

# ALL FUN AND (MIND) GAMES? PROTECTING CONSUMERS FROM THE MANIPULATIVE HARMS OF INTERACTIVE VIRTUAL REALITY

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## Abstract

*Information technologies increasingly influence our daily lives. While mostly benign, revolutionarily affective technologies are emerging that pose potential autonomy, economic, and privacy harms to consumers. Interactive virtual reality, or VR gaming, is arguably chief among them. But despite its rapid adoption by consumers (often for use by children) and its demonstrable power to manipulate human cognition and behavior, the law is ill-equipped to curtail its harms. This is owed to a general incognizance of the now-extensive research on the technology’s manipulative effects and the consequent lack of discussion in public forums on how best to constrain them, both doctrinally and practically. This Article aims to enlighten lawmakers, jurists, and the general public about the effects of interactive VR, demonstrate how First Amendment doctrine permits the constraint of its manipulative harms, and illustrate what those constraints might look like in practice. In doing so, it raises the question: what or who is being played—the game or the consumer?*

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*“[W]e’re really proud to be able to say we can change the brain. We can change behavior, do positive things to make a difference for people with disabilities or mental health conditions and all of that. But if you’re going to say that, you’ve got to accept the flip side of the coin.”*

—Albert Rizzo, Director of Medical Virtual Reality, USC<sup>1</sup>

## INTRODUCTION

Virtual reality (VR) is often compared to the Wachowski sisters’ hit film, *The Matrix*.<sup>2</sup> It is obvious why, so I will not belabor the point. I do, however, submit one more mind-boggling film into the equation. In Christopher Nolan’s *Inception*,<sup>3</sup> an “extractor” named Arthur explains to Japanese businessman Saito the difficulty of planting an idea in someone’s subconscious (what the film calls “inception”), only for his partner “Dom” Cobb to contradict him:

Arthur: Okay, here’s me planting an idea in your head. I say to you:  
don’t think about elephants. What are you thinking about?

Saito: Elephants.

1. Brian Crecente, *‘We’re Running with Scissors’: Why Some Experts Worry About VR Dangers*, POLYGON (Apr. 7, 2017), <http://www.polygon.com/features/2017/4/7/15205366/vr-danger-close>.

2. THE MATRIX (Warner Bros. 1999).

3. INCEPTION (Warner Bros. 2010).

Arthur: Right, but it's not your idea because I gave it to you. The subject's mind can always trace the genesis of the idea. True inspiration is impossible to fake.

Cobb: That's not true.

As it turned out, Cobb was right; the protagonists proceeded to successfully plant the idea of breaking up his father's energy conglomerate in Robert Fischer's mind.<sup>4</sup> While real-life inception may not be possible, the human mind is malleable enough to be subject to a great deal of idea-planting.<sup>5</sup> The use of a mix of technology and psychology to manipulate people into thinking, feeling, or doing one thing or another forms the basis of business marketing,<sup>6</sup> political campaigning,<sup>7</sup> and police interrogations,<sup>8</sup> among other activities. These techniques may be off-putting, but they are by and large legal.<sup>9</sup> But what if a technology came along that was unparalleled in its ability to subtly alter people's preferences and behaviors? What if it was marketed as entertainment, perhaps for your children? For the reasons presented in this Article, VR games pose precisely that risk—one that can and should be constrained by law.

VR has advanced considerably, both technologically and in popularity, in recent years. Google's Vice President of Virtual Reality recently remarked that within ten years, VR will create experiences so immersive that they will be indistinguishable from reality.<sup>10</sup> While VR has a variety of applications, its greatest growth has been in video games.<sup>11</sup> VR was arguably advanced the most by Palmer Luckey, a "video game enthusiast," and John Carmack, a renowned

4. *Id.*

5. See S.C. Matz et al., *Psychological Targeting as an Effective Approach to Digital Mass Persuasion*, 114 *Proceedings of the National Academy of Sciences* 12714 (2017) (finding that appealing to individuals' unique psychologies significantly alters their behavior); see also NORMAN DOIDGE, *THE BRAIN THAT CHANGES ITSELF: STORIES OF PERSONAL TRIUMPH FROM THE FRONTIERS OF BRAIN SCIENCE* xix-xx (2007) (discussing neuroplasticity—the brain's ability to "change its own structure and function through thought and activity"—and warning that "it renders our brains not only more resourceful but also more vulnerable to outside influences").

6. DOUGLAS VAN PRAET, *UNCONSCIOUS BRANDING: HOW NEUROSCIENCE CAN EMPOWER (AND INSPIRE) MARKETING* (2012).

7. See Sue Halpern, *Mind Games: How Campaigns Are Using Marketing, Manipulation, and "Psychographic Targeting" to Win Elections—and Weaken Democracy*, *NEW REPUBLIC* (Oct. 18, 2018), <https://newrepublic.com/article/151548/political-campaigns-big-data-manipulate-elections-weaken-democracy> (explaining the role personal data collection plays in manipulating voters); see also DREW WESTEN, *THE POLITICAL BRAIN: THE ROLE OF EMOTION IN DECIDING THE FATE OF THE NATION* (2008) (detailing why voters are vulnerable to such manipulation).

8. See RICHARD A. LEO, *POLICE INTERROGATION AND AMERICAN JUSTICE* (2008).

9. See *infra* Part II (discussing exceptions to the rule that such speech is protected).

10. See David Pierce, *Inside Google's Plan to Make VR Amazing for Absolutely, Positively Everyone*, *WIRED* (Apr. 14, 2016), <https://www.wired.com/2016/04/google-vr-clay-bavor>.

11. See *Oculus Expected to Sell 1.3M Quest Units in 2019; XR Revenue Reached \$6.6B in 2018 and is Projected to Increase 442% by 2022*, *SUPERDATA RES.* (Jan. 24, 2019), <https://www.superdataresearch.com/xrupdate/> (noting that games earned 43% of VR's \$1.2 billion software revenue in 2018); see also John Gaudiosi, *Virtual Reality Video Game Industry to Generate \$5.1 Billion in 2016*, *FORTUNE* (Jan. 5, 2016), <http://fortune.com/2016/01/05/virtual-reality-game-industry-to-generate-billions/>; Nick Wingfield, *Popularity of Sony's PlayStation VR Surprises Even the Company*, *N.Y. TIMES* (Feb. 26, 2017), <https://www.nytimes.com/2017/02/26/business/sony-playstation-vr-sales.html> (citing data showing that PlayStation VR, a VR head-mounted display (HMD) used in conjunction with a PlayStation video game console, has vastly outsold the Oculus Rift and HTC Vive).

video game programmer who is now the Chief Technology Officer at Oculus VR.<sup>12</sup> In 2017, Mark Zuckerberg, Chief Executive Officer of Oculus's parent company Facebook, set a goal of achieving an install base of 1 billion users.<sup>13</sup> According to industry forecasts, the market will be halfway there by 2025,<sup>14</sup> when software consumption will have far outpaced hardware purchases.<sup>15</sup> VR games look poised to continue to drive software growth for the foreseeable future.<sup>16</sup>

When Zuckerberg made his announcement, he alluded to the fact that the sector is fraught with potential liabilities.<sup>17</sup> It should thus be unsurprising that the rapid adoption of this revolutionary technology has been trailed by a flurry of writings about it in the legal literature. The two who have most comprehensively taken up this task—Mark Lemley and Eugene Volokh—primarily address criminal and tortious online interactions between different VR users,<sup>18</sup> though they also touch on consumer privacy, intellectual property (IP), and antitrust issues.<sup>19</sup> They largely overlook the less obvious but equally prominent psychological and behavioral harms that the technology can uniquely inflict on users.<sup>20</sup> Consequently, they underestimate the need for constraints overall, advocating instead for a “hands-off approach to regulation of VR,”<sup>21</sup> and

12. Complaint at 2–3, *ZeniMax Media, Inc. v. Oculus VR, LLC*, 166 F. Supp. 3d 697 (N.D. Tex. 2015) (No. 14 Civ. 1849).

13. Betsy Morris, *Facebook Sets Goal of a Billion Virtual-Reality Users, Unveils New Headset*, WALL ST. J. (Oct. 11, 2017), <https://www.wsj.com/articles/facebook-sets-goal-of-a-billion-virtual-reality-users-unveils-new-headset-1507764852>.

14. Gene Munster et al., *Next Mega Tech Theme Is Virtual Reality*, PIPER JAFFRAY (2015). In fact, the estimate is for the adoption of 500 million HMDs, so the number of unique users is likely to far surpass that number given that multi-member households will likely share an HMD.

15. See *Industry Insights*, GRAND VIEW RES. (May 2017), <https://www.grandviewresearch.com/industry-analysis/virtual-reality-vr-market>.

16. See Don Karl et al., *2019 Augmented and Virtual Reality Survey Report*, PERKINS COIE (2019) (citing a survey of industry experts predicting games will continue to attract the majority of industry investment over the next year).

17. See Morris, *supra* note 13 (“We want to make sure [VR is] safe, a force for good . . .”).

18. See Mark Lemley & Eugene Volokh, *Law, Virtual Reality, and Augmented Reality*, 166 U. PENN. L. REV. 1051, 1057 (2018).

19. *Id.* at 1111–13, 1125–28, 1130–32.

20. The authors do note that VR elicits greater psychological, behavioral, and physiological responses than other media, citing a handful of news reports and scientific studies to that effect. *Id.* at 1065–66, 1128. However, they draw overly narrow conclusions from this research, using it to infer that VR can have “physical consequences,” such as being frightened to death by a visceral horror game or (in a more contrived scenario) “deliberately creating a strobe effect in VR precisely to play a nasty prank on someone you know to be endangered by this,” rather than addressing the more direct, likelier harms that the research contemplates. *Id.* at 1066, 1081. Alternatively, they discuss the potential for government-mandated trainings (e.g., using VR to put employees in the shoes of victims of sexual harassment to promote empathy, or to develop soldiers’ pain resistance). *Id.* at 1128–29. Again, however, the focus is on pseudo-physical harms such as “virtual groping.” *Id.* at 1129. They raise questions of public or private attempts to change people’s “beliefs or moral attitudes” through such trainings, but do not answer them. *Id.* The rest of their article makes little mention of the psychological and behavioral effects of VR.

21. *Id.* at 1135. To be fair, the authors cabin their recommendation to the present state of affairs. *Id.* And their point that the premature regulation of new technologies can have unintended negative consequences is well taken. *Id.* at 1135–36. Still, many of the harms the authors contemplate stem from potential interactions in still-budding online communities that, as they note, may or may not materialize and, if they do, may not be severe enough to warrant regulation. *Id.* Conversely, because psychological and behavioral manipulation is innate to popular interactive VR setups, many users are *already* being harmed each time they put on an HMD to play a

in turn fail to conceive of a First Amendment doctrine that would allow for sufficient VR software constraints.<sup>22</sup> Others have taken up similar issues with similar shortcomings, namely the failure to address VR's psychosocial harms,<sup>23</sup> the consequent need for constraints, including through products liability,<sup>24</sup> and relevant First Amendment issues accompanying such constraints.<sup>25</sup> All of these

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game. See *infra* Part I. Their suggestion is sensible in light of the former, but less so in light of the latter. The authors do dedicate one part of their paper to potential tort lawsuits that could remedy VR's harms, but most of these measures are targeted at harms caused by other users. *Id.* at 1101–17. The one type of lawsuit they propose that could address harms caused by the software itself (e.g., when a VR user “stumble[s] over a glass table” or “walk[s] into a houseguest”)—products liability suits against VR software manufacturers—does not get at the psychosocial harms caused by the software. *Id.* at 1055 n.10, 1104–1106.

22. That is not to suggest the authors do not address First Amendment law, only that they do not adequately address the law as it pertains to interactive VR's manipulative harms. For example, the authors' reliance on analogizing to aeronautical charts and compasses to argue that the directional “instructions provided by . . . VR . . . headsets” should be considered products may avoid First Amendment issues implicated by applying strict products liability to software, *id.* at 1105–06, but the analogy does not work when applied to expressive VR software. Additionally, the authors raise the possibility of certain VR spaces receiving the same speech protections and being subject to the same restrictions as real-life company towns and, in some states, privately owned shopping malls. *Id.* at 1132–34. But they also note persuasive counterarguments to that approach, including recent district court rulings protecting search engines' right to control what appears in their search results. *Id.* at 1133; see also *Dreamstime.com, LLC v. Google, LLC*, 2019 WL 2372280, at \*2 (N.D. Cal. June 5, 2019) (citing four district court rulings with that holding). Even if courts bought the analogy, it still does not provide a means of constraining otherwise protected speech transmitted through a manipulative medium. Lastly, the authors raise more questions than they answer on the speech-conduct distinction in VR spaces. Lemley & Volokh, *supra* note 18, at 1136–37. The latter essentially holds that nonexpressive conduct unprotected in real life would not be protected in VR spaces (e.g., driving a virtual car in a manner and under circumstances akin to driving an actual one). Even if the authors embraced the argument, it simply does not cover a great deal of harmful VR software that is and will be expressive. There are also sound arguments that such conduct in VR spaces would in fact be entitled to First Amendment protection. See Marc Jonathan Blitz, *The Freedom of 3D Thought: The First Amendment in Virtual Reality*, 30 CARDOZO L. REV. 1141 (2008).

23. There is a general oversight in the literature concerning VR's psychological and behavioral harms. See, e.g., Roya Bagheri, *Virtual Reality: The Real Life Consequences*, 17 U.C. DAVIS BUS. L.J. 101 (2017) (discussing only consumer privacy, IP, and physical tort harms); Ellii Cho, *Copyright or Trade Dress? Toward IP Protection of Multisensory Effective Designs for Immersive Virtual Environments*, 33 CARDOZO ARTS & ENT. L.J. 801 (2015) (IP harms); Joshua A.T. Fairfield, *Mixed Reality: How the Laws of Virtual Worlds Govern Everyday Life*, 27 BERKELEY TECH. L. J. 55 (2012) (consumer privacy, IP, reputational, contract, and property harms); Roderick O'Dorisio, *Torts in the Virtual World*, 94 DENV. L. REV. ONLINE 1 (2017) (physical and pseudo-physical tort harms); Jaclyn Seelagy, *Virtual Violence*, 64 UCLA L. REV. DISCOURSE 412 (2016) (crimes); Gilad Yadin, *Virtual Reality Exceptionalism*, 20 VAND. J. ENT. & TECH. L. 839 (2018) (crimes and Fourth Amendment privacy harms); Gilad Yadin, *Virtual Reality Surveillance*, 35 CARDOZO ARTS & ENT. L.J. 707 (2017) (Fourth Amendment privacy harms); Gilad Yadin, *Virtual Reality Intrusion*, 53 WILLAMETTE L. REV. 63 (2016) (crimes).

24. While one author touched on some cognitive risks and the potential applicability of products liability, she dismissed the latter on the grounds that VR experiences are still too intangible. See Crystal Nwaneri, *Ready Lawyer One: Legal Issues in the Innovation of Virtual Reality*, 30 HARV. J.L. & TECH. 601, 625 (2017) (also discussing IP and consumer privacy harms, and, briefly, cognitive and behavioral harms). Another pair of authors who discussed products liability focused on physical harms flowing from use of the HMD software, rather than that of games. See David E. Fink & Jamie N. Zagoria, *VR/AR in a Real World*, 33 ENT. & SPORTS LAW. 1 (2016) (same).

25. Take, for instance, treatments of two famous video game cases: *Brown v. Entm't Merchants Ass'n*, 564 U.S. 786 (2011); and *Wilson v. Midway Games, Inc.*, 198 F. Supp. 2d 167 (D. Conn. 2002). At least one other commentator identified most components of the *Brown* “objective effects” test, but did not apply it to VR. Ryan Pree, Note, *Free Speech After Brown v. Entertainment Merchants Association*, 14 J.L. IN SOCIETY 245, 266–67 (2013). Another predicted that regulations of VR games would likely fail the test on the ground that scientific studies will not show such games produce legally cognizable effects distinguishing them from other media, and so instead focused his argument on a narrow “terroristic speech” exception. Robert Hupf, “*Step into the Game*”: *Assessing the Interactive Nature of Virtual Reality Video Games through the Context of “Terroristic Speech*,” 19 VIRGINIA J.L. & TECH. 602 (2015). Others cautiously suggested that video games may reach a

authors raise important problems that legislatures and courts will inevitably have to consider if not solve. The problem is not that they cannot see the forest for the trees, but that they are overlooking an especially prominent tree: interactive VR's unique and powerful ability to influence human thought and behavior.<sup>26</sup>

This Article contributes to the nascent discussion on VR law by filling these gaps in the literature. In Part I, I detail the various psychological and behavioral harms posed by VR games and why those harms are unique to VR games, as opposed to VR software generally. In Part II, I show why constraints on VR games would not pose insurmountable First Amendment obstacles under existing jurisprudence. In Part III, I briefly consider different approaches to constraining VR games, namely product safety regulation and products liability. In Part IV, I outline how a plaintiff might make their case under products liability law. Through this exercise, I demonstrate that VR games increasingly impose psychosocial costs on consumers and society in the form of manipulation and

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technological “tipping point” that *may* justify their regulation under *Brown* and also focused on the qualitative differences, rather than the objective effects, of VR. *See, e.g.,* Eric T. Gerson, *More Gore: Video Game Violence and the Technology of the Future*, 76 BROOKLYN L. REV. 1121, 1157 (2011); Garrett Mathew-James Mott, *Game Over for Regulating Violent Video Games? The Effect of Brown v. Entertainment Merchants Ass’n on First Amendment Jurisprudence*, 45 LOYOLA L.A. L. REV. 633, 650–52 (2012); Lindsay E. Wuller, *Losing the Game: An Analysis of the Brown v. Entertainment Merchants Association Decision and Its Ramifications in the Area of “Interactive” Video Games*, 57 ST. LOUIS U. L.J. 457, 489–90 (2013). Concededly, much of the research demonstrating VR’s objective effects postdates these writings. Likewise, some arguments simply predated *Brown* and thus did not address the objective effects test. Eric T. Gerson, *Video Game Violence and the Technology of the Future*, 76 BROOK. L. REV. 1121 (2011). Even if commentators had applied the test to modern VR games, they would have found that it permits only limited constraints. *See infra* Part II.A. This Article considers less explored pathways to constraining VR’s manipulative harms. *See infra* Part II.B–C.

Treatments of *Wilson* are also incomplete, noting its holding that the video game software at issue was too intangible to be considered a product, but ignoring the impact-tangibility standard that this Article argues it introduced. Jonathan M. Proman, *Liability of Media Companies for the Violent Content of Their Products Marketed to Children*, 78 ST. JOHN’S L. REV. 427, 429 n.5, 436–37 (2012); Joseph L. Reutiman, *Defective Information: Should Information Be a “Product” Subject to Products Liability Claims?*, 22 CORNELL J.L. & PUB. POL’Y 181, 194 (2012); Mika Sharpe, *Products Liability in the Digital Age: Liability of Commercial Sellers of CAD Files for Injuries Committed with A 3d-Printed Gun*, 68 AM. U. L. REV. 2297, 2315, 2327–28 (2019) (citing *Wilson*). One author argued that *Wilson* does not address software that “functionally is a physical product,” such as a software-integrated braking system. David Berke, *Products Liability in the Sharing Economy*, 33 YALE J. ON REG. 603, 616 (2016). This argument, though similar in its functionalism, is otherwise distinct from the impact-tangibility standard. *Compare infra* Part IV.A.

26. Marc Jonathan Blitz clairvoyantly predicted the tree would be there in 2008; perhaps more impressive, the science fiction authors he cites did so decades earlier. However, although he raised some of these harm potentialities—namely dissociative disorders and addiction—he did so by relying more on science fiction than science. Blitz, *supra* note 22, at 1225–42. This is not a slight, but rather an acknowledgment that much of the science on the subject postdates his article. While Blitz also explored avenues for regulation that would avoid or survive strict First Amendment scrutiny, his arguments have not aged well. For instance, Blitz postulated that some VR speech, such as making another person’s indistinguishable doppelganger act inconsistently with their real self, may be unprotected as “misleading.” *Id.* at 1231. More likely, it would be unprotected defamation. In either case, he does not address the fact that VR games in themselves are misleading, or manipulative. Blitz also, in conclusory fashion, found simply “that the physiological effects associated with [VR] addiction would probably justify some degree of state intervention even if VR was normally protected.” *Id.* at 1235–36. Lastly, Blitz argued that a “VR experience would almost certainly (and should) have lower First Amendment protection (if any at all) when the cruelty it depicts is a recording of real cruelty inflicted on actual individuals.” *Id.* at 1237. However, depictions of real-life violence do not fall under the historical categories of low-value speech. *Cf. United States v. Stevens*, 559 U.S. 460 (2010) (holding as much for depictions of animal cruelty). Though there may be a compelling interest in regulating such depictions, that route is unlikely to stem the majority of harms flowing from VR games’ fictionalized violence.

potentially other harms, and propose doctrines and constraints that can be used to address them. In particular, I argue that VR game developers and publishers can (constitutionally) and should (from a public policy perspective) be required to warn of the manipulative effects their products cause.

## I. THE MANIPULATIVE HARMS OF VIRTUAL REALITY GAMES

Before embarking on a lengthy discussion as to how interactive VR (i.e., VR gaming) can constitutionally be constrained and which constraints are optimal, it seems logical to start with *why* such a discussion is necessary. The very notion of playing games betrays a sense of fun, and popular suggestions that video games cause violence and other serious adverse effects have largely been debunked.<sup>27</sup> This Part examines the various interfaces through which VR can be experienced and their associated psychological, behavioral, and physiological effects.<sup>28</sup> The aim is to deduce, through a rough meta-analysis, the variety and extent of the psychosocial effects produced by VR games. In so doing, it demonstrates that VR games, as opposed to non-VR games and non-game VR software, are uniquely capable of manipulating consumers. The effects confirmed by the literature are then translated into legally cognizable harms, subject to governmental constraints.

### A. *The Manipulative Effects of Virtual Reality Games*

#### 1. *Cognitive Psychology*

The cognitive psychology literature shows why VR games pose greater challenges than other VR software, which in turn pose more challenges than non-VR experiences. “[C]ognition is grounded in multiple ways, including simulations, situated action, and . . . bodily states,” including the body’s relationship to the environment.<sup>29</sup> VR is often used to test the latter, called “embodied cognition theory.” In one study, some elementary school children were read a false narrative about a time they swam with orca whales, while others were shown in VR their virtual doppelgangers swimming with such whales; head-tracking, interactive controls, and haptic feedback were not used.<sup>30</sup> The former had no effect, but the latter elicited false memory formation—when interviewed five days later, over half the children falsely believed that they had actually swam with whales.<sup>31</sup> “This finding suggests that third parties may be able to elicit false memories without the consent or mental effort of an individual,” through the use of VR.<sup>32</sup> The researchers suggested that a more

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27. Christopher J. Ferguson, *Do Angry Birds Make for Angry Children?*, 10 PERSPECTIVES ON PSYCHOL. SCI. 646 (2015).

28. Cf. J.O. Bailey et al., *When Does Virtual Embodiment Change Our Minds?*, 25 PRESENCE 222, 224–25 (2016).

29. Lawrence W. Barsalou, *Grounded Cognition*, 59 ANN. REV. PSYCHOL. 617, 619 (2008).

30. Kathryn Y. Segovia & Jeremy N. Bailenson, *Virtually True*, 12 MEDIA PSYCHOL. 371 (2009).

31. *Id.* at 384–85.

32. *Id.* at 388.

immersive VR interface could elicit a higher rate of false memory formation in children.<sup>33</sup> To one of the researchers, the main takeaway was clear: “Virtual experiences can change the cognitive structure of your brain,” in a way that non-VR experiences cannot.<sup>34</sup>

Even among VR experiences, there is great variation in cognitive effects depending on the level of immersion and interactivity. In one study, researchers examined whether a virtual avatar’s body movements can change a person’s space-valence associations.<sup>35</sup> The VR experience was interactive in that participants’ arm movements affected their digital avatar’s arm movements, and provided visual feedback in that each time they “touched” a virtual block it would move locations.<sup>36</sup> The software could fairly be characterized as a VR game.<sup>37</sup> The findings suggested that interactive VR experiences with purely visual feedback are not sufficient to influence cognition, but interactivity plus visual and haptic feedback may be.<sup>38</sup> Indeed, when in a later study participants “embodied” a cow and coral in VR, the use of visual and haptic feedback (e.g., feeling vibrations when the cow avatar was poked with a cattle prod) elicited higher levels of body transfer and a longer-lasting feeling of interconnectedness with nature than purely visual feedback, which in turn generated greater body transfer than watching the experience on a monitor without VR.<sup>39</sup> In addition to the type of feedback, other studies suggest that different control schemes affect the level of body ownership and agency that participants feel over novel appendages in VR.<sup>40</sup> One study found that a more realistic controller (e.g., pulling a trigger as opposed to clicking a mouse to shoot) and a larger field of view (e.g., VR as opposed to a computer monitor) induced greater aggression and presence among violent video game players.<sup>41</sup> Interactive, immersive VR experiences, namely VR games, elicit greater cognitive effects than passive VR software, which in turn has greater effects than limited-immersion experiences like reading or watching film.

## 2. Behavioral Psychology

The body transfer achieved by VR has real-world behavioral consequences. In one study, participants who embodied a taller avatar in VR were more assertive during real world negotiations than those who embodied shorter ones.<sup>42</sup>

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33. *Id.* at 387–88.

34. Paul Solman, *Seeing Is Believing*, PBS (July 11, 2013), <https://vhil.stanford.edu/mm/2013/pbs-seeing-is-believing.pdf>.

35. Bailey et al., *supra* note 28, at 222.

36. *Id.* at 226–27.

37. *See id.* at 222, 230 (comparing the experiment’s VR experience with video games).

38. *Id.* at 222, 229–30.

39. S.J. Ahn et al., *Experiencing Nature: Embodying Animals in Immersive Virtual Environments Increases Inclusion of Nature in Self and Involvement with Nature*, 21 J. COMPUTER-MEDIATED COMM’N 399, 403–09 (2016).

40. B. Laha et al., *Evaluating Control Schemes for the Third Arm of an Avatar*, 25 PRESENCE 129 (2016).

41. K.J. Kim & S.S. Sundar, *Can Interface Features Affect Aggression Resulting from Violent Video Game Play?*, 16 CYBERPSYCHOL., BEHAVIOR, & SOCIAL NETWORKING 329 (2013).

42. N. Yee et al., *The Proteus Effect*, 36 COMM’N RESEARCH 285 (2009).

In another study, men who watched in VR as their virtual doppelgangers ate either healthy or unhealthy food, and rapidly gain or lose weight accordingly, were more likely to imitate the doppelgangers and eat candy than men who experienced no visual change.<sup>43</sup> Similarly, participants who watched their virtual doppelgangers exercise in VR were more likely to exercise in real life than those who watched them stand still or avatars that did not look like them exercise.<sup>44</sup> Interacting with an age-progressed rendering of themselves in VR made participants in another study exhibit increased saving behavior.<sup>45</sup> Participants who took a virtual shower in VR and received both haptic and visual feedback of the amount of energy consumed by their hot water usage were more likely to use cooler water when washing their hands in the real world.<sup>46</sup> Apart from the “shower” study, none of the studies permitted interactivity beyond looking around the virtual environment nor incorporated haptic feedback. Thus, even a passive, visual-feedback-only VR experience is sufficient to significantly alter short-term behavior.<sup>47</sup>

These effects are unlike anything that can be achieved in traditional media. Embodying the avatar of a person with a visual disability (i.e., wearing a VR device with a colorblind filter), significantly more so than perspective taking (i.e., imagining what it would be like to be colorblind), “[led] participants to voluntarily spend twice as much effort to help persons with colorblindness compared to participants who had only imagined being colorblind.”<sup>48</sup> Embodying an opponent in VR caused participants to make greater concessions during a negotiation exercise than those who were simply given information about the opponent’s perspective.<sup>49</sup> Seeing the negative health consequences of soft drink consumption on the body in VR after reading a health pamphlet reduced such consumption one week after treatment, significantly more so than only reading the pamphlet.<sup>50</sup> These studies illustrate how VR influences user behavior much more so than reading literature, which some have analogized to

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43. J. Fox et al., *Virtual Experiences, Physical Behaviors: The Effect of Presence on Imitation of an Eating Avatar*, 18 PRESENCE 294 (2009).

44. J.A. Fox & J.N. Bailenson, *Virtual Self-Modeling: The Effects of Vicarious Reinforcement and Identification on Exercise Behaviors*, 12 MEDIA PSYCHOL. 1 (2009).

45. H.E. Hershfield et al., *Increasing Saving Behavior Through Age-Progressed Renderings of the Future Self*, 48 J. MARKETING RESEARCH S23 (2011).

46. J.O. Bailey et al., *The Impact of Vivid and Personal Messages on Reducing Energy Consumption Related to Hot Water Use*, 47 ENV’T & BEHAV. 570 (2015).

47. In line with the aforementioned studies, I use “short-term” to mean up to one week following a VR experience.

48. S.J. Ahn et al., *The Effect of Embodied Experiences on Self-Other Merging, Attitude, and Helping Behavior*, 16 MEDIA PSYCHOL. 7, 7 (2013).

49. H. Gehlbach et al., *Many Ways to Walk a Mile in Another’s Moccasins: Type of Social Perspective Taking and Its Effect on Negotiation Outcomes*, 52 COMPUT. IN HUM. BEHAV. 523 (2015).

50. S.J. Ahn, *Incorporating Immersive Virtual Environments in Health Promotion Campaigns: A Construal Level Theory Approach*, 30 HEALTH COMM. 545 (2015).

playing video games,<sup>51</sup> and perspective taking, which is heralded as one of the more powerful effects reading literature can have on us.<sup>52</sup>

Further research found that playing violent VR games produces more aggressive feelings in people than playing violent desktop-based games.<sup>53</sup> In a recent study, children between the ages of 4 and 6 who played Simon Says with Grover, a popular *Sesame Street* character, in VR were less able to inhibit their actions and not mimic what Grover did than kids who played with him on TV.<sup>54</sup> Not only does this study further illustrate the unique behavioral effects that VR can achieve compared to playing non-VR games, it raises an obvious and frightening question: what if, instead of Simon Says, those children were playing a game in which they embodied a terrorist engaging in a mass shooting?<sup>55</sup> That in turn raises the question of the effect of interactivity in VR on behavior.

Among VR experiences, increased interactivity has been shown to yield increased behavioral effects. Participants who were given the power of flight “akin to Superman’s” in VR were much more likely to help the experimenter pick up spilled pens, and to pick up more pens, than those assigned to be helicopter passengers; motion-controlled movement and haptic floor vibrations were used.<sup>56</sup> In another study, playing violent video games in VR was more likely to evoke aggressive thoughts in young adults than merely observing the games play out in VR.<sup>57</sup> Likewise, participants who cut down a tree in VR using a haptic joystick controller consumed significantly less paper than those who

51. See, e.g., *Am. Amusement Mach. Ass’n v. Kendrick*, 244 F. 3d 572, 577 (7th Cir. 2001) (Posner, J.) (“Maybe video games are different. They are, after all, interactive. But this point is superficial, in fact erroneous. All literature . . . is interactive . . .”).

52. Amanda Haertling Thein et al., *Perspective-Taking as Transformative Practice in Teaching Multicultural Literature to White Students*, 97 *ENG. J.* 54 (2007).

53. Susan Persky & Jim Blascovich, *Immersive Virtual Environments Versus Traditional Platforms: Effects of Violent and Nonviolent Video Game Play*, 1 *MEDIA PSYCHOL.* 135 (2007). But see Ron Tamborini et al., *Violent Virtual Video Games and Hostile Thoughts*, 48 *J. BROAD. & ELEC. MEDIA* 335 (2004) (finding that playing violent VR games is no more likely to increase hostile thoughts than playing violent non-VR games).

54. J.O. Bailey et al., *Immersive Virtual Reality Influences Children’s Inhibitory Control and Social Behavior*, Paper Presentation at the International Communication’s 67th Annual Conference, San Diego, CA (2017); see Sandee LaMotte, *The Very Real Health Dangers of Virtual Reality*, CNN (Dec. 13, 2017), <https://www.cnn.com/2017/12/13/health/virtual-reality-vr-dangers-safety/index.html> (describing the study).

55. Not only do games like this exist, they are extremely popular. See Patrick Klepek, *That Time Call of Duty Let You Shoot Up an Airport*, KOTAKU (Oct. 23, 2015), <https://kotaku.com/that-time-call-of-duty-let-you-shoot-up-an-airport-1738376241> (describing the in-game mission “No Russian”); Ben Leach, *Call of Duty: Modern Warfare 2 Takes \$1 Billion in Sales*, THE TEL. (Jan. 14, 2010), <https://www.telegraph.co.uk/technology/video-games/6986632/Call-of-Duty-Modern-Warfare-2-takes-1-billion-in-sales.html>. The latest iteration in the *Call of Duty* franchise has been described as “frightening,” because it apparently gives players the opportunity to kill civilians and embody a child soldier, among other things. See Dean Takahashi, *Call of Duty: Modern Warfare Impressions—Taking War in a Frightening Direction*, VENTUREBEAT (May 30, 2019), <https://venturebeat.com/2019/05/30/call-of-duty-modern-warfare-impressions-taking-war-in-a-frightening-direction/> (discussing Infinity Ward studio’s single-player campaign for the forthcoming installment).

56. R.S. Rosenberg, S.L. Baughman & J.N. Bailenson, *Virtual Superheroes: Using Superpowers in Virtual Reality to Encourage Prosocial Behavior*, 8 *PLOS ONE* 1, 1 (2013).

57. Sandra Calvert & Siu-Lan Tan, *Impact of Virtual Reality on Young Adults’ Physiological Arousal and Aggressive Thoughts: Interaction Versus Observation*, 15 *J. APPLIED DEVELOPMENTAL PSYCHOL.* 125 (1994). But see Tamborini et al., *supra* note 53 (finding that playing violent VR games is no more likely to increase hostile thoughts than observing violent games being played).

merely read a description or watched a video of a tree-cutting.<sup>58</sup> These studies further reinforce the notion that VR gaming affects short-term behavior more than passive VR software, which in turn affects behavior significantly more than limited-immersion activities like reading or watching film.

Embodied experiences in VR can also affect how users perceive themselves and others. When light-skinned users embodied a dark-skinned avatar in VR, their implicit racial bias against dark-skinned people in the physical world decreased significantly.<sup>59</sup> Similarly, when domestic abuse offenders embodied female victims in VR, their bias toward classifying victims' fearful faces as happy substantially decreased, potentially mitigating a cause of abuse.<sup>60</sup> On the other hand, women with higher levels of body image disturbance, "a key feature in eating disorders" and something linked to increases in suicidality among adolescents,<sup>61</sup> experienced higher levels of body dissatisfaction when interacting with female avatars of various sizes in VR, particularly in "the populated beach scene."<sup>62</sup> This research supports earlier findings that patients with eating disorders experience distress when exposed to virtual foods and eating environments in VR.<sup>63</sup> Noting that "many video games and virtual worlds are populated by unrealistic, hypersexualized representations of women," one study found that "[p]articipants who wore sexualized avatars internalized the avatar's appearance and self-objectified, reporting more body-related thoughts than those wearing nonsexualized avatars" and that "[p]articipants who saw their own faces, particularly on sexualized avatars, expressed more rape myth acceptance than those in other conditions."<sup>64</sup> The study has serious implications in a world where video games are increasing in popularity and VR gaming is becoming mainstream.<sup>65</sup> Today, 49% of American adults regularly play video games, while 57% of women ages 18–29 play video games.<sup>66</sup> Again, there is an effect premium that VR achieves over traditional media. For example, embodying an elderly person in VR was more effective than perspective taking in mitigating the effects of ageism.<sup>67</sup>

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58. S.J. Ahn et al., *Short-and Long-Term Effects of Embodied Experiences in Immersive Virtual Environments on Environmental Locus of Control and Behavior*, 39 *COMPUT. IN HUM. BEHAV.* 235 (2014).

59. T.C. Peck et al., *Putting Yourself in the Skin of a Black Avatar Reduces Implicit Racial Bias*, 22 *CONSCIOUSNESS & COGNITION* 779 (2013).

60. S. Seinfeld et al., *Offenders Become the Victim in Virtual Reality: Impact of Changing Perspective in Domestic Violence*, 8 *SCI. REP.* 1 (2018).

61. Jennifer Dyl et al., *Body Dysmorphic Disorder and Other Clinically Significant Body Image Concerns in Adolescent Psychiatric Inpatients: Prevalence and Clinical Characteristics*, 36 *CHILD PSYCHIATRY HUM. DEV.* 369 (2006).

62. C.K. Purvis et al., *Developing a Novel Measure of Body Satisfaction Using Virtual Reality*, 10 *PLOS ONE* 1, 1, 10 (2015).

63. M. Ferrer-Garcia & J. Gutierrez-Maldonado, *The Use of Virtual Reality in the Study, Assessment, and Treatment of Body Image in Eating Disorders and Nonclinical Samples: A Review of the Literature*, 9 *BODY IMAGE* 1, 9 (2012).

64. J. Fox, J.N. Bailenson & L. Tricase, *The Embodiment of Sexualized Virtual Selves: The Proteus Effect and Experiences of Self-objectification via Avatars*, 29 *COMPUT. IN HUM. BEHAV.* 930, 930 (2013).

65. *Id.* at 936 (citations omitted).

66. Maeve Duggan, *Who Plays Video Games and Identifies as a "Gamer,"* PEW RES. CTR. (Dec. 15, 2015), <http://www.pewinternet.org/2015/12/15/who-plays-video-games-and-identifies-as-a-gamer/>.

67. S.Y. Oh et al., *Virtually Old*, 60 *COMPUT. IN HUM. BEHAV.* 398 (2016).

Evidence also suggests marketing is more effective in VR. One example is using face-scanning or picture-merging technology to subtly and without detection by the user's conscious morph a VR user's face into a political candidate's,<sup>68</sup> which has been shown in non-VR contexts to increase the likelihood that the user would vote for that candidate.<sup>69</sup> When VR users were made to listen to a persuasive speech by a digital person, the users found the "person" more likeable and persuasive when it subtly mimicked the users' head movements, compared to digital persons that utilized pre-set movements.<sup>70</sup> A combination of these tools—identification and interactivity—may have superordinate effects. VR users who are able to control an avatar in the first-person while it is using a product and its brand (e.g., wearing a shirt with brand logos on it) are more likely to cultivate favorable brand attitude and purchase intention than absent the interactivity or by seeing other avatars use the product and brand.<sup>71</sup> This suggests that already-in-use self-endorsement advertising techniques that utilize only identification but not interactivity will be enhanced in VR environments.<sup>72</sup> This prospect has led some ethicists to warn "that advertising tactics using embodiment technology such as VR can have a powerful unconscious influence on behavior."<sup>73</sup>

### 3. *Physiology*

As the photorealism of VR software increases, so too will its effects on presence.<sup>74</sup> Through the illusion of presence, VR can affect pain receptivity. Four patients with complex regional pain syndrome (CRPS) responded to exercises in VR (with both visual and haptic feedback) much more positively than during normal physical therapy sessions.<sup>75</sup> Another study found that "immersive VR can be an effective nonpharmacologic pain reduction technique for burn patients experiencing severe to excruciating pain during wound care."<sup>76</sup> VR has also been shown to reduce pain and anxiety in children undergoing

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68. Solman, *supra* note 34. Face-scanning and picture-merging technology is already commercially available and in widespread use in the video game market. See, e.g., [New Gen] *How to Scan Your Face into NBA 2K18*, 2K SUPPORT, <https://support.2k.com/hc/en-us/articles/115012746208—New-Gen-How-To-Scan-Your-Face-Into-NBA-2K18> (last visited Sept. 10, 2019).

69. Jeremy N. Bailenson et al., *Facial Similarity Between Voters and Candidates Causes Influence*, 72 PUB. OP. Q. 935 (2008).

70. Jeremy N. Bailenson & Nick Yee, *Digital Chameleons*, 16 PSYCH. SCI. 814 (2005).

71. Sun Ahn & Jeremy Bailenson, *Self-Endorsing Versus Other-Endorsing in Virtual Environments*, 40 J. ADVERT. 93 (2011).

72. LinkedIn has applied Ahn and Bailenson's self-endorsement research in its "Picture Yourself" advertisements, and "the ads are so successful that LinkedIn runs them continuously." Bonnie Tsui, *It's 10 P.M. Do You Know What Your Avatar Is Doing?*, PAC. STANDARD (Jan. 8, 2013), <https://psmag.com/social-justice/jeremy-bailenson-virtual-reality-facebook-advertising-51304>.

73. Michael Madary & Thomas Metzinger, *Real Virtuality*, 3 FRONTIERS IN ROBOTICS & AI 1, 18 (2016).

74. Fox et al., *supra* note 43, at 294.

75. A.S. Won et al., *Two Virtual Reality Pilot Studies for the Treatment of Pediatric CRPS*, 16 PAIN MED. 1644 (2015).

76. H.G. Hoffman & D.R. Patterson et al., *Virtual Reality Pain Control During Burn Wound Debridement in the Hydrotank*, 24 CLINICAL J. PAIN 299, 299 (2008).

cancer<sup>77</sup> and dental<sup>78</sup> treatments. The more immersive the VR experience (e.g., with head-tracking, high-resolution video, and stereophonic sound), the higher the levels of presence and pain reduction.<sup>79</sup> Interactive VR, in turn, has been shown to produce higher levels of presence and pain reduction than passive VR.<sup>80</sup> While high levels of interactivity, such as the use of motion controls, are effective in reducing pain and may especially benefit children with more severe conditions like CRPS and cerebral palsy, such treatments carry an increased risk of “cybersickness,” or feelings of nausea and dizziness.<sup>81</sup>

### B. *The Dangers of Manipulative Entertainment*

VR software is fundamentally different from other media in its effects on human cognition, behavior, and physiology. There is increasingly a scientific consensus that “watching a film or playing a non-immersive video game cannot create the strong illusion of owning and controlling a body that is not your own,” like VR can.<sup>82</sup> That the mind can be so easily manipulated by such illusions is “why we should be cautious about the psychological effects of applied VR: this technology is unique in beginning to target and manipulate the UI in our brain itself.”<sup>83</sup> The research *supra* demonstrates that even brief exposure to interactive VR can have measurable short-term effects on human behavior and, especially in children, cognition. VR games can influence what we think of social issues, of others, and ourselves. They can cause us to alter our behavior, from how we treat others to how we spend our money, and possibly even how we vote. They can even trick our mind into believing we are not in pain. “So,” the skeptic asks, “is that so wrong?” She might see why letting a twelve-year-old embody a terrorist all weekend does him (and possibly others) harm. But is it wrong that some kid in a hospital wing will obtain some momentary relief from his CRPS by jumping into a VR game? Is it wrong that someone stepping into the virtual “shoes” of a shrub or cow might unknowingly reduce their paper or red meat consumption and help save the planet? The rather unintuitive answer is: yes, it might be.

The answer turns on the harm of manipulation. The most significant harm established in the literature is VR games’ ability to manipulate human thought and behavior.<sup>84</sup> It is the most significant because it appears to result from fairly little playtime and regardless of the genre of game, such that many VR gamers

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77. Jonathan Gershon et al., *A Pilot and Feasibility Study of Virtual Reality as a Distraction for Children with Cancer*, 43 J. AM. ACAD. CHILD ADOLESCENT PSYCHIATRY 1243 (2004).

78. Naser Asl Aminabadi et al., *The Impact of Virtual Reality Distraction on Pain and Anxiety During Dental Treatment in 4-6 Year-Old Children*, 6 J. DENTAL RES., DENTAL CLINICS, DENTAL PROSPECTS 117 (2012).

79. H.G. Hoffman & S.R. Sharar et al., *Manipulating Presence Influences the Magnitude of Virtual Reality Analgesia*, 111 PAIN 162 (2004).

80. J. Gutierrez-Maldonado, O. Gutierrez-Martinez & K. Cabas-Hoyos, *Interactive and Passive Virtual Reality Distraction*, 167 STUD. HEALTH TECH. & INFORMATICS 69 (2011).

81. Andrea Stevenson Won et al., *Immersive Virtual Reality for Pediatric Pain*, 4 CHILD. 1, 6 (2017).

82. Madary & Metzinger, *supra* note 73, at 2.

83. *Id.* at 5.

84. *Supra* Part I.A.

are already at risk to it. Of course, mere influence is insufficient to amount to legal harm. Manipulation, however, is something different from mere nudging or persuasion. Manipulation comes in many shades but can generally be characterized as “an effort to influence people’s choices . . . to the extent that it does not sufficiently engage or appeal to their capacity for reflection and deliberation.”<sup>85</sup> What follows is “a justified sense of *betrayal*,” such that choosers, once made aware of the manipulation, “can justly complain that because of the intentional actions of a manipulator, they have not, in a sense, had a fair chance to make a decision on their own.”<sup>86</sup> That is, manipulation only becomes *harmful* when it would violate the knowing chooser’s reasonable expectations under the circumstances.<sup>87</sup> The reasonableness criterion renders the standard an objective one.<sup>88</sup> For example, reasonable people are aware that politicians want to garner votes and often attempt to do so by smearing their competition, so when they flash their opponent’s record on TV like a bad horror flick, people’s deliberative capacities “are not usually on hold” even if they are not exactly being targeted.<sup>89</sup> So, a voter who sees the commercial cannot reasonably cry foul because she was or should have been aware of the tactic.

This definition makes sense in light of the fundamental harm of manipulation: its capacity to “violate people’s autonomy (by making them instruments of another’s will) and offend their dignity (by failing to treat them with respect).”<sup>90</sup> In contexts where people’s conscious minds have been socialized to guard against manipulation, they are better able to avoid being instrumentalized, even if they are unaware in that particular instance that it is taking place.<sup>91</sup> Where that is not the case, however, as where manipulators target people’s unconscious minds, people are at risk of manipulative harm. And the harm occurs *irrespective* of the character of the influence. To return to one of my earlier examples, it may well be that the vast majority of CRPS patients (or their surrogate decisionmakers) would find the risks of VR therapy so minimal and the benefit of pain relief so great that they would always consent to it. Nevertheless, physicians must obtain their patients’ consent for such therapy or they will be liable in tort for battery; that is so even if the therapy invariably

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85. CASS R. SUNSTEIN, *THE ETHICS OF INFLUENCE: GOVERNMENT IN THE AGE OF BEHAVIORAL SCIENCE* 82 (2016) (emphasis omitted). Interestingly, he cites subliminal advertising as inherently manipulative because it “bypass[es] deliberation altogether.” *Id.* at 82–83. As I demonstrate *infra* Part II.C, VR games should be considered inherently manipulative on similar grounds.

86. *Id.* at 83 (emphasis omitted).

87. *Id.* at 86 (“[T]he proper evaluation of acts of manipulation depends a great deal on context, including the expectations associated with particular roles.”).

88. *Cf. id.* at 89.

89. *Cf. id.* at 86.

90. *Id.* at 84.

91. Some research suggests this is the case. See, e.g., Amna Kirmani & Rui (Juliet) Zhu, *Vigilant Against Manipulation*, 44 J. MKTG. RES. 688, 698 (2007) (“[U]sing ad headlines that might trigger a prevention focus (e.g., a headline for CIT Group stating, ‘Help you avoid hazards’) might also make readers more suspicious of ambiguous ad claims. Consequently, consumers may be more vigilant or skeptical when processing the advertisement . . . .”). But see Micah L. Berman, *Manipulative Marketing and the First Amendment*, 103 GEO. L.J. 497, 522 (2015) (describing advertising that “[b]y implanting (or triggering) desires in consumers’ minds without their conscious awareness, . . . seriously violates consumers’ autonomy” and, “because it is difficult to detect, is nearly impossible for consumers to recognize and guard against.”).

yields positive health outcomes.<sup>92</sup> That is, even if everyone subject to the influence would retrospectively characterize it as benign, there is still harm in violating their expectation of and disrespecting their capacity to make that cost-benefit analysis on their own. Though less apparent, economic and privacy injuries can also result from manipulation.<sup>93</sup>

Much of the literature on manipulation is centered on the commercial context—what Jon Hanson and Douglas Kysar termed “market manipulation.”<sup>94</sup> But the subtle cognitive and behavioral influences that VR games exercise over consumers pose similar dangers. People play games for recreation, often during lunch or at the end of a tiring workday,<sup>95</sup> so consumers of VR games are likely to be particularly vulnerable to their games’ manipulative effects and thus to violations of their autonomy.<sup>96</sup> That video games are popularly conceived of as “entertainment” products and advertised as such raises concerns that, absent clear and obvious warnings to the contrary, consumers will underestimate the negative psychological and behavioral effects of VR games, causing them to inefficiently demand more of those products than is optimal—a type of economic injury.<sup>97</sup> And as the effects contemplated by the research gain mainstream publicity, consumer distress or discomfort caused by the vague sense that VR games are being used to monitor their thoughts and behavior (e.g., through their in-game choices) and perhaps even their physiological responses, and then the actual use of that data to exploit their biases through, say, in-game marketing<sup>98</sup> would constitute subjective and objective privacy injuries, respectively.<sup>99</sup> For reasons that may already be obvious and will become plainer as this Article progresses, giving consumers fair warning of VR games’ manipulative effects would substantially mitigate these harms.

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To be clear, not all VR experiences pose the same risk of manipulation. In the research summarized *supra*, variations in the level of realism and type of

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92. *Cf.* Perna v. Pirozzi, 457 A.2d 431, 438 (N.J. 1983) (“Under a battery theory, proof of an unauthorized invasion of the plaintiff’s person, even if harmless, entitles him to nominal damages” and possibly other damages); Richard A. Epstein, *The Erosion of Individual Autonomy in Medical Decisionmaking: Of the FDA and IRBs*, 96 GEO. L.J. 559, 566–68 (2007).

93. Ryan Calo, *Digital Market Manipulation*, 82 GEO. WASH. L. REV. 995, 1024–34 (2014).

94. Jon D. Hanson & Douglas A. Kysar, *Taking Behavioralism Seriously*, 112 HARV. L. REV. 1420 (1999).

95. See *Global Video Games Investment Review*, IBIS CAPITAL (last visited Sept. 10, 2019), [https://twvideo01.ubm-us.net/o1/vault/gdceurope2010/slides/T\\_Merel\\_Business%20&%20Management\\_Global%20Video%20Games%20Investment.pdf](https://twvideo01.ubm-us.net/o1/vault/gdceurope2010/slides/T_Merel_Business%20&%20Management_Global%20Video%20Games%20Investment.pdf) (noting this is the case for “casual/social” games).

96. *Cf.* Calo, *supra* note 93, at 1031–34 (discussing autonomy as the absence of vulnerability).

97. Just as gun manufacturers may be downplaying the risk of accidental shooting and playing up the risk of attack to vulnerable populations, VR game manufacturers may be downplaying the risk of psychological and behavioral manipulation and playing up the entertainment aspects of their products to children and parents. *Cf. id.* at 1025–27 (citing *inter alia* Hanson & Kysar, *supra* note 94, at 1459–60, 1463–64).

98. I use “in-game marketing” to mean any revenue-generating mechanics implemented in the games’ software, including advertisements, product placement, and microtransactions.

99. See Calo, *supra* note 93, at 1027–31; see also M. Ryan Calo, *The Boundaries of Privacy Harm*, 86 IND. L.J. 1131, 1142–53 (2011) (discussing cases illustrating these principles). Many of these practices are already being deployed in the gaming industry. Patrick Stafford, *The Dangers of In-Game Data Collection*, POLYGON (May 9, 2019), <https://www.polygon.com/features/2019/5/9/18522937/video-game-privacy-player-data-collection>.

avatar, feedback, and control affected the level of body transfer and presence that users experienced. Users who embodied doppelgangers experienced greater physiological arousal and were more likely to change their short-term behavior than those who merely watched them. A combination of visual and haptic feedback elicited greater effects on body transfer and presence than purely visual feedback. Higher levels of interactivity through motion controls elicited stronger effects than mere head-tracking. The most effective VR software, in terms of its influence on users, has realistic sights and sounds in which users embody a virtual doppelganger, control it via motion controls, and experience haptic feedback when interacting with virtual objects. It is the software that “tricks” the mind and body into mistaking the virtual for the real.<sup>100</sup> Fully immersive VR interfaces capable of producing that result are increasingly the norm,<sup>101</sup> and the interactivity of such interfaces means that VR games, rather than more passive VR experiences, will exercise the greatest influence over user cognition and behavior.<sup>102</sup> Make no mistake: a fully immersive VR gaming experience is the one that will soon be enjoyed by the average consumer, and is already being enjoyed by many. All are at risk of manipulation, which should be constrained. But first, like Saito, we must address the elephant in the room: the powerful First Amendment protections video games have been accorded.

## II. THE FIRST AMENDMENT AND CONSTRAINING VIRTUAL REALITY GAMES

As exemplified by my brief discussion of the informed consent doctrine *supra* Part I.B, manipulation is generally considered to be a regulable legal harm. Courts and legislatures have always considered manipulation to be an indirect form of fraud, and regularly proscribed it as such.<sup>103</sup> But there are conceivable impediments to constraining VR games’ manipulative effects. For instance, courts have been reluctant to apply strict liability to ideas and expression due

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100. See JIM BLASCOVICH & JEREMY BAIENSON, *INFINITE REALITY: AVATARS, ETERNAL LIFE, NEW WORLDS, AND THE DAWN OF THE VIRTUAL REVOLUTION* 1–2 (2011) (“The brain often fails to differentiate between virtual experiences and real ones.”).

101. The sights and sounds that help create the illusion are continually improving as developers attempt to bridge the “uncanny valley.” Larry Frum, *Emerging Technology Heightens Video-Game Realism*, CNN (Nov. 14, 2013), <http://www.cnn.com/2013/11/14/tech/gaming-gadgets/realism-video-games/>; Megan Larkin, *Advancing Video Game Technology May Be Too Realistic*, COLUM. SCI. & TECH. L. REV. BLOG (Oct. 15, 2013), <http://stlr.org/2013/10/15/advancing-video-game-technology-may-be-too-realistic/>; Luke Plunkett, *We’re Getting Dangerously Close To Photo-Realistic Video Game Landscapes*, KOTAKU (Mar. 28, 2016), <http://kotaku.com/were-getting-dangerously-close-to-photo-realistic-video-1767614245>; Keith Stuart, *Photorealism – The Future of Video Game Visuals*, THE GUARDIAN (Feb. 12, 2015), <https://www.theguardian.com/technology/2015/feb/12/future-of-video-gaming-visuals-nvidia-rendering>. There is an industry consensus that motion controls should and will be the standard input device used to operate VR software. Daniel Starkey, *The Race to Develop VR Controls*, POLYGON (last visited Aug. 8, 2019), <https://www.polygon.com/a/the-race-for-vr/the-race-for-vr-controls>. One analyst predicted that haptics would “take off” once HMD sales surpassed 100 million units by 2023. Sarah E. Needleman, *Virtual Reality, Now with a Sense of Touch*, WALL ST. J. (Apr. 3, 2018), <https://www.wsj.com/articles/virtual-reality-now-with-the-sense-of-touch-1522764377> (quoting Gene Munster of venture capital firm Loup Ventures).

102. See *Video Games*, MERRIAM-WEBSTER, <https://www.merriam-webster.com/dictionary/video%20game> (“an electronic game in which players *control* images on a video screen” (emphasis added)).

103. See Eric A. Posner, *The Law, Economics, and Psychology of Manipulation*, Coase-Sandor Institute for Law and Economics Working Paper No. 726 (2015) (citing numerous cases and statutes to that effect).

primarily to First Amendment concerns, namely the chilling effect it would have on speech.<sup>104</sup> The same concerns apply to video games, even violent ones.<sup>105</sup> But the Supreme Court has also held that “[e]ach medium of expression . . . must be assessed for First Amendment purposes by standards suited to it, for each may present its own problems.”<sup>106</sup> Warning requirements for VR games could survive strict scrutiny and even warrant lesser scrutiny due to the unique psychosocial harms they pose to users; their potentially deceptive marketing and health risks; and the inherently subliminal nature of the medium.

#### A. “Objective” Psychosocial Harms

The First Amendment’s protections against abridgments of the “freedom of speech” textually appear only to apply to verbal activity.<sup>107</sup> In Supreme Court jurisprudence, however, “speech” is a term of art; some verbal activities are deemed “nonspeech,”<sup>108</sup> while some nonverbal activities, such as expressive conduct, are granted the protections of “speech.”<sup>109</sup> In practice, the level of First Amendment protection accorded to a verbal or nonverbal activity depends firstly on whether its content is considered to be expressive.<sup>110</sup> If it is not expressive, then it is not “speech” and therefore unprotected.<sup>111</sup> If it is expressive, the inquiry moves to whether the constraint is content-based or content-neutral. If the constraint is content-neutral, such as “time, place, and manner”<sup>112</sup> and incidental<sup>113</sup> restrictions, the constraint receives only intermediate scrutiny,

104. See, e.g., *Winter v. G.P. Putnam’s Sons*, 938 F.2d 1033, 1035 (9th Cir. 1991) (“Would any author wish to be exposed . . . for writing on a topic which might result in physical injury? e.g. How to cut trees; How to keep bees?” (quoting *Walter v. Bauer*, 439 N.Y.S.2d 821, 823 (Sup. Ct. 1981))).

105. See, e.g., *Sanders v. Acclaim Entm’t, Inc.*, 188 F. Supp. 2d 1264, 1275 (D. Colo. 2002) (finding that imposing tort liability on violent video game manufacturers “would burden [their] First Amendment rights to freedom of expression.”).

106. See *Promotions, Ltd. v. Conrad*, 420 U.S. 546, 557 (1975); see also *Metromedia, Inc. v. City of San Diego*, 453 U.S. 490, 501 (1981) (“Each method of communicating ideas is ‘a law unto itself’ and that law must reflect the ‘differing natures, values, abuses and dangers’ of each method.”).

107. U.S. CONST. amend. I.

108. See, e.g., *R.A.V. v. City of St. Paul*, 505 U.S. 377, 386 (1992) (noting that fighting words are “nonspeech”).

109. See, e.g., *United States v. O’Brien*, 391 U.S. 367, 376 (1968) (acknowledging that there are cases “when ‘speech’ and ‘nonspeech’ elements are combined in the same course of conduct.”).

110. See *Texas v. Johnson*, 491 U.S. 397, 404 (1989) (“In deciding whether particular conduct possesses sufficient communicative elements to bring the First Amendment into play, we have asked whether ‘[a]n intent to convey a particularized message was present, and [whether] the likelihood was great that the message would be understood by those who viewed it.’” (quoting *Spence v. State of Wash.*, 418 U.S. 405, 410–11 (1974))).

111. *Id.* But see *Hurley v. Irish-Am. Gay, Lesbian & Bisexual Grp. of Boston*, 515 U.S. 557, 569 (1995) (“[A] narrow, succinctly articulable message is not a condition 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 Schönberg, or Jabberwocky verse of Lewis Carroll.” (citing *Spence*, 418 U.S. at 411)). For more on the difficulty (and potential futility) of distinguishing “speech” from action and defining what is or is not “expressive,” see Frederick Schauer, *On the Distinction Between Speech and Action*, 65 EMORY L.J. 427 (2015); and Jed Rubenfeld, *The First Amendment’s Purpose*, 53 STANFORD L. REV. 767 (2001).

112. See *Frisby v. Schultz*, 487 U.S. 474, 481 (1988) (defining these restrictions as “regulations of the time, place, and manner of expression”). These restrictions also must “leave open ample alternative channels of communication.” *Id.* (citation omitted).

113. See *San Francisco Arts & Athletics, Inc. v. U.S. Olympic Comm.*, 483 U.S. 522, 536 (1987) (defining these restrictions as “restrictions on expressive speech . . . incidental to the primary congressional purpose of”

wherein the constraint must be narrowly tailored to serve a substantial or important government interest unrelated to the suppression of free expression.<sup>114</sup> If it is content-based,<sup>115</sup> the inquiry turns on whether the activity is of high or low social value.<sup>116</sup> For noncommercial speech, only historically delimited categories of “low-value” speech, including fighting words, obscenity, libel, and fraud, are generally entitled to no protections.<sup>117</sup> As for “high-value” speech, which comprises all other categories of speech,<sup>118</sup> constraints are presumptively invalid and must survive strict scrutiny,<sup>119</sup> wherein the constraint must be the least speech-restrictive means to serve a compelling government interest.<sup>120</sup> In any case, the constraint must neither be too underinclusive or overinclusive when judged against its asserted purpose, lest it fail the narrow tailoring and least restrictive means requirements,<sup>121</sup> or betray that the state’s asserted substantial or compelling interest is not genuine.<sup>122</sup> Similar to the concept of overinclusiveness, vague regulations will be voided as unconstitutional.<sup>123</sup>

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regulating non-speech activity); *see also* *Clark v. Community for Creative Non-Violence*, 468 U.S. 288, 298 (1984) (noting that the standard for analyzing the constitutionality of an incidental restriction “is little, if any, different from the standard applied to time, place, or manner restrictions.”).

114. *See Ward v. Rock Against Racism*, 491 U.S. 781, 798–99 (1989) (“[A] regulation of the time, place, or manner of protected speech must be narrowly tailored to serve the government’s legitimate, content-neutral interests but that it need not be the least restrictive or least intrusive means of doing so. Rather, the requirement of narrow tailoring is satisfied ‘so long as the . . . regulation promotes a substantial government interest that would be achieved less effectively absent the regulation.’” (citations omitted)).

115. A regulation is content-based if it “‘on its face’ draws distinctions based on the message a speaker conveys,” or is facially neutral but “cannot be ‘justified without reference to the content of the regulated speech,’ or . . . [was] adopted by the government ‘because of disagreement with the message [the speech] conveys.’” *Reed v. Town of Gilbert*, 135 S. Ct. 2218, 2227 (2015) (citations omitted).

116. Genevieve Lakier, *The Invention of Low-Value Speech*, 128 HARV. L. REV. 2166, 2170–71 (2015).

117. *See United States v. Stevens*, 559 U.S. 460, 469 (2010) (noting that historical evidence of a “long-settled tradition of subjecting that speech to regulation” is required to establish a new category of low-value speech); *see also* *Roth v. United States*, 354 U.S. 476, 483 (1957) (concluding that obscenity is “outside the protection intended for speech and press”); *Beauharnais v. Illinois*, 343 U.S. 250, 266 (1952) (concluding that libel is not “within the area of constitutionally protected speech”); *Chaplinsky v. New Hampshire*, 315 U.S. 568, 571–72 (1942) (concluding that regulating “fighting words” has “never been thought to raise any constitutional problem” (citations omitted)).

118. KATHLEEN ANN RUANE, CONG. RESEARCH SERV., 7–5700, FREEDOM OF SPEECH AND PRESS: EXCEPTIONS TO THE FIRST AMENDMENT 5 (2014).

119. *R.A.V. v. City of St. Paul*, 505 U.S. 377, 382–83 (1992).

120. *Sable Commc’ns of California, Inc. v. F.C.C.*, 492 U.S. 115, 126 (1989).

121. *See Brown v. Entm’t Merchants Ass’n*, 564 U.S. 786, 805 (2011) (noting in a strict scrutiny analysis that overinclusiveness fails the narrow tailoring requirement); *Ward v. Rock Against Racism*, 491 U.S. 781, 798–99 (1989) (noting that narrow tailoring is satisfied only if “the means chosen are not substantially broader than necessary to achieve the government’s interest.”). There is some suggestion in the case law of an additional overbreadth standard. *See, e.g., American Civil Liberties Union v. Gonzales*, 478 F. Supp. 2d 775 (E.D. Pa. 2007), *aff’d sub nom. American Civil Liberties Union v. Mukasey*, 534 F.3d 181, 198 (3d Cir. 2008), *cert. denied*, 129 S. Ct. 1032 (2009). But this seems to me, as well other scholars and courts, to be the equivalent of overinclusiveness. *See Brown*, 564 U.S. at 805 (equating the two concepts); Eugene Volokh, *Freedom of Speech, Permissible Tailoring and Transcending Strict Scrutiny*, 144 U. PENNSYLVANIA L. REV. 2417, 2430 (1997) (same).

122. *See Brown*, 564 U.S. at 802 (“Underinclusiveness raises serious doubts about whether the government is in fact pursuing the interest it invokes, rather than disfavoring a particular speaker or viewpoint.” (citations omitted)).

123. *See Grayned v. City of Rockford*, 408 U.S. 104, 108 (1972) (“[L]aws [must] give the person of ordinary intelligence a reasonable opportunity to know what is prohibited, so that he may act accordingly.”).

In *Brown v. Entertainment Merchants Ass'n*,<sup>124</sup> the Supreme Court reasoned that certain content-based constraints on media that cross a threshold of psychosocial harm can survive strict scrutiny. In response to a California statute prohibiting the sale of violent video games to minors and requiring that such games bear labels of “18” prominently on the front cover, the Supreme Court, in a 7-2 opinion by Justice Scalia, held that violent video games “are as much entitled to the protection of free speech as the best of literature.”<sup>125</sup> However, the Court highlighted that the problem with California’s statute, which was a content-based constraint on speech,<sup>126</sup> was that it appeared to be targeting “the *ideas* expressed by speech . . . and not its objective effects.”<sup>127</sup> The Court found evidence of such effects dispositive in weighing the law’s constitutionality, noting that the psychology studies California relied on “do not prove that violent video games *cause* minors to *act* aggressively”<sup>128</sup> and citing a research psychologist’s testimony to demonstrate that the effect of violent video games on children’s aggression is “small and indistinguishable from effects produced by other media.”<sup>129</sup> As a result of these equivocal research findings, California failed to satisfy its burden of showing that the law was justified by a compelling government interest—in this case, the psychological wellbeing of children (and, most likely, the physical harm the games might inspire them to inflict on others).<sup>130</sup> Additionally, the fact that some of the children who are forbidden from buying violent video games on their own would otherwise have parental permission to do so rendered the statute overinclusive, thus failing the least speech-restrictive means requirement.<sup>131</sup> Industry self-regulation by the

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124. 564 U.S. 786 (2011).

125. See *Brown*, 564 U.S. at 796 n.4 (quoting *Winters v. New York*, 333 U.S. 507, 510 (1948)); see also *Kirby v. Sega of America, Inc.*, 114 Cal. App. 4th 47, 58 (2006) (finding that video games are “expressive works entitled to as much First Amendment protection as the most profound literature.”).

126. *Brown*, 564 U.S. at 794.

127. *Id.* at 799. The Court cited violence, gore, and racism as ideas that might impermissibly be targeted. *Id.*

128. *Id.* at 799–800. The Court took issue specifically with studies that “show at best some correlation between exposure to violent entertainment and minuscule real-world effects, such as children’s feeling more aggressive or making louder noises in the few minutes after playing a violent game than after playing a nonviolent game.” *Id.*

129. *Id.* at 801–02. The Court used this fact in demonstrating that the statute was underinclusive with respect to media that yielded similar effects in children, such as “Saturday morning cartoons, . . . games rated for young children, [and] . . . pictures of guns.” *Id.* The Court also noted that the statute was underinclusive in another key respect, namely its willingness “to leave this dangerous, mind-altering material in the hands of children so long as one parent (or even an aunt or uncle) says it’s OK.” *Id.* at 802. As Justices Breyer and Thomas noted in their dissents, however, this latter suggestion that the statute would have fared better had it removed the parental consent provision conflicts with Supreme Court precedent. *Id.* at 849–50 (Breyer, J., dissenting) (citing *inter alia Ginsberg v. New York*, 390 U.S. 629, 639 (1968)); *id.* at 837–38 (Thomas, J., dissenting) (same); see also *F.C.C. v. Pacifica Found.*, 438 U.S. 726, 758 (1978) (Powell, J., concurring) (“[S]ociety may prevent the general dissemination of [vulgar and offensive] speech to children, leaving to parents the decision as to what speech of this kind their children shall hear and repeat”); *Action for Children’s Television v. F.C.C.*, 58 F.3d 654, 663 (D.C. Cir. 1995) (referencing “[t]he Government’s dual [compelling] interests in assisting parents and protecting minors”).

130. *Id.* at 799–802. The Court has long held that “there is a compelling interest in protecting the physical and psychological well-being of minors,” such as “shielding minors from the influence of literature that is not obscene by adult standards.” *Sable Commc’ns of California, Inc. v. F.C.C.*, 492 U.S. 115, 126 (1989).

131. *Brown*, 564 U.S. at 804.

Entertainment Software Rating Board (ESRB), which assigns age-specific ratings to video games and encourages retailers to refrain from selling inappropriate games to minors without parental consent, was also cited as a less restrictive alternative.<sup>132</sup> The Court cited a 2009 Federal Communications Commission (FCC) finding that the rating system was 80% effective in limiting sales of “M” (mature) rated games to minors,<sup>133</sup> and noted that even if regulation could further deter such sales, “the government does not have a compelling interest in each marginal percentage point by which its goals are advanced.”<sup>134</sup>

Justice Alito’s concurrence with Chief Justice Roberts was more cautious, arguing that moving forward, the Court “should make every effort to understand the new technology,” including how it may differ “fundamentally” from other media.<sup>135</sup> Referencing the fact that video games’ sights and sounds are becoming “indistinguishable” from reality and citing research on the psychological effects of VR and haptic feedback technology,<sup>136</sup> Alito noted that “the experience of playing video games . . . may be very different from anything that we have seen before.”<sup>137</sup> He posited that the same content—violence—can yield vastly different effects depending on the medium of transmission.<sup>138</sup> For instance, the psychological effect of using motion controls in VR to bash someone’s head in with a baseball bat is likely exacerbated compared to doing something similar in TV-based gaming using a combination of button presses and joystick movements.<sup>139</sup> Nonetheless, Alito sided with the majority because of the law’s reliance on unconstitutionally vague “community standards” of the kinds of violence suitable for minors.<sup>140</sup>

Justice Breyer’s dissent in *Brown* in many ways mirrored Alito’s opinion,<sup>141</sup> save for in one key respect: Breyer believed that video games have

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132. *Id.* at 803.

133. *Id.* (citing FTC, *Marketing Violent Entertainment to Children*, at 30 (Dec. 2009), <http://www.ftc.gov/os/2009/12/P994511violententertainment.pdf>). The system’s effectiveness increased to nearly 90% by the time the Court’s decision was published. FTC, *Undercover Shopper Survey on Enforcement Entertainment Ratings Finds Compliance Worst for Retailers of Music CDs and the Highest Among Video Game Sellers* (Apr. 20, 2011), <https://www.ftc.gov/news-events/press-releases/2011/04/ftc-undercover-shopper-survey-enforcement-entertainment-ratings>.

134. *Brown*, 564 U.S. at 803 n.9.

135. *Id.* at 806 (Alito, J., concurring).

136. Haptic feedback devices “are interfaces to computers or networks that exchange power (e.g., forces, vibrations, heat) through contact with some part of the user’s body, following a programmed interactive algorithm” (e.g., force feedback game joysticks). Karon MacLean, *Haptic Interaction Design for Everyday Interfaces*, 4 REVIEWS OF HUMAN FACTORS AND ERGONOMICS 149, 150 (2008). Haptic devices “are used to generate movement references and . . . serve as force reflection and pairs, generated upon interacting with virtual objects.” Raul Wirz et al., *Efficient Transport Protocol for Networked Haptics Applications*, in HAPTICS 3, 3 (Manuel Ferre ed., 2008).

137. *Brown*, 564 U.S. at 815.

138. *Id.* at 806, 820–21.

139. *Id.* at 817–19. Alito’s inference is almost certainly true. Analogously, while watching sexualized representations of women in a movie or reading a sexualized description of women in a book may affect the watcher or the reader’s body dissatisfaction, the effect is distinctly compounded when the *same* content (in substance, if not in form) is experienced through VR. See *supra* notes 61–64.

140. *Brown*, 564 U.S. at 810–13.

141. See *id.* at 849 (Breyer, J., dissenting) (referring to Alito’s “examples of the increasing interactivity of video game controllers”).

already crossed Alito's technological threshold that would render them "fundamentally" different from other media. To support this view, Breyer cites a number of social science and neuroscience studies and meta-analyses that causally link violent video games to increased aggression.<sup>142</sup> He notes that many of the studies and a number of public health professional associations distinguish video games from other media, finding that "the closer a child's behavior comes, not to watching, but to *acting* out horrific violence, the greater the potential psychological harm."<sup>143</sup> At the end of his opinion, Breyer attaches a sizeable list of the studies he relied on.<sup>144</sup> The common thread through each opinion is that the regulation of video games may survive strict scrutiny if *inter alia* they can be shown to have "objective effects" (Scalia) that differ "fundamentally" (Alito) from other media, including having "greater . . . potential psychological harm" in children (Breyer) and "caus[ing them] to act aggressively" (Scalia).

The Court's common-thread "objective effects" doctrine is worth discussing further. Historically, the Court has steered clear from setting a standard of proof under which the government must prove the existence of a substantial or compelling state interest. Some remarked that the Court moved in that direction in *Turner Broadcasting System, Inc. v. F.C.C.*,<sup>145</sup> when it remanded a case for further proceedings rather than deferring to Congress's predictive judgment as to the necessity of the "must-carry" provisions of the Cable Television Consumer Protection and Competition Act of 1992.<sup>146</sup> There, the Court held that the government "must demonstrate that the recited harms are real, not merely conjectural."<sup>147</sup> The Court cautioned that this was not an attempt "to reweigh the evidence *de novo*, or to replace Congress' factual predictions with our own," but rather "to assure that, in formulating its judgments, Congress has drawn reasonable inferences based on substantial evidence."<sup>148</sup> In *Brown*, the Court noted that the standard articulated in *Turner* was only for intermediate scrutiny cases; in strict scrutiny cases, "the burden is much higher."<sup>149</sup> While it is unclear precisely what the standard is in either case, other than compelling and substantial interests require "compelling" and "substantial" evidence, respectively,<sup>150</sup> the Court in *Brown* strongly suggests that causal evidence that a certain category of media psychologically and behaviorally harms children<sup>151</sup> significantly more than other protected media is

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142. *Id.* at 851–52.

143. *Id.* at 852–55 (emphasis in original).

144. *Id.* at 858–72.

145. 512 U.S. 622 (1994).

146. See RUANE, *supra* note 118, at 14 (discussing *Turner*).

147. *Turner*, 512 U.S. at 664.

148. *Id.* at 666 (citing *Century Comm. Corp. v. FCC*, 835 F.2d 292, 304 (D.C. Cir. 1987) ("[W]hen trenching on first amendment interests, even incidentally, the government must be able to adduce either empirical support or at least sound reasoning on behalf of its measures")).

149. *Brown*, 564 U.S. at 799–800.

150. In *Brown*, the Court stated only that "ambiguous proof will not suffice" and "[t]he State's evidence is not compelling." *Id.* at 800. In *Turner*, the Court made clear that its standard there differed from the "substantial evidence" standard of administrative law. See 512 U.S. at 666.

151. Among adults, the courts have only identified protecting the psychological well-being of pregnant women and victims of sex trafficking as "substantial" or "important" state interests. See *Stuart v. Camnitz*, 774

sufficient to prove a compelling state interest in its regulation.<sup>152</sup> Given the science establishing that VR games have manipulative psychosocial effects on child users,<sup>153</sup> the regulation of their content, where targeted at children, employing the least speech-restrictive means available, and neither over nor underinclusive, should survive strict scrutiny. But there are several challenges with content-based warnings and sales restrictions. As discussed *infra*, it is not clear from the research that VR games' content, as opposed to the medium through which that content is transmitted, is what produces the manipulative effects on children and users more generally. So, while the government likely has a compelling interest in constraining interactive VR as a medium in order to protect children from manipulation, the research may be insufficient to establish such an interest in regulating the content of particular games. Additionally, there arguably are effective, less restrictive alternatives to constraining the harm: content-neutral warnings and/or a governmental awareness campaign designed to make parents and guardians aware of VR games' objective effects, rather than their content.<sup>154</sup> The government would bear the burden of proving that such alternatives would not only be less effective, but *ineffective* in curtailing interactive VR's harm to children (e.g., by limiting sales to them).<sup>155</sup>

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F.3d 238, 250 (4th Cir. 2014) (finding that protecting pregnant women's psychological health "is undeniably an important state interest"); *EMW Women's Surgical Ctr., P.S.C. v. Beshear*, 283 F. Supp. 3d 629, 633 (W.D. Ky. 2017) ("[S]tates have substantial interests in . . . ensuring the psychological well-being . . . of pregnant women"); see also *United States v. Paris*, Cr. No. 03:06-cr-64 (CFD), 2007 WL 1484974, at \*2 (D. Conn. 2007) ("[T]he interests of the Government . . . in protecting these [adult victim] witnesses from the likely adverse . . . psychological consequences of publicly linking their identities to their past lives as sex workers is . . . substantial"); *United States v. Graham*, No. 14-cr-500 (NSR), 2015 WL 6161292, at \*10 (S.D.N.Y. 2015) (limiting any reference to the adult victim of sex trafficking to their first name only on the same ground). Courts have, however, held that protecting the (physical) public health and safety is a compelling state interest. See, e.g., *Olsen v. Drug Enforcement Admin.*, 878 F.2d 1458, 1462 (D.C. Cir. 1989).

152. At least one other commentator has identified most of the components of this test. See Paree, *supra* note 25, at 266–67 ("Should [a state] want to make a case for placing a unique restriction on video games, it will have to present evidence that the . . . nature of video games can cause some prevalent social harm that the state has a compelling interest to avoid. . . . [T]he research would have to be compelling and show a significant causal relationship between video game use and the harm to be avoided. . . . To avoid under-inclusiveness challenges, the harm must stem from the unique nature of video games . . .").

153. *Supra* Part I.A.

154. At least one court has held that the government could deploy an educational campaign to raise awareness about the ESRB system rather than require content-based warnings on video games. See *Entm't Software Ass'n v. Blagojevich*, 469 F.3d 641, 650–52 (7th Cir. 2006) (citing *inter alia* 44 *Liquormart, Inc. v. Rhode Island*, 517 U.S. 484, 507 (1996) ("It is perfectly obvious that alternative forms of regulation that would not involve any restriction on speech would be more likely to achieve the State's goal of promoting temperance . . . [E]ducational campaigns focused on the problems of excessive, or even moderate, drinking might prove to be more effective.")). While the ESRB does not currently warn of VR's psychosocial harms, it is not obvious why the government could not simply take the research *supra* Part I.A and convincingly present it to the public.

155. See *United States v. Playboy Entm't Grp., Inc.*, 529 U.S. 803, 816–17 (2000). Of course, if as the technology develops it becomes clear that in addition to manipulation, VR games carry surplus risks that vary with their content, then an awareness campaign and content-neutral warnings would likely be insufficient. An awareness campaign probably is already insufficient, as the harm of manipulation can only be cured if consumers are made aware of a game's particular effects so that they can informedly decide whether it is worth playing. It would be extremely difficult to effectively communicate through a campaign each particular game's effects to consumers in a manner that does not lead to information overload. In that case, content-based warnings and/or restricting sales to children would likely survive strict scrutiny. If particular content threatens the physical safety of the public, there may even be a compelling interest in a total sales ban of such content. See *supra* note 151.

Only one case, *Candy Lab Inc. v. Milwaukee Cty.*,<sup>156</sup> has applied *Brown* to augmented reality (AR); none have applied it to VR. The case arose out of a county's grievance that players of AR games like *Pokémon Go* "trashed Milwaukee County parks, stayed after park hours, caused significant traffic congestion, and made excessive noise."<sup>157</sup> In response, the county passed an ordinance requiring AR game publishers offering their games in county parks "to apply for event permits and secure garbage collection, security, and medical services, as well as insurance," or else face a fine or imprisonment.<sup>158</sup> The Eastern District of Wisconsin granted the AR game developer-publisher a preliminary injunction against the ordinance on the ground that it afforded too much discretion to permit-granting officials and was too vague to satisfy the narrow tailoring criterion.<sup>159</sup> Interestingly, despite the ordinance singling out AR games as a medium, the court, citing Supreme Court precedent, found it to be a content-neutral regulation on high-value speech since it "covers [AR] games regardless of their content, be it poker, zombie-killing, or Pokémon-catching."<sup>160</sup> Although the court ultimately sided with the developer, its reasoning was cautious; it acknowledged at the outset that the regulation of VR and AR presents "multifaceted issues where little definitive guidance exists"<sup>161</sup> and admitted there was "some appeal" to the developer's argument that regulations singling out a particular medium of expression over others are content-based under one interpretation of *Brown*.<sup>162</sup> In fact, the court's intuition was correct. While regulations targeting intra-medium expression (e.g., sexualized representations or violence in VR games) would "undoubtedly" be considered content-based,<sup>163</sup> the Supreme Court has repeatedly understood

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156. 266 F. Supp. 3d 1139 (E.D. Wis. 2017).

157. *Id.* at 1141.

158. *Id.*

159. *Id.* at 1150–53.

160. *Id.* at 1149 (citing *inter alia* *Turner Broad. Sys., Inc. v. F.C.C.*, 512 U.S. 622, 660 (1994) (holding that a "speech regulation that applies to one medium (or a subset thereof) but not others . . . 'is insufficient by itself to raise First Amendment concerns.'")).

161. *See id.* at 1145 (referring to the application of the First Amendment to AR and VR). The court cited Lemley and Volokh's article as the only scholarly guidance available in the AR and VR regulatory sphere, *id.* at n.2, which is insufficient for the reasons laid out *supra* notes 20–22.

162. *See id.* at 1150 ("Recall that *Brown* seems to treat the literary *and* interactive aspects (physical or virtual) of video gaming as an undivided, expressive whole. Taken to its furthest limit, this would mean that although the Ordinance does not care about the contents of the AR game being played, it is arguably content-based because it is directed at the physical act of game-playing, which is itself a part of the expression.").

163. *See id.* at 1150 (citing *Brown*, 564 U.S. at 799). That the Court in *Brown* spoke at length about the similarities in violent content across different mediums, including literature, TV, and music, 564 U.S. at 795–98, and that Breyer thought it obvious in his dissent that this was a content-based regulation despite his belief in the compounding effects of the medium, *id.* at 847, illustrate that this interpretation is accurate. On the surface, this appears to conflict with the Court's prior rulings. For example, in *City of Renton v. Playtime Theatres, Inc.*, 475 U.S. 41 (1986), the Supreme Court upheld a proximity zoning ordinance limiting the locations of adult movie theaters on the ground that it was "aimed not at the *content* of the films shown at 'adult motion picture theatres,' but rather at the *secondary effects* of such theaters on the surrounding community," namely their deleterious effect on the "quality of urban life"—a substantial state interest. *Id.* at 47, 50. There, the Court analyzed an intra-medium (movies), content-based (sexually explicit material) regulation as content-neutral because the regulation could be justified solely by reference to that content's harmful secondary, nonexpressive effects. *Id.* at 48 (Breyer, J., dissenting). However, this may just be the application of mid-tier scrutiny for soft-core, non-obscene pornography or perhaps a recognition that neighborhood stabilization is a compelling state

media-based regulations<sup>164</sup> to be content-neutral, absent evidence of discriminatory intent and so long as they “appear” to be “justified by some special characteristic of the medium being regulated.”<sup>165</sup> Whether they survive intermediate scrutiny depends on whether they satisfy the *Turner* test, whereby substantial evidence of a medium-specific harm premium must prove a substantial interest in its regulation, as well as the narrow tailoring, inclusiveness, and “ample alternative channels” requirements.<sup>166</sup>

These criteria are sensible even without reference to case law. Assume, for instance, there was substantial causal evidence that VR games as a whole, regardless of content, have harmful psychosocial effects on users when played beyond a threshold number of hours in a single play session. While there are intangible ideas, images, and representations in those games, which typically enjoy substantial First Amendment protections, the mechanism of injury bypasses them. It is the direct psychological and physiological connection caused by the software’s *interaction* with the hardware—the head-mounted display (HMD)—that causes injury. Haptic feedback peripherals and motion controllers even enable gaming software to establish a direct biophysical connection to the gamer with a concordant potential for harm, akin to how a game instructing the player to “button mash” a controller can cause carpal tunnel syndrome in their wrist,<sup>167</sup> only more severe. The ideas expressed within the games are epiphenomenal of that direct connection, and thus would be orthogonal to any claim of injury. Of course, if there was insubstantial evidence that the harms in question are greater than those of other, protected media, singling out a medium looks more like singling out speech. But given the evidence assumed in this hypothetical, a regulation requiring that an automatic shut-off mechanism be installed in all VR games and activated at the problematic hour mark may well survive intermediate scrutiny. There is increasingly a

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interest. See FREEDOM OF EXPRESSION—ADULT ENTERTAINMENT ZONING, GOV. DISCRIM. § 11:12. *Brown*’s apparent conflict with *Ginsberg v. New York*, 390 U.S. 629 (1968), where only mid-tier scrutiny was applied to a prohibition on the sale of sexually explicit materials to minors, can be reconciled on similar grounds. See *Brown*, 564 U.S. at 814 (discussing the disparate treatment between *Ginsberg*’s “girlie magazines” and *Brown*’s “violent and depraved video games”).

164. I define “media-based regulation” as a regulation constraining a particular medium of expression without reference to intra-medium content.

165. *Turner Broad. Sys., Inc. v. F.C.C.*, 512 U.S. 622, 660–61 (1994); see also Geoffrey R. Stone, *Content-Neutral Restrictions*, 54 U. CHI. L. REV. 46, 64–70 (1987) (describing both media-based prohibitions and “time, place, and manner” restrictions as content-neutral).

166. At first glance, some lower courts appear to have applied the wrong standard. Compare *Turner*, 512 U.S. at 660 (“It would be error to conclude . . . [t]hat the First Amendment mandates strict scrutiny for any speech regulation that applies to one medium (or a subset thereof) but not others.” (discussing *Leathers v. Medlock*, 499 U.S. 439 (1991))), with *Pitt News v. Pappert*, 379 F.3d 96, 105, 110–11 (3rd Cir. 2004) (holding that regulations that target a “narrow segment of the media” are “presumptively invalid” and must survive strict scrutiny (citing *Leathers*, 499 U.S. at 447)), and *ForSaleByOwner.com Corp. v. Zinnemann*, 347 F. Supp. 2d 868, 878 (E.D. Cal. 2004) (same (citing *Pitt News*, 379 F.3d at 110–11)) [hereinafter FSBO]. But the cases are reconcilable. *Pitt News* and FSBO both implicate intra-medium expression; the former regulation differentiated based on educational affiliation rather than media type, *Pitt News*, 379 F.3d at 101–02, and the latter regulation treated online newspapers differently from other websites despite both offering “virtually identical” content via the internet, FSBO, 347 F. Supp. 2d at 878–79. As such, the application of strict scrutiny was appropriate.

167. BEYOND GAME DESIGN 160 (Chris Bateman ed., 2009); Ronald D. Owen, Review, *Carpal Tunnel Syndrome: A Products Liability Perspective*, 37 ERGONOMICS 449, 462–66 (1994).

consensus that even brief exposure to VR games across genres changes users' behavior.<sup>168</sup> But there are two problems with mandating a shut-off mechanism. First, the harm is not the changes themselves, but that consumers are unaware that their VR games cause such changes—an affront to their autonomy.<sup>169</sup> Second, even if the harm is the changes, because minimal exposure is all that is required to produce them, an automatic shut-off mechanism may be useless—that is, unless it can be shown that it would mitigate any surplus harm from longer-term exposure, something not yet confirmed by the research.

Because of the lack of industry self-regulation on this issue, we are left with three feasible alternatives: a governmental awareness campaign, a content-neutral warning requirement, or a sales restriction. Although the first option is the least restrictive, it is not equally able to remedy the harm—manipulation without the user's knowledge.<sup>170</sup> For instance, warnings plastered on video game packaging or start-up screens will reach virtually all users; awareness campaigns will undoubtedly fall short of that mark.<sup>171</sup> Sales restrictions targeted at the effects of the medium, as opposed to the content of any particular games, would not attract strict scrutiny; they would only incidentally burden speech in the course of regulating conduct.<sup>172</sup> Still, a sales ban would be vastly overinclusive insofar as it extends to adults, given that the harm of manipulation could be substantially mitigated by a warning. Restricting sales only to children could be justified on the ground that they could not as effectively as adults steel themselves from, or consent to, VR games' influences even when made aware of their manipulative effects. But to the extent that such a restriction would be accompanied by a provision allowing parents or guardians to approve of the sale, it would fail as overinclusive for the same reasons set out in *Brown*. Assuming that would be the case, content-neutral warnings are most likely to survive intermediate scrutiny and even warrant lesser scrutiny, as discussed *infra*.

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168. *Supra* Part I.A.2.

169. It may be that the changes themselves do one day amount to significant enough harms that the government would have a substantial or compelling interest in constraining them. But that much has not been shown by the research to date.

170. *See* *Vance v. Judas Priest*, Nos. 86–3939, 86–3939, 1990 WL 130920, at \*25 (D. Nev. Aug. 24, 1990) (“[S]ubliminal communications . . . do not enable an individual to further his personal autonomy. Instead, they are intended to influence and manipulate the behavior of the listener *without his knowledge*.” (emphasis added)).

171. This may be why the courts have pointed to the ESRB system, which requires rating labels, as a less restrictive alternative, as opposed to merely arguing that a governmental awareness campaign in itself would be equally effective. *See* *Brown*, 564 U.S. at 803; *Blagojevich*, 469 F.3d at 650–52. Of course, one could envision a scenario in which the awareness campaign reaches 80% of users, 100% of whom are receptive to the message, while warnings reach 100% of users, less than 80% of whom are receptive. But the government need only produce substantial evidence that there is no less restrictive, equally effective alternative.

172. *Cf.* *Sorrell v. IMS Health Inc.*, 564 U.S. 552, 567 (2011) (giving examples of incidental burdens on speech in the course of restricting economic activity or other nonexpressive conduct).

### B. Deceptive Marketing (and Health Risks)

Commercial speech is rather unhelpfully<sup>173</sup> defined as speech which “propose[s] a commercial transaction”<sup>174</sup> and which is “related solely to the economic interests of the speaker and its audience”<sup>175</sup>—something discoverable through the application of “common sense.”<sup>176</sup> Regulations on commercial speech that restrict information entering the market generally receive intermediate scrutiny under *Central Hudson Gas & Electric Corp. v. Public Service Commission*.<sup>177</sup> However, under *Zauderer v. Office of Disciplinary Counsel*,<sup>178</sup> compelled disclosure requirements, so long as they extend only to “factual and uncontroversial information”<sup>179</sup> and are not “unduly burdensome,”<sup>180</sup> need at most satisfy a mix of rational basis and intermediate review, wherein the requirements must be reasonably related to a state interest that would qualify as substantial under *Central Hudson*<sup>181</sup>—a low bar.<sup>182</sup> Warning requirements are considered a form of compelled disclosure.<sup>183</sup> Sufficient interests have been found to include not only preventing the deception of consumers as in *Zauderer*,<sup>184</sup> but also protecting the public health.<sup>185</sup> The

173. See Jennifer M. Keighley, *Can You Handle the Truth? Compelled Commercial Speech and the First Amendment*, 15 U. PA. J. CONST. L. 1, 74 (2012) (describing this definition as “confused”).

174. Va. State Bd. of Pharm. v. Va. Citizens Consumer Council, 425 U.S. 748, 762 (1976) (quotation omitted); see also *Bolger v. Youngs Drug Prods. Corp.*, 463 U.S. 60, 66 (1983) (describing this as “the core notion of commercial speech.”).

175. *Cent. Hudson Gas & Elec. Corp. v. Public Serv. Comm’n.*, 447 U.S. 557, 561 (1980).

176. *Bolger*, 463 U.S. at 64.

177. 447 U.S. at 564–66.

178. 471 U.S. 626 (1985).

179. See, e.g., *Safelite Grp., Inc. v. Jepsen*, 764 F.3d 258, 263 (2d Cir. 2014) (quoting *Zauderer*, 471 U.S. at 651). A powerful case has been made that “the ‘factual and uncontroversial’ limitation is best read as a check to ensure that any mandated statement is *factually accurate* (or *factually uncontroversial*).” Micah L. Berman, *Clarifying Standards for Compelled Commercial Speech*, 50 WASH. U.L. & POL’Y 53, 65 (2016); see also *Discount Tobacco City & Lottery, Inc. v. United States*, 674 F.3d 509, 559 n.8 (6th Cir. 2012) (using this definition); *CTIA—The Wireless Ass’n v. City of Berkeley*, 139 F. Supp. 3d 1048, 1071 (N.D. Cal. 2015) (same) [hereinafter *CTIA—Berkeley*], *vacated and remanded*, 138 S. Ct. 2708 (2018). However, the Supreme Court recently appears to have adopted a more subjective understanding of “uncontroversial,” separate from the “factual” criterion. See *Nat’l Inst. of Family & Life Advocates v. Becerra*, 138 S. Ct. 2361, 2366 (2018) (noting that *Zauderer* is inapposite because the regulation required that information be provided on “state-sponsored services—including abortion, hardly an ‘uncontroversial’ topic.”).

180. *Becerra*, 138 S. Ct. at 2372 (quoting *Zauderer*, 471 U.S. at 651).

181. See *Am. Meat Inst. v. U.S. Dep’t of Agric.*, 760 F.3d 18, 23 (D.C. Cir. 2014) (“[T]he Supreme Court has not made clear whether *Zauderer* would permit government reliance on interests that do not qualify as substantial under *Central Hudson*’s standard”; see also *CTIA—Berkeley*, 139 F. Supp. at 1064 (“[C]ircuit courts have essentially characterized the *Zauderer* test as a rational basis or rational review test.”). “[T]here is a persuasive argument that, where . . . the compelled disclosure is that of clearly identified government speech, and not that of the private speaker, a standard even less exacting than that established in *Zauderer* should apply.” *CTIA—Berkeley*, 139 F. Supp. 3d at 1066–67; see also Berman, *supra* note 179, at 81–82 (arguing that this implicates the First Amendment no more than a private tax used to disseminate government messaging).

182. See *Kansas v. United States*, 16 F.3d 436, 443 (D.C. Cir. 1994) (“[T]he pedestrian nature of those interests affirmed as substantial calls into question whether any governmental interest—except those already found trivial by the [Supreme] Court—could fail to be substantial.”).

183. See, e.g., *Discount Tobacco*, 674 F.3d at 569 (upholding textual warnings on the dangers of smoking).

184. 471 U.S. at 650; see also *Am. Meat Inst. v. United States Dep’t of Agric.*, 760 F.3d 18, 22 (D.C. Cir. 2014) (noting *Zauderer* “seems inherently applicable beyond the problem of deception.”).

185. See, e.g., *CTIA—Berkeley*, 139 F. Supp. 3d at 1066 (“[I]t would make little sense to conclude that the government has greater power to regulate commercial speech in order to prevent deception than to protect public

standard of proof for the state interest is that the “disclosures must remedy a harm that is ‘potentially real not purely hypothetical,’”<sup>186</sup> a weaker variation of the *Turner* test for substantial state interests discussed *supra* Part II.A. It is unclear whether the inclusiveness standards apply, though recent Supreme Court jurisprudence suggests that they do.<sup>187</sup> While there is also some controversy over which of *Zauderer* or *Central Hudson* is more apposite to graphic warning requirements,<sup>188</sup> courts have most recently cited the latter as precedent.<sup>189</sup>

Any regulations imposing warning requirements related to video games’ content are likely to be considered compelled noncommercial speech, which implicates strict scrutiny. The Seventh Circuit found in *Entertainment Software Ass’n v. Blagojevich*<sup>190</sup> that warnings that comprise so much as a label of “18” affixed on a video game’s retail box, where that number is a representation of the game’s content such as sexually explicit or violent material, are content-based restrictions on noncommercial speech because of the subjective, “non-factual” nature of such content.<sup>191</sup> Notably, the court did not hold that *Zauderer* was inapposite because any warning affixed to video games would implicate strict scrutiny due to the inherently creative nature of the medium. Some might argue that *Brown*, which placed video games on the pantheon of “books, plays, and movies,”<sup>192</sup> did just that. But as the D.C. Circuit noted in *Discount Tobacco*

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health and safety, a core function of the historic police powers of the states.”). Some have suggested that consumer interest or awareness may also be sufficient. See Note, *Repackaging Zauderer*, 130 HARV. L. REV. 972, 983 (2017) (referring to a “move by some courts to more explicitly embrace consumer interest as a justification for the imposition of compelled commercial disclosures” (citing *CTIA—Berkeley*, 139 F. Supp. 3d at 1069–70; *Grocery Mfrs. Ass’n v. Sorrell*, 102 F. Supp. 3d 583, 597–98 (D. Vt. 2015); *Am. Meat Inst.*, 760 F.3d at 23 (D.C. Cir. 2014))). This position is erroneous. The cases cited *id.* all involved some potential for harm to the public health, which does not, as suggested, put them in conflict with *International Dairy Foods Ass’n v. Amestoy*, 92 F.3d 67, 73–74 (2d Cir. 1996), which held that consumer interest “alone” is insufficient.

186. See *Becerra*, 138 S. Ct. at 2367 (quoting *Ibanez v. Florida Dept. of Business and Professional Regulation, Bd. of Accountancy*, 512 U.S. 136, 146 (1994)); see also *Int’l Dairy Foods Ass’n v. Boggs*, 622 F.3d 628, 641 (6th Cir. 2010) (*Zauderer* applies “where a disclosure requirement targets speech that is inherently misleading . . . [or] where . . . the speech at issue is potentially misleading.” (citing *Milavetz, Gallop & Milavetz, P.A. v. United States*, 559 U.S. 229 (2010))). This seems to cut against some courts’ requirement that the harm be proven “likely.” See, e.g., *Mass. Ass’n of Private Career Sch. v. Healey*, 159 F. Supp. 3d 173, 196 (D. Mass. 2016). For a discussion of why VR games are inherently misleading, see *infra* Part II.C.

187. Compare *Zauderer*, 471 U.S. at 651 n.14 (“[W]e are unpersuaded by appellant’s argument that a disclosure requirement is subject to attack if it is ‘under-inclusive’ . . . As a general matter, governments are entitled to attack problems piecemeal, save where their policies implicate rights so fundamental that strict scrutiny must be applied.”), and *New York State Rest. Ass’n v. New York City Bd. of Health*, 556 F.3d 114, 134 (2d Cir. 2009) (holding that underinclusiveness is not fatal to compelled disclosures), with *Becerra*, 138 S. Ct. at 2375–76 (“Underinclusiveness raises serious doubts about whether the government is in fact pursuing the interest it invokes, rather than disfavoring a particular speaker or viewpoint” (quoting *Brown*, 564 U.S. at 802)).

188. Compare *R.J. Reynolds Tobacco Co. v. FDA*, 696 F.3d 1205, 1216 (D.C. Cir. 2012) (“[G]raphic warnings are not ‘purely’ factual because . . . they are primarily intended to evoke an emotional response, or, at most, shock the viewer into retaining the information in the text warning.” (applying *Central Hudson*)), overruled in part by *Am. Meat Inst. v. USDA*, 760 F.3d 18 (D.C. Cir. 2014), with *Discount Tobacco*, 674 F.3d at 569 (applying *Zauderer*).

189. *Cigar Ass’n of Am. v. U.S. Food & Drug Admin.*, 315 F. Supp. 3d 143, 165–66, 169–70 (D.D.C. 2018).

190. 469 F.3d 641 (7th Cir. 2006).

191. *Id.* at 652 (declining to apply *Zauderer* scrutiny for this reason).

192. *Brown*, 564 U.S. at 790.

*City & Lottery v. United States*,<sup>193</sup> both *Brown* and *Blagojevich* involved warning requirements that were content-based, rather than content-neutral,<sup>194</sup> and “involved not just warning requirements, but also affirmative limitations on speech (in the form of sales restrictions),”<sup>195</sup> suggesting that it was the sales restrictions as opposed to the warning requirements that triggered strict scrutiny in both cases.<sup>196</sup> As such, in order to attract the less demanding *Zauderer* scrutiny, VR game warnings must be content-neutral, consisting strictly of the psychological and behavioral effects of the games.

Of course, to succeed under the standard, there must be substantial evidence of potential deception or harm to the public health.<sup>197</sup> Marketing VR games as entertainment (often for use by children), without disclosing their effects, is at least potentially if not inherently misleading to consumers. That alone should satisfy the substantial interest criterion.

Additionally, some of the health risks posed by VR games resemble those of other products which the government has been deemed to have a substantial interest in regulating through compelled speech. In *Discount Tobacco*, the Sixth Circuit upheld the government’s graphic warning requirements for tobacco products, which mandated “that tobacco manufacturers reserve a significant portion of tobacco packaging for the display of health warnings, including graphic images intended to illustrate the hazards of smoking[.]”<sup>198</sup> The court noted that “[a]mple evidence establishes that current warnings do not effectively inform consumers of the health risks of tobacco use and that consumers do not understand these risks,” “adolescents are a target of the marketing expertise of Tobacco Companies,” and there is “no evidence that the content of any of the health warnings are in dispute within the scientific or medical community.”<sup>199</sup> It is already established that VR games are so psychoactive and bioactive that they psychologically manipulate users.<sup>200</sup> Furthermore, VR games are likely to be advertised to a broad audience and to minors in particular,<sup>201</sup> and consumers undoubtedly do not understand the risks associated with VR gaming. In these respects, VR games are analogous to tobacco products and thus could be regulated on similar grounds, namely content-neutral warnings.

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193. 674 F.3d 509 (6th Cir. 2012).

194. *See id.* at 527 (noting that the warning labels touch upon the plaintiffs’ “core speech in the form of ‘art and literature’ based on the state’s determination that certain words were ‘too harmful to be tolerated,’” rather than “serve as disclaimers to the public regarding the incontestable health consequences of using [the product]”).

195. *Id.* at 526–27.

196. This may have been the case in *Brown*, where the majority’s analysis discussed the statute as a whole rather than each constraint separately, but clearly was not the case in *Blagojevich* given its explicit discussion of the warning label requirement as grounds alone for strict scrutiny.

197. *See Entm’t Software Ass’n v. Blagojevich*, 404 F. Supp. 2d 1051, 1081 (N.D. Ill. 2005) (declining to apply *Zauderer* because *inter alia* defendants “offered no evidence that there is any actual confusion or deception of parents or children about the ESRB rating system or the content of the games necessitating these measures”), *aff’d*, 469 F.3d 641 (7th Cir. 2006).

198. 674 F.3d at 520.

199. *Id.* at 526, 569.

200. *Supra* Part I.A.

201. *Cf. FED. TRADE COMM’N, MARKETING VIOLENT ENTERTAINMENT TO CHILDREN* (2000).

Some may argue that the worst health effects of tobacco, particularly cancer, are vastly more severe than any of the harms from playing VR games, rendering them too dissimilar. This may be true. Nevertheless, health-related disclosures have been successfully upheld for products whose potential harms are arguably less than those of VR games and whose evidentiary basis is certainly no stronger than the studies presented *supra* Part I.A. For instance, nutrition labeling on food products has been repeatedly upheld under *Zauderer* on the ground that the government has a substantial interest in reducing obesity.<sup>202</sup> Surely, the risk that VR games could plant false memories in children should be considered on equal footing. Similarly, country-of-origin labeling on food products has been upheld because of the government's interest in *inter alia* "empower[ing] consumers to take *possible* country-specific differences in safety practices into account" and "the economy-wide benefits of confining the market impact of a disease outbreak."<sup>203</sup> Some may counter that the research presented *supra* Part I.A is weaker than that which, say, links high caloric intake to obesity, but even equivocal,<sup>204</sup> if not contradictory,<sup>205</sup> research findings as to the health risks of a product or health benefits of a regulation in the nutrition and food safety contexts have been sufficient to warrant compelled disclosure. Equivocal research findings have been sufficient in other contexts as well, such as warnings about cell phone radiation.<sup>206</sup> This may seem odd when judged under *Turner*'s substantial evidence requirement, but in the context of *Zauderer*, it is sensible. Recall that under *Turner*, which governs content-neutral constraints in the noncommercial context, the evidence must show that the harm is "real"; under *Zauderer*, it must show merely that there is a "potential" for harm. That there is a scientific debate over a product's safety is in itself substantial evidence of that harm potentiality. The courts' disparate treatment of commercial and noncommercial speech justifies this "double standard."

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202. See, e.g., *New York State Rest. Ass'n v. New York City Bd. of Health*, 556 F.3d 114 (2d Cir. 2009).

203. *Am. Meat Inst. v. U.S. Dep't of Agric.*, 760 F.3d 18, 25 (D.C. Cir. 2014) (emphasis added).

204. See, e.g., *Grocery Mfrs. Ass'n v. Sorrell*, 102 F. Supp. 3d 583, 597–98 (D. Vt. 2015) (upholding disclosure requirements despite legislative findings showing "conflicting studies assessing the health consequences of food produced from genetic engineering" and the potential for the products to "cause unintended consequences").

205. See, e.g., *Am. Meat Inst. v. U.S. Dep't of Agric.*, 760 F.3d 18, 25 (D.C. Cir. 2014) (upholding disclosure requirements despite "agency statements (from prior rulemakings) claiming that country-of-origin labeling serves no food safety interest"); see also *id.* at 51–52 (Brown, J., dissenting) (noting the agency also "reject[ed] commenters' suggestions that the origin labeling program is 'critical to respond to outbreaks of food borne illness'" (citation omitted)). But see *Am. Beverage Ass'n v. City & Cty. of San Francisco*, 871 F.3d 884, 895 (9th Cir. 2017) (finding a warning that sugary beverages contribute to obesity to be non-factual given *inter alia* agency statements that sugars "can be a part of a healthy dietary pattern when not consumed in excess amounts"), *reh'g en banc granted*, 880 F.3d 1019 (9th Cir. 2018).

206. See *CTIA—The Wireless Ass'n v. City of Berkeley, Cal.*, 139 F. Supp. 3d 1048, 1070 (N.D. Cal. 2015) (upholding cell phone warning requirements despite that "there is scientific uncertainty as to the relationship between SAR levels and the risk of, e.g., cancer, and there is scientific debate about whether nonthermal as well as thermal effects of RF radiation may pose health risks"), *vacated and remanded*, 138 S. Ct. 2708 (2018). But see *CTIA—The Wireless Ass'n v. City & Cnty. of San Francisco*, 494 F. App'x 752, 753–54 (9th Cir. 2012) (rejecting a similar warning because "[t]here is a debate in the scientific community about the health effects of cell phones" and "there is no evidence of cancer caused by cell phones," rendering the warning's suggestion that cell phone radiation is dangerous more opinion than fact).

While one could pursue commercial speech restrictions, as opposed to compulsions, that is not advisable in the VR gaming context. Advertising restrictions would trigger the more demanding *Central Hudson* test, and the Supreme Court struck them down in at least one case under the standard by identifying warnings as a less restrictive alternative.<sup>207</sup> We have already seen the D.C. Circuit in *Discount Tobacco* suggest from its interpretation of *Brown* that video game sales restrictions are subject to strict scrutiny and identify warnings as a less restrictive alternative. In other words, content-neutral warnings are the surest bet to attract and survive *Zauderer* scrutiny. For similar reasons, graphic warning requirements should be avoided, as these may be subject to the *Central Hudson* test. In addition to the difficulty of graphically depicting VR games' risks, they may not even provide much of a "shock" premium;<sup>208</sup> textual warnings can comprise up to 30% of a product's packaging and 20% of its advertisements without implicating *Central Hudson*.<sup>209</sup>

### C. Subliminal Messaging and Unconscious Influence

The manipulative effects of VR games are the product of gameplay elements that may fall outside the scope of free speech protections, namely stimuli that are exceedingly likely to influence users' unconscious. Unconscious influence is defined as "a lack of awareness of the influences or effects of a triggering stimulus"—when people are not "aware of and able to report on the true causes of their behavior[.]"<sup>210</sup> Subliminal stimuli are sensory stimuli that are "too weak or brief to enter conscious awareness,"<sup>211</sup> such that any influence they have on the receiver is unconscious.<sup>212</sup> In the current VR context, these stimuli are auditory, visual, or tactile.<sup>213</sup> Regular stimuli, the sensory feedback that VR users consciously receive through the course of normal gameplay, can also have unconscious influence—that is, when users are aware of the stimuli,

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207. See *Thompson v. W. States Med. Ctr.*, 535 U.S. 357, 376 (2002) (noting that instead of restricting advertising for compounded drugs, the government's interest "could be satisfied by the far less restrictive alternative of requiring each compounded drug to be labeled with a warning that the drug had not undergone FDA testing and that its risks were unknown").

208. While graphic warnings have been shown to be superior to small-text warnings in conveying the risks of and reducing smoking behavior, there is also evidence that large-text warnings are equally effective. See, e.g., David Hammond, *Health Warning Messages on Tobacco Products*, 20 TOBACCO CONTROL 327, 329, 331 (2011).

209. *Cigar Ass'n of Am. v. U.S. Food & Drug Admin.*, 315 F. Supp. 3d 143, 166–67 (D.D.C. 2018).

210. John Bargh & Ezequiel Morsella, *The Unconscious Mind*, 3 PERSPECTIVES ON PSYCHOLOGICAL SCI. 73, 75 (2008).

211. *Id.* at 74.

212. See Richard Gafford, *The Operational Potential of Subliminal Perception*, CIA at 67 (Sept. 18, 1995), <https://www.cia.gov/library/center-for-the-study-of-intelligence/kent-csi/vol2no2/pdf/v02i2a07p.pdf> ("The use of subliminal perception . . . is a device to keep him unaware of the source of his stimulation. The desire here is not to keep him unaware of what he is doing, but rather to keep him unaware of why he is doing it").

213. Other stimuli, like olfactory stimuli that stimulate smell and taste receptors, may eventually become commercially viable, though there are difficulties. See David Matthews, *Why Smells Are So Difficult to Simulate for Virtual Reality*, UPLOAD VR (Mar. 9, 2017), <https://uploadvr.com/why-smell-is-so-difficult-to-simulate-in-vr>. They have been shown to increase feelings of presence in VR environments. Benson G. Munyan, III et al., *Olfactory Stimuli Increase Presence in Virtual Environments*, 11 PLOS ONE 1 (2016).

but not their effects.<sup>214</sup> The power of presence and embodiment in interactive VR is so great that virtually *any* game can unconsciously affect user cognition and behavior.<sup>215</sup> So, the medium can rightly be considered inherently likely to influence users at the level of the unconscious, as with subliminal stimuli. Practically speaking, the two types of stimuli—subliminal and regular—differ only with respect to the likelihood that users will be able to trace back the causes of their thinking and behavior to the source, and for both types of stimuli in interactive VR, the likelihood is low.

### 1. *Commercial Speech*

The FCC has been concerned with subliminal advertising since 1957,<sup>216</sup> and declared it against the public interest in 1974.<sup>217</sup> The FCC's ban on subliminal messaging was on the ground that "[w]hether effective or not, [subliminal] broadcasts clearly are intended to be deceptive" and therefore are "inconsistent with the obligations of a licensee."<sup>218</sup> Federal Trade Commission (FTC) and FCC policy has since evolved, doing away with the "intent" standard. Instead, the agencies now base their determinations of deceptive advertising on whether the practice "is likely to mislead consumers acting reasonably under the circumstances about a material fact," "rather than whether it causes actual deception" and "regardless of whether the advertiser intended to convey those claims."<sup>219</sup> Circuit courts have generally applied the same standard.<sup>220</sup> The National Association of Broadcasters, an industry-wide self-regulating body, and all the major networks followed the FCC's lead.<sup>221</sup> The Bureau of Alcohol, Tobacco, and Firearms also prohibited the use of subliminal messaging in alcohol marketing on the ground that it is "deceptive."<sup>222</sup>

In *Banzhaf v. F.C.C.*,<sup>223</sup> the D.C. Circuit upheld the FCC's requirement that broadcasters of cigarette advertisements also devote time to anti-smoking commercials.<sup>224</sup> The court's ruling was on the grounds that the advertisements

214. Bargh & Morsella, *supra* note 210, at 75.

215. *Supra* Part I.A.

216. Public Notice Concerning the Use of "Subliminal Perception" Advertising by Television Stations, 40 F.C.C. 10 (1957).

217. See Public Notice Concerning the Broadcast of Information by Means of "Subliminal Perception" Techniques, 39 Fed. Reg. 3714 (Jan. 29, 1974) ("broadcasts employing such techniques are contrary to the public interest").

218. *Id.*

219. See Fed. Comm. Comm'n & Fed. Trade Comm'n, *Joint FCC/FTC Policy Statement for the Advertising of Dial-Around and Other Long-Distance Services to Consumers*, File No. 00-72, 15 FCC Rcd. 8654, at ¶¶ 5–6 (Mar. 1, 2000); see also Fed. Trade Comm'n, *FTC Policy Statement on Deception* (Oct. 14, 1983), *appended to* Cliffdale Associates, Inc., 103 F.T.C. 110, 174 (1984).

220. See *Beneficial Corp. v. FTC*, 542 F.2d 611, 617 (3d Cir. 1976) ("An intent to deceive is not an element of a deceptive advertising charge under [FTC Act] § 5. . . . [T]he likelihood or propensity of deception is the criterion by which advertising is measured." (citing cases from the Third, Seventh, and Ninth Circuits)).

221. Scot Silvergate, *Subliminal Perception and the First Amendment*, 44 U. MIAMI L. REV. 1243, 1268–69 (1990).

222. U.S. Dep't of Justice, Bureau of Alcohol, Tobacco, and Firearms, *Advertising of Distilled Spirits*, 27 C.F.R. § 5.65(h) (1988).

223. 405 F.2d 1082 (D.C. Cir. 1968), *cert. denied*, 396 U.S. 842 (1969).

224. *Id.* at 1100–01.

implicitly portrayed a product whose normal use is hazardous to one's health as socially desirable,<sup>225</sup> and that broadcasting as a medium has a unique "subliminal impact" warranting "different treatment under the First Amendment" compared to other media—"subliminal" in that a radio or TV commercial "may be [passively] heard even if not [actively] listened to,"<sup>226</sup> and "impactful" in that psychology experiments "indicate strongly that people tend to remember advertising messages presented by a combination of visual and auditory methods [(e.g., TV commercials)] significantly more than those presented by either method alone [(e.g., print advertising)]."<sup>227</sup> Subsequently, in *Capital Broadcasting Co. v. Mitchell*,<sup>228</sup> the District of Columbia upheld a complete ban on broadcast cigarette advertising instituted by the Public Health Cigarette Smoking Act of 1969.<sup>229</sup> The decision expanded on the reasoning in *Banzhaf* "that there are significant differences between the electronic media and print," including that the former exerts greater influence on young people than the latter.<sup>230</sup> These cases "distinguished subliminal advertising as a unique medium relatively unprotected by the [F]irst [A]mendment when the public health is threatened."<sup>231</sup> Even though broadcasting has since shed its reputation as a uniquely subliminal medium unworthy of protection,<sup>232</sup> the notion that subliminal advertisements and advertisements transmitted through subliminal media warrant little if any First Amendment protections when the products being advertised pose health risks is well-founded.<sup>233</sup> Given the subliminal nature of VR in-game marketing discussed *supra* Part I.A.2, such marketing could be classified as unprotected, low-value speech and prohibited entirely. Some may point to evolutions in the Supreme Court's commercial speech doctrine over the last half-century, beginning with *44 Liquormart, Inc. v. Rhode Island*,<sup>234</sup> as contrary to this line of reasoning. In fact, as Micah Berman has skillfully demonstrated, the Court's push toward stricter review of commercial speech regulations has been with respect to paternalistic restrictions of non-misleading, informational speech, not manipulative speech.<sup>235</sup>

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225. *Id.* at 1086.

226. *Id.* at 1100–01.

227. *Id.* at 1101 n.77.

228. 333 F. Supp. 582 (D.D.C. 1971), *aff'd*, 405 U.S. 1000 (1972).

229. *Id.* at 586.

230. *Id.*

231. Harry Schiller, *First Amendment Dialogue and Subliminal Messages*, 11 N.Y.U. REV. L. & SOC. CHANGE 331, 342 (1982).

232. *See, e.g.*, *Greater New Orleans Broad. Ass'n, Inc. v. United States*, 527 U.S. 173, 195–96 (1999) (holding that a ban on the advertisement of lottery information in states where it is legal was unconstitutional under *Central Hudson*).

233. *See* Schiller, *supra* note 231, at 351–52 (arguing that because "[s]ubliminals are by their nature deceptive," they would not receive protection even under *Central Hudson*).

234. 517 U.S. 484 (1996).

235. Berman, *supra* note 91.

## 2. *Noncommercial Speech*

It may be unsurprising that in the commercial context, where deceptive and misleading speech is unprotected,<sup>236</sup> the use of subliminal stimuli is not either. However, even in the entertainment and art contexts, the two courts that have considered the issue—one in *Vance v. Judas Priest*<sup>237</sup> and the other in *Waller v. Osbourne*<sup>238</sup>—found that subliminal communications are not protected speech.<sup>239</sup> In *Vance*, the estates of two teenagers who committed suicide sued the heavy metal rock band Judas Priest and CBS Records under the theory that subliminal messages in one of the band’s albums, namely repetitions of the words “Do It,” caused their deaths.<sup>240</sup> While the court acknowledged that “the lyrics of the song were protected speech,” it found that those communicated subliminally were not.<sup>241</sup> The court reasoned that subliminal stimuli are not protected because they, by their nature, “are intended to surreptitiously influence the thought processes of an individual, and ultimately, his behavior,” “without his knowledge and consent,” depriving him of “the ability to foreclose others from secretly intruding into [his] subconscious.”<sup>242</sup> The reasoning is equally applicable to regular stimuli that are as likely to influence human psychology or behavior at the unconscious level, as with VR games. Thus, speech that is intended to unconsciously influence an individual’s thoughts and behavior is not protected when it is transmitted without forewarning, even when the speech at issue is a form of expression that is granted strong First Amendment guarantees, like music.<sup>243</sup> Because this rule incorporates an intent criterion, however, it is

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236. See *Cent. Hudson Gas & Elec. Corp. v. Pub. Serv. Comm’n of New York*, 447 U.S. 557, 575–76 (1980).

237. No. 86-3939, 1990 WL 130920 (D. Nev. Aug. 24, 1990).

238. 763 F. Supp. 1144 (M.D. Ga. 1991), *aff’d without op.*, 958 F.2d 1084 (11th Cir. 1992), *cert. denied*, 506 U.S. 916 (1992); see also *id.* at 1148 (“[T]he presence of a subliminal message, whose surreptitious nature makes it more akin to false and misleading commercial speech and other forms of speech extremely limited in their social value, would relegate the music containing such to a class worthy of little, if any, first amendment constitutional protection.” (citing *Vance*, 1990 WL 130920)).

239. See also *Gilmer v. Buena Vista Home Video, Inc.*, 939 F. Supp. 665, 670 (W.D. Ark. 1996) (noting that in both *Vance* and *Waller*, “the court felt the proper characterization of the message as being subliminal or not was important to the court’s analysis of the First Amendment issue. We agree.”).

240. *Vance*, 1990 WL 130920, at \*1–2.

241. *Id.* at \*22.

242. *Id.* at \*25, \*28, \*31–32. This is in line with a popular conception of the First Amendment as protecting “a society of free choice,” where each person is at liberty “to decide for himself what he will read and to what he will listen.” *Ginsberg v. State of N.Y.*, 390 U.S. 629, 649 (1968). Because such a society requires that people have the capacity to choose, “[w]hen expression occurs in a setting where the capacity to make a choice is absent, government regulation of that expression may co-exist with and even implement First Amendment guarantees.” *Id.*

243. See *Cinevision Corp. v. City of Burbank*, 745 F.2d 560, 567 (9th Cir. 1984); see also *Reed v. Village of Shorewood*, 704 F.2d 943, 950 (7th Cir. 1983), *rev’d on other grounds sub nom. Brunson v. Murray*, 843 F.3d 698 (7th Cir. 2016) (“If the [City Council] passed an ordinance forbidding the playing of rock and roll music . . . , they would be infringing a First Amendment right . . . even if the music had no political message—even if it had no words—and the defendants would have to produce a strong justification for thus repressing a form of ‘speech.’” (citations omitted)).

highly unlikely any plaintiffs could succeed on it. Indeed, this proved fatal to the plaintiffs' claims in both *Vance* and *Waller*.<sup>244</sup>

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At least three First Amendment doctrines permit the constraint of VR games. The objective psychosocial harms doctrine would permit court-imposed, content-based warning labels targeted at children. The misleading nature and health risks of VR games would permit content-neutral warning labels more broadly. The subliminal messaging and unconscious influence doctrine would permit maximal constraints on in-game marketing, including warnings that a game contains subliminal advertisements and their possible effects, though it is unlikely to constrain noncommercial speech due to the intent requirement. The First Amendment need not be a bar to the constraint of manipulative VR games. Because the harm is unique to interactive VR as a medium, and because VR gaming is uniquely subliminal, few of these doctrines would apply to other mediums unless and until such mediums become similarly affective. As such, the doctrines are broad enough to provide courts and legislatures with the needed flexibility to constrain VR gaming's worst harms, but narrow enough to ensure that such constraints cannot be extended to most other forms of speech.

### III. OPTIMALLY CONSTRAINING VIRTUAL REALITY GAMES

If it is clear that VR games' manipulative harms are constitutionally regulable, then the next question is how best to constrain them. As things currently stand, VR game developers and publishers have every incentive to pass the manipulative costs of their business and design decisions onto consumers. This is obviously inefficient.<sup>245</sup> Two ways the law can operate to force cost-internalization are regulation and liability. If the cost of a constraint exceeds the cost of manipulation, it should not be imposed. If the cost of manipulation exceeds the cost of either constraint, however, then the least-cost constraint should be imposed. The purpose of this Part is not to weigh those costs, though policymakers will likely feel pressed to do so. Rather, its purpose is to suggest that the balance could reasonably favor constraints given the growth of the VR gaming industry and the innateness of its harms, and thus to provide a rough estimation of which constraint is optimal. It does so by discussing some relevant considerations, both practical (achieving the optimal cost-benefit balance) and doctrinal (abiding by the First Amendment).

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244. See *Vance*, 1990 WL 130920, at \*22 (“[T]he plaintiffs did not lose this case because defendants proved that subliminal stimuli have no effect on human behavior. Rather, plaintiffs lost this case because they failed to prove that defendants intentionally placed subliminal messages on the album . . .”); *Waller*, 763 F. Supp. at 1151 (“[T]here is no evidence that defendants’ music was intended to produce acts of suicide . . .”).

245. All references to “optimality” and “efficiency” in this Article are synonymous with “Kaldor-Hicks efficiency.” An allocation is said to be Kaldor-Hicks superior “if and only if those whose welfare increases in the move from [one distribution] to [another] could fully compensate those whose welfare diminishes with a net gain in welfare.” Jules L. Coleman, *Efficiency, Utility, and Wealth Maximization*, 8 HOFSTRA L. REV. 509, 513 (1980). An allocation is considered “efficient” when no further superior allocation can be made.

### A. *What Regulation Might Look Like*

#### 1. *Noncommercial Content*

The options for regulating noncommercial VR gaming content are limited. Apart from sales restrictions, which would likely be unconstitutional, legislatures can force disclosures as to VR games' manipulative risks. Forced disclosures can take several forms. First, there can be a generalized warning that VR games unconsciously alter users' thoughts and behaviors. This would minimize administrative and enforcement costs, but is at risk of being both overinclusive and ineffective. It would be overinclusive in giving consumers the perception that every VR game poses an equivalent threat to their autonomy as the next, which is unlikely to be the case.<sup>246</sup> This, in turn, would render the warning ineffective, as consumers exposed to games they find to be low-risk become conditioned to discount or ignore the harms of riskier ones. Second, companies can be required to warn of the specific, evidence-based, manipulative effects of their games. This would require companies to invest in researching the effects of their products and likely lead to industry self-regulation.<sup>247</sup> While this approach would be efficiently inclusive and similarly minimize administrative costs, there are likely to be substantial enforcement costs. The regulator will not only have to review the companies' research, or at least some sample of it, but it may also have to invest in replication studies to ensure companies are doing honest research. Third, the legislature could set up an independent administrative review system, which would minimize enforcement costs but produce significant administrative costs. It would also be overinclusive in that some VR games that consumers would find low-risk would be subject to the review process or, if not, at least be subject to some costly exemption procedure. Among these approaches, the second seems optimal. But it may not optimally constrain VR games' other potential harms, where products liability would also be efficiently inclusive, only at a lower administrative cost.<sup>248</sup>

#### 2. *Commercial Content*

Ryan Calo has thoroughly discussed pathways to manipulative commercial speech regulation elsewhere.<sup>249</sup> To summarize, legislatures could strengthen privacy laws, limiting companies' ability to gather and deploy consumer information for manipulative purposes in VR games.<sup>250</sup> The problem here is that

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246. See *supra* Part I.A (discussing different effects that different VR experiences have on users). Consumers cannot estimate whether the benefit of playing a particular VR game outweighs the costs without knowing the specific effects the game may have on them.

247. For what this might look like in practice, see *infra* Part III.B. It is an open question precisely how such a law could be drafted in a content-neutral manner, as many of the studies *supra* Part I.A appear to have tailored their methodologies to the expressive content of the VR software they used, or vice versa.

248. *Infra* Part III.B.

249. Calo, *supra* note 93, at 1041–48.

250. *Id.* at 1042.

companies regularly use such information to improve product quality.<sup>251</sup> Alternatively, the FTC could police manipulative marketing in games just as it does for unfair and deceptive business practices in general, though this would likely require a change in the law to expand its jurisdiction.<sup>252</sup> Regulation might also take the form of mandatory, marketing-free product options,<sup>253</sup> which would be priced higher to reflect the decrease in revenues. Because video games are typically normal or (if free-to-play) inferior goods, that some consumers would be priced out of the marketing-free version is less of a concern than for more essential goods or services.<sup>254</sup> But many games already offer the option to purchase an advertisement-free alternative to the “free-to-play” (with advertisements) version of the game, and forced disclosures would likely incentivize such bifurcation in VR games across the board. The most extreme option would be an outright ban on some or all manipulative VR in-game marketing. This may be constitutionally feasible,<sup>255</sup> but it is not advisable.<sup>256</sup> “Triple-A,” big-budget game development and marketing is becoming increasingly expensive and even though many games are low-budget, they are also often sold at a loss,<sup>257</sup> forcing publishers to look for alternative means of raising revenue. Such revenue, in turn, is used to lower prices or offer games for free, and improve product quality. The forced disclosure options discussed *supra* could also apply to commercial speech. But again, for VR games’ other potential harms, products liability achieves the same benefit at a lesser cost.

### B. Future-Proofing Through Products Liability

#### 1. Practical Considerations

Susan Rose-Ackerman provides a useful framework for determining the optimal means of constraining product harms: regulation and tort law.<sup>258</sup> Product safety regulation is optimal where “the harm is very diffuse, with many people harmed in a small way,” such that “[n]o one has much of an incentive to sue individually”; “damages are imposed on large numbers of people,” with many “individualized but similar harms”; “the damages cannot be tied to a single, identifiable source”; and “the companies causing the injuries are too poor to pay for the harm they cause.”<sup>259</sup> Otherwise, the tort system is optimal, especially for low probability injuries.<sup>260</sup> Under these criteria, given the current state of the research on interactive VR, product safety regulation of the variety

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251. *Id.* at 1042–43.

252. *Id.* at 1043–44.

253. *Id.* at 1047–48.

254. *Cf. id.*

255. *Supra* Part II.C.

256. *But see* Berman, *supra* note 91, at 533–36 (outlining the downsides of disclosure requirements).

257. *See* Raph Koster, *The Cost of Games*, VENTUREBEAT (Jan. 23, 2018), <https://venturebeat.com/2018/01/23/the-cost-of-games/>.

258. Susan Rose-Ackerman, *Product Safety Regulation and the Law of Torts*, in *PRODUCT LIABILITY AND INNOVATION* 151–58 (Janet R. Hunziker & Trevor O. Jones eds., 1994).

259. *Id.* at 152.

260. *Id.*

discussed *supra* seems optimal. The manipulative harm produced by VR games' unconscious influence is diffuse and subtle, such that consumers will have a difficult time identifying when they are harmed. To the extent some are able to uncover the harm, they may have little incentive individually to sue; at best, they might recover emotional damages and at worst nominal to no damages.

But consider the possibility that the research evolves to establish that interactive VR's harms vary considerably depending on the game. That possibility has at least been contemplated by the research; it may even be a natural inference. In that future, using the tort system to constrain VR games would be optimal. The harm suffered by consumers would idiosyncratically vary in degree, depending on *inter alia* the genre of game; the particular gameplay and marketing mechanics; the level of immersion achieved by the interface, including realistic sights and sounds, motion controls, and haptic feedback; the user's age, health, and psychology; and the length of time the user spends in the game.<sup>261</sup> Lawsuits under a tort system would be relatively sparse, as there would need to be the right confluence of the abovementioned factors to cause injury, apart from the general harm to autonomy caused by VR games' unconscious influence. With respect to the latter, one holding affirming the research that such harm is inherent to VR gaming and a cognizable injury may be all that is needed to incentivize game companies to warn of the harm, assuming the industry does not prophylactically react to the risk of liability as it has done in the past.<sup>262</sup> A claimant looking to sue will have little doubt about the parties responsible: the game developers and publishers whose logos feature prominently on the physical product or its virtual start-up screen. Generally, video game companies are highly profitable, with the top twenty-five companies accumulating revenues of \$70 billion in 2016 and growing at a rate of 10% per year since 2012.<sup>263</sup> While there are smaller developers and publishers, the top ten game companies alone comprise over 50% of global sales,<sup>264</sup> so the majority of claims are likely to be directed at companies capable of compensation.

In the context of constraining VR games within the tort system, a strict liability regime is preferable to a negligence one. As Steven Croley and Jon Hanson note, strict liability is optimal where high information costs prevent consumers from efficiently assessing product risks and distinguishing horizontally between product brands; manufacturers' inability to distinguish between lower-risk marginal and higher-risk inframarginal consumer preferences produces inefficiently restrictive warranties and investments in

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261. The research to date establishes that differences in such factors produce diverse effects. See *supra* Part I.A. The question is whether some of those effects, beyond manipulation, will one day be shown to amount to regulable legal harm. Several such potential harms are discussed *infra* Part IV.C.

262. See *infra* note 274. Regulatory warning requirements are likely still the superior option for constraining VR games' manipulative harms. See *supra* Part III.A. It is not apparent that courts would rule, based on the limited facts before them, that all or even most VR games are manipulative and require warnings. If they did, it is even less apparent that they could require the disclosure of VR games' objective effects in as efficient a manner as, say, a regulatory rule that went through notice and comment.

263. See H.B. Duran, *The Top 25 Game Companies of 2016 by Revenue*, A LIST DAILY (Mar. 23, 2017), <http://www.alistdaily.com/digital/top-25-companies-of-2016-by-game-revenue/>.

264. *Id.*

product safety; and first-party insurance inefficiently reduces incentives for investment in product safety.<sup>265</sup> Conversely, A. Mitchell Polinsky and Steven Shavell identify three mitigating factors that undermine products liability's usefulness, namely where market forces efficiently incentivize increases in product safety such that demand shifts synchronously with product safety; information costs are sufficiently low such that consumers on average hold accurate estimates of product risks; and first-party insurance is perfectly compensatory.<sup>266</sup> Because of games' branding as entertainment, the growing share of the "casual" games market comprising less-informed, inframarginal consumers,<sup>267</sup> and the subtle if not unconscious influence of VR games such that their harms will be difficult for consumers to trace to the source, market forces will not alter the demand for or prices of VR games in a way that accurately reflects the risk of playing them and efficiently incentivizes increases in product safety. Further, because of VR games' idiosyncratic harms assumed in this scenario, it is unlikely that first-party insurers would be able to accurately assess insureds' unique consumption of VR games' and the risks associated with that particular subcategory of game such that premiums adjust in a way that efficiently incentivizes consumer and manufacturer investments in product safety. Rather, forcing VR game companies to internalize the marginal costs of their design decisions would produce price variations that enable consumers to most accurately assess a particular VR game's risk.

## 2. *Doctrinal Considerations*

Across two of the three First Amendment doctrines presented *supra* Part II, whether the constraint in question is efficiently inclusive—that is, neither over nor underinclusive—has bearing on whether it passes constitutional muster. Products liability warning requirements, like other forms of products liability constraints, are imposed on specific product lines<sup>268</sup> when, and only when, they cross a certain user-harm threshold.<sup>269</sup> This latter element neatly tracks the compelling and substantial interest tests adopted by the courts in First Amendment cases,<sup>270</sup> such that a court could dispose of both issues in one fell

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265. Steven Croley & Jon Hanson, *Rescuing the Revolution: The Revived Case for Enterprise Liability*, 91 MICH. L. REV. 683, 767–86 (1993). Even product liability's critics admit that where these premises hold true, product liability is the optimal regime. *Id.* at 768–69.

266. A. Polinsky & Steven Shavell, *The Uneasy Case for Product Liability*, 123 HARV. L. REV. 1436, 1443–69 (2010).

267. Rory Maher, *Casual Gaming Is a Spectacular Business, With Profit Margins Near 90%*, BUSINESS INSIDER (Oct. 20, 2009), <http://www.businessinsider.com/casual-gaming-profit-margins-near-90-2009-10>; Aaron Pressman, *'Candy Crush' Outranks 'Call of Duty' As Mobile Gaming Beats PCs*, FORTUNE (Apr. 22, 2016), <http://fortune.com/2016/04/22/mobile-gaming-pc-sales/>.

268. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 (AM. LAW INST. 1998) (“Questions of design defects and defects based on inadequate instructions or warnings arise when the specific product unit conforms to the intended design but the intended design itself, or its sale without adequate instructions or warnings, renders the product not reasonably safe. If these forms of defect are found to exist, then every unit in the same product line is potentially defective.”).

269. The threshold is not perfect safety, but *reasonable* safety. See *id.* § 2 (“Many courts have invoked the concept of ‘not reasonably safe’ to describe defective designs and defects due to failure to instruct or warn.”).

270. *Supra* Part II.

swoop by using the higher of the two harm thresholds. This would also mean that unless a party can demonstrate that the harms produced by the game in question are replicable across the medium, only that game could be liable for failure to warn. As such, products liability warnings are unlikely to be overinclusive. Of course, an administrative licensing regime could be established with the same standards, but the Supreme Court has already expressed a preference for industry self-regulation when generally effective, and even identified the video game industry as exemplary in this regard.<sup>271</sup> Indeed, the Court has long preferred self-regulation over governmental interference in the realm of protected speech.<sup>272</sup> Products liability would spur such self-regulation. Some may argue that *parens patriae* is warranted because some of the harms that users will encounter will be subtle and unrecognizable to the average person, rendering products liability underinclusive. However, gamers have shown a knack for identifying such harms,<sup>273</sup> and even a minimal amount of litigation by gamers is all that is required to incentivize the industry to sufficiently self-regulate given the specter of liability.

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While smaller publishers and self-publishers may understandably object to a strict liability regime, courts are more likely to preserve their freedom of expression than the legislature and regulatory agencies. Further, it will incentivize larger publishers to pool their resources to establish industry-wide self-regulation. When Congress threatened to regulate the industry in the 1990s in response to concerns over violent video games, some of the larger publishers at the time led the charge to establish industry-wide self-regulation in the form of the ESRB.<sup>274</sup> The ESRB's licensing fees are structured such that the larger publishers subsidize smaller publishers and self-publishers.<sup>275</sup> This experience

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271. *Brown v. Entm't Merchant Ass'n*, 564 U.S. 786, 803–804 (2011).

272. See David Kohler, *Self Help, the Media and the First Amendment*, 35 HOFSTRA L. REV. 1263, 1266 (2007) (“[T]he preference for self help . . . remains at the core of our First Amendment jurisprudence. In authoring what are probably the two most influential opinions in the development of modern First Amendment doctrine, Justices Oliver Wendell Holmes and Louis Brandeis envisioned a self-regulating speech marketplace insulated from government interference in all but the most extreme cases.” (citing *Abrams v. United States*, 250 U.S. 616, 624–31 (1919) (Holmes, J., dissenting); and *Whitney v. California*, 274 U.S. 357, 372–80 (1927) (Brandeis, J., concurring))).

273. See, e.g., Matt Martin, *It Takes Up to 40 Hours to Unlock Darth Vader and Other Heroes in Star Wars Battlefront 2*, VG247 (Nov. 13, 2017), <https://www.vg247.com/2017/11/13/it-takes-40-hours-to-unlock-darth-vader-and-other-heroes-in-star-wars-battlefront-2/> (discussing a data analysis of the player progression system in *Star Wars: Battlefront 2* by a user on Reddit, subsequent outrage within the player base, and updates to the system in response).

274. Andy Chalk, *Inappropriate Content*, THE ESCAPIST (July 20, 2007), <http://www.escapistmagazine.com/articles/view/video-games/columns/the-needles/1300-Inappropriate-Content-A-Brief-History-of-Videogame-Ratings-and-t>.

275. See *Entertainment Software Ratings Board*, GIANT BOMB, <https://www.giantbomb.com/entertainment-software-ratings-board/3010-6476/> (last visited Jan. 26, 2018) (“The ESRB has a fee for rating games and that fee depends on how much the game cost to develop. If the game cost more than \$250,000 dollars the fee would be \$4,000 dollars, if the cost of development was less than \$250,000 dollars the fee would be \$800.”); Jessica Conditt, *Why Your Favorite Indie Game May Not Get a Boxed Edition*, ENGADGET (Nov. 13, 2017), <https://www.engadget.com/2017/11/13/esrb-indie-games-physical-boxed-edition-limited-run-special-reserve/> (“In September, the [ESRB] announced a new tier for rating digital-to-physical games, allowing any title with a development budget of \$1 million or less to be rated as a boxed product for \$3,000, rather than the

with the ESRB suggests that the industry believes self-regulation is superior to governmental regulation, and that industry leaders would likely engage in a similar exercise should strict liability for VR games be adopted by the courts. This self-regulatory association might largely resemble the ESRB, only instead of “adults who typically have experience with children, whether through prior work experience, education or as parents or caregivers,”<sup>276</sup> the raters might comprise psychologists and other professionals who can provide accurate risk assessments.<sup>277</sup> While this would certainly raise the cost of VR game development, most likely resulting in higher prices, those prices would generally reflect the risk premium that interactive VR has over other gaming. Similarly, it would improve overall product safety—another, central aim of strict liability.

#### IV. APPLYING PRODUCTS LIABILITY TO VIRTUAL REALITY GAMES

This Part will outline the contours of a VR game products liability suit. While video games have historically been considered too intangible to constitute “products” under products liability law,<sup>278</sup> the pairing of the immersive nature of VR with the interactive quality of video games warrants special consideration into whether VR games cross the threshold of tangibility so as to constitute “products” and, if so, what injury-causing design defects would subject game developers and publishers to liability. A plaintiff must show that VR games are products, that they caused him harm, and that the harm resulted from a defect in the product.<sup>279</sup>

##### A. *Virtual Reality Games as “Products”*

The *Restatement (Third) of Torts: Products Liability* defines a “product” as “tangible personal property distributed commercially for use or consumption.”<sup>280</sup> Courts have focused on tangibility when determining whether something distributed commercially is a product.<sup>281</sup> There is no bright line that distinguishes tangible from intangible products. Oregon’s appellate court held

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standard submission price of more than \$10,000.”); Owen Good, *ESRB Opens No-Cost Ratings Service for Digitally Distributed Games*, KOTAKU (Oct. 24, 2012), <https://kotaku.com/5954704/esrb-opens-no-cost-ratings-service-for-digitally-distributed-games> (“Downloadable games sold through the three console makers’ online services will be rated by what the [ESRB] is calling a ‘streamlined, no-cost service’ . . .”).

276. *Who Decides Which Rating Should Be Assigned?*, FAQs, ESRB, <http://www.esrb.org/ratings/faq.aspx#14> (last visited Jan. 26, 2018).

277. There is already some precedent for this within the industry. The Recreational Software Advisory Council, a predecessor to the ESRB, employed a team of auditors at Yale University’s Psychology Department to rate computer games in the 1990s. See Stephen Balkan, *Content Ratings for the Internet and Recreational Software*, in *PRIVACY AND SELF-REGULATION IN THE INFORMATION AGE* 140 (1997).

278. *Wilson v. Midway Games, Inc.*, 198 F. Supp. 2d 167 (D. Conn. 2002); *Sanders v. Acclaim Entm’t, Inc.*, 188 F. Supp. 2d 1264 (D. Colo. 2002); *James v. Meow Media, Inc.*, 90 F. Supp. 2d 798 (W.D. Ky. 2000).

279. RESTATEMENT (SECOND) OF TORTS: PRODUCTS LIABILITY § 402A (AM. LAW INST. 1965).

280. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 19(a) (AM. LAW INST. 1998).

281. See, e.g., *Wilson*, 198 F. Supp. 2d at 173 (“The line drawn in these cases is whether the properties of the item that the plaintiff claimed to have caused the harm was ‘tangible’ or ‘intangible.’”); *Winter v. G.P. Putnam’s Sons*, 938 F.2d 1033, 1034 (9th Cir. 1991) (“Products liability law is geared to the tangible world.”).

a pet shop strictly liable for having sold a rabid skunk,<sup>282</sup> despite the fact that most pet owners likely would not consider their pets to be “products.” Most courts “consider[] electricity a product once it has passed through a consumer’s meter,”<sup>283</sup> despite the fact that electricity does not appear to be “tangible.” The battle over bright lines most pertinent to video games centers on the sale of information. In *Winter v. G.P. Putnam’s Sons*,<sup>284</sup> the Ninth Circuit held that “[t]he purposes served by products liability law are focused on the tangible world and do not take into consideration the unique characteristics of ideas and expression,” such as the information in a book.<sup>285</sup> Yet, the court makes an exception for aeronautical charts because they are “highly technical tools” and “graphic depictions of technical, mechanical data,” analogous to a compass.<sup>286</sup> Notably, the court also suggested that “[c]omputer software that fails to yield the result for which it was designed may be another [exception].”<sup>287</sup> In *Wilson v. Midway Games*,<sup>288</sup> the District of Connecticut attempted to make sense of this muddled case history, distinguishing “instruction manuals, cookbooks, navigational charts and similar materials” from “alleged exhortation, inspiration or ‘brainwashing’”—instructions may be products, whereas sources of inspiration may not.<sup>289</sup>

As is the case with movies, the intangible “thoughts, images, ideas, and messages contained in . . . video games” are generally not considered products.<sup>290</sup> Most products liability claims against video game manufacturers have concerned violent acts allegedly inspired by the software. In *Wilson*, the game in question, *Mortal Kombat*, enabled players to control digital characters in killing their in-game opponents through the performance of brutal executions.<sup>291</sup> The plaintiff argued that the interactive nature of video games—the element of control—distinguishes them from other, more passive mediums such as movies and music.<sup>292</sup> In the context of violent video games, the plaintiff continued, that interactivity, when paired with the realistic graphical depictions of modern video games, “make[s] players physically feel as if they are killing the characters in the game, and rewards players when they tap their ‘killer responses.’”<sup>293</sup> As a result of this pairing of realism with interactivity, “there is no longer any way to distinguish between the physical ‘container’ of the ideas

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282. *Sease v. Taylor’s Pets, Inc.*, 740 Or. App. 110, 115–16 (Or. Ct. App. 1985).

283. JAMES HENDERSON, JR., AARON TWERSKI, & DOUGLAS KYSAR, *PRODUCTS LIABILITY* 36 (8th ed., 2016) (citing cases).

284. 938 F.2d 1033 (9th Cir. 1991).

285. *Id.* at 1034.

286. *Id.* at 1035–36.

287. *Id.* at 1036.

288. 198 F. Supp. 2d 167 (D. Conn. 2002).

289. *Id.* at 172–73.

290. *Sanders v. Acclaim Entm’t, Inc.*, 188 F. Supp. 2d 1264, 1277–80 (D. Colo. 2002); *see also* *James v. Meow Media, Inc.*, 90 F. Supp. 2d 798, 811 (W.D. Ky. 2000) (“[I]ntangible thoughts, ideas and messages contained within games . . . are not products for the purposes of strict products liability”).

291. *See Wilson*, 198 F. Supp. 2d at 170.

292. *Id.* at 169–70.

293. *Id.*

and the ideas themselves.”<sup>294</sup> The plaintiff’s claim failed, however, because “[s]he offer[ed] no persuasive reason for distinguishing the technological advances that led to *Mortal Kombat*’s creation from developments at the turn of the twentieth century that ushered in the motion picture.”<sup>295</sup> The court’s holding was thus limited insofar as it left the door open to “persuasive reason[ing]” that can sufficiently distinguish modern video games from other mediums, beyond mere interactivity. This inference is buttressed by the fact that the court likened the plaintiff’s argument to Marshall McLuhan’s maxim that “the medium is the message,” without disputing his underlying contention that “the sociological and psychological impact of a medium lies as much in the way it delivers content as it does in the content itself.”<sup>296</sup> Because the court was relying on the tangibility standard in rendering its decision,<sup>297</sup> that it was unwilling to dismiss video games as per se “intangible” suggests that VR games could qualify as products under the standard if “persuasive reason[ing]” can “distinguish[] the technological advances that led to [the software’s] creation from developments . . . that ushered in the motion picture,” namely in terms of “the sociological and psychological impact of [the] medium.”<sup>298</sup>

Thus, at least one court has left open the possibility that video games could be distinguished from other media through research demonstrating their distinct psychosocial impact. In so doing, the court in *Wilson* suggests, video games may cross the legal threshold from the intangible to the tangible, and into the realm of products liability. In *Brown*, Justice Alito foresaw a day when video games might soon cross that threshold—when a player could simulate “smashing a skull” with a baseball bat through motion controls and “‘actually feel the splatting blood from the blown-off head’ of a victim” through haptic feedback.<sup>299</sup> That day has arrived. While motion controls were already in mainstream use when Alito wrote his concurrence,<sup>300</sup> VR HMDs only recently

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294. *Id.* at 173–74.

295. *Id.* at 174 (italics added).

296. *Id.*

297. *Id.* at 173; *see also id.* at 174 (“*Mortal Kombat* is not sufficiently different in kind to fall outside the ‘intangible’ category that is demarcated in the case law . . .”).

298. Whether the classification of VR games as “tangible” would violate the ordinary meaning of the term is irrelevant. As the examples cited *supra* notes 282–87 demonstrate, the courts do not always rely on ordinary meaning when deciding whether something is or is not “tangible” or a “product,” and they are well within their powers in making such determinations. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 19, cmt. a (AM. LAW INST. 1998) (“Apart from statutes that define ‘product’ for purposes of determining products liability, in every instance it is for the court to determine as a matter of law whether something is, or is not, a product.”).

299. *Brown v. Entm’t Merchant Ass’n*, 564 U.S. 786, 817–818 (2011).

300. The Nintendo Wii, a video game console that relies on motion controls, sold 85 million units by fiscal year 2011. *See Historical Data*, NINTENDO (Jan. 31, 2016), [https://www.nintendo.co.jp/ir/library/historical\\_data/pdf/consolidated\\_sales\\_e1612.pdf](https://www.nintendo.co.jp/ir/library/historical_data/pdf/consolidated_sales_e1612.pdf). The Microsoft Kinect for Xbox 360, a gaming device that exclusively uses motion controls, became the “fastest selling consumer electronics device” in history, selling 8 million units in the first sixty days after its release in 2010. Guinness World Records, *Kinect Confirmed as Fastest-Selling Consumer Electronics Device* (archived Mar. 11, 2011, retrieved Feb. 19, 2017), [https://web.archive.org/web/20110311213211/http://community.guinnessworldrecords.com/\\_Kinect-Confirmed-As-Fastest-Selling-Consumer-Electronics-Device/blog/3376939/7691.html](https://web.archive.org/web/20110311213211/http://community.guinnessworldrecords.com/_Kinect-Confirmed-As-Fastest-Selling-Consumer-Electronics-Device/blog/3376939/7691.html).

entered the market in 2016,<sup>301</sup> haptic feedback peripherals soon followed.<sup>302</sup> Were the courts to change their classification of video games (at least in the VR context) in response to new information and understandings, it would not be the first time they have done so. Courts once assumed that real property was not subject to products liability, but “[t]he widespread development of mass-production techniques in the housing industry in the decades following World War II provided the factual basis for the eventual elimination of these conceptual impediments.”<sup>303</sup> Courts are now presented with a “factual basis” tantamount to an emerging scientific consensus that VR games are determinedly different from other media and their psychosocial harms make them worthy of classification as products under the *Wilson* impact-tangibility standard described *supra*.

### B. Product Defects and Assigning Liability

In order to establish the liability of a VR game developer or publisher, the plaintiff must show that the game was sold or distributed in a defective condition.<sup>304</sup> Under the *Restatement (Third) of Torts: Products Liability*, there are three categories of product defect: design defect, manufacturing defect, and warning defect.<sup>305</sup> It is likely that the plaintiffs in most VR gaming products liability cases will be able to establish that the defect in question existed when the product left the hands of the defendant on the basis of *res ipsa loquitur*.<sup>306</sup> Thus, the matter is not discussed. Likewise, the focus here is on the liability of game developers and publishers,<sup>307</sup> rather than their wholesalers and retailers.<sup>308</sup>

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301. Joe Durbin, *VR Sales Analysis*, UPLOAD VR (Nov. 14, 2016), <https://uploadvr.com/superdata-headset-sales-analysis/>.

302. Josh Constone, *Zuckerberg Shows Off Oculus Gloves for Typing in VR*, TECHCRUNCH (Feb. 9, 2017), <https://techcrunch.com/2017/02/09/oculus-gloves/>; Jamie Feltham, *Disney Is Working on a VR Chair with Haptic Feedback*, UPLOAD VR (Nov. 7, 2016), <https://uploadvr.com/disney-working-vr-video-player-haptic-feedback/>; Rachel Metz, *Oculus Project Lets You Feel in VR without Gloves*, MIT TECH. REV. (July 6, 2016), <https://www.technologyreview.com/s/601833/oculus-project-lets-you-feel-in-vr-without-gloves/>; Jamie Rigg, *Teslasuit Does Full-Body Haptic Feedback for VR*, ENGADGET (Jan. 6, 2016), <https://www.engadget.com/2016/01/06/teslasuit-haptic-vr/>.

303. HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 35.

304. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 1 (AM. LAW INST. 1998).

305. *Id.* § 2.

306. *Id.* § 3. It has never before been suggested that a video game’s software could be altered during the traditional manufacturing process, in which the game’s code is burned onto compact discs or cartridges. Furthermore, the video game industry is shifting to a direct-to-consumer digital distribution model, in which the game’s content is delivered as digital information rather than via physical media. See Keith Stuart, *The Digital Apocalypse*, THE GUARDIAN (May 17, 2016), <https://www.theguardian.com/technology/2016/may/17/video-game-industry-changing-virtual-studios> (“[T]he broadband internet era gradually allowed developers to distribute their games digitally”); *Worldwide Digital Games Market*, SUPERDATA (Mar. 28, 2017), <https://www.superdataresearch.com/us-digital-games-market/> (“U.S. digital revenue grew 6.4% year-over-year in February across console, PC, and mobile games.”).

307. The distinction between these two is often muddled, as many developers self-publish and many publishers exert creative control over the development process. On the latter point, see Anonymous Game Developer, *We Need Better Video Game Publishers*, Kotaku (Apr. 15, 2013), <https://kotaku.com/we-need-better-video-game-publishers-472880781>.

308. Because video game end sellers are increasingly also the designers and/or manufacturers, there is little need to discuss wholesalers and retailers as separate actors in the distribution chain. See Anser Haider & Waqar Jamshed, *Gaming Sector Follows Streaming Video’s Lead with Direct-to-Consumer Offerings*, S&P GLOBAL

Video game developers design and manufacture the code for the game,<sup>309</sup> while publishers finance, market, and distribute the games for sale.<sup>310</sup> Because VR game developers and publishers are in by far the best position to inspect the games for defects,<sup>311</sup> it is highly unlikely that any court would hold any wholesalers or retailers liable for those defects.<sup>312</sup>

### 1. Design Defect

A design defect is “when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe.”<sup>313</sup> The availability of a reasonable alternative design (RAD) is determined via risk-utility balancing.<sup>314</sup> Factors that may be considered in a risk-utility analysis include “the magnitude and probability of the foreseeable risks of harm, the instructions and warnings accompanying the product, and the nature and strength of consumer expectations regarding the

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(Feb. 28, 2019), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/50172772>.

309. *Infra* Part IV.B.1–2.

310. Bruce Everiss, *What Do Game Publishers Do and Is There Any Need for Them?*, BRUCE ON GAMES (Sept. 4, 2009), <http://www.bruceongames.com/2009/09/04/what-do-game-publishers-do-and-is-there-any-need-for-them/>.

311. First, because most games sold through wholesalers and retailers are sold in sealed packages, inspection for defects is almost always prevented. HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 56. Second, even if the wholesalers and retailers could access the video game software, they likely lack the technical competence and resources to adequately inspect it. At the very least, they would have to employ skilled personnel to play through each game using a proper VR interface. *Fallout 4*, a recently released game that sold 12 million copies the day it launched and that is now playable in VR, has over 400 hours of content. See John Gaudiosi, *‘Fallout 4’ \$750 Million Game Launch Leaves ‘Call of Duty’ in the Dust*, FORTUNE (Nov. 16, 2015), <http://fortune.com/2015/11/16/fallout4-is-quiet-best-seller/>; David Jagneaux, *AMD VP: Fallout 4 VR Will Be an ‘Industry Changer’ Like Mario and Sonic*, UPLOAD VR (Apr. 15, 2017), <https://uploadvr.com/amd-vp-fallout-4-vr-industry-changer-mario-sonic/>; Eddie Makuch, *Fallout 4 Has 400+ Hours of Content*, GAMESPOT (Aug. 3, 2015), <https://www.gamespot.com/articles/fallout-4-has-400-hours-of-content/1100-6429400/>. One full-time employee would thus have to spend over fifty days working full-time to inspect the game. See also RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. o (AM. LAW INST. 1998) (“Nonmanufacturing sellers such as wholesalers and retailers often are not in a good position feasibly to adopt safer product designs or better instructions or warnings.”).

312. See HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 56 (“The tendency is for the liability to be passed up the chain from retailers and wholesalers to the manufacturer by means of implied rights of indemnity.”); see also *Jones v. GMRI, Inc.*, 551 S.E.2d 867 (N.C. Ct. App. 2001) (applying a state statute that provides that “[n]o product liability action . . . shall be commenced or maintained against any seller when the product was acquired and sold by the seller in a sealed container or when the product was acquired and sold by the seller under circumstances in which the seller was afforded no reasonable opportunity to inspect the product in such a manner that would have, or should have, in the exercise of reasonable care, revealed the existence of the condition complained of”); *Sanns v. Butterfield Ford*, 94 P.3d 301 (Utah Ct. App. 2004) (applying a state statute that “does not provide a cause of action for strict liability against a purely passive distributor where the fault complained of arises out of a design or manufacturing defect, and where the manufacturer/designer of the product is a named party to the action.”).

313. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(b) (Am. Law Inst. 1998).

314. Risk-utility analysis was first introduced by Judge Learned Hand in *United States v. Carroll Towing Co.*, 159 F.2d 169 (2d Cir. 1947). For examples of other courts applying risk-utility analysis in products liability cases, see *Bourne v. Marty Gilman, Inc.*, 452 F.3d 632, 638 (7th Cir. 2006); *Smith v. Louisville Ladder Co.*, 237 F.3d 515, 530 (5th Cir. 2001); and *Thibault v. Sears, Roebuck & Co.*, 395 A.2d 843, 846 (N.H. 1978).

product, including expectations arising from product portrayal and marketing.”<sup>315</sup> A small minority of states have adopted an independent consumer expectations test for defective designs, but most jurisdictions rely on risk-utility analysis,<sup>316</sup> which already factors in consumer expectations.<sup>317</sup> Depending on how a game is marketed, consumer expectations could serve as either a sword<sup>318</sup> or a shield<sup>319</sup> in a risk-utility analysis. Because VR games are marketed as entertainment products, the former is more likely.

In the context of video game development, “design is the process of creating the content and rules of a game.”<sup>320</sup> Video game design does not require computer programming skills,<sup>321</sup> but rather imagination and creativity.<sup>322</sup> “[T]here are many types of game design,” including world design, system design, content design, game writing, level design, and user interface design.<sup>323</sup> These design elements are typically incorporated into a detailed “Game Design Document,”<sup>324</sup> although as with most software,<sup>325</sup> the design and code construction processes are often intertwined such that the design is continually refined through a process of “iterative prototyping.”<sup>326</sup> Most aspects of game design implicate developers’ creativity and expression, including “the creation of the overall backstory, setting, and theme of the game,” “the creation of characters, items, puzzles, and missions,” and “the writing of dialogue, text, and story within the game world,”<sup>327</sup> and thus would implicate strong First Amendment protections.<sup>328</sup> In this context, a RAD would take the form of a speech restriction, such as an automatic shut-off mechanism after a certain playtime threshold is reached.<sup>329</sup> However, as discussed *supra* Part II.A, such a RAD is doomed to fail unless and until the research confirms VR games’

315. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. f (AM. LAW INST. 1998).

316. HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 181.

317. Consumer expectations should be judged on the basis of what a reasonable consumer would expect. See *Heaton v. Ford Motor Co.*, 435 P.2d 806, 809 (Or. 1967).

318. *Id.* at 806.

319. *Halliday v. Sturm, Ruger & Co.*, 792 A.2d 1145 (Md. 2002).

320. BRENDA BRATHWAITE & IAN SCHREIBER, CHALLENGES FOR GAME DESIGNERS 2 (2009).

321. *Id.* at 4.

322. See ANDREW ROLLINGS & ERNEST ADAMS, ANDREW ROLLINGS AND ERNEST ADAMS ON GAME DESIGN 18–20 (2003) (noting that “[o]f all the jobs on the development team, game design is the one that offers the greatest scope for creative expression” and that “[i]magination is essential” to game design).

323. BRATHWAITE & SCHREIBER, *supra* note 320, at 5.

324. BOB BATES, GAME DESIGN: THE ART AND BUSINESS OF CREATING GAMES 276–91 (2d ed. 2004).

325. See Clark Savage Turner & Debra J. Richardson, *Software and Strict Products Liability* 4–5 (Oct. 2000), <http://www.ics.uci.edu/~redmiles/ics131-FQ03/week07everyday/Turner-A.pdf> (“More realistic views of the software process recognize continuous feedback loops showing that these stages are not really discrete, but inevitably intertwined . . . . If major design is necessarily done concurrently with construction, then the two activities merge as an activity and the line between them becomes very murky or vanishes.”).

326. BATES, *supra* note 324, at 226.

327. BRATHWAITE & SCHREIBER, *supra* note 320, at 5.

328. See *Wilson v. Midway Games, Inc.*, 198 F. Supp. 2d 167, 181 (D. Conn. 2002) (“Taking Wilson’s allegations as true, the Court concludes that *Mortal Kombat*, as Wilson describes it, is protected First Amendment speech. Wilson’s allegations about the game . . . demonstrates that what her suit is targeting are the expressive elements of the game: its plot . . . , its characters . . . , and the visual and auditory milieu in which the story line is played out”).

329. For an example of an automatic shut-off mechanism being endorsed as a RAD, see *Boatland of Houston, Inc. v. Bailey*, 609 S.W.2d 743 (Tex. 1980) (Campbell, J., dissenting).

harmful effects on users only commence or significantly compound with prolonged, above-minimal playtime.

## 2. *Manufacturing Defect*

A manufacturing defect is “when the product departs from its intended design.”<sup>330</sup> With respect to software, manufacturing is the process by which “software source code is constructed from design specifications (or other engineering ‘intention’), [and] is compiled into an executable form . . . .”<sup>331</sup> At this stage of a game’s development, the development team “produc[es] assets and code for the game.”<sup>332</sup> In order to determine whether a VR game has a manufacturing defect, the plaintiff would need to look at the Game Design Document and any record of iterative prototyping or “feature creep”<sup>333</sup> to determine whether the game code and content differ from the intended design. Outside of bugs and glitches, it is highly unlikely that the final product will differ significantly from the game’s intended design, as any such changes would be caught during the testing phase.<sup>334</sup> By the end of this process, “all the major bugs are fixed; the functionality is working as designed; and all the game assets are finalized.”<sup>335</sup> Because there are no documented cases of harm caused by bugs or glitches, nor of a video game shipping that differs significantly from its intended design,<sup>336</sup> VR games are unlikely to have manufacturing defects.

## 3. *Warning Defect*

A warning defect is “when the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of reasonable instructions or warnings by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the instructions or warnings renders the product not reasonably safe.”<sup>337</sup> Ordinarily, warnings, no matter how stark, are not a substitute for a RAD if one is available.<sup>338</sup> However, given the unavailability of an adequate RAD for VR games, warnings are a

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330. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(a) (AM. LAW INST. 1998).

331. Turner & Richardson, *supra* note 325, at 4.

332. HEATHER MAXWELL CHANDLER, THE GAME PRODUCTION HANDBOOK 9 (2d ed. 2010).

333. *Id.* at 10 (defined as “when features are continually added to the project during the actual production phase”).

334. *Id.* at 12.

335. *Id.* at 13.

336. There is one interesting borderline case. The game *Grand Theft Auto: San Andreas* was recalled by the publisher when “sophisticated players” produced a program that revealed a sexually explicit mini-game within the game’s code. See Press Release, Makers of Grand Theft Auto: San Andreas Settle FTC Charges, FTC (June 8, 2006), <https://www.ftc.gov/news-events/press-releases/2006/06/makers-grand-theft-auto-san-andreas-settle-ftc-charges>. However, the controversial code in question was *intentionally* “locked . . . away” rather than removed entirely because it was “very interwoven in [GTA]” and production would have been delayed in order to remove it. Simon Parkin, *Who Spilled Hot Coffee?*, EUROGAMER (Nov. 30, 2012), <http://www.eurogamer.net/articles/2012-11-30-who-spilled-hot-coffee>. Because the code conformed with the intended design, it was not a manufacturing defect.

337. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2(c) (AM. LAW INST. 1998).

338. *Id.* at cmt. 1; see also *Uniroyal Goodrich Tire Co. v. Martinez*, 977 S.W.2d 328, 334–36 (Tex. 1998) (holding as much).

viable alternative. A failure to warn claim depends on “whether the reasonable manufacturer knew or should have known of the danger, in light of the generally recognized and prevailing *best scientific knowledge*, yet failed to provide adequate warning to users or consumers.”<sup>339</sup> In light of the research presented *supra* Part I.A, VR game developers and publishers will be liable for not warning consumers as to the psychosocial harms caused by their products. While most of those risks are not obvious, to the extent that some are, “the duty to warn is not necessarily obviated merely because a danger is clear.”<sup>340</sup> Furthermore, to the extent that VR games’ manipulative effects may be considered analogous to at least some pharmaceuticals, “direct warnings and instructions to [gamers] are warranted . . . .”<sup>341</sup> Indeed, VR games are already being heavily utilized in the medical context.<sup>342</sup> The similarities in health risks to some food products,<sup>343</sup> which are also subject to products liability warning requirements,<sup>344</sup> have already been noted. As argued *supra* Part II, warning requirements are more likely than the alternatives to survive First Amendment scrutiny.

Most games already include warnings for age-inappropriate content,<sup>345</sup> and VR hardware manufacturers warn of most general risks associated with playing VR games, including seizures, repetitive stress injury, and bumping into objects.<sup>346</sup> However, neither VR games nor VR hardware specify the non-

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339. Olson v. Prosoco, 522 N.W.2d 284, 289–90 (Iowa 1994) (emphasis added); *see also* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. n (AM LAW INST. 1998) (“[T]he evidence that the defendant did or did not conduct adequately reasonable research or testing before marketing the product may be admissible” in a strict liability claim).

340. Liriano v. Hobart Corp., 170 F.3d 264, 270 (2d Cir. 1999).

341. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 6, cmt. e (AM. LAW INST. 1998); *see also* Perez v. Wyeth Laboratories, Inc. 734 A.2d 1245 (N.J. 1999) (holding that pharmaceutical manufacturers that advertise prescription drugs directly to consumers have a duty to warn of the dangers and side effects of the product).

342. *See* Kalpana Srivastava, R. C. Das & S. Chaudhury, *Virtual Reality Applications in Mental Health*, 23 IND. PSYCHIATRY J. 83 (2014) (“VR has been used in conjunction with counseling and cognitive behavior therapy for the treatment of addictions. . . . The effectiveness of VR has been verified in the treatment of [a range of phobias], body image disturbances, binge eating disorders, and fear of flying.”). VR exposure therapy has been shown to effectively treat post-traumatic stress and anxiety disorders. *See* Cristina Botella et al., *Virtual Reality Exposure-Based Therapy for the Treatment of Post-Traumatic Stress Disorder*, 11 NEUROPSYCHIATRIC DISEASE & TREATMENT 2533 (2015); M.B. Powers & P.M.G. Emmelkamp, *Virtual Reality Exposure Therapy for Anxiety Disorders*, 22 J. ANXIETY DISORDERS 561 (2008). VR has also been used as a pain reliever and to improve upper limb function in stroke patients. *See supra* notes 75–80; K.E. Laver et al., *Virtual Reality for Stroke Rehabilitation*, 2 COCHRANE DATABASE SYST. REV. 1 (2015).

343. *Supra* Part II.B.

344. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 7 (AM. LAW INST. 1998).

345. PlayStation, *PlayStation VR ft. Batman: Arkham VR*, YOUTUBE, <https://www.youtube.com/watch?v=swjyD6Sy2t8> (last visited Apr. 18, 2017); *Batman: Arkham VR*, PLAYSTATION STORE, [https://store.playstation.com/#/en-us/games/batman-arkham-vr/cid=UP1018-CUSA05335\\_00-ARKHAMVRLT000000](https://store.playstation.com/#/en-us/games/batman-arkham-vr/cid=UP1018-CUSA05335_00-ARKHAMVRLT000000) (last visited Apr. 18, 2017); *Principles and Guidelines for Responsible Advertising Practices*, ESRB, [http://www.esrb.org/ratings/principles\\_guidelines.aspx](http://www.esrb.org/ratings/principles_guidelines.aspx) (last visited Apr. 17, 2017); *ESRB Ratings Guide*, ESRB, [http://www.esrb.org/ratings/ratings\\_guide.aspx](http://www.esrb.org/ratings/ratings_guide.aspx) (last visited Apr. 18, 2017).

346. *Health and Safety*, OCULUS, [https://static.oculus.com/documents/310-30023-01\\_Rift\\_HealthSafety\\_English.pdf](https://static.oculus.com/documents/310-30023-01_Rift_HealthSafety_English.pdf) (last visited Apr. 18, 2017); *Health Warnings*, PLAYSTATION, <https://www.playstation.com/en-us/network/legal/health-warnings/> (last visited Apr. 18, 2017); *Health and Safety*, Samsung VR (last visited July 19, 2018), <https://www.oculus.com/legal/health-and-safety-warnings/>. *But see* Doug Magyari, *Virtual Reality: Are Health Risks Being Ignored?*, CNBC (Jan. 8, 2016), <http://www.cnbc.com/2016/01/08/virtual-reality-are-health-risks-being-ignored-commentary.html>.

obvious psychosocial harms that could result from playing VR games.<sup>347</sup> Some might argue that VR hardware manufacturers, rather than developers and publishers, should be liable for these failures to warn, especially since they have shouldered the burden of warning of general risks. However, because the potential for harm could vary depending on the specific content of the game in question,<sup>348</sup> and because VR game developers and publishers are in the best position to weigh<sup>349</sup> and cover<sup>350</sup> those risks, the duty to warn should lay with them. This is the approach taken by the video game industry, which leaves content-specific warnings up to the developers and publishers of individual games,<sup>351</sup> and general risks associated with playing games to the hardware manufacturers.<sup>352</sup> Placing liability on VR hardware manufacturers for such warnings would be overinclusive, as it is likely that many VR games are perfectly safe to play with minimal to no warnings. It would require a laundry list of harms associated with playing any and all varieties of VR games. According to cognitive research, this could “lead to ‘wear-out,’ in which consumers tune out messages that are repeated too often.”<sup>353</sup> Thus, a consumer who has played several safe VR games may mistakenly assume future VR games he plays will be equally safe. Alternatively, such warnings may cause consumers to avoid using VR products entirely, despite their many benefits. These results are counter to the aims of products liability law.<sup>354</sup>

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347. Google’s Daydream View warning comes closest, but still only addresses a small portion of the potential risks. See *Health and Safety*, DAYDREAM HELP (last updated Nov. 10, 2016), [https://support.google.com/daydream/answer/7185037?visit\\_id=1-636162973848457164-2214380425&p=safetywarrantyreq&rd=1](https://support.google.com/daydream/answer/7185037?visit_id=1-636162973848457164-2214380425&p=safetywarrantyreq&rd=1) (“If the content is frightening, violent, or anxiety provoking, it can cause your body to react physically, including increasing your heart rate and blood pressure. It can also, in some individuals, cause psychological reactions, including anxiety, fear, or even Post Traumatic Stress Disorder (or PTSD).”).

348. Compare *supra* notes 59 and 67 (detailing VR games that reduced players’ implicit racial bias and ageism), with *supra* notes 61–64 (detailing VR games that increase players’ body dissatisfaction); compare also *supra* note 49 (detailing a VR game that made the player more likely to grant concessions in real-world negotiations), with *supra* note 42 (detailing a VR game that made the player more assertive in real-world negotiations).

349. *Supra* note 311.

350. The VR software market is estimated to be worth five times more than the VR hardware market by 2020. *Facts on Virtual Reality (VR)*, STATISTA, <https://www.statista.com/topics/2532/virtual-reality-vr/> (last visited Apr. 21, 2017).

351. *Principles and Guidelines for Responsible Advertising Practices*, *supra* note 345.

352. *Wii – Health and Safety Precautions*, NINTENDO, <https://www.nintendo.com/consumer/wiisafety.jsp> (last visited Apr. 18, 2017).

353. HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 318.

354. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. a (AM. LAW INST. 1998) (“The emphasis [of products liability] is on creating incentives for manufacturers to achieve optimal levels of safety in designing and marketing products. Society does not benefit from products that are excessively safe . . . any more than it benefits from products that are too risky. Society benefits most when the right, or optimal, amount of product safety is achieved.”); see also *Broussard v. Continental Oil Co.*, 433 So. 2d 354, 358 (La. Ct. App. 1983) (noting that cramming a laundry list of warnings onto a drill “would decrease the effectiveness of all of the warnings”).

### C. *Injury and Causation*

Once a products liability claim is brought against a VR game developer and/or publisher, the plaintiff must still show injury and causation.<sup>355</sup> There are two types of harm that might result from VR games: direct harm to the player, and harm to third parties inflicted by the player. To establish causation, the plaintiff must show that the VR game's defect was the cause-in-fact and proximate cause of their injury.<sup>356</sup> Cause-in-fact means "the harm [attributable to the product defect] . . . would [not] have resulted from other causes in the absence of the product defect,"<sup>357</sup> while proximate cause means "the defect is a substantial factor in increasing the plaintiff's harm beyond that which would have resulted from other causes."<sup>358</sup> Because the question of cause-in-fact is typically "easily answered in the affirmative,"<sup>359</sup> this Section focuses on the kinds of injuries gamers may suffer and issues of proximate causation. In every instance with respect to alleged design and warning defects, liability is imposed "only when the product is put to uses that it is reasonable to expect a seller or distributor to foresee."<sup>360</sup> Evidence that a VR game developer or publisher "engaged in little or no research or testing may . . . help to support the contention that . . . the risk could have been foreseen."<sup>361</sup> The harms discussed below are conceivable, but go beyond manipulation and so are not necessarily confirmed by the scientific research; they are used for purely illustrative purposes.

#### 1. *Harms Inflicted on Gamers*

##### a. *Physical Harm*

The most obvious physical harm a VR gamer might experience is when "rely[ing] on instructions provided by their VR . . . headset[.]" such as textual or visual in-game cues suggesting that the player should move in a certain direction, "makes [them] walk into a wall" or some other obstacle.<sup>362</sup> Proximate causation could be established by analogizing to the aeronautical chart and compass examples used in the products liability case law.<sup>363</sup> Because the VR user is completely immersed in the experience, their reliance on the software causes injury in the same way that "total reliance placed by pilots on

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355. See *James v. Meow Media, Inc.*, 90 F. Supp. 2d 798, 811 (W.D. Ky. 2000) ("Assuming *arguendo* that the doctrine of strict liability could be extended to include the thoughts, ideas, and messages contained in video games, . . . [p]laintiffs nevertheless would have to establish causation in order to state a claim based on strict liability theories").

356. HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 85.

357. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 16(b) (AM. LAW INST. 1998).

358. *Id.* § 16(a). In other words, did the absence of a warning in or RAD of the VR game substantially contribute to the harm the plaintiff suffered?

359. HENDERSON, JR., TWERSKI & KYSAR, *supra* note 283, at 85.

360. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. m (AM. LAW INST. 1998).

361. *Id.* at cmt. n.

362. Lemley & Volokh, *supra* note 18, at 42.

363. *Brocklesby v. United States*, 767 F.2d 1288 (9th Cir. 1985); *Aetna Cas. & Sur. Co. v. Jeppesen & Co.*, 642 F.2d 339 (9th Cir. 1981).

navigational charts directly links the charts to the accidents.”<sup>364</sup> One formidable defense to this claim is that HMD manufacturers are in the best position to minimize harm to the gamer by using sensors “to display in-application wall and floor markers when users get near boundaries they defined.”<sup>365</sup> If the HMD manufacturer does not include this kind of sensor tracking technology despite it being commercially available,<sup>366</sup> the gamer could establish liability on the basis of the availability of a RAD or failure to warn. Thus, such claims against VR game developers and publishers are likely to fail.

Another kind of physical harm that could befall VR gamers might result from the way in which the game interacts with haptic feedback peripherals. “On the software side,” VR game developers can use plug-ins to their game engines “to pinpoint the [haptic] feedback controllers will give.”<sup>367</sup> In other words, the gaming software controls the kind of feedback a haptic device gives the gamer. For example, a player whose in-game avatar is “shot” could be injured if the gaming software, as programmed by the developer, activates corresponding haptic feedback to the gamer with sufficient force and/or frequency.<sup>368</sup> This scenario is not unrealistic and may even be likely.<sup>369</sup> Once more, a potential problem with this claim is that liability may be better placed elsewhere. It is arguable that a haptic feedback suit with that high of a potential for injury should be declared “manifestly unreasonable” in design.<sup>370</sup> However, the threshold for

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364. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 19, Rptr’s Note, cmt. a (AM. LAW INST. 1998) (citing cases).

365. Lemley & Volokh, *supra* note 18, at 42 n.128 (quoting a developer guide for the Oculus Guardian System).

366. *Id.*

367. Jamie Feltham, *TouchSense Force Lets Devs Create Better Haptic Feedback on Oculus Touch*, UPLOAD VR (Feb. 22, 2017), <https://uploadvr.com/touchsense-force-delivers-high-quality-haptic-feedback-oculus-touch/>. For definitions of “plug-in” and “game engine,” respectively, see 2 *Plug-in*, MERRIAM-WEBSTER’S COLLEGIATE DICTIONARY (11th ed. 2003) (“a small piece of software that supplements a larger program”); and *Game Engine*, OXFORD DICTIONARIES ONLINE, [https://en.oxforddictionaries.com/definition/us/game\\_engine](https://en.oxforddictionaries.com/definition/us/game_engine) (last visited Apr. 14, 2017) (“The basic software of a computer game or video game.”).

368. The Tactile Gaming Vest is one example of a haptic feedback peripheral that can accomplish this feat. It is designed such that “[w]hen the player’s character experiences injury in the game, the vest simulates the appropriate sensation (bullet hit, vibration, and/or heat) in the correct location on the player’s body.” *Tactile Gaming Vest (TGV)*, IROBOTICIST, <https://iroboticist.com/2010/03/26/tgv/> (last visited Apr. 15, 2017). Its creators say the experience is “closer to a paintball excursion, but it doesn’t hurt as much.” Priya Ganapati, *Gaming Vest Makes Virtual Fights Real and Painful*, WIRED (Mar. 26, 2010), <https://www.wired.com/2010/03/gaming-vest-makes-virtual-fights-real-and-painful/>.

369. One haptic feedback suit is being advertised as follows: “Suit up to feel the thrill of every explosion, gunshot, and sword fight in VR. Hardlight’s patented pattern of 16 unique haptic feedback zones target every muscle group responsible for delivering each real, gut wrenching reaction.” *Hardlight VR Suit*, KICKSTARTER, <https://www.kickstarter.com/projects/morgansinko/hardlight-vr-suit-dont-just-play-the-game-feel-it> (last visited Apr. 18, 2017).

370. The U.S. Army has requested haptic feedback technology that could “create an impulse force that simulates the feel of debris strikes from a virtual explosion (i.e. IED) or bullet strikes.” U.S. ARMY SMALL BUSINESS INNOVATION RESEARCH PROGRAM, PROPOSAL SUBMISSION INSTRUCTIONS No. A12-074 (2011) <http://www.acq.osd.mil/osbp/sbir/solicitations/sbir20121/army121.htm>. Such a technology would almost certainly be deemed “unreasonably dangerous” were it sold to average consumers. *Cf.* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. e (AM. LAW INST. 1998) (“a toy gun that shoots hard rubber pellets with sufficient velocity to cause injury to children could be found to be defectively designed”).

a product design to be declared manifestly unreasonable is extremely high,<sup>371</sup> and because haptic suits will likely be advertised to “hardcore,” adult gamers who value the realism provided by forceful feedback, the argument is likely to fail on the basis of consumer expectations.<sup>372</sup> Thus, if such suits are allowed on the market, VR game developers could be liable for software that activates them in a manner that is likely to cause injury beyond what a reasonable consumer would expect.

#### b. Psychological Harm

It has already been demonstrated that VR can be used to treat a range of psychiatric conditions.<sup>373</sup> But VR games can also *cause* psychological injury to players. As one researcher put it: “[T]he technology is agnostic and it’s the application of the technology that you have to worry about.”<sup>374</sup> This potential for harm is so concerning that ethicists “urge careful screening of subjects [of VR experiments] to minimize the risks of aggravating an existing psychological disorder or an undetected psychiatric vulnerability.”<sup>375</sup> “[O]f particular concern are vulnerabilities to disorders that could potentially become aggravated by prolonged immersion and illusions of embodiment, such as Depersonalization/Derealization,”<sup>376</sup> as well as, presumably, the other conditions explored *supra* Part I.A, like body-image disorders<sup>377</sup> and false memory creation.<sup>378</sup> Out of respect for VR users’ autonomy, even those that may be healthy, ethicists strongly “recommend that . . . VR experiments ought to include an explicit statement to the effect that immersive VR can have lasting behavioral influences on subjects, and that some of these risks may be presently unknown.”<sup>379</sup> “Just as VR can be used to increase empathy, it can conceivably be used to decrease empathy,” and just as it can alleviate pain, it can conceivably

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371. See *Parish v. Jumping, Inc.*, 719 N.W.2d 540, 544 (Iowa 2006) (“[B]ear in mind that our comment *e* talks about extremely dangerous products with very low social utility. . . . We admit that there may be times, and I think they’d be rare, probably non-existent, when a product might come to court, to you, that was so bad, so very outloud [sic] bad, so very antisocial, that it would tug against the very grain of the way you were raised”) (quoting James A. Henderson, Jr., *The Habush Amendment: Section 2(b) comment e*, 8 KAN. J.L. & PUB. POL’Y 86, 86 (1998)).

372. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. e (1998) (“[I]f the realism of the hard-pellet gun, and thus its capacity to cause injury, is sufficiently important to those who purchase and use such products . . . , then no reasonable alternative will . . . be available”).

373. *Supra* note 342.

374. Crecente, *supra* note 1.

375. Madary & Metzinger, *supra* note 73, at 8.

376. *Id.* Pharmaceutical manufacturers regularly warn of these conditions. See, e.g., *Miller v. Pfizer Inc. (Roerig Div.)*, 196 F. Supp. 2d 1095, 1104 (D. Kan. 2002) (noting the drug manufacturer accepted the FDA’s proposed label warning of depersonalization). Failure to do so may subject them to liability. See, e.g., *In re Neurontin Mktg., Sales Practices, & Prod. Liab. Litig.*, 612 F. Supp. 2d 116, 150 (D. Mass. 2009) (finding expert testimony that a drug caused *inter alia* depersonalization admissible).

377. Pharmaceutical manufacturers warn against the use of certain medications by persons with eating disorders. *In re Phenylpropanolamine (PPA) Prod. Liab. Litig.*, 227 F.R.D. 553, 594 (W.D. Wash. 2004).

378. Cf. Elizabeth F. Loftus, *Creating False Memories*, 277 SCIENTIFIC AMERICAN 70 (1997) (discussing the cases of plaintiffs who received millions in settlement payments after suing psychiatrists and therapists for causing them to develop false memories).

379. Madary & Metzinger, *supra* note 73, at 8–9.

be used to cause suffering.<sup>380</sup> For instance, if VR software effectively treats PTSD by re-exposing soldiers to the experience that caused it (e.g., a warzone in Iraq or Afghanistan),<sup>381</sup> then presumably a user's prolonged embodiment of a virtual "soldier" in a realistic warzone through VR could cause PTSD.<sup>382</sup> A warning that exposure to the game could cause PTSD would almost certainly be required under either the non-obvious or analogous health risk standards discussed *supra* Part IV.B.3.

There are numerous other psychological harms that VR games could expose gamers to, specifically problems of addiction and habituation.<sup>383</sup> Take, for example, the fact that the combination of VR and haptic feedback now makes it possible for users to have sex with virtual, non-human-controlled characters in VR.<sup>384</sup> Compulsive pornography use is increasingly considered an addiction akin to drug or alcohol addiction among psychology researchers. One study showed that the brain activity of compulsive pornography users resembles that of substance abusers.<sup>385</sup> If compulsive pornography use is not already analogous to substance abuse, VR may be the technology that pushes it over the edge.<sup>386</sup> The problem is further compounded by the fact that video games have already proven to be addictive,<sup>387</sup> making the pairing of VR sex with gaming a dangerous combination.<sup>388</sup> Documented harms resulting from pathological gaming include depression, anxiety, social disabilities, and poorer performance in school,<sup>389</sup> loneliness,<sup>390</sup> and in some cases death.<sup>391</sup> Recently, the World Health Organization classified "gaming disorder" as a behavioral addiction.<sup>392</sup> The

380. *Id.* at 10.

381. This is precisely how VR exposure therapy works. *Bravemind*, USC INSTITUTE FOR CREATIVE TECHNOLOGIES (Mar. 2016), [http://ict.usc.edu/wp-content/uploads/overviews/Post%20Traumatic%20Stress%20Disorder\\_Overview.pdf](http://ict.usc.edu/wp-content/uploads/overviews/Post%20Traumatic%20Stress%20Disorder_Overview.pdf) (highlighting use of VR therapy).

382. Even though VR first-person shooter games' advertisements typically include age disclaimers, they do not warn of the potential psychological harms associated with the products. *See, e.g., Raw Data*, STEAM, <http://store.steampowered.com/app/436320/> (last visited Apr. 17, 2017); *Onward*, STEAM, <http://store.steampowered.com/app/496240/> (last visited Apr. 17, 2017); PlayStation, *PlayStation VR Worlds – Announcement Trailer / PS VR*, YOUTUBE (Mar. 15, 2016), <https://www.youtube.com/watch?v=yFnciHpEOMI>.

383. *Cf. Simpson v. Philip Morris Inc.*, No. CV03-4717SVW(CWX), 2003 WL 23341207 (C.D. Cal. Nov. 6, 2003) (holding that addiction is a compensable tort (citing other cases to that effect)).

384. Alice Bonasio, *Sex in Virtual Reality is Getting Even More Immersive in 2017*, UPLOAD VR (Jan. 21, 2017), <https://uploadvr.com/porn-teledildonics-2017/>.

385. Valeria Voon et al., *Neural Correlates of Sexual Cue Reactivity in Individuals with and without Compulsive Sexual Behaviours*, 9 PLOS ONE 1 (2014).

386. Those who have experienced it call it "a leap forward in erotic intensity." Dan Kaplan, *Virtual Reality Porn and the Future of Loneliness*, TECHCRUNCH (July 11, 2015), <https://techcrunch.com/2015/07/11/virtual-reality-porn-and-the-future-of-loneliness/>.

387. Douglas A. Gentile et al., *Pathological Video Game Use Among Youths: A Two-Year Longitudinal Study*, 127 PEDIATRICS e319 (2011); Mark Griffiths, *The Role of Context in Online Gaming Excess and Addiction: Some Case Study Evidence*, 8 INT'L J. MENTAL HEALTH & ADDICTION 119 (2010); Jeroen Lemmens, Patti Valkenburg & Jochen Peter, *Psychosocial Causes and Consequences of Pathological Gaming*, 27 COMPUTERS IN HUMAN BEHAVIOR 144 (2011).

388. Mark D. Griffiths, *Gambling, Sex, and Gaming in Virtual Reality*, PSYCHOLOGY TODAY (June 15, 2016), <https://www.psychologytoday.com/blog/in-excess/201606/gambling-sex-and-gaming-in-virtual-reality>.

389. Gentile et al., *supra* note 387, at e322.

390. Lemmens, Valkenburg & Jochen, *supra* note 387, at 149.

391. Alex Tisdale, *Gaming in Virtual Reality Could Be the Very Real Death of You*, VICE NEWS (June 8, 2016), [https://www.vice.com/en\\_us/article/gaming-in-virtual-reality-could-be-the-very-real-death-of-you-911](https://www.vice.com/en_us/article/gaming-in-virtual-reality-could-be-the-very-real-death-of-you-911).

392. 11th Revision of the International Classification of Diseases, 6C51 Gaming Disorder (Apr. 2019).

compounding effects of VR on human psychology and behavior are likely to exacerbate these symptoms. More recently, potentially addictive gambling mechanisms have made their way into video games as child-friendly as *Star Wars*,<sup>393</sup> in what appear to be attempts at exerting unconscious influence on players in order to incentivize them to make more in-game purchases.<sup>394</sup> Again, this influence is likely to be compounded by VR, which poses serious threats to individual autonomy and privacy.<sup>395</sup> If it can be established that long-term exposure to certain types of VR games causes addiction,<sup>396</sup> a warning would likely be warranted.

## 2. *Harms Gamers Inflict on Third Parties*

Under the superseding causation doctrine, courts have generally rejected the argument that video game manufacturers should be made liable for harm befalling third parties that was inspired by the game's content.<sup>397</sup> "A superseding cause exists when: 1) an extraordinary and unforeseeable act intervenes between a defendant's original tortious act and the injury or harm sustained by plaintiffs and inflicted by a third party; and 2) the original tortious act is itself capable of bringing about the injury."<sup>398</sup> In *Sanders v. Acclaim Entertainment*,<sup>399</sup> the court held that the Columbine victims' families could not recover under products liability in part because the "intentional violent acts" of the shooters, who were avid players of violent video games like *Doom* and *Quake*, were not foreseeable and "constituted a superseding cause which broke any chain of causation."<sup>400</sup> Similarly, in *James v. Meow Media*,<sup>401</sup> the Western District of Kentucky held that Michael Carneal's shooting spree at Heath High School was so unforeseeable that it constituted a superseding cause over any alleged negligence by the developers and publishers of the violent video games Carneal was fond of playing.<sup>402</sup> While the behavioral psychology literature does demonstrate that VR games are capable of changing users' short-term behavior in significant ways, it has not yet been shown that violent VR games can in fact

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393. Hannah Dwan, *Hawaii to Crack Down on 'Predatory' Loot Boxes in Video Games Following Star Wars Battlefront 2 Controversy*, THE TELEGRAPH (UK) (Nov. 27, 2017), <http://www.telegraph.co.uk/gaming/news/hawaii-crack-predatory-loot-boxes-video-games/>.

394. See, e.g., Blake Hester, *'Destiny 2' Is Hindering Player Progression*, ROLLING STONE (Nov. 27, 2017), <https://www.rollingstone.com/glixel/news/report-destiny-2-is-hindering-player-progression-w512646> (reporting that players of *Destiny 2* were outraged to find that their progression was being decelerated the better they played).

395. Madary & Metzinger, *supra* note 73, at 18.

396. Cf. Romeo Vitelli, *Are Video Games Addictive?*, PSYCHOLOGY TODAY (Aug. 19, 2013), <https://www.psychologytoday.com/blog/media-spotlight/201308/are-video-games-addictive> ("Though researchers have looked at amount of time spent online as a risk for addiction, *type* of video game may be important as well. Not only are role-playing gamers more vulnerable to addiction but so are shooter and strategy gamers.")

397. *Sanders v. Acclaim Entm't, Inc.*, 188 F. Supp. 2d 1264 (D. Colo. 2002); *James v. Meow Media, Inc.*, 90 F. Supp. 2d 798 (W.D. Ky. 2000), *aff'd*, 300 F.3d 683 (6th Cir. 2002).

398. *Sanders*, 188 F. Supp. 2d at 1276.

399. 188 F. Supp. 2d 1264.

400. *Id.* at 1276, 1279.

401. 90 F. Supp. 2d 798 (W.D. Ky. 2000), *aff'd*, 300 F.3d 683 (6th Cir. 2002).

402. *Id.* at 801, 806–10.

cause violent tendencies beyond aggressive thoughts and feelings.<sup>403</sup> Nevertheless, if a one-off experience can produce up to a week's worth of behavioral changes and the average American gamer spends over six hours per week playing video games,<sup>404</sup> at least one hour of which is with violent first-person shooters,<sup>405</sup> it is at least plausible such evidence could become available. If it does, developers and publishers may be liable for warning defects in the same way that manufacturers of selective serotonin reuptake inhibitors have been found liable for failing to warn that their products could cause violent behavior—something demonstrated by expert testimony.<sup>406</sup>

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There are two areas of liability in VR gaming that are not addressed in this Part, but are worth mentioning. First, video game design has been democratized in recent years due to “modding”—a process whereby gamers make alterations to a game by changing its code.<sup>407</sup> Many developers actively encourage modding by providing gamers with custom “mod tools” packaged with the game.<sup>408</sup> On the one hand, this encourages innovation<sup>409</sup>—something that products liability law is not keen to stifle.<sup>410</sup> On the other hand, it may subject VR game developers and publishers to liability, as it is clearly foreseeable that

403. Calvert & Tan, *supra* note 57; Persky & Blascovich, *supra* note 53.

404. *The State of Online Gaming – 2018*, LIMELIGHT NETWORKS (2018), <https://www.limelight.com/resources/white-paper/state-of-online-gaming-2018/>; *Multi-Platform Gaming*, NIELSEN (May 27, 2014), <http://www.nielsen.com/us/en/insights/news/2014/multi-platform-gaming-for-the-win.html>. At the tail-end of the distribution, the numbers are far more alarming. 34 million “core” gamers in the U.S.—those who spend on average at least five hours per week playing games—spend an average of 22 hours per week playing. *The NPD Group Reports 34 Million Core Gamers Spend an Average of 22 Hours per Week Playing Video Games*, NPD (May 13, 2014), <https://www.npd.com/wps/portal/npd/us/news/press-releases/the-npd-group-reports-34-million-core-gamers-spend-an-average-of-22-hours-per-week-playing-video-games/>. Five million of those are considered “extreme” gamers, averaging 45 hours per week playing games. *Extreme Gamers Spend an Average of 45 Hours Per Week Playing Video Games*, NPD (Aug. 11, 2008), [https://www.npd.com/press/releases/press\\_080811.html](https://www.npd.com/press/releases/press_080811.html).

405. See *The State of Online Gaming – 2018*, *supra* note 404; see also *Essential Facts About the Computer and Video Game Industry*, ESA (2018), [http://www.theesa.com/wp-content/uploads/2018/05/EF2018\\_FINAL.pdf](http://www.theesa.com/wp-content/uploads/2018/05/EF2018_FINAL.pdf) (demonstrating that five of the top eight best-selling video games of 2017 were shooters, three of which involve shooting other people).

406. See, e.g., *Estates of Tobin by Tobin v. Smithkline Beecham Pharmaceuticals*, 164 F. Supp. 2d 1278 (D. Wyo. 2001); see also *State of Connecticut v. Christopher DeAngelo*, 26 Conn. L. Rptr. 461 (Super. Ct. 2000). But see *Blanchard v. Eli Lilly & Co.*, 207 F. Supp. 2d 308 (D. Vt. 2002) (holding that absent expert testimony that Prozac caused the murder-suicide, the drug manufacturer’s lack of warning is not the proximate cause of the harm).

407. Rafi Letzter, *Online Communities Are Changing Video Games to Make Them Better, Weirder, and Much More Wonderful*, BUSINESS INSIDER (July 21, 2015), <http://www.businessinsider.com/video-game-modding-2015-7>.

408. *Id.*

409. Mark Zuckerberg has attributed his interest in programming to his childhood experience playing video games. Amar Toor, *Mark Zuckerberg Says Video Games Can Help Kids Become Programmers*, THE VERGE (May 22, 2015), <http://www.theverge.com/2015/5/22/8643065/mark-zuckerberg-video-games-good-for-kids>. Video game modding has also produced participatory cultures built on positive reciprocity, which may have broader societal benefits. See TANJA SIHVONEN, PLAYERS UNLEASHED! (2011).

410. See *Carlin v. Superior Court*, 920 P.2d 1347, 1354 (Cal. 1996) (seeking to strike the optimal balance between ensuring safety and encouraging innovation).

gamers will take advantage of mod tools if given easy access to them.<sup>411</sup> So as not to stymie this positive development, one possible compelled disclosure requirement may be including with the game a set of “instructions for proper use” of mod tools designed to minimize the potential for harmful mods. A second area worth discussing is online gaming, specifically the potential for users to commit torts against one another in shared virtual environments over the internet. This issue has been discussed *ad nauseam* elsewhere.<sup>412</sup> It should be added that liability is best assigned at the level of the software rather than the hardware manufacturer, as not all VR games enable online user-to-user interactions.<sup>413</sup> This is the approach taken by the video game industry, which warns consumers if a game enables such interactions.<sup>414</sup>

### CONCLUSION

This Article has demonstrated, through doctrinal and practical considerations, that harmful VR gaming software, whether commercial or noncommercial in nature, can and should be constitutionally constrained through content-neutral warning requirements. Because video games are the fastest growing entertainment medium, and because VR is such a revolutionarily affective technology, even a narrow application of this Article can have far-reaching implications. I contend, however, that the Article’s implications stretch further still. It has presented a menu of doctrines through which the constraint of media with significant psychosocial impact can survive First Amendment scrutiny, and an impact-tangibility standard through which such software can be classified as products. As software plays an increasingly prominent role in our day-to-day lives, from how we move about to what we purchase, and from who we date to how we engage in leisure, its impact will only continue to grow—and so, too, will its harms. Some of those harms will be obvious, as when an autonomous car’s code causes it to veer off the road and injure its passengers, but the psychosocial harms will be more subtle; they may even be packaged as “fun and games” for your children. To the extent that regulation and tort law, including products liability, can serve a useful role in constraining these harms, outdated doctrinal impediments should not lightly stand in the way. This Article has attempted to remove some of those impediments, lest emerging technologies regulate us, from what we think to how we behave, instead.

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411. See RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. p (AM. LAW INST. 1998) (“Foreseeable product misuse, alteration, and modification must also be considered in deciding whether an alternative design should have been adopted.”).

412. Lemley & Volokh, *supra* note 18.

413. *Batman: Arkham VR*, *supra* note 345.

414. *ESRB Ratings Guide*, *supra* note 345.