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ARTICLE

LAW, VIRTUAL REALITY, AND AUGMENTED REALITY

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Virtual Reality (VR) and Augmented Reality (AR) are going to be big—not just for gaming but for work, for social life, and for evaluating and buying real-world products. Like many big technological advances, they will in some ways challenge legal doctrine. In this Article, we will speculate about some of these upcoming challenges, asking:

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(1) *How might the law treat “street crimes” in VR and AR—behavior such as disturbing the peace, indecent exposure, deliberately harmful visuals (such as strobe lighting used to provoke seizures in people with epilepsy), and “virtual groping”? Two key aspects of this, we will argue, are the Bangladesh problem (which will make criminal law very hard to practically enforce) and technologically enabled self-help (which will offer an attractive alternative protection to users, but also a further excuse for real-world police departments not to get involved).*

(2) *How might the law handle tort lawsuits, by users against users, users against VR and AR environment operators, outsiders (such as copyright owners whose works are being copied by users) against users, and outsiders against the environment operators?*

(3) *How might the law treat users’ alteration of other users’ avatars, or creation of their own avatars that borrow someone else’s name and likeness?*

(4) *How might privacy law deal with the likely pervasive storage of all the sensory information that VR and AR systems present to their users, and that they gather from the users in the course of presenting it?*

(5) *How might these analyses reflect on broader debates even outside VR and AR, especially order without law and the speech–conduct distinction?*

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INTRODUCTION

In 2016, the world suddenly went crazy for Pokémon GO. Millions of people were traveling to spaces public and private to catch, train, and fight with monsters that only they could see. As the mania spread, cities and parks

held Pokémon GO parties.¹ Hospitals and the Holocaust Museum put up signs warning players that no Pokémon could be found there.² At least one police station politely asked people who came searching for Pokémon to do so outside the building.³

Gamers and those nostalgic for the Pokémon card game loved the Pokémon GO phenomenon. People whose property was invaded by dozens or hundreds of Pokémon GO players hated it, or adapted to it, or tried to make money from it.⁴ Many others were puzzled by it. And us? We're law professors, so naturally our first thought was "just imagine how many potential legal questions this raises!" That's why lawyers are so much fun at cocktail parties.

Pokémon GO was the first exposure most of the world had to augmented reality (AR). AR allows digital content to be layered over the real world. Using special glasses or, more commonly for now, a smartphone, AR users can see the real world as it actually exists, but with digital images superimposed on the world so that they seem to exist as part of the world. And while gaming is the first application to reach the mass market, it won't be the last. Our experience of the real world will increasingly be overlaid with information and images—sometimes related to what we physically see, sometimes not.⁵

¹ See, e.g., Irv Leavitt, *Northbrook Police Plan Pokemon Go Hunt with Northbrook Kids*, CHI. TRIB. (Aug. 2, 2016, 4:56 PM), <http://www.chicagotribune.com/suburbs/northbrook/news/ct-nbs-pokemon-walk-tl-o8o4-20160802-story.html> [https://perma.cc/BW5E-R3CT].

² Suzanne Baker, *At Naperville Hospital and Schools, It's Pokemon 'No'*, CHI. TRIB. (Jul. 19, 2016, 6:20 PM), <http://www.chicagotribune.com/suburbs/naperville-sun/ct-nvs-naperville-pokemon-no-st-0720-20160719-story.html> [https://perma.cc/L8KM-GSS4]; Andrea Peterson, *Holocaust Museum to Visitors: Please Stop Catching Pokémon Here*, WASH. POST (Jul. 12, 2016), https://www.washingtonpost.com/news/the-switch/wp/2016/07/12/holocaust-museum-to-visitors-please-stop-catching-pokemon-here/?utm_term=.667536c9b43b [https://perma.cc/TA4W-XYVK]. For a discussion of the clashing norms of Pokémon GO players and memorial sites, see generally Elizabeth F. Judge & Tenille E. Brown, *Pokémonials: Placing Norms in Augmented Reality*, 50 U.B.C. L. REV. 971 (2017).

³ Ben Guarino, *Australian Cops to Pokemon Fans: Do Not Come Looking for Pikachu in Our Police Station*, WASH. POST (Jul. 7, 2016), https://www.washingtonpost.com/news/morning-mix/wp/2016/07/07/australian-cops-to-pokemon-fans-do-not-come-looking-for-pikachu-in-our-police-station/?utm_term=.13b7a4d6bbfi [https://perma.cc/ZY3Q-NCFY].

⁴ See, e.g., Abby Ohlheiser, *What Happens When Pokémon Go Turns Your Home into a Gym*, WASH. POST (July 11, 2016), https://www.washingtonpost.com/news/the-intersect/wp/2016/07/11/what-happens-when-pokemon-go-turns-your-home-into-a-gym/?utm_term=.bid42771f29a [https://perma.cc/M58L-ZE3N]; Alex Schiffer & Paresh Dave, *Aside from Investors, Who Else Can Cash in on the 'Pokemon Go' Craze?*, L.A. TIMES (July 12, 2016, 3:48 PM), <http://www.latimes.com/business/technology/la-fi-tn-pokemon-business-20160712-snap-story.html> [https://perma.cc/4U9J-N7YB].

⁵ For a twist on augmented reality, see Beck Besecker, *Diminished Reality Will Have as Much Power as AR for Retailers*, VENTUREBEAT (Oct. 26, 2017, 3:45 PM), <https://venturebeat.com/2017/10/26/diminished-reality-will-have-as-much-power-as-ar-for-retailers/> [https://perma.cc/GD5W-76Z2]. "Diminished reality" lets users who are shopping for furniture, art, and the like "digitally remove unwanted, inanimate objects from their physical surroundings, to get an even more realistic view of how potential purchases will fit within the context of their lives." *Id.*

Beyond AR, there is virtual reality (VR). While AR adds visible digital content to a person's perception of the real world, VR replaces the real world altogether. Using goggles and speakers, VR places people inside a virtual environment, letting them move around in it and interact with it as if it were the real world.

In some ways, VR is a competitor technology to AR: business meetings and social interactions with remote parties could happen either via VR or AR, depending on which technology evolves most quickly. In other ways, VR can be complementary, with people using AR technology for adding to physical-world interactions, and VR for creating entirely fictional worlds.

VR also got big in 2016. Four major VR hardware platforms were deployed; so were many applications—mostly games, but also immersive news reporting and social experiments.⁶ And the technology, already impressive in its realism, continues to develop at a breakneck pace. While most applications of VR today remain games, before long we will interact more and more in virtual rather than real space (especially as avatars become realistic enough, and begin to reliably track user facial expressions). Work, training, sales, social life,⁷ education, exercise,⁸ even psychotherapy: VR will affect all these and more.⁹

AR and VR both present legal questions for courts, companies, and users. Some are new takes on classic legal questions. People will kill and die using AR and VR—some already have.¹⁰ They will injure themselves and others. Some will use the technology to threaten or defraud. Sorting out who is responsible will require courts to understand the technology and how it differs from the

⁶ See, e.g., Signe Brewster, *Behind the Numbers of Virtual Reality's Sluggish Debut*, MIT TECH. REV. (Dec. 30, 2016), <https://www.technologyreview.com/s/603208/behind-the-numbers-of-virtual-realitys-sluggish-debut/> [<https://perma.cc/UP9Y-YPQA>]; Darrell Etherington, *Google's Daydream View Made Me a Believer Again in Consumer VR*, TECHCRUNCH (Nov. 10, 2016), <https://techcrunch.com/2016/11/10/googles-daydream-view-made-me-a-believer-again-in-consumer-vr/> [<https://perma.cc/56D7-ULMD>]; *PlayStation VR to Debut in October for \$399*, CNBC (Mar. 16, 2016, 12:21 PM), <http://www.cnbc.com/2016/03/16/playstation-vr-to-debut-in-october-for-399.html> [<https://perma.cc/L32K-RQAA>].

⁷ See, e.g., Adam Thierer & Jonathan Camp, *Permissionless Innovation and Immersive Technology: Public Policy for Virtual and Augmented Reality* 15, 22 (2017) (unpublished manuscript), <https://www.mercatus.org/system/files/thierer-immersive-technology-mercatus-working-paper-v1.pdf> [<https://perma.cc/KYS7-X6DB>].

⁸ See, e.g., Jamie Feltham, *VR Health Group Is Rating How Many Calories Games Burn*, UPLOADVR (Aug. 16, 2017), <https://uploadvr.com/vr-health-group-rating-many-calories-games-burn/> [<https://perma.cc/4YUW-DKC3>]; VIRZOOM, <http://www.virzoom.com> [<https://perma.cc/FL9L-23YT>] (profiling a company that sells stationary bicycles that interact with VR headsets to make exercise more entertaining).

⁹ See *infra* notes 48–53.

¹⁰ Charles Riley & Yoko Wakatsuki, *Pokemon Go-Playing Truck Driver Kills Woman in Japan*, CNN (Aug. 24, 2016, 8:45 AM), <http://money.cnn.com/2016/08/24/technology/pokemon-go-death-japan/index.html> [<https://perma.cc/BU63-9UAE>]; *VR Glasses Blur Reality Leading to Death Blow for Moscow Resident*, TASS (Dec. 22, 2017), <http://tass.com/society/982465> [<https://perma.cc/V338-NGW6>]. The Moscow man apparently stumbled over a glass table while wearing a VR headset, shattered the glass, and mortally wounded himself on the broken glass.

world that came before. But it won't necessarily require a fundamental rethinking of legal doctrines. A death threat via AR or VR is legally the same as a death threat via an oral conversation, a letter, an email, or a fax.¹¹

But AR and VR will also create new legal questions. Virtual interactions will be conducted through privately owned and operated devices and networks. Those interactions may therefore be subject to contractual terms and conditions that users will likely never see or consider, but that significantly limit the privacy, property, and liberty rights of those users.

The interactions may not happen in any one physical jurisdiction, and therefore may be harder to regulate effectively. This move—from conducting most of our business in public spaces with public rules, largely located in a single jurisdiction, to private spaces with private rules in which the parties seem next to each other but are really physically in many jurisdictions—may cause us to rethink just what constitutes a legally binding contract and what things we want governed by public rather than private rules.

And AR and VR can also raise more fundamental questions. VR isn't "real" in the way we normally use that term: It is bits cobbled together to produce artificial sounds and images that we observe. But it *feels* real in a way that is hard to understand until you've experienced it. The same may be true with AR, if it can overlay vivid and realistic images of people and objects over the real reality that we see.

This gut feeling of realness can cast doubt on legal doctrines that tend to distinguish between physical contact and physical danger and things that are "mere" audio and visual communication. We base many rules on the distinction between the mental and the visceral, between things we perceive and things we experience. We also draw significant legal lines between speech and conduct. VR and AR will make it harder to draw those lines, and may push us to think hard about why we punish certain kinds of conduct and not others in the physical world. Indeed, they may even lead us to rethink the notion of what is "real" in a world where more and more of our most significant and emotionally real experiences aren't "real" in the classic physical understanding of that term. But they feel real, and they can have real physiological consequences.¹²

VR and AR aren't the first technologies to challenge legal doctrine. We can, for instance, learn some important lessons from our efforts to apply legal rules

¹¹ Because VR- and AR-mediated conversations are more likely to be recorded, the VR/AR threat may be easier to prove than an oral threat; but in that respect, the VR/AR threat would be much like a threatening letter.

¹² We are increasingly learning that much of what is sometimes dismissed as "emotional" injury does in fact affect us physiologically as well, from post-traumatic stress disorder to the effects of abusive relationships. See, e.g., Jacqueline C. Campbell, *Health Consequences of Intimate Partner Violence*, 359 LANCET 1331 (2002).

to the Internet over the past quarter century,¹³ and from some cutting-edge scholarship a decade ago on the law of non-immersive virtual worlds.¹⁴ But most of those legal rules developed haphazardly, not deliberately. Thinking deeply now about how the law will apply to VR and AR requires us to tread new ground. The reward—hopefully—will be not only a solid framework for applying legal doctrine to some tricky new questions, but also a better understanding of doctrines we take for granted in the physical world.

We begin in Part I by discussing the rise of VR and AR and how people experience those technologies. We then turn in Part II to how the law is likely to treat “street crimes” in VR—behavior such as disturbing the peace, indecent exposure, deliberately harmful visuals (such as strobe lighting used to provoke seizures in people with epilepsy), and “virtual groping.”¹⁵ Two key aspects of this, we will argue, are the Bangladesh problem (which will make criminal law very hard to practically enforce) and technologically enabled self-protection (which will offer an attractive alternative to legal enforcement, but also a further excuse for real-world police departments not to get involved).

In Part III, we consider tort lawsuits, by users against users, users against VR and AR environment operators, outsiders (such as copyright owners whose works are being copied by users) against users, and outsiders against the environment operators. In Part IV, we discuss whether it is a tort to alter other users’ avatars or create your own avatars that borrow someone else’s name and likeness.

We then consider in Part V the likelihood that VR and AR systems will pervasively store all the sensory information that they present to their users (and that they gather in the course of presenting it), and discuss the privacy implications of such data collection and potential disclosure. We turn in Part VI to some implications of the virtual street being privately owned, unlike most public streets. And we close in Part VII by talking about three overarching issues—order without law, the speech–conduct distinction, and the nature of harm—that can reflect on broader debates even outside VR and AR.

Our article primarily aims to identify the interesting coming questions and outline some possible answers. We will sometimes suggest which answers are best, but that’s not the main value that we seek to add. Rather, we simply hope that, by thinking ahead about such matters, all of us can better decide how both

¹³ Kevin Werbach, for instance, points out that the initial response to the Internet was to treat the virtual as a separate space from the real, but that was a mistake. The virtual and the real inevitably bleed over into each other. Kevin Werbach, *The Song Remains the Same: What Cyberlaw Might Teach the Next Internet Economy*, 69 FLA. L. REV. 887, 906-07 (2017).

¹⁴ Orin S. Kerr, *Criminal Law in Virtual Worlds*, 2008 U. CHI. LEGAL F. 415, 416-17 (asserting that “games are artificial structures better regulated by game administrators than federal or state governments”); Lastowka & Hunter, *infra* note 20, at 73 (arguing that “virtual worlds are jurisdictions separate from our own”).

¹⁵ We focus on U.S. law, since that’s what we know; but many of the questions we raise might be helpful to scholars studying similar matters in other countries.

VR and AR law and VR and AR technology should be developed, and perhaps also learn something about the role of law in the physical world as well.

I. THE RISE OF THE MACHINES

A. *The Technological Background*

How did 2016 come to be the year of VR and AR? From a technical perspective, the success of AR and the ability to start deploying VR stem from several trends coming together.

First, computer processing power continues to grow exponentially.¹⁶ That permits real-time processing of enormous amounts of data on ever-smaller devices. It also permits highly realistic graphics, as anyone who has played a modern computer game can attest.

Critical to VR, what was impossible with even a cluster of supercomputers a decade ago—real-time rendering of a world that surrounds you and responds as you interact with it—can now be done on a home PC and deployed to a lightweight, fairly comfortable headset. Indeed, lower-quality VR images without interactivity but with full surround video are already being sent to your smartphone with a headset made of cardboard.¹⁷ For the moment, the best VR experiences require a cable connected to your PC, but that's likely to change soon, as onboard headset processing power and wireless communications technology improve.¹⁸

AR takes advantage of the same technological developments, but also some additional ones. First, likely about two billion people in the world now have in

¹⁶ Moore's Law observes that integrated circuit density and therefore (roughly speaking) computer performance has generally been observed to double every 1½ to 2 years. See, e.g., *Intel's 22 nm Technology Moves Transistor Into the 3rd Dimension*, INTEL, <https://www.intel.com/content/www/us/en/silicon-innovations/standards-22-nanometers-technology-backgrounder.html> [https://perma.cc/76UL-A634]. Transistor shrinkage may be reaching its limit, but it seems likely that there will be other ways to boost speed even if Moore's Law runs out. See, e.g., Tom Simonite, *Moore's Law Is Dead. Now What?*, MIT TECH. REV. (May 13, 2016), <https://www.technologyreview.com/s/601441/moores-law-is-dead-now-what/> [https://perma.cc/8TWT-749V] (proposing alternatives such as "working harder to improve the design of chips and making chips specialized to accelerate particular crucial algorithms"); *After Moore's Law*, ECONOMIST: TECH. Q. (Mar. 12, 2016), <http://www.economist.com/technology-quarterly/2016-03-12/after-moores-law> [https://perma.cc/SSD6-DLKA] (discussing ways to dramatically advance the functions of computers, such as using quantum mechanics, having computers "emulate biological brains," and "diffus[ing] computer power rather than concentrating it").

¹⁷ Marcus Wohlson, *Google Cardboard's New York Times Experiment Just Hooked a Generation on VR*, WIRED (Nov. 9, 2015, 5:32 PM), <https://www.wired.com/2015/11/google-cardboards-new-york-times-experiment-just-hooked-a-generation-on-vr/> [https://perma.cc/22FW-F5HH].

¹⁸ See, e.g., Paul Lilly, *TPCast Wireless Adapter for HTC Vive Goes Up for Preorder in US*, PC GAMER (Sept. 6, 2017), <http://www.pcgamer.com/tpcast-wireless-adapter-for-htc-vive-goes-up-for-preorder-in-us/> [https://perma.cc/E2XZ-VFU4].

their pockets a computing device of incredible power.¹⁹ Second, wireless connectivity lets that device connect to the Internet and other devices in almost all populated places in the world. Third, those devices come with very good built-in location tracking services. Those factors put together mean that you can send graphics and other information to a phone or other portable electronic device and know where that phone is and where it's looking when you do.

AR and VR also differ in the openness of the technologies they employ. If you play Pokémon GO, the monsters you see on your screen are provided by the game maker, Niantic. But the screen on which they appear is your smartphone. The game can be played on any phone platform, and players with iPhones can see and interact with players with Android phones. AR is, at least generally, interoperable.

VR, by contrast, is not. VR is currently the province of a variety of proprietary headsets—at the time we write this, the main players are the Oculus Rift, the Vive, the Playstation VR, and the HoloLens, though that will doubtless change. Each platform runs its own games, sometimes on different computer hardware. While we expect that more games and apps will be written to work on multiple platforms over time, for the foreseeable future those programs will not work across platforms. If I want to interact with a friend in a VR game or business meeting, we both have to wear the same type of headset.

B. *The Practical Applications*

So far, most uses of VR and AR have been in gaming. Pokémon GO is a good example of AR using phones plus location plus graphics processing to generate images that are superimposed on the real world, allowing players to go to real places to find and capture virtual monsters. VR gaming offers far more exciting prospects, because it takes the user into the game itself. Rather than controlling an avatar on a screen, the user becomes the avatar, and the physical movements of her body translate into the world she perceives around her. Even at this early stage, the effects of the technology can be remarkable.

Some readers may be inclined to dismiss VR and AR as unimportant because they are “just” gaming platforms. That would be a mistake.²⁰ First, gaming itself is an enormous and underappreciated business and social phenomenon—worth studying in its own right,²¹ and likely to become more

¹⁹ ERICSSON, ERICSSON MOBILITY REPORT: ON THE PULSE OF THE NETWORKED SOCIETY (Nov. 2016), <https://www.ericsson.com/assets/local/mobility-report/documents/2016/ericsson-mobility-report-november-2016.pdf> [<https://perma.cc/8K3Q-GUEC>].

²⁰ For discussion of the importance of law in multi-player virtual worlds, see F. Gregory Lastowka & Dan Hunter, *The Laws of Virtual Worlds*, 92 CALIF. L. REV. 1, 8-12 (2004).

²¹ Edward Castronova, *Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier* 2 (Ctr. for Econ. Studies & Ifo Instit. for Econ. Research Working Paper No. 618, 2001), <https://>

so over time, since it is growing far faster than other forms of media. About 25 million Americans identify themselves as active video gamers.²² The industry is a \$30 billion annual business in the U.S., and \$90 billion worldwide.²³ It has spawned its own popular television network, *Twitch.tv*, and in 2015 more people tuned in to watch the finals of a League of Legends tournament than watched the NBA basketball finals.²⁴ Pokémon Go alone generated over \$1 billion in revenue in the last year.²⁵

And VR also changes the way people react to games. Kids playing violent VR videogames, for example, have higher physiological arousal and aggressive thoughts than those observing someone play the game on a 2D screen.²⁶

But the use and promise of AR and VR are also not limited to gaming. Google's entry-level phone-based VR app, Cardboard, launched with immersive video news reporting, allowing users to visit a Syrian refugee camp and other news hot spots around the world, looking around (though not interacting).²⁷ VR programs like Tiltbrush are letting artists create art in three dimensions by

papers.ssrn.com/sol3/papers.cfm?abstract_id=294828 [https://perma.cc/VV9V-UXFL] (“[E]conomists believe that it is the practical actions of people, and not abstract arguments, that determine the social value of things. One does not study the labor market because work is holy and ethical; one does it because the conditions of work mean a great deal to a large number of ordinary people. By the same reasoning, economists and other social scientists will become more interested in Norrath and similar virtual worlds as they realize that such places have begun to mean a great deal to large numbers of ordinary people.”).

²² Maeve Duggan, *Gaming and Gamers*, PEW RES. CTR. (Dec. 15, 2015), <http://www.pewinternet.org/2015/12/15/gaming-and-gamers/> [https://perma.cc/6SFP-RQHZ] (finding that 10% of American adults identify as “gamers”).

²³ Press Release, Entm’t Software Ass’n, U.S. Video Game Industry Generates \$30.4 Billion in Revenue for 2016 (Jan. 19, 2017), <http://www.theesa.com/article/u-s-video-game-industry-generates-30-4-billion-revenue-2016/> [https://perma.cc/28BQ-LMUA]; Dean Takahashi, *Worldwide Game Industry Hits \$91 Billion in Revenues in 2016, with Mobile the Clear Leader*, VENTURE BEAT (Dec. 21, 2016, 7:00 AM), <http://venturebeat.com/2016/12/21/worldwide-game-industry-hits-91-billion-in-revenues-in-2016-with-mobile-the-clear-leader/> [https://perma.cc/267T-74JX].

²⁴ David Segal, *Behind League of Legends, E-Sports’s Main Attraction*, N.Y. TIMES (Oct. 10, 2014), https://www.nytimes.com/2014/10/12/technology/riot-games-league-of-legends-main-attraction-esports.html?_r=0 [https://perma.cc/W235-GRVR].

²⁵ Ross Todd, *Pokestop: Judge Calls Timeout in Suit Against Pokémon Go Maker*, RECORDER (July 27, 2017, 5:18 PM), <https://www.law.com/therecorder/sites/therecorder/2017/07/27/pokestop-judge-calls-timeout-in-suit-against-pokemon-go-maker/> [https://perma.cc/3S68-F5CX].

²⁶ Sandra L. 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, 136-37 (1994).

²⁷ For an example of VR reporting by the New York Times, see, e.g., Susan Dominus, *The Displaced: Hana*, N.Y. TIMES (Nov. 5, 2015), <https://www.nytimes.com/2015/11/08/magazine/the-displaced-hana.html> [https://perma.cc/9GN4-J5T2].

working inside their creations.²⁸ VR art has already appeared in major museums.²⁹ VR systems will allow a new generation of computer-aided design of products.³⁰

Other VR projects have included diversity training that lets people change their race or sex and see how others interact with them when they look different than they do outside VR.³¹ VR will also doubtless be used for training people for various physical tasks; think airplane simulators, but for activities that have much more complicated and dynamic controls.³²

AR is technically quite interesting, and will become even more so when it moves from cell phones to glasses. The first well-known attempt, Google Glass, failed,³³ but we think that was just a problem with this particular implementation. The technology, when implemented right and socially accepted, will be powerful and profoundly appealing, not just in gaming but at work and in social life.

AR apps include the ability to superimpose relevant data over an image on a computer screen. Google Glass offered a computer screen that projected information over a real view of the world.³⁴ Other AR projects include heads-up displays for pilots and drivers that let them access important information without looking away from the road or the runway.³⁵

²⁸ Frank Rose, *The Making of Virtually Real Art with Google's Tilt Brush*, N.Y. TIMES (Jan. 4, 2017), <https://www.nytimes.com/2017/01/04/arts/design/the-making-of-virtually-real-art-with-googles-tilt-brush.html> [https://perma.cc/4J4P-JXMZ].

²⁹ *Id.*

³⁰ Jilin Ye, Saurin Badiyani, Vinesh Raja & Thomas Schlegel, *Applications of Virtual Reality in Product Design Evaluation*, in HUMAN-COMPUTER INTERACTION, HCI APPLICATIONS AND SERVICES 1190, 1193 (Julie A. Jacko ed., 2007).

³¹ Marco della Cava, *Virtual Reality Tested by NFL as Tool to Confront Racism, Sexism*, USA TODAY (Apr. 8, 2016), <https://www.usatoday.com/story/tech/news/2016/04/08/virtual-reality-tested-tool-confront-racism-sexism/82674406/> [https://perma.cc/FW63-VPEA] (“Feeling prejudice by walking a mile in someone else’s shoes is what VR was made for,” says Jeremy Bailenson, director of Stanford University’s Virtual Human Interaction Lab.”); see also Thierer & Camp, *supra* note 7, at 46 (noting that VR applications can generally make viewers empathize more with others).

³² Daniel Newman, *Hyper-Training and the Future Augmented Reality Workplace*, FORBES (Sept. 20, 2016), <https://www.forbes.com/sites/danielnewman/2016/09/20/hyper-training-and-the-future-augmented-reality-workplace/#1754b5e28b07> [https://perma.cc/88BT-U3UW]; Jonathan Vanian, *Farmers Insurance Is Using the Oculus Rift to Train Workers in Virtual Reality*, FORTUNE (Oct. 25, 2017), <http://fortune.com/2017/10/25/oculus-rift-headsets-farmers-insurance/> [https://perma.cc/R2UH-YHBZ] (“[I]t’s impractical to create a real-life house riddled with every possible problem. That’s where VR comes in.”).

³³ Nick Bilton, *Why Google Glass Broke*, N.Y. TIMES (Feb. 4, 2015), https://www.nytimes.com/2015/02/05/style/why-google-glass-broke.html?_r=0 [https://perma.cc/4MBA-2HHP].

³⁴ Hayley Tsukayama, *Everything You Need to Know About Google Glass*, WASH. POST (Feb. 27, 2014), <https://www.washingtonpost.com/news/the-switch/wp/2014/02/27/everything-you-need-to-know-about-google-glass/> [https://perma.cc/NJ7F-EHCS].

³⁵ Matt Richtel, *Windshield Devices Bring Distracted Driving Debate to Eye Level*, N.Y. TIMES (May 29, 2015), <https://www.nytimes.com/2015/05/31/technology/windshield-devices-bring-distracted-driving-debate-to-eye-level.html> [https://perma.cc/ZH2Q-XDQ8].

AR glasses can help workers in their jobs, by pointing out extra information about the objects they are manipulating, or alerting them to safety risks. They can help people professionally by giving them instant access to information they may need for their negotiations or other business conversations.

Most relevant to what we'll be discussing below, they can help people interact with coworkers, business partners, friends, and family who are not physically present, by projecting the other person's image into the wearer's field of view. Coupled with high quality audio, such video presence can create much more lifelike interactions than currently available with Skype and similar videoconferencing systems. Implemented well enough, it can save billions of dollars in business travel costs (especially considering the cost of traveler time as well as of transportation and hotels). And it can help people maintain friendships and family life across distance.

And there is much more coming. Imagine that you walk into a cocktail party and someone who looks vaguely familiar comes up to say hello to you. AR offers the possibility that your glasses could run facial recognition software, identify the person, and unobtrusively tell you who they are (and remind you of the names of their spouse and kids, and the last time you saw each other).³⁶ Indeed, the Chinese police are already wearing facial-recognition glasses to help them identify suspects.³⁷

VR and AR also offer the possibility of real-time interaction with people from around the world—not just text chat, or even video conferencing, but actual interaction. Interacting in a virtual space lets people behave naturally in a way that a phone or computer screen will not permit. It also allows collaborative design of art, architecture, or virtually anything else.

And then, inevitably with new technologies, there is sex. Realistic, interactive pornography—whether with live remote participants or with software constructs—is likely to drive a significant amount of early VR business, and also to push technical development in VR towards more realistic

36 Natasha Singer, *Never Forgetting a Face*, N.Y. TIMES (May 17, 2014), <https://www.nytimes.com/2014/05/18/technology/never-forgetting-a-face.html> [<https://perma.cc/PU8S-J9LP>] (discussing Nametag, an early app for Google Glass, which pulled up public Facebook profile information for strangers whom wearers glanced at in passing). There is nothing new under the Sun: The ancient Romans had a special job category for those who performed such services for politicians who wanted to pretend to know voters' names—a *nomenclator*. CRISTINA ROSILLO-LÓPEZ, PUBLIC OPINION AND POLITICS IN THE LATE ROMAN REPUBLIC 182 (2017); see also Cicero, *Pro Murena*, in ORATIONS OF MARCUS TULLIUS CICERO 106 (John Carew Rolfe ed. 1900) (63 B.C.) (mocking the supposedly always upright Cato for using a nomenclator to deceive people into thinking that Cato actually remembered them).

37 Josh Chin, *Chinese Police Add Facial-Recognition Glasses to Surveillance Arsenal*, WALL ST. J. (Feb. 7, 2018, 6:52 AM), <https://www.wsj.com/articles/chinese-police-go-robocop-with-facial-recognition-glasses-1518004353> [<https://perma.cc/AC4G-XDFB>].

avatars.³⁸ That will be important for reasons we discuss in Part IV. And the development of sexual “haptics,” devices that can reproduce sensations and not just sights and sounds, will take things far beyond mere pornography.

Many of these applications—such as gaming, education, shopping, historical reenactment, tourism, and sex—can also be enhanced by the presence of artificially intelligent characters with whom humans can interact. (For a dark example, think *Westworld*, but without the difficulty of creating physical robots.) But for this world to come about, we don’t need to assume that AI will develop to the point that there are realistic AIs that can sufficiently emulate human behavior, especially in real time. The prospect of interacting with fellow human beings in VR and AR should be enticing enough.

Likely because of applications such as these, Digi-Capital predicts that AR and VR together will be a \$150 billion business by 2020, with most of that revenue coming from outside of games.³⁹ This will be big business, with big possibilities—and at least medium-sized potential for extra legal problems and legal complexity.

C. *The Effect on our Interaction with the World*

1. Distraction

VR and AR will not just offer new ways for us to interact with each other (or to interact with constructed worlds with or without each other). Based on what we know from existing VR and AR, both technologies will affect the way people interact with the world around them.

Consider the distracting tendency of AR. It is no surprise that people find cell phones distracting. Traffic deaths are up after years of decline,⁴⁰ likely in large part because people are texting and driving.⁴¹ Phones are attractive nuisances, and we are generally less good than we think we are at splitting our attention between them and the real world.

³⁸ See, e.g., Alyson Krueger, *Virtual Reality Gets Naughty*, N.Y. TIMES (Oct. 28, 2017), <https://www.nytimes.com/2017/10/28/style/virtual-reality-porn.html> [<https://perma.cc/9A8C-LK64>] (“Pornography is what rushed along the first printing press, and spurred developments in the internet, online payment systems and other technology. Now it’s time for virtual reality.”).

³⁹ Chad Huston, IP Issues with Augmented and Virtual Reality: The Pokémon Effect (Feb. 2017) (unpublished paper) (on file with authors).

⁴⁰ Neal E. Boudette, *U.S. Traffic Deaths Rise for a Second Straight Year*, N.Y. TIMES (Feb. 15, 2017), <https://www.nytimes.com/2017/02/15/business/highway-traffic-safety.html> [<https://perma.cc/H53F-C8LB>] (“[T]he two-year increase [from 2014 to 2016]—14 percent—is the largest in more than a half century.”).

⁴¹ Charles Fleming, *Car Company Heads Say They’re Doing All They Can to Help Prevent Texting-and-Driving Accidents*, L.A. TIMES (Nov. 17, 2016), <http://www.latimes.com/business/la-fi-hy-live-updates-2016-la-auto-show-car-company-heads-say-they-re-doing-all-1479409325-htmllstory.html> [<https://perma.cc/Q5WM-FVCW>] (reporting speculation by Ford and Chevrolet executives).

But if a normal cell phone screen is distracting, AR has the potential to be especially so. While some AR implementations—such as heads-up displays—are designed to minimize distraction, the temptation to focus for a moment on the latest alert rather than on the road is almost irresistible.⁴² That temptation becomes even stronger when the alert doesn't signal you from your hand or your pocket but actually overlays what you see with your full field of vision. There are already instances in which people playing Pokémon GO have walked off a cliff or into oncoming traffic.⁴³ And the distractions of AR are only likely to increase with time.

2. Immersion

If we react to AR by splitting our attention (badly) between the world around us and the virtual world layered on top of it, we react to VR by ignoring the real world entirely in favor of the world we experience inside the headset. If you haven't experienced true immersive VR for yourself, you might find it hard to believe just how real it feels inside the headset. But one experiment may give some perspective.

In one VR application, you can walk out onto what appears to be a board high in the air and jump off. You are not, of course, standing high above the ground. Your mind knows this, because a minute ago you were standing in a flat room, because there are people standing right next to you talking to you, and because you know you are in a VR experience.

Nonetheless, a large fraction of the people in this simulation won't even walk out onto the board because it looks precarious. Some panic and have to take the headset off altogether. Of those who do walk out, most aren't willing to step off the "plank" and appear to fall, even though the step is in reality only a single step on a flat surface in a normal room. And even those who do step off—who presumably let their intellectual awareness of their physical surroundings control what their senses are telling them—invariably lean forward as they take that one step, because their body is signaling them that they are falling.⁴⁴

⁴² Stephen Williams, *As Head-Up Displays Become Common, Distraction Becomes an Issue*, N.Y. TIMES (Sept. 10, 2015), <https://www.nytimes.com/2015/09/11/automobiles/as-head-up-displays-become-common-distraction-becomes-an-issue.html> [https://perma.cc/95V9-VTZ8] ("To automakers, the technology makes for safer driving because the driver does not need to look down for information . . . But to skeptics, head-up displays are yet another informational distraction for the already data-overloaded driver.").

⁴³ Veronica Rocha, *2 California Men Fall Off Edge of Ocean Bluff While Playing 'Pokemon Go'*, L.A. TIMES (July 14, 2016, 3:45 PM), <http://beta.latimes.com/local/lanow/la-me-ln-pokemon-go-players-stabbed-fall-off-cliff-20160714-snap-story.html> [https://perma.cc/P2TW-EPTB].

⁴⁴ Liat Clark, *Walking the Plank with the Oculus Rift is Stomach-Churning Stuff*, WIRED UK (May 30, 2013), <http://www.wired.co.uk/article/oculus-vr> [https://perma.cc/D4CS-WQPD].

There are many more examples of the very real feeling we get when we are in VR. We experience what happens there as if it were really happening, whether it is a close encounter with a whale, or enemies jumping out to take shots at us.

One study used VR to replicate the Milgram shock experiment—a famous psychology experiment in which a subject is asked to press a button to electrically shock a stranger in another room. There are no actual shocks delivered with the button, but during the experiment, the stranger cries out in pain and the subject hears those cries.

In the original Milgram experiment the test subjects thought they were administering real electric shocks to real people.⁴⁵ Not so in this experiment. In spite of the fact that all participants in the VR study knew that neither the stranger nor the shocks were real, the participants “tended to respond to the situation at the subjective, behavioural and physiological levels [as measured by skin conductance and heart rate] as if it were real.”⁴⁶ Those subjects who interacted with the stranger via text screen did not produce comparable levels of response.⁴⁷

Many people cannot instantly separate their intellectual understanding of what is happening from the very different signals their body is sending them. And even for those who can, the body will not be ignored.

People in VR environments physiologically respond to actions done to them in VR.⁴⁸ Subjects who see themselves getting slapped in VR respond with skin conductance and heart rate levels as if they were actually getting slapped.⁴⁹ The results are replicable even when the subject is male and their VR “body” is female so that they are well aware that it is not “their” body.⁵⁰ Of course, the effects of being virtually punched wouldn’t equal those of a real punch: there would be no lingering bruise or physical pain, and people would intellectually understand that their body has not actually been touched. But in the moment, the instant reaction to the virtual contact is, for many people, much like the reaction to physical contact.

⁴⁵ Benedict Carey, *Decades Later, Still Asking: Would I Pull That Switch?*, N.Y. TIMES (July 1, 2008), <http://www.nytimes.com/2008/07/01/health/research/01mind.html> [<https://perma.cc/L4XK-MKHG>].

⁴⁶ Mel Slater et al., *A Virtual Reprise of the Stanley Milgram Obedience Experiments*, PLOS ONE, Dec. 2006, at 1, 1; see also Marcus Cheetham et al., *Virtual Milgram: Empathic Concern or Personal Distress? Evidence from Functional MRI and Dispositional Measures*, FRONTIERS HUM. NEUROSCIENCE, Oct. 2009, at 1,1 (finding that subjects’ responses indicated that the “objective ‘reality’ of pain is of secondary importance for this response”).

⁴⁷ Slater et al., *supra* note 46, at 7.

⁴⁸ Mel Slater et al., *First Person Experience of Body Transfer in Virtual Reality*, PLOS ONE, May 2010, at 1.

⁴⁹ *Id.* at 4, 6.

⁵⁰ *Id.* at 1.

Indeed, the realism of VR can be harnessed for therapy. VR has been effectively used to treat stress⁵¹ and brain damage⁵² because the human nervous system responds to stimuli in VR environments similarly to ones in the physical environment. Several studies have particularly focused on the treatment of anxiety disorders through exposure therapy in VR; though overall anxiety was lower in VR environments, the magnitude of anxiety decline in the VR treatment and real-world treatment was similar.⁵³

VR therapy has also been compared to imaginal therapy—asking patients to imagine the anxiety-inducing situations. VR has even been used to treat medical and psychological conditions, for instance by conditioning people to lose their fear of heights.⁵⁴ Patients in VR therapy exhibited more anxiety during therapy but a greater decline in anxiety as a result of therapy than did patients in imaginal therapy.⁵⁵ VR made the experience seem more real.

VR is, in a word, a *visceral* experience. Things that happen there aren't physically real: if the bad guy shoots you in *Bullet Train*, you don't die in real life. But they feel real indeed.

And those feelings can in turn have real physical consequences. You could literally be scared to death (or at least into a heart attack) by a game that felt sufficiently real. Even if you aren't physically harmed, you will have experienced what you saw and did in VR in a way that you do not on the Internet or in a non-VR video game. And that fact has significant consequences for how the law intersects with VR, as we will see in the next Part.

3. Image

VR and AR, when they show us to others, don't show us as we actually appear. Capturing our actual appearance in 3D, transmitting this video, and superimposing

⁵¹ Matilda Annerstedt et al., *Inducing Physiological Stress Recovery With Sounds of Nature in a Virtual Reality Forest—Results From a Pilot Study*, 118 *PHYSIOLOGY & BEHAV.* 240, 248 (2013); Youssef Shibani et al., *Trier Social Stress Test In Vivo and In Virtual Reality: Dissociation of Response Domains*, 110 *INT'L J. PSYCHOPHYSIOLOGY* 47, 54 (2016).

⁵² Mónica S. Cameirão et al., *Neurorehabilitation Using the Virtual Reality Based Rehabilitation Gaming System: Methodology, Design, Psychometrics, Usability and Validation*, *J. NEUROENGINEERING & REHABILITATION*, Sept. 2010, at 1, 12; see also Yoram Baram & Ariel Miller, *Virtual Reality Cues for Improvement of Gait in Patients with Multiple Sclerosis*, 66 *NEUROLOGY* 178 (2006).

⁵³ P.M.G. Emmelkamp et al., *Virtual Reality Treatment Versus Exposure In Vivo: A Comparative Evaluation in Acrophobia*, 40 *BEHAV. RES. & THERAPY* 509, 510 (2002); Giuseppe Riva et al., *Interreality in Practice: Bridging Virtual and Real Worlds in the Treatment of Posttraumatic Stress Disorders*, 13 *CYBERPSYCHOL., BEHAV., & SOC. NETWORKING* 55, 55 (2010).

⁵⁴ See Jessica Vitkus, *Can Virtual Reality Cure My Fear of Heights?*, *OZY* (Mar. 16, 2017), <http://www.ozy.com/true-story/can-virtual-reality-cure-my-fear-of-heights/76264> [https://perma.cc/X2TN-DUZ4]; Virtual Reality Immersion Therapy for Treating Psychological, Psychiatric, Medical, Educational and Self-Help Problems, U.S. Patent No. 6,425,764 B1 (issued July 30, 2002).

⁵⁵ Brenda K. Wiederhold et al., *The Treatment of Fear of Flying: A Controlled Study of Imaginal and Virtual Reality Graded Exposure Therapy*, 6 *IEEE TRANSACTIONS INFO. TECH. BIOMED.* 218, 218 (2002).

it on the receiver's VR environment is too difficult even for modern technology. (It requires not just extra bandwidth, but many cameras surrounding us.)

Instead, we appear through our avatars. Today, the avatars look cartoonish, but they will become increasingly realistic-looking, and will include our facial expressions, which will be captured in real time and superimposed on the avatar.⁵⁶ Indeed, realistic-looking avatars are primed to be a growth business in their own right.⁵⁷

But *realistic-looking* need not mean *real*. They could, for instance, be nicely dressed and coiffed versions of us, even if when we're actually hooking into VR in our pajamas before our morning shower. Naturally, they could be somewhat younger and better-looking versions of us. Or if we're young but want to seem more mature in business interactions, we can use slightly older-looking avatars. In any event, we will look like we want ourselves to look, no longer bound by the limitations of our actual appearance (except insofar as social or business conventions might treat sharp departures from our real appearance as untrustworthy or manipulative).

Indeed, avatars could be largely or entirely disconnected from our real appearance: of a different sex, of a different race, with different facial features, lacking our disabilities. Or they could look like dinosaurs. This could be done for experimentation, for pseudonymity, or to avoid hostility.

This malleability of visual identity has minuses as well as pluses. Easy pseudonymity could mean less social accountability (just as physical distance may mean less legal accountability—more on that later). People could also feel professionally or socially pressured to take on personas that seem inauthentic to them, but that seem more profitable. Some people may feel pressured to choose a more favored race and sex (and may resent having made such a choice). Even more people will likely try to avoid having their avatar replicate their physical features that our society views as ugly or offputting, such as disfigurements, wrinkles, or fat.⁵⁸

⁵⁶ James Gorman, *Manipulating Faces from Afar in Realtime*, N.Y. TIMES (Oct. 26, 2015), https://www.nytimes.com/2015/10/26/science/manipulating-facial-expressions-in-live-video.html?_r=1 [https://perma.cc/P83U-77NU]; Cat Zakrzewski, *Virtual Reality Takes On the Videoconference*, WALL ST. J. (Sept. 18, 2016, 10:06 PM), <https://www.wsj.com/articles/virtual-reality-takes-on-the-videoconference-1474250761> [https://perma.cc/Z2MW-ANL6]; *Mask*, MINDMAZE, <https://www.mindmaze.com/mask/> [https://perma.cc/6ZCX-KXWM] (describing technology that is supposed to allow communication of facial expressions in VR, but that is apparently not yet ready for distribution).

⁵⁷ Taylor Mayol, *Now You Too Can Live in a Simulation*, OZY (June 17, 2016), <http://www.ozy.com/fast-forward/now-you-too-can-live-in-a-simulation/67657> [https://perma.cc/WT9N-LTAN].

⁵⁸ See, e.g., HAROLD ROSENBERG, *DISCOVERING THE PRESENT: THREE DECADES IN ART, CULTURE, AND POLITICS* 260-61 (1973):

If this new, modern anonymity, and the freedom that accompanies it, were actually brought to fulfillment, all fixed differences in people would be dissolved. There would be no Jews, no Frenchmen, no Catholics, except insofar as individuals elected to make

At the same time, many people are likely to be quite enthusiastic about the possibility of beauty—or just being aesthetically average—coming at next to no cost and next to no investment of time. Many women spend hours each week on makeup and hair for work; that may be a regrettable demand of our culture, but it's quite real: indeed, as some judges have noted, it seriously burdens professional women.⁵⁹ If they can instead VR- and AR-commute, all that time will be saved. Likewise, men wouldn't have to worry about shaving; both sexes can save on dry-cleaning.⁶⁰

More importantly, many people who are self-conscious about their appearance can be freed from that. Many who find themselves treated worse because they are obese or otherwise socially stigmatized will be able to avoid that. To be sure, there might be some social constraints; someone who looks much better in VR than in real life might be looked down on by some real-life coworkers or acquaintances who view such appearance modification as

themselves Jews, Frenchmen, or Catholics. Even racial identifications, such as kinky hair or a long nose, would be eliminated as an insufferable obstacle to free decision. Humanity would appear as a raw material, physical and mental—from which individuals would be constantly fabricating selves according to their tastes. A fantasy? Perhaps But even those who do want a clean slate usually find that some particular form has been rather heavily, if not ineradicably, engraved upon them The new anonymity of the human being, whether as a fact or as a possibility, puts an enormous emphasis on the act of defining oneself.

Rosenberger was obviously writing without an eye towards VR in particular, but his analysis fits well into what VR can offer, for better or worse. Thanks to Sam Bray for pointing us to this passage.

A related question is whether the malleability of appearance will lead to more conformity (as people find it cheaper and easier to conform to the appearance that customers, coworkers, or even social acquaintances favor) or more individuality (as people find it cheaper and easier to look the way they want to look, and to show off their creativity and independent-mindedness). We suspect there will be some of both.

⁵⁹ See, e.g., *Jespersion v. Harrah's Operating Co., Inc.* 444 F.3d 1104, 1117 (9th Cir. 2006) (en banc) (Kozinski, J., dissenting) (citation omitted):

Harrah's overall grooming policy is substantially more burdensome for women than for men. Every requirement that forces men to spend time or money on their appearance has a corresponding requirement that is as, or more, burdensome for women: short hair v. "teased, curled, or styled" hair; clean trimmed nails v. nail length and color requirements; black leather shoes v. black leather shoes. The requirement that women spend time and money applying full facial makeup has no corresponding requirement for men, making the "overall policy" more burdensome for the former than for the latter.

Many businesses might not formally impose such requirements on their employees, but social norms may step in even in the absence of formal work rules. To the extent that VR can let people comply with these requirements by just designing their avatars, with no need to invest time each day, that will ease this disproportionate burden on women.

⁶⁰ To be sure, some of the time saved on grooming may end up being shifted to grooming the avatar. But even if one spends some time designing avatars with different outfits for different days, such design should be quicker—and more easily reusable—than real grooming.

dishonest. But many professional and social relationships will be entirely remote—virtual, telephonic, and email—and for those relationships the parties’ “real” appearances will not be particularly important.

And as with much modern technology, VR and AR will be especially useful for people who have some kinds of physical disabilities—not just because they could conceal their disabilities, if they want that sort of privacy, but because they could often much more easily “get around” in VR and AR than they could in the physical world. It’s not clear to us how much all this will affect law as such, but it will certainly affect people’s experience of the technology.⁶¹ (Returning to a point mentioned in the previous section, it will especially affect people’s online sex lives; but appearance unfortunately matters in business and socializing as well.)

Indeed, the ability to obscure aspects of one’s identity has proved socially useful in other contexts. The percentage of women who won jobs in orchestras went up dramatically after orchestras began blind auditions in which the interviewers didn’t know the race or gender of the person performing.⁶²

VR offers the same possibility for job interviews. We may be able to significantly reduce subconscious race and gender bias in interviewing (as well as bias against the disabled, or for that matter against fat, bald, or ugly people) if the interviewers see an avatar who doesn’t look like the real person.⁶³ On the other hand, to the extent that the VR software lets one modify the facial expressions that one is sending, that could hide potentially valuable visual cues related to how much attention the interviewees are paying, how much interest they are showing, and the like.

4. Data

The reality you feel in VR is made out of bits of data. And because of that, it is owned and stored somewhere by a private company—or perhaps several. Those private companies will invariably impose terms of use that

⁶¹ In some situations, employers and places of public accommodation that are legally required to provide “reasonable accommodations” to disabled employees and patrons might offer VR or AR presence as one such accommodation. Whether that should be viewed as legally adequate for companies that continue to primarily operate in nonvirtual reality—e.g., “we don’t need to put in ramps for access by people in wheelchairs, because they can just VR-commute instead of showing up in person”—or whether some in-person accommodation needs to be made available may prove a complicated question, which we won’t answer here. But to the extent that a business moves to an entirely VR-commuting model, this would indeed equalize access for mobility-impaired employees and customers.

⁶² Claudia Goldin & Cecilia Rouse, *Orchestrating Impartiality: The Impact of “Blind” Auditions on Female Musicians*, 90 AM. ECON. REV. 715, 737 (2000).

⁶³ For a related though potentially more pessimistic perspective on this, see Mary Anne Franks, *The Desert of the Unreal: Inequality in Virtual and Augmented Reality*, 51 U.C. DAVIS L. REV. 499, 502 (2017), which argues that prejudices in the real world could well be replicated in virtual realities, based on the biases of their creators.

purport to bind users of the hardware and software. Those terms may disclaim liability for harm. They may assert ownership over the things we create in VR. And they may require us to consent to having information about our conduct in the virtual world recorded and shared.⁶⁴

Our movements and actions in the physical world are increasingly observed, recorded, and tracked. But there are still spaces where we are not followed and acts that are not recorded and searchable. In VR that will likely not be true. Everything we do, we do before an audience—a private company that may well keep and catalog that data, and may have lots of reasons to do so (data mining, security, user convenience, and more).

Of course, the same is true of the Internet today. But we may do, say, and experience things in VR we would not put in an email. That VR feels like the real world may cause us to treat it like the real world. When we feel like we are alone with someone, we may be more likely to share intimate secrets than we would on a public street, or even in an email. But in VR those secrets are, inevitably, being recorded somewhere, and are likely being retained.⁶⁵

II. CRIME ON THE VIRTUAL STREET

That, then, is the likely technical and social reality of VR and AR. What legal problems will it cause? Let us begin with the VR and AR equivalents of street crimes.

A. *What Would VR/AR Street Crimes Be Like?*

Much traditional criminal law enforcement involves street crimes: in-person misconduct, such as robbery, sexual assault, indecent exposure, or disorderly conduct. Many such crimes literally happen on the street. Many others happen in homes, businesses, or schools, but share many traits with traditional street crimes.

Many of the worst such crimes aren't a problem in VR. You generally needn't worry about being really murdered in a virtual space. Likewise, you needn't worry (subject to some complexities that we'll mention below) about being really beaten or raped.

Indeed, this could be one reason people will shift some activities to VR. Physically going out to drink with friends might be more fun in some ways than getting a virtual drink, where everyone is physically at home but can see each other in VR. You can hug your friends in a real bar. You can feel physically close to them and not just emotionally close. If you're looking to

⁶⁴ See, e.g., OCULUS TOUCH HEALTH AND SAFETY AND WARRANTY GUIDE (2016) (on file with authors); *Terms and Conditions of Use*, VIRTUAL REALITY CO., <http://www.thevrcompany.com/terms-of-use/> [<https://perma.cc/X8N4-UB25>].

⁶⁵ See Gilad Yadin, *Virtual Reality Surveillance*, 35 CARDOZO ARTS & ENT. L.J. 707, 715 (2017).

pick up a sex partner for the evening, doing that in VR would require haptic hardware that goes beyond what we have today.⁶⁶

Yet going out together for a virtual drink—to be precise, staying in for a drink, but being virtually together—has its own advantages. You needn't worry about getting into a bar fight or getting mugged on the way home. You needn't worry about driving home drunk or paying for a cab. Plus, the booze is much cheaper at home.⁶⁷

Still, as we'll discuss below, there may well be some kinds of "street crime" in VR. How will the law likely deal with that? How should it?

1. Disturbing the Peace and the Bangladesh Problem

What sorts of street crime can there even be in VR? Today's VR is basically audiovisual—you can see and be seen and hear and be heard, but you can't be punched or shot or caressed. (Caressed is surely on its way, but not here yet.⁶⁸) We thus focus on crimes of sound or of sight.

A classic sound crime is disturbing the peace through loud noise, for instance through screaming loudly in a public place.⁶⁹ That crime can pose First Amendment problems when applied to speech that disturbs because of its content,⁷⁰ but it's pretty straightforward when applied to speech that disturbs because it's too loud.⁷¹

Indeed, if you see someone standing on the sidewalk screaming, calling the police is a standard response. You expect the police to come out, maybe talk the guy into going away, maybe arrest him, maybe even have him prosecuted. Dealing with such annoying street behavior is part of what police normally do.

Now say someone is screaming in a VR public place.⁷² Let's assume this isn't in a game, but in a place where people need to congregate for economic reasons—to shop at a VR store, or even go to their VR jobs. The harm caused by the screaming is the same: it interferes with people's other tasks.

⁶⁶ Of course, people are working on changing this. See, e.g., Alex Hawgood, 'Interactive' Gets a New Meaning, N.Y. TIMES (Dec. 24, 2013), <http://www.nytimes.com/2013/12/26/fashion/Sex-toys-cybersex-high-tech.html> [<https://perma.cc/F7U6-C28W>].

⁶⁷ A drinkable \$15 750-ml bottle of hard liquor contains about 15 shots' worth (assuming each shot is 50 ml, or about 1.75 fl oz), so that amounts to \$1 per shot. Your VR headset can pay for itself so quickly.

⁶⁸ See *supra* note 66.

⁶⁹ See, e.g., CAL. PENAL CODE § 415(2) (2015) (imposing jail time and/or a fine on "[a]ny person who maliciously and willfully disturbs another person by loud and unreasonable noise").

⁷⁰ E.g., *Cohen v. California*, 403 U.S. 15, 26 (1971) (reversing conviction for wearing a jacket that read "Fuck the Draft").

⁷¹ See, e.g., *Kovacs v. Cooper*, 336 U.S. 77, 82-83 (1949).

⁷² By this, we simply mean a place that, in the VR environment, can be visited by any user (or at least by a very large set of users), and where each user sees the other users who are visiting the same place at the same time.

So you call the police.

“Officer, there’s this guy screaming and bothering my kids and me.”

“What’s the street address?”

“It’s not on the street, it’s in this VR world.”

[Pause.]

“We’re playing a virtual game in the virtual park, and this guy is bothering us.”

“Where are you, really?”

“Well, I’m in my apartment, but that’s not what’s important! I’m wearing my virtual headset, and it feels to me like I’m playing with my kids in the park—they’re with my ex across the country, but we’re spending some time playing together, and this jackass is ruining it for us.”

“And where is he, really?”

“Oh, I clicked on his avatar, and it tells me that he’s hooked up from Dhaka—you know, in Bangladesh. But it feels like he’s right next to us.”

[Click.]

Now maybe if you call a more technically savvy police agency, they’ll understand your concerns more quickly. But their reaction is likely to continue to be skeptical, because of what we label the “Bangladesh problem”: It will take a lot to get domestic police interested in investigating a crime where the criminal is in a foreign country.⁷³ (In Bangladesh, they might call it the Wyoming problem.) Indeed, it will take a lot even if the criminal is in another American state, or perhaps even in another city. Getting someone extradited is a hassle. Even dealing with another jurisdiction’s police department to arrange an arrest in that jurisdiction is a hassle.⁷⁴

⁷³ We use Bangladesh because it’s a good example of a populous country that is very far away, that contains millions of English speakers, that likely won’t make it trivially easy to extradite petty offenders, and that has a fun polysyllabic name. Use “Ukraine problem” or “India problem,” if you prefer. Indeed, even for police calls in the U.S., versions of the problem could happen even as to more familiar places (the Nebraska problem? the Scotland problem?), though it is possible that the more familiar places will also be ones that will be more open to extradition.

⁷⁴ For extradition to be legally possible, the conduct would have to be a crime in the extraditing jurisdiction as well as the requesting jurisdiction: “Under the principle of ‘dual criminality,’ no offense is extraditable unless it is criminal in both countries.” *In re Extradition of Russell*, 789 F.2d 801, 803 (9th Cir. 1986). Moreover, extradition often requires that the crime be sufficiently “serious,” RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW § 476(1)(c) (AM. LAW. INST. 1986), which generally requires that the crime be punishable by at least one year in prison in both countries, *id.* § 475 cmt. (c). But even if both conditions are satisfied, there remains the practical deterrent created by the difficulty of extradition even when it’s legally available.

Will they go through the hassle to investigate a murder? Maybe. But, “You think I can get someone extradited from Bangladesh for disturbing the peace?” the police officer might ask you. “Or even from Nebraska?” Indeed, perhaps your state won’t even have jurisdiction over such crimes committed by people screaming in their rooms elsewhere in the world; but even if the state is legally entitled to prosecute such crimes, it would surely be very hard for local police and prosecutors to bring such a prosecution.⁷⁵

And VR street criminals would indeed likely live all over the world. There are no oceans or borders in VR—that is one of its advantages. The VR “places” in which Americans will travel will be disproportionately Anglophone (though good real-time translation might change that⁷⁶), and disproportionately (but not entirely) drawn from richer countries. Yet many of the people who share the same VR “street” will be oceans apart, and most will at least be from different states.

The same problem already exists to a significant extent on the Internet. The people who harass you or even threaten you on Twitter or Reddit can as easily be in New Zealand as in New York.⁷⁷ Courts handling civil cases have struggled for decades with how to address the problem of people who cause injury far from where they live. But criminal prosecutions for such transnational threats appear to be vanishingly rare, even when the conduct is something (doxing, swatting) that seems much more serious than simply yelling in a public place.⁷⁸

Yet the illusion of physical presence that VR and AR bring is likely to make potentially criminal incidents more common. It’s relatively rare for someone in a foreign country to care so much about us that he would tweet death threats about us; it happens, but generally just for pretty high-profile people. Most threats seem likely to stem from personal, emotionally laden interactions that usually require a sense of in-person connection—people threatening their exes, rival gang members, schools, and the like.⁷⁹

⁷⁵ See Kerr, *supra* note 14, at 426-27 (noting this problem with criminal enforcement in virtual worlds). In principle, the foreign jurisdiction—in our hypothetical, Bangladesh—might itself prosecute the malefactor, rather than extraditing him. See, e.g., James Eli Shiffer, *Canadian Teen Sentenced After “Swatting,” “Doxing” Across North America*, STAR TRIB. (Minn.) (July 25, 2015), <http://www.startribune.com/canadian-teen-sentenced-after-swatting-doxing-across-north-america/318537651/> [<https://perma.cc/4K3Q-TKVW>] (discussing Canadian prosecution of a Canadian for crimes that injured U.S. citizens in the U.S.). But if persuading a country to extradite someone for a relatively minor crime is hard, it may be even harder to persuade that country to invest its own resources to prosecute someone who didn’t harm anyone in that country.

⁷⁶ See Alec Ross, *The Language Barrier Is About to Fall*, WALL ST. J. (Jan. 29, 2016, 9:32 AM), <https://www.wsj.com/articles/the-language-barrier-is-about-to-fall-1454077968> [<https://perma.cc/H5X4-97R4>].

⁷⁷ Cf. Shiffer, *supra* note 75 (discussing conviction for international swatting and doxing).

⁷⁸ For a rare example of a prosecution for swatting, see Shiffer, *supra* note 75.

⁷⁹ See, e.g., *Elonis v. United States*, 135 S. Ct. 2001, 2005 (2015); *Virginia v. Black*, 538 U.S. 343, 350-51 (2003).

But the crimes we describe in this subsection and the coming ones are likely to be much more common. People scream and create a public commotion in the real world; there's no reason why they wouldn't do the same in a VR space. People sexually harass strangers and indecently expose themselves in the real world; there's no reason why they wouldn't do the same in VR (more on that below). Indeed, they may be more likely to do this, precisely because they may reasonably infer that it will be hard for the police to catch them. There likely will be more desire for criminal prosecution than with comparable Internet misconduct, precisely because the feeling of physical presence may make the victims of VR street crime viscerally feel victimized.⁸⁰ That desire, though, may be hard to satisfy.

To be sure, VR does tend to facilitate policing in one way, by solving some problems of proof and identification. If the VR platform keeps good logs, it can accurately report just which avatar was screaming, and just how loud he was. Some VR platforms may require people to identify themselves, at least with a credit card, before signing on. And even if the platform doesn't require such self-identification, subpoenas might be used to trace the typical avatar to an Internet subscriber—a complicated and imperfect process, but one that could work better at identifying VR street criminals than we currently are at identifying real street criminals.

Still, the greater difficulties of extradition are likely to exceed the greater ease of proof. And many VR street crimes might thus be practically ignored by traditional police departments.

Of course, this might yield pressure for VR operators to set up in-VR “police,” who might be able to deal with transgressors quickly; and there might be “courts” as well, for resolving disputes (especially disputes involving in-VR commerce). But, practically speaking, the penalties will likely be, at most, suspension or ejection from the VR environment. And it seems likely that the ejected participants can just get back on by creating a new user ID. Perhaps facial recognition or biometric identification might make the ejection stick, but such security measures will likely be easily avoidable, or require all users to have expensive hardware, and thus limit the VR environment's customer base. (Binding arbitration with the threat of money damages might in principle be available, but in practice enforcement costs—especially across continents—are often likely to preclude that.)

If a VR environment requires people to provide a credit card, or otherwise supply a deposit, such new user IDs might become harder to create, and the environment might even threaten fines or forfeited deposits for bad behavior. How often this will happen will depend on economic factors that we can't

⁸⁰ To be sure, some other Internet misconduct does lead to understandable calls for prosecution because it is viscerally frightening or humiliating in other ways. Death threats and revenge porn are classic examples.

easily predict. We expect that many VR environments will want to allow free access, or at least access that doesn't require a credit card (but might require only some prepaid gift card), since the VR operators will want to harness network effects by increasing their user bases. Presumably, those operators will make money from in-VR purchases rather than through credit card subscriptions. But we're not certain whether this will be so; indeed, some environments might want to require credit cards or elaborate identification systems precisely to maintain a more orderly experience for their users.

So the real-world police are unlikely to intervene to stop the VR street screamer, and in-VR policing institutions may not be effective. But there's a good reason why disturbing the peace is a crime: It affects people's quality of life, and tends to push them away from a place where they want to be, and where we might want them to be (for instance, if we want them to work there or shop there). And the creators of the VR environment will be keenly aware of this, because lost quality of VR life means lost profits to them, especially since different VR environments will likely be hotly competing with each other.

Code, as Larry Lessig put it, is law—maybe the most effective sort of law.⁸¹ And VR environment operators can easily implement code that can deal with the screamers. The operator could, for instance, allow each user to control the perceived volume, for that user, of any other user. That's good not just to silence the screamers, but also to quiet down acquaintances who are a bit too loud, or to amplify acquaintances who mutter. And this should be technically trivial to code.⁸²

The instruments of the real world—real ears and real brains—don't have such a feature. But the sensescape created by the VR software is more versatile and more individually controllable than what mere human anatomy can provide.⁸³

81 LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE 6 (1999).

82 AltspaceVR, a prominent program for social interaction in VR, already has such a feature. See *How Do I File an Abuse Report?*, ALTSPEACEVR (Nov. 11, 2017, 5:51 PM), <https://altspacevr.zendesk.com/hc/en-us/articles/115003528853-How-do-I-file-an-Abuse-Report-> [https://perma.cc/U2XZ-GGM4] ("Before you submit [an abuse] report, you should be aware that you do have tools for dealing with any disruptive user who is preventing you from having a positive experience. When you bring up a user's Name Tag by interacting with their avatar you will see several buttons. One of these tools will allow you to mute the user, and another will allow you to block them. You will no longer hear the audio for any user you mute. Blocked users will no longer be seen or heard, and they will no longer be able to see or hear you. Additionally, if you are experiencing issues with other users invading your personal space, you can activate your Personal Space Bubble, which causes others to become invisible if they get too close to you."). AltspaceVR has recently been acquired by Microsoft. Lucas Matney, *Microsoft Acquires Social Virtual Reality App AltspaceVR*, TECHCRUNCH (Oct. 3, 2017), <https://techcrunch.com/2017/10/03/microsoft-acquires-social-virtual-reality-app-altspacevr/> [https://perma.cc/F86N-9UWP].

83 By "sensescape," we simply mean the array of sensory inputs that a VR environment provides to users: today, mostly sights and sounds, but it could soon include touch, smell, temperature, pain, and more. Riley Snyder, *Getting Physical with Virtual Reality*, L.A. TIMES (July 18, 2014, 5:00 AM), <http://www.latimes.com/business/la-fi-virtual-reality-boom-20140718-story.html> [https://perma.cc/8BSE-WP53].

Taking advantage of this versatility can help prevent or quickly interrupt VR street crime. Yet shifting to these in-VR remedies likely means shifting away from the criminal law, and from the standard criminal law penalties.

2. Indecent Exposure

We can see the same if we consider another crime, this one visual rather than aural: indecent exposure. (Quite a few of our examples in this article will deal with nudity, because we think that many of the early legal flashpoints in VR and AR will likewise involve nudity and sex.⁸⁴)

There you are, minding your own VR or AR business, and you see this avatar a few feet away from you—and he’s naked. Plus he’s unusually well-equipped; if you’re going to have an avatar, why settle for mere realism? Or maybe he’s naked and deliberately grotesque. (Two penises?) Or maybe he’s masturbating. Or having sex with someone.

You avert your eyes, but he pops right in front of you, wherever you look. And this might happen even when you aren’t practically able to leave—for instance, if your in-VR job requires you to be “present” in that particular VR “location.”

If this were happening on a street, the exhibitionist would probably be arrested for indecent exposure or public lewdness.⁸⁵ But whether this law can be applied in VR turns out to be surprisingly complicated.

The Supreme Court has held that public nudity may be banned even in strip clubs, where the patrons pay money to see such nudity.⁸⁶ But the Court has also held that the First Amendment protects public displays of films containing nudity, even on drive-in theater screens visible from the street, where unwilling drivers and pedestrians may see the nudity (moving, in color, twenty feet high).⁸⁷

Even outside VR, this can be confusing enough that a Michigan appellate court has upheld an indecent exposure conviction for a man’s displaying his penis on a public access cable television show that he produced.⁸⁸ This seems

⁸⁴ That is consistent with the development of other new technologies, including the Internet and video recorders. See, e.g., Geoffrey George Gussis, *Website Development Agreements: A Guide to Planning and Drafting*, 76 WASH. U. L.Q. 721, 722 (1998) (“The vast majority of the early Internet law material focused on only a few issues: First Amendment rights, child pornography, and the liability of online information providers.”).

⁸⁵ He might also be deterred by social convention, or perhaps by the sense that he doesn’t look that good naked. But in VR, he can look as good (or as grotesque) as he wants, and he doesn’t have to show his real face. There may be immediate and temporary social sanctions—for instance, if he goes naked into a VR shop, he might get ejected—but then he can just quickly change his avatar to something clothed, and then change it back when he’s done shopping.

⁸⁶ *Barnes v. Glen Theatre, Inc.*, 501 U.S. 560, 571 (1991).

⁸⁷ *Erznoznik v. City of Jacksonville*, 422 U.S. 205, 217 (1975).

⁸⁸ *People v. Huffman*, 702 N.W.2d 621, 625 (Mich. Ct. App. 2005). But see *State v. Legassie*, 171 A.3d 589, 596 (Me. 2017) (“[A] digital photograph transmitted over the internet is legally insufficient to constitute an ‘exposure’ . . .”).

inconsistent with the drive-in case,⁸⁹ but it may just reflect a deeper inconsistency between the drive-in case and the public nudity cases.⁹⁰

This gets even more complex when we go beyond video of nudity to video of sexual behavior. If the video is obscene, then it can theoretically be punished even when the viewers are consenting.⁹¹ And even material that is not outright obscene enough but is nonetheless “obscene-as-to-minors” might still be punishable when it is deliberately shown in public places where minors may be present.⁹² But the Court has held that the government can’t ban such obscene-as-to-minors material online, even in places that minors can access, because a less restrictive alternative is to have parents use filtering software to shield their children, if they so wish.⁹³

Perhaps the drive-in case and the public nudity case, though, can be reconciled: public nudity is viscerally perceived as real and immediate in a way that a video display is not, the theory would go; and public nudity thus evokes reactions from which the law can legitimately protect people.

If that’s so, public nudity in VR and AR becomes a harder case. After all, nudity in VR is technically a display of video (as in the drive-in case) but also functionally aimed at emulating in-person presence (as in the public nudity cases). And while the avatars so far are relatively cartoonish, it won’t be long before a nude VR avatar—normal size, with normal movements, seemingly standing next to you—feels a lot more like a physically present person than it does like a picture on a screen.

One reason the law forbids indecent exposure is that such public nudity may lead some observers to worry that the exposor may move on to sexual assault.⁹⁴ That is a serious worry when the exposor is physically nearby, but the law is less likely to treat it as a real risk when the exposor is present only virtually. Nonetheless, unwanted exposure to others’ nudity may cause feelings of unease even when it is logically clear that no in-person assaults are possible. So whether we should be more worried about indecent exposure in VR may depend on

⁸⁹ One of us filed an amicus brief in *Huffman* supporting review by the Michigan Supreme Court, but that court denied an appeal, by a 5–2 vote. *People v. Huffman*, 708 N.W.2d 95 (Mich. 2006).

⁹⁰ This is an example of how VR can further blur the already sometimes blurry line between speech and conduct. See *infra* Section VIII.B.

⁹¹ See generally *Miller v. California*, 413 U.S. 15 (1973).

⁹² See *Crawford v. Lungren*, 96 F.3d 380, 384, 389 (9th Cir. 1996) (upholding a ban on unattended coin-operated news rack sales of material “harmful” to minors); *Am. Booksellers v. Webb*, 919 F.2d 1493, 1506 (11th Cir. 1990) (upholding a ban on display, in a place accessible to minors, of any material that’s “harmful to minors”); *Davis-Kidd Booksellers, Inc. v. McWherter*, 866 S.W.2d 520, 527, 529 (Tenn. 1993) (same).

⁹³ *Ashcroft v. ACLU*, 542 U.S. 656, 669 (2004).

⁹⁴ See Sharon Riordan, *Indecent Exposure: The Impact Upon the Victim’s Fear of Sexual Crime*, 10 J. FORENSIC PSYCHOL. 309, 313–15 (1999) (reporting this worry on the part of survey respondents).

whether we think the primary focus of the law is on the unease that it creates among passersby, or on public indecency as a proxy for future physical attack.⁹⁵

But maybe this legal conundrum is likely to stay academic. We're back to the Bangladesh Problem. How many police departments would relish the prospect of trying to extradite someone from a foreign country, or even another state, because his online avatar is nude?

The good news is that, as with loud avatars, VR users may be able to protect themselves from unwanted nudity in many circumstances. VR environments can easily be designed to let users change how others' avatars appear to them. "My avatar," after all, is just a visual image that I would like to present in displays that come up on others' VR goggles, communicated through the VR software on central computers and on the other users' computers. Those users don't have to perceive me as the avatar I chose.⁹⁶

They could, for instance, substitute another avatar; if my avatar is Adolf Hitler and they don't like it, they could substitute Mahatma Gandhi (or vice versa). Or they could just edit the avatar: If my avatar is naked and they don't like it, they could color it solid green, or perhaps solid green except the face (software permitting, but this shouldn't be hard to develop). Conversely, if they'd like to see more nudity, they could replace my avatar with whatever naked version—again, whether attractive or grotesque⁹⁷—they prefer.⁹⁸

Indeed, they could probably use a program that automatically blacks out all the naked parts of naked-seeming avatars.⁹⁹ Or the operator can require people who select a nude avatar to also provide a clothed version, so that

95 For why we focus on these objections, rather than on the argument that public nudity should be banned for moral reasons, see *infra* note 134 and accompanying text.

96 Allowing that sort of modification may create other legal problems, however, as we discuss below.

97 Grotesque alterations of a person's image were once actionable as defamation. See *Burton v. Crowell* Pub. Co., 82 F.2d 154, 154-56 (2d Cir. 1936) (holding that an ad that appeared to portray a famous jockey as having a "grotesque, monstrous, and obscene" penis, and that included text which could be read as "reinforc[ing] the ribald interpretation," could be libelous, even if it wouldn't reasonably be seen as making factual assertions about the plaintiff); *Reproduced Camel Ad*, <http://www.law.ucla.edu/volokh/vrcrowell.jpg> [<https://perma.cc/5H37-M5AZ>] (reproducing the ad, with the offending portion in the upper left-hand corner). But today obvious nonfactual mockery would be viewed as nonlibelous, precisely because it lacks a false factual assertion. See, e.g., *Mink v. Knox*, 613 F.3d 995, 1005-08 (10th Cir. 2010). Whether it might be seen as a right of publicity infringement will be discussed in Part IV.

98 The VR operator might also let the VR store outside of which the nude avatar—or the screamer—is standing exercise some control over such behavior.

99 See Simon Walden, *Can Off the Shelf AI Vision Systems Detect and Censor Art Nude Photographs?*, *DIYPHOTOGRAPHY* (Dec. 1., 2016), <http://www.diyphotography.net/can-off-shelf-ai-vision-systems-detect-censor-art-nude-photographs/> [<https://perma.cc/F62F-XEJ3>] (reporting that such programs are generally effective, though in close cases, human decisions are needed).

One program, VR Chat, has a "panic button" that deals with the problem of nudity by "turn[ing] every avatar around you into a grey robot uniformly, so people can't really spam you with nasty avatars." Paul Stinson, *Virtual Reality Platforms See More Harassment, Trolling*, *BNA ELECTRONIC COMMERCE & LAW REPORT*, March 21, 2018. One commentator describes this as "basically muting" people visually. *Id.*

people who prefer to avoid seeing nudity can select that with just one global switch. This might be useful if the automated editing yields results that are too crude to yield an enjoyable VR experience, or if the operator wants to minimize even the initial unwilling exposures to nudity.¹⁰⁰

Now let's play out again a conversation with the police, focusing on how this technologically enabled self-protection might affect their decision.

"There's this avatar standing in the VR park, and he's completely naked!"

"Why don't you just hit the 'dress up the avatar' button?" the police officer asks. (Again, we assume an officer who knows something about VR.)

"I shouldn't have to do that!" you say. "He's violating the law, and it shouldn't be up to me, the victim, to try to avoid that."

And that's a plausible argument, in theory; as you point out to the officer, "After all, 'To say that one may avoid further offense by turning off the radio when he hears indecent language is like saying that the remedy for an assault is to run away after the first blow. One may hang up on an indecent phone call, but that option does not give the caller a constitutional immunity or avoid a harm that has already taken place.' Justice Stevens said that, you know. In *FCC v. Pacifica Foundation*.¹⁰¹ Same for nudity as for vulgar language."

But our police officer is not a theorist. "Are you telling me that you could have avoided this problem by clicking on a button," he says, "and you're bothering me? I have real crimes to deal with—ones in which the victims really need me to do something that they can't do for themselves."

Or, if the officer is a theorist, perhaps he is one of the economic rather than deontological variety. "You are the cheapest cost avoider here," he says. "You can avoid the unwanted nudity with just a few clicks; I would have to go through much more effort to get it prosecuted. I know that the criminal law does not usually formally focus on that; but, practically, it makes me reluctant to give your call a high priority."

Now of course there are limits to this "you should have avoided the problem yourself" argument. Presumably if the crime is more serious—say, burglary—the police wouldn't just refuse to investigate the case simply because they thought you were somewhat foolish for having left your front

¹⁰⁰ Presumably the operator would enforce this by threatening to delete nude avatars that lack a clothed version and that yield complaints, and perhaps to delete the offending users' accounts and make it a hassle for them to create new ones. This won't stop the determined repeat offender, but given that it's easy enough to create both a nude and clothed avatar, most users would likely choose to comply with the operator's policy rather than go to the trouble of repeatedly evading it.

¹⁰¹ 438 U.S. 726, 748-49 (1978).

door unlocked.¹⁰² But for minor enough crimes, and ones where the main worry is prevention going forward, the police are unlikely to invest many resources into such prevention when citizens can more effectively prevent the problem themselves. Or the police may simply not have the resources to devote to something that they view as less serious than crimes of violence.

And this tendency only increases as a result of the Bangladesh Problem. As arrest and prosecution become much more expensive for the police, and technologically enabled self-protection simultaneously becomes less expensive for citizens, the police are likely to become less interested in intervening, especially in cases that (rightly or wrongly) don't seem to them to involve any "real" harm. And if police indeed don't take this problem very seriously, VR users will have to fall back on self-help in most cases.

3. Virtual Intrusion

While we will sometimes interact with others in a public virtual place, many VR interactions will take place behind virtual closed doors. Business meetings, romantic assignations, and even gatherings of friends are often private rather than public affairs. But VR, like the Internet, raises the prospect that interactions we think are private may be spied on by others without our knowledge.

Typically that will happen through hacking or other cybersecurity breaches in which the perpetrator gains access to the computer system of one or more of the participants. But it might also happen in a public space that appears to be empty but isn't. After all, if I can make my avatar appear however I want, I might be able to make it invisible, or just really, really small, in order to avoid notice.

Hacking is a crime in its own right, and treating intrusion on a VR system in the same way as an intrusion on any other computer system may be the simplest way for the law to deal with the issue. But our computer crime statutes have been justly criticized as vague and overbroad.¹⁰³

Some have suggested that treating VR spying as computer hacking is a bad fit, because the primary injury is the violation of private personal space.¹⁰⁴ Gilad Yadin argues that we should treat such intrusions as if they occurred in physical space, where they would constitute trespass or burglary.¹⁰⁵ This is in

¹⁰² Or maybe they would—it happens too often with sex crimes where the police think the victim failed to take proper precautions—but they shouldn't.

¹⁰³ E.g., Orin S. Kerr, *Norms of Computer Trespass*, 116 COLUM. L. REV. 1143, 1146-47 (2016); Orin S. Kerr, *Cybercrime's Scope: Interpreting "Access" and "Authorization" in Computer Misuse Statutes*, 78 N.Y.U. L. REV. 1596, 1597 (2003); Kerr, *supra* note 14, at 423; Jonathan Mayer, *Cybercrime Litigation*, 164 U. PA. L. REV. 1453, 1457-58 (2016).

¹⁰⁴ Gilad Yadin, *Virtual Reality Intrusion*, 53 WILLAMETTE L. REV. 63, 95 (2016); *see also* Gilad Yadin, *Virtual Reality Surveillance*, 35 CARDOZO ARTS & ENT. L.J. 707, 715 (2017) (discussing government surveillance in virtual reality and arguing for a broader application of the Fourth Amendment).

¹⁰⁵ Yadin, *Virtual Reality Intrusion*, *supra* note 104, at 97-99.

part simply an issue of perspective: Do we evaluate VR as it *is* or as it *feels*?¹⁰⁶ But it may also affect the willingness of police to react. Burglary sounds more serious—and more tractable—than spying on a VR conversation, even if the spying might in the long run be more harmful.

4. Strobe Lighting and Virtual Assault

Here's a possible test case that does involve a serious harm that is harder to avoid: About three percent of people who have epilepsy—disproportionately, young people—can have seizures triggered by strobe lighting.¹⁰⁷ And at least one person has already had an epileptic seizure while interacting with others in VR.¹⁰⁸

Though such seizures tend not to be fatal, or even greatly injurious, at least when the person having the seizure is just sitting in his home in front of his computer, they do involve a nontrivial risk of injury. This hasn't been seen as reason enough to generally ban strobe lights, especially since such lights seem to be entertaining for many people and are sometimes used as a safety feature. But deliberately creating a strobe effect precisely to play a nasty prank on someone you know to be endangered by this would likely be tortious or even criminal.¹⁰⁹

But here, too, a program running on a user's VR headset might be able to detect strobe lighting and convert it to something nonstrobing. People who know they are strobe-sensitive, or who even think they might be, could then easily turn on this program.¹¹⁰

¹⁰⁶ Orin S. Kerr, *The Problem of Perspective in Internet Law*, 91 GEO. L.J. 357, 357–58 (2003) (noting a similar problem in assessing Internet claims).

¹⁰⁷ About one percent of the population has epilepsy. Rosemarie Kobau et al., *Epilepsy in Adults and Access to Care—United States 2010*, MORBIDITY & MORTALITY WKLY. REP. 909, 910 (2010). This 3% of 1% thus amounts to about 100,000 people in the U.S., and many more internationally.

¹⁰⁸ Emanuel Maiberg, *Virtual Reality Users Watch Helplessly as Another User Has In-Game Seizure*, MOTHERBOARD (Jan. 19, 2018, 8:43 AM), https://motherboard.vice.com/en_us/article/ne4myg/vrchat-seizure [<https://perma.cc/GU72-RXKN>].

¹⁰⁹ Derek Hawkins, *Newsweek Trump Critic Says He Had Epileptic Seizure After Twitter Troll Purposely Sent Him Flashing Image*, WASH. POST (Dec. 21, 2016), https://www.washingtonpost.com/news/morning-mix/wp/2016/12/21/newsweek-reporter-and-trump-critic-says-he-suffered-epileptic-seizure-after-twitter-user-purposely-sent-him-flashing-image/?utm_term=.56fb77671dc4 [<https://perma.cc/ZR89-TDW3>]; see also Ashley Carman, *FBI Arrests Alleged Attacker who Tweeted Seizure-Inducing Strobe at Kurt Eichenwald*, THE VERGE (Mar. 17, 2017, 12:38 PM), <https://www.theverge.com/2017/3/17/14959168/kurt-eichenwald-fbi-arrest-strobe-epilepsy-twitter> [<https://perma.cc/3QUQ-FXT2>].

¹¹⁰ For a pre-VR analysis of this, see *How Is TV Made Safe for People with Epilepsy?*, BBC (June 7, 2007), http://news.bbc.co.uk/2/hi/uk_news/magazine/6728071.stm [<https://perma.cc/UBU9-4P8Q>], which describes various TV broadcasts that had inadvertently caused epileptic seizures in viewers. See also *Photosensitive Epilepsy Analysis Tool*, U. MD. C. INFO. STUD., TRACE RES. & DEV. CTR., <https://trace.umd.edu/peat> [<https://perma.cc/B5ZX-C5G4>] (offering a free program that will analyze whether a video poses an epilepsy seizure risk, and that could likely be easily adapted to provide real-time filtering of dangerous strobing); *Photosensitive Seizure—Monitor and Block Tool*, GPII DEVELOPERSPACE, <https://ds.gpii.net/challenges/photosensitive-seizure-monitor-and-block-tool> [<https://perma.cc/84HE-W6CJ>] (proposing a “Challenge” to software developers “to create a piece of software that can be installed in a display monitor (or

The initial exposure—for those who have neglected to get and turn on such a program, or for those who are unaware that they need it—is materially more dangerous than in the disturbing the peace scenario: physical injury, not just annoyance. And an attempt to deliberately trigger a seizure, as in our hypothetical, is highly morally culpable. The purpose is to harm someone, even if most of the time the purpose will be frustrated by the targets' precautions.

Would this be enough to lead the police to be willing to intervene? Or would they likely not think this to be worth triggering a possible interstate or international investigation, when, at least going forward, the victim could avoid such harms through technological means?

The strobe light example is the rare virtual hypothetical that combines such culpability with the real risk of physical injury, but others might arise in the future. Imagine, for instance, a hack that alters the VR camera positioning information so that a user who thinks she is in the middle of her living room is in fact standing at the edge of the stairs; or one that deliberately sends someone using AR walking into a wall or off a cliff.

The use of VR (or, more likely, AR) systems to deliberately cause physical harm to a user is more likely to get the attention of police and courts than are disturbing the virtual peace or virtual indecent exposure. Even accidental harm might be criminal if it was grossly negligent and the harm was serious enough. More likely it will be a tort, particularly if the AR system allows pop-ups that obscure necessary views rather than, say, confining ads to defined spaces within a virtual scenscape.¹¹¹ But the law will take it more seriously precisely because the consequences are more obviously physical rather than virtual.

5. "Virtual groping"

Harm, though, can also feel real without being physical. Only a few months after commercial VR became broadly available, a woman named Jordan Belamire (a pseudonym) was "virtually groped." Belamire recounted playing a multiplayer zombie shooter game when another player—who recognized Belamire as female by her voice—began to make gestures that seemed like virtual groping:

In between a wave of zombies and demons to shoot down, I was hanging out next to BigBro442 [the other player], waiting for our next attack. Suddenly, BigBro442's disembodied helmet faced me dead-on. His floating hand

box connected to a display) that will a) monitor the signal coming in to the display, b) detect visual events that are known to trigger a seizure, and c) alter the signal to remove that stimulus").

¹¹¹ For a discussion of the problem and best practices for companies to deal with it, see generally Kiron Lebeck et al., *How to Safely Augment Reality: Challenges and Directions*, in PROCEEDINGS OF THE 17th INTERNATIONAL WORKSHOP ON MOBILE COMPUTING SYSTEMS AND APPLICATIONS 45 (2016), <http://dx.doi.org/10.1145/2873587.2873595> [<https://perma.cc/4WWA-3P7F>].

approached my body, and he started to virtually rub my chest [E]ven when I turned away from him, he chased me around, making grabbing and pinching motions near my chest. Emboldened, he even shoved his hand toward my virtual crotch and began rubbing¹¹²

And Belamire reports that BigBro442's behavior, though utterly lacking in physical contact, seemed so realistic as to be disturbing. Belamire had earlier in her article described how realistic a VR cliff seemed to be, triggering her fear of heights.

"The virtual groping," she said, "feels just as real. Of course, you're not physically being touched, just like you're not actually one hundred feet off the ground, but it's still scary as hell."¹¹³ Her experience is consistent with the studies we reported in subsection I.C.2 suggesting that people react physiologically to touches in VR much as if they had happened in the physical world.

Under current law, virtual groping probably wouldn't be a crime. It isn't sexual battery, because there's no touching.¹¹⁴ Tort law tends to define "assault" as including an actor's intentionally putting someone in "imminent apprehension" of "offensive contact,"¹¹⁵ but criminal law tends not to outlaw such behavior unless it actually causes injury or is an attempt to commit battery.¹¹⁶ And beyond that, it's not clear that such imminent apprehension would be present when the target consciously knows that no physical contact is possible. While sexual threats by remote actors over the Internet have sometimes been treated as crimes, those cases all hinge on the plausibility that the threat made over the Internet will be carried out in the physical world.¹¹⁷

Should the law be changed? Virtual groping might seem (at least to an outsider) less serious than real groping because there is no "real" physical contact. Nonetheless, Belamire is doubtless right that, because of the visceral feeling created by virtual reality, such virtual groping will be highly upsetting to many people. And the more visceral VR becomes, the more it feels to the victim like a real assault.¹¹⁸ (Compare the plank experiment we discussed

¹¹² Jordan Belamire, *My First Virtual Reality Groping*, MEDIUM: ATHENA TALKS (Oct. 20, 2016), <https://medium.com/athena-talks/my-first-virtual-reality-sexual-assault-2330410b62ee#.sweicopgr> [<https://perma.cc/3D25-3X2L>].

¹¹³ *Id.*

¹¹⁴ See, e.g., CAL. PENAL CODE § 243.4(e)(1) (West 2018) ("Any person who touches an intimate part of another person, if the touching is against the will of the person touched, and is for the specific purpose of sexual arousal, sexual gratification, or sexual abuse, is guilty of misdemeanor sexual battery").

¹¹⁵ RESTATEMENT (SECOND) OF TORTS § 21 (AM. LAW INST. 1965). Likewise, one could imagine this scenario being actionable as intentional infliction of emotional distress—but in this Part we are specifically considering how criminal law (not just tort law) should apply to VR and AR.

¹¹⁶ MODEL PENAL CODE § 211.1(2)(a) (AM. LAW INST. 1980).

¹¹⁷ See, e.g., *Elonis v. United States*, 135 S. Ct. 2001, 2011-13 (2015).

¹¹⁸ People who have followed the Internet for a long time may recall *A Rape in Cyberspace*, a Village Voice article about a "virtual rape" in an early non-VR online environment. Julian Dibbell, *A Rape in Cyberspace*, VILLAGE VOICE (Dec. 23, 1993), <https://www.villagevoice.com/2005/10/18/a-rape->

above, in which many people felt that walking on a virtual plank over a virtual chasm did feel psychologically much like walking over a real chasm.)¹¹⁹

And peoples' reactions may well depend on how developed and personalized their avatar is, something that differs from platform to platform and game to game, and that is likely to change over time. Perhaps virtual groping will be upsetting enough to treat it as the sort of action that criminal law ought to, in principle, forbid, if not now then in the near future. This question likely can't be resolved until we have more experience with how people actually feel in such situations.

Nonetheless, here too, as in the indecent exposure scenario, it seems unlikely that police will do much about it. Few police departments will be eager to extradite someone from another country or even another state simply because he made gestures, however disquieting, in a virtual reality game. Even if the groper is nearby, police officers may not devote many resources to deal with people who, after all, did not literally touch anyone. That might be a mistake given the nature of the VR experience, but it is likely what will happen.¹²⁰

Absent an effective police response, VR users may again turn to technologically enabled self-protection, protection that may be easier in VR than in the real world. The physical structure of the real world is notoriously tolerant of people coming very close to you. Protection from unwanted touch has to rely on legal rules, social mores, and the threat of violent self-protection. But the code-as-law of the VR world can easily forbid avatars from approaching within some perceived distance of you, or forbid particular people from doing it, or forbid this except in certain games. VR developers have already offered this as a response to Belamire's article; as the author of the VR game that Belamire had been playing wrote,

We should have prevented this in the first place. While QuiVr is still in pre-release alpha, we'd already programmed a setting into the game called your[] "Personal Bubble," so other player's hands disappear if they come close to your face. This way, the rare bad-apple player can't block someone else's view and be annoying. . . . We hadn't, though, thought of extending that fading function to the rest of the body . . . [Jonathan, the original creator of QuiVr,] spent the morning changing the game to extend the Personal Bubble; now, when

in-cyberspace/ [<https://perma.cc/EW7K-T7X6>]. We view the title as figurative: disturbing and offensive as it may be to manipulate others' avatars in sexual ways, without their permission, on a computer screen, it's far less harmful than actual rape. Nonetheless, a VR version of such behavior, in an immersive environment, may be highly disturbing indeed—still likely not as harmful as physical sexual assault, but harmful enough that people will rightly seek protection from such behavior.

¹¹⁹ See *supra* note 44 and accompanying text.

¹²⁰ This is not an issue specific to groping. As we discuss below, courts are likely to be hesitant to treat crimes and torts in VR as "real," at least until they become more familiar with the technology. See *infra* notes 182–183 and accompanying text.

the setting was turned on, other players faded out when they reached for you, no matter their target, chest included. It was a possible solution; no one should be able to treat another player like the author had been treated¹²¹

Indeed, the VR game's author suggested other technologically enabled self-protection options, including ones that come across as more active self-defense (or, if you prefer, retaliation)—perhaps, for instance, allowing a player to “reach[] out with a finger, and with a little flick, sen[d the other] player flying off the screen like an ant.”¹²² One can even design the game so that this feature can only be used against those avatars who come too close to one's own (or else the flicking could itself become a form of unprovoked aggression). Or the VR or AR company can set up a bubble feature that excludes some avatars but not others that the participant has placed on a “close approach permitted” list.

If people behaved better, none of this would be needed. And we don't intend to suggest that the ability to protect oneself makes the impact of the behavior on the victim less severe or puts the moral onus on the victim to avoid being groped. But given that people do behave badly, VR and AR technologies sometimes offer better tools for dealing with bad behavior than the physical world does. We discuss more implications of those tools below.¹²³

6. Crimes that Can't be Easily Technologically Avoided—Extortion, Threats, and the Like

Technological protection only works for crimes that are indeed avoidable with technical measures. Many will not be. For instance, there is no technical feature that you can use to avoid someone trying to extort money from you in VR or AR by threatening you with attack in the real world (“I know where you live in the real world, and I'll burn down your house if you don't pay me \$10,000 worth of VR goods”). There, you will have to rely on normal law enforcement and normal criminal law, subject to the constraints imposed by the Bangladesh problem.

But it's no accident that extortion is not usually seen as a street crime, in the sense of a crime that is generally committed through physical presence (as opposed to through potentially long-distance communication, even absent VR). For a considerable amount of the street crime that has a VR analog, technologically enabled self-protection is a possible protection—and failure to use such self-protection may lead to the police having less sympathy for your plight. Again, we aren't endorsing that position for nontrivial offenses: It is

¹²¹ Henry Jackson & Jonathan Schenker, *Dealing With Harassment in VR*, UPLOADV (Oct. 25, 2016), <http://uploadvr.com/dealing-with-harassment-in-vr/> [<https://perma.cc/F633-QZ79>].

¹²² *Id.*

¹²³ See *infra* notes 131–148 and accompanying text.

not the way we approach (or at least ought to approach) serious crimes in the real world. But we think it is likely how the police will instinctively respond.

7. AR Crimes that Can't Be Easily Technologically Avoided—Startling

Finally, let's note one crime that is especially likely to be dangerous in AR: deliberately or recklessly startling someone in a way that's likely to dangerously interfere with his physical-world tasks.

Say I know that you're driving with your AR set engaged, and I deliberately appear in your field of vision—not just as me, but as a giant, loud, fire-breathing dragon (or perhaps as a very attractive naked person). Or perhaps I happen to know that you have a fear of spiders, so that's the avatar I choose, in an attempt to startle you.¹²⁴ You are indeed startled and get into an accident. Perhaps I did so as a stupid prank—the equivalent of shouting “Look out! Snake!” at a jogger. Or I released malware that does this automatically.¹²⁵ Or maybe I even did so in hopes of harming you.

Doing so could conceivably be assault if I intentionally put you in fear of bodily harm.¹²⁶ It may also be a crime, such as reckless endangerment,¹²⁷ or negligent homicide or involuntary manslaughter if someone dies.¹²⁸ (In principle, this might happen even in VR, but the risks are greater when people are using AR, which they might do even when driving or walking down a busy street.¹²⁹ People immersed in VR games may be more

¹²⁴ See, e.g., U. OF WASH. TECH POLICY LAB, AUGMENTED REALITY: A TECHNOLOGY AND POLICY PRIMER 7 (2017), http://techpolicylab.org/wp-content/uploads/2016/02/Augmented_Reality_Primer-TechPolicyLab.pdf [<https://perma.cc/ZU7L-ZQHE>] (discussing a prank in which a spider is digitally superimposed onto someone's hand using AR).

¹²⁵ For a discussion of this problem and how to solve it, see Kiron Lebeck et al., *Securing Augmented Reality Output*, in IEEE SYMPOSIUM ON SECURITY AND PRIVACY 320, 321-24 (2017).

¹²⁶ That is clearest when the startling is aimed at making the target feel momentarily “in fear of imminent serious bodily injury,” MODEL PENAL CODE § 211.1(1)(c) (AM. LAW INST. 1980). But it might be so, at least in some states, even if it is just “intended to place another in fear of immediate physical contact which will be . . . insulting[] or offensive, coupled with the apparent ability to execute the act.” IOWA CODE ANN. § 708.1(2)(b) (West 2013). The question would be whether a visceral fear of immediate contact should qualify even if, on a moment's reflection, the target would realize that the “apparent ability to execute the act” was purely apparent and not real.

¹²⁷ MODEL PENAL CODE § 211.2 (criminalizing “engag[ing] in conduct which places or may place another person in danger of death or serious bodily injury”).

¹²⁸ MODEL PENAL CODE § 210.4.

¹²⁹ See Franziska Roesner, *Security & Privacy for Augmented Reality* (PowerPoint deck 2017, on file with authors) (giving example of a giant spider projected onto a car's augmented reality display); see also Franziska Roesner, Tadayoshi Kohno & David Molnar, *Security and Privacy for Augmented Reality Systems*, 57 COMM. ASS'N FOR COMPUTING MACHINERY 88, 91-92 (2014) (discussing this and other AR security problems in more detail); Lebeck et al., *supra* note 125, at 320 (describing how a “malicious or buggy AR application could potentially obscure real-world pedestrians, overlay misleading information on real-world road signs, or occlude the virtual content of other AR applications, such as collision warnings or other important safety alerts”).

conditioned to surprises, just as they are in a 3D movie.) And the behavior can be tortious, especially if it leads to physical injury.

More likely than virtual spiders are virtual pop-up ads. Companies will have a strong financial interest in placing advertising in your AR space, and AR makers will have a financial interest to let them do so for a fee. That isn't problematic in itself. But if you are logged into a data feed in your AR while driving and the system pops up a huge ad that covers your screen, it may cause you to get into an accident.

This would be one of the few scenarios—strobe lighting being the other—which could actually cause physical injury. And it is also not easily avoided through technological self-protection measures.

But as a practical matter, this is likely to be a special case of the broader problem: AR can be distracting, especially for drivers¹³⁰ but also for people walking near traffic and other hazards. AR designers will have to find some way of dealing with such normal incidental distractions; that might likewise be useful for dealing with deliberate but much more unusual distractions. If they don't—if they pop up ads that block my view of the road—they are likely to face tort liability, though probably not criminal liability except in unusual circumstances.

B. *Diversity of Sensescape*

Technological self-protection options, if properly designed, can do more than just make it unnecessary for police to intervene—such options can make possible a broader diversity of VR environments from which users can choose. Indeed, they can make it possible to have a broader diversity of experience within the same environment.¹³¹

Consider the indecent exposure hypothetical. Some people may like being in an environment where some of the avatars they see are naked, or where they themselves come across as naked. They might be consciously seeking titillation. But they may also want realism, for instance if they are engaged in VR tourism to a nude beach.

Or they may want fantasy, if they want to visit a fictional world where nudity taboos are absent (or are different), or where mythical but part-human creatures (think satyrs or centaurs or mermaids) are normally nude. Or they may be nudists,

¹³⁰ Stephen Williams, *As Head-Up Displays Become Common, Distraction Becomes an Issue*, N.Y. TIMES (Sept. 10, 2015), <https://www.nytimes.com/2015/09/11/automobiles/as-head-up-displays-become-common-distraction-becomes-an-issue.html?mtrref=www.google.com> [https://perma.cc/WA5Y-K3X5].

¹³¹ See Jaclyn Seelagy, *Virtual Violence*, 64 UCLA L. REV. DISC. 412, 430-32 (2016).

who feel more comfortable coming across as naked, and being around other people who do the same. Or perhaps they support nudity as a political statement.¹³²

Leaving the policing of nudity taboos to each VR environment—or perhaps to each user in a VR environment—can increase people’s options. Some people will go to the nudist environments; others will go to nonnudist ones.

But beyond that, if the technologically enabled self-protection measures are available, different users will be able to have different experiences in the same VR environment. Those who like casual nudity could see nudists’ avatars as nude. Those who dislike it could see the same avatars as clothed. So even if you need to be in a particular VR environment (for instance, because your job so requires), you could experience that environment without the nudity.

To be sure, some people have moral objections even to voluntary nudity; consider the public nudity laws that ban nudity even in strip clubs.¹³³ But we think these objections should not be particularly strong. Even if bans on consensual public nudity are constitutionally permissible, we doubt that they are good policy; it’s better, we think, to live and let live on such matters, leaving people free to choose from a diverse range of environments and a diverse range of options in each environment—so long as they are participating in the environment voluntarily.¹³⁴

The de facto legal toleration of nearly all online pornography throughout the U.S., even of pornography that is likely theoretically punishable as obscenity, supports our view. At least on the Internet, the Sexual Revolution is over, and sex won: Where the sex is entirely online, without bricks-and-mortar stores that are seen as potentially attracting bad elements, it is generally tolerated.¹³⁵ And if the toleration stems from difficulty of enforcement as much as from thoroughgoing acceptance, that would apply at least as much in VR as well.

The strobe example likewise shows how technologically enabled self-protection can promote diversity of sensescape. Some people like strobe

¹³² See, e.g., *Tagami v. City of Chicago*, 875 F.3d 375, 379 (7th Cir. 2017) (concluding that the Free Speech Clause doesn’t protect such a statement).

¹³³ See *Barnes v. Glen Theatre, Inc.*, 501 U.S. 560, 563-64, 572 (1991) (upholding such a law).

¹³⁴ Among other things, there will doubtless be plenty of VR spaces, including foreign-hosted ones, where one can appear nude among consenting fellow users; any attempt to protect people’s morals from being degraded by presence in such spaces seems doomed, at least in modern society. The better questions are whether (and how) potentially offended viewers should be protected. Many people will likely feel strong social or professional pressure to participate in various VR environments. But we don’t expect that there will be similar pressure against using this sort of sensescape-altering software, a choice that might generally be hidden from everyone but the user.

¹³⁵ Jennifer Kinsley reports that obscenity prosecutions have continued to occasionally arise; but the list of prosecutions gathered there involves almost exclusively offline distribution, suspected child pornography, or, in a very few instances, commercial distribution of online porn that is seen as unusually offensive (such as depictions of rape or bestiality). And even those rare prosecutions appear not to have made much of a dent in the volume of pornography available online. See generally Jennifer M. Kinsley, *The Myth of Obsolete Obscenity*, 33 CARDOZO ARTS & ENT. L.J. 607 (2015).

lighting, for aesthetic reasons. It's also a good way of getting people's attention for things like alarms, especially for the hard of hearing.¹³⁶ And epileptic seizures can be triggered by other near-strobe effects that are likewise valuable for aesthetics or for verisimilitude.¹³⁷ Giving people an option to decide whether to block or allow strobe effects will maximize the number of possible virtual environment designs, while maximizing the virtual environments' accessibility to the small minority that suffers from epilepsy as well as the majority that doesn't.¹³⁸

Finally, though more controversially, diversity of options may be relevant even for sexual touching. We assume very few people want to be groped by strangers. But people's preferences when it comes to sexual (and sexualish) matters are notoriously diverse, and often unexpected to those who don't share the preferences. And that is especially so when the sexual behavior is relatively low-risk for the target: not sex in the absence of clearly communicated consent; not even physical groping in the absence of clearly communicated consent; but the visual perception of gestures that appear similar to what physical groping would look like in the real world.

There might be VR spaces where people go to meet prospective sexual partners (whether for in-person sex or for the VR equivalent of phone sex) in which such behavior is accepted. Likewise, there might be VR games in which this behavior is allowed. This could be for verisimilitude: If you're playing a game set at the Bristol docks in 1750, you might want rude behavior, and the reactions to the behavior, to be part of the gameplay. Or it could be for titillation: We can imagine that some people might fantasize about rough or nonconsensual sex and enjoy the fantasy even though they wouldn't enjoy the

¹³⁶ See, e.g., *Hearing Impaired Smart Strobe Light*, FIRST ALERT STORE, <http://www.firstalertstore.com/store/products/sl177-hearing-impaired-smart-strobe-light.htm> [<https://perma.cc/74EK-T4N5>] (advertising a strobe light "that's proven to be extremely efficient in providing assistance for individuals with hearing impairments").

¹³⁷ See *Photosensitivity and Seizures*, EPILEPSY FOUND., <http://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures> [<https://perma.cc/B7YZ-RJSP>] (identifying "[n]atural light, such as sunlight, especially when shimmering off water, flickering through trees or through the slats of Venetian blinds," "[t]elevision screens or computer monitors due to the flicker or rolling images," and "[c]ertain visual patterns, especially stripes of contrasting colors" as potential triggers).

¹³⁸ The Global Public Inclusive Infrastructure project has challenged developers to create a "Photosensitive Seizure—Monitor and Block Tool" which would "create a piece of software that can be installed in a display monitor (or box connected to a display) that will a) monitor the signal coming in to the display, b) detect visual events that are known to trigger a seizure, and c) alter the signal to remove that stimulus." *Photosensitive Seizure—Monitor and Block Tool*, GPII, <https://ds.gpii.net/challenges/photosensitive-seizure-monitor-and-block-tool> [<https://perma.cc/X67A-F5D6>].

physical experience;¹³⁹ a VR version may provide those people with the right combination of realism and fantasy.

Of course, most people, like Belamire, won't want to be virtually groped.¹⁴⁰ But the value of technologically enabled self-protection in VR environments is precisely the possibility that people can control their environment and consent to only what they want.

Unlike many spaces in VR that people enter just for fun, people may have no choice but to use VR at their job or at school. Workers shouldn't have to put up with indecent exposure or sexual groping in their virtual workplace any more than in their real workplace. Here too the ability to control the terms of interaction has the potential to make things better in the virtual than the real world. If you work in an online environment in which many customers' avatars are nude, and you don't like to see that, a properly designed VR environment may allow you to block such nudity even while other employees or customers—who may like such nudity—can see it.

Indeed, you may be able to do the same with avatars whose clothing bears messages that you find offensive (either because of the viewpoints expressed on it, or because of its vulgarity), or with avatars that aren't nude but are dressed in ways that you find immodest. In the physical world, many employees have to deal with such offensive imagery, even in places where outright nudity is illegal; but if the VR environment is designed to allow diversity of sensescape for each individual participant, they may have much more control of what they see or who can touch them. (To be sure, in some situations, it is their employers that will have that control, which may not amount to the same thing;¹⁴¹ but often it will make sense for the employers to leave such choices to employees, since that could be a good way to preserve morale and avoid complaints, usually at little cost to the employer.)

Technological self-help remedies, and their ability to change your audiovisual sensescape, generally work only where the asserted harm is itself audiovisual. If the harmful thing is that you have to see nude customer avatars, the technological self-help (the dress-up-the-avatar feature) will prevent that harm, even if you're an employee and have to be there. But if the harm stems from something external to your perception, as when someone libels you, or from the very knowledge that people are spreading rumors about you, see themselves groping you (even if you don't see it), and so on, then your ability to control your audiovisual sensescape doesn't suffice. Criminal law may come

¹³⁹ See, e.g., Leon F. Seltzer, *Don't Call Them "Rape Fantasies"*, PSYCHOL. TODAY (Nov. 5, 2014), <https://www.psychologytoday.com/blog/evolution-the-self/201411/don-t-call-them-rape-fantasies> [<https://perma.cc/K8AG-MX88>].

¹⁴⁰ See *supra* notes 112–113.

¹⁴¹ This control over the employee's lived experience might or might not satisfy us. We discuss that issue in more detail *infra* Part IV.

to reflect this, not punishing purely audiovisual misconduct that could instead be controlled by users' ability to control their own sensescape, but punishing misconduct for which such control is seen as inadequate.

C. Defaults and the Initial Intrusion

Diversity of sensescape is an adequate substitute for a one-size-fits-all prohibition only when the participants can meaningfully choose the sensescape they experience and give real and informed consent to that sensescape. Walking into a general interest game or other VR environment isn't consent to be sexually assaulted; taking a job or going to school certainly isn't. Such conduct should be impermissible outside of spaces where it is clearly a part of the game and people understand what they are getting into. And that leads us to the problem of defining the defaults.

If we set the default as freedom to interact, all the self-protection tools involve the likelihood that people will often be exposed to misconduct—such as loudness, public nudity, or virtual groping—once, or perhaps once per offender, before they block the misconduct. To be sure, potential victims might be able to prevent some of the misconduct at the outset, with the proper configuration, but practically they will often not think about it until the first incident. The tools that will likely be available thus may allow what one might see as an initial intrusion, but can stop recurrences.

Should that be considered acceptable? Or should the criminal law try hard to prevent even the initial intrusion? Recall Justice Stevens' specific analogies:

To say that one may avoid further offense by turning off the radio when he hears indecent language is like saying that the remedy for an assault is to run away after the first blow. One may hang up on an indecent phone call, but that option does not give the caller a constitutional immunity or avoid a harm that has already taken place.¹⁴²

And indeed the law generally forbids unwanted physical “blow[s]” (though not all unwanted touching) and all indecent telephone calls, including the initial call.¹⁴³ On the other hand, the law doesn't forbid unwanted indecent mailings—rather, it lets residents demand that the mailer stop sending them offensive material.¹⁴⁴ Likewise, the law can't categorically forbid door-to-door leafleters from coming to your home, though it can forbid

¹⁴² FCC v. Pacifica Found., 438 U.S. 726, 748-49 (1978).

¹⁴³ 47 U.S.C. § 223 (2012).

¹⁴⁴ See Rowan v. U.S. Post Office Dep't, 397 U.S. 728, 737 (1970).

them once you've put up a "No Soliciting" sign.¹⁴⁵ And many, including us, don't think *Pacifica* is a shining beacon of First Amendment jurisprudence.¹⁴⁶

Alternatively, we could define the default interactions in VR in more limited ways, and require people who want to engage in certain kinds of conduct (nudity or sexual contact, but also perhaps the exchange of money or personal information) to jointly opt into allowing such interaction in individual cases.¹⁴⁷ That would reduce the freedom to interact with strangers, but it would also reduce the harm strangers can do. And if the interaction is one that is out of the norm between strangers, such as indecent exposure or sexual touching, a default norm of exclusion seems preferable.

Even in circumstances where people can practice self-protection once a threat is identified, then, the law can and should set defaults. A virtual environment could be configured to permit strobing except for those who opt out, or to forbid strobing except for those who opt in. Likewise for showing nude avatars, or allowing physical approaches within some distance. The law could thus take the view that even an initial intrusion of this sort is a crime unless (1) the environment forbids the intrusion by default and (2) the user has expressly allowed the intrusion. This might mean that:

¹⁴⁵ See *Martin v. City of Struthers*, 319 U.S. 141, 147-49 (1943).

¹⁴⁶ See *FCC v. Fox Television Stations, Inc.*, 132 S. Ct. 2307, 2321 (2012) (Ginsburg, J., concurring); *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 533 (2009) (Thomas, J., concurring). Indeed, Justice Stevens himself erred in trying to explain how *Pacifica* was consistent with his more recent opinion in *Reno v. ACLU*, 521 U.S. 844 (1997). "Unlike the regulation[] upheld in . . . *Pacifica*," Justice Stevens wrote, "the scope of the [Communications Decency Act] is not limited to commercial speech or commercial entities." *Id.* at 877. But the *Pacifica* regulation was not limited either to commercial speech or to commercial entities; the broadcast in *Pacifica* itself was noncommercial speech carried by a nonprofit, noncommercial radio station. *In re Application of Pacifica Found.*, 50 F.C.C.2d 1025, 1025 (1975) (describing *Pacifica* as "the licensee of noncommercial educational FM Stations" including "WBAI, New York"); see also *In re Citizen's Complaint Against Pacifica Foundation Station WBAI (FM)*, 56 F.C.C.2d 94, 95 (1975), *aff'd sub nom.* *FCC v. Pacifica Found.*, 438 U.S. 726 (1978) (confirming that the broadcast was indeed on WBAI). This helps show, we think, how hard *Pacifica* is to reconcile with modern First Amendment law.

¹⁴⁷ We might even imagine automating that process, so that each avatar had a customizable set of defaults that permitted some sorts of interactions and automatically refused others.

If the environment lets you supply both a clothed avatar and a nude avatar, and by default has others only see your clothed avatar,	then there's no indecent exposure even when you create a nude avatar, since only people who have affirmatively chosen the see-nudity option will see the nude avatar.
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If the environment lets you supply both a clothed avatar and a nude avatar, but by default lets people see the nude avatar,	then you're guilty of indecent exposure for using a nude avatar, since people are entitled to be shielded from even the initial intrusion of nudity into their visual field.
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If the environment only lets you supply one avatar, but allows a "clothe this avatar" feature on an avatar-by-avatar basis,	then you're likewise guilty of indecent exposure for using a nude avatar.
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Alternatively, the law could take the view that certain initial intrusions aren't a big enough deal to justify criminal punishment, so long as they can be quickly dealt with by the offended user. That might be true of disturbing the peace, for instance; only after someone is warned about their behavior and persists are they likely to be arrested. Or the law could take the view—which would yield the same result, though on a different rationale—that the decision to enter the VR environment is consent enough to such quickly-dealt-with initial intrusions like disturbing the peace, even when entering the VR environment may be required by your desire to access important resources (your VR job, your VR educational program, your access to VR shops).

We're inclined to think that, so long as the initial intrusion is relatively minor and can be quickly stopped through technological self-protection, and so long as the user is there voluntarily, there's no need to bring the machinery of the criminal law into the matter. (Tort and employment law might be a different story.) More serious intrusions, by contrast, require advance consent. And some intrusions might be unlawful even with consent.¹⁴⁸

¹⁴⁸ Some rare intrusions might be unlawful even with consent, especially if they involve haptics or algics. See *infra* Section II.E. For instance, the law may punish commercial sexual contact using haptics as prostitution (setting aside the question whether it is wise to criminalize prostitution). Similarly, the law may forbid transactions in which, for instance, debtors promise to be periodically put in serious pain using VR algics until they pay off the debt.

But this judgment will often turn on just what intrusions the law thinks are minor enough: Unwanted noise? Nudity? Strobe lights? Virtual groping? We have views on the relative severity of these—the law should prohibit virtual groping without explicit prior consent, but not unwanted noise; nudity should depend on the context—but reasonable voters and legislators can differ about where to draw the line. And these questions will become especially complicated once we get to VR environments that go beyond the merely audiovisual, a matter we will turn to below.

D. *Beyond the Audiovisual: Haptic Assault*

So far, we've talked about harms that can be caused by the audiovisual features of VR—the only features that are well-developed now. But let's now turn to features that VR is likely to acquire soon: haptics.¹⁴⁹

Haptics are to touch what optics are to sight. Existing 2D games have very simple haptics: a Playstation DualShock controller that vibrates when you drive over bumps or run into something, for instance. But the immersive nature of VR can offer quite a bit more.

Gloves that reproduce sensation on fingers are haptics. So are temperature controls that can make VR tourism more realistic. So are devices that could cause feelings of physical resistance, so that a virtual swordfight would yield realistic sensations when your virtual sword hits your virtual opponent's. And one can also embed haptics and remote control into sex aids, a technology called teledildonics.¹⁵⁰

Teledildonics raises the possibility of haptic sex crimes, which might trouble us even more than virtual groping because of the heightened realism associated with physical sensation. Unconsented-to sexual touching is a serious offense, and should be so even if the person doing the touching is not in the room with you. True, some people may be less troubled by unwanted remote fondling through their haptic interfaces than by unwanted in-person fondling. But we think it likely that people will be justifiably upset enough by such unwanted touching that it would merit punishment.

Similar issues come up outside of sex. Say some people enjoy a particular game that's supposed to simulate a dangerous physical activity (battle, mountain climbing, flying an airplane), but are frustrated that death or injury in the game has no real consequences. They think it makes themselves and other players reckless and distorts the game's realism. Playing poker for

¹⁴⁹ *Getting to Grips with Haptic Technology*, VIRTUAL REALITY SOC'Y, <https://www.vrs.org.uk/virtual-reality-gear/haptic/> [<https://perma.cc/D88N-LF42>] (describing how haptics technology “has the express purpose of stimulating the sensation of touch” and noting that haptics “are sure to be a major part of . . . future virtual reality experiences”).

¹⁵⁰ Yes, that really is what it's called. And no, we aren't going to give you a link to find out more.

matchsticks, it is often said, isn't the same as real poker. Likewise, playing at sword fighting when being stabbed through the neck just means "Game Over" or "restart from base camp" isn't, they think, as realistic as it should be.

So they think that players ought to have skin in the game, as it were: Certain events should trigger something bad—not death (they're not *that* hardcore) but physical pain. Indeed, paintball players sometimes take the view that the painful sting of being hit enhances the game, by making players work harder to avoid being hit, or just by making the game exciting.¹⁵¹ Likewise, some social psychology experiments punish people who lose a game by requiring them to consume an unpleasantly bitter substance, thus encouraging participants to take the game seriously.¹⁵²

Imagine then that a VR setup can have an optional hardware feature: a device that produces an electric shock that is not dangerous but is painful. (One might call this "algics" rather than normal haptics.¹⁵³) People who want to play the hypothetical Extreme Swordfighting must have the device attached, and when they are hit with the virtual sword, they get a real shock.¹⁵⁴ Here, unlike in our previous examples, we do have actual physical contact with the victim's body, though triggered at a distance rather than by someone standing next to you.

So long as the shock really doesn't pose any serious physical danger, causing the shock by hitting someone in-game wouldn't be battery. Battery generally requires nonconsensual touching, at least so long as it doesn't involve a public fight that risks spreading, or serious physical damage that goes beyond mere pain. This is why a wide variety of often painful activities, from football games to mild sadomasochism, are legal.¹⁵⁵ And you consented

¹⁵¹ See, e.g., *How to Treat Paintball Welts*, AC PAINTBALL (Apr. 22, 2015), <https://acpaintball.com/2015/04/22/how-to-treat-paintball-welts/> [<https://perma.cc/KY3V-9EUZ>] ("Most players consider paintball well worth the risk of pain, some even welcome the risk to increase the adrenaline and excitement.").

¹⁵² See, e.g., Don L. Coursey et al., *Fear and Loathing in the Coase Theorem: Experimental Tests Involving Physical Discomfort*, 16 J. LEGAL STUD. 217, 223 (1987).

¹⁵³ -*algia* is the Greek root meaning pain, as seen in words such as "analgesic."

¹⁵⁴ Cf. 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/> [<https://perma.cc/P56W-BYEG>]; Seelagy, *supra* note 131, at 418 ("[P]ain is just another sensation that can add to the realism of a[] [virtual reality] environment or experience, and there may be reasons for at least mild forms of it.").

¹⁵⁵ See, e.g., MODEL PENAL CODE § 2.11(2) (AM. LAW INST., Proposed Official Draft 1962) (providing that consensual conduct is not criminal, even if "it causes or threatens bodily injury," if "the bodily injury consented to or threatened by the conduct consented to is not serious," or "the conduct and the injury are reasonably foreseeable hazards of joint participation in a lawful athletic contest or competitive sport or other concerted activity not forbidden by law"). But see *Commonwealth v. Carey*, 974 N.E.2d 624, 630-31 (Mass. 2012) (concluding that sadomasochism that risks causing more serious injury remains punishable assault, even when consensual); *Govan v. State*, 913 N.E.2d 237, 242-43 (Ind. Ct. App. 2009) (likewise).

to be hit by a virtual sword—or at least to run the risk of being hit.¹⁵⁶ By contrast, triggering the haptics outside the game—for instance by hacking someone's VR rig to give them a surprise electric shock—presumably would be nonconsensual.¹⁵⁷

So far, so good. But consent in a virtual world has some nuances that we might not expect, as we see in the next Section.

E. Consent

Say that you're playing a game, whether VR or not. One of your fellow players steals some of your in-game currency, embezzles it, or defrauds you of it. That theft can have real-world financial consequences. In-game currency can often be bought and sold for real money, and you can even imagine a system in which your in-game assets are replenished, when needed, directly from your bank account or credit card. Indeed, many games have currency top-up systems that let players put real money in and convert it to virtual money when they run out.¹⁵⁸

One way to steal virtual money (or a magic sword, or anything else of value) would be to hack into your computer, or physically threaten you in the real world. That sort of behavior should be criminal, though of course it isn't easy to get police attention for violations of computer crime laws—or even for thefts conducted through such violations—at least unless the crimes cause substantial financial loss.¹⁵⁹

But our hypothetical player didn't hack into anyone's computer or do anything else that was outside the understood possibilities of the game (whether or not it was against the ostensible laws of the society set forth in

¹⁵⁶ We're assuming here that this is only a game, so if you don't like it, you don't have to play it. If an employer required employees to accept painful shocks, for instance as punishment for poor performance and thus as an incentive to do better, the analysis may well be different. (What happens if you are making money this way, for instance by being a competitive Extreme Swordighting player, is a more complicated matter. We suspect it will be decided chiefly by the relevant leagues—much as the NFL and professional boxing have dealt and are dealing with the more serious risks involved in those sports—subject to legislative or Occupational Safety and Health Administration oversight, as well as public pressure.)

¹⁵⁷ Of course, if the algic device malfunctions and provides more painful shocks than anyone expected—or causes electrocution, burns, or other lasting physical injuries—then the manufacturer and seller of the device could be sued on a standard product liability theory. But we set aside such malfunction-based claims here and focus on functioning that is intended by one player, and understood by players generally as part of the game.

¹⁵⁸ See, e.g., Hayley Tsukayama, *Diablo 3 Auction House to Charge Real Money for In-game Goods*, WASH. POST (Aug. 1, 2011), https://www.washingtonpost.com/blogs/faster-forward/post/diablo-3-auction-house-to-charge-real-money-for-in-game-goods/2011/08/01/gIQAIIzTnI_blog.html [https://perma.cc/Y9NN-RT7E].

¹⁵⁹ Kristina Davis, *Why Cybercrime is So Hard to Investigate*, COMPUTER CRIME RES. CTR. (Dec. 29, 2015), <http://www.crime-research.org/articles/4002/> [https://perma.cc/7VVD-GV7S].

the game). Rather, he just cut off your (virtual) purse and ran off with it. Or he threatened to have his character kill your character if you didn't give him the money. Or you opened your virtual safe to let him take 10 gold pieces, and he used the access to take 1000.

Games sometimes permit such actions. If I fight your character and win, I may be able to loot his body. That sort of looting, if it is "theft" at all, is theft contemplated by the rules of the game. By playing the game I accepted the risk that I might lose virtual currency to an enemy, just as I consented in the sword fighting algis scenario¹⁶⁰ to the possibility that I would feel pain as a result of being hit by a virtual sword.

But now let us assume that what my thief did violates the rules of the game itself. Should that be a crime from the perspective of American law? Or should it be just one of the things that happens in the wolf-eat-wolf world that is *Game of Thrones: The Game*?¹⁶¹ Indeed, might it be a valued gameplay feature, which helps create verisimilitude, extra strategic options, and emotional tension? What kind of goody-goody nonsense would *Game of Thrones: The Game* be if all players actually had to follow Westeros law?

Maybe the remedy for such theft within the game would be an attempt to launch an in-game criminal prosecution, under whatever rules the game environment allows. (Perhaps trial by combat?) Or maybe such thefts would be deterred by the threat of blood feud, or of magical or divine retaliation, all within the game. Just as the possibility of broken treaties is a valuable feature of games such as *Risk*, *Diplomacy*, and *Machiavelli*,¹⁶² the possibility of theft may be a valuable feature of other games.

One way of conceptualizing this is that playing a computer game (VR or otherwise) might by default amount to consent to everything that *could* physically happen within the game, whether or not it is *legally allowed* within the game. This has been labeled the "magic circle" excluding real law from virtual worlds.¹⁶³

A game could announce that it is departing from the default. For instance, gamers are often frustrated if their opponents use bots or cheat codes to

¹⁶⁰ See *supra* Section II.D.

¹⁶¹ See GAME OF THRONES: THE GAME, [http://www.gameofthrones-rpg.com/\[https://perma.cc/4D7Q-9CZY\]](http://www.gameofthrones-rpg.com/[https://perma.cc/4D7Q-9CZY]). We're not sure whether outright theft is currently physically possible in *Game of Thrones: The Game*; but if it isn't, it should be.

¹⁶² Another game for which legally mandated honesty would be a ridiculous policy.

¹⁶³ See Joshua A.T. Fairfield, *The Magic Circle*, 11 VAND. J. ENT. & TECH. L. 823, 825 (2009) ("The thrust of the magic circle metaphor is that actions that occur within virtual worlds are not real, and thus cannot be sanctioned using real-world law. Following this reasoning, real-world law is appropriately left out of virtual worlds."); Mark A. Lemley, *The Dubious Autonomy of Virtual Worlds*, 2 U.C. IRVINE L. REV. 575, 578 (2012).

circumvent the limitations under which everyone else operates.¹⁶⁴ If game makers ban the exploits,¹⁶⁵ players could presumably have a civil cause of action against a cheater—or could even call for a criminal prosecution of the cheater—just as they could pursue a computer hacker who took valuable data off their laptops. And many games in fact do ban hackers and bots, presumably because they think their players want a level playing field in some respects.

But a rule that violations of in-game laws must be dealt with, if at all, using in-game justice (formal or otherwise) seems to us a sensible default for many games. At least it should be an option, and if it is given as an explicit option, it will be one that many games are likely to choose.¹⁶⁶

Yet VR involves more than just games. Some environments, including some VR environments, are likely to be used for straight-up commerce, where people shouldn't have to expect cheating, and where our legal system should prohibit cheating. "Sure, my store is an elaborate fraud—we goblins are notorious tricksters, and widely known within Middle Earth to be evil" may be an acceptable explanation for a "let the player beware" response in a game, but it shouldn't apply when the store is part of a normal VR shopping mall.¹⁶⁷

Again, though, the distinction turns, we think, on consent: one consents to more trickery when playing a game than when engaging in normal commerce. Presumably in most cases it will be clear which environment is one and which is the other. But perhaps there might be need for clear statement rules, so that fraud and theft of in-VR resources would be noncriminal only if something is clearly labeled as a "game," perhaps with a requirement that the users specifically acknowledge the possibility of fraud and theft as a condition of playing the game.¹⁶⁸

The existence of haptics and algics might also change the calculus. Return to our example of virtual swordfighting, but now assume that someone deliberately violates the rules of the game to inflict more pain than the rules allow.

Say, for instance, that one of the rules of Extreme Swordfighting is that you don't hit someone who is already labeled as dead or disabled, or someone who has surrendered. But say that you keep hitting me after I'm down, inflicting five shocks

¹⁶⁴ See, e.g., Abby Ohlheiser, *'World of Warcraft' Halted an Army of Cheaters with a Massive Player Ban*, WASH. POST (May 15, 2015), <https://www.washingtonpost.com/news/the-switch/wp/2015/05/15/world-of-warcraft-halted-an-army-of-cheaters-with-a-massive-player-ban/> [<https://perma.cc/TY2S-3X8W>].

¹⁶⁵ *Id.*

¹⁶⁶ F. Gregory Lastowka & Dan Hunter, *Virtual Crimes*, 49 N.Y.L. SCH. L. REV. 293, 305-07 (2004).

¹⁶⁷ See Fairfield, *supra* note 163, at 834 (arguing that virtual property shouldn't be outside the scope of real-world laws); Lastowka & Hunter, *supra* note 20, at 29 (same).

¹⁶⁸ See GREG LASTOWKA, *VIRTUAL JUSTICE: THE NEW LAWS OF ONLINE WORLDS* 12-14 (2010) (noting the risk of theft in virtual environments and the ways in-game rules might deal with it).

in succession rather than the officially allowed one. I'm very upset by your deliberately sadistic behavior, and I try to have you prosecuted.¹⁶⁹

As with the theft in the previous subsection, one possible reaction is that this is a crime: I have consented only to those shocks that are within the rules of the game. You have violated the rules, and thus exceeded the consent.

But another possible reaction is that I've consented to a broader range of behavior: by playing the game with my shocker enabled, I have consented to anything that you can do (at least short of serious physical injury) with that shocker. Indeed, the possibility of cheating may be an understood part of the game.¹⁷⁰

Here too self-protection may play a role. Algic devices, such as the electric shockers, will likely come with an easy override, and may even be programmable to (for instance) limit the shocks to no more than one every ten seconds, so one will have the time to engage the override. Manufacturers would have lots of incentive to provide such features and tout them to users.¹⁷¹

And if you play a game in which repeated shocks are possible, and don't engage any override that blocks such shocks, that itself might be seen as consent to the shocks, even when the shocks violate the internal game rules. If you don't like it, shift to a different setting. This will make it possible for you to enjoy more self-protective gameplay, while others can enjoy more transgressive gameplay—again, diversity of sensescape.

In principle, sexual haptics have some similarities to algics and to other haptics. One doesn't have to place haptics on one's erogenous zones, or to enable them even if one has them, just as one doesn't have to have algics, or to turn on the algics. (VR and AR are better that way than real reality is: Our bodies have biological haptic and algic interfaces that are accessible to passersby, whether or not we want to turn them on.)

At the same time, if one walks into a party with one's haptics turned on, one might be expecting—as in the real world—that one's lover would feel authorized to, say, covertly rub one's thigh, but that a stranger would not. And because unauthorized sexual touching is much more intrusive and offensive than even unauthorized pain in a swordfighting game, there is good reason to require overt opt-in before sexual touching (though again recall that this

¹⁶⁹ Cf. *R. v. McSorley*, [2000] BCPC 0116 (Can. B.C.) (finding an NHL player guilty of criminal assault for slashing his opponent in the head with his hockey stick during a game).

¹⁷⁰ Not all physical fouls in sports, for instance, are treated as assault. "[T]he consent defense [to a charge of criminal assault] is not limited to conduct within the rules of the games, rather it is to the conduct and harm that are the reasonably foreseeable hazards of joint participation in an athletic contest . . ." *State v. Shelley*, 929 P.2d 489, 490, 492 (Wash. Ct. App. 1997) (citing MODEL PENAL CODE § 2.11 cmt. 2 (AM. LAW INST., Official Draft and Revised Comments 1995) and ROLLIN M. PERKINS & RONALD M. BOYCE, CRIMINAL LAW 154 (3d ed. 1982)).

¹⁷¹ The manufacturers may well set the low-shock option (such as no more than one shock per ten seconds) as a default, though there may be some pressure among players to disengage the default in order to show how hard-core one is.

touching will be felt only if one attaches haptics to those parts of one's body). Indeed, it's possible that under existing criminal laws prohibiting unwanted sexual touching, such triggering of another's haptics might already be a crime: much depends on whether courts would be willing to treat such technologically intermediated behavior as tantamount to "touching."

These questions, of course, are already famously contested and complex in the real world. We expect them to be similarly disputed in VR and AR as well, especially when one moves away from the pretty clear taboos (you don't touch someone's genitals unless there are strong indications of consent) to borderline questions (When is it OK to kiss someone? To caress someone's butt when dancing?).

At this point, without more knowledge about how sexual haptics are likely to be used, we're not sure what the right answer will be. The ability to define default consent in software can make VR safer than the real world—for instance, well-designed software may let me consent in advance to certain types of touching but not others, or touching by some people but not others, and touching that isn't consented to won't even be felt. The question that remains is to what extent, if at all, we should view it as the victim's job to set software consent boundaries; more on that below.¹⁷²

F. *Consent and Impersonation*

Consent in the physical world—to sex, to hitting, or to fraud—presents a variety of legal issues. But VR and AR add a couple of new twists. The first, which we raised above, is that consent can always change with the environment (game-playing vs. shopping, for instance), and people may switch virtual environments more often than physical environments.

A second way VR complicates the picture, though, is that identity is malleable. If I convince someone to have (virtual) sex with me by pretending to be her boyfriend, that too seems like something at least tort law would be inclined to punish. In the physical world some states treat physical sex by impersonation as a crime,¹⁷³ but virtual sex may well not qualify because of the absence of physical contact. Might the behavior be actionable as intentional

¹⁷² See *infra* Section IV.A.

¹⁷³ Compare *Suliveres v. Commonwealth*, 449 Mass. 112, 118 (2007) (holding that sex by impersonation is not rape), with CAL. PENAL CODE § 261(a)(5) (West 2018) (treating sex as rape when the victim "submits under the belief that the person committing the act is someone known to the victim other than the accused, and this belief is induced by any artifice, pretense, or concealment practiced by the accused, with intent to induce the belief").

infliction of emotional distress?¹⁷⁴ Perhaps the tort of battery, on the theory that the consent defense is made unavailable because of the fraud?¹⁷⁵

Here, too, the possibility of technological self-protection might mitigate some of the harm. In a world in which people can change their appearance at will, experienced VR users will learn not to assume that we are who we say we are, merely based on our avatars' names (TaylorSwift? JaneSmith?) and appearance. So before handing over money (or engaging in sex) you will probably want to verify that your prospective partner is who he or she appears to be, perhaps with a shared password or some sort of persistent actual identity.

But not all VR environments will want to require people to disclose their real identities, just as some but not all web pages have "real name" policies. So the law may want to police cases of intentional misrepresentation, at least when there are significant consequences at stake. And, subject to the Bangladesh problem, identity fraud that yields sufficiently serious losses may be one of the acts in which the default legal rule doesn't give the perpetrator one free pass.

III. TORT, INTELLECTUAL PROPERTY, AND VR/AR PROVIDER LIABILITY

A. *Direct Tort Lawsuits Against Offenders: The Causes of Action*

So far, we've been talking chiefly about criminal law; what about tort law? Let us turn first to the direct tort liability of some of the potential offenders we described above.

In theory, such liability might be possible in many of the circumstances we have identified, even if criminal law won't apply. For instance, using strobe lights to deliberately cause a seizure in a person one knows is epileptic is likely at least negligence, and possibly also the intentional tort of "purposeful infliction of bodily harm."¹⁷⁶

For the other scenarios, tort liability would be more of a stretch, but not implausible. Disturbing the peace might be recharacterized as nuisance, at least in a suit brought by "nearby" VR or AR stores whose business is interfered with by the screaming; but, especially as to VR, that would require nuisance law to be modified, for instance by treating VR "places" as tantamount to "uses of land" which nuisance law protects.¹⁷⁷ Nuisance also

¹⁷⁴ See, e.g., RESTATEMENT (SECOND) OF TORTS § 46 (AM. LAW INST. 1965).

¹⁷⁵ See, e.g., *id.* §§ 18, 19 (stating that nonconsensual offensive touching can be battery); *id.* § 892B(2) (stating that consent procured by fraud may be invalid).

¹⁷⁶ RESTATEMENT (THIRD) OF TORTS: INTENTIONAL TORTS TO PERSONS § 104 (AM. LAW INST., Tentative Draft No. 1 2015).

¹⁷⁷ RESTATEMENT (SECOND) OF TORTS § 822 (noting that one is liable for "a private nuisance" only if "his conduct is a legal cause of an invasion of another's interest in the private use and enjoyment of land, and the invasion is either (a) intentional and unreasonable, or (b)

generally requires either long-term interference or especially serious interference;¹⁷⁸ disturbing the peace law punishes even brief incidents.¹⁷⁹

Virtual groping might be treated as intrusion upon seclusion; though it happens in “public” places, the intrusion tort can apply even there, to behavior that is seen as intruding on one’s bubble of personal space.¹⁸⁰ Indecent exposure might qualify as well. Both might also constitute intentional infliction of emotional distress, even in the absence of physical touching, on the theory that they are both “outrageous,”¹⁸¹ though that tort generally requires a showing of severe emotional distress where there is no physical contact.

Tort law can also reach a wide array of conduct that wouldn’t be a crime even in the physical world. Defaming a VR avatar using false factual assertions that injure the avatar’s reputation—and thus make it harder for a person to engage in business and social life using the avatar—should be a tort, even if the avatar is pseudonymous.

One of us has had an extended debate with a well-respected federal judge who believed it was impossible to defame an avatar because avatars weren’t real, so their reputation couldn’t be injured.¹⁸² This “it’s just a game” sense might pervade VR for some time in the courts, in part because most judges are unlikely to be early adopters of VR. But we think such a view is misguided.¹⁸³

And that is true even if the character in question is not “Eugene Volokh” but “Fredo the Bored Panda,”¹⁸⁴ an avatar you made up but use persistently in VR. Persistent avatars, like authorial pseudonyms, can constitute a part of their user’s identity just as much as real names can, and their misuse creates

unintentional and otherwise actionable under the rules controlling liability for negligent or reckless conduct, or for abnormally dangerous conditions or activities”).

¹⁷⁸ *Id.* §§ 821D, 821F cmt. G.

¹⁷⁹ *See, e.g., supra* note 69 and accompanying text.

¹⁸⁰ RESTATEMENT (SECOND) OF TORTS § 652B.

¹⁸¹ *See, e.g., State Rubbish Collectors Ass’n v. Siliznoff*, 240 P.2d 282, 286 (Cal. 1952) (holding that liability for “serious invasions of mental and emotional tranquility” was “clear” when threats to give up a business account “caused defendant to suffer extreme fright”); *Bundren v. Superior Court*, 145 Cal. App. 3d 784, 792 (1983) (finding a question existed as to whether intentional infliction of emotional distress occurred when defendant made telephone calls rudely demanding payment from a person who the caller knew was recovering from surgery); *Esposito-Hilder v. SFX Broad., Inc.*, 665 N.Y.S.2d 697, 700 (N.Y. App. Div. 1997) (holding that allegations of radio talk show describing plaintiff as the “ugliest bride” in a newspaper’s wedding announcement section could support claim for emotional distress); RESTATEMENT (THIRD) OF TORTS: PHYSICAL AND EMOTIONAL HARM §46 (AM. LAW INST. 2012). Reasonable minds could differ over whether virtual groping should be thought to involve “physical” touching, but the conduct might reasonably be viewed as outrageous enough that it shouldn’t matter.

¹⁸² Lemley, *supra* note 163, at 576. No, we won’t tell you who it was. What happens in the hallways outside conferences stays in the hallways outside conferences.

¹⁸³ *Id.*; Lastowka & Hunter, *supra* note 20, at 72-73.

¹⁸⁴ OK, we made that up. But feel free to make it your avatar if you want.

similar problems.¹⁸⁵ Corporations can sue for defamation, because people invest time and money to create reputational capital for the corporation.¹⁸⁶ There's no reason why the same wouldn't apply to a pseudonym that is used to do business, in VR or otherwise—or to one that is used for ordinary life. Surely falsehoods that damaged the reputation of Mark Twain were defamatory even if they didn't expressly mention Samuel Clemens.

The damages to a pseudonym's reputation might be less in many situations than the damages to a real person's reputation, because many pseudonyms have built up less reputational capital, and people can take on new ones with little loss. But they could be quite great in other situations, if—as is true in some Internet circles and will likely be increasingly true in VR—the pseudonym or avatar is better known than the person's name, which might be obscure or even deliberately concealed.¹⁸⁷ Most readers probably couldn't come up with the real name of The Weeknd, but that doesn't mean we couldn't defame him.

B. *Direct Tort Lawsuits Against Offenders: Practicalities (and Impracticalities)*

Tort lawsuits against VR and AR offenders have one important advantage over criminal prosecutions: they are available even when the police are unwilling to intervene. For example, even if the police don't want to spend their time on a difficult investigation—especially when they think the complainant could have avoided the problem using technologically enabled self-protection—the complainant can still demand his day in court.¹⁸⁸

Practically speaking, though, we doubt that people will often sue each other for most VR or AR behavior. First, again, there is the Bangladesh problem. VR torts might involve tricky jurisdictional questions; if you're screaming in a VR forum from your apartment in Poland, is it fair to require you to answer lawsuits filed in San Francisco or in Buenos Aires?

People have litigated that question extensively in Internet cases.¹⁸⁹ But even if a court in, say, California concludes that it has jurisdiction over the Pole (perhaps because the Pole targeted strobe lights at a person who he knew

¹⁸⁵ Lastowka and Hunter go so far as to suggest that the combination of an owner and her virtual representation are a form of cyborg that might be entitled to its own set of rights, though they conclude that granting such rights is ultimately unworkable. Lastowka & Hunter, *supra* note 20, at 51-72. We wouldn't go that far. But we don't have to; it is quite enough that a virtual persona has the same attributes as a persistent pseudonym in real life.

¹⁸⁶ See, e.g., *Martin Marietta Corp. v. Evening Star Newspaper Co.*, 417 F. Supp. 947, 956 (D.D.C. 1976).

¹⁸⁷ See Lastowka & Hunter, *supra* note 20, at 63-68.

¹⁸⁸ Comparative negligence is generally not a defense to intentional torts, though of course outright consent would be. RESTATEMENT (SECOND) OF TORTS § 892A (AM. LAW INST. 1979).

¹⁸⁹ See, e.g., Alan M. Trammel & Derek E. Bambauer, *Personal Jurisdiction and the "Interwebs,"* 100 CORNELL L. REV. 1129, 1163-73 (2015).

to be in San Francisco), enforcing a judgment against someone half a world away would likely be very hard, and in any event many defendants would lack the money to satisfy a judgment.

Second, while police refusal to go forward wouldn't be a barrier to civil lawsuits, the cost of such lawsuits might be. However distressed one might be by virtual groping, it's unlikely that one would be willing to spend tens of thousands of dollars tracking down the culprit, suing him, and trying to recover the judgment. Some people might, perhaps to send a message, but that would be rare.

And abbreviated procedures that are aimed at making lawsuits cheaper and easier—such as small claims trials or restraining orders—won't help much. A small claims court might be reluctant to allow a lawsuit against someone far away, even if jurisdiction is in principle available;¹⁹⁰ any judgment, moreover, would still be costly to enforce. And the police may be as reluctant to go after a remote restraining order violator as they are to go after a faraway flasher or screamer.

C. Tort Lawsuits for Physical Injuries to Outsiders

VR and AR users will sometimes also physically injure outsiders. A player chasing a Pokémon might run into someone,¹⁹¹ or might cause damage by trespassing on someone's property.¹⁹² A VR user wearing a headset might walk into a houseguest. AR users may also be injured by those onto whose property they encroach. Indeed, one property owner has already shot at Pokémon Go players wandering onto his property.¹⁹³

¹⁹⁰ Some small claims courts' jurisdictions are limited to local defendants. See, e.g., N.Y. CIV. CT. ACT § 1801 (2016).

¹⁹¹ Mara Faccio & John J. McConnell, *Death by Pokémon GO: The Economic and Human Cost of Using Apps While Driving* (Nat'l Bureau of Econ. Research, Working Paper No. 24308, 2018), <http://www.nber.org/papers/w24308.pdf> [https://perma.cc/C8YV-426E]; Hayley Tsukayama, *Pokemon Go's Unexpected Side Effect: Injuries*, WASH. POST (July 10, 2016), <https://www.washingtonpost.com/news/the-switch/wp/2016/07/08/pokemon-gos-unexpected-side-effect-injuries/> [https://perma.cc/XBZ4-H5GV].

¹⁹² Richard Winton, *Police Fear the Dark Side of 'Pokemon Go'*, L.A. TIMES (July 12, 2016, 5:15 PM), <http://www.latimes.com/local/lanow/la-me-ln-pokemon-cops-20160712-snap-htmstory.html> [https://perma.cc/GR4J-42MM]. We set aside VR or AR defects that cause trespass without damage. Negligent trespass is generally not actionable absent damage. RESTATEMENT (SECOND) OF TORTS § 165 (AM. LAW. INST. 1965). Likewise, a manufacturer's negligence in leading someone to trespass should generally not be actionable without damage, either. For a discussion of the property law issues raised by Pokémon GO, see, e.g., Molly S. Van Houweling, *Tempting Trespass or Suggesting Sociability? Augmented Reality and the Right to Include*, 51 U.C. DAVIS L. REV. 731 (2017); Samuel Mallick, Note, *Augmenting Property Law: Applying the Right to Exclude in the Augmented Reality Universe*, 19 VAND. J. ENT. & TECH. L. 1057, 1065-73 (2017).

¹⁹³ In Florida, naturally. See Lee Moran, *Man Opens Fire on Two 'Pokemon Go' Players in Florida*, HUFFINGTON POST (July 17, 2016, 9:14 AM), http://www.huffingtonpost.com/entry/shots-pokemon-go-florida_us_578b6de5e4b03fc3ee512f13 [https://perma.cc/44A9-UXUX].

Those injuries will often be the fault of the user herself, or someone else using the system. But sometimes the injury may result from flaws in the design of the VR or AR hardware or software itself. And in the case of Pokémon GO, the trespass itself may result from the intentional design of the system, not from errors. After all, Niantic “put” desirable Pokémon “in” private spaces.¹⁹⁴ And that opens a second, more practical possibility: suing the hardware or software designer itself.

These design defects should be analyzed using normal tort law rules.¹⁹⁵ Just as a car or bicycle manufacturer may be liable for physical injuries caused by defects in the device, so too a VR or AR equipment manufacturer may be liable. If a defect in an AR headset, for instance, causes it to flash a very bright light that temporarily blinds users and leads them to run into people, that sounds no different from a defect in a bicycle’s brakes that leads the rider to run into someone.

Many such defects would stem from the VR or AR system providing incorrect information to people—for instance, an AR system defectively instructing you to turn in the wrong place, or a VR system that claims to sense whether someone walks into your room but then defectively fails to properly report it. The fact that information is involved complicates things, because the publication of information—even false information—might implicate the First Amendment. For instance, the leading case on false information in reference books held that the publisher of the Mushroom Encyclopedia isn’t strictly liable when you poison yourself because the Encyclopedia had bad information.¹⁹⁶ On the other hand, the publisher of a flawed aeronautical chart is strictly liable when you use the chart to fly into a mountain.¹⁹⁷

Even if the Mushroom Encyclopedia case is correct, we think incorrect directional information provided by VR and AR that makes you walk into a wall is more like the incorrect directional information provided in aeronautical charts. Even more than with charts, people generally rely on instructions provided by their VR and AR headsets automatically, with no opportunity for reflection. Indeed, that is the whole point: If a VR headset shows a pathway for you to walk down, you’re supposed to walk down it. That

¹⁹⁴ For discussion of the trespass issues Pokémon Go raises, see Donald J. Kochan, *Playing with Real Property Inside Augmented Reality: Pokémon Go, Trespass, and Law’s Limitations*, 38 WHITTIER L. REV. (forthcoming 2017); Andrew L. Rossow, *Gotta Catch . . . a Lawsuit? A Legal Insight into the Intellectual, Civil, and Criminal Battlefield ‘Pokemon Go’ Has Downloaded onto Smartphones and Properties Around the World*, 16 J. MARSHALL REV. INTELL. PROP. L. 329, 340-42 (2017). Those lawsuits have already begun. See, e.g., *Candy Lab Inc. v. Milwaukee Cty.*, 266 F. Supp. 3d 1139 (E.D. Wis. July 20, 2017) (adjudicating a lawsuit challenging a city ordinance requiring companies offering AR games to secure permits and garbage collection, among other services).

¹⁹⁵ Leave aside for now the immunity for Internet intermediaries in 47 U.S.C. § 230; we return to that below.

¹⁹⁶ *Winter v. G.P. Putnam’s Sons*, 938 F.2d 1033, 1037 (9th Cir. 1991).

¹⁹⁷ *Brocklesby v. United States*, 767 F.2d 1288, 1296-97 (9th Cir. 1985).

assumes that the VR system is supposed to know where walls and other obstacles are, but they generally do.¹⁹⁸

The Ninth Circuit's effort to distinguish aeronautical charts from the Mushroom Encyclopedia is a little opaque, but it supports our position:

Aeronautical charts are highly technical tools. They are graphic depictions of technical, mechanical data. The best analogy to an aeronautical chart is a compass. Both may be used to guide an individual who is engaged in an activity requiring certain knowledge of natural features. Computer software that fails to yield the result for which it was designed may be another. In contrast, *The Encyclopedia of Mushrooms* is like a book on how to use a compass or an aeronautical chart. The chart itself is like a physical "product" while the "How to Use" book is pure thought and expression.¹⁹⁹

Even if a mushroom encyclopedia is "pure thought and expression," because it teaches how to do something, a VR or AR headset is far from that. Instead, it's an even more automatic "guide" than a compass: It offers visual cues that the user is meant to follow without thinking. It is like a physical product, albeit one composed in large part of information.

*D. Using Tort Law to Draft VR/AR Operators into Preventing
Misbehavior by Users*

Plaintiffs often won't want to limit suits against operators to errors in the systems themselves; they may also want to hold operators liable for users' misconduct. Individual users may be hard to sue, but VR and AR operators—both software and hardware providers—will not be. They will usually be easily identifiable, and will often have assets in many of the jurisdictions in which their users live. Users who believe they have been harmed while participating in a VR environment might thus sue, not just the primary tortfeasors, but also the VR operators for negligently contributing to their injuries.

Generally speaking, American negligence law holds that people who provide physical spaces—such as shopping malls—have a duty of reasonable care to safeguard their business visitors from physical harm.²⁰⁰ That includes harm from criminal attack. The theory is one of negligence, not of strict liability or vicarious liability: a shopping mall owner wouldn't be liable simply

¹⁹⁸ See, e.g., *Oculus Guardian System*, OCULUS DEVELOPER CTR., <https://developer3.oculus.com/documentation/pcsdk/latest/concepts/dg-guardian-system/> [<https://perma.cc/D5H2-LWMD>] ("The Oculus Guardian System is designed to display in-application wall and floor markers when users get near boundaries they defined.").

¹⁹⁹ *Winter*, 938 F.2d at 1036.

²⁰⁰ RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL AND EMOTIONAL HARM § 51 (AM. LAW INST. 2012).

because a visitor was criminally attacked by another visitor.²⁰¹ But if there were reasonable, cost-effective, not unduly burdensome steps that the owner could have taken to prevent reasonably foreseeable crime, and the owner didn't take the steps, then the owner could be held liable.²⁰²

This negligence theory would clearly apply to AR that is under a physical property owner's control. Say that a shopping mall provides an AR network to its customers—perhaps so they can more easily find their way to stores, or see what's available in a store, or just communicate with friends and thus better enjoy the shopping experience. And say that someone uses the network to target a customer for a strobe-light attack. If (1) the attack was reasonably foreseeable, (2) the AR software could have easily and inexpensively provided an option that customers could use to block strobing, but (3) the AR software failed to do that, then the shopping mall owner might well be liable for any damage that the attack caused. There would be no need for any extension of existing law; that would already be the result today.

But what about VR that we use on our own physical property? Or what about an AR system that is provided entirely by AR operators who are unrelated to any shopping mall that we might happen to be visiting? There, the existing duty of a property owner to business visitors wouldn't arise. Instead, courts would have to consider whether to recognize a new duty, not based on ownership of real estate but based on ownership of "virtual estate," in the sense of a VR environment that feels to people like a "place," even if it is not one, or an AR environment that is superimposed on the places that people are visiting.

The rationale for such a duty might be that the VR or AR operator, like a real estate owner, is uniquely situated to provide protections that users cannot themselves provide.²⁰³ Conversely, if the VR and AR environments are open enough that people can easily buy and run their own apps that provide, say, anti-strobing protection, that would cut against imposing such a duty on the VR/AR operators.

Perhaps, though, such a new duty wouldn't even be necessary, because—unlike in the physical world—VR and AR operators are, however unintentionally, affirmatively contributing to VR and AR-based attacks, rather than just failing to

²⁰¹ See, e.g., *Castaneda v. Olsher*, 162 P.3d 610, 613 (Cal. 2007) (holding that landlords have no duty to reject tenants who may be gang members in order to protect others' safety).

²⁰² See, e.g., *Kline v. 1500 Massachusetts Ave. Apartment Corp.*, 439 F.2d 477, 487 (D.C. Cir. 1970). If the attack was unforeseeable, then the attacker's voluntary act would be viewed as "breaking the chain of causation," and the shopping mall's actions would be seen as not being a proximate cause of the attack. But if the attack was foreseeable, proximate cause would be seen as present even though the immediate cause of the harm was the attack itself. See, e.g., RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM §§ 19, 34.

²⁰³ See, e.g., *Mills v. White Castle Sys., Inc.*, 421 N.W.2d 631, 633-34 (Mich. Ct. App. 1988).

stop them. If I can send you strobing images via a VR system, the VR system is itself an unwitting participant in the process, a factual cause of any injury you suffer.

This doesn't make the VR maker strictly liable, but perhaps it does impose on it a duty of reasonable care to make sure that its system doesn't cause such harm. As the Restatement (Third) of Torts: Liability for Physical and Emotional Harm puts it, "An actor ordinarily has a duty to exercise reasonable care" when "the actor's . . . course of conduct results in greater risk to another than the other would have faced absent the conduct," including "by exposing another to the improper conduct of third parties."²⁰⁴ This duty is the foundation for many negligence theories, such as negligent entrustment and negligent supervision:

- If (1) I give you access to a car or a gun, (2) I should have known that you couldn't be trusted with such devices, and (3) you harm someone by misusing the device, then I can be sued for negligent entrustment (on the theory that I've affirmatively contributed to the harm by lending you the device).
- If (1) you are an independent contractor whom I've engaged, (2) I fail to reasonably supervise you to make sure that you aren't misusing your powers under the contract, and (3) you do cause harm through such misuse, then I can be sued for negligent supervision (on the theory that I've affirmatively contributed to the harm by bringing you into my project).²⁰⁵

Likewise, if we cross negligent entrustment and negligent supervision, we get the following duty, which is already long established in copyright infringement as well as some tort cases:

- If (1) I give you access to my flea market, (2) I fail to reasonably supervise you to make sure that you aren't selling copyright-infringing products, and (3) you do sell such products, then I can be sued for contributory copyright infringement.²⁰⁶
- If (1) I give you access to my computer system, (2) I fail to reasonably supervise your use of the system, and (3) you use it to distribute nude photos of your stepdaughter, then I could be held liable for negligent supervision.²⁰⁷

²⁰⁴ RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 7(a), cmt. O.

²⁰⁵ See, e.g., *Bellere v. Gerics*, 759 N.Y.S.2d 105, 107 (App. Div. 2003). We say "independent contractor" rather than "employee" to make clear that this involves negligent supervision, not the strict liability theory of respondeat superior. See RESTATEMENT (THIRD) OF TORTS: LIAB. FOR PHYSICAL & EMOTIONAL HARM § 56.

²⁰⁶ *Fonovisa, Inc. v. Cherry Auction, Inc.*, 76 F.3d 259, 264 (9th Cir. 1996). This duty is limited by statute for online service providers, though not entirely eliminated. 17 U.S.C. § 512(a) (2012).

²⁰⁷ *Doe v. XYZ Corp.*, 887 A.2d 1156, 1167 (N.J. Super. Ct. App. Div. 2005). That case involved misuse of a computer system by the employee of the system's owner; but its logic didn't turn on the employment relationship and would apply to other system users as well. See also *Howard v. Hertz*

By the same logic,

- If (1) I give you access to my VR environment, (2) I fail to reasonably supervise your use of the environment, and (3) you use it to tortiously injure someone, then I could be held liable for negligent supervision.

We think courts should hesitate to impose such liability, especially when the proposed supervision or precautions would seriously interfere with other users' privacy or freedom. Say, for instance, that Tom defrauds Paul while using the Delta Corporation's VR environment; Tom had a past criminal conviction for fraud; and Delta could have prevented the fraud by just doing a background check on all its users (assume it has their names because it requires them to provide nonanonymous credit cards to participate).

If Paul can successfully sue Delta for negligently enabling this fraud—essentially by negligently entrusting the system to the known fraudster third-party Tom—then Delta would have a strong incentive just to bar people with criminal histories from its system.²⁰⁸ Or if Paul can successfully sue Delta for negligently enabling the fraud by failing to warn people of Tom's criminal history, then Delta would have a strong incentive to overtly label everyone with a criminal conviction who is using its system. (Perhaps a scarlet *F*, for fraud, on the avatar's chest?²⁰⁹)

Corp., No. 13-00645, 2014 WL 5431168, at *3 (D. Haw. Oct. 23, 2014) (holding a company could be held liable for negligently failing to supervise employees' use of work computers to post items that allegedly inflicted emotional distress on a customer); *Boston v. Athearn*, 764 S.E.2d 582, 587 (Ga. Ct. App. 2014) (holding that parents could be held liable for negligently failing to supervise a child's defamatory use of the family computer, at least after they were on notice that he was engaged in defamation); *Lansing v. Sw. Airlines Co.*, 980 N.E.2d 630, 632-33, 641 (Ill. App. Ct. 2012) (holding a company could be held liable for negligently failing to supervise employees' use of work computers to harass a customer); *Gray v. Schenectady City Sch. Dist.*, 86 A.D.3d 771, 773-74 (N.Y. App. Div. 2011) (similar). *Boston* involved parents' duty to supervise their children, 764 S.E.2d at 585, but cases such as *Doe v. XYZ Corporation* show that the same can apply to property owners' duty to supervise users of their property. *But see* *Finkel v. Dauber*, 906 N.Y.S.2d 697, 702 (N.Y. Sup. Ct. 2010) (concluding that New York law doesn't allow negligent supervision actions based on a parent's entrusting a child with a computer, because in New York "there is no cause of action for negligent supervision of a child, absent an allegation that the parent entrusted the child with a dangerous instrument which caused harm to a third party," and a computer is not treated as a sufficiently "dangerous instrument").

²⁰⁸ The court in *Doe v. Internet Brands, Inc.*, 824 F.3d 846 (9th Cir. 2016), allowed a claim against a modeling networking site for negligently failing to warn users that particular viewers of the site were drugging and raping users whom they found on the site. But there the allegation was that the site operators were aware of the scheme. *Id.* at 848-49. The question we discuss in the text is whether site operators should have a duty to perform criminal history checks on users, and either eject or publicly identify those who have shown a propensity to commit crimes even when operators have no reason to think that those people are likely to commit any particular future crime.

²⁰⁹ Or, with a different sort of criminal history, "Poor Impulse Control" on the avatar's forehead? *See* NEAL STEPHENSON, *SNOW CRASH* (1992).

Such an approach might be appealing to some, despite the burden it imposes on user privacy and the extra burden it places on people with criminal convictions even after they have served their sentences. VR and AR environments might want to tout their background checks as a means of attracting users, just as Uber publicizes that it does background checks on its drivers.²¹⁰ And perhaps a legislature might conclude that VR and AR companies should have a duty to do this as well, though this might raise interesting First Amendment problems.

But we don't think that juries should be making such decisions, especially on an *ex post* basis, in cases when the plaintiff has been injured and the effects of imposing liability will be felt by third parties who aren't represented in court. Courts ought to hold as a matter of law that there is no tort law duty to impose such privacy- and liberty-compromising precautions, whether in VR environments or otherwise.²¹¹

If those precautions are to be legally required, they should be required only as a result of legislative decision directed to specific kinds of precautions and misconduct, not a jury verdict that could arise in any VR negligence case. The law does not similarly require Internet service providers or cell phone providers to supervise the conduct of their users, at least outside contributory copyright infringement and child pornography.²¹² And we worry that the consequences of imposing such a duty would cause larger problems: restricting user privacy and limiting what individuals can do even with consent.

At most, courts should allow such negligent supervision lawsuits only when the defendant has failed to implement reasonably inexpensive and effective technological self-protection measures that don't involve excluding users or disclosing information about them. Even then we're not sure that such measures should be required through the unpredictable tort liability system, as opposed to through clearer, narrow regulations or through market pressure. But at least such requirements would increase the diversity of choices available to users, rather than decreasing them.

210 See Rachel Feintzeig & Rachel Emma Silverman, *In the Uber Age, a Boom in Background Checks*, WALL ST. J. (May 10, 2016, 8:35 PM), <https://www.wsj.com/articles/background-checks-are-booming-1462926915> [<https://perma.cc/FZQ6-ZM4G>] (describing Uber's employee background checks).

211 See Eugene Volokh, *Tort Law vs. Privacy*, 114 COLUM. L. REV. 879, 948 (2014).

212 Congress is currently considering a third exception for sites promoting sex trafficking. See Stop Enabling Sex Traffickers Act, S. 1693, 115th Cong. (2017).

E. Copyright and Trademark Liability to Outsiders²¹³

Let us now turn to liability that isn't preempted by terms of use (because it involves the rights of people who aren't themselves VR or AR users) and is expressly exempted from § 230 immunity: liability for copyright and trademark infringement.²¹⁴

Say that you are designing your own avatar. You could make it look as much like yourself as possible, receding hairline, love handles, and all. But, as we mentioned above, one of the exciting things about VR is the malleability of your identity. Why not make yourself just a bit younger and more attractive? Or change your hair color?

For that matter, why not experiment with a different race, or gender, or species? Freed of biology, and of the need for permanence, people will experiment with all kinds of images to represent themselves. And while some will try to create something new, some will just copy. Why not look like . . . Superman? Lara Croft? The Cat in the Hat?

Copyright and trademark lawsuits against VR/AR users who create such avatars, or companies that sell them, would likely operate much as they have now, though with many of the uncertainties we see now.²¹⁵ Fictional characters' images coupled with their unusual character traits are protected by copyright. If you copy enough of the visuals, character traits, or both to be copying expression and not just idea, you might be infringing. What if you just wear a red-and-blue superhero costume with a cape but no S? What if the game lets you have certain superpowers, and you also have your character appear and disappear by seeming to fly?²¹⁶ Answering questions like these is why IP lawyers get paid the big bucks.

If your use is noncommercial, and licensed avatars aren't already being distributed by the copyright owner, your use might be a fair use. But if someone

²¹³ In this Section we consider copyright claims based on uses of copyrighted works in a virtual world. For a different issue on what aspects of the design of a virtual world are themselves copyrightable, see Jack Russo & Michael Risch, *Virtual Copyright*, in *THE LAW OF VIRTUAL AND AUGMENTED REALITY* (Woody Barfield & Marc Blitz eds., forthcoming 2018).

²¹⁴ 47 U.S.C. § 230(c)(1) (2012).

²¹⁵ For a detailed discussion, see Russo & Risch, *supra* note 213 (manuscript at 3), which concludes that "traditional characters and animation" will likely not be "treated any differently in virtual reality."

²¹⁶ This issue has been litigated before in *Marvel Enters., Inc. v. NCSoft Corp.*, No. CV04-9253RGKPLAX, 2005 WL 878090, at *1 (C.D. Cal. Mar. 9, 2005), when Marvel sued a company that allowed users to design their own superhero avatars, though the case settled before a substantive ruling on the merits. Ross Miller, *Marvel vs. City of Heroes Lawsuit Settled*, ENGADGET (Dec. 14, 2005), <https://www.engadget.com/2005/12/14/marvel-vs-city-of-heroes-lawsuit-settled/> [<https://perma.cc/9TM8-EK36>]. Disney also notoriously threatened legal action against daycare centers that featured murals of Disney characters on their walls. Paul Richter, *Disney's Tough Tactics*, L.A. TIMES, July 8, 1990, at D1.

goes into business selling such avatars without the copyright owner's approval, that would probably not be a fair use.²¹⁷ It might also be trademark infringement.

Copyright and trademark owners, though, might not want to go after individual users, or even small-time fly-by-night avatar sellers. Instead, they might sue the VR or AR operators as contributory infringers. The environment operator might be immune under the Digital Millennium Copyright Act (DMCA),²¹⁸ but only until someone sends the operator a notice-and-takedown request; once the operator gets the request, it would have to promptly block the allegedly infringing avatar or risk losing a lawsuit.²¹⁹

There is an established body of case law that sets out the limits of intermediary liability under the DMCA.²²⁰ There is less clarity on intermediary liability for trademark infringement on the Internet, but that law is also developing.²²¹ But the legal issues and their practical consequences may differ somewhat in the VR and AR environments.

First, while there are certainly opportunities for outright copying of works or logos in VR, we expect that many of the allegations will be against user-generated works that incorporate or modify those works rather than wholesale duplication of the kind that is common online. Those user-generated works can still be infringing, but they are more likely to be transformative and less likely to be commercial, complicating the copyright case and making it likelier that infringement lawsuits will deter lawful uses.²²²

Second, the use of AR is likely to generate some novel copyright issues involving derivative works. One way to infringe is to combine your work with another in a way that creates a new work or changes the market for the original work. AR users may do exactly that when they place a virtual Pokémon "in" a work of sculpture, visually merge the copyrighted work that appears in their phone or glasses with an actual work that appears in front of them, or use filters that alter the appearance of copyrighted works.

True, those new derivative works are just passing things, not permanent alterations, at least unless the user takes a photo. But some case law has

²¹⁷ See, e.g., *Marvel Enters., Inc.*, 2005 WL 878090, at *4; Carl Michael Szabo, *Thwack!! Take That, User-Generated Content!*: *Marvel Enterprises v. NCSoft*, 62 FED. COMM. L.J. 541, 558 (2010).

²¹⁸ 17 U.S.C. § 512(c) (2012).

²¹⁹ *Id.* § 512(c)(1)(A)(3).

²²⁰ See, e.g., *Viacom Int'l, Inc. v. YouTube, Inc.*, 676 F.3d 19, 26-28 (2d Cir. 2012).

²²¹ See, e.g., *Tiffany (NJ) Inc. v. eBay Inc.*, 600 F.3d 93, 96, 103-05 (2d Cir. 2010); Mark A. Lemley, *Rationalizing Internet Safe Harbors*, 6 J. TELECOMM. & HIGH TECH. L. 101, 106 (2007).

²²² See, e.g., *Lenz v. Universal Music Corp.*, 815 F.3d 1145, 1148 (9th Cir. 2016) (addressing the problem of takedown notices directed at fair uses); Daniel Seng, *The State of the Discordant Union: An Empirical Analysis of DMCA Takedown Notices*, 18 VA. J.L. & TECH. 369, 441 (2014) (finding a large number of vague or outdated takedown notices); Jennifer M. Urban & Laura Quilter, *Efficient Process or "Chilling Effects"? Takedown Notices Under Section 512 of the Digital Millennium Copyright Act*, 22 SANTA CLARA COMPUTER & HIGH TECH. L.J. 621, 644-45 (2006) (same).

treated such ephemeral changes to a copyrighted work as infringing.²²³ Courts will have to decide whether and under what circumstances a user's subjective view of a derivative work not visible to others—or the facilitation of such an act—constitutes copyright infringement.

Finally, the consequences of copyright infringement under the DMCA may be more significant for the infringer in VR than on the Internet. To comply with the DMCA, intermediaries must agree to take down identified acts of infringement and to terminate the accounts of repeat infringers.²²⁴ On the Internet, neither penalty is all that drastic or effective. It is easy enough to repost a video that has been taken down, and frequently not difficult to create another account from which to do so.

But it is harder to know what it means to “take down” a VR avatar that infringes copyright or trademark law, so companies may err on the side of caution by deleting the account altogether. And we think people will be more invested in their VR accounts than in a particular online account, so the consequences of being suspected of VR infringement may turn out to be more significant than on the Internet.

F. 47 U.S.C. § 230 as a Limit on VR/AR Operator Liability

Under current law, VR/AR operators would likely be immune from liability for most misconduct by their users because of 47 U.S.C. § 230. Section 230 bars any “interactive computer service” provider from being held liable based on “information provided by another information content provider.”²²⁵ This is why services such as Yelp, the Washington Post, YouTube, and America Online aren't liable for defamation, invasion of privacy, or intentional infliction of emotional distress in content posted by their users.²²⁶

The story of § 230 is long and oft-told, and we won't repeat it here.²²⁷ But the upshot is that § 230 would probably immunize VR and AR operators from offensive textual, audio, or visual communications by their users, likely including indecent exposure, virtual groping, and such. It would probably immunize them even from communications that cause physical harm, such as the deliberately harmful use of strobe lighting.²²⁸

²²³ See, e.g., *Micro Star v. Formgen Inc.*, 154 F.3d 1107, 1109, 1114 (9th Cir. 1998); *Lewis Galoob Toys, Inc. v. Nintendo of Am., Inc.*, 964 F.2d 965, 968 (9th Cir. 1992); *Atari, Inc. v. N. Am. Philips Consumer Elecs. Corp.*, 672 F.2d 607, 617 (7th Cir. 1982).

²²⁴ 17 U.S.C. § 512(c)(1)(C) (2012).

²²⁵ 47 U.S.C. § 230(c) (2012).

²²⁶ See, e.g., *Zeran v. Am. Online, Inc.*, 129 F.3d 327, 328 (4th Cir. 1997).

²²⁷ See Anupam Chander, *How Law Made Silicon Valley*, 63 EMORY L.J. 639, 650-57 (2014).

²²⁸ See Thierer & Camp, *supra* note 7, at 40-42.

At the same time, some recent courts have read § 230 more narrowly, perhaps because they sense that rampant misconduct online requires someone to control it, especially when the misconduct appears in an environment where direct lawsuits against those who are misbehaving are impractical and the police are unlikely to step in.²²⁹ It is possible that courts will take a similar view when it comes to VR and AR operators, especially since the service they provide feels so different in many ways—seeming so much more physical—than what the paradigm beneficiaries of § 230 offer. And haptic torts seem unlikely to be covered by § 230 at all.

G. Tort Liability for Physical Injury to Users; Terms of Use as Contractual Limits on Liability

Finally, VR and AR defects are also likely to lead to injury to the systems' own users. Here, the analysis will be much the same as in the previous subsection, but subject to any enforceable terms of use that might waive liability to the users themselves.

Those limits, though, are likely to be substantial. The ubiquity of "consent" to terms of use may mean we will see relatively few VR and AR legal disputes brought by users. Unlike in Section II.E, here we speak not of informed consent to someone hitting you with a virtual sword, but rather the fictional consent consumers give whenever they have agreed to terms of use that exist somewhere in a box or on a web page.²³⁰

All the VR and AR legal issues we have discussed are likely to arise, at least in the foreseeable future, in the context of private, proprietary systems. Everything you do in VR—both personal experiences in your own home and interactions with others—occurs in a computer environment that is privately designed, recorded, and controlled. The same is true for the overlays that AR provides over your experience of the real world. For that reason, they are likely to be covered by the VR and AR operators' terms of use.

It is too soon to know exactly what this will mean for the law of VR and AR. But we have some experience with so-called "walled gardens" in electronic communications.²³¹ That experience suggests that makers of the

²²⁹ See, e.g., *J.S. v. Village Voice Media Holdings, L.L.C.*, 359 P.3d 714, 717 (Wash. 2015); Jeff Kosseff, *The Gradual Erosion of the Law That Shaped the Internet: Section 230's Evolution Over Two Decades*, 18 COLUM. SCI. & TECH. L. REV. 1, 3 (2016) ("[C]ourts have slowly eroded the once-absolute immunity by concluding that some online service providers encouraged or contributed to the user content, and therefore the user content was not 'provided by another information content provider.'" (quoting 47 U.S.C. § 230(c)(1))).

²³⁰ See, e.g., Joshua A.T. Fairfield, *Anti-Social Contracts: The Contractual Governance of Virtual Worlds*, 53 MCGILL L. REV. 427, 429 (2008).

²³¹ See, e.g., Greg Lastowka, *Walled Gardens and the Stationers' Company 2.0*, REVISTA DE INTERNET, DERECHO Y POLÍTICA, Nov. 2012, at 41, 43, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2204465

platforms have almost plenary authority to do what they want without legal complaint from their customers, at least when it doesn't involve physical injury.²³² This authority may give them the power to enforce rules or norms when the police or tort law will not.²³³ But it also means they will almost certainly seek to insulate themselves from tort liability.

That is particularly true when it comes to potential economic loss. Users of Apple phones, for instance, have access to the public internet and phone networks, but Apple decides what apps they can and cannot run. Apps can be dropped from the store, and if they are, users lose any investment they made using the app.²³⁴ Players of massively multiplayer online role-playing games (MMORPGs) invest substantial time and resources in creating and leveling up avatars and accumulating resources—but that investment exists only so long as the game remains live, and only so long as the company doesn't boot the player off the system.²³⁵ Technology companies routinely waive liability for such economic damage in their terms of use, and VR environment operators are likely to do the same.

Waivers of liability would probably also cover injuries to privacy or other emotional distress.²³⁶ If a VR or AR operation wanted to disclaim any liability stemming from indecent exposure, virtual groping, and the like, it could probably do so.²³⁷ The question whether such operators are hypothetically

[<https://perma.cc/G3R6-NMJT>]; cf. Dan Hunter, *Walled Gardens*, 62 WASH. & LEE L. REV. 607, 611-12 (2005).

²³² See Lastowka & Hunter, *supra* note 166, at 307.

²³³ See Kerr, *supra* note 14, at 424-25.

²³⁴ Apple periodically bans apps for actual or perceived violations of its terms of service, or sometimes for no (disclosed) reason at all. See Lucy Black, *Dash-Life Without the App Store*, I PROGRAMMER (Feb. 24, 2017), <http://www.i-programmer.info/news/201-ios/10547-dash-life-without-the-app-store.html> [<https://perma.cc/H3SN-GYMN>] ("Kapeli Dash was summarily removed by Apple with no prior warning . . . This is by no means an isolated incident—Apple's decisions are generally final, even when they seem harsh or even unfounded."); Sarah Perez, *Controversial Crime Reporting App Vigilante Banned From App Store*, TECHCRUNCH (Nov. 2, 2016), <https://techcrunch.com/2016/11/02/controversial-crime-reporting-app-vigilante-banned-from-app-store/> [<https://perma.cc/3JHV-S6RY>].

²³⁵ See *Bragg v. Linden Research, Inc.*, 487 F.Supp.2d 593, 595 (E.D. Pa. 2007); Greg Lastowka, *User-Generated Content and Virtual Worlds*, 10 VAND. J. ENT. & TECH. L. 893, 915-16 (2008) (noting that one MMORPG, *World of Warcraft*, "retains the right to terminate accounts and delete all data present on the accounts for 'ANY REASON OR NO REASON'").

²³⁶ See, e.g., *Eriksson v. Nunnink*, 183 Cal. Rptr. 3d 234, 250 (Cal. Ct. App. 2015); *Darnaa, LLC v. Google Inc.*, 236 F. Supp. 3d 1116, 1123 (N.D. Cal. 2017) ("Perhaps regrettably, limitation-of-liability clauses like Section 10 'have long been recognized valid . . .'" (citation omitted)); RESTATEMENT (THIRD) OF TORTS: APPOINTMENT OF LIAB. § 2 (AM. LAW INST. 2000).

²³⁷ While the user might not be the person who bought the system, that likely won't matter. Putting on the headset is likely to be treated as agreeing to terms of use by most modern courts. See, e.g., NANCY S. KIM, *WRAP CONTRACTS* (2014); Mark A. Lemley, *Terms of Use*, 91 MINN. L. REV. 459, 467 (2006).

liable under some negligent supervision or entrustment theory or have 47 U.S.C. § 230 immunity may thus prove to be largely moot.

You are also likely bound by the terms of use even when you haven't read them, and thus haven't agreed to them in any normal sense of the word.²³⁸ And precisely because those terms are not negotiated or read, they tend to give the companies that write them lots of rights and few responsibilities.²³⁹

The ubiquity of terms of use is not new, of course. The same problem infects web sites. But the effect of those terms is likely to be greater in VR and AR than it is in website visits. VR systems are likely to collect not just data about you but other sensitive information, particularly if (as seems likely) one use of VR will be for virtual sex. And as we have seen, the importance of consent to physical contact and other behavior is likely to be much greater in VR and AR than it is in website visits. And as VR is deployed in education and the workplace, the nominal "consent" to terms of use gets even more fictional. Students who want to continue attending school and employees who want to keep their job may have little choice but to agree to use the VR headset and software their employer provides—and thus to "agree" to the terms of use associated with that software.

VR and AR may thus represent the acceleration of a trend begun with the Internet: the tendency of contract law to swallow property and tort law. Unless the law changes, VR and AR legal obligations (or their absence) will likely be determined mostly by the dictates of contracts written by VR and AR companies. That is likely to mean, among other things, that even people who think they have a vested interest in virtual avatars or possessions have no such interest under current law. Instead, they possess something they may view as integral to their identity but which the law views as subject to terms of use that say the software company owns it all.²⁴⁰

VR and AR operators' liability for negligent physical injury or even negligent property damage, though, may not be as easily waived. Many states are less likely to enforce waivers that are part of nonnegotiable form contracts.²⁴¹ Many are also less likely to enforce waivers when an activity is

²³⁸ Lemley, *supra* note 237.

²³⁹ KIM, *supra* note 237; Florencia Marotta-Wurgler, *What's in a Standard Form Contract? An Empirical Analysis of Software License Agreements*, 4 J. EMPIRICAL LEGAL STUD. 677, 680 (2007).

²⁴⁰ Lastowka and Hunter point out that the legal principles of property should apply just as well to virtual as to real property but are unlikely to do so under current law. Lastowka & Hunter, *supra* note 20, at 50-51.

²⁴¹ See, e.g., RESTATEMENT (THIRD) OF TORTS: APPORTIONMENT OF LIAB. § 2 cmt. e.

seen as practically necessary—including medical care²⁴² or even auto repair²⁴³—rather than just as entertainment.

VR and AR might at first seem like a form of recreation, which may cut in favor of enforcing the waivers.²⁴⁴ But as they become more important for employment and business, they may indeed come to be seen as practical necessities.²⁴⁵ So perhaps in the comparatively rare situations where physical injury is possible in VR and AR, and the provider is seen as negligent for not taking reasonable steps to prevent the injury, the waiver that the provider requires users to sign might be ineffective.

IV. HOW OTHER PEOPLE SEE YOU, EVEN IF YOU DON'T SEE IT

A. *Your Role in Others' Personal Sensescapes*

So far, we have spoken of intrusions on VR or AR users' own sensescapes—actions that cause them to see, hear, or feel things that are offensive or even harmful to them. But what if other users decide to include you in *their* sensescape, even in ways that you might not directly perceive?

Our inclination is towards what we call “freedom of sensescape”: People should generally be free to see and hear whatever they want in their own VR displays, even when the material is offensive or may lead some people to behave badly. (We would say the same as to AR, except for rules aimed at preventing distracted driving and the like.) The contents of one's own VR sensory feed are very close to the contents of one's thoughts and fantasies. Banning people from displaying VR images to themselves simply because it offends others or may lead to bad behavior should be as improper as trying to punish people for unexpressed fantasies, or for notes written in their own diaries.

But what if my sensescape offends you because it refers to you in certain ways, even if you don't personally experience it? We suggested earlier that users can engage in self-protection by turning down your volume if you are too loud, virtually clothing your avatar as it appears on their AR or VR

²⁴² See, e.g., *Tunkl v. Regents of the Univ. of Cal.*, 383 P.2d 441, 447 (Cal. 1963) (holding a waiver of negligence liability as to medical care, even charitable care, unenforceable partially on the grounds that medical care is “a practical and crucial necessity”).

²⁴³ See, e.g., *Gardner v. Downtown Porsche Audi*, 225 Cal. Rptr. 757, 760 (Ct. App. 1986) (holding a waiver exempting an automobile repair garage from ordinary negligence liability unenforceable because, among other reasons, “it is virtually impossible to exist in the Los Angeles area without a fully operational automobile”).

²⁴⁴ See, e.g., *Randas v. YMCA of Metro. L.A.*, 21 Cal. Rptr. 2d 245, 247-48 (Ct. App. 1993) (holding a waiver of negligence liability in a swimming class to be enforceable). But see *City of Santa Barbara v. Superior Ct. of Santa Barbara Cty.*, 161 P.3d 1095, 1097 (Cal. 2007) (holding a waiver of gross negligence liability to be unenforceable even as to recreational activity).

²⁴⁵ See *Gardner*, 225 Cal. Rptr. at 760 (concluding that cars, which were a luxury just several decades before, had become so necessary that car repair service had become “a vital, life-or-death function”).

display, or keeping you out of their personal space, all without your consent or perhaps even your knowledge, merely by changing their local software setting.²⁴⁶ But what if people use this not to prevent crimes or torts against themselves, but instead to make your avatar appear ridiculous within their VR display, without your knowledge or consent?

Or what if they want to make you appear naked to their eyes? Naturally, they probably won't be able to make it look like what your naked body actually looks unless they have photographs of your naked body. But they can just merge your face and your gestures and motions with a generic computer-generated naked body tailored to your physique and skin tone.

Or suppose your "personal space" bubble prevents you from perceiving other avatars as groping you, but they can still see themselves groping you? True, software companies might design a system so that all parties had to share a common visual version of events. But there's no guarantee that this is the way systems will indeed be designed, and some reason to think that software companies would want to give each user more flexibility. For instance, if you go to a VR bar together with us, why not let each of us perceive the decor of the bar in the way that we most like, for instance if you like a loud, dark, crowded bar and we like a quiet, well-lit, uncrowded one?

What's more, in AR, all this can happen when the people are physically right next to each other. If they can load a software program onto their glasses that reminds them of your name and your kids' names while talking to you at a cocktail party, what if they instead load your most embarrassing picture from a social media site while looking at you, or a fake "nude" image of you?²⁴⁷

From one perspective, we might react by saying, "you can't see the naked person or the groper; problem solved." You are not confronted with something that offends you or that you perceive as an assault, so you do not suffer injury. It's creepy if you find out about this later, or if you see signs that this is happening right now. But "creepy" doesn't mean illegal. No law, for instance, prevents someone in the privacy of their own home from masturbating while thinking about you or looking at your picture, even if you really don't want them to.

On the other hand, you may well be upset when you learn that you are being viewed (here, literally viewed) disrespectfully. And this might especially trouble you when you are in virtual or real personal proximity to the people who are viewing you that way: People who are (in their subjective experience) virtually ogling or groping you may treat you differently in that

²⁴⁶ See *supra* subsection II.A.2.

²⁴⁷ Fake celebrity porn—photoshopping someone's head onto an image of a naked body—is a real thing, and is likely to become even easier to make. See James Vincent, *AI Tools Will Make It Easy to Create Fake Porn of Just About Anybody*, THE VERGE (Dec. 12, 2017, 12:54 PM), <https://www.theverge.com/2017/12/12/16766596/ai-fake-porn-celebrities-machine-learning> [<https://perma.cc/3NKX-5LZU>].

interaction—physical interaction when it comes to AR, virtual interaction in VR—than if they weren't doing so.

Of course, if this is just what people themselves see in their individual headsets, no one will be the wiser. But information about how they've configured their systems might come out, whether through discovery in litigation, a search under a warrant, or a hack. And even if it doesn't, the possibility that people are doing this may affect how we interact with others in VR, or even in the physical world with people who are wearing AR.

We think there may be good reason for companies and virtual societies to ban or restrict some kinds of alteration or "touching" of others' avatars, even when the alteration or touching is visible only to the alterer and not to the avatar owner. The easiest case involves the presence of third parties or one of the parties recording the event and sharing it with others. If others perceive you as groping me, and me as doing nothing about it, the fact that from my perspective it never happened doesn't prevent harm to my reputation. But whether such crimes that are seen solely within the perpetrator's sensescape should be illegal is a harder question.

To be sure, attempts, even unsuccessful, to influence others' sensescapes might be punishable. Factual impossibility is rarely a defense to a criminal charge of attempt.²⁴⁸ I can be convicted of attempted murder even though it was impossible to murder you because you were already dead.²⁴⁹ Similarly, assuming groping someone in VR is a crime, we might conclude that attempting to grope someone (and from the perpetrator's perspective, succeeding) is a crime (attempt) even though the crime couldn't actually have been carried out because the victim was wearing a personal space bubble.

But private access to images that don't substantially affect third parties is generally not punishable. Thus, possessing child pornography depicting actual children may be banned, the Supreme Court said, because the possession itself stimulates a market for the creation of the speech, creation that involves criminal harm to the children. Yet possessing speech that was not created as a result of criminal conduct—such as sexual images of entirely fictional children—is protected.²⁵⁰ Indeed, the Supreme Court's *Stanley v.*

²⁴⁸ See, e.g., John Hasnas, *Once More unto the Breach: The Inherent Liberalism of the Criminal Law and Liability for Attempting the Impossible*, 54 HASTINGS L.J. 1, 3 (2002). This also extends to speech crimes when the speech falls within a First Amendment exception. See, e.g., *State v. Luther*, 134 P.3d 205, 211 (Wash. 2006) (holding that there is no factual impossibility defense to a charge of attempted receipt of child pornography, even when the actual images "turn out to be images that are not of actual minors"). The Model Penal Code disallowed factual impossibility as a defense in all cases, MODEL PENAL CODE § 5.01(1)(a), though not all states have adopted that approach.

²⁴⁹ Cf. *United States v. Thomas*, 13 U.S.C.M.A. 278 (1962) (upholding conviction of attempted rape where defendants believed they were raping an unconscious woman who was in fact dead).

²⁵⁰ See, e.g., *Ashcroft v. Free Speech Coal.*, 535 U.S. 234, 256 (2002).

Georgia decision, which held that mere possession of obscenity cannot be punished, fits well with this principle:

Whatever may be the justifications for other statutes regulating obscenity, we do not think they reach into the privacy of one's own home. If the First Amendment means anything, it means that a State has no business telling a man, sitting alone in his own house, what books he may read or what films he may watch. Our whole constitutional heritage rebels at the thought of giving government the power to control men's minds.²⁵¹

That argument reasonably extends to the contents of one's VR display. And the law of disclosure of private facts, false light invasion of privacy, and the right of publicity fits the freedom of sensescape as well: those torts don't even apply to material shared with a few friends, and even more clearly don't apply to material displayed just to oneself.²⁵²

None of this is to say we shouldn't be bothered by this sort of conduct. VR and AR companies may want to ban or restrict it, or at least to warn people that it is (or might be) happening.²⁵³ And if it causes the victim injury it will be tortious. But making it a crime would push the limits of *Stanley v. Georgia*.

B. *Display to Others*

Now let's take a step away from purely individual decisions to view another's avatar differently. Say that John decides to configure his own VR system to substitute a different avatar for your own when he sees you in VR; but say that he also shares this with Jack, Jerry, and Jane. And say that avatar is in some way disrespectful.

Maybe John thinks that you are a fascist and decides to draw a little Hitler moustache on you or put a swastika armband on his image of your avatar; and all his friends then copy that design. Indeed, maybe John announces to the world that this substitution is available to anyone who wants it (assuming the VR/AR environment makes it easy for people to do that). John might view that as a political statement, and so might the people who copy from him.

If you're of our generation, think back to the *Doonesbury* cartoons that constantly represented Dan Quayle as a feather, Bill Clinton as a waffle, and

²⁵¹ 394 U.S. 557, 565 (1969).

²⁵² RESTATEMENT (SECOND) OF TORTS § 652D cmt. a (AM. LAW INST. 1977). Libel law also doesn't apply when the speaker displays material just to herself. *See id.* § 577(1).

²⁵³ In some situations, one can imagine employment law forbidding this as well, for instance, if the very knowledge that a supervisor is using a sexually themed avatar at work to represent an employee is seen as creating a hostile work environment even if no-one other than the supervisor actually sees the avatar. But that is a separate, and controversial, issue that is beyond the scope of this Article.

Arnold Schwarzenegger as a giant groping hand.²⁵⁴ What if VR and AR users could do the same, not just in their sensescapes, but in the sensescapes of others who were willing to follow the user's lead?

And what can be done for political reasons can also be done out of personal spite or cruel humor. John could share with his friends an avatar that is a grotesque caricature of an acquaintance's (say, Pat's) appearance, perhaps exaggerating some unattractive feature of Pat's. Or John could share with his friends an avatar of their acquaintance Chris apparently naked, which is to say Chris's face merged with a plausible-looking naked body.

Human nature being what it is, we expect there to be a good deal of this sort of behavior. And while much of it would be sophomoric, we think that on balance it should be protected by the First Amendment where it does not mislead, especially since it can be used for political, social, religious, and artistic commentary.

One question is whether publicizing sexually themed adaptations of others' avatars—avatars configured to look like the user naked, even when the user has not chosen this—should be treated differently. Should such nonconsensual sexualization of others' images be seen as a dignitary injury forbidden by law, by analogy to the recent movement to forbid nonconsensual distribution of real sexual images (often labeled "revenge porn")? Or does the fact that everyone understands the nudity to be faked lead the image to retain its First Amendment protection? Courts are beginning to litigate this question in the context of fake celebrity porn,²⁵⁵ though those cases are surprisingly rare, perhaps because none of the victims want to call more attention to the offending sites.²⁵⁶

If you want to consider a nonsexual version of this, consider the piñata problem: Somewhere, someone is using your face on a piñata.²⁵⁷ Should we laugh it off? Be vaguely uneasy about it, but leave it as a matter for social norms rather than law? Forbid sales of piñatas with images of famous people, but not forbid noncommercial creation and use of such items? (That may well

²⁵⁴ See, e.g., James Barron, *A Cartoonist Feasts on a President. So?*, N.Y. TIMES (Aug. 31, 1994), <http://www.nytimes.com/1994/08/31/garden/a-cartoonist-feasts-on-a-president-so.html> [<https://perma.cc/manage/create?folder=4078>].

²⁵⁵ Tim Kenneally, *'Storage Wars' Star Brandi Passante Files Lawsuit Over Porn Video*, THE WRAP (Sept. 21, 2013, 4:38 PM), <https://www.thewrap.com/storage-wars-star-brandi-passante-files-real-lawsuit-over-fake-porn-video-62856/> [<https://perma.cc/LZ58-2NXM>].

²⁵⁶ P. David Marshall, *Celebrity Fakes—Where Porn Meets a Sense of Possession*, THE CONVERSATION (Dec. 11, 2013, 9:29 PM), <http://theconversation.com/celebrity-fakes-where-porn-meets-a-sense-of-possession-20829> [<https://perma.cc/ZR5U-L32Z>].

²⁵⁷ And definitely Donald Trump's face. We've seen it.

be the rule under modern tort law.²⁵⁸) Should we treat the matter differently if the piñata is a full-on realistic effigy, or its VR equivalent, where someone can abuse an avatar who looks like their least favorite politician—or, to be more sporting, can box against such an avatar?

On the legal merits, privacy torts like “false light” invasion of privacy (if the images are fake), defamation (if they are fake but are presented as real), or public disclosure of private facts (if the image is real) all seem plausible responses to fake celebrity porn. But in VR, presumably no one thinks your naked avatar is “real”—it is, after all, an avatar. That makes these tort theories, focused as they are on factual assertions, much tougher to sustain. Yet it doesn’t mean there is no underlying emotional or dignitary harm. And there may sometimes be actionable reputation harm as well, if reasonable observers would believe that the avatar was actually your own creation.

C. *Pervasive Display*

So far, we’ve talked about how you choose to alter others’ avatars. But what if you are designing your own avatar, and you deliberately choose someone else’s name and appearance, perhaps to mock that other person, or perhaps to impersonate them?

Say that someone creates an avatar in a popular VR environment. He calls the avatar Eugene Volokh (or Mark Lemley), and he makes it look like Eugene Volokh. (Recall that we’re assuming highly lifelike avatars, something that will likely arrive within the next few years.) Then this “Eugene Volokh” starts traipsing through the VR environment, saying and doing all sorts of foolish things.

Now maybe Volokh could sue for libel,²⁵⁹ or even seek criminal punishment under various state laws that ban impersonation.²⁶⁰ But say that it’s clear that this isn’t the real Volokh; for instance, say that the VR world has a special marker for people who are admittedly pseudonymous (e.g., by displaying a scarlet P for “pseudonym” on the front of their avatars). Reasonable observers would therefore realize, on a moment’s reflection, that this is someone mocking Volokh, not Volokh himself.

If this were a movie, then this use of a real person as a character, as in *Forrest Gump* or *Midnight in Paris*, would be permissible, even protected under

²⁵⁸ The right of publicity might well prevent commercial use of a person’s image on such things. *But see* *Cardtoons, L.C. v. Major League Baseball Players Ass’n*, 95 F.3d 959, 976 (10th Cir. 1996) (suggesting that commercial uses of others’ images are permissible if they come across as parodies).

²⁵⁹ *See, e.g., Yantha v. Omni Childhood Ctr., Inc.*, No. 13-1948, 2013 WL 5327516, at *5 (E.D.N.Y. 2013) (holding that impersonating someone in print in order to damage their reputation can be defamation); *Rall v. Hellman*, 726 N.Y.S.2d 629, 631 (N.Y. App. Div. 2001) (same).

²⁶⁰ *See, e.g., People v. Golb*, 991 N.Y.S.2d 792, 799-800 (N.Y. 2014) (upholding a criminal impersonation conviction for a defendant who posed as various other people online to damage their reputations).

the First Amendment, notwithstanding any possible “right of publicity” claim.²⁶¹ It might be parody, or a fictionalized account of real events, or just entertainment, humorous or not. But so long as a reasonable person would perceive it as something fictional, rather than as making factual assertions about the real person, it wouldn’t be actionable, either as libel, false light invasion of privacy, or infringement of the right of publicity.²⁶²

By the same logic, it may well be that designing an avatar that uses the name and likeness of a real person as an obviously fictional character in a VR or AR environment should likewise be permissible. This may indeed be the right answer, and there is real value in such a conclusion. Letting people play others online, especially when it’s clear that this is just a pseudonym, can be a useful means of parody, commentary, and entertainment. There are all kinds of fake celebrity Twitter accounts, for instance. So long as it’s clear they are fake (say, the Twitter handle is “@fakeDonaldTrump”), their mimicking the real celebrity is protected parody rather than deception.²⁶³

But perhaps such avatar design should not be allowed unless the person whose name and likeness are used consents, because the visceral quality of VR might make a difference. If you see a movie with a Eugene Volokh character, you don’t just know you’re seeing a movie—you feel that you’re seeing a movie. You’re sitting in your armchair, with the movie visibly on a screen in front of you. You have a popcorn bucket in your hand, or a snack on the coffee table. You probably see other viewers in front of you or beside you.

But if you see an avatar in a VR world, you’re seeing it in a context specially designed to mimic reality as much as possible. When you turn your head, the illusion created by VR is reinforced, not broken. In more advanced VR systems, you might be walking around on a two-dimensional treadmill rather than just sitting in your armchair.²⁶⁴

²⁶¹ See, e.g., JENNIFER E. ROTHMAN, *THE RIGHT OF PUBLICITY: PRIVACY REIMAGINED FOR A PUBLIC WORLD* (forthcoming 2018); Stacey L. Dogan & Mark A. Lemley, *What the Right of Publicity Can Learn from Trademark Law*, 58 STAN. L. REV. 1161, 1177 (2006); Eugene Volokh, *Freedom of Speech and the Right of Publicity*, 40 U. HOUS. L. REV. 903, 906 (2003).

²⁶² At least, it *shouldn’t* be actionable. Some courts have (wrongly) held otherwise in the context of video games and the right of publicity, perhaps because they view games as less artistic than movies or books. See, e.g., *Keller v. Elec. Arts Inc. (In re NCAA Student-Athlete Name & Likeness Licensing Litig.)*, 724 F.3d 1268, 1276 (9th Cir. 2013); *Hart v. Elec. Arts, Inc.*, 717 F.3d 141, 170 (3d Cir. 2013).

²⁶³ See, e.g., *New Times, Inc. v. Isaacks*, 146 S.W.3d 144, 155-56 (Tex. 2004) (holding that material purporting to quote a person as saying something ridiculous is not libelous if it comes across as evident parody).

²⁶⁴ The Virtuix Omni is one such example that we’ve tested, though calling it a two-dimension treadmill is a bit of an oversimplification. VIRTUIX, <http://www.virtuix.com/> [<https://perma.cc/9BVM-X79W>]. Strider VR offers another option. See Dominic Brennan, *Strider VR is an Intriguing New Omnidirectional Treadmill Solution*, ROAD TO VR (Aug. 14, 2017), <https://www.roadtovr.com/strider-vr-intriguing-new-omnidirectional-treadmill-solution/> [<https://perma.cc/HA3W-75M9>].

Moreover, you'll see the avatar not in some special context that you bring up just to see impersonations (e.g., a Saturday Night Live broadcast). Rather, you might see the avatar in your ordinary "travels" in the VR environment. Even if you logically recognize that the avatar is a pseudonym, it will feel like a person named "Eugene Volokh." And you might see the avatar fairly often, if he goes to the same online conferences or chat rooms or bars that you frequent.

The danger, then, is that your experience of the fictional "Eugene Volokh" will color your perception of the real Volokh. Even if you intellectually know that the dumb or rude things that "Eugene Volokh" says weren't really said by the real Volokh, when you actually meet the real Volokh those things may still taint your view of him. Perhaps you won't take what he says as seriously. Or perhaps you'll work hard to try to put the fake "Eugene Volokh" out of your mind while interacting with the real one, but that very process will distract you from your real interaction.

This is much like the concern that animates the law of trademark dilution by tarnishment.²⁶⁵ The law prevents people from producing Dogiva dog biscuits, even when consumers won't likely be confused into thinking that the dog biscuits are really from the people who make Godiva Chocolates. It's enough that the dog biscuits might taint the associations of the chocolates and make the chocolates less appetizing.²⁶⁶

To be sure, trademark dilution law is limited to commercial uses; the use here is noncommercial, and perhaps that should be relevant. Moreover, trademark dilution law is limited to "famous mark[s]," ones "widely recognized by the general consuming public of the United States."²⁶⁷ Our concern is actually with the opposite. If there is an avatar who is named "Justin Bieber," and who looks like Justin Bieber, this probably won't color your perception of the real Bieber: You're more likely to viscerally perceive the avatar as just a pseudonym or a reference because your mental image of Bieber is going to be more molded by Bieber's much larger media presence and because it seems less likely that he is really there interacting with you. Rather, our concern is for people who aren't particularly famous; they are the ones whose identity is most likely to be diluted by avatar impersonation.²⁶⁸

If this argument is right, then perhaps the right of publicity should have a broader scope as to VR and AR avatars than in other contexts, including as

²⁶⁵ See, e.g., 15 U.S.C. § 1125(c) (2012); CAL. BUS. & PROF. CODE § 14202(m) (West 2018).

²⁶⁶ *Grey v. Campbell Soup Co.*, 650 F. Supp. 1166, 1175 (C.D. Cal. 1986), *aff'd without op.*, 830 F.2d 197 (9th Cir. 1987).

²⁶⁷ 15 U.S.C. § 1125(c).

²⁶⁸ Some have likewise suggested that truly famous names and marks are actually hard to dilute. See, e.g., *Louis Vuitton Malletier S.A. v. Haute Diggity Dog, LLC*, 507 F.3d 252, 267 (4th Cir. 2007).

to noncommercial uses.²⁶⁹ Or perhaps we should be satisfied with some form of labeling, in much the way Twitter distinguishes “Real Donald Trump” from other Donald Trumps by using a blue verified check mark.

We are inclined to be cautious in expanding both the right of publicity and the trademark dilution theory. The right of publicity has generally excluded noncommercial uses, and we think that this is an important safeguard that prevents the right from trampling on much speech of social significance. The scholarship on dilution is at best inconsistent,²⁷⁰ and we have argued elsewhere that dilution law, like right of publicity law, raises significant First Amendment concerns.²⁷¹ But at a minimum the visceral nature of VR presents an interesting test of the theory of tarnishment; and as we learn more about how VR is actually experienced, we might find that our views have to change.

V. PERVASIVE INFORMATION CAPTURE

Because VR software captures your motion and activities and responds to them, there is a record of everything you do in VR. That record likely exists not only on your computer but also in the cloud. The VR company probably has broad access to it under the terms of use. Companies might or might not store it depending on space and legal constraints.

True, such pervasive information capture happens with your Internet browsing habits and data on your smartphone. The devices and sites you use track and store more than you think.²⁷²

But the data needed to make VR and AR work must not only generate a record of where I am and whom I interact with at any given time but may also save records of intimate acts and conversations. And the visceral, visual nature of those records may make us more concerned about the privacy of those records than we are about most of our texts.

VR systems are also likely to capture information that people may not expect and would consider particularly private. For instance, VR companies will

²⁶⁹ Though the right of publicity is generally applied just to commercial uses, some older cases suggest that even noncommercial appropriation of another’s name or likeness might sometimes be actionable. See, e.g., RESTATEMENT (SECOND) OF TORTS § 652C cmt. B (AM. LAW INST. 1977); see also *Hinish v. Meier & Frank Co.*, 113 P.2d 438, 448 (Or. 1941).

²⁷⁰ Compare Rebecca Tushnet, *Gone in Sixty Milliseconds: Trademark Law and Cognitive Science*, 86 TEX. L. REV. 507, 507 (2008) (“Though the cognitive theory of dilution is internally consistent and appeals to the authority of science, it does not rest on sufficient empirical evidence to justify its adoption.”), with Dogan & Lemley, *supra* note 261, at 1197 (noting that “dilution properly understood is targeted at reducing consumer search costs”).

²⁷¹ Mark A. Lemley & Eugene Volokh, *Freedom of Speech and Injunctions in Intellectual Property Cases*, 48 DUKE L.J. 147, 221 n.325 (1998).

²⁷² Jonathan R. Mayer & John C. Mitchell, *Third-Party Web Tracking: Policy and Technology*, in IEEE SYMPOSIUM ON SECURITY AND PRIVACY 413, 415 (2012), <http://ieeexplore.ieee.org/document/6234427?reload=true> [https://perma.cc/C6BT-BPF5].

want a detailed map of our bodies to allow us to interact realistically using avatars. They also may want sensory data about physiological responses to apps, both in order to rate games and to detect and fix errors making people sick.

They may want to track where my eye moves in order both to prevent dizziness and to optimize display and rendering.²⁷³ Oculus, for instance, tracks users' head, hand, and eye movements, as well as whether they are sitting or standing. It shares that information with developers, and perhaps with third parties.²⁷⁴ Other companies may track, gather, and perhaps resell information aimed at estimating users' emotional responses.²⁷⁵ There are good reasons for companies to collect that data, but it is likely to be data that people don't expect they are sharing with a private company.

Indeed, this sort of retention might be billed as a valuable feature for users, who can then have a "life log" that they could review or search later to refresh their memories or relive or show others interesting moments.²⁷⁶ But it may happen even when users would rather that it didn't happen, especially when it comes to their interactions with others who do choose to keep such life logs.

And the retention might also be useful for in-system dispute resolution systems, for instance if users dispute the terms of a commercial transaction they entered into online or claim that they were libeled or otherwise injured. Perhaps there might be, for instance, a form of internal subpoena, where people can require the production of any conversations that involved them. That offers the promise of helping resolve many of the kinds of disputes we

273 For a discussion of the legal issues with eye tracking technology, see BHAVISHYA RAVI, PRIVACY ISSUES IN VIRTUAL REALITY: EYE TRACKING TECHNOLOGY (July 3, 2017), <https://www.alston.com/-/media/files/insights/publications/2017/07/alstonbird-eyetracking-16pvlr27.pdf> [<https://perma.cc/D4ZE-G869>].

274 See Letter from Jordan McCollum, Gen. Counsel, Oculus, to Senator Al Franken (May 13, 2016), https://www.franken.senate.gov/files/letter/160519_OculusRiftResponse.pdf [<https://perma.cc/6J9Z-WCSB>].

275 Lucas Matney, *Looxid Labs is Combining Brain Waves and VR to Build an Analytics Super Engine*, TECHCRUNCH (Sept. 18, 2017), <https://techcrunch.com/2017/09/18/looxid-labs-is-combining-brain-waves-and-vr-to-build-an-analytics-super-engine/> [<https://perma.cc/2QXM-LQT5>]. For a different sort of information gathering, see Camila Domonoske, *Vibrator Maker To Pay Millions Over Claims It Secretly Tracked Use*, NAT'L PUBL. RADIO (Mar. 14, 2017, 1:52 PM), <https://www.npr.org/sections/thetwo-way/2017/03/14/520123490/vibrator-maker-to-pay-millions-over-claims-it-secretly-tracked-use> [<https://perma.cc/VL23-J493>].

276 Query whether such life-logging can be restricted by law, in the name of protecting others' privacy, or whether the recorders have a First Amendment right to record information in order to be able to communicate it later, whether for political purposes, entertainment, or autobiography. See U. OF WASH. TECH POLICY LAB, *supra* note 124, at 6; Thierer & Camp, *supra* note 7, at 19-20, 39-40; Daxton R. "Chip" Stewart & Jeremy Littau, *Up, Periscope: Mobile Streaming Video Technologies, Privacy in Public, and the Right to Record*, 93 JOURNALISM & MASS COMM. Q. 312, 320 (2016). For cases recognizing some right to record—though often just limited to public spaces or the behavior of public officials—see *Turner v. Driver*, 848 F.3d 678, 689 (5th Cir. 2017) (holding there is a constitutionally protected right to videotape police carrying out their duties in public); *ACLU of Illinois v. Alvarez*, 679 F.3d 583, 608 (7th Cir. 2012); *Glik v. Cunniffe*, 655 F.3d 78, 82 (1st Cir. 2011); and *Smith v. City of Cumming*, 212 F.3d 1332, 1333 (11th Cir. 2000).

discussed above, either by providing evidence in court or by facilitating dispute resolution outside the legal system.

Maintaining such records, though, will also facilitate government investigations in circumstances in which the law does seek to intervene. That will sometimes be good, but it can also be abused. Presumably all such recordings would be subject to subpoena—but only if they're kept in the first place.²⁷⁷ Should they be?

Under current Fourth Amendment law there is no constitutional barrier to such subpoenas or even outright searches, on the (controversial) theory that one can't have a strong expectation of privacy in data one turns over to VR and AR companies.²⁷⁸ But should there be some sort of privilege, developed by common law or by statute, either requiring a high showing of relevance for such subpoenas, or perhaps even categorically banning them (as would be the case for most attorney-client-privileged or priest-penitent-privileged information, for example)?

VR and AR operators need to consider all these questions, and VR and AR users need to consider what they want, especially if different operators adopt different policies. How long should the systems maintain records of in-system interactions? Should they let individual users erase their own records? What records should be kept for possible future dispute resolution?

Companies will have to take a position on these questions. A privacy-oriented provider, for instance, might store most data locally rather than in the cloud. And when the information is stored, the legal system needs to consider how broadly such records should be made available to the government and to litigants. Governments will also have to decide whether and how to regulate private use of this data for marketing purposes.²⁷⁹

To be sure, there may be practical limits to data capture. VR generates *a lot* of data—too much to practically transmit and store on an ongoing basis, at

²⁷⁷ Some have argued that there should be a warrant required in such cases. See, e.g., Jonathan Mayer, *Government Hacking*, 127 YALE L.J. 570, 641-43 (2018); see also U. OF WASH. TECH POLICY LAB, *supra* note 124, at 6 (suggesting that courts rethink the third-party doctrine, which is the reason why warrants have generally not been required here). In some other countries, this information might be even more easily available to the government. See, e.g., Stanley Lubman, *China's Social Credit System: Turning Big Data Into Mass Surveillance*, WALL ST. J. (Dec. 21, 2016, 12:20 PM), <https://blogs.wsj.com/chinarealtime/2016/12/21/chinas-social-credit-system-turning-big-data-into-mass-surveillance/> [<https://perma.cc/R4A8-A2M3>] ("The Chinese government is taking the first steps in an evolving plan to employ big data to establish a nationwide system of mass surveillance of the entire population. This 'social-credit system' would mobilize technology to collect information on all citizens and use that information to rate their behavior, including financial creditworthiness and personal conduct."). And in other countries that have strong privacy protections, the information may be less available.

²⁷⁸ See, e.g., *United States v. Jean*, 207 F. Supp. 3d 920, 931-33 (W.D. Ark. 2016) (summarizing case law on the limits to Fourth Amendment protection in material that users communicate to computer service providers).

²⁷⁹ For an argument for immediate regulation of the use of data gathered in VR, see Roya Bagheri, *Virtual Reality: The Real Life Consequences*, 17 U.C. DAVIS BUS. L.J. 101, 118 (2017).

least today. That fact might itself mean that while everything that happens in VR generates data, we may not keep much of that data for very long. But perhaps as storage gets ever cheaper and quicker, even that will not be a barrier.

VI. COMPULSORY VR EXPERIENCES

VR promises to provide especially effective training. What if the government is so pleased with such training that it mandates its use—and not just for teaching particular processes, but for changing attitudes and beliefs?

Researchers, for instance, have already developed a VR program aimed at treating domestic abusers by virtually placing them into a victim's shoes: having them “experience the virtual scene as if they were the target” of domestic “verbal abuse and intimidation.”²⁸⁰ One can imagine similar VR programs—whether aimed at preventing domestic violence, sexual violence, workplace harassment, or crimes or torts or rule violations more broadly—being mandated not just for convicted abusers, but for high school students, entering college students, government employees, or even private employees.

California law, for instance, already orders large employers to require their supervisory employees to go through at least two hours of sexual harassment training every two years.²⁸¹ We have had such training ourselves, and we're skeptical about how much the current version actually improves people's behavior²⁸²—but VR training, in which the trainee is made to play the part of a victim, might well be much more effective. Could and should the government mandate such training? Or should there be some restraints on

²⁸⁰ S. Seinfeld et al., *Offenders Become the Victim in Virtual Reality: Impact of Changing Perspective in Domestic Violence*, 8 SCI. REPORTS, Feb. 9, 2018, at 1, <https://www.nature.com/articles/s41598-018-19987-7> [<https://perma.cc/KL6P-9FE9>]. The study reports that the VR treatment appears to significantly increase the probability that the (male) offenders will correctly recognize fear on female faces—something that such offenders are generally less likely than nonoffenders to accurately do, and that has been hypothesized to help cause domestic violence. See Amy D. Marshall & Amy Holtzworth-Munroe, *Recognition of Wives' Emotional Expressions: A Mechanism in the Relationship Between Psychopathology and Intimate Partner Violence Perpetration*, 24 J. FAM. PSYCHOL. 21 (2010). The study is of course far from definitive: It was based on a small set of experimental subjects (20 abusers and 19 control group members), and it's not clear that its temporary effect on fear recognition would translate into any lasting change in behavior. But it seems quite possible that the technology would have such effects, and media coverage of the study suggests that there is enthusiasm for such solutions. See, e.g., Shivali Best, *Virtual Reality Is Used to Treat Domestic Violence Offenders by Placing Them in Their Victim's Shoes*, MIRROR (UK) (Feb. 26, 2018), <https://www.mirror.co.uk/tech/virtual-reality-used-treat-domestic-12090653> [<https://perma.cc/CU5A-UDVW>].

²⁸¹ CAL. GOV'T CODE § 12950.1 (West 2018).

²⁸² “Remarkably little research has been performed on the effectiveness of employers' efforts to raise awareness.” Vicki J. Magley & Joanna L. Grossman, *Do Sexual Harassment Prevention Trainings Really Work?*, SCI. AM. (Nov. 10, 2017), <https://blogs.scientificamerican.com/observations/do-sexual-harassment-prevention-trainings-really-work/> [<https://perma.cc/V9J3-ZN9W>] (“To date . . . only one research study has looked at [whether the training reduces sexual harassment]. And it found that the training was ineffective.”).

such government mandates, whether constitutional or statutory? Should there even be statutory limits on some private employer VR training mandates?

These questions will be particularly important once haptics and, perhaps, algics²⁸³ are developed. If someone suggested real-world training programs (especially government-mandated ones) in which the subjects had to be beaten or deliberately put in pain as a means of learning empathy or “influenc[ing] perceptions, attitudes and behaviors,”²⁸⁴ many would likely oppose such programs, at least outside training aimed at preparing soldiers or police officers for real fighting or real pain.²⁸⁵ Unwanted touching, especially of breasts or genitals, seems objectionable as well, again unless the training is for a job that requires touching (such as medicine).²⁸⁶

But even if the VR is purely audiovisual, its visceral impact could make it feel almost like real touching; indeed, that is one reason that VR training might be so effective. If people perceive “virtual groping” as highly intrusive, would it be proper to require unwilling subjects to submit to virtual groping so they know how it feels and thus learn not to inflict it—or real groping—on others?

And even in the absence of perceived physical touching, should there be some limit on compelling people to have certain VR experiences when the goal is to change their beliefs or moral attitudes? Can the government require people to “live” in VR for some time as a different race or sex, as a means of preventing racism or sexism? Can it require people to experience being a police officer in VR, so they can better empathize with the threats and hard choices that police officers face? Can it require people to spend time in a VR representation of an ISIS-controlled city, or a North Korean prison camp, so that people come to better appreciate the evils of particular foreign regimes (and perhaps the merits of military actions against such regimes)?

Our sense is that the answers to these questions will likely turn on the why, the what, and the who:

- Training aimed at teaching specific skills (e.g., driving a car, if people continue driving cars) may raise different legal issues than training aimed at changing attitudes or beliefs.

²⁸³ See *supra* text accompanying note 153.

²⁸⁴ Seinfeld et al., *supra* note 280.

²⁸⁵ Many police officers are, for instance, required to get Tasered and pepper-sprayed as part of their training, though there might be legal constraints on this when the officers have medical conditions that make such training risky. See *Lewis v. City of Union City*, 877 F.3d 1000 (11th Cir. 2017).

²⁸⁶ There might be constraints on this even when it comes to medical training. See *Doe v. Valencia Coll. Bd. of Trs.*, 838 F.3d 1207, 1212-13 (11th Cir. 2016) (holding that transvaginal ultrasound exams, which a state college required its sonography students to undergo as part of their training, were searches for Fourth Amendment purposes, and remanding for an analysis of whether the requirement was reasonable under the circumstances).

- Training involving perceived intrusion on one's physical space, especially with a sexual dimension, may be especially troubling. So might training involving fear of human attack, which may lead the subject to feel dominated by another person.
- Training required for convicted criminals as a condition for probation or early release may raise different legal issues than training legally required of the public at large, or (say) all supervisory employees at all large private companies.
- On the other side of the "who," it would matter whether the imposition comes from a government, a private employer, a private college, or a private K-12 school.

We suspect that it's too early to tell what the law should do in such situations; but we hope that identifying the issues, and the potential distinctions, might be helpful as the VR training mandates begin to arise.

VII. PRIVATIZATION

The virtual street is likely to be largely privately owned. The virtual environment operators we discuss will generally be private companies. There are some government-run environments, for instance set up by public universities or for government services (imagine, for instance, a virtual environment designed for military training). And those government servers will be subject to some different rules, including the First Amendment. But the dominant operators are likely to be the VR analogs to Facebook or Google; indeed, some might be subsidiaries of the actual Facebook and Google.²⁸⁷

We think this will generally produce competition and thus be good for innovation. But it will likely yield at least two kinds of controversies.

A. *Monopolies*

The story of the Internet has been of intense competition followed by consolidation. Google has emerged as the overwhelming leader in search engines (at least in the U.S.); Facebook has done the same within its domain. (Remember Myspace? Livejournal?)

Such dominance is not permanent; if someone builds a better search engine, it may displace Google like Google displaced Yahoo!.²⁸⁸ And even a

²⁸⁷ One of the major VR companies, Oculus, is owned by Facebook.

²⁸⁸ Mohit Aron, *Why Google Beat Yahoo in the War for the Internet*, TECHCRUNCH (May 22, 2016), <https://techcrunch.com/2016/05/22/why-google-beat-yahoo-in-the-war-for-the-internet/> [https://perma.cc/ZM5A-PZEH].

dominant company may feel a good deal of pressure to innovate in order to make people use the product more. Social media, for instance, competes for user interest and time with lots of other forms of social connection and entertainment; Facebook may want to make its platform more engaging to get people to spend more hours on Facebook and less on Netflix, even though Facebook's and Netflix's products don't directly compete.

Nonetheless, consumers and regulators may well worry about monopolies in this market as in others. Google has already attracted antitrust investigation.²⁸⁹ Future VR environment operators may find the same. So might VR equipment manufacturers. (Recall the IBM antitrust case, which lasted from 1969 to 1982.²⁹⁰)

There may also be pressures to mandate interoperability. One important feature of VR hardware is that it should interact well with multiple VR environments: Just as an Apple computer can be used to access either Google or Bing, VR headsets should ideally be designed to work well with a wide range of software and not just programs licensed by the headset designers. That interactivity is even more important because of network effects. My VR headset is more useful if many other people have headsets that will run the same software and let me communicate with them.²⁹¹

Interoperable hardware systems have traditionally trounced their closed counterparts in market competition. VHS beat out Betamax VCRs in the 1970s in large part because the open hardware standard allowed a wide variety of companies to build products that worked with the format. The same is true with PCs, which reduced Macs to a niche market in the 1980s.²⁹² The Mac comeback didn't happen until after the rise of the Internet made it possible to run most programs on any platform.

But interoperability is far from inevitable. Most video game platforms are closed, and many have exclusive content available on only one system. The market will likely encourage interoperability, but if it doesn't, there might be calls to require it as a matter of law, especially if one company emerges as dominant.

The current debates about "net neutrality" might also be duplicated in the VR world: There may be a push to bar VR hardware producers from discriminating against particular VR software producers, or to bar VR shopping mall operators from discriminating against particular would-be VR

²⁸⁹ See, e.g., Mark Scott, *Google Fined Record \$2.7 Billion in E.U. Antitrust Ruling*, N.Y. TIMES (June 27, 2017), https://www.nytimes.com/2017/06/27/technology/eu-google-fine.html?_r=0 [<https://perma.cc/SLW8-MCJT>].

²⁹⁰ Edward T. Pound, *Why Baxter Dropped the I.B.M. Suit*, N.Y. TIMES (Jan. 9, 1982), <http://www.nytimes.com/1982/01/09/business/why-baxter-dropped-the-ibm-suit.html> [<https://perma.cc/AXG7-DGSF>].

²⁹¹ For a discussion of network effects, see Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CALIF. L. REV. 479, 590-91 (1998).

²⁹² *Id.* at 592.

“storefronts” that want access to the shopping mall’s customers. Just as the Internet works best as a neutral platform on which anyone can build, an interactive VR network open to all will likely maximize adoption of the technology by both software developers and users. At the same time, we want private companies to have the incentive to improve the hardware technology, making headsets smaller and lighter, improving resolution, and adding other features that make the experience more immersive.

Whether such neutrality mandates really promote innovation or instead slow it down is of course hotly disputed. The net neutrality debates generally involve tradeoffs between incentives to invest in the hardware network and incentives to develop software that runs on top of that network.²⁹³ They also present the curious situation of regulation designed to serve the purpose of deregulation. The same issues will arise in VR.

We don’t intend to express an opinion on how those issues should be resolved in VR; it’s too early in the development of the technology for that. But if we are right that access to VR devices and platforms will become as critical to daily life as access to the Internet and that they are likely to be dominated by one or a few private companies, these debates about promoting competition and innovation will likely arise there as much as they do for the Internet. At the very least, a dominant platform is likely to face calls to have some sort of due process before banning users or apps from its system (and hence effectively from the virtual world altogether).

B. Free Speech

Private environments are not state actors for First Amendment purposes. They can, for instance, ban avatars wearing Nazi regalia, or expel users for vulgarity or for virtual flag burning or blasphemy. That is true even if VR environments are monopolies.²⁹⁴

Of course, the more we experience private environments as “virtual streets” or virtual parks or shopping districts, the more uneasy many people—including judges—will be with this lack of constitutional constraint. Even in 1946, the Supreme Court concluded that the private owners of a “company town” should be constrained by the First Amendment.²⁹⁵ A few states have extended the same reasoning to large privately owned shopping malls,²⁹⁶ though most

²⁹³ For a discussion of this, see Barbara van Schewick, *INTERNET ARCHITECTURE AND INNOVATION* 73-74 (2010).

²⁹⁴ See, e.g., *Jackson v. Metro. Edison Co.*, 419 U.S. 345, 351-52 (1974).

²⁹⁵ *Marsh v. Alabama*, 326 U.S. 501, 509 (1946).

²⁹⁶ *Robins v. PruneYard Shopping Ctr.*, 592 P.2d 341, 347 (Cal. 1979); *Green Party of New Jersey v. Hartz Mountain Indus., Inc.*, 752 A.2d 315, 328 (N.J. 2000); see also *Bock v. Westminster Mall Co.*, 819 P.2d 55, 61-62 (Colo. 1991) (adopting such a rule but only when the government uses

states have refused.²⁹⁷ As people get used to “living” in VR, at least a good part of each day, they may press for changes in the law that treat the virtual street like a real street. As Richard Re put it, “Forget company towns—how about a company reality?”²⁹⁸

Some of these environments really will be company “towns.” As VR is increasingly adopted in education and the workplace, many people will have no effective choice but to use VR—and not just VR, but the system and software their school or employer provides.

At the same time, VR environment providers may credibly argue that they have their own First Amendment rights to choose what to present as part of the audiovisual content that they’re providing their customers. The Supreme Court has held that state law may not require newspapers to provide a right of reply to people they criticize: “The choice of material to go into a newspaper . . .—whether fair or unfair—constitute[s] the exercise of editorial control and judgment,” and the First Amendment protects that judgment.²⁹⁹ A court has applied the same logic to a search engine’s choice of what to include in search results.³⁰⁰ The same logic should apply to VR environment providers, who choose what material will appear in the video and audio feeds that their users receive.

This brings us back, oddly enough, to the indecent exposure question discussed in subsection II.A.2. If one views a VR environment as essentially a highly interactive movie (or video game) presented to its viewers, then government bans on nude avatars are bans on the display of nude images, and thus unconstitutional. Likewise, requirements that the VR environment operator provide access to speech and speakers that it doesn’t want are unconstitutional requirements that the producer of a speech product (whether a newspaper, a film, or VR video and audio) include speech that it doesn’t want.

But if one views a virtual street as the equivalent of a real street, then bans on nude avatars are bans on public nudity, which are generally constitutional. And requirements that VR operators provide open access to speakers are like

space in the mall for traditional government functions, such as a police substation); *Batchelder v. Allied Stores Int’l, Inc.*, 445 N.E.2d 590, 595 (Mass. 1983) (adopting such a rule but only as to signature gathering for elections).

²⁹⁷ *Golden Gateway Ctr. v. Golden Gateway Tenants Ass’n*, 29 P.3d 797, 802 n.5 (Cal. 2001) (collecting cases in which courts declined to follow *Robins*).

²⁹⁸ Email from Richard Re, Assistant Professor of Law, UCLA School of Law to Eugene Volokh, Professor of Law, UCLA School of Law (Mar. 14, 2017) (on file with author).

²⁹⁹ *Miami Herald Publ’g Co. v. Tornillo*, 418 U.S. 241, 258 (1974). The Supreme Court upheld right-of-reply requirements for *broadcasters* in *Red Lion Broad. Co. v. FCC*, 395 U.S. 367, 396 (1969), but that case has been limited to over-the-airwaves broadcasting, which has historically been subjected to greater regulations. *See Reno v. ACLU*, 521 U.S. 844, 869 (1997); *Turner Broad. Sys., Inc. v. FCC*, 512 U.S. 622, 637 (1994).

³⁰⁰ *Zhang v. Baidu.com Inc.*, 10 F. Supp. 3d 433, 443 (S.D.N.Y. 2014). One of us co-wrote a white paper commissioned by Google supporting that view. Eugene Volokh & Donald M. Falk, *Google: First Amendment Protection for Search Engine Search Results*, 8 J.L. ECON. & POL’Y 883, 894 (2012).

requirements that real estate owners—such as private shopping malls or universities³⁰¹—provide such open access; those requirements have been upheld.

VIII. THE LIGHT VR AND AR CAN SHED ON LEGAL DEBATES MORE BROADLY

As promised, we have just sketched some of the more interesting legal issues that VR and AR are likely to generate. But some of this analysis, we hope, can also reflect on broader legal debates. Let's briefly recap some such possibilities.

A. *Order Without (Much) Law*

For various reasons, we might see crimes, torts, and other problems arise in VR without the legal system doing much about it. The Bangladesh problem will mean that enforcement will often be too difficult, especially as to the less serious crimes and torts that we're likely to see in VR and AR. Because VR looks to an outsider like something that isn't real, and because right now most potential issues arise in the context of games, many courts and police departments may instinctively conclude that misconduct is a private matter within the game or server.³⁰² The availability of technologically enabled self-protection will give people a cheap alternative to calling the police and going to court, which will in turn make police even more reluctant to intervene. VR and AR operators' ability to contractually waive liability, coupled with 47 U.S.C. § 230, will likely discourage lawsuits against the operators.

And this relative lack of government-imposed law may not be bad, at least at the outset. There is a natural tendency for legislatures or courts to intervene to try to solve perceived problems with new technologies. But the best way to nurture a new technology can sometimes be for the law to leave it alone.

Anupam Chander has argued that a series of (largely accidental) decisions in the early history of the Internet created safe spaces in which companies could innovate without the fear of government regulation.³⁰³ The same may prove true of VR and AR. We don't yet know how these technologies will

301 See, e.g., *Rumsfeld v. Forum for Acad. & Institutional Rights, Inc.*, 547 U.S. 47, 70 (2006); *PruneYard Shopping Ctr. v. Robins*, 447 U.S. 74, 88 (1980); *State v. Schmid*, 84 N.J. 535, 568 (1980), *dismissed as moot sub nom. Princeton Univ. v. Schmid*, 455 U.S. 100 (1982) (recognizing a right to access in open university spaces despite a university's potential property right interests).

302 Kerr, *supra* note 14, at 416-17 (arguing against new laws to regulate conduct within virtual worlds because virtual worlds "at bottom are computer games, and games are artificial structures better regulated by game administrators than federal or state governments" (footnote omitted)).

303 Anupam Chander, *How Law Made Silicon Valley*, 63 EMORY L.J. 639, 642 (2014) ("[L]egal innovations in the 1990s that reduced liability concerns for Internet intermediaries, coupled with low privacy protections, created a legal ecosystem that proved fertile for the new enterprises of what came to be known as Web 2.0."); see also Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y.U. L. REV. 460, 506-07 (2015).

develop, both technologically and culturally. Setting legal rules too early risks rendering those rules irrelevant as the technology moves in unexpected ways.³⁰⁴ Worse, legal rules can unduly channel or stifle the development of technology. So a generally hands-off approach to regulation of VR and AR is probably good, at least for now.³⁰⁵

At the same time, many of the problems we discussed above are (or are likely to become) real ones. In the absence of legal regulation, VR and AR communities can and should develop their own norms to govern permissible and impermissible social interactions. VR and AR companies (both hardware platforms and software companies) can also contribute by considering and adopting best practices for behavior. Operators could set up dispute resolution systems within the environment they run, whether for quality-of-life matters or for commercial transactions.

There are, however, limits to private ordering as a solution to disputes that arise in VR and AR. We are likely to see those limits tested when operators seek to insulate themselves completely from liability for any sort of injury (as they invariably will). Many of the potential harms involve the risk of physical injury or at least serious psychological injury. That makes it important that consent at least be actual, not merely a legal conclusion that somewhere there is a terms of service contract posted and I am deemed to have agreed to it by turning on my machine.³⁰⁶

There is a good argument that courts have stretched the definition of consent too far in the browsewrap cases generally.³⁰⁷ But even if contract law continues to enforce these terms in general, courts are increasingly pushing back on specific provisions that seem unfair or surprising to consumers, and that are contained in contract forms the consumer had no effective opportunity to review.³⁰⁸ Consent should mean informed consent with a

³⁰⁴ See, e.g., Jane Kaufman Winn, *Open Systems, Free Markets, and Regulation of Internet Commerce*, 72 TUL. L. REV. 1177, 1253 (1998) (discussing examples of legal regulation of emerging technology that became irrelevant because the technology moved in an unexpected direction).

³⁰⁵ But see Werbach, *supra* note 13, at 902 (arguing in the context of the sharing economy that treating the Internet as a separate place made governments too reluctant to regulate it).

³⁰⁶ Joshua Fairfield argues that terms-of-use contracts cannot suffice to create legal rules for virtual worlds; we need some public law in those worlds. Fairfield, *supra* note 230, at 459.

³⁰⁷ See, e.g., KIM, *supra* note 237, at 5 (“The rigid rules of traditional contract law simply ignore the reality of modern day transactions. Realizing the limits of playing by formalistic rules, courts have twisted contract doctrine to uphold certain agreements that made sense given [prior] business environments.”); Lemley, *supra* note 237, at 465 (“[I]n today’s electronic environment, the requirement of assent has withered away to the point where a majority of courts now reject any requirement that a party take any action at all demonstrating agreement to or even awareness of terms in order to be bound . . .”).

³⁰⁸ For recent decisions narrowing the reach of browsewrap contracts, see *Nguyen v. Barnes & Noble, Inc.*, 763 F.3d 1171, 1178–79 (9th Cir. 2014); *Specht v. Netscape Commc’ns Corp.*, 306 F.3d 17, 32 (2d Cir. 2002); *Mohamed v. Uber Techs., Inc.*, 109 F. Supp. 3d 1185, 1204 (N.D. Cal. 2015).

reasonable alternative, not simply a legal acknowledgement of the existence of boilerplate somewhere. And in the real world even clear waivers of liability often don't apply to negligent or intentional physical harm.³⁰⁹

B. *Virtual Reality and the Speech–Conduct Distinction*

VR and AR will also challenge our understanding of what is speech (or, more precisely, communication)—and thus strongly protected by the First Amendment and other norms—and what is non-speech conduct that merits regulation. Is a nude avatar like nudity on a drive-in screen (speech) or like indecent exposure (conduct)? Are avatars apparently having sex like a sex scene on a drive-in screen (speech, though perhaps in some situations within the obscenity exception) or public lewdness (conduct, and indeed a sex crime)?

Is virtual non-haptic groping like the display of an image (speech) or like unwanted touching, or the threat of unwanted touching (conduct)? Is the display of a scene that leads the user to walk off a cliff, or even just into his apartment wall, more like an error in the Mushroom Encyclopedia (speech) or an error in an aviation chart (treated by the law as conduct)? Is a VR environment operator like a shopping mall, and thus subject to possible regulations requiring it to provide access to speakers, or like a filmmaker or video game manufacturer, with its own First Amendment rights not to include speech that it wants to exclude?

There are good reasons in the physical world to distinguish between words and actions and between words and things. Some of the lines turn out to be difficult to draw, and some of the results might not make a whole lot of sense. But the basic distinction makes sense in the physical world because we think the harm words can cause at a distance is generally less and easier to avoid than the harm of physical contact.

VR and AR, though, are deliberately created to make communicated images and sounds feel like real life. They challenge our perception of the real because they blur the cognitive line between imagery and physical presence. People initially react to a virtual slap as if they had actually been slapped.³¹⁰ The reaction is visceral; it doesn't involve real physical contact, but it feels real in a way that words or images outside VR don't.³¹¹

That requires us to consider why we restrict things like indecent exposure when we don't restrain images of the same things, and whether the physical

³⁰⁹ See *supra* notes 226 and 228.

³¹⁰ See *supra* subsection I.C.2.

³¹¹ To be sure, courts in the last century worried about movies in much the same terms. See, e.g., *Joseph Burstyn, Inc. v. Wilson*, 343 U.S. 495, 502 (1952) (rejecting the claim that “motion pictures possess a greater capacity for evil, particularly among the youth of a community, than other modes of expression”).

reality or the perception should be the driving force.³¹² And that in turn raises fundamental questions about what counts as harm, in VR and AR or outside it.

C. *The Virtual, the Real, and the Nature of Harm*

The self-protection options we discussed above, unlike systemic limitations on what can happen, change only my lived experience and not yours. If I exercise the option to avoid seeing you naked, you may not know about it. As far as you know you're naked in front of me, but my experience is that you are clothed.

We might be fine, even happy, with that difference. It allows a sort of live-and-let-live freedom of sensescape in which our vision of what happens differs. We might even think that if freedom of sensescape should be a baseline legal norm of VR, it will often require that different people perceive things differently.

But maybe that shouldn't satisfy us. Does the ability to prevent my perception of bad things mean that they don't injure me? That turns out to be a hard question that gets at some pretty fundamental issues around the nature of harm.

If the harm is my physical or psychological experience of seeing you naked (or my being virtually groped), much and perhaps all such harm can easily be avoided by giving me control over how you appear to me and how you can interact with my avatar.³¹³ Yet this subjective or unshared experience may have corrosive effects on the real world. If I use my control over your appearance in my sensescape to perceive you as naked when you are talking to me, I may treat you differently in that conversation, and perhaps treat you differently afterwards.

Further, in other contexts we punish antisocial behavior like groping that is intended to harm someone even if it doesn't, perhaps to deter actual harm but perhaps because we view the culpability of the groper as an independent wrong even if no one is injured and no one views or records the act. It is not clear that the law should, or even can, regulate that behavior.³¹⁴ But whether or not we prohibit it, we might reasonably worry about the effects of that behavior as a society.³¹⁵

Finally, we might find a dignitary injury in the mere knowledge that bad things are happening to me even if I don't experience them. As Judge Posner

³¹² For a similar discussion of whether Internet law should consider the way the Internet actually works or the way it seems to work to users, see Orin S. Kerr, *The Problem of Perspective in Internet Law*, 91 GEO. L.J. 357, 362-64 (2003).

³¹³ The exceptions will be things like defamation, fraud, and the right of publicity, because they affect how I am viewed by third parties. My reputation is injured by your defamation even if I never learn about it. Indeed, the harm might be worse in that case, since I have no opportunity to respond to falsehoods I never hear about.

³¹⁴ *Stanley v. Georgia*, 394 U.S. 557, 565 (1969) ("If the First Amendment means anything, it means that a State has no business telling a man, sitting alone in his own house, what books he may read or what films he may watch. Our whole constitutional heritage rebels at the thought of giving government the power to control men's minds.").

³¹⁵ Cf. Andrew Gilden, *Punishing Sexual Fantasy*, 58 WM. & MARY L. REV. 419, 431 (2016) (discussing how the law treats sexual fantasy when it is revealed).

put it, “[i]magine if nude pictures of a woman, uploaded to the Internet without her consent though without identifying her by name, were downloaded in a foreign country by people who will never meet her. She would still feel that her privacy had been invaded.”³¹⁶

This in turn requires us to think seriously about some distinctions we take for granted—between presence and remoteness, between speech and conduct, and between what is real and what is “merely” perceived. If it turns out that the reason we ban indecent exposure is in part about perception and psychic harm rather than physical threat, that might cause us to rethink what it means to be hurt in a way the law cares about. If it turns out that we care about the perpetrator’s intended behavior (and, from his subjective perspective, his actual conduct) even in the absence of any harm to the victim, as we do in some but not all attempt law, that suggests a much broader notion of what we would punish if we only knew about it. And that has implications not just for the virtual world but also for the real world.

CONCLUSION

VR and AR will present challenging issues for the law. Many such issues will require adapting existing doctrines to new circumstances or modifying legal rules to take account of new facts. We don’t have definitive answers to these questions; our purpose in raising them is to begin the process of thinking about them.

But some themes stand out across legal doctrines. The visceral nature of VR will challenge the lines the law draws between physical presence and remoteness, between conduct and speech, and between physical and psychological harm. The fact that VR occurs on private, proprietary systems subject to terms of use and that people are disinclined to treat it as real means that the law is likely to be reluctant to intervene in a number of cases. And the ability to define the terms of your interaction within the world in software may change the prospects for self-protection.

The very existence of VR and AR poses existing legal questions in new ways, ways that can illumine the assumptions the law makes about freedom and harm in the physical world as well as the virtual world. For that reason alone, it is worth paying attention to the developing law of virtual and augmented reality.

³¹⁶ *Northwestern Mem’l Hosp. v. Ashcroft*, 362 F.3d 923, 929 (7th Cir. 2004).