the retail price.⁵¹ In recent years, the video game industry has captured most of its overall revenue from these post-sale or post-download micropayments.⁵²

The usual approach is to allow the user to play for a few minutes or even a few days without any kind of sales pitch.⁵³ Then some goal is dangled in front of the player, such as the chance to win a new in-game item or to upgrade the player's character.⁵⁴ Achieving the goal usually requires the player to cash in some significant amount of in-game currency that can be either purchased with cash or earned through time on device.⁵⁵ The latter option may require hours of tedious work from the player,⁵⁶ and the game is often designed to make it impossible to get this work done in one sitting.⁵⁷ The user is only allowed to play for ten minutes or so at a time, for example,

REPORT 2016 6 (2016), <https://www.swrve.com/images/uploads/whitepapers/swrve-monetization-report-2016.pdf> [<https://perma.cc/W5W5-AUMR>] (showing that 73.5 percent of mobile in-app purchases range from \$0 to \$10).

51. See Sifa et al., *supra* note 24, at 345; see also Ben Lindbergh, *Battlefront, Reddit: The Video Game Pricing Wars That Might Reshape the Industry*, RINGER (Dec. 2, 2017, 8:00 AM), <https://www.theringer.com/features/2017/12/2/16725196/reddit-fighting-microtransaction-exploitation-in-video-games> [<https://perma.cc/HT8J-5VRN>] (“Rather than raise the sticker price and scare away customers on the front end, publishers are, logically enough, opting to tack on costs *post-purchase*, via paid downloadable content, ‘season passes’ that grant access to all future DLC, and, more problematically, microtransactions.”).

52. See Rob Thubron, *Microtransactions from Free-to-Play Games Almost Three Times the Revenue of Paid Game Releases*, TECHSPOT (Nov. 30, 2017, 6:15 AM), <https://www.techspot.com/news/72104-microtransactions-ftp-pc-games-generate-22-billion-2017.html> [<https://perma.cc/9F7W-YYNY>]; TTT, *supra* note 46 (showing that 82 percent of game revenue in 2017 came from F2P games containing in-app purchases).

53. See, e.g., Damion Schubert, *Respecting the Player's Wallet*, GAMASUTRA (Apr. 29, 2013), https://www.gamasutra.com/view/news/191264/Respecting_the_players_wallet.php [<https://perma.cc/Q68N-DD97>] (noting that in *Star Wars: The Old Republic*, “[p]layers are rarely, if ever, prompted to spend money in the first 10 levels, and the player is likely to forget that doing so is even possible”).

54. On June 12, 2019, the author played through the opening stages of *Candy Crush Saga* and *Minion Rush*. In *Candy Crush Saga*, the player runs out of moves and is then given the opportunity to keep playing using “gold bars” and a “Piggy Bank” purchasable for \$2.99. In *Minion Rush*, apparently a children's game, the player is eventually introduced to a set of slot-machine-like “prize pods” and character upgrades called “costumes” that can be purchased through a set of in-game currencies. Revives and prize pods can also be earned by watching a video advertisement.

55. See TTT, *supra* note 46.

56. Blizzard's *Overwatch* allows users to save about an hour of completing repetitive in-game goals per dollar paid. See Paul Tassi, *The Math Behind Why Overwatch's Loot Boxes Are Exhausting to Unlock*, FORBES (June 10, 2016, 11:28 AM), <https://www.forbes.com/sites/insertcoin/2016/06/10/the-math-behind-why-overwatches-loot-boxes-are-exhausting-to-unlock> [<https://perma.cc/Z3SC-54XX>].

57. In the mobile game *Harry Potter: Hogwarts Mystery*, for example, the player becomes trapped in a “Devil's Snare,” which appears to slowly suffocate the player's avatar. At this point, the player runs out of the “energy” that allows them to complete tasks within the game. The player may either pay for some quick energy and escape the snare or wait for hours for the energy to recharge. Julia Alexander, *Harry Potter: Hogwarts Mystery's In-App Purchases, Wait Times Turning Players Away*, POLYGON (Apr. 27, 2018, 12:08 PM), <https://www.polygon.com/2018/4/27/17290168/harry-potter-hogwarts-mysterys-devils-snare-purchases-wait-time> [<https://perma.cc/X6XG-3U8K>].

or the user may be required to “check in” every twenty-four hours, or even every four hours, to collect a bonus toward the goal.⁵⁸ At some point, an invested player will be worn down to the point where it appears rational to spend, say, \$2.99 and skip ahead to the sought-after goal.⁵⁹ At this point, of course, another in-game goal appears and the cycle begins again.

Most players never pay, and most of those who do pay very little. Instead, most revenue from micropayments is highly concentrated among a small group of apparent addicts who individually spend thousands of dollars on in-app purchases. One study showed that 0.15 percent of mobile gamers account for 50 percent of the industry’s revenue from micropayments.⁶⁰ About 1.9 percent make up 90 percent of revenue.⁶¹ These gamers are called “whales” within the video game industry, and they compensate for the overwhelming majority of gamers who either never pay or who pay very little.⁶² In this respect, the video game industry’s revenue structure is coming to resemble that of the gambling industry and the alcohol industry, where addicted customers also account for most of the profits.⁶³ The term “whale,” in fact, originated in the casino industry.⁶⁴ And as in the casino industry, the whale-centered model can be highly profitable. The freemium⁶⁵ mobile game *Game of War*, despite its poor critical reception, draws a yearly average

58. William Grosso, *The Science & Craft of Designing Daily Rewards—and Why FTP Games Need Them*, GAMASUTRA (June 13, 2016, 5:32 PM), http://www.gamasutra.com/blogs/WilliamGrosso/20160613/274759/The_Science_Craft_of_Designing_Daily_Rewards_and_Why_FTP_Games_Need_Them.php [<https://perma.cc/593G-DQ4Y>].

59. See, e.g., Keza MacDonald, *Harry Potter: Hogwarts Mystery Review: A Shameless Shake-Down*, GUARDIAN (May 4, 2018, 2:00 PM), <https://www.theguardian.com/games/2018/may/04/harry-potter-hogwarts-mystery-review> [<https://perma.cc/5WHU-Y4NV>] (“Hogwarts Mystery pulls the old trick of hiding the true cost of its purchases behind an in-game ‘gem’ currency, but I worked out that you’d have to spend about £10 a day just to play Hogwarts Mystery for 20 consecutive minutes.”).

60. *Swrve Finds 0.15% of Mobile Gamers Contribute 50% of All In-Game Revenue*, SWRVE (Feb. 25, 2014), <https://www.swrve.com/company/press/swrve-finds-015-of-mobile-gamers-contribute-50-of-all-in-game-revenue> [<https://perma.cc/4QBG-UU3H>].

61. Klubnikin, *supra* note 50.

62. Paul Tassi, *Why It’s Scary When 0.15% Mobile Gamers Bring In 50% of the Revenue*, FORBES (Mar. 1, 2014, 4:28 PM), <https://www.forbes.com/sites/insertcoin/2014/03/01/why-its-scary-when-0-15-mobile-gamers-bring-in-50-of-the-revenue/> [<https://perma.cc/VK7A-HBER>].

63. See generally Tiffany Hsu, *Video Game Addiction Tries to Move from Basement to Doctor’s Office*, N.Y. TIMES (June 17, 2018), <https://www.nytimes.com/2018/06/17/business/video-game-addiction.html> [<https://perma.cc/6Y8Z-B4VW>].

64. See Lisa Fletcher et al., *Biggest Loser?: Gambler Dropped \$127M in a Year*, ABC NEWS (Dec. 8, 2009), <https://abcnews.go.com/GMA/gambler-dropped-127-million-vegas-blames-casino-losses/story?id=9272730> [<https://perma.cc/5FCN-8QP4>].

65. “Freemium” is a portmanteau of “free” and “premium”: free for now, and you pay later for more content. See Brian X. Chen, *Playing at No Cost, Right into the Hands of Mobile Game Makers*, N.Y. TIMES (Mar. 18, 2012), <https://www.nytimes.com/2012/03/19/technology/game-makers-give-away-freemium-products.html> [<https://perma.cc/7ZQX-CQ4E>].

of \$550 per player—a remarkable figure given the overwhelming majority of players who pay very little.⁶⁶

This unbalanced revenue structure may give game developers strong incentives to encourage addiction-driven, whale-like purchases. But gaming companies often have a collateral interest in addicting nonpaying players as well. First, a player who keeps playing might pay later on; a player who walks away will not. Second, many mobile games contain a social dimension that is enhanced by widespread participation. In *Design Home*, for example, players rate and review each other's attempts at interior design.⁶⁷ In *Marvel Strike Force*, players join together in “alliances” to fight major battles and to compare victories—a social dynamic that creates a sense of obligation.⁶⁸ Nonpaying players who participate in these activities enhance the games' allure for the whales and potentially promote the games to others.⁶⁹ For both of these reasons, it is in game developers' interest to ensure that their customers, both paying and nonpaying, spend as much “time on device” as possible.

B. An Overview of Habit-Forming Design

Developers drive time on device by producing user interface (UI) and user experience (UX) design practices that draw the user into compulsive behavior. Natasha Dow Schüll, a leading researcher of the casino industry, has commented that UX design is “about looping people into these flows of incentive and reward. Your coffee at Starbucks, your education software, your credit card, the meds you need for your diabetes. Every consumer interface is becoming like a slot machine.”⁷⁰

Insiders in the tech industry share Schüll's assessment. In a recent BBC documentary, for instance, several former Facebook executives stepped forward to explain how core design features they had personally invented

66. Andrew Handley, *What They Won't Tell You About Game of War*, LOOPER, <https://www.looper.com/34210/untold-truth-game-war/> [<https://perma.cc/QP9A-PPF3>] (last visited Aug. 22, 2019).

67. Leslie Katz, *This Game Will Make You Obsessed with Rattan Ottomans and Watercolor Whales*, CNET (Sept. 6, 2018, 6:00 AM), <https://www.cnet.com/news/design-home-game-has-me-obsessed-with-rattan-ottomans-watercolor-whales/> [<https://perma.cc/D6V8-9FKZ>].

68. Brian Shea, *Opinion—Marvel Strike Force Is One of the Most Addictive Games I've Played All Year*, GAME INFORMER (June 8, 2018, 8:58 PM), <https://www.gameinformer.com/opinion/2018/06/08/opinion-marvel-strike-force-is-one-of-the-most-addictive-games-ive-played-all> [<https://perma.cc/4JL8-E54U>].

69. See Schubert, *supra* note 53 (“[T]he game is served well by having a large free-to-play population. . . . Even if only a fraction [of players] are paying for your game, having a free population of a couple million means that you have a couple million people potentially evangelizing the game to their friends and family.”).

70. Ian Leslie, *The Scientists Who Make Apps Addictive*, ECONOMIST: 1843 (Oct./Nov. 2016), <https://www.1843magazine.com/features/the-scientists-who-make-apps-addictive> [<https://perma.cc/DK52-M22V>].

exploited weaknesses in human psychology.⁷¹ These design features include the “Like” button, the News Feed’s endless scroll, which enables the user to see more posts without stopping to ask for more, and even the choice to use the color red in notification badges.⁷²

Sean Parker, the inventor of Napster and later the first company president at Facebook, told interviewers that UI designers have “exploit[ed] a vulnerability in human psychology” by “giv[ing] users ‘a little dopamine hit’” when doing so would help the company “consume as much of [the users’] time and conscious attention as possible.”⁷³ Aza Raskin, inventor of the infinite scroll at Mozilla, told interviewers that behind every phone screen, there are about a thousand engineers who work on increasing addictiveness.⁷⁴ Leah Pearlman, inventor of the “Like” button, admitted that the feature had her “kind of addicted to the feedback.”⁷⁵ “It’s . . . exactly the kind of thing that a hacker like myself would come up with,” said Sean Parker.⁷⁶ “The inventors [and] creators,” he continued, “understood [the addictive potential] consciously. And we did it anyway.”⁷⁷

The techniques designers use to produce these effects vary, but Nir Eyal’s 2014 bestseller, *Hooked: How to Build Habit Forming Products*, helpfully boils them down to a four-step process. “The ultimate goal of a habit-forming product,” he writes, “is to solve the user’s pain by creating an association so that the user identifies the company’s product or service as the source of relief.”⁷⁸ The ideal is “unprompted user engagement, bringing users back repeatedly, without depending on costly advertising or aggressive messaging.”⁷⁹

In the first step, the user is “triggered” to use the product.⁸⁰ Early on, this trigger is “external.”⁸¹ It comes from advertising, or from an invitation from a friend to join Facebook or Instagram.⁸² Or perhaps the user is “triggered” to download a game from iTunes or the App Store as a response to what Eyal terms the “pain”⁸³ of boredom. After repeated use, the user picks up “internal

71. See Hilary Andersson, *Social Media Apps Are “Deliberately” Addictive to Users*, BBC NEWS (July 4, 2018), <https://www.bbc.com/news/technology-44640959> [<https://perma.cc/27T4-GD9U>].

72. See *id.*

73. Olivia Solon, *Ex-Facebook President Sean Parker: Site Made to Exploit Human “Vulnerability,”* GUARDIAN (Nov. 9, 2017, 3:11 PM), <https://www.theguardian.com/technology/2017/nov/09/facebook-sean-parker-vulnerability-brain-psychology> [<https://perma.cc/WEN7-TKU6>].

74. Andersson, *supra* note 71.

75. *Id.*

76. Solon, *supra* note 73.

77. See Thuy Ong, *Sean Parker on Facebook: “God Only Knows What It’s Doing to Our Children’s Brains,”* VERGE (Nov. 9, 2017, 10:21 AM), <https://www.theverge.com/2017/11/9/16627724/sean-parker-facebook-childrens-brains-feedback-loop> [<https://perma.cc/Q6FU-UZAN>].

78. EYAL, *supra* note 1, at 52.

79. *Id.* at 5.

80. *Id.* at 39–60.

81. *Id.* at 41.

82. *Id.* at 44–47.

83. *Id.* at 52.

triggers” that prompt the user to take action without any need for outside intervention.⁸⁴ Simple habit formation may do the job, as the user comes to rely on a phone app as a quick cure for boredom.⁸⁵ But many apps set goals for the user which encourage the process of internal trigger formation.⁸⁶ Snapchat’s “streak” feature, for instance, counts the number of consecutive days that two friends have used the platform to communicate with each other.⁸⁷ If either friend misses a day, then the streak is lost.⁸⁸

In step two, the triggered user takes action by downloading, registering for, or using the application.⁸⁹ Scrolling through the Facebook News Feed or “pulling down” to see recent tweets constitutes action, and Eyal advises that successful developers make the barriers to action as low as possible; ideally, the user should be able to act without stopping to think before doing so.⁹⁰ On Pinterest, for example, users can simply scroll forever without ever needing to hit a “See More” button.⁹¹ The user can simply keep scrolling, and the service will keep serving up more pinned items.⁹² If the user stops scrolling, the site displays some images as cut off at the fold, indicating that there is still more to see.⁹³

The endless scroll monetizes the same human tendency that was illustrated by the famous “bottomless bowl of soup” experiment.⁹⁴ One group was served a normal bowl of tomato soup.⁹⁵ The other group was served a bowl of tomato soup that was literally “bottomless”: a tube under the table kept pumping in more soup.⁹⁶ The group with the bottomless bowls of soup ate on average about 73 percent more soup seemingly because, without having to stop and ask for seconds, they had no opportunity to reflect on how hungry

84. *Id.* at 47–51.

85. *Id.* at 28–31.

86. See Göran Wägström, *Is Social Media Addiction Worse Than Cigarettes?*, FORBES (Nov. 21, 2018, 7:45 AM), <https://www.forbes.com/sites/forbestechcouncil/2018/11/21/is-social-media-addiction-worse-than-cigarettes> [<https://perma.cc/Y86U-CDJ7>].

87. *Social Media Must Be Made Less Addictive, Says Watchdog*, BBC NEWS (June 12, 2018), <https://www.bbc.com/news/technology-44452265> [<https://perma.cc/BM5B-RN68>].

88. *Id.* In 2018, Anne Longfield, Children’s Commissioner for England, called for Snapchat to drop the streak feature. *Id.*

89. EYAL, *supra* note 1, at 61.

90. *Id.* at 67.

91. *Id.* at 79.

92. *Id.*

93. *Id.* at 110.

94. See generally Brian Wansink et al., *Bottomless Bowls: Why Visual Cues of Portion Size May Influence Intake*, 13 OBESITY RES. 93 (2005). Note, however, that apparent methodological deficiencies have brought the paper under scrutiny as many other papers to emerge from Professor Wansink’s Food and Brand Lab at Cornell University have been retracted. Pete Etchells & Chris Chambers, *Mindless Eating: Is There Something Rotten Behind the Research?*, GUARDIAN (Feb. 16, 2018, 6:21 AM), <https://www.theguardian.com/science/head-quarters/2018/feb/16/mindless-eating-brian-wansink-is-there-something-rotten-behind-the-research> [<https://perma.cc/R99V-MTCZ>].

95. Wansink et al., *supra* note 94, at 95.

96. *Id.* at 96.

they actually were.⁹⁷ This bottomless approach to the scroll is widespread among social apps today.⁹⁸

In step three, after the user takes action, the system serves up a “variable reward”—a reward that, as on a slot machine, varies on a random basis.⁹⁹ The core of the addiction machine, variable rewards’ addictiveness was first discovered in a series of experiments on pigeons and rats.¹⁰⁰ These animals were given a food-pellet dispenser with a lever.¹⁰¹ Predictable results meant that these animals would push the lever when they wanted a snack.¹⁰² But when the rewards were randomized, the animals would press endlessly on the lever, hungry or not.¹⁰³

The variable reward is overt in many gaming applications. As explained in Part II, many online games offer “loot boxes” to players in exchange for micropayments of a dollar or two.¹⁰⁴ After paying, the loot box opens in an animated sequence to reveal a pseudorandomized set of in-game items such as character upgrades.¹⁰⁵ Some items are rare, and some are junk; the similarity to the ups-and-downs appeal of the slot machine is impossible to miss.

Other applications involve a subtler variable reward component. Perhaps the most common application of the variable reward principle is in the “pull to refresh” feature found in most phone apps.¹⁰⁶ “Pull down” in Facebook or in your podcasting app, for example, and the app will load a new, and unpredictable, set of updates. The feature contributes nothing to functionality; apps such as Facebook could just as easily notify the user when an event occurs. Instead, it is designed, like the pull of a slot machine or the press of a food-dispenser lever, to engage the user.¹⁰⁷ And as for the “loading”? It is usually a contrivance—nothing but a visual animation displayed to whet the appetite.¹⁰⁸

97. *Id.*

98. Facebook, Instagram, Twitter, Quora, Snapchat, and Pinterest all employ the infinite scroll. Vinit Joshi, *The Problem with Infinite Scrolling Feeds*, MEDIUM (July 18, 2017), <https://blog.newtonhq.com/the-problem-with-infinite-scrolling-feeds-e3d1aad2c078> [<https://perma.cc/CQ3V-H7FH>].

99. EYAL, *supra* note 1, at 95.

100. *Id.* at 99.

101. *Id.*

102. *Id.*

103. *Id.*

104. *See infra* Part II.A.3.

105. *See* Senate Environment and Communications References Committee, Parliament of Australia, *Gaming Micro-Transactions for Chance-Based Items* (Report, November 2018) 2–3 [1.11]–[1.13].

106. *See* Tristan Harris, *The Slot Machine in Your Pocket*, SPIEGEL ONLINE (July 27, 2016, 5:25 PM), <http://www.spiegel.de/international/zeitgeist/smartphone-addiction-is-part-of-the-design-a-1104237.html> [<https://perma.cc/V3AA-ZBWM>].

107. *See id.*; Julian Morgans, *The Secret Ways Social Media Is Built for Addiction*, VICE (May 21, 2017, 4:30 AM), https://www.vice.com/en_uk/article/vv5jkb/the-secret-ways-social-media-is-built-for-addiction [<https://perma.cc/BHV7-XQ6E>].

108. Morgans, *supra* note 107 (“You know when you open Instagram or Twitter and it takes a few moments to load updates? That’s no accident. Again, expectation is part of what makes intermittent variable rewards so addictive. This is because without that three-second

Small design tweaks can be extremely effective at enhancing the sense of reward.¹⁰⁹ T. Dalton Combs of Boundless Mind (formerly known as Dopamine Labs) explains how his firm might enhance a product’s addictive neural “kick”: “When you text a friend a ‘Congratulations’ iMessage, you get confetti falling from the top—those little elements are called UI sugar. . . . Then, on a user-by-user basis, we change that sugar to make it more or less enticing to build that habit over time.”¹¹⁰

In step four, after collecting the variable reward, the user is encouraged to invest somehow in the product by doing a “bit of work” on it—for example, by updating a Facebook profile or posting a photo to Instagram or Pinterest. This investment is then used to restart the cycle.¹¹¹ After sinking this investment into the product, the user becomes “internally triggered” to come back and check on its performance: Who commented? What did they say? How many likes?¹¹²

The user’s investment can be leveraged to trigger and reward others as well. Post a photo to Facebook with one of your friends in it, and Facebook will send an external trigger to your friend with a push notification.¹¹³ Your friend will then take action by opening the Facebook app, and in return Facebook will show your friend the variable reward of a photo that may be flattering or may be embarrassing.¹¹⁴ The sweet spot for Facebook, of course, is for your friend’s social anxiety to internally trigger them to check the photo later and see how other Facebook users have evaluated their appearance. Those users, through their own investments, will have variably rewarded or punished your friend with likes, comments, or silence.¹¹⁵

Along the way, your friend’s actions and investments will have helped Facebook “improve the product” by giving the algorithms information about what “engages” your friend. Facebook’s algorithms will then incorporate this information into the schedule of “triggers” and “rewards” that it serves

delay, Instagram wouldn’t feel variable. There’s no sense of *will I win?* because you’d know instantly. So the delay isn’t the app loading. It’s the cogs spinning on the slot machine.”)

109. Shieber, *supra* note 3 (noting that “Dopamine Labs predicts they can add 10 percent to a company’s revenues”).

110. April Glaser & Will Oremus, *Fighting Tech with Tech*, SLATE (Nov. 24, 2017), <https://slate.com/technology/2017/11/dopamine-labs-t-dalton-combs-on-tech-addictions-and-habits-on-if-then-podcast.html> [<https://perma.cc/P6QU-PSAY>].

111. EYAL, *supra* note 1, at 143–47.

112. *Id.* at 154–61.

113. See generally *What Types of Notifications Does Facebook Send?*, FACEBOOK, <https://www.facebook.com/help/166890600006551> [<https://perma.cc/JQX7-YK5T>] (last visited Aug. 22, 2019).

114. See generally Britney Fitzgerald, *One in Four Women Deliberately Posts Unflattering Pictures of Facebook Friends, Survey Finds*, HUFFINGTON POST (July 3, 2012, 1:21 PM), https://www.huffpost.com/entry/one-in-four-women-unflattering-photos-facebook_n_1646499 [<https://perma.cc/8BBZ-6QAU>]; *What Is Tagging and How Does It Work?*, FACEBOOK, <https://www.facebook.com/help/124970597582337/> [<https://perma.cc/446W-2VVQ>] (last visited Aug. 22, 2019).

115. See Morgans, *supra* note 107.

to your friend—particularly in the News Feed, the endless scroll of ads and variable rewards that greet users every time they open the app.¹¹⁶

C. *What's the Harm?*

Habit-forming design causes at least three types of harm: addiction, strain on social norms, and degradation of public discourse.

1. Extreme Cases of Problem Use

First, there is acute and severe harm that occurs to a relatively small group of “problem users”—time and money losses generally similar to those suffered by problem gamblers. In one extreme case, an anonymous poster on Reddit wrote that the F2P mobile game *Final Fantasy Brave Exvius* appealed to him as “[a] short format game that I could play for 5 or 10 minutes and put it away.”¹¹⁷ He said, “I am currently \$15,800 in debt. My wife no longer trusts me. My kids, who ask me why I am playing Final Fantasy all the time, will never understand how I selfishly spent money I should have been using for their activities.”¹¹⁸

This “problem gaming disorder,” as defined by the WHO,¹¹⁹ “affects only a small proportion of people who engage in digital- or video-gaming activities.”¹²⁰ The situation is similar to that in the gambling industry, where only a small percentage of the population develops a serious habit.¹²¹

Industry leaders in both the tech and the gambling sectors emphasize the behavioral nature of the problem, and they suggest that they are not responsible for the small minority’s problems with impulse control.¹²² People can develop behavioral addictions to any product, they say, or any behavior, and individual propensities are often a determining factor.¹²³

116. See Josh Constine, *How Facebook News Feed Works*, TECHCRUNCH (Sept. 6, 2016), <https://techcrunch.com/2016/09/06/ultimate-guide-to-the-news-feed/> [https://perma.cc/CP5X-D45H].

117. Nothing024, *A Whale of a Tale*, REDDIT (Dec. 13, 2017), https://www.reddit.com/r/FFBraveExvius/comments/7jmezv/a_whale_oo_a_tale/ [https://perma.cc/HZ5R-E5WL] (posting anonymously).

118. *Id.*

119. See *supra* note 6 and accompanying text.

120. See *Gaming Disorder*, *supra* note 6; see also Charlotte Thorensen Wittek et al., *Prevalence and Predictors of Video Game Addiction: A Study Based on a National Representative Sample of Gamers*, 14 INT’L J. MENTAL HEALTH & ADDICTION 672, 672 (2015) (showing 1.4 percent “addicted gamers” and 7.3 percent problem gamers among a randomly selected sample of Norwegian gamers).

121. See *supra* note 64 and accompanying text.

122. NATASHA DOW SCHÜLL, ADDICTION BY DESIGN: MACHINE GAMBLING IN LAS VEGAS 18 (2012).

123. Howard Shaffer, director of the Harvard Medical School Division on Addiction, was one of the first to call slot machines “the crack cocaine of gambling.” *Id.* But after forming close ties with the American Gaming Organization, an industry group, Shaffer has qualified the “crack cocaine” statement considerably. *Id.* at 262–65. In an interview with CBS’s *60 Minutes*, he told interviewer Leslie Stahl that even actual crack cocaine should not be considered addictive because “[o]nly a small minority” of cocaine users develop a cocaine addiction, “and the same would be true with gambling.” *60 Minutes: Slot Machines: The Big*

But the industry plays a strong contributory role. Both the casino and the mobile gaming industries draw most of their revenue from that same small percentage of vulnerable users.¹²⁴ Developers have strong incentives to drive problem use, just as casinos do, and they make every effort to do so.

The similarity between tech addiction and gambling addiction is less striking outside of gaming, where in-app purchases are less common. But the heavy “gamification” that pervades these applications, together with the developers’ shared imperative to drive engagement at all costs, suggests that the phenomenon of “problem use” extends beyond the gaming sector.

2. Social Norms and Lifestyle

The clinical debate around “gaming addiction” overlooks a more significant consumer protection issue: the average person’s compulsive attachment to smartphones and, in particular, the social media and gaming applications that run on them. One study shows that twentysomethings check their phones eighty-five times a day on average, and that more than half of these check-ins last less than thirty seconds.¹²⁵ The study shows that average Americans use their phones for five hours in total every day.¹²⁶ Still, another study shows that users *touch* their phones 2617 times per day.¹²⁷

Norms of constant distraction have emerged to feed these habits. It is now a social norm, for example, for two people eating together to keep their phones face up on the table and check incoming messages during their meal.¹²⁸ It is increasingly common to stop in the middle of a conversation to respond to a text.¹²⁹ One survey by Verizon reports that 77 percent of users turn to their phones first thing in the morning and nearly 90 percent use their phone in the bathroom.¹³⁰

Governments in liberal societies should not generally take activities off the table simply because they are a waste of time. But it is unclear whether regulation of addictive design would necessarily substitute the government’s judgment for consumers’ judgment. People may be spending much more

Gamble (CBS television broadcast Jan. 7, 2011), <https://www.cbsnews.com/news/slot-machines-the-big-gamble-07-01-2011/2/> [<https://perma.cc/D4QR-B4Q7>].

124. See *supra* notes 60–66 and accompanying text.

125. Sally Andrews et al., *Beyond Self-Report: Tools to Compare Estimated and Real-World Smartphone Use*, PLOS ONE (Oct. 28, 2015), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0139004> [<https://perma.cc/7RDX-E9MN>].

126. *Id.*

127. Winnick, *supra* note 4.

128. See Sandee LaMotte, *Smartphone Addiction Could Be Changing Your Brain*, CNN (Dec. 1, 2017, 11:16 AM), <https://www.cnn.com/2017/11/30/health/smartphone-addiction-study/index.html> [<https://perma.cc/CY95-UGFK>].

129. Emma Seppälä, *Are You “Phubbing” Right Now?: What It Is and Why Science Says It’s Bad for Your Relationships*, WASH. POST (Oct. 13, 2017), <https://www.washingtonpost.com/news/inspired-life/wp/2017/10/13/are-you-phubbing-right-now-what-it-is-and-why-science-says-its-bad-for-your-relationships> [<https://perma.cc/2U99-NNQV>].

130. Edward Cardenas, *Study: 9 Out of 10 People Use Their Cell Phone in the Bathroom*, CBS DET. (June 30, 2015, 3:06 PM), <https://detroit.cbslocal.com/2015/06/30/study-9-out-of-10-people-use-their-cellular-phone-in-the-bathroom/> [<https://perma.cc/3D75-SU99>].

time checking their phones than they realize or prefer. If the regulatory goal is simply to make product design less manipulative, then regulation in principle exists to enhance rather than diminish tech users' freedom of choice. And of course, any concerns that restrictions on habit-forming design are overly paternalistic can be ignored insofar as the regulation is targeted at children's products.

It is also worth considering the miscellaneous external harms that flow from compulsive tech use. Early studies indicate drops in productivity, empathy, and general intelligence when smart devices are in the room.¹³¹ High-income workers and executives in the tech industry disproportionately prefer low-tech and no-tech private schooling for their children.¹³²

Even to the extent that some of these harms might be called "aesthetic" or "cultural," recall that governments regulate simple nuisances all the time. Think of the do-not-call list,¹³³ or the law that attempts to regulate spam email,¹³⁴ or the local ordinances that regulate shrubbery and house paint.¹³⁵ In each of these cases, the government has stepped in to regulate a mostly aesthetic harm in order to enhance general quality of life.

3. The Public Sphere

The third harm is less focused but more severe: addictive tech's distortive effect on public discourse and ultimately the democratic process.

There are reasons to suspect that the old marketplace of ideas is undergoing renovation as a state-of-the-art casino. Just like twenty-first-century casinos,

131. See Robinson Meyer, *Your Smartphone Reduces Your Brainpower, Even If It's Just Sitting There*, ATLANTIC (Aug. 2, 2017), <https://www.theatlantic.com/technology/archive/2017/08/a-sitting-phone-gathers-brain-dross/535476/> [https://perma.cc/6ZKW-TH3U]; see also Robert Rosenberger, *Yes, Smartphone Use Is Probably Behind the Spike in Driving Deaths. So Why Isn't More Being Done to Curb It?*, SLATE (Dec. 28, 2017, 5:57 AM), <https://slate.com/technology/2017/12/yes-smartphone-use-is-probably-behind-the-spike-in-vehicle-related-deaths-so-why-isnt-more-being-done-to-curb-distracted-driving.html> [https://perma.cc/8BK9-ZTUV].

132. See Nellie Bowles, *The Digital Gap Between Rich and Poor Kids Is Not What We Expected*, N.Y. TIMES (Oct. 26, 2018), <https://www.nytimes.com/2018/10/26/style/digital-divide-screens-schools.html> [https://perma.cc/EBP5-JPLK]; Matthew Jenkin, *Tablets Out, Imagination In: The Schools That Shun Technology*, GUARDIAN (Dec. 2, 2015, 2:00 AM), <https://www.theguardian.com/teacher-network/2015/dec/02/schools-that-ban-tablets-traditional-education-silicon-valley-london> [https://perma.cc/25ZT-ATQQ]; Chris Weller, *An MIT Psychologist Explains Why So Many Tech Moguls Send Their Kids to Anti-Tech Schools*, BUS. INSIDER (Nov. 7, 2017, 12:42 PM), <https://www.businessinsider.com/sherry-turkle-why-tech-moguls-send-their-kids-to-anti-tech-schools-2017-11> [https://perma.cc/SSZ2-R24Y].

133. The FTC bars calls to any telephone number in the "do-not-call" registry" without express written consent or an established business relationship. 16 C.F.R. § 310.4(b)(1)(iii)(B) (2019).

134. Controlling the Assault of Non-Solicited Pornography and Marketing Act of 2003, 15 U.S.C. §§ 7701–7713 (2012).

135. See *Members of the City Council v. Taxpayers for Vincent*, 466 U.S. 789, 794 (1984) (upholding a content-neutral ban on signs and posters justified as an effort to avoid "clutter and visual blight"); *Davis v. City of Worthington*, No. C-2-00-65, 2001 WL 175262, at *4 (S.D. Ohio Feb. 13, 2001) (holding that "[p]laintiff's 'natural landscaping' lacks 'the sufficient communicative elements to bring it within the protections afforded by the First Amendment'").

social media platforms surveil their users to ensure that the state of play is always adapting to the players' emotional needs. For example, "luck ambassadors" in a casino use real-time data from slot machines to anticipate the point when a disappointed or fatigued gambler might be ready to walk away from the machine.¹³⁶ When that happens, it is time to approach the gambler with a free drink, or tickets to a show, or some other pick-me-up.¹³⁷ Facebook executives bragged about an eerily similar ability to a group of Australian bankers: the platform can detect when teenage users "feel 'insecure,' 'worthless' and 'need a confidence boost.'"¹³⁸

This is not to say that online platforms necessarily drive engagement by boosting mood. To the contrary, it seems that the most reliable engagement drivers are messages that stimulate feelings of outrage and group identification.¹³⁹ Many recommendation algorithms—YouTube's most prominently—have been shown repeatedly to send users along a "radicalizing" path.¹⁴⁰ These platforms in essence have devised a guided daydream that monetizes our weaknesses for tribalism and negative rumination.

Social media platforms' constant pandering to these emotions has likely informed, if not driven, the content of today's angry tribal politics. But the engagement model has also warped the underlying *physics* of public discussion. Finding personally interesting content in the pre-internet era required some amount of deliberation or at least intention—a person would find new sources either through friends or through store owners, or maybe by browsing in a bookstore or library. Today's recommendation algorithms, on the other hand, keep users always "on the rails," to borrow a term from

136. See Evan Selinger, *Inside the Casino, the House is Always Watching*, CHRISTIAN SCI. MONITOR (June 3, 2015), <https://www.csmonitor.com/World/Passcode/Passcode-Voices/2015/0603/Inside-the-casino-the-house-is-always-watching> [https://perma.cc/P9NR-KJTP]; see also Andrew Thompson, *Engineers of Addiction: Slot Machines Perfected Addictive Gaming. Now, Tech Wants Their Tricks*, VERGE (May 6, 2015), <https://www.theverge.com/2015/5/6/8544303/casino-slot-machine-gambling-addiction-psychology-mobile-games> [https://perma.cc/8HT9-7TDQ].

137. See Leslie, *supra* note 70; Plumer, *supra* note 27; Selinger, *supra* note 136; see also John Rosengren, *How Casinos Enable Gambling Addicts*, ATLANTIC (Dec. 2016), <https://www.theatlantic.com/magazine/archive/2016/12/losing-it-all/505814/> [https://perma.cc/ZR3P-AZ29].

138. Sam Levin, *Facebook Told Advertisers It Can Identify Teens Feeling "Insecure" and "Worthless,"* GUARDIAN (May 1, 2017, 3:01 PM), <https://www.theguardian.com/technology/2017/may/01/facebook-advertising-data-insecure-teens> [https://perma.cc/X6ME-KF3D].

139. See *supra* note 21 and accompanying text.

140. See Mathew Ingram, *YouTube's Secret Life as an Engine for Right-Wing Radicalization*, COLUM. JOURNALISM REV. (Sept. 19, 2018), https://www.cjr.org/the_media_today/youtube-conspiracy-radicalization.php [https://perma.cc/2Y67-X4LS]; Rebecca Lewis, *Alternative Influence: Broadcasting the Reactionary Right on YouTube*, DATA & SOC'Y (Sept. 18, 2018), <https://datasociety.net/output/alternative-influence/> [https://perma.cc/PG6E-UYA8]; Zeynep Tufekci, *YouTube, the Great Radicalizer*, N.Y. TIMES (Mar. 10, 2018), <https://www.nytimes.com/2018/03/10/opinion/sunday/youtube-politics-radical.html> [https://perma.cc/QF89-9A8K].

video gaming.¹⁴¹ A user with a budding interest does not need to seek it out—the News Feed will ensure that this content finds the user.

Importantly, the user may not *realize* that they are predisposed to engage with a given kind of content; the algorithm takes the work of self-discovery off the user’s hands. In some cases, these recommendations are helpful. But they can also be harmful—for instance, when YouTube helps users “activate” authoritarian tendencies that might otherwise have lain dormant.¹⁴²

By serving users’ “revealed preferences” rather than *stated* preferences, user engagement algorithms largely crowd out the individual’s role in cultivating a set of interests and values.¹⁴³ But as on a slot machine, the device must cultivate an illusion of control to maintain the compulsion. Slot machines carry this principle to an extreme; users are led to believe that they know exactly when to stop the spinning reels, when in truth the payout has already been calculated.¹⁴⁴ On YouTube, the effect is more subtle; the user may choose to discriminate among a seemingly endless universe of sources, when in truth the menu of options has already been rigorously pruned to fit the user’s own preexisting temptations.¹⁴⁵ Facebook users who “like,” share, and comment on what they see are given an apparent opportunity to express themselves in public discussions, though the recommendation algorithm determines who will see it and when.¹⁴⁶

141. See Will Hindmarch, *Sword-Fighting on a Roller-Coaster: Railroading for the Best in RPG Play*, MEDIUM (Nov. 13, 2014), <https://medium.com/gameplaywright-presents/sword-fighting-on-a-roller-coaster-railroading-for-the-best-in-rpg-play-547333c80359> [<https://perma.cc/F4LC-6Y7C>] (describing how “railroading” in video game design leaves the player a small sphere of agency while marching the player through a series of large-scale objectives).

142. See Dave Hanley & Alicia Hatch, *Social Activation*, DELOITTE INSIGHTS (Feb. 21, 2014), <https://www2.deloitte.com/insights/us/en/focus/tech-trends/2014/2014-tech-trends-social-activation.html> [<https://perma.cc/2KB4-LYB8>] (“The power of social activation is unleashed when others advocate an organization’s message in their own words to their network.”). See generally KAREN STENNER, *THE AUTHORITARIAN DYNAMIC* (2005) (positing that authoritarianism is a predisposition that activates when the authoritarian person is exposed to conditions of normative threat in the form of social difference or disobedience of authority).

143. Julie E. Cohen, *What Privacy Is for*, 126 HARV. L. REV. 1904, 1926–27 (2013) (“Stimuli tailored to consumptive preferences crowd out other ways in which preferences and self-knowledge might be expressed . . .”).

144. SCHÜLL, *supra* note 123, at 82–86.

145. See Aaron Smith et al., *Many Turn to YouTube for Children’s Content, News, How-To Lessons*, PEW RES. CTR. (Nov. 7, 2018), <https://www.pewinternet.org/2018/11/07/many-turn-to-youtube-for-childrens-content-news-how-to-lessons/#an-analysis-of-random-walks-through-the-youtube-recommendation-engine> [<https://perma.cc/M26K-RRWB>] (“[T]he site’s recommendation engine is responsible for more than 70% of users’ time spent watching videos on the platform. These sorts of recommendation systems seek to draw viewers to content that is more engaging to them, potentially keeping them on the site for longer periods of time.”).

146. See Tim Herrera, *What Facebook Doesn’t Show You*, WASH. POST (Aug. 14, 2014), <https://www.washingtonpost.com/news/the-intersect/wp/2014/08/18/what-facebook-doesnt-show-you/> [<https://perma.cc/HYU9-C8VS>] (finding that Facebook showed the editor 29 percent of all posts users in his network made during six hours of scrolling through his News Feed).

Speed reinforces the compulsive flow of a slot machine, and social apps thrive on the same phenomenon.¹⁴⁷ Social platforms, craving data, strive to make posting as quick and spontaneous as possible; they do not want users to think for too long before they speak or share.¹⁴⁸ The obvious and unfortunate result is a more hot-blooded and emotionally reflexive media environment than was possible on slower media.¹⁴⁹ Inevitably, speakers say ill-considered things every day, often triggering cycles of mass indignation and recrimination that enlighten no one and reverberate over multiple news cycles.¹⁵⁰ “Online mobs” are a commonplace,¹⁵¹ and they can easily become real mobs in markets, such as Sri Lanka’s or Myanmar’s, where platforms have not invested heavily in top-down censorship.¹⁵²

The “fire” of violence and mass hatred that concerned the U.S. Supreme Court in its early free speech opinions appears to catch far more quickly and easily on social media.¹⁵³ Much of this may result from the simple fact that speakers have been placed in such close and constant contact with each other. But it also may be that outside behavioral manipulation has compromised the

147. See Anna Johansson, *Your Social Media Apps Are as Addictive as Slot Machines—Should They Be Similarly Regulated?*, NEXT WEB (Mar. 25, 2018), <https://thenextweb.com/contributors/2018/03/25/social-media-apps-addictive-slot-machines-similarly-regulated/> [<https://perma.cc/2RLG-KG8M>].

148. EYAL, *supra* note 1, at 67–74 (discussing Facebook login prompts and embeddable Tweet buttons as devices that “prompt users to move quickly” by reducing the necessary “brain cycles—the level of mental effort and focus required to take an action”).

149. See Jayson DeMers, *59 Percent of You Will Share This Article Without Even Reading It*, FORBES (Aug. 8, 2016, 2:27 PM), <https://www.forbes.com/sites/jaysondemers/2016/08/08/59-percent-of-you-will-share-this-article-without-even-reading-it> [<https://perma.cc/U5L9-PYHX>]; *supra* note 21 and accompanying text.

150. See Anna Johansson, *Social Media Mobs Are Worse for Society Than the People They Shame*, NEXT WEB (Oct. 31, 2018, 4:00 AM), <https://thenextweb.com/contributors/2018/10/31/social-media-mobs-are-worse-for-society-than-the-people-they-shame/> [<https://perma.cc/EJ3U-HJGS>].

151. See Amanda Hess, *Some Online “Mobs” Are Vicious. Others Are Perfectly Rational.*, N.Y. TIMES MAG. (Aug. 7, 2018), <https://www.nytimes.com/2018/08/07/magazine/some-online-mobs-are-vicious-others-are-perfectly-rational.html> [<https://perma.cc/TQS2-7BND>] (“Twitter . . . incentivizes people with no true investment in a controversy to weigh in anyway.”).

152. See Vinu Goel et al., *In Sri Lanka, Facebook Contends with Shutdown After Mob Violence*, N.Y. TIMES (Mar. 8, 2018), <https://www.nytimes.com/2018/03/08/technology/sri-lanka-facebook-shutdown.html> [<https://perma.cc/M27T-P5GV>]; Paul Mozur, *A Genocide Incited on Facebook, with Posts from Myanmar’s Military*, N.Y. TIMES (Oct. 15, 2018), <https://www.nytimes.com/2018/10/15/technology/myanmar-facebook-genocide.html> [<https://perma.cc/K7CS-UPKV>].

153. See Ben Popken, *How WhatsApp Became Linked to Mob Violence and Fake News—and Why It’s Hard to Stop*, NBC NEWS (Nov. 2, 2018, 4:31 AM), <https://www.nbcnews.com/tech/tech-news/how-whatsapp-became-linked-mob-violence-fake-news-why-it-n929981> [<https://perma.cc/F395-F5A2>]; Sunita Sohrabji, *Social Media Platforms Should Not Encourage Mob Violence: India IT Minister Ravi Shankar Prasad in Silicon Valley*, INDIA W. (Aug. 30, 2018), https://www.indiawest.com/news/global-indian-social-media-platforms-should-not-encourage-mob-violence-india-it/article_8792ead0-acac-11e8-88ac-e3e297231f7b.html [<https://perma.cc/S732-CZBA>] (“In an eerie pattern, the victims, largely Muslim male visitors, are branded ‘child abductors’ and brutally beaten, often to death. WhatsApp groups have been accused of promoting fake news—falsely accusing the victims of violence—to foment mob violence.”).

role of individual deliberation as the public sphere's most effective natural safeguard against disaster.¹⁵⁴ And this is to say nothing of the unprecedented opportunities that platforms' engagement-driving techniques have given saboteurs who look to spread misinformation and engineer social conflict.

The dominant prescription for these problems today is either to encourage or require platforms to take down dangerous content. The fiat-based solution called "content moderation" would be condemned as an unconstitutional prior restraint if it were instituted by a state or the federal government. It is a "private" solution to the mess, but this formalism masks a fundamental betrayal of the free speech concept. Justice Louis Brandeis wrote of free speech both as "an end and as a means" to preserve liberty.¹⁵⁵ Addictive social media architecture threatens free speech in both senses.

II. PROSPECTS FOR REGULATION

Today, the problem of compulsive tech use is not widely understood, or widely acknowledged, as either a serious public problem or a serious private problem for any but the most desperately addicted individuals. There is little public or institutional drive to address it. Scattered K–12 schools require students to put cell phones away during the school day (even as many more have chosen to "innovate" by providing all students with branded, internet-capable tablet devices under discounted contracts with manufacturers).¹⁵⁶ Private nonprofits have run ad campaigns encouraging parents to put their cell phones away at the family dinner table.¹⁵⁷ But the lack of any strong or consistent public response seems to reflect an equivocal position about humanity's deepening absorption into its "smart" devices: the times and the norms are understood to be changing, some ways good, some ways bad, but almost entirely within a rubric of personal or parental responsibility.

Much of this laissez-faire attitude is rooted in the underlying technologies being so new. There has been no high-profile addiction crisis—nothing in the ballpark of the opioid epidemic, for example—to capture public attention. Even to the extent that the public *is* aware of the problem, it can at times

154. See Cohen, *supra* note 143, at 1917–18 ("The modulated society . . . continually adjust[s] the information environment to each individual's comfort level. Liberal democratic citizenship requires a certain amount of *discomfort*—enough to motivate citizens to pursue improvements in the realization of political and social ideals. The modulated citizenry lacks the wherewithal and perhaps even the desire to practice this sort of citizenship.").

155. *Whitney v. California*, 274 U.S. 357, 375 (1927) (Brandeis, J., concurring).

156. See Carolyn Thompson, *More US Schools Consider Allowing Students to Use Cellphones*, CHRISTIAN SCI. MONITOR (Apr. 3, 2018), <https://www.csmonitor.com/USA/Education/2018/0403/More-US-schools-consider-allowing-students-to-use-cellphones> [<https://perma.cc/5DM2-6MTM>]; Leo Versel, *As Cell Phones Proliferate in K–12, Schools Search for Smart Policies*, EDUC. WEEK (Feb. 8, 2018, 11:21 AM), https://blogs.edweek.org/edweek/DigitalEducation/2018/02/smartphones_student_learning_classrooms_K12_education.html [<https://perma.cc/QTS7-P3GG>].

157. See, e.g., Tim Nudd, *Will Ferrell's Darkly Comic New Ads Show How Our Devices Are Ruining Family Time*, AD WEEK (Oct. 19, 2017), <https://www.adweek.com/brand-marketing/will-ferrells-darkly-comic-new-ads-show-how-our-devices-are-ruining-family-time/> [<https://perma.cc/MJD5-Z77M>].

appear unlikely that strong regulation is even possible. Too many lawmakers lack basic understanding of the subject matter, as Facebook CEO Mark Zuckerberg's 2018 congressional hearings revealed,¹⁵⁸ and tech industry lobbyists have eagerly offered their own expertise to compensate.¹⁵⁹

The state of the art, moreover, is still primitive and unthreatening compared with what may be coming in the next ten or twenty years. As transformative as early twenty-first-century smartphones have been, the major tech companies are moving toward products that are significantly more invasive and omnipresent.

In 2017, for example, Facebook announced that it plans to roll out its product in "augmented reality": wearable products that overlay a consumer interface onto the user's perception of real-world environments.¹⁶⁰ And around the same time, the company announced that it was developing a wearable product that allows the user to type by thinking.¹⁶¹ At a minimum, these extensions of Facebook's product will expand surveillance, targeted advertising, and gamification into the entire phenomenological space. At a maximum, user dependency and stimulus response will empower Facebook to transcend the whole concept of "advertising" and sell user stimulus response itself to clients. Much, as always, will depend on Facebook's own internal culture of ethics and self-restraint.

If future developments along these lines raise public concern, then the regulatory response should escalate with the sense of urgency. Light-touch responses would try to help consumers make good decisions. More dramatic responses would simply disable products' most dangerous features. Some or all of these protective measures may apply to minors or young children exclusively or, if the sense of emergency is especially pronounced, the protections may apply across the market.

Part II.A discusses the requirements that might be imposed on app developers and distributors as part of an effort to police addictive tech. These run the gamut from simple labeling and disclosure requirements to total product bans, as well as a few more novel intermediate options. Part II.B

158. See Chris Cillizza, *How the Senate's Tech Illiteracy Saved Mark Zuckerberg*, CNN (Apr. 11, 2018, 3:58 PM), <https://www.cnn.com/2018/04/10/politics/mark-zuckerberg-senate-hearing-tech-illiteracy-analysis/index.html> [<https://perma.cc/FJA5-QUCJ>].

159. See SHOSHANA ZUBOFF, *THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER* 105 (2019) ("Google and Facebook vigorously lobby to kill online privacy protection, limit regulations, weaken or block privacy-enhancing regulation, and thwart every attempt to circumscribe their practices . . .").

160. See Patrick Moorhead, *Facebook F8 Day 2: 10 Year Roadmap for VR/AR, Wireless, Brain Interfaces and Open-Sourced AI*, FORBES (Apr. 20, 2017, 3:03 PM), <https://www.forbes.com/sites/patrickmoorhead/2017/04/20/facebook-f8-day-2-recap-10-year-roadmap-for-vr-comms-brain-interfaces-and-open-sourced-ai/> [<https://perma.cc/FC4J-G3LY>].

161. See James Titcomb, *Mark Zuckerberg Confirms Facebook Is Working on Mind-Reading Technology*, TELEGRAPH (Apr. 19, 2017, 8:09 PM), <https://www.telegraph.co.uk/technology/2017/04/19/mark-zuckerberg-confirms-facebook-working-mind-reading-technology/> [<https://perma.cc/LY5A-TLB2>].

describes how these regulatory requirements might come into existence, whether through existing regulatory authority or through new law.

A. Strategies for Regulation

1. Labeling Requirements

As in the field of tobacco regulation, the government may use product labeling to encourage consumers to make good choices.¹⁶² A traditional labeling strategy might require tech products to display general messages about risks associated with tech addiction and overuse. These messages could be tailored to the specific risks that a given product presents. A warning label for Snapchat, for example, could point the user to resources on goal-setting and social obligation as means of driving engagement. Minnesota's proposed loot box law would require certain games to carry the following label: "Warning: This game contains a gambling-like mechanism that may promote the development of a gaming disorder that increases the risk of harmful mental or physical health effects, and may expose the user to significant financial risk."¹⁶³

But the adaptable nature of tech products would also enable regulators to move beyond crude general-purpose appeals. Apps might be required to post the amount of time the user has logged, whether in a given session or over a longer period such as a day or a week. Other usage indices—such as the number of posts, likes, logins, swipes, or taps—might be displayed as well.

2. Responsible Use Devices

One step beyond simple disclosure requirements might require apps to look for patterns of problem use and intervene with warnings or invitations to take a break at appropriate times. Some casinos have voluntarily adopted "responsible gaming solutions" such as iView's Intelligent Gaming Analysis Platform, or iGap.¹⁶⁴ These casinos, Natasha Dow Schüll explains, have adopted the software to insure against burnout and maintain lifelong customers.¹⁶⁵ The concept could easily be adapted to social media platforms, for instance, which have access to a much richer suite of data-analytics tools than casinos do.

After Dopamine Labs (now rebranded as Boundless Mind) came under fire for a *60 Minutes* profile describing its ability to make outside firms' software

162. See, e.g., 15 U.S.C. § 1333 (2012).

163. H.R. 4460, 90th Leg., Reg. Sess. (Minn. 2018); cf. Assemb. 2194, 2017–2018 Leg., Reg. Sess. (Cal. 2018); S. 3024, 29th Leg., Reg. Sess. (Haw. 2018); H.R. 2727, 29th Leg., Reg. Sess. (Haw. 2018); H.R. 2686, 29th Leg., Reg. Sess. (Haw. 2018).

164. *Responsible Gaming Solutions*, IVIEWSYSTEMS, <https://www.iviewsystems.com/responsible-gaming> [<https://perma.cc/M7HD-WZ7G>] (last visited Aug. 22, 2019).

165. SCHÜLL, *supra* note 123, at 283.

more addictive,¹⁶⁶ the firm released a product called *Space* that is designed to help users break away from patterns of compulsive app use.¹⁶⁷ *Space* monitors the phone user's device use for patterns of addiction and then intervenes between the user and the most alluring apps by forcing the user to wait for several seconds before the app opens.¹⁶⁸ During this interval, *Space* invites the users along for a brief breathing exercise called the "moment of Zen."¹⁶⁹

Other major firms have also introduced anti-addiction functionality into their own products in what appears to be the Silicon Valley equivalent of carbon offsetting. Although these features are rarely, if ever, turned on by default,¹⁷⁰ they appear to have real practical value for those who are interested in them. Facebook and Instagram now allow users to check in on their daily use, to turn off notifications temporarily, and to set a timer that goes off when the user exceeds self-imposed limits.¹⁷¹

It appears that these firms want to frame the addiction matter as a personal choice and set themselves up as willing helpers for however their customers wish to live their lives. Importantly, however, the anti-addiction measures in apps like Facebook and Instagram are almost always turned off by default and buried in settings menus.¹⁷² But that could change if regulators required app developers to put anti-addiction functionality in the foreground of the UI rather than in an out-of-the-way settings menu, and even more so if the anti-addiction functionality was turned on by default.

166. See Jonathan Shieber, *Dopamine Labs Slings Tools to Boost and Reduce App Addiction*, TECHCRUNCH (Feb. 13, 2017), <https://techcrunch.com/2017/02/13/dopamine-labs-slings-tools-to-boost-and-reduce-app-addiction/> [<https://perma.cc/XF3B-4UTC>].

167. See S. C. Stuart, *This AI Wants to Give You Space (from Your Apps)*, PC MAG. (June 11, 2018, 7:00 AM), <https://www.pcmag.com/news/361725/this-ai-wants-to-give-you-space-from-your-apps> [<https://perma.cc/Z4G7-PSC7?type=image>].

168. See Glaser & Oremus, *supra* note 110.

169. See *id.* Helpfully, Boundless Mind designer T. Dalton Combs has suggested to Slate that the company's mainline addiction products could be put to great use on actual Zen meditation apps if any of their designers were interested in a consultation. See *id.* "Any meditation app is leaving a lot of Zen on the table by not thinking about how to make a mindful practice a habit of mind," he mused. *Id.*

170. See, e.g., Alfred Ng, *Google, Android P Take On Phone Addiction with Android Dashboard*, CNET (May 8, 2018, 11:27 AM), <https://www.cnet.com/news/google-creates-new-android-controls-to-take-on-phone-addiction/> [<https://perma.cc/96UQ-K74A?type=image>]; Richard Nieva, *Facebook, Instagram Add Tools to Limit Time Spent on the Apps*, CNET (Aug. 1, 2018, 4:00 AM), <https://www.cnet.com/news/facebook-instagram-add-tools-to-limit-time-spent-on-the-apps/> [<https://perma.cc/ETA3-SX2F?type=image>]; Marguerite Reardon & Shara Tibken, *Apple Helps You Kick iPhone Addiction with iOS 12*, CNET (June 4, 2018, 10:50 AM), <https://www.cnet.com/news/apple-helps-you-kick-iphone-addiction-with-ios-12/> [<https://perma.cc/S89X-WU7Q>].

171. Nieva, *supra* note 170.

172. See Alex Hern, *Facebook and Instagram to Let Users Set Time Limits*, GUARDIAN (Aug. 1, 2018, 7:18 AM), <https://www.theguardian.com/technology/2018/aug/01/facebook-and-instagram-to-let-users-set-time-limits> [<https://perma.cc/K69V-ZRTR>].

3. Bans on Dangerous Features

Regulators could ratchet up the pressure further by requiring app developers to disable various features that are known to drive compulsive use. Over the past year, for example, international regulators have investigated, regulated, and, in some cases, criminalized loot boxes—the pseudo-slot machine alluded to earlier.¹⁷³ A pending bill in the U.S. Senate would prohibit their use in video games marketed to minors.¹⁷⁴ A loot box is an in-game item—usually portrayed as some sort of closed container—that gives randomly selected in-game items to the player.¹⁷⁵ The loot box itself is usually purchased with in-game virtual currencies that can be earned slowly through play or bought quickly for real cash.¹⁷⁶ One or two dollars is typical.¹⁷⁷ Loot boxes’ resemblance to slot machines is widely acknowledged.¹⁷⁸ First, they distribute rewards in a pseudorandom scatter that is well-known to drive compulsive use.¹⁷⁹ Second, loot boxes often exploit the same behavioral fallacies as slot machines by exposing users to artificially frequent “near misses.”¹⁸⁰ These near misses create the mistaken impression that the user is closing in on a jackpot and encourage further use.¹⁸¹ Finally, both loot boxes and slot machines are often operated with tokens rather than actual currency.¹⁸² The exchange rate from dollar to token is typically unwieldy by design so that the user lacks any intuitive grasp of

173. See *infra* notes 216–38 and accompanying text.

174. The bill, sponsored by Senator Josh Hawley, would also prohibit “pay-to-win” games marketed to minors. Press Release, Josh Hawley, *supra* note 8.

175. See Cecilia D’Anastasio, *Why Opening Loot Boxes Feels Like Christmas, According to Game Devs*, KOTAKU (Mar. 20, 2017, 2:00 PM), <https://kotaku.com/why-opening-loot-boxes-feels-like-christmas-according-1793446800> [<https://perma.cc/9V5U-Z3VS>].

176. See, e.g., Daniel Friedman, *Destiny 2 Should Steal Overwatch’s Loot Box System or Shut Down the Eververse*, POLYGON (Jan. 8, 2018, 10:15 AM), <https://www.polygon.com/2018/1/8/16855180/overwatch-skins-loot-box-prices-destiny-2-crate-analysis> [<https://perma.cc/AM59-TEW7>] (comparing the sale of loot boxes in *Destiny 2* and *Overwatch*).

177. See *id.*

178. See D’Anastasio, *supra* note 175; see also Benjamin Pu, *What Are Loot Boxes? FTC Will Investigate \$30B Video Game Industry*, NBC NEWS (Nov. 28, 2018, 4:27 PM), <https://www.nbcnews.com/tech/tech-news/loot-boxes-gambling-video-games-ftc-look-it-n941256> [<https://perma.cc/HL6L-VPJM>]; Alex Wiltshire, *Behind the Addictive Psychology and Seductive Art of Lootboxes*, PC GAMER (Sept. 28, 2017), <https://www.pcgamer.com/behind-the-addictive-psychology-and-seductive-art-of-loot-boxes/> [<https://perma.cc/Z7MV-GQ5B>].

179. Wiltshire, *supra* note 178 (“[T]he dopamine system, which is targeted by drugs of abuse, is also very interested in unpredictable rewards. Dopamine cells are most active when there is maximum uncertainty, and the dopamine system responds more to an uncertain reward than the same reward delivered on a predictable basis” (quoting Dr. Luke Clark, director at the Center for Gambling Research at the University of British Columbia)).

180. *Id.* (describing the role of near-misses in the video game *Counter-Strike: Global Offensive*).

181. See *id.* (“A moderate frequency of near-misses encourages prolonged gambling Problem gamblers often interpret near-misses as evidence that they are mastering the game and that a win is on the way.” (quoting Dr. Clark)).

182. See *id.*

how much “one more pull” or one more in-game purchase will cost.¹⁸³ Making financial cost an abstraction removes a significant cognitive speed bump.

Loot boxes represent only one tool among a diverse kit of addictive design strategies that might come under scrutiny. Users seem to be drawn in easily by goal-setting, such as in the pursuit of “badges” representing the user’s “achievements.”¹⁸⁴ Early goals are met quickly, and they gradually become more demanding as the user progresses.¹⁸⁵ One particularly effective goal-setting tactic is to encourage users to maintain a “streak” of daily use.¹⁸⁶ The streak increases by one for each day that the user checks in and performs the required action, and many apps bestow badges on users who maintain the streak for some given amount of time.¹⁸⁷

Apps also drive engagement by preying on social obligation.¹⁸⁸ Facebook users, to give the most familiar example, are summoned daily to wish their many “friends” a happy birthday. On Instagram, some conscientious users “Like” all of their friends’ posts and expect the same in return. The platform guards this economy of mutual obligation zealously.¹⁸⁹ When Rameet Chawla released *Lovematically*, “a platform that automatically likes every

183. Kyle Orland, *ESRB Defends “Fun” Loot Boxes as It Starts Labeling All “In-Game Purchases,”* ARS TECHNICA (Feb. 27, 2018, 11:01 AM), <https://arstechnica.com/gaming/2018/02/esrb-defends-fun-loot-boxes-as-it-starts-labeling-all-in-game-purchases/> [<https://perma.cc/BT3B-GAVL>] (“[*Quake Champions*] has two kinds of coins: ones that can only be earned, and ones that can only be purchased with real money. A lot of loot box games do the same confusing thing.”).

184. Snapchat, for example, gives out trophies such as “Panda Bear” and “Monkey Covering Ears” for sending fifty snaps with the black-and-white filter and one snap without sound, respectively. John-Michael Bond, *How to Fill Your Snapchat Trophy Case Like a Champ*, DAILY DOT (Mar. 12, 2017, 5:00 AM), <https://www.dailydot.com/debug/snapchat-trophies/> [<https://perma.cc/D3WT-Y6AT>].

185. See *CodeFights Unveils Code Arcade to Make Honing Your Skills a Thrilling Game*, PR NEWSWIRE (Sept. 21, 2016, 4:46 AM), <https://www.prnewswire.com/news-releases/codefights-unveils-code-arcade-to-make-honing-your-skills-a-thrilling-game-300332143.html> [<https://perma.cc/JL95-JFDS>] (“Arcade games are beloved and addictive because players are prompted to complete tasks of increasing difficulty by mastering certain skills.”).

186. See Sarah E. Needleman, *How Mobile Games Aim to Keep You Coming Back*, WALL ST. J. (Jan. 8, 2017, 7:18 PM), <https://www.wsj.com/articles/how-mobile-games-aim-to-keep-you-coming-back-1483790404> [<https://perma.cc/Z2GE-584S>] (“This year, 18 out of the top 25 most downloaded games in the U.S. offer some form of daily-reward system . . .”).

187. See Taylor Lorenz, *Teens Explain the World of Snapchat’s Addictive Streaks Where Friendships Live or Die*, BUS. INSIDER (Apr. 14, 2017, 1:58 PM), <https://www.businessinsider.com/teens-explain-snapchat-streaks-why-theyre-so-addictive-and-important-to-friendships-2017-4> [<https://perma.cc/5YKD-A5UT>] (“Snapchat rewards longer streaks with special emojis, such as the ‘100’ emoji for streaks lasting 100 days, or a mountain emoji for an extremely long streak.”).

188. See Needleman, *supra* note 186 (“A particularly effective tactic is team-based objectives, since players tend to nudge one another to participate, said Harlan Crystal, technology chief at Pocket Gems Inc. In its strategy game ‘War Dragons,’ for instance, the more players who show up for a daily team battle, the better a team’s chances to win and for members to earn free virtual currency.”).

189. See Brendan O’Connor, *Lovematically: The Social Experiment Instagram Shut Down After Two Hours*, DAILY DOT (Feb. 17, 2014, 4:22 PM), <https://www.dailydot.com/debug/lovmatically-auto-like-instagram-shut-down/> [<https://perma.cc/48ZJ-92MW>].

single post that passes your Instagram feed,” Facebook—which owns Instagram—stopped the threat within two hours and “[a]ll posts on Facebook . . . that included links to Lovematically.com were deleted, and any attempts to post these links are still met with an error message.”¹⁹⁰

Other platforms lure users in by “notifying” them of tangential events involving people that they know.¹⁹¹ This may suggest that either the friend directed this news to the user or that the user is under some social obligation to weigh in—or some combination of the two. But social media posts, unlike email or direct messages, are generally not directed to anyone in particular.¹⁹² And to the extent that there is a social obligation to communicate about some event—an acquaintance’s birthday, for instance—the obligation may exist largely or entirely because the platform has cooked it up as an engagement driver.¹⁹³

Sometimes simple aesthetics can drive compulsive use. It is well documented, for instance, that app developers display notifications in bright red because the color inspires a sense of urgency.¹⁹⁴ Developers use animations of fireworks, explosions, and bursts of light to amplify the sense of reward when a user reaches a goal.¹⁹⁵ Many applications draw out loading times artificially and accompany them with animations to create a sense of anticipation when users pull down and refresh their screens.¹⁹⁶

Snapchat’s “streak” feature combines these various techniques into a particularly potent cocktail of goal-setting, social obligation, randomized rewards, and aesthetic enticement.¹⁹⁷ Users, typically teenagers, continue their streak with various friends by sending them each at least one “snap” a day.¹⁹⁸ Breaking the streak is typically received among these younger users as a lack of commitment to the friendship.¹⁹⁹

190. *Id.*

191. See Louise Matsakis, *Facebook Notification Spam Has Crossed the Line*, WIRED (Feb. 15, 2018, 2:16 PM), <https://www.wired.com/story/facebook-notification-spam-two-factor/> [<https://perma.cc/A9JQ-X6ZP>] (“It might be somebody that you want to hear from, but you don’t know, the only way to know is to check it.”).

192. See *id.* (“Now Facebook will nag you when an acquaintance comments on someone else’s photo, or when a distant family member updates their status.”).

193. See Glenn Fleishman, *How Facebook Devalued the Birthday*, FAST CO. (Apr. 6, 2018), <https://www.fastcompany.com/40550725/how-facebook-devalued-the-birthday> [<https://perma.cc/H38B-76UA>].

194. See John Herrman, *How Tiny Red Dots Took Over Your Life*, N.Y. TIMES (Feb. 27, 2018), <https://www.nytimes.com/2018/02/27/magazine/red-dots-badge-phones-notification.html> [<https://perma.cc/Y4RY-4ZMR>].

195. See Wiltshire, *supra* note 178 (displaying several of these animations).

196. See Kaveh Waddell, *Why Some Apps Use Fake Progress Bars*, ATLANTIC (Feb. 21, 2017), <https://www.theatlantic.com/technology/archive/2017/02/why-some-apps-use-fake-progress-bars/517233/> [<https://perma.cc/JFC5-BNWG>]; Mark Wilson, *The UX Secret That Will Ruin Apps for You*, FAST CO. (July 6, 2016), <https://www.fastcompany.com/3061519/the-ux-secret-that-will-ruin-apps-for-you> [<https://perma.cc/8HY4-BJY4>].

197. See *supra* notes 87–88 and accompanying text.

198. See *supra* note 187 and accompanying text.

199. See Lorenz, *supra* note 187.

Today, loot boxes are the testing ground for regulating pernicious design features.²⁰⁰ Regulators could conceivably go much further in the future—“streaks,” arbitrary notifications, and even certain aesthetic elements might come under scrutiny.

Finally, regulators might step in to limit users’ access to certain tech products altogether. It is easy to envision the FTC limiting minors’ access to the kind of habit-forming tech products that are today marketed to children without so much as a warning label.²⁰¹ It is also easy to imagine many states’ self-exclusion laws, through which problem gamblers can lock themselves out of casinos, extended to certain apps that either resemble gambling or that already meet the state law definition of gambling.

Lawmakers cutting adults off completely from any behaviorally addictive tech product would seem out of the question today. Not even slot machines, long considered the “crack cocaine” of gambling, receive that kind of regulatory treatment.²⁰² Over the long run, however, it is possible that we will see tech products dangerous enough to justify this extreme measure.

4. Counter-Addictive Design

A final approach would introduce countermeasures to mitigate the habit-forming effects of persuasive design.²⁰³ Some anti-addictive design might resemble the features discussed above, but without the option to turn them off: time-outs, for instance, after a long period of use. Another approach would allow unlimited use but subject to some degree of transactional friction. Facebook users, for instance, might be prompted to pay some small amount of “postage” before putting up photos or commenting, or they might just be prompted to confirm or review their comment before doing so. Or instead of the overconsumption-encouraging “infinite scroll” included in most apps today, apps might—like Google’s search results—show ten or so results at a time and require the user to “flip the page” after reaching the bottom.

200. As of June 15, 2019, loot boxes appear to be the only area where there is serious talk of regulation.

201. The Entertainment Software Rating Board, a trade organization, recently adopted a vague “in-game purchases” label that covers loot boxes among various other designs. See Nick Statt, *ESRB’s Loot Box Response Is New “In-Game Purchases” Label That Applies to Almost Every Game*, VERGE (Feb. 27, 2018, 1:05 PM), <https://www.theverge.com/2018/2/27/17058400/esrb-in-game-purchases-label-microtransactions-loot-boxes-regulation-oversight> [<https://perma.cc/F2GP-R66G>].

202. See *supra* note 123 and accompanying text. See generally AM. GAMING ASS’N, RESPONSIBLE GAMING REGULATIONS & STATUTES (2016), <https://www.americangaming.org/wp-content/uploads/2019/01/Responsible-Gambling-Regulations-WEB.pdf> [<https://perma.cc/263V-UHDP>].

203. See Arielle Pardes, *Quality Time, Brought to You by Big Tech*, WIRED (Dec. 31, 2018, 7:00 AM), <https://www.wired.com/story/how-big-tech-co-opted-time-well-spent/> [<https://perma.cc/9A2Y-N486>] (“On both iOS and Android, it’s now easier to keep track of how many hours you spend on certain apps, and even set app time limits. But neither company has done much to address the persuasive design of those apps.”).

In some Asian countries, some kinds of anti-addiction design are mandatory. In addition to funding rehabilitation programs for tech addiction, the governments of South Korea, Vietnam, and Thailand have required that game developers and administrators implement technical features to frustrate minors' attempts to overuse their products.²⁰⁴ Under “Cinderella” or “Shutdown” laws, game companies must remove gamers under the age of eighteen from their servers between the hours of midnight and 6:00 a.m.²⁰⁵ China goes even further, requiring developers to incorporate “fatigue” mechanics into their games to make them less enticing after long periods of consecutive use.²⁰⁶ After three hours of use, the value of in-game items and rewards—such as experience points acquired for killing an enemy or ammunition picked up off the ground—must be cut down by half.²⁰⁷ After five hours of use, the player's character begins to take damage minute by minute.²⁰⁸

As alien as these laws may seem, they are not impossible as a technological matter. The aversion is cultural and subject to change.

B. Tools for Regulation

1. Existing Tools for Regulation

Some regulatory authority already exists to combat addictive tech without new legislation. Gambling law, consumer protection law, and certain common law torts all provide avenues to regulate at least some aspects of addictive tech.

a. Gambling Law

Certain applications do more than just borrow from casinos' approach to design—instead, they involve either traditional gambling or something that resembles it closely enough to qualify as gambling under the law. So it is fitting that gambling commissions would be the first legal authorities in the United States and Europe to regulate addictive tech design.

Gambling in most jurisdictions, both in the United States and abroad, is defined by three elements: first, the gambler must “stake or risk something of value”; second, “chance is a material factor”; finally, “successful play is rewarded by something of value.”²⁰⁹ These elements can be satisfied just as

204. See Orsolya Király et al., *Policy Responses to Problematic Video Game Use: A Systematic Review of Current Measures and Future Possibilities*, 7 J. BEHAV. ADDICTIONS 503, 506 (2018) (citing Leigh Alexander, *Vietnamese Gov't Puts Curfew on Online Gaming*, GAMASUTRA (Feb. 22, 2011), https://www.gamasutra.com/view/news/33143/Vietnamese_Govt_Puts_Curfew_On_Online_Gaming.php) [<https://perma.cc/Y2Y8-RBTJJ>].

205. Ji-Young, *supra* note 11; Sun, *supra* note 11. South Korea's online gaming platforms must screen users by requiring them to submit a national ID number. Le, *supra* note 11.

206. See Király et al., *supra* note 204, at 508.

207. *Id.*

208. *Id.*

209. 38 AM. JUR. 2D *Gambling* § 2 (2010).

well in an online setting as in a traditional offline setting, and many jurisdictions already regulate online gambling.²¹⁰

Now, gambling laws are being tested in two new contexts. First, plaintiffs have brought claims against developers of “social casino” apps—free-to-play mobile apps that contain simulated slot machines, roulette, and other casino games that dispense virtual currency rather than actual cash. Most of these claims have failed,²¹¹ but in Washington State they have been successful.²¹² In *Kater v. Churchill Downs Inc.*,²¹³ the Ninth Circuit held that *Big Fish Casino*, a social app, counted as an “illegal gambling game” under Washington law.²¹⁴ Under a statutory remedy, members of the plaintiff class recovered in-game payments they had made to the game’s distributor—payments that for some individuals amounted to thousands of dollars.²¹⁵

Second, gambling commissions around the world have considered regulating games that contain loot boxes. Gambling commissioners in the Netherlands²¹⁶ and Belgium²¹⁷ have classified loot boxes as gambling under existing regulations and threatened companies that continue to market them to children with criminal fines.²¹⁸ China and South Korea, which already regulate video gaming heavily, now require game developers to disclose players’ chances of winning.²¹⁹ Commissioners in the United Kingdom and France have declined to classify loot boxes as gambling on decidedly

210. See Benjamin Miller, *The Regulation of Internet Gambling in the United States: It’s Time for the Federal Government to Deal the Cards*, 34 J. NAT’L ASS’N ADMIN. L. JUDICIARY 527, 546–56 (2014).

211. See John T. Holden, *Trifling and Gambling with Virtual Money*, 25 UCLA ENT. L. REV. 41, 81–89 (2018).

212. See, e.g., *Wilson v. PTT, LLC*, 351 F. Supp. 3d 1325, 1326 (W.D. Wash. 2018) (denying a motion to dismiss for failure to state a claim); *Wilson v. Playtika, Ltd.*, 349 F. Supp. 3d 1028, 1045 (W.D. Wash. 2018) (denying a motion to dismiss for failure to state a claim).

213. 886 F.3d 784 (9th Cir. 2018).

214. *Id.* at 788.

215. *Id.*

216. The Netherlands’ gaming authority studied ten loot boxes and determined that four contravened the country’s gambling law because they offered in-game rewards that could be sold in external markets. NETH. GAMING AUTH., *STUDY INTO LOOT BOXES: A TREASURE OR A BURDEN?* 3 (2018), <https://dutchgamesassociation.nl/news/loot-boxes-netherlands-gaming-authoritys-findings/> [<https://perma.cc/3EQ3-LCY3>]. The regulator found that all ten loot boxes had the potential to be addictive, and that their addictive potential ranged from “moderate” (comparable to bingo) to “high” (comparable to blackjack). *Id.* at 9.

217. The Belgian Gaming Commission has classified loot boxes generally as gambling without regard to whether their contents can be sold for cash. BELG. GAMING COMM’N, *RESEARCH REPORT ON LOOT BOXES 10* (2018), https://www.gamingcommission.be/opencms/export/sites/default/jhksweb_nl/documents/onderzoeksrapport-loot-boxen-Engels-publicatie.pdf [<https://perma.cc/Z9JG-WTZM>] (“[I]t is not important if a ‘skin’ in *Overwatch*, *FIFA 18* or *C-S: GO* is merely of aesthetic value. What is important is that players attach value to it and that this value is also emphasised by the game developers themselves.”).

218. See T. J. Hafer, *The Legal Status of Loot Boxes Around the World, and What’s Next in the Debate*, PC GAMER (Oct. 26, 2018), <https://www.pcgamer.com/the-legal-status-of-loot-boxes-around-the-world-and-whats-next/> [<https://perma.cc/2XLV-FEDB>].

219. See *id.*

technical grounds while still expressing concern.²²⁰ In 2018, U.S. state legislatures took up bills requiring game developers to shield minors from loot boxes and to disclose the odds to adults.²²¹ Washington State considered a bill to require its gambling commission to investigate the practice.²²²

Loot boxes and social casinos clearly satisfy the “chance” element of gambling.²²³ The other two elements present more difficulty.²²⁴

Whether the gambler has provided consideration for the opportunity to play is an open question. For purposes of contract law, users who open loot boxes and play social casinos apps provide consideration even absent cash payment. In *Gottlieb v. Tropicana Hotel & Casino*,²²⁵ the court held that a gambler provided consideration by voluntarily taking a free spin on a casino’s “Million Dollar Wheel.”²²⁶ The court rejected the casino’s argument that the free spin was gratuitous, pointing out that the casino had collected valuable marketing data when the plaintiff had swiped her casino-issued ID card.²²⁷ *Gottlieb*’s reasoning maps easily onto almost all free phone apps: the user is always providing consumer data in exchange for some in-app experience.²²⁸ But in the same opinion, the *Gottlieb* court interpreted “consideration” to have a more constrained meaning, at least under New Jersey law.²²⁹ The court deferred to a formal opinion from the Attorney General of the State of New Jersey, concluding that the “legislative intent was to exclude from the statutory elements comprising the gambling offense the sort of personal inconvenience which will constitute consideration sufficient to support a contract.”²³⁰

The “thing of value” element has become the sticking point. Courts and gambling commissions that have declined to identify social casinos and loot boxes as gambling have generally done so by adopting an artificially constrained definition of “value.”²³¹ First, they require an aftermarket to

220. *See id.* The question for the European regulators comes down to the cash value of in-game rewards. The Netherlands and Belgium pointed to the existence of real-world aftermarkets for virtual goods. *Id.* The United Kingdom and France declined to recognize these aftermarkets on the ground that many games’ terms of service prohibit aftermarket trading. *Id.*

221. Jason M. Bailey, *A Video Game “Loot Box” Offers Coveted Rewards, but Is It Gambling?*, N.Y. TIMES (Apr. 24, 2018), <https://www.nytimes.com/2018/04/24/business/loot-boxes-video-games.html> [<https://perma.cc/2NM6-FFJ4>]; *see also supra* note 8 and accompanying text.

222. *See* S. 6266, 65th Leg., Reg. Sess. (Wash. 2018).

223. *See supra* note 209 and accompanying text.

224. *See supra* note 209 and accompanying text.

225. 109 F. Supp. 2d 324 (E.D. Pa. 2000).

226. *Id.* at 327–30.

227. *Id.*

228. *See* Magali Eben, *Market Definition and Free Online Services: The Prospect of Personal Data as Price*, 14 I/S: J.L. & POL’Y FOR INFO. SOC’Y 221, 240 (2018).

229. *Gottlieb*, 109 F. Supp. 2d at 330.

230. *Id.* (citing Att’y Gen. of the State of N.J., Formal Opinion No. 6—1983 (June 1, 1983)).

231. *See* *Mason v. Mach. Zone, Inc.*, 851 F.3d 315, 319 (4th Cir. 2017); *Phillips v. Double Down Interactive LLC*, 173 F. Supp. 3d 731, 741 (N.D. Ill. 2016); *Soto v. Sky Union, LLC*, 159 F. Supp. 3d 871, 87982 (N.D. Ill. 2016); Andy Chalk, *French Gambling Regulator*

exist for the in-game items.²³² Second, the items must be transferable *between* accounts; the fact that players can sell their account passwords does not qualify.²³³ Finally, if the game developer's terms of service forbid users to sell their virtual winnings for cash, then the winnings are not considered valuable.²³⁴

This final requirement makes no sense. The law does not normally hold that goods lose their value if the transaction is illegitimate. Think of bribery, for example. Bribery, too, requires that the briber offer a "thing of value" to the bribee. An offer of unlawful narcotics would presumably qualify despite the goods' legal illegitimacy.²³⁵ Why, then, should a gambling transaction be considered valueless because it violates another contract's terms—an adhesion contract, no less? It appears that many gambling commissions are simply hesitant to move into unfamiliar terrain and that this excessively formal approach to the "thing of value" element protects them from doing so. The effect of this final requirement is to allow video game and social casino developers to effectively opt out of gambling regulations through contractual boilerplate.

At some level, the whole conversation around aftermarkets comes across as a distraction. By extending or enhancing play, virtual items obviously deliver value to players who want them.²³⁶ This value is what gamers pay for when they drop quarters into arcade machines, or when they purchase "skins" for their avatars in online social games. Unless we are to understand these transactions as something other than contractual interactions, the intangible or make-believe nature of the items, contrary to what at least one court has said,²³⁷ should make no difference. There is no substantial difference between the purchase of an in-game item and a license to access a non-resellable e-book for a Kindle reader; both involve value exchanges.²³⁸

Determines That Loot Boxes Are Not Legally Gambling, PC GAMER (July 4, 2018), <https://www.pcgamer.com/french-gambling-regulator-determines-that-loot-boxes-are-not-legally-gambling/> [<https://perma.cc/KN5N-A2JC>]; *Loot Boxes Within Video Games*, GAMBLING COMM'N (Nov. 24, 2017), <http://www.gamblingcommission.gov.uk/news-action-and-statistics/news/2017/Loot-boxes-within-video-games.aspx> [<https://perma.cc/T5DH-7N4U>].

232. *Soto*, 159 F. Supp. 3d at 879–80; *Mason v. Mach. Zone, Inc.*, 140 F. Supp. 3d 457, 469 (D. Md. 2015), *aff'd*, 851 F.3d 315 (4th Cir. 2017); *Loot Boxes Within Video Games*, *supra* note 231.

233. *Soto*, 159 F. Supp. 3d at 879–80; *Mason*, 140 F. Supp. 3d at 468.

234. *See Mason*, 851 F.3d at 320 n.3; *Phillips*, 173 F. Supp. 3d at 735; *see also* Holden, *supra* note 211, at 95 ("The reliance on terms of service agreements that feature certain components including: non-redeemability of in-game items, non-transferability of coins to third-parties, and the revocability of license to access the account have formed the basis for the avoidance of gambling laws by social casino operators.")

235. *See, e.g.*, *United States v. Walker*, 348 F. App'x 910, 911 (5th Cir. 2009) (affirming defendant's criminal conviction where he accepted OxyContin in lieu of cash).

236. *See supra* note 175 and accompanying text.

237. *Mason*, 140 F. Supp. 3d at 469 ("The laws of California and Maryland do not trifle with play money, and so Plaintiff's Complaint must be dismissed.")

238. *See Sarah Reis, Note, Toward a "Digital Transfer Doctrine"?: The First Sale Doctrine in the Digital Era*, 109 NW. U. L. REV. 173, 180–83 (2014) (discussing the limitations on Kindle e-book ownership).

Jurisdictions may differ in their approaches to these questions, to be sure. Some jurisdictions' gambling laws may be more accommodating to expansive rather than restrictive definitions of "value."²³⁹ But absent some clear intent to *exclude* nonmonetary value, a hornbook definition of gambling would cover social casinos and loot boxes alike, and perhaps other monetization techniques to come.

Plausible interpretations exist, then, that would give gambling commissioners jurisdiction over essentially any online game of chance—including games of chance where no actual cash is exchanged. That is about as far as an ambitious gambling commissioner could go without overreaching. But within reason, gambling commissions are already well positioned to regulate some of the most habit-forming monetization mechanics in gaming today.

b. Consumer Protection

The FTC has provided the country's closest approximation of a common law of privacy.²⁴⁰ In particular, the agency has used its power under the FTC Act to police "unfair and deceptive practices" to pursue tech firms that violate their own advertised privacy policies.²⁴¹ Absent a specific mandate to deal with habit-forming design techniques, the FTC may be able to adapt its privacy approach to the problem.

Generally, the FTC has focused on deceptive practices and used its broader power over unfair practices sparingly.²⁴² The FTC would likely bring that same approach to the problem of habit-forming tech design. An unfair practice must satisfy three criteria that probably would be difficult to fulfill: first, the practice must cause substantial harm to consumers; second, the harm must not be reasonably avoidable by the consumer; third, the injury caused by the practice must not be outweighed by any countervailing benefit to competition or consumers.²⁴³

239. One classic question involves whether free replays on pinball and video arcade machines constitute "things of value." See S. R. Shapiro, Annotation, *Coin-Operated Pinball Machine or Similar Device, Played for Amusement Only for Confining Reward to Privilege of Free Replays, as Prohibited or Permitted by Antigambling Laws*, 89 A.L.R.2d 815 § 5[a] (2019) ("The most controversial questions have been whether free replays are 'property' or 'things of value.'").

240. See Daniel J. Solove & Woodrow Hartzog, *The FTC and the New Common Law of Privacy*, 114 COLUM. L. REV. 583, 587 (2014) ("It is fair to say that today FTC privacy jurisprudence is the broadest and most influential regulating force on information privacy in the United States—more so than nearly any privacy statute or common law tort. The statutory law regulating privacy is diffuse and discordant, and common law torts fail to regulate the majority of activities concerning privacy.").

241. *Id.* at 604 (describing this power as the FTC's "lynchpin function").

242. See Zahr K. Said, *Mandated Disclosure in Literary Hybrid Speech*, 88 WASH. L. REV. 419, 446 (2013) ("Historically, the FTC has very rarely exercised its authority to pursue those engaged in unfair methods of competition and instead has focused almost exclusively on deceptive actions, statements, or practices.").

243. 15 U.S.C. § 45(n) (2012).

The first and third elements of unfairness pose problems for any near-term attempt to regulate habit-forming design. The unformed state of the research on behavioral addiction may make a determination of “substantial harm” appear too conjectural.²⁴⁴ More significantly, the close tie between addictive design and app monetization would provide an avenue for tech companies to argue that their techniques for “driving engagement” are what enable them to offer software either cheaply or for free.²⁴⁵

This calculus could change over the long term, however, as market conditions change. Causal theories linking design and behavioral addiction may gain wider acceptance. Better data analytics capabilities and a more absorbing user experience may come to intensify the habit-forming effect. Certain monetization strategies may come to look more like simple rent-seeking with little to no consumer benefit at the margin. And at least where major industry players like Google and Facebook are concerned, consumer-risk exposure may no longer be reasonably avoidable. In that environment, the FTC could engage in enforcement actions or rulemaking directed at habit-forming technology as an unfair practice. One would hope that by this point Congress would have provided the FTC or some other authority with a more specific mandate to combat the problem.

In the near term, deceptiveness offers a more promising ground for regulation—most likely regulation of apps marketed to children. The agency defines deception as a “representation, omission or practice that is likely to mislead the consumer acting reasonably in the circumstances, to the consumer’s detriment.”²⁴⁶ When it has reached settlements with tech companies for deceptive practices, the Commission has preferred for obvious reasons to target firms that breach express promises.²⁴⁷ But in some deception cases the Commission has also settled with developers who breached reasonable consumer expectations rather than an express representation.²⁴⁸

Habit-forming children’s apps offer the clearest target for rulemaking or enforcement under the Commission’s deceptive practices jurisdiction. In Google’s Play Store and Apple’s iTunes Store, children’s apps are generally found in the “Family” section.²⁴⁹ But this reassuring label often conflicts with the developer’s aggressive monetization model. In some cases, children have been lured into apps that have parted them from their parents’ money at

244. See generally Letter from Francis S. Collins, Dir., Dep’t of Health & Human Servs., to Michael F. Bennet, U.S. Senator (June 5, 2018), <https://www.scribd.com/document/384767297/NIH-Response-to-Bennet-Letter-on-Tech-Addiction> [https://perma.cc/PW3T-WAYR] (describing the state of the research on behavioral addiction).

245. See *supra* Part I.

246. *Cliffdale Assocs., Inc.*, 103 F.T.C. 110, 176 (1984).

247. Solove & Hartzog, *supra* note 240, at 626–34.

248. See *id.* at 666–72.

249. *Find Family-Friendly Content in Google Play*, GOOGLE PLAY HELP, <https://support.google.com/googleplay/answer/6209531> [https://perma.cc/98H9-8Y4T] (last visited Aug. 22, 2019); *App Store > Games > Family*, iTUNES PREVIEW, <https://itunes.apple.com/us/genre/ios-games-family/id7009?mt=8> [https://perma.cc/SZ4P-BKS3] (last visited Aug. 22, 2019).

casino-like rates of thousands of dollars per hour.²⁵⁰ Even assuming that the parents avoid these kinds of charges, it stands to reason that few parents would expect such a manipulative presence from a game that sits in the “Family” section of the Google Play Store.²⁵¹

Part of the appeal of the “deceptive practices” approach to enforcement is that it would not require the FTC to take any position on the ultimate harmfulness or efficacy of habit-forming design. All that matters is whether certain aggressive monetization techniques conflict with the parent’s reasonable expectation.²⁵² As in the FTC’s recent settlement with a firm that misrepresented its baby mattresses as “organic,” the uncertain state of the underlying science is simply irrelevant.²⁵³

In the course of these enforcement efforts, the FTC can begin to develop a “common law” of habit-forming tech in the same way that it has developed a “common law” of online privacy.²⁵⁴ Companies marketing children’s apps might be put on guard against incorporating certain suspect features in their products—features that may range from loot boxes to dual currency systems to overbearing notifications.²⁵⁵ In the process, regulators could catalyze the creation of a set of industry norms that might later be incorporated into rulemaking.

c. Common Law Torts

Tort law, in principle, might provide a means for some plaintiffs to receive compensation for injuries that flow from compulsive tech use. But the case law on behavioral addiction is not particularly inviting.

First, several lawsuits have alleged that casinos and video slot machine manufacturers owe problem gamblers a duty of care; none have

250. The FTC has pursued Apple and Amazon over billing practices that allowed children to rack up thousands of dollars in microtransactions without their parents’ consent. In Apple’s case, the company’s billing software discreetly left users’ credit card authorizations in effect for fifteen minutes after each payment was made. Parents authorized app purchases for their children, and the children went on fifteen minute in-app shopping sprees without their parents’ knowledge. The FTC pursued this unannounced extension of payment authorization under its unfairness authority. *FTC v. Amazon.com, Inc.*, No. C14-1038-JCC, 2016 U.S. Dist. LEXIS 55569 (W.D. Wash. Apr. 26, 2016); *Apple Inc., FTC File No. 112-3108*, 2014 WL 1330287 (F.T.C. Mar. 25, 2014).

251. See Erik Allison, *The High Cost of Free-to-Play Games: Consumer Protection in the New Digital Playground*, 70 SMU L. REV. 449, 470 (2017) (“While a parent should be able to tell their child ‘no,’ it is a deceptive practice on the part of the game for a game to entice children into making all the steps for a purchase except the authorization.”).

252. “[T]he Commission will find an act or practice deceptive if, first, there is a representation, omission, or practice that, second, is likely to mislead consumers acting reasonably under the circumstances, and third, the representation, omission, or practice is material.” *Cliffdale Assocs., Inc.*, 103 F.T.C. 110, 164 (1984).

253. See Press Release, Fed. Trade Comm’n, Illinois Firm Barred from Making Misleading Baby Mattress Claims (Sept. 28, 2017), <https://www.ftc.gov/news-events/press-releases/2017/09/illinois-firm-barred-making-misleading-baby-mattress-claims> [<https://perma.cc/9PS9-T4Q4>].

254. See generally Solove & Hartzog, *supra* note 240.

255. See *supra* Part II.A.

succeeded.²⁵⁶ In *Stevens v. MTR Gaming Group, Inc.*,²⁵⁷ the widow of a suicidal problem gambler sued a slot machine manufacturer on strict product liability and negligent design and failure to warn theories.²⁵⁸ The court held that the state’s pervasive regulation of the gambling industry²⁵⁹ precluded any inference that the legislature would have meant to leave casinos or game manufacturers stuck with a common law duty of care.²⁶⁰ Courts in other states have reached the same result through similar reasoning.²⁶¹

Unlike their counterparts in the gambling industry, the tech companies who might sit as defendants in a tech-addiction tort case do not belong to heavily regulated industries. In principle, that should make the early gambling cases easy to distinguish; in tech, there is no regulatory apparatus to displace the ordinary tort law duty of care.

The First Amendment, however, may still prevent plaintiffs in tech-addiction tort cases from receiving compensation. In *Watters v. TSR, Inc.*,²⁶² the plaintiff attempted to link the publishers of *Dungeons & Dragons*, a tabletop role-playing game, to the suicide of her adult son.²⁶³ The Sixth Circuit granted summary judgment to the publisher, reasoning that the plaintiff had failed to establish fault or causation.²⁶⁴ The court also held that strict product liability was out of the question given the case’s First Amendment salience.²⁶⁵ The court noted that courts should “avoid applying the common law in a way that would bring the constitutional problems to the fore.”²⁶⁶

Beyond *Watters*, the record for gaming addicts—or anything else that might offer a clear precedent for product liability on account of tech

256. David M. Ranscht, *Problem Gambling Is Funny*, 6 UNLV GAMING L.J. 59, 74 (2015) (“Several lawsuits have been initiated, and have been almost uniformly unsuccessful.”).

257. 788 S.E.2d 59 (W. Va. 2016).

258. *See id.* at 61. The plaintiff alleged that the machines “employ[ed] algorithms and other features that deceptively cause gamblers to play longer, more quickly, and more intensely. The machines are allegedly designed to cause physiological change in brain functioning, which promotes the loss of willpower and curtails the capacity to make rational decisions [B]y their construction and programming, the machines erode the players’ ability to walk away before they have exhausted their available funds.” *Id.* The plaintiff also sued the casino, alleging that it had “facilitate[d] the compulsive behavior engendered by the machines by targeting affected patrons with marketing ploys such as offering complementary [sic] food and lodging, and by tendering lines of credit on terms that would not otherwise be bargained for.” *Id.*

259. In particular, the state had set up an administrative approval process for gambling devices, a “self-exclusion” program whereby problem gamblers could bar themselves from casinos and established a statewide “Compulsive Gambling Treatment Fund.” *Id.* at 65. The court inferred that the legislature must have intended these administrative remedies to exclude any tort law duty of care. *See id.* at 67.

260. *See id.* at 63.

261. *See, e.g.,* *Taveras v. Resorts Int’l Hotel, Inc.*, No. 07–4555, 2008 WL 4372791 (D.N.J. Sept. 19, 2008); *Caesars Riverboat Casino, LLC v. Kephart*, 934 N.E.2d 1120 (Ind. 2010).

262. 904 F.2d 378 (6th Cir. 1990).

263. *Id.* at 379.

264. *See id.* at 380–84.

265. *See id.* at 382.

266. *Id.* at 383.

addiction—includes only one other case.²⁶⁷ In *Smallwood v. NCSoft Corp.*,²⁶⁸ the U.S. District Court for the District of Hawaii allowed a similar set of claims to survive a motion to dismiss, but the suit's pro se plaintiff did not proceed further.²⁶⁹ Unfortunately, the underlying complaint is so crudely drafted that it is somewhat hard to know what to take from the court's reasoning.

Hardly a promising record, in short. But these cases are not totally plaintiff-preclusive either. Recall that tobacco plaintiffs had logged a decades-long string of defeats before the first plaintiff award came in *Cipollone v. Liggett Group*.²⁷⁰ By the late eighties, however, an improved medical understanding of nicotine's addictive qualities plus an emerging public consciousness of nicotine's risks and the industry's malfeasance helped *Cipollone*'s plaintiffs to succeed.²⁷¹ The history of product litigation over behavioral addictions is short, and it is too early to predict that similar developments will not eventually come through.

2. New Tools for Regulation

The existing regulatory capacity to police habit-forming design is limited. Social casinos, loot boxes, and similar devices that have not yet emerged can at least in principle be regulated in the same way that gambling is regulated. Depending on the jurisdiction's approach to gambling, these regulations could include licensing procedures, odds disclosure requirements, self-exclusion programs where problem gamblers can lock themselves out of regulated gambling establishments, and so on. Consumer protection agencies, meanwhile, are well-positioned to police certain children's apps that are monetized through aggressive habit-forming design.²⁷² But for better or worse, no governmental entity today appears to have authority to police habit-forming design beyond the gaming sphere. That authority will have to come from a new place.

267. I exclude various "violent video game" cases in which a gamer—often described as "addicted"—allegedly picked up violent tendencies by imitating in-game events or characters. These theories have consistently failed. *See, e.g.,* *Wilson v. Midway Games, Inc.*, 198 F. Supp. 2d 167, 171 (D. Conn. 2002); *Sanders v. Acclaim Entm't, Inc.*, 188 F. Supp. 2d 1264, 1268 (D. Colo. 2002); *cf. Brown v. Entm't Merchs. Ass'n*, 564 U.S. 786, 800–01 (2011) (casting doubt on the quality of the social science linking violent games with violent behavior).

268. 730 F. Supp. 2d 1213 (D. Haw. 2010).

269. *See generally id.*

270. 593 F. Supp. 1146 (D.N.J. 1984); *see* Peter F. Riley, Note, *The Product Liability of the Tobacco Industry: Has Cipollone v. Liggett Group Finally Pierced the Cigarette Manufacturers' Aura of Invincibility?*, 30 B.C. L. REV. 1103, 1117–41 (1989).

271. *See* Riley, *supra* note 270, at 1128.

272. Such a role would outgrow naturally from the FTC's responsibility for enforcing the Children's Online Privacy Protection Act, which regulates commercial websites' use of personally-identifying information on children under the age of eighteen. *See* 15 U.S.C. § 6505(a)–(e) (2012); *see also* 16 C.F.R. § 312.9 (2019).

a. Piecemeal Legislation

Over time, Congress may adopt legislation that attacks individually offensive design techniques piecemeal. It is not too hard, for example, to imagine a statutory scheme designed to curb intrusive and misleading push notifications within phone apps—sort of a successor to the Controlling the Assault of Non-Solicited Pornography and Marketing Act’s regulation of spam email.²⁷³ Another law might require mobile devices to come prepackaged with software to notify users when their app usage has exceeded reasonable limits—a utility similar to iOS’s *Screen Time* app but turned on by default.

b. A General Mandate

Or Congress may grant a general mandate to an agency—most likely the FTC but perhaps even the Consumer Product Safety Commission—to regulate predatory design practices that tend to promote behavioral addiction. Vague as that may sound, addiction itself is a rather elastic term even among clinicians; it is no vaguer than similar terms, such as “unfair,” that are often found in enabling legislation.²⁷⁴ The Controlled Substances Act (CSA), in fact, contains language to the same effect: the potential for “psychological or physical dependence” is a criterion left to the discretion of administrative officials.²⁷⁵

Efficacy, of course, is another question. New applications and platforms arise constantly, and those that already exist are always updating their design. New addictive designs are always emerging, and developers can vary them quickly in response to enforcement. But this is not a totally unique or unprecedented concern. The problem exists in the narcotics sector as well, where drug labs constantly tweak chemical compounds to avoid the application of the CSA’s “Schedule I.”²⁷⁶ Regulators have struggled to meet these innovations.²⁷⁷ The gambling industry, too, has its own colorful history of cat and mouse.²⁷⁸

273. Controlling the Assault of Non-Solicited Pornography and Marketing Act of 2003, 15 U.S.C. §§ 7701–7713 (2012).

274. The Federal Trade Commission Act prohibits “unfair” practices. 15 U.S.C. § 45(a)(1) (2012).

275. See 21 U.S.C. § 812(b)(2)(C) (2012). The Attorney General, in consultation with the Secretary of the Department of Health and Human Services, may add new substances to the CSA’s five-category schedule of regulated and prohibited drugs. See *id.* The Consumer Product Safety Act also uses vague language about “risk of injury” to instruct administrative rulemakers. See 15 U.S.C. § 2052 (2012) (“The term ‘risk of injury’ means a risk of death, personal injury, or serious or frequent illness.”). An addendum referring to behavioral dependence—assuming that the language about “illness” does not already cover it—would hardly be out of place.

276. See Timothy P. Stackhouse, Note, *Regulators in Wackyland: Capturing the Last of the Designer Drugs*, 54 ARIZ. L. REV. 1105, 1111–18 (2012).

277. See *id.* at 1111.

278. One machine popular in the late 1990s and early 2000s, for example, sold borderline-worthless one-minute phone cards for a quarter a piece. See *generally* Hest Techs., Inc. v. State *ex rel.* Perdue, 749 S.E.2d 429 (N.C. 2012). Each card entered the purchaser in a

c. Dry-Up-the-Market Approaches

Finally, legislatures could address these problems from the outside, and not by restricting the contents of habit-forming tech products in themselves, but by blunting or destroying the incentive to make them in the first place.

For products with advertising-based monetization models, the remedy is clear: either restrict targeted advertising or make it less lucrative through taxation. Within the short run, privacy regulation along the lines of the European Union's General Data Protection Regulation²⁷⁹ may provide some help along these lines. Over the long run, and for reasons that transcend the addiction issue, governments should move toward a more general ban on the behavioral advertising industry—a radical move that would clearly violate the First Amendment and that would create a need for wider structural regulation to fund online content.²⁸⁰ Such a program is beyond the scope of this Article, but it would surely blunt the incentive to drive engagement.

For products that are monetized through in-app purchases, there may be less dramatic solutions. The law might, for example, set up caps on the total amount merchants could collect from a single user within a year. Today, many microtransaction-based games are designed to target “whales”: the 0.15 percent of users who account for half of the revenue in the average microtransaction-financed game.²⁸¹ These “whales,” spending thousands of dollars on average on a single game,²⁸² would appear to be problem users.²⁸³ As long as they make up game developers' biggest profit center,²⁸⁴ though, developers will likely continue to design casino-like products that are optimized for problem use.

A new statute might allow big spenders to retrieve every dollar spent in excess of some reasonable limit. The limit could equal a dollar figure fixed by regulation—say, \$100 per app—or it could be calculated on some floating

sweepstakes with a risk-reward spread similar to a slot machine. *See generally id.* Purchasers could collect their winnings from a cashier who would scan a QR code printed on the back of the card. *See id.* at 443. More recently, gambling operators have opened internet cafes where gamblers purchase minute after minute of internet access alongside their chance to win. *See generally* United States v. Davis, 690 F.3d 330 (5th Cir. 2012). Courts have never had much trouble peering through the veil. *See Hest Techs.*, 749 S.E.2d at 430–31 (“[N]o sooner is a lottery defined, and the definition applied to a given state of facts, than ingenuity is at work to evolve some scheme of evasion But, in this way, it is not possible to escape the law's condemnation” (quoting *State v. Lipkin*, 84 S.E. 340, 343 (N.C. 1915))).

279. Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation), 2016 O.J. (L 119) 1 (EU).

280. *See generally* Kyle Langvardt, *A New Deal for the Online Public Sphere*, 26 GEO. MASON L. REV. (forthcoming 2019).

281. *See supra* note 60 and accompanying text.

282. This is a rough extrapolation from the data indicating that 50 percent of mobile gaming revenue comes from 0.15 percent of players. *See supra* note 58 and accompanying text. If that is the case, then the top 0.15 percent of players will pay at least \$1000 so long as revenue is at least \$2000 and the game raises \$3 per player.

283. *See supra* Part I.C.1.

284. *See supra* notes 60–61 and accompanying text.

basis. One approach might say that for a given app, the limit should equal the total in-app expenditure level by users at the ninety-ninth percentile. Merchants and platforms such as Google Play and the iTunes Store could then be made jointly liable to provide quick refunds to any user who exceeds the limit. Ideally, this policy would enlist the major platforms as enforcers against predatory design practices.

III. FIRST AMENDMENT CHALLENGES

Even modest efforts to regulate addictive design will likely be challenged as infringements on free expression. How the law should handle these challenges, however, is unclear. Two first-order questions arise.

The first is a question of what Frederick Schauer has called “coverage.”²⁸⁵ The coverage inquiry is distinct from the question of whether a type of speech will ultimately be protected from regulation or not.²⁸⁶ Instead it asks, in a given case, whether the First Amendment has any salience at all.²⁸⁷ In cases involving speech in furtherance of a criminal conspiracy, or insider trading, or obligations under a written contract, defendants do not even suggest that their use of language would entitle them to First Amendment protections.²⁸⁸ Gambling operations are treated as similarly “uncovered”; though litigants have occasionally raised First Amendment challenges to gambling laws, their arguments have never been taken seriously.²⁸⁹ But the range of coverage is always expanding,²⁹⁰ and the Supreme Court has articulated no outer limit that might help to determine whether various addictive design techniques should be considered First Amendment subject matter at all.²⁹¹ The case law is marked in places by language suggesting essentially total coverage for software,²⁹² and tech industry lawyers have encouraged this maximal approach.²⁹³ But the case law is much likelier to reveal an approach that does

285. See generally Frederick Schauer, *The Boundaries of the First Amendment: A Preliminary Exploration of Constitutional Salience*, 117 HARV. L. REV. 1765 (2004).

286. See *id.* at 1769–74.

287. See *id.*

288. See *id.* at 1783–84.

289. See, e.g., *United States v. Edge Broad. Co.*, 509 U.S. 418, 426 (1993) (“[G]ambling . . . implicates no constitutionally protected right; rather, it falls into a category of ‘vice’ activity that could be, and frequently has been, banned altogether.”); *Interactive Media Entm’t & Gaming Ass’n Inc. v. Att’y Gen.*, 580 F.3d 113, 118 n.8 (3d Cir. 2009) (noting that gambling “lacks any ‘communicative element’ sufficient to bring it within the ambit of the First Amendment”) (quoting *United States v. O’Brien*, 391 U.S. 367, 376 (1968)); *Allied Veterans of World, Inc.: Affiliate 67 v. Seminole County*, 783 F. Supp. 2d 1197 (M.D. Fla. 2011), *aff’d*, 468 F. App’x 922 (11th Cir. 2012) (finding that a county ordinance banning “simulated gambling devices” regulated conduct rather than speech).

290. See generally Schauer, *supra* note 285.

291. See generally *id.*

292. *Universal City Studios, Inc. v. Corley*, 273 F.3d 429, 447 (2d Cir. 2001).

293. See, e.g., Matthew Panzarino, *Apple Files Motion to Vacate the Court Order to Force It to Unlock iPhone, Citing Constitutional Free Speech Rights*, TECHCRUNCH (Feb. 25, 2016), <https://techcrunch.com/2016/02/25/apple-files-motion-to-dismiss-the-court-order-to-force-it-to-unlock-iphone-citing-free-speech-rights/> [<https://perma.cc/NU74-2S86>].

not regard all software design as equally expressive for purposes of the First Amendment.

A second question has to do with regulatory means and ends and their adequacy relative to whatever standard of heightened scrutiny might be in play. The most obvious governmental purpose for regulating addictive design will have to do with public health, and in particular the public health of children who might be exposed to these products. But there are deeper regulatory purposes at play as well—most prominently, a concern for the health of the same public sphere that the Free Speech Clause exists to protect.

A. Coverage

Addictive design cuts across a variety of speech contexts that may be protected by the First Amendment. At a minimum, the Ninth Circuit's decision in *Kater* has introduced gambling regulation to the world of consumer video games, a medium that has been recognized to contain strong expressive salience for First Amendment purposes.²⁹⁴ Further regulation of addictive tech, even if it only affects products marketed to children, could cut closer to core constitutional territory. In particular, Justice Anthony Kennedy recently recognized social media platforms as “the most important places . . . for the exchange of views” in the twenty-first century.²⁹⁵ Proponents of any consumer measure to deal with addictive design—beginning with the loot box bills now being considered in several states—should expect a First Amendment challenge.

The outlines of such a challenge are obvious enough: video game companies speak when they design video games. When the government restricts loot boxes, it burdens games that contain one particular kind of content. Facebook speaks by maintaining its service. When the government requires Facebook to tell its users how long they have spent on the device, it compels Facebook's authors to speak a message that is not their own. And so on; these arguments lend themselves to efficient mass production. After all, if UX design is just another expression for software's content, then virtually any law that regulates software should count as a content-discriminatory law of the sort that triggers strict scrutiny under today's interpretation of the First Amendment.²⁹⁶

These arguments' viability, however, depends heavily on the level of generality that is chosen to define the problem. First, a software product might be viewed *holistically*, as a single, unified article of speech. On this generalistic account, laws that reach in and regulate a loot box, for example, have the effect of burdening one aspect of the speaker's “message.” This way of thinking has the advantage of simplicity, and it fits well with the current Supreme Court's austere First Amendment style. But carried to its logical conclusion, this approach would also require strict constitutional

294. See *Kater v. Churchill Downs Inc.*, 886 F.3d 784, 785 (9th Cir. 2018).

295. *Packingham v. North Carolina*, 137 S. Ct. 1730, 1734 (2017).

296. *Reed v. Town of Gilbert*, 135 S. Ct. 2218, 2229–30 (2015) (finding that an ordinance regulating “temporary directional signs” was content discriminatory and unconstitutional).

scrutiny in any case involving the regulation of software. This holistic view is not likely to survive sustained contact with twenty-first-century regulatory problems involving 3D-printable consumer products, cryptocurrency speculation, and so on.²⁹⁷

Second, a piece of software might be viewed *specifically*, as a consumer product that integrates speech components with nonspeech components.²⁹⁸ This approach would acknowledge the expressive components in various kinds of applications—literary or character elements in video games, shared media content in social media, etc.—without assuming that other purely mechanical components such as login credentialing or memory caching are expressive by association. The question then becomes whether regulated items such as loot boxes, or infinite scrolls, or bright red notification badges constitute speech for First Amendment purposes on their own merits.

As the following section demonstrates, courts have not yet chosen between the holistic and the particular approach.

1. The Holistic Approach

If laws regulating addiction mechanisms in games or social media were challenged on First Amendment grounds, the challengers would likely cite certain relatively recent Supreme Court opinions as broad authority for the proposition that the medium being regulated is all but inviolable. Challengers might cite *Brown v. Entertainment Merchants Ass'n*²⁹⁹ for the proposition that video games are broadly protected.³⁰⁰ Challengers might cite *Packingham v. North Carolina*³⁰¹ for the proposition that social media and its platforms are essentially inviolable.³⁰² And challengers might cite *Sorrell v. IMS Health Inc.*³⁰³ in support of a “rule that information is speech”—a rule that could be interpreted to cover just about everything that happens on computers or the internet.³⁰⁴

But a fair look at the case law reveals that the courts have never really said these things, and indeed they have never extended any special constitutional protection to tech products or the internet beyond what the First Amendment would ordinarily furnish in a low-tech setting.

297. See Kyle Langvardt, *The Doctrinal Toll of “Information as Speech,”* 47 LOY. U. CHI. L.J. 761, 769–75 (2016).

298. In the world of tangible objects, there is no such thing as pure speech; even a book contains paper stock that is intuitively distinct from any expressive content. The perception that software is different because of its intangible or conceptual nature is ultimately delusive. Credit, debt, governments, corporations, family relationships, and so on are all intangible and conceptual, and all intersect in various ways with activities that may be expressive for First Amendment purposes. But that is no reason to say that these phenomena are somehow shot through in every dimension with First Amendment significance.

299. 564 U.S. 786 (2011).

300. See *id.* at 790.

301. 137 S. Ct. 1730 (2017).

302. See *id.* at 1734.

303. 564 U.S. 552 (2011).

304. See *id.* at 571 (“The State asks for an exception to the rule that information is speech, but there is no need to consider that request in this case.”).

a. Games

In *Brown*, the Supreme Court invalidated a California law that prohibited the sale or rental of violent video games to minors and required them to be labelled “18.”³⁰⁵ Justice Antonin Scalia, writing for a seven-justice majority, dispelled any notion that video games might deserve subordinate First Amendment status:

Like the protected books, plays, and movies that preceded them, video games communicate ideas—and even social messages—through many familiar literary devices (such as characters, dialogue, plot, and music) and through features distinctive to the medium (such as the player’s interaction with the virtual world). That suffices to confer First Amendment protection.³⁰⁶

None of the justices seemed to disagree on this initial point.³⁰⁷

From here, Justice Scalia proceeded with a conventional content-discrimination analysis.³⁰⁸ By singling out video games based on their content, the California statute opened itself up to strict scrutiny.³⁰⁹ Supposing for the sake of argument that children’s well-being, broadly defined, constituted a compelling state interest, Justice Scalia nevertheless found the means-end fit lacking.³¹⁰ The available social science, he wrote, had failed to establish a strong causal connection between the video games and any actual violence.³¹¹

Brown never says that all video games are speech, and the Court had no occasion to do so. Instead the case asked only whether *portrayals of violence* that occur in video games are speech—for those are all that the statute regulated. So while challengers to a loot box law would inevitably cite

305. *Brown*, 564 U.S. at 789.

306. *Id.* at 790.

307. Justice Thomas’s dissent proposed, somewhat tangentially to the other justices’ discussion, that “speech to minor children bypassing their parents” is an unprotected category for originalist reasons. *Id.* at 822 (Thomas, J., dissenting). It is unclear where Justice Thomas would come down on the question of whether video games might be speech at all. He writes: “The Court holds that video games are speech for purposes of the First Amendment and finds the statute facially unconstitutional. I disagree.” *Id.* at 838–39. But which of these two points does Justice Thomas disagree with? That video games are speech, that the statute is facially unconstitutional, or both? The bulk of Justice Thomas’s discussion about the history of *speech* to minor children bypassing their parents would seem to assume, even if it is an unprotected category, that *some* kind of speech for First Amendment purposes is going on. Even regulations of unprotected low-value speech can offend the First Amendment if a law discriminates within the unprotected category based on content or viewpoint. *See R.A.V. v. City of St. Paul*, 505 U.S. 377 (1992). But Justice Thomas does not conduct an *R.A.V.* analysis here.

308. *Brown*, 564 U.S. at 799–803 (majority opinion).

309. *See id.* at 799.

310. The social science, he reasoned, failed to support the selective application of the law: realistically violent games like *Grand Theft Auto* and cartoonish games like *Sonic the Hedgehog* alike were shown to rile kids up. *Id.* at 800–01. Second, Justice Scalia found the law to be underbroad insofar as it permitted children to buy the games with their parents’ permission. *Id.* at 802. If these games were really so harmful, he reasoned, then why not bar them to children altogether? *Id.*

311. *See id.* at 800–02.

Brown as support for a thoroughgoing First Amendment protection for video games, the analogy is superficial. Only three justices of the *Brown* Court discuss the features that distinguish video games from media traditionally protected by the First Amendment—and far from suggesting that games as such deserve total protection, they express concern about interactive video games’ special potential for harm over and above noninteractive media.³¹²

A clear reading of *Brown*, then, leaves many aspects of gaming outside the First Amendment’s coverage. No member of the Court addresses the relatively questionable “speechiness” of austere, nonrepresentative video games such as *Pong* or *Candy Crush*. Video gambling machine operators have tried and failed in lower courts to invoke *Brown* in defense of “entertaining display[s]” that simulate slot machines.³¹³ There is simply no “video games as speech” doctrine that offers any shelter to the various behavioral techniques that games and other types of “gamified” applications use to drive engagement.

b. Social Apps and Platforms

The law extends certain extraordinary protections to online platform owners under the Communications Decency Act of 1996³¹⁴ (CDA). Section 230 provides that online platform owners may not “be treated as the publisher or speaker of any information provided.”³¹⁵ The CDA has indeed taken on such a strong protective aura that tech platforms have begun to raise § 230’s shield against liability in situations where it has no clear relevance. The general counsel for Lyft, for example, has taken the position that the CDA protects it from vicarious liability for the torts of its drivers.³¹⁶ Under these

312. *Id.* at 806 (Alito, J., concurring) (“We should not jump to the conclusion that new technology is fundamentally the same as some older thing with which we are familiar There are reasons to suspect that the experience of playing violent video games just might be very different from reading a book, listening to the radio, or watching a movie or a television show.”); *id.* at 855 (Breyer, J., dissenting) (“I would find sufficient grounds in these studies and expert opinions for this Court to defer to an elected legislature’s conclusion that the video games in question are particularly likely to harm children.”).

313. *Telesweeps of Butler Valley, Inc. v. Kelly*, No. 3:12-CV-1374, 2012 WL 4839010, at *6 (M.D. Pa. Oct. 10, 2012), *aff’d sub nom. Telesweeps of Butler Valley, Inc. v. Att’y Gen.*, 537 F. App’x 51 (3d Cir. 2013) (“Unlike in *Brown*, the simulated gambling programs at issue here do not contain plots, storylines, character development, or any elements that would communicate ideas.”); *Hest Techs., Inc. v. State ex rel. Perdue*, 749 S.E.2d 429, 437 (N.C. 2012) (“While *Brown* confirmed that First Amendment protection extends to video games, the Court struck down the state law at issue because it was a content-based restriction on violent video games. Here [the video gambling ban] applies regardless of the content of the video game.”); *cf. Candy Lab Inc. v. Milwaukee County*, 266 F. Supp. 3d 1139, 1146 (E.D. Wis. 2017) (“[W]hat Candy Lab’s game lacks in compelling literary tropes, it makes up for by employing ‘features distinctive to the medium (such as the player’s interaction with the virtual world).’”); *Alfarah v. City of Soledad*, No. 5:15-CV-05569-EJD, 2016 WL 3456697, at *5 (N.D. Cal. June 24, 2016) (“In general, playing or offering games is conduct, not speech.”).

314. Pub. L. No. 104-104, tit. V, 110 Stat. 56, 133–43 (codified as amended in scattered sections of 18 and 47 U.S.C.).

315. 47 U.S.C. § 230(c)(1) (2012).

316. See Abbey Stemler, *The Myth of the Sharing Economy and Its Implications for Regulating Innovation*, 67 EMORY L.J. 197, 217 (2017).

hyperprotective conditions, there has been no need for courts to engage seriously with the question of how much protection the First Amendment itself might provide to online platform owners.

Even so, expectations have been set high. Online platforms today are widely considered the First Amendment equivalent of newspaper editors.³¹⁷ Whatever the merit of this perhaps overly flattering analogy, it nevertheless would seem to reach only a corner of a Facebook's or a Google's operations—namely, the companies' decisions to rank or censor content. Even if Facebook really is comparable to a newspaper, a decision to regulate addictive user design may be no more offensive than laws requiring the use of recycled newsprint.³¹⁸ Just because an organization does a lot of editing does not mean that this editing permeates the entire enterprise.

Then there is Justice Kennedy's arresting remark in 2017's *Packingham v. North Carolina* that the internet, particularly social media, "is the most important place[] . . . for the exchange of views."³¹⁹ Tonally, Justice Kennedy's opinion in that case creates an unmistakable sense of anticipation that *somebody* involved with social media, whether users or the platforms themselves, will soon receive a new shelter under the First Amendment. Some banned social media users have cited the case to imply that social platforms are state actors.³²⁰ Social media operators may someday cite Kennedy's words in support of a *Lochner*-like freedom of contract between platform and user.

But the case, much like *Brown*, really says very little at all—only that it was overkill for the state of North Carolina to bar a released sex offender from most social media for life. If a similar law applied in real space—say, one that made it unlawful for a convicted sex offender to communicate with people in public places such as streets and parks—it would have traversed the free speech pale. *Packingham* says that total exile from major social platforms is unacceptable by the same token.³²¹ This obvious extension of

317. See Eugene Volokh & Donald M. Falk, *Google: First Amendment Protection for Search Engine Search Results*, 8 J.L. ECON. & POL'Y 883, 884–85, 887 (2012); see also *Miami Herald Pub. Co. v. Tornillo*, 418 U.S. 241, 256–58 (1974) (striking down a Florida statute granting a "right of reply" to political candidates personally attacked in newspaper editorial pages). For opinions applying *Tornillo* to search engines, see *e-ventures Worldwide, LLC v. Google, Inc.*, No. 2:14-cv-646-FtM-PAM-CM, 2017 WL 2210029, at *3–4 (M.D. Fla. Feb. 8, 2017); *Jian Zhang v. Baidu.com Inc.*, 10 F. Supp. 3d 433, 436–43 (S.D.N.Y. 2014); *Langdon v. Google, Inc.*, 474 F. Supp. 2d 622, 629–30 (D. Del. 2007).

318. These laws may raise First Amendment concerns, however, if they are imposed differentially. See generally Richard Madris, Comment, *Recycled Newsprint Laws and Differential Taxation of the Press*, 61 U. CHI. L. REV. 1069 (1994) (urging that recycled newsprint laws are unconstitutional because they affect only newspapers).

319. See *Packingham v. North Carolina*, 137 S. Ct. 1730, 1734 (2017).

320. See *Prager Univ. v. Google LLC*, No. 17-CV-06064-LHK, 2018 WL 1471939, at *8 (N.D. Cal. Mar. 26, 2018); *Nyabwa v. FaceBook*, No. 2:17-CV-24, 2018 WL 585467, at *1 (S.D. Tex. Jan. 26, 2018).

321. *Packingham*, 137 S. Ct. at 1736 ("This case is one of the first this Court has taken to address the relationship between the First Amendment and the modern Internet. As a result, the Court must exercise extreme caution before suggesting that the First Amendment provides scant protection for access to vast networks in that medium.").

First Amendment logic hardly suggests that social platforms or applications should be any *less* regulable than privately owned physical spaces. All *Packingham* really means is that social platforms are not subordinate forums within the First Amendment order.

Reno v. ACLU,³²² the 1997 case that extended robust speech protections to the internet for the first time, is similarly modest: it raises online speech protections up to the level of offline speech protections, but it does not suggest that they go any higher.³²³ The CDA provisions at issue in *Reno* imposed a heavy age and identity verification requirement on online publishers who distributed certain sexually explicit materials that were defined as inappropriate for minors.³²⁴ The law was overbroad in that it encompassed protected nonobscene materials and would have required consenting adults to disclose personally identifying materials before viewing them.³²⁵ It would have been struck down if it had been applied to brick-and-mortar bookstores.³²⁶ The government apparently hoped that the CDA might get by under a lenient standard similar to the one applied to broadcast media.³²⁷ The Court declined the invitation. But nothing in the opinion suggests that online publishers or merchants should enjoy protections *beyond* what they would get offline.³²⁸

c. Computer Code

When the Federal Bureau of Investigation (FBI) ordered Apple to unlock the encrypted phone of the San Bernardino shooter, the company argued that to do so would constitute “compelled speech.”³²⁹ Such arguments rarely win the day in court, though judges nevertheless take them more seriously than they should.

The theory that computer code is a form of speech dates back to the Northern District of California’s 1996 decision in *Bernstein v. United States Department of State*,³³⁰ where the judge reckoned that computer programming languages should be treated as the equivalent of natural languages such as English or German.³³¹ On this theory, statements communicated in code deserve the same formidable battery of First

322. 521 U.S. 844 (1997).

323. *See id.* at 870 (“[O]ur cases provide no basis for qualifying the level of First Amendment scrutiny that should be applied to [the Internet].”).

324. *See id.* at 857–61.

325. *See id.* at 881–82.

326. *See id.* at 864–65 (comparing the CDA unfavorably with a New York statute restricting minors’ access to nonobscene erotic magazines).

327. *See id.* at 866–67 (declining to extend *FCC v. Pacifica Foundation*, 438 U.S. 726 (1978), which upheld FCC regulations against profanity in primetime broadcasts).

328. *See generally id.*

329. *See Panzarino, supra* note 293.

330. 922 F. Supp. 1426 (N.D. Cal. 1996).

331. *See id.* at 1435 (“This court can find no meaningful difference between computer language, particularly high-level languages as defined above, and German or French. . . . Even object code, which directly instructs the computer, operates as a ‘language.’” (quoting *Yniguez v. Arizonans for Official English*, 69 F.3d 920, 934–36 (9th Cir. 1995))).

Amendment protections as statements communicated in a natural language.³³²

The *Bernstein* argument has had very little practical effect. Academics who wanted to use computer code for illustrative purposes have won victories.³³³ But in cases about actual consumer-grade software, courts have consistently used a watered-down First Amendment analysis to avoid following *Bernstein's* flawed logic through to its preposterous conclusions.³³⁴

2. The Particular Approach

There is a simple appeal to an approach that says “video games are speech,” or that “social media is speech,” or that software generally is speech. But the costs of heightened scrutiny across the board will pile up quickly. First Amendment law will eventually have to draw some lines among the internet’s various uses and acknowledge that most of them are nonexpressive. It is at this point, after the generalistic approach’s easy answers fall away, that courts might begin to evaluate specific aspects of addictive design on their own First Amendment merits.

a. Addictive Design as Conventional Message-Bearing Speech

At least some of the design elements in question communicate some kind of easily articulable message. When Facebook tells you that you have twenty-nine likes, it is telling you that you have twenty-nine likes. And when app icons use stop-sign red dots to get your attention, the message is: “Hey! Over here!”

But messages should not be dismissed as eligible First Amendment content just because they are austere.³³⁵ Even simple commercial solicitations count. *Expressions Hair Design v. Schneiderman*³³⁶ frames “the communication of prices,” apart from any surrounding advertising content, as a form of speech.³³⁷ A New York law that banned credit surcharges but not “cash discounts” regulated merchants’ communicative choices in such a way as to potentially summon First Amendment protection.³³⁸

332. The analogy proves little, however, unless you assume that statements in English or German qualify categorically for First Amendment protections. They do not, of course; natural language has many strictly practical uses—in contracting, in conspiring, in insider trading, and so on—that contain no First Amendment dimension.

333. See generally *Junger v. Daley*, 209 F.3d 481 (6th Cir. 2000).

334. Langvardt, *supra* note 297, at 772–75.

335. Cf. *Hest Techs., Inc. v. State ex rel. Perdue*, 749 S.E.2d 429, 437 (N.C. 2012) (finding that a video gambling machine announcing “‘winner,’ or ‘you lose,’ or ‘good job,’ or ‘too bad,’ or simply show the amount of money won” is not protected speech because “the announcement is merely a necessary but incidental part of the overall noncommunicative activity of conducting the sweepstakes”).

336. 137 S. Ct. 1144 (2017).

337. See *id.* at 1151.

338. *Id.* at 1146–47.

Clip-art-level visual content may also incline a court toward extending protection to certain elements of interface design. In a recent case, *Candy Lab Inc. v. Milwaukee County*,³³⁹ the Eastern District of Wisconsin extended protection to *Texas Rope 'Em*, a *Pokémon Go*-like scavenger hunt in which users travel to real world locations to collect cards that the player could add to a hand of poker.³⁴⁰ Despite the game's lack of the "plot, character or dialogue" elements that made the difference in *Brown*, the court found protected content in the "Western-themed virtual environment, complete with a Texas-themed game title, color scheme, and graphics, allowing the player to corral favorable playing cards using an animated lasso."³⁴¹

Courts analyzing video gambling machines, on the other hand, have been less generous. "[M]erely stat[ing] whether a player has won a prize by displaying a depiction of, for instance, three cherries," has been held insufficient for First Amendment protection.³⁴² It is unclear what accounts for the difference between the three cherries and the simple "Wild West" images in *Texas Rope 'Em*. It may have less to do with the "speechiness" of these images as such and more to do with an unspoken decision to lay off the First Amendment where gambling is concerned.³⁴³

b. Addictive Design as Abstract Expression

Other addictive design techniques cannot be said to convey any message at all. These elements—such as the "infinite scroll" of your News Feed, the "pull to refresh" capability of your podcasting app, or the flashing lights and sounds that intensify the ritual of opening a loot box—fit even less easily into the First Amendment domain than the clip-art-level expression of *Texas Rope 'Em*. But the Supreme Court has stressed that a clear and particularized message is not necessary to invoke constitutional protection.

In *Hurley v. Irish-American Gay, Lesbian & Bisexual Group of Boston, Inc.*,³⁴⁴ a touchstone in discussions about abstract expression, the Court upheld a parade organizer's right to exclude a gay and lesbian organization from marching in a St. Patrick's Day festival.³⁴⁵ The state's public accommodation law generally prohibited discrimination on the basis of sexual orientation—conduct that in most instances is not considered expressive for First Amendment purposes—and it was unclear what message, if any, the parade organizer intended to send. But Justice David Souter wrote for the Court that "a narrow, succinctly articulable message is not a condition

339. 266 F. Supp. 3d 1139 (E.D. Wis. 2017).

340. *See id.* at 1141.

341. *See id.* at 1146.

342. *Telesweeps of Butler Valley, Inc. v. Kelly*, No. 3:12-CV-1374, 2012 WL 4839010, at *5 (M.D. Pa. Oct. 10, 2012), *aff'd sub nom. Telesweeps of Butler Valley, Inc. v. Att'y Gen.*, 537 F. App'x 51 (3d Cir. 2013).

343. *See generally* Amanda Shanor, *First Amendment Coverage*, 93 N.Y.U. L. REV. 318 (2018) (arguing that the First Amendment is less likely to cover situations, such as sexual harassment, where strong social norms mandate clear consequences for the speech).

344. 515 U.S. 557 (1995).

345. *See id.* at 580–81.

of constitutional protection, which if confined to expressions conveying a ‘particularized message,’ would never reach the unquestionably shielded painting of Jackson Pollock, music of Arnold Schoenberg, or Jabberwocky verse of Lewis Carroll.”³⁴⁶

Developers may argue that much of what makes addictive design work rests within this zone of sensory abstraction. Notification badges are more effective in bold colors—red in particular—and in certain organizations of physical space.³⁴⁷ Many apps and games put on little productions for the purpose of building suspense before user events. When a Twitter user “pulls down” to see recent tweets, the top of the screen shows a short animation. Loot boxes in video games put on a more elaborate show. The box typically sits isolated in an austere, empty space and begins to quake. It then explodes open with a blinding flash accompanied by noises and music. Stars or confetti fly into the air, and finally the user’s new in-game items are revealed.³⁴⁸ What these phenomena lack in an articulable message, they possess in terms of sheer aesthetic force.

Such arguments can easily be carried too far, though. It is significant that Justice Souter chose three artists to illustrate his point and that *Hurley* itself arose in the context of a parade.³⁴⁹ Art and parades, however inscrutable their meaning, are almost purely expressive phenomena by definition. Even if the expression defies articulation, it is there. But that is not obviously the case for abstract design choices—say, stripes on wallpaper—that do not occur within the context of some kind of expressive *work*. To extend *Hurley*’s protection to images generally, sounds generally, or UX design generally, would disregard the possibility of nonrepresentational meaning—a critical distinguishing feature of art itself.

One reason to protect Pollock’s work despite its nonrepresentational nature would be to say that the choice not to represent any particular subject matter is *itself* meaningful. In this respect, any public decision to withhold protections from work that “doesn’t depict anything” or “that my three-year-old could draw” would discriminate not only in terms of content, but along even more troubling lines of taste and culture.³⁵⁰

346. *Id.* at 569 (citation omitted).

347. Paul Lewis, “Our Minds Can Be Hijacked”: *The Tech Insiders Who Fear a Smartphone Dystopia*, *GUARDIAN* (Oct. 6, 2017, 1:00 AM), <https://www.theguardian.com/technology/2017/oct/05/smartphone-addiction-silicon-valley-dystopia> [<https://perma.cc/7ZWD-PYXW>] (“When smartphone users glance at their phones, dozens or hundreds of times a day, they are confronted with small red dots beside their apps, pleading to be tapped. ‘Red is a trigger colour,’ [former Google ethicist Tristan] Harris says. ‘That’s why it is used as an alarm signal.’”).

348. Bailey, *supra* note 221 (“When an elite soccer player is opened in the game FIFA 18, fireworks explode and confetti falls. Overwatch’s items soar into view to a triumphant tune.”).

349. *Hurley v. Irish-Am. Gay, Lesbian & Bisexual Grp. of Bos., Inc.*, 515 U.S. 557, 559, 569 (1995).

350. *Cf.* *Nat’l Endowment for the Arts v. Finley*, 524 U.S. 569, 576 (1998) (upholding requirement that the National Endowment for the Arts “tak[e] into consideration general standards of decency and respect for the diverse beliefs and values of the American public” when awarding artistic merit grants).

As for instrumental music, it may often carry clear national, ethnic, or cultural messaging that no liberal society has any business prohibiting. And where the message is harder to discern—say in the work of John Cage or the noise artist Merzbow, any attempt to suppress that kind of material would reflect a troubling authoritarian concern with suppressing cultural subversion.³⁵¹

Red badges, infinite scrolls, and other nonrepresentational features of the consumer interface lie far outside these concerns, which makes it hard to say that elements of UI design should command any degree of First Amendment coverage on their own intrinsic merits. A more persuasive theory would hold that these aspects of design receive protection because of their attention-grabbing or attention-holding role—their monetizing role—in relation to products that are expressive for other reasons.³⁵²

c. Addictive Design as an Auxiliary to Speech

The instinct that habit-forming design techniques intersect with First Amendment coverage is understandable. Yet it is hard to give any persuasive account for why most gamification tricks—badges, loot boxes, infinite scrolls, streaks, and so on—should count either as speech or as the sort of content that cannot be burdened without triggering strict scrutiny. There is no good reason to say that either software, the internet, social platforms, video games, or other “gamified” applications should be treated as pure speech. And even if some design techniques—the two-second pyrotechnics display that occurs when a loot box opens, for instance—*might* be viewed as speech standing alone, techniques such as YouTube’s autoplay function or Twitter’s pull-to-refresh design are hard to rationalize as First Amendment material. The best that can be said for them is that they sit *adjacent* to the real expression—the “literary and dramatic elements” in video games, the conversations about life, news and culture within social media, and so on.

This is not to say that adjacent is a bad place to be. First, the addictive UX in social media and video games helps to monetize the content.³⁵³ If engagement suffers on Facebook, Facebook’s ability to deliver core speech suffers as well. And the same is true for video games that are financed largely or entirely through advertising or microtransactions. Any restriction against the use of some addictive design technique—say, autoplay—would presumably burden speech financially. If that burden applies on a content-discriminatory basis—as if educational video platforms were permitted to use autoplay but others were not—then strict scrutiny should apply.³⁵⁴ But

351. See Alan K. Chen, *Instrumental Music and the First Amendment*, 66 HASTINGS L.J. 381, 425–31 (2015).

352. See *Disc. Tobacco City & Lottery, Inc. v. United States*, 674 F.3d 509, 547 (6th Cir. 2012) (invalidating as overbroad a ban on all use of color and imagery in tobacco ads displayed outside certain designated locations).

353. See *supra* Part I.A.

354. It would be another matter, of course, if some apps were prohibited from trafficking in addictive UX and others were not. In *Sorrell v. IMS Health Inc.*, the Supreme Court struck

as long as a law regulated autoplay across the board, without respect to the content of the video or the identity or message or viewpoint of the platform, then a law regulating autoplay should probably be considered akin to a time, place, and manner restriction calling for relatively deferential review.

Second, and more broadly, there might be prophylactic reasons not to allow regulation of design components that are bound up so closely with expressive subject matter. Loot boxes sit alongside fully protected literary and dramatic content that should not be disturbed. Autoplay is sewn into YouTube and Netflix, the new century's answer to broadcast media.³⁵⁵ Even if certain design elements are only doubtfully expressive, courts may choose to err on the side of caution in light of the design elements' close association with material that is *clearly* expressive. But practically speaking, the protective buffer can only extend so far if courts are to avoid the *Lochner*-like absurdities that would follow from wholesale constitutional protection for tech.

B. Degrees of Scrutiny

So far, this Article has addressed only the basic question of whether the First Amendment is in play at all when the government regulates addictive design. But in those cases where the First Amendment does come into play, it will become necessary to determine how far the Constitution's protections extend. Here lie the usual black-letter questions about the appropriate level of scrutiny, the adequacy of the means-end fit, and so on.

This Article discusses a couple of doctrinal details that can be made out today, but the likely state of the doctrine over the next decade or so is too fluid to speak with precision. The Supreme Court's almost limitless view of the reach of "speech," together with its determination to apply strict scrutiny to every form of content regulation, is plainly unsustainable within an economy and society that is increasingly built around information both as an economic resource and as an apparatus of industrial control.³⁵⁶ To date, courts have not formulated a clear and workable theory to describe software's

down a law against the sale of consumer data to name-brand pharmaceutical retailers. 564 U.S. 552, 580 (2011). There was no need for the Court to say definitively that the data was actually speech, though the Court hinted strongly at it. *See generally id.* Instead, it was enough for the Court to identify the pharmaceutical data as an important input in the expressive business of marketing and to say that the law discriminated among marketers by denying them that input on a content- and viewpoint-selective basis. *See id.* at 571.

355. *See* Kevin Roose, *The Making of a YouTube Radical*, N.Y. TIMES (June 8, 2019), <https://www.nytimes.com/interactive/2019/06/08/technology/youtube-radical.html> [<https://perma.cc/TP49-UPRC>]; Tufekci, *supra* note 140; Chris Welch, *Netflix Now Lets You Disable Post-Play to Avoid Binge Watching Entire TV Seasons*, VERGE (Jan. 27, 2014, 4:13 PM), <https://www.theverge.com/2014/1/27/5351268/netflix-now-lets-you-disable-post-play-avoid-binge-watching-tv> [<https://perma.cc/RA7A-C3PC>].

356. *See* Ashutosh Bhagwat, *When Speech Is Not "Speech,"* 78 OHIO ST. L.J. 839, 843–50 (2017) (describing a "coverage crisis" in which the Supreme Court increasingly views all forms of communication and information sharing as speech and applies strict scrutiny to content regulation of all kinds).

place in the universe of First Amendment speech, let alone worked out a doctrinal framework.

One point is relatively clear today, and that is that certain modest efforts to regulate habit-forming apps can probably slide in under rational basis review. This is for two reasons. First, the First Amendment's protections for commercial speech do not extend to deceptive advertising.³⁵⁷ Second, the Court has allowed the government to require product labeling where doing so is reasonably related to the goal of preventing consumer deception.³⁵⁸ When the government requires advertising content to consist of "purely factual and uncontroversial information," the Court has held that those requirements are not "unjustified or unduly burdensome."³⁵⁹

Above, this Article suggested that near-term regulatory efforts may include a crackdown on aggressive monetization in children's products.³⁶⁰ Under their authority to police deceptive practices, the FTC or similar state-level agencies could push developers either to remove certain habit-forming features from children's products or to attach warning labels for parents.³⁶¹ At least some of these measures should be able to avoid heightened scrutiny altogether even assuming that the First Amendment covers the app in question.

Beyond this point, however, the degree of First Amendment protection, if any, is wide open. One aspect of this contingency has to do with the basic question discussed above: whether the design techniques under regulatory scrutiny constitute speech for First Amendment purposes and, if they do, on what basis? The answers in this area will inform the question not only of whether the regulation of addictive UX design brings the First Amendment into play at all, but also of whether that regulation should count as truly content discriminatory or not. If a loot box is considered "speech," then a loot box ban is content discriminatory. If a loot box is not considered "speech," on the other hand, then a ban on loot boxes may be considered a content-neutral burden on video games that profit from loot boxes.

And it may well turn out that the Court determines the level of scrutiny based on broader equities rather than the formal divide between content-based and content-neutral regulation. Most of the Supreme Court had an easy time applying the formal approach, and ultimately strict scrutiny, in a low-stakes case involving the ill counsels of violent video games.³⁶² But in cases involving international terrorism or even "speech advocating drug use," even

357. *Cent. Hudson Gas & Elec. Corp. v. Pub. Serv. Comm'n*, 447 U.S. 557, 563 (1980) ("[T]here can be no constitutional objection to the suppression of commercial messages that do not accurately inform the public about lawful activity. The government may ban forms of communication more likely to deceive the public than to inform it.")

358. *Zauderer v. Office of Disciplinary Counsel*, 471 U.S. 626, 628 (1985) ("[A]n advertiser's rights are adequately protected as long as disclosure requirements are reasonably related to the State's interest in preventing deception of consumers.")

359. *Id.* at 651.

360. *See supra* Part II.A.

361. *See supra* Part II.A.

362. *Brown v. Entm't Merchs. Ass'n*, 564 U.S. 786, 800 (2011).

today's highly speech-protective Court has shown itself startlingly capable of inventing new and more deferential tests.³⁶³ If a strong consensus emerges that behavioral manipulation by big tech constitutes a serious threat to the public, then the Court's First Amendment doctrine may adapt to that consensus in unpredictable ways.

The level of scrutiny will depend still more broadly on the long-term status of tech platforms and computing within the constitutional order. The issues here are important enough to public policy and challenging enough to existing doctrine that it would not be surprising to witness a period of deep doctrinal modification at the Supreme Court over the coming decades.

Today, tech platforms call on the First Amendment and its statutory adjunct, § 230 of the CDA, as a regulatory shelter.³⁶⁴ It seems clear that this shelter is beginning to weaken. In 2018, Congress qualified § 230 for the first time in the Stop Enabling Sex Traffickers Act,³⁶⁵ a law that holds platforms liable for knowingly assisting, facilitating, or supporting sex trafficking.³⁶⁶ And on the First Amendment front, it becomes harder every year to maintain the posture that computing and the internet consist either entirely or even mostly of expressive activity. It will not be long before courts are forced to mark off certain nonexpressive uses of information as either unprotected or less protected.

It is even possible that some app developers and online platforms may face a total reversal of fortune with respect to free speech law and norms. If the legal and policy communities come to view the largest online platforms as *de facto* regulators of speech and society, then courts may constitutionalize their activities through some modification of the state action doctrine. Or, as this Article's author has urged in a previous paper, courts may allow government extra room to ensure that these private regulators protect civil rights and liberties.³⁶⁷ The effect in either case would be to put big tech on the back foot and to give government a free hand.

CONCLUSION

This Article has focused mainly on developers' efforts, through applied behavioral science, to maximize time on device by encouraging users to form habits. But note that habit-forming design represents only a crude application of a wider technology of behavioral manipulation that grows more sophisticated every year.

It is too indirect to say that Facebook and Google monetize their products by "placing ads." It is better to say that these firms' actual "product" consists

363. See *Holder v. Humanitarian Law Project*, 561 U.S. 1, 2 (2010) (holding that the law may prohibit giving "material support" for lawful activities of designated foreign terrorist organizations); *Morse v. Frederick*, 551 U.S. 393, 406 (2007) (holding that schools may prohibit speech, here "BONG HiTS 4 JESUS," that can be reasonably interpreted as advocating drug use).

364. See *supra* notes 315–16 and accompanying text.

365. See 47 U.S.C. § 230(e)(5) (2012).

366. See *id.*

367. See generally Langvardt, *supra* note 280.

in the ability to raise the odds that a targeted consumer will perform a desired action following a behavioral cue. At some point, through pervasive surveillance and conditioning and visual stimuli embedded in users' contact lenses,³⁶⁸ some tech developers may become so good at raising the odds of a purchase that probability approaches certainty and persuasion approaches control. As the always PR-challenged Boundless Mind (formerly Dopamine Labs) boasts in their own promotional materials, "we've built a Skinner box more powerful than anything B.F. [Skinner] himself could have imagined in his wildest dreams."³⁶⁹

Even now, after all of the criticism that has been leveled against big tech, the basic threat to freedom and dignity has received relatively little public attention.³⁷⁰ But the issue is simply too immense to ignore forever. There will eventually be calls to impose some restraints on overreaching platforms, and to extend some shelter to objectors who wish to disconnect from the behaviorist machine. Doing so will involve deep political, practical, and most likely constitutional difficulty. By taking habit-forming design seriously, as a legitimate subject matter for public concern and later for public regulation, we can begin to develop the social capacity to confront those challenges skillfully.

368. See Doug Bolton, *Samsung Patents Design for "Smart" Augmented Reality Contact Lenses*, INDEPENDENT (Apr. 6, 2016), <https://www.independent.co.uk/life-style/gadgets-and-tech/news/samsung-smart-contact-lenses-patent-a6971766.html> [https://perma.cc/KCV8-B5KL].

369. See Matt Mayberry, *How a 1930's Harvard Student Laid the Groundwork for Facebook Likes*, BOUNDLESS MIND (Mar. 22, 2018), <https://www.boundless.ai/blog/how-a-1930s-harvard-student-laid-the-groundwork-for-modern-phone-addiction/> [https://perma.cc/WCH7-XXTP].

370. Some notable books over the past year or so, however, have taken the free will problem on directly. See, e.g., BRETT FRISCHMANN & EVAN SELINGER, RE-ENGINEERING HUMANITY (2018); ZUBOFF, *supra* note 159.