



BROWSE

SUBSCRIPTIONS

SUBMIT A PAPER

BLOG



REGISTER

SIGN IN



Advanced

Search

Download this Paper

Open PDF in Browser

Share:

Law, Virtual Reality, and Augmented Reality

Stanford Public Law Working Paper No. 2933867

UCLA School of Law, Public Law Research Paper No. 17-13

64 Pages

Posted: 17 Mar 2017

Last revised: 14 Apr 2017

[Mark A. Lemley](#)

Stanford Law School

[Eugene Volokh](#)

University of California, Los Angeles (UCLA) - School of Law

Date Written: March 15, 2017

Abstract

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:

(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).

Paper statistics

DOWNLOADS

1,163

RANK

13,646

ABSTRACT VIEWS

4,479

Related eJournals

Stanford Law School,
Public Law & Legal Theory
Research Paper Series

Follow



University of California,
Los Angeles School of Law,
Public Law & Legal Theory
Research Paper Series ...

Follow



[View more](#)

(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?

Keywords: Virtual Reality, Augmented Reality, Law & Technology, Criminal Law, Torts, Privacy, Right of Publicity

[Suggested Citation](#)

[Show Contact Information](#)

[Download this Paper](#)

[Open PDF in Browser](#)

[Submit a Paper](#)

Section 508 Text Only
Pages

Quick Links

[Research Paper Series](#)

[Conference Papers](#)

[Partners in Publishing](#)

[Organization](#)

[Homepages](#)

[Newsletter Sign Up](#)

Rankings

[Top Papers](#)

[Top Authors](#)

[Top Organizations](#)

About

[SSRN Objectives](#)

[Network Directors](#)

[Presidential Letter](#)

[Announcements](#)

[Contact us](#)

[FAQs](#)



INTRODUCTION

In the summer of 2016, the world suddenly went crazy for Pokemon 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 Pokemon GO parties.¹ Hospitals and the Holocaust Museum put up signs warning players that there were no Pokemon to be found on the premises.² At least one police station politely asked people who came to the police station to catch Pokemon to do so outside the building rather than coming in to bother their officers.³

Gamers and those with a nostalgia for the Pokemon card game loved the Pokemon GO phenomenon. People whose property was invaded by dozens or hundreds of Pokemon GO players hated it, or adapted to it, or tried to make money from it.⁴ Many other people 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.

Pokemon 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

* William H. Neukom Professor, Stanford Law School; partner, Durie Tangri LLP. Article © 2017 Mark A. Lemley & Eugene Volokh.

** Gary T. Schwartz Professor of Law, UCLA School of Law; academic affiliate, Mayer Brown LLP.

Thanks to the participants at the UC Davis conference on Future-Proofing Law, the Stanford Law School conference on regulating disruption, and the Internet Law Works in Progress conference for comments on prior drafts; and to Tyler O'Brien and James Yoon for research assistance.

¹ Irv Leavitt, *Northbrook Police Plan Pokemon Go Hunt with Northbrook Kids*, CHI. TRIB., Aug. 2, 2016.

² Andrea Peterson, *Holocaust Museum to Visitors: Please Stop Catching Pokémon Here*, WASH. POST, Jul. 12, 2016; Suzanne Baker, *At Naperville Hospital and Schools, It's Pokemon 'No'*, L.A. TIMES, Jul. 19, 2016.

³ Ben Guarino, *Australian Cops to Pokemon Fans: Do Not Come Looking for Pikachu in Our Police Station*, WASH. POST, Jul. 7, 2016.

⁴ Abby Ohlheiser, *What Happens When Pokémon Go Turns Your Home into a Gym*, WASH. POST, Jul. 11, 2016; Alex Schiffer & Paresh Dave, *Aside from Investors, Who Else Can Cash in on the 'Pokemon Go' Craze?*, L.A. TIMES, July 12, 2016.

world will increasingly be overlaid with information and images—sometimes related to what we physically see, sometimes not.

Beyond AR, there is also 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.⁵ And the technology, already impressive in its realism, continues to develop at a breakneck pace. While most applications of VR today remain games, it won't be long before more and more of our interactions occur in virtual rather than real space (especially as avatars become realistic enough, and begin to reliably track user facial expressions).

AR and VR both present legal questions for courts, companies, and users. Some are new takes on classic legal questions. People will die using AR and VR—indeed, some already have.⁶ They will injure themselves and others. Some will use the technology to threaten or defraud others.

Sorting out who is responsible will require courts to understand the technology and how it differs from the 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 e-mail, or a fax.⁷

⁵ *PlayStation VR to debut in October for \$399*, CNBC, Mar. 16, 2016, <http://www.cnbc.com/2016/03/16/playstation-vr-to-debut-in-october-for-399.html> (PlayStation VR); 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-realities-sluggish-debut/> (Oculus, Sony, and HTC); 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/> (Google Daydream View).

⁶ Charles Riley & Yoko Wakatsuki, *Pokemon Go-playing truck driver kills woman in Japan*, CNN, Aug. 24, 2016.

⁷ 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.

But AR and VR will also create new legal questions. Virtual interactions will be conducted through devices and networks that are privately owned and operated. 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 other questions that are more fundamental. VR isn't "real" in the way we normally mean that term. It is an artificial construct, bits cobbled together to produce 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 "just" 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. VR and AR will make it harder to draw that line, 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 experiences aren't "real" in the classic understanding of that term.

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 to the Internet over the past quarter century. But most of those efforts happened 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.” 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, but also a further excuse for real-world police departments not to get involved).

In Part III, we turn to 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 users’ alteration of other users’ avatars, or creation of their own avatars that borrow someone else’s name and likeness, and discuss whether that should be viewed as tortious.

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. And we close in Part VI by talking about two overarching issues—order without law and the speech-conduct distinction—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 to better develop both VR and AR law and VR and AR technology, 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, roughly following Moore’s Law.⁸ 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

⁸ See https://en.wikipedia.org/wiki/Moore's_law.

video are already being sent to your smartphone with a headset made of cardboard.⁹ For the moment, the best VR experiences require a cable connected to your PC, but that's likely to change soon, as on-board headset processing power and wireless communications technology improve.¹⁰

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 their pockets a computing device of incredible power.¹¹ 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 Pokemon 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, such as the Oculus Rift, the Vive, the Playstation VR, and the HoloLens. 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 platform. 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. Pokemon 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

⁹ Marcus Wohlsen, *Google Cardboard's New York Times Experiment Just Hooked a Generation on VR*, WIRED, Nov. 9, 2015.

¹⁰ Adi Robertson, *Seven Big Questions About Microsoft's New VR Headsets*, THE VERGE, Oct. 27, 2016, <http://www.theverge.com/2016/10/27/13421726/microsoft-windows-10-vr-headset-big-questions>.

¹¹ *Ericsson mobility report: On the pulse of the Networked Society*, ERICSSON, Nov. 2016, <https://www.ericsson.com/assets/local/mobility-report/documents/2016/ericsson-mobility-report-november-2016.pdf>

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. First, gaming itself is an enormous and underappreciated business and social phenomenon. Gaming is a significant phenomenon worth studying in its own right, and likely to become more so over time, since it is growing far faster than other forms of media. About 25 million Americans identify themselves as active video gamers.¹² The industry is a \$30 billion annual business in the U.S., and \$90 billion worldwide.¹³ 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.¹⁴

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.¹⁵

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 you to visit Syria and other news hot spots around the world, looking around (though not interacting).¹⁶ VR programs like Tiltbrush are already letting artists create art in three dimensions by working inside their creations.¹⁷ VR art has al-

¹² Maeve Duggan, *Gaming and Gamers*, PEW RESEARCH CENTER, Dec. 15, 2015, <http://www.pewinternet.org/2015/12/15/gaming-and-gamers/> (10% of American adults identify as “gamers”).

¹³ Entertainment 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/>; Dean Takahashi, *Worldwide game industry hits \$91 billion in revenues in 2016, with mobile the clear leader*, VENTURE BEAT, Dec. 1, 2016, <http://venturebeat.com/2016/12/21/worldwide-game-industry-hits-91-billion-in-revenues-in-2016-with-mobile-the-clear-leader/>.

¹⁴ David Segal, *Behind League of Legends, E-Sports’s Main Attraction*, N.Y. TIMES, Oct. 10, 2014.

¹⁵ Sandra Calvert & Siu-Lan Tan, *Impact of Virtual Reality on Young Adults’ Physiological Arousal and Aggressive Thoughts: Interaction Versus Observation*, 15 J. APPLIED DEVELOPMENTAL PSYCH. 125 (1994).

¹⁶ Susan Dominus, *The Displaced: Hana*, N.Y. TIMES, Nov. 5, 2015.

¹⁷ Frank Rose, *The Making of Virtually Real Art with Google’s Tilt Brush*, N.Y. TIMES, Jan. 4, 2017.

ready appeared in major museums.¹⁸ VR systems will allow a new generation of computer-aided design of products.¹⁹

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.²⁰ 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.²¹

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, proved to be a failure.²² But we think that is a problem with this particular implementation. The technology, when implemented right, will be powerful and profoundly appealing, not just in gaming but at work and in social life. AR apps include not only gaming, but 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.²³ Other AR projects includes heads-up displays for pilots and drivers that let them access important information without looking away from the road or the runway.²⁴

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

¹⁸ *Id.*

¹⁹ Jilan Ye, Saurin Badiyani, Vinesh Raja & Thomas Schlegel, *Applications of Virtual Reality in Product Design Evaluation*, in HUMAN-COMPUTER INTERACTION, HCI APPLICATIONS AND SERVICES (J.A. Jacko ed., 2007)..

²⁰ Marco della Cava, *Virtual Reality Tested by NFL as Tool to Confront Racism, Sexism*, USA TODAY, April 8, 2016.

²¹ Daniel Newman, *Hyper-Training and the Future Augmented Reality Workplace*, FORBES, Sep. 20, 2016.

²² Nick Bilton, *Why Google Glass Broke*, N.Y. TIMES, Feb. 4, 2015.

²³ Hayley Tsukayama, *Everything You Need to Know About Google Glass*, WASH. POST, Feb. 27, 2014.

²⁴ Matt Richtel, *Windshield Devices Bring Distracted Driving Debate to Eye Level*, N.Y. TIMES, May 29, 2015.

well as of transportation and hotels). And it can help people maintain friendships and family life across distance.

And there is much more coming. The ability to overlay data on an image of the real world (or, with Glass, on the real world itself) has myriad possible uses beyond depicting cute monsters. 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).²⁵

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 avatars. 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.

C. *The effect on our interaction with the world*

1. Distraction

VR and AR will not simply 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,²⁶ in large part because people are texting and driving.²⁷ Phones

²⁵ Natasha Singer, *Never Forgetting a Face*, N.Y. TIMES, May 17, 2014 (discussing Namtag, an early app for Google Glass which accomplished this) Oddly enough, the ancient Romans had a special job category for a human who performed such services for politicians who wanted to pretend to know voters’ names—a *nomenclator*. William Safire, *On Language*, N.Y. TIMES, Dec. 30, 1979.

²⁶ Neal E. Boudette, *U.S. Traffic Deaths Rise for a Second Straight Year*, N.Y. TIMES, Feb. 15, 2017.

²⁷ 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.

are attractive nuisances, and we are generally less good than we think we are at splitting our attention between them and the real world.

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,²⁸ the temptation to just look for a moment at the latest alert is almost irresistible. 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 Pokemon GO have walked off a cliff or into oncoming traffic.²⁹ 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 proportion 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 (presumably) 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 and start to fall as they take that one step, because their body is signaling them that they are falling.³⁰

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

²⁸ Stephen Williams, *As Head-Up Displays Become Common, Distraction Becomes an Issue*, N.Y. TIMES, Sept. 10, 2015.

²⁹ Veronica Rocha, *2 California Men Fall off Edge of Ocean Bluff While Playing 'Pokemon Go'*, L.A. TIMES, July 14, 2016l.

³⁰ Liat Clark, *Walking the Plank with the Oculus Rift is Stomach-churning stuff*, WIRED, May 30, 2013.

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.³¹ 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.”³² Those subjects who interacted with the stranger via text screen did not produce comparable levels.³³

Many people cannot 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. It releases chemicals in response to perceived threats, pleasures, or opportunities whether or not the brain knows those things aren’t real.

People in VR environments physiologically respond to actions done to them in VR.³⁴ Subjects who see themselves getting slapped in VR respond with skin conductance and heart rate levels as if they were actually getting slapped. The results are replicable even when the subject is male and their VR “body” is female.³⁵

Indeed, the realism of VR can be harnessed for therapy. VR has been effectively used to treat stress³⁶ and brain damage³⁷ because the

³¹ Benedict Carey, *Decades Later, Still Asking: Would I Pull That Switch?*, N.Y. TIMES, July 1, 2008.

³² Mel Slater et al., *A virtual reprise of the Stanley Milgram obedience experiments*, 1 PLOS ONE e39 (2006); Marcus Cheetham et al., *Virtual Milgram: empathic concern or personal distress? Evidence from functional MRI and dispositional measures*, 3 FRONTIERS HUMAN NEUROSCIENCE 29 (2009).

³³ Slater, *supra* note 32.

³⁴ Mel Slater et al., *First person experience of body transfer in virtual reality*, 5 PLOS ONE e10564 (2010).

³⁵ *Id.*

³⁶ Matilda Annerstedt et al., *Inducing physiological stress recovery with sounds of nature in a virtual reality forest—Results from a pilot study*, 118 Physiology & Behavior 240 (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 (2016).

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.³⁸

VR therapy has also been compared to imaginal therapy—asking patients to imagine the anxiety-inducing situations. 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.³⁹ 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 very 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 normal 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 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 increas-

³⁷ Monica S. Cameirão et al., *Neurorehabilitation using the virtual reality based Rehabilitation Gaming System: methodology, design, psychometrics, usability and validation*, 7 J. NEUROENG. REHABIL. 48 (2010); Yoram Baram & Ariel Miller, *Virtual reality cues for improvement of gait in patients with multiple sclerosis*, 66 NEUROLOGY 178 (2006).

³⁸ Giuseppe Riva et al., *Interreality in Practice: Bridging Virtual and Real Worlds in the Treatment of Posttraumatic Stress Disorders*, 13 CYBERPSYCHOL. BEHAV. SOC. NETW. 55 (2010); P.M. Emmelkamp et al., *Virtual Reality Treatment Versus Exposure In Vivo: A Comparative Evaluation in Acrophobia*, 40 BEHAV. RES. THER. 509 (2002).

³⁹ Brenda K. Wiederhold et al., *The Treatment of Fear of Flying: A Controlled Study of Imaginal and Virtual Reality Graded Exposure Therapy*, 6(3) IEEE TRANS. INF. TECHNOL. BIOMED. 218 (2002).

ing realistic-looking, and will include our facial expressions, which will be captured in real time and superimposed on the avatar.⁴⁰

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. This may be true with regard to race and sex, but it will be even more true of avoiding physical features that our society views as ugly or off-putting.

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. If they can instead VR- and AR-commute, all that time will be saved. 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.

And of course, as with much modern technology, VR and AR will be especially useful for people who are physically disabled—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. (Returning to a point mentioned in the

⁴⁰ Cat Zakrzewski, *Virtual Reality Takes On the Videoconference*, WALL ST. J., Sep. 18, 2016; James Gorman, *Manipulating Faces from Afar in Realtime*, N.Y. TIMES, Oct. 26, 2015.

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 proven 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.⁴¹

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 fat, bald, or ugly people) if the interviewers see an avatar who doesn't look like the real person. 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 interviewee is paying, how much attention he is showing, and the like.

4. Data

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

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.

⁴¹ Christina Duff, *Female Musicians Fare Better When Heard But Not Seen*, WALL ST. J., Mar 7., 1997.

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 pick up a sex partner for the evening, doing that in VR would require haptic hardware that goes beyond what we have today.⁴²

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.⁴³

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.⁴⁴) We thus focus on crimes of sound or of sight.

⁴² Of course, people are working on changing this. See, e.g., Alex Hawgood, *Interactive Gets a New Meaning*, N.Y. TIMES, Dec. 24, 2013.

⁴³ 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.

⁴⁴ See *supra* note 42.

A classic sound crime is disturbing the peace through loud noise, for instance through screamingly loudly in a public place.⁴⁵ That crime can pose First Amendment problems when applied to speech that disturbs because of its content,⁴⁶ but it's pretty straightforward when applied to speech that disturbs because it's too loud.⁴⁷

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. 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.

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 sitting in my bedroom, 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

⁴⁵ See, e.g., CAL. PEN. CODE § 415 (2015)

⁴⁶ E.g., *Cohen v. California*, 403 U.S. 15 (1971).

⁴⁷ See, e.g., *Kovacs v. Cooper*, 336 U.S. 77, 82–83 (1949).

a crime where the criminal is in a foreign country.⁴⁸ 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 the same state is a hassle.

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.

And there's every reason to think that the VR street criminals would indeed 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 that⁴⁹), and disproportionately 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 South Africa as in South Carolina. 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.

Yet the illusion of 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 only 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, gang members, schools, and the like.⁵⁰

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

⁴⁸ We have nothing against Bangladesh: It's just 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 "South Africa problem" or "India problem," if you prefer.

⁴⁹ Alec Ross, *The Language Barrier Is About to Fall*, WALL ST. J., Jan. 29, 2016.

⁵⁰ *Virginia v. Black*, 538 U.S. 343 (2003); *Elonis v. United States*, 135 S. Ct. 2001 (2015)

commotion in the real world; there's no reason why they wouldn't do the same in a VR space. People 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. Moreover, there will be more desire for criminal prosecution than with Internet misconduct, precisely because the feeling of physical presence may make the victims of VR street crime viscerally feel victimized. 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. And perhaps the VR platform requires people to identify themselves before accessing it, at least with a credit card; or with the proper subpoenas, the typical avatar can be traced back to an Internet subscriber. But the greater difficulties caused by extradition are likely to exceed the greater ease of proof. And many VR street crimes might thus be practically ignored by traditional police department.

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 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.

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 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. 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.⁵¹ 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.⁵²

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.⁵³ 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.

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.⁵⁴ But whether this law can be applied in VR turns out to be surprisingly complicated.

⁵¹ LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* (1999).

⁵² AltSpaceVR, a prominent program for social interaction in VR, already has such a feature. AltSpaceVR, *How Do I File an Abuse Report?*, Mar. 1, 2017, <https://help.altvr.com/hc/en-us/articles/206865083-How-do-I-file-an-Abuse-Report-> (“Before you submit [an abuse] report, we suggest Muting the individual that is being a disturbance. You can click the ‘Mute’ button on their nametag. This will cause them to stop moving and will eliminate any audio that they may be producing through their microphone.”).

⁵³ By “sensescape,” we simply mean the array of sensory inputs that a VR environments 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, Jul. 18, 2014.

⁵⁴ 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

The Supreme Court has held that public nudity may be banned even in strip clubs, where the patrons pay money to see such nudity.⁵⁵ 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).⁵⁶

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.⁵⁷ This seems inconsistent with the drive-in case,⁵⁸ but it may just reflect a deeper inconsistency between the drive-in case and the public nudity cases.

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.⁵⁹ 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.⁶⁰ 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.⁶¹

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.

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.

⁵⁵ *Barnes v. Glen Theatre, Inc.*, 501 U.S. 560, 564 (1991).

⁵⁶ *Erznoznik v. City of Jacksonville*, 422 U.S. 205 (1975).

⁵⁷ *People v. Huffman*, 702 N.W.2d 621 (Mich. Ct. App. 2005).

⁵⁸ 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).

⁵⁹ *Miller v. California*, 413 U.S. 15 (1973).

⁶⁰ See *Crawford v. Lungren*, 96 F.3d 380 (9th Cir. 1996) (upholding ban on unattended coin-operated newsrack sales of "harmful to minors" material); *American Booksellers v. Webb*, 919 F.2d 1493 (11th Cir. 1990) (upholding 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 (Tenn. 1993) (same).

⁶¹ *ACLU v. Ashcroft (II)*, 542 U.S. 656 (2004).

If that's so, public nudity in VR and AR becomes a harder case. After all, nudity in VR is technically 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.⁶² That is a serious worry when the exposor is physically nearby, but not 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 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.

But maybe this legal conundrum is likely to stay academic. First, 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?

Second, 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 other users' computers. Those users don't have to perceive me as the avatar I chose.⁶³

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 should be easy software to develop). Conversely, if they'd like to see more nudity, they could replace my avatar with whatever naked version—again, whether attractive or grotesque—they prefer.⁶⁴

⁶² See Sharon Riordan, *Indecent Exposure: The Impact Upon the Victim's Fear of Sexual Crime*, 10 J. FORENSIC PSYCH. 309, 313, 315 (1999).

⁶³ Allowing that sort of modification may create other legal problems, however, as we discuss below.

⁶⁴ The VR operator might also let the VR store outside which the nude avatar—or the screamer—is standing exercise some control over such behavior.

Indeed, they could probably use a program that automatically blacks out all the naked parts of naked-seeming avatars.⁶⁵ Or the operator can require people who select a nude avatar to also provide a nonnude version, so that 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.⁶⁶

Now let's play out again a conversation with the police, focusing on how this technologically enabled self-help 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 isn't 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*.⁶⁷ 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."

⁶⁵ 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/>.

⁶⁶ Presumably the operator would enforce this by threatening to delete nude avatars that lack a nonnude 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 nonnude avatar, most users would likely choose to comply with the operator's policy rather than go to the trouble of repeatedly evading it.

⁶⁷ 438 U.S. 726 (1978).

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, whereas I would have to go through much more effort to prosecute it. 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 say “your own fault for having left your front door unlocked, we won’t investigate the case.” 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.

And this tendency only increases as a result of the Bangladesh Problem. As arrest and prosecution becomes 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 don’t seem to them to involve any “real” harm.

3. Strobe lighting

Here’s a possible test case that does involve a serious harm that is harder to avoid: About 3% of people who have epilepsy—disproportionately, young people—can have seizures triggered by strobe lighting.⁶⁸ 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.⁶⁹ But deliberately creating a strobe effect in VR precisely to play a nasty prank on someone you know to be endangered by this would likely be tortious or even criminal.⁷⁰

⁶⁸ About 1% of the population has epilepsy, Rosemarie Kobau et al., *Epilepsy in adults and access to care—United States 2012*, MORBIDITY AND MORTALITY WKLY. REP. 909, 910, so this 3% of 1% amounts to about 100,000 people in the U.S., and many more outside.

⁶⁹ See *Coluni v. Northeast Roller Skating Indus., Ltd.*, 94 A.D.2d 824 (1983); *Coursey v. Nintendo of Am., Inc.*, 764 N.E.2d 597 (Ill. Ct. App. 1999).

⁷⁰ Derek Hawkins, *Newsweek Trump Critic Says He Had Epileptic Seizure After Twitter Troll Purposely Sent Him Flashing Image*, WASH. POST, Dec. 21, 2016.

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.⁷¹

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, and 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 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. But it will do so precisely because the consequences are more obviously physical rather than virtual.

4. "Virtual groping"

Harm, though, can also feel real without being physical. Only a few months after commercial VR became available, a woman named Jordan Belamire (a pseudonym) was "virtually groped." Belamire recounted playing a multi-player 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.

⁷¹ For a pre-VR analysis of this, see *How Is TV Made Safe for People with Epilepsy?*, BBC, June 7, 2007; see also Univ. of Md. College of Info. Studies, Trace es. & Dev. Ctr., *Photosensitive Epilepsy Analysis Tool*, <https://trace.umd.edu/peat> (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).

His floating hand 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 rubbing. . . .⁷²

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.⁷³

"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." Her experience is consistent with the studies we reported in Part 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.⁷⁴ Tort law tends to define "assault" as including an actor's intentionally putting someone in "imminent apprehension" of "offensive contact,"⁷⁵ but criminal law tends not to outlaw such behavior unless it is actually an attempt to commit battery.⁷⁶ 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.⁷⁷

Should the law be changed? We suspect that very few people would find virtual groping, accomplished through purely visual means, to be as upsetting as real groping. Nonetheless, Belamire is doubtless right that, because of the visceral feeling created by virtual reality, such virtual

⁷² Jordan Belamire, *My First Virtual Reality Groping*, MEDIUM: AETHENA TALKS (Oct. 20, 2016), <https://medium.com/athena-talks/my-first-virtual-reality-sexual-assault-2330410b62ee#.swe1c0pgr>.

⁷³ This is similar to the plank experiment, in which many VR participants find it very hard to step off what looks like a plank over a chasm, even though they know there really is no chasm. See *supra* note 30 and accompanying text.

⁷⁴ See, e.g., CAL. PENAL CODE § 243.4(e)(1) ("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 . . .").

⁷⁵ RESTATEMENT (SECOND) OF TORTS § 21.

⁷⁶ MODEL PENAL CODE § 211.1(2)(a).

⁷⁷ *Elonis v. United States*, 135 S. Ct. 2001 (2015)

groping will be more upsetting to many people than getting an unwanted tweet or an email expressing sexual desire.

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 than 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, there is reason to be skeptical of whether criminal law can and should apply. First, as always, is the Bangladesh Problem: 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 police officers who greatly respect women's bodily integrity may be hesitant to use a great deal of resources to deal with people who, after all, did not literally touch anyone.

Second, here too technologically enabled self-protection may be available. 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. Indeed, 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. The arrows that get shot at you stick in your helmet, which is good for a laugh, but they do no damage and quickly disappear so they don't get in the way. We hadn't, though, thought of extending that fading function to the rest of the body

I called Jonathan, who is . . . the original creator of QuiVr He'd already seen the article—his girlfriend had sent him the link—and he had spent the morning changing the game to extend the Personal Bubble; now, when 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 treated again.⁷⁸

⁷⁸ *Dealing With Harassment in VR*, UPLOADVR, Oct. 25, 2016, <http://uploadvr.com/dealing-with-harassment-in-vr/>.

Indeed, the 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, sent [the other] player flying off the screen like an ant.”⁷⁹ 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. 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.

5. Crimes that can’t be easily technologically avoided—extortion, threats, and the like

This cheapest-cost-avoider/you-could-have-avoided-it-yourself argument, of course, 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 little sympathy for your plight.

6. 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 of whatever sex you find attractive). 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. You are indeed startled and get into an accident.

⁷⁹ *Id.*

(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.)

That might well be a crime, such as reckless endangerment,⁸⁰ or negligent homicide or involuntary manslaughter if someone dies.⁸¹ It could certainly be a tort (more on that in Part III). 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-help measures.

But as a practical matter, this is likely to be a special case of the broader problem: AR can be distracting, especially for drivers⁸² 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.

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.

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 place (or time) where women go topless.

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) are normally nude. Or they may be nudists, who feel more comfortable coming across as naked, and being around other people who do the same.

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.

⁸⁰ MODEL PENAL CODE § 211.1(2)(a).

⁸¹ MODEL PENAL CODE § 210.4.

⁸² Stephen Williams, *As Head-Up Displays Become Common, Distraction Becomes an Issue*, N.Y. TIMES, Sept. 10, 2015.

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 can see nudists' avatars as nude. Those who dislike it can 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 can experience that environment without the nudity.

To be sure, some people may have moral objections even to voluntary nudity; consider the public nudity laws that ban nudity even in strip clubs.⁸³ 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. That is even more true when the environment itself is one you can choose whether or not to participate in.

The de facto 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.⁸⁴ 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 the value of technologically enabled self-help. Some people like strobe 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.⁸⁵ And epilepsy can be triggered by other near-strobe effects that are likewise valuable for aesthetics or for verisimilitude.⁸⁶ Giving people an option to decide whether to block 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.

⁸³ *Barnes v. Glen Theatre, Inc.*, 501 U.S. 560, 564 (1991).

⁸⁴ *See, e.g., State v. Louisiana Toy Co.*, 483 So. 2d 1264, 1268 (La. Ct. App.) (“[T]hat prosecutions for obscenity might be rare or even erratic does not mean they are arbitrary or discriminatory.”)

⁸⁵ FIRST ALERT, <http://www.firstalertstore.com/store/products/sl177-hearing-impaired-smart-strobe-light.htm> (last visited Mar. 10, 2017).

⁸⁶ *Photosensitivity and Seizures*, EPILEPSY FOUNDATION, <http://www.epilepsy.com/learn/triggers-seizures/photosensitivity-and-seizures> (“Natural light, such as sunlight, especially when shimmering off water, flickering through trees or through the slats of Venetian blinds,” “Television screens or computer monitors due to the flicker or rolling images,” and “Certain visual patterns, especially stripes of contrasting colors.”).

Finally, though more controversially, diversity of options may be relevant even for virtual groping. Most people, we believe, wouldn't like being virtually groped by people they just met online. 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: 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.

Some people, for instance, might find such attempts to be more akin to flirting than to assault, and find the possibility of such attempts to be welcome, even if they rebuff individual instances of the attempts. Indeed, there might be VR spaces where people go in order to meet prospective sexual partners (whether for in-person sex or for the VR equivalent of phone sex) in which such behavior is part of the courtship ritual.

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 physical experience;⁸⁷ 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 groped. But that's the point: There is a diversity of sexual preferences. VR offers the possibility that people can control their environment and consent to only what they want.

C. Defaults and the initial intrusion

All this, of course, raises a question that's a version of Justice Stevens's *Pacifica* argument. 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 allow what one might see as an initial intrusion, but can stop recurrences.

⁸⁷ Leon F. Seltzer, *Don't Call Them "Rape Fantasies"*, PSYCHOLOGY TODAY, Nov. 5, 2014, <https://www.psychologytoday.com/blog/evolution-the-self/201411/don-t-call-them-rape-fantasies>.

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.⁸⁸

And indeed the law generally forbids unwanted physical “blow[s]” (though not all unwanted touching), and all indecent telephone calls, including the initial call.⁸⁹ 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.⁹⁰ Likewise, the law can't categorically forbid door-to-door leafleters from coming to your home, though it can forbid them once you've put up a “No Soliciting” sign.⁹¹ And many, us among them, don't think *Pacifica* is a shining beacon of First Amendment jurisprudence.⁹²

Even in circumstances where people can practice self-help 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

⁸⁸ FCC v. *Pacifica Found.*, 438 U.S. 726, 749 (1978) (Stevens, J., lead op.).

⁸⁹ 47 U.S.C. § 223.

⁹⁰ *Rowan v. U.S. Post Office Dep't*, 397 U.S. 728, 738 (1970).

⁹¹ *Martin v. City of Struthers*, 319 U.S. 141 (1943).

⁹² FCC v. *Fox Television Stations, Inc. (II)*, 132 S. Ct. 2307, 2321 (2012) (Ginsburg, J., dissenting); FCC v. *Fox Television Stations, Inc (I)*, 556 U.S. 502, 532–35 (2009) (Thomas, J., dissenting). Indeed, Justice Stevens himself erred in trying to explain how *Pacifica* was consistent with Justice Stevens' 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. *Application of Pacifica Found.*, 50 F.C.C.2d 1025 (1975) (describing *Pacifica* as “the licensee of noncommercial educational FM Stations” including “WBAI, New York”); *In re Citizen's Complaint Against Pacifica Foundation Station WBAI (FM)*, 56 F.C.C.2d 94 (1975), *eventually 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.

default and (2) the user has expressly allowed the intrusion. This might mean that:

<p>If the environment lets you supply both a clothed avatar and a nude avatar, and by default has others only see your clothed avatar,</p>	<p>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.</p>
<p>If the environment lets you supply both a clothed avatar and a nude avatar, but by default lets people see the nude avatar,</p>	<p>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.</p>
<p>If the environment only lets you supply one avatar, but allows a “clothe this avatar” feature on an avatar-by-avatar basis,</p>	<p>then you’re likewise guilty of indecent exposure for using a nude avatar.</p>

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. 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, 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-help matters, there’s no need to bring the machinery of the criminal law into the matter. (Tort law might be a different story.)

But this judgment will often turn on just what intrusions you think are minor enough: Unwanted noise? Nudity? Strobe lights? Virtual groping? We have views on the relative severity of these—the law should probably prohibit virtual groping without explicit prior consent, but not unwanted noise and probably not nudity—but reasonable people 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.

Haptics are to touch what are 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 business called teledildonics.⁹³

Teledildonics raises the possibility of haptic sex crimes. 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, sexually transmitted diseases and unwanted pregnancy aren't a threat in the virtual world; and 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 matchsticks, it is often said, isn't the same as real poker. Likewise, playing at sword fighting when being speared through the neck just means "Game Over" isn't as realistic, they think, 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* hard-core) 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.⁹⁴ Likewise, some social psychology experiments punish people who lose a game by requiring them to consume a substance that is extremely unpleasantly bitter, so as to encourage participants to take the game seriously.⁹⁵

⁹³ No, we aren't providing a citation. Search for it yourself if you really want to.

⁹⁴ See, e.g., *How to Treat Paintball Welts*, <https://acpaintball.com/2015/04/22/how-to-treat-paintball-welts/> ("Most players consider paintball well worth the risk of pain, some even welcome the risk to increase the adrenaline and excitement.")

⁹⁵ 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 (1987).

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 think of it as “algics” rather than normal haptics.⁹⁶) People who want to play Extreme Sword Fights (let’s call it) must have the device attached, and when they are hit with the virtual sword, they get a real shock.⁹⁷ Here, unlike our previous examples, we do have actual physical contact with the victim’s body, albeit contact 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.⁹⁸ And you consented to be hit by a virtual sword—or at least to run the risk of being hit. 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.

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, or 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. In-

⁹⁶ *-algia* is the Greek root meaning pain, as seen in words such as “analgesic.”

⁹⁷ 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/>.

⁹⁸ See, e.g., MODEL PENAL CODE § 2.11(2) (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 625 (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).

deed, many games have currency top-up systems that let players put real money in and convert it to virtual money when they run out.⁹⁹

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.

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 laws announced within 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 algics scenario¹⁰⁰ to the possibility that I would be 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*?¹⁰¹ 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* and *Diplomacy*, 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 consent to everything that *could* physically happen within the game, whether or not it is *legally allowed*

⁹⁹ Hayley Tsukayama, *Diablo 3 Auction House to Charge Real Money for In-game Goods*, WASH. POST, Aug. 1, 2011.

¹⁰⁰ See *supra* Part II.D.

¹⁰¹ We're not sure how much outright theft is currently physically possible in *Game of Thrones—The Game*; but if it isn't, it should be.

within the game. This has been labeled the “magic circle” excluding real law from virtual worlds.¹⁰²

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 circumvent the limitations under which everyone else operates.¹⁰³ If game makers ban the exploits,¹⁰⁴ a player could presumably have a civil or even criminal cause of action against the cheater, just as she could pursue a computer hacker who took valuable data off her laptop. 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.¹⁰⁵

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. “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 shouldn't apply when the store is part of a normal VR shopping mall.¹⁰⁶

Again, though, the distinction turns, we think, on consent: One consents to more trickery when one is playing a game than when one is 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 acknow-

¹⁰² See Joshua Fairfield, *The Magic Circle*, 11 VAND. J. ENT. & TECH. L. 823 (2009); Mark A. Lemley, *The Dubious Autonomy of Virtual Worlds*, 2 U.C. IRVINE L. REV. 575 (2012).

¹⁰³ Abby Ohlheiser, *'World of Warcraft' halted an army of cheaters with a massive player ban*, WASH. POST, May 15, 2015.

¹⁰⁴ *Id.*

¹⁰⁵ Greg Lastowka & Dan Hunter, *Virtual Crimes*, 49 N.Y.L. SCH. L. REV. 293 (2004–05).

¹⁰⁶ See Greg Lastowka & Dan Hunter, *The Laws of the Virtual Worlds*, 92 CALIF. L. REV. 1 (2003) (both arguing that virtual property shouldn't be outside the scope of real-world laws); Fairfield, *Magic Circle*, *supra* note 102 (same).

ledge the possibility of fraud and theft as a condition of playing the game.¹⁰⁷

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 in succession rather than the officially allowed one. I'm very upset by your deliberately sadistic behavior, and I try to have you prosecuted.¹⁰⁸

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.

Here too self-help may play a role. It seems very likely that algic devices, such as the electric shockers, will 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. Certainly manufacturers would have lots of incentive to provide such features and tout them to users.

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.

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. (Again, VR and AR are better that way than real reality is: Our bodies have biological haptic and algic

¹⁰⁷ Greg Lastowka, *Virtual Justice*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1702427 (working paper 2014) (noting the risk of theft in virtual environments and the ways in-game rules might deal with it).

¹⁰⁸ Regina v. McSorley, [2000] BCPC 0166, <http://www.provincialcourt.bc.ca/judgments/pc/2000/01/p00%5F0 116.htm>.

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 seen as much more intrusive and offensive than even unauthorized pain in a sword-fighting game, there may be good reason to require some overt opt-in before such touching, at least when it moves beyond the thigh and on to the breasts or genitals (though again recall that this becomes a problem only if one attaches haptics to those parts of one's body).

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, but we think the problem is bound up with how we think about consent in a particular virtual environment.

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, though it almost certainly isn't rape under the current U.S. definition of the term.¹⁰⁹ Perhaps intentional infliction of emotional distress?¹¹⁰ Perhaps the tort of battery, on the theory that the consent defense is made unavailable because of the fraud?¹¹¹

¹⁰⁹ See, e.g., *Suliveres v. Commonwealth*, 449 Mass. 112 (2007). Some statutes do treat sex while impersonating a *spouse* as rape. See, e.g., CAL. PEN. CODE § 261(a)(5).

¹¹⁰ See, e.g., RESTATEMENT (SECOND) OF TORTS § 46.

¹¹¹ See, e.g., RESTATEMENT (SECOND) OF TORTS §§ 18, 19 (nonconsensual offensive touching can be battery); *id.* § 892B(2) (consent procured by fraud may be invalid).

Here, too, the possibility of technological self-help might incline the law not to be too quick to intervene. 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 about the 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 a form of battery, though that question is complicated.¹¹²

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.¹¹³ Nuisance also generally requires either long-term interference or especially serious interference;¹¹⁴ disturbing the peace law punishes even brief incidents.

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

¹¹² RESTATEMENT (THIRD) OF TORTS: INTEN. TORTS TO PERSONS § 101.

¹¹³ RESTATEMENT (SECOND) OF TORTS § 822.

¹¹⁴ RESTATEMENT (SECOND) OF TORTS §§ 821D, 821F cmt. g.

space.¹¹⁵ 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,”¹¹⁶ 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 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.¹¹⁷ 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.¹¹⁸

Corporations can sue for defamation, because people invest time and money to create reputational capital for the corporation.¹¹⁹ 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. The idea that falsehoods that damaged the reputation of Mark Twain weren’t defamatory unless they expressly mentioned Samuel Clemens strikes us as unsound.

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.

¹¹⁵ RESTATEMENT (SECOND) OF TORTS § 652B.

¹¹⁶ See, e.g., *State Rubbish Collectors Ass’n v. Siliznoff*, 240 P.2d 282 (Cal. 1952) (threats); *Bundren v. Superior Court*, 145 Cal. App. 3d 784 (1983) (telephone calls rudely demanding payment from a person who the caller knew was recovering from surgery); *Esposito-Hilder v. SFX Broadcasting, Inc.*, 665 N.Y.S.2d 697 (N.Y. App. Div. 1997) (radio talk show describing plaintiff as the “ugliest bride” in a newspaper’s wedding announcement section). 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.

¹¹⁷ Lemley, *Dubious Autonomy*, *supra* note 102, at 576. No, we won’t tell you who it was. What happens in the hallways outside conferences stays in the hallways outside conferences.

¹¹⁸ *Id.*; Lastowka & Hunter, *Laws*, *supra* note 106, at 72–73.

¹¹⁹ See, e.g., *Martin Marietta Corp. v. Evening Star Newspaper Co.*, 417 F.Supp. 947 (D.D.C. 1976).

Most readers probably couldn't come up with the real name of The Weeknd, but that doesn't mean we couldn't defame him.¹²⁰

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-help—the complainant can still demand his day in court.¹²¹

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.¹²² 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 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;¹²³ any judgment, moreover, would still be costly to enforce.

¹²⁰ Try this: Selena Gomez is too good a singer for him.

¹²¹ Comparative negligence is generally not a defense to intentional torts, though of course outright consent would be. RESTATEMENT (SECOND) OF TORTS § 892A.

¹²² See, e.g., Alan M. Trammel & Derek Bambauer, *Personal Jurisdiction and the "Interwebs,"* 100 CORNELL L. REV. 1129 (2015).

¹²³ Some small claims courts are limited in their jurisdiction over out-of-state defendants. See, e.g., N.Y. CITY CIV. CT. ACT § 1801 (limiting New York

And the police may be as reluctant to go after a faraway 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 Pokemon might run into someone,¹²⁴ or might cause damage by trespassing on someone's property.¹²⁵ A VR user wearing a headset might walk into a houseguest. 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 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. Just as a car or bicycle manufacturer may be liable for physical injuries caused by defects in the device, so 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 Ninth Circuit has held that the publisher of the Mushroom Encyclopedia isn't strictly liable when you poison yourself because the Encyclopedia had bad information.¹²⁶ On the other hand, the publisher of a flawed aeronautical chart is strictly liable when you use the chart to fly into a mountain.¹²⁷

City small claims courts to actions where “the defendant either resides, or has an office for the transaction of business or a regular employment”).

¹²⁴ Hayley Tsukayama, *Pokemon Go's unexpected side effect: injuries*, WASH. POST, Jul. 10, 2016.

¹²⁵ Richard Winton, *Police fear the dark side of 'Pokemon Go'*, L.A. TIMES, Jul. 12, 2016. We set aside VR or AR defects that cause pure trespass, without damage. Negligent trespass is generally not actionable absent damage. RESTATEMENT (SECOND) OF TORTS § 165. Likewise, a manufacturer's negligence in leading someone to trespass should generally not be actionable without damage, either.

¹²⁶ *Winter v. G.P. Putnam's Sons*, 938 F.2d 1033 (9th Cir. 1991).

¹²⁷ *Brocklesby v. United States*, 767 F.2d 1288 (9th Cir. 1985).

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 assumes that the VR system is supposed to know where walls and other obstacles are, but they generally do.¹²⁸

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.¹²⁹

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 users 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 won't want to limit suits against operators just 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 the tortfeasors themselves, but 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 rea-

¹²⁸ See, e.g., Oculus, *Oculus Guardian System*, <https://developer3.oculus.com/documentation/pcsdk/latest/concepts/dg-guardian-system/> ("The Oculus Guardian System is designed to display in-application wall and floor markers when users get near boundaries they defined.").

¹²⁹ *Winter v. G.P. Putnam's Sons*, 938 F.2d 1033, 1036 (9th Cir. 1991).

sonable care to safeguard their business visitors from physical harm.¹³⁰ That includes harm from criminal attack.¹³¹ The theory is one of negligence, not of strict liability or vicarious liability: A shopping mall owner wouldn't be liable simply because a visitor was criminally attacked by another visitor.¹³² 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.¹³³

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, which we use on our own real estate? 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 software protections that users cannot themselves provide.¹³⁴ Conversely, if the VR and

¹³⁰ RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 51 (2012).

¹³¹ *Id.*

¹³² *See, e.g.,* Castaneda v. Olsher, 162 P.3d 610 (Cal. 2007).

¹³³ *See, e.g.,* Kline v. 1500 Massachusetts Avenue Corp., 439 F.2d 477 (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 §§ 19, 34.

¹³⁴ *See, e.g.,* Mills v. White Castle System, Inc., 421 N.W.2d 631, 634 (Mich. Ct. App. 1988).

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 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 it strictly liable, of course. 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 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."¹³⁵ 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 do 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).¹³⁶

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.¹³⁷

¹³⁵ RESTATEMENT (THIRD) OF TORTS: PHYS. & EMOT. HARM § 7(a) & cmt. o.

¹³⁶ 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: PHYS. & EMOT. HARM § 56.

¹³⁷ *Fonovisa v. Cherry Auction*, 76 F.3d 259 (9th Cir. 1996). This duty is limited by statute for online service providers, though not entirely eliminated. 17 U.S.C. § 512.

- 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.¹³⁸

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. 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?)

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.¹³⁹ 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.¹⁴⁰

But we don't think that juries should be making such decisions, especially on an *ex post* basis, in a case brought when plaintiff has been

¹³⁸ *Doe v. XYZ Corp*, 887 A.2d 1156 (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.

¹³⁹ Rachel Feintzeig & Rachel Emma Silverman, *In the Uber Age, a Boom in Background Checks*, WALL ST. J., May 10, 2016.

¹⁴⁰ Stephanie Rosenbloom, *New Online-Date Detectives Can Unmask Mr. or Ms. Wrong*, N.Y. TIMES, Dec. 18, 2010.

injured and when the effects of imposing liability will be felt by third parties who aren't present 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.¹⁴¹

If those precautions are to be legally required, they should be required only as a result of a legislative decision directed to certain specific kinds of precautions and specific kinds of 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 the bounds of contributory copyright infringement. And we worry that the consequences of imposing such a duty would cause other, 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 claim is that defendant failed to implement reasonably inexpensive and effective technological self-help 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 operation of the 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; more on this diversity shortly.

E. 47 U.S.C. § 230 as a limit on VR/AR operator liability

We also think it's likely that, under current law, VR/AR operators would be immune from liability for most misconduct by their users, because of 47 U.S.C. § 230. Section 230 generally bars any "interactive computer service" provider from being held liable based on "information provided by another information content provider."¹⁴² This is why, for instance, 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 items posted by their users.¹⁴³

The story of § 230 is long and oft-told, and we won't repeat it here.¹⁴⁴ 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 the like.

¹⁴¹ See Eugene Volokh, *Tort Law vs. Privacy*, 114 COLUM. L. REV. 879 (2014).

¹⁴² 47 U.S.C. § 230 (2012).

¹⁴³ *Zeran v. America Online, Inc.*, 129 F.3d 327 (4th Cir. 1997), *cert. denied*, 524 U.S. 937 (1998).

¹⁴⁴ See, e.g., Anupam Chander, *How Law Made Silicon Valley*, 63 EMORY L.J. 639 (2014).

It would probably immunize them even from communications that cause physical harm, such as the deliberately harmful use of strobe lighting.

At the same time, some recent courts have read § 230 more narrowly, perhaps because of a sense that rampant misconduct online requires someone to control it, in an environment where direct lawsuits against those who are misbehaving are impractical, and the police are unlikely to step in.¹⁴⁵ It is possible, though not certain, 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—so much more physical—than what the paradigm beneficiaries of § 230 offer. And haptic torts seem likely to be seen as not covered by § 230 at all.

F. Tort liability for physical injury to users; terms of use as contractual limits on liability

Finally, VR and AR defects are likely to also 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 in the courts. Unlike in Part II.E, here we mean not informed consent to having someone hit you with a virtual sword, but the fictional consent we consumers give whenever we are held to have agreed to terms of use that exist somewhere in a box or on a web page.¹⁴⁶

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

¹⁴⁵ See, e.g., *J.S. v. Village Voice Media Holdings, L.L.C.*, 359 P.3d 714 (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 (2016).

¹⁴⁶ Joshua Fairfield, *Anti-Social Contracts: The Contractual Governance of Virtual Worlds*, 53 MCGILL L. REV. 427 (2008).

electronic communications.¹⁴⁷ And that experience suggests that makers of the 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.¹⁴⁸

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 are at the whim of Apple's decisions of 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.¹⁴⁹ 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.¹⁵⁰

Waivers of liability would likely also likely cover injuries to privacy or other emotional distress.¹⁵¹ If a VR or AR operation wanted to disclaim any liability stemming from indecent exposure, virtual groping, and the like, it could do so.¹⁵² The question whether such operators are hypothetically liable under some negligent supervision or entrustment theory, or have 47 U.S.C. § 230, 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

¹⁴⁷ See, e.g., Greg Lastowka, *Walled Gardens and the Stationers' Company 2.0*, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2204465 (working paper 2013); cf. Dan Hunter, *Walled Gardens*, 62 WASH. & LEE L. REV. 607 (2005) (worrying about walled gardens in publishing).

¹⁴⁸ Lastowka & Hunter, *Virtual Crimes*, *supra* note 105.

¹⁴⁹ 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*, Feb. 24, 2017, <http://www.i-programmer.info/news/201-ios/10547-dash-life-without-the-app-store.html> (“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*, Nov. 2, 2016, <https://techcrunch.com/2016/11/02/controversial-crime-reporting-app-vigilante-banned-from-app-store/>.

¹⁵⁰ See *Bragg v. Linden Research, Inc.*, 487 F. Supp. 593 (E.D. Pa. 2007); Greg Lastowka, *User-Generated Content and Virtual Worlds*, 10 VAND. J. ENT. & TECH. L. 893, 915–16 (2008).

¹⁵¹ See, e.g., RESTATEMENT (THIRD) OF TORTS: APP. LIAB. § 2; *Erikson v. Nunink*, 233 Cal. App. 4th 708, 727 (2015).

¹⁵² 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 (2006)

word.¹⁵³ 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.¹⁵⁴

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 web site visits. VR systems are likely to collect not just data about you but other sensitive information, particularly if (as seems likely) one early use of VR is 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 web site visits.

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.

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.¹⁵⁵ Many are also less likely to enforce waivers when an activity is seen as practically necessary—not just if it's medical care, but possibly also auto repair¹⁵⁶—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.¹⁵⁷ But as they become more important for employment and business, they may indeed come to be seen as practical necessities.¹⁵⁸ 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 inju-

¹⁵³ *Id.*

¹⁵⁴ Kim, *supra* note 153; Florencia Marotta-Wurgler, *What's in a Standard Form Contract? An Empirical Analysis of Software License Agreements*, 4 J. EMP. L. STUD. 677 (2007) (finding no material difference in software license agreements).

¹⁵⁵ See, e.g., RESTATEMENT (THIRD) OF TORTS: APP. LIAB. § 2 & cmt.e.

¹⁵⁶ See, e.g., *Tunkl v. Regents*, 383 P.2d 441 (Cal. 1963) (holding a waiver of negligence liability as to medical care, even charitable care, unenforceable).

¹⁵⁷ See, e.g., *Randas v. YMCA of Metro. L.A.*, 17 Cal. App. 4th 158 (1993) (holding a waiver of negligence liability in a swimming class to be enforceable). *But see* *City of Santa Barbara v. Superior Ct.*, 161 P.3d 1095 (Cal. 2007) (holding a waiver of gross negligence liability to be unenforceable even as to recreational activity).

¹⁵⁸ See, e.g., *Gardner v. Downtown Porsche Audi*, 180 Cal. App. 3d 713 (1986) (holding a waiver of negligence liability in a contract with a car repair shop unenforceable, when the shop's negligence allowed the car to be stolen),

ry, the waiver that the provider requires users to sign might be ineffective.

G. Copyright and trademark liability to outsiders

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 47 U.S.C. § 230 immunity: liability for copyright and trademark infringement.

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.¹⁵⁹ 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. 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 appearing to fly?¹⁶⁰ Answering questions like that 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 goes into business selling such avatars without the copy-

¹⁵⁹ Well, for some of us, anyway.

¹⁶⁰ This issue has been litigated before in *Marvel Ents. v. NCSoft Corp.*, 2005 WL 878090 (C.D. Cal. March 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 suit settled*, ENGADGET, Dec. 14, 2005, <https://www.engadget.com/2005/12/14/marvel-vs-city-of-heroes-lawsuit-settled/>. And Disney notoriously threatened legal action against day care centers that featured murals of Disney characters on their walls. Paul Richter, *Disney's Tough Tactics*, L.A. Times, July 8, 1990, at D1.

right owner's approval, such a use would probably not be a fair use.¹⁶¹ It might also be trademark infringement.

Copyright and trademark owners, though, might well 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,¹⁶² but only until someone sends the operator a notice-and-takedown request; and then the operator would have to promptly block the allegedly infringing avatar, or risk losing a lawsuit.

There is an established body of case law that sets out the limits of intermediary liability under the DMCA.¹⁶³ There is less clarity on intermediary liability for trademark infringement on the Internet, but there too the law is developing.¹⁶⁴ 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, particularly copyrighted 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 raising the likelihood of overzealous enforcement by copyright owners.¹⁶⁵

Second, the use of AR is likely to generate some novel copyright issues involving derivative works. One way to infringe copyright is to combine your work with another in a way that creates a new work or changes the market for that work. AR users may do exactly that whenever they place a virtual Pokemon “in” a work of sculpture, visually merge the copyrighted work that appears in their phone or glasses with

¹⁶¹ See, e.g., *Marvel Enters. v. NCSOFT Corp.*, 74 USPQ 2d 1303 (C.D. Cal. 2005); Carl Michael Szabo, *Thwack!! Take That, User-Generated Content!: Marvel Enterprises v. NCSOFT*, 62 FED. COMM. L.J. 541 (2010).

¹⁶² 17 U.S.C. § 512.

¹⁶³ See, e.g., *Viacom Intern., Inc. v. YouTube, Inc.*, 676 F.3d 19 (2d Cir. 2012).

¹⁶⁴ See, e.g., *Tiffany (NJ) Inc. v. eBay Inc.*, 600 F.3d 93 (2d Cir. 2010); Mark A. Lemley, *Rationalizing Internet Safe Harbors*, 6 J. TELECOM. & HIGH TECH. L. 101 (2007).

¹⁶⁵ See, e.g., *Lenz v. Universal Music Corp.*, 815 F.3d 1145 (9th Cir. 2015); Daniel Seng, *The State of the Discordant Union: An Empirical Analysis of DMCA Takedown Notices*, 18 VA. J.L. & TECH. 369 (2014); 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 (2006).

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 treated such ephemeral changes to a copyrighted work as infringing.¹⁶⁶ Courts will have to decide whether and under what circumstances a user's subjective viewing 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.¹⁶⁷ On the Internet, neither penalty is all that drastic—or all that effective if you are a copyright owner. It is easy enough to repost a video that has been taken down, and frequently not that hard 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 with a particular web site, so the consequences of VR infringement under the DMCA may turn out to be higher than on the Internet.

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

¹⁶⁶ See, e.g., *Lewis Galoob Toys, Inc. v. Nintendo of America, Inc.*, 964 F.2d 965 (9th Cir. 1992); *Atari, Inc. v. North American Philips Consumer Electronics Corp.*, 672 F.2d 607 (7th Cir. 1982); *Micro Star v. Formgen Inc.*, 154 F.3d 1107 (9th Cir. 1998).

¹⁶⁷ 17 U.S.C. § 512.

themselves simply because it offends others (even the subjects of the images), 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-help by turning down your volume if you are too loud, virtually clothing your avatar as it appears on their AR or VR 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.¹⁶⁸ But if the software provides such control, it won't always be used to prevent crimes or torts.

What if people instead make your avatar appear naked to their eyes without your knowledge or consent? Naturally, they probably won't be able to make it look like your naked body actually looks, unless they have some 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 what if 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 in such a way 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 and we go to a VR bar together, why not let each of us perceive the décor 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?¹⁶⁹

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.

¹⁶⁸ *See supra* Part II.A.2.

¹⁶⁹ Fake celebrity porn—photoshopping someone's head onto an image of a naked body—is a real thing. This one too you can look up for yourself if you really want to.

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.¹⁷⁰

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 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.

This creepiness may well be reason for companies to ban or restrict some kinds of perception. But we don't think it makes such behavior illegal. That is true even for otherwise unprotected speech. 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. But display of speech that was not created as a result of criminal conduct is protected.¹⁷¹

Indeed, the Supreme Court's *Stanley v. 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.¹⁷²

That is even more apt, we think, for 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

¹⁷⁰ We're not personally at much risk of this, but we understand others might be.

¹⁷¹ See, e.g., *Ashcroft v. Free Speech Coalition*, 535 U.S. 234 (2002).

¹⁷² 394 U.S. 557, 565 (1969).

torts don't even apply to material shared with a few friends, and even more clearly don't apply to material displayed for one's own benefit.¹⁷³

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. Our point is only that it isn't illegal.

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 Arnold Schwarzenegger as a giant groping hand. 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, Alan's) appearance, perhaps exaggerating some unattractive feature of Alan's. Or John could share with his friends an avatar of their acquaintance Alice apparently naked, which is to say Alice'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, especially since it can be used for political, social, religious, and artistic commentary.

One question is whether publicizing sexually themed adaptations of others' avatars—an avatar that is configured to look like the user naked, even when the user has not chosen this—should be treated differ-

¹⁷³ See RESTATEMENT (SECOND) OF TORTS § 652D cmt. a. Libel law also doesn't apply when the speaker displays material solely for his own benefit. See RESTATEMENT (SECOND) OF TORTS § 577(1).

ently. Should such nonconsensual sexualization of others' images be forbidden by law, by analogy to the recent movement to forbid to 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,¹⁷⁴ though those cases are surprisingly rare, perhaps because none of the victims want to call more attention to the offending sites, or perhaps because the defendants are probably judgment proof, or in Bangladesh.¹⁷⁵

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.

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 avatars that are highly lifelike, 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 we could sue for libel,¹⁷⁶ or even seek criminal punishment under various state laws that ban impersonation.¹⁷⁷ But say that it's clear that this isn't the real Eugene 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

¹⁷⁴ Tim Kenneally, 'Storage Wars' Star Brandi Passante Files Real Lawsuit Over Fake Porn Video, THE WRAP, Oct. 30, 2012, <http://my.xfinity.com/blogs/tv/2012/10/30/storage-wars-star-brandi-passante-files-real-lawsuit-over-fake-porn-video/>.

¹⁷⁵ P. David Marshall, *Celebrity Fakes—Where Porn Meets a Sense of Possession*, THE CONVERSATION, Dec. 11, 2013, <http://theconversation.com/celebrity-fakes-where-porn-meets-a-sense-of-possession-20829>.

¹⁷⁶ See, e.g., *Rall v. Hellman*, 726 N.Y.S.2d 629, 631 (App. Div. 2001); *Yantha v. Omni Childhood Center, Inc.*, 2013 WL 5327516, *5 (E.D.N.Y. 2013).

¹⁷⁷ See, e.g., *People v. Golb*, 23 N.Y.3d 455 (2014).

their avatars). Reasonable observers would therefore realize, on a moment's reflection, that this isn't the real Eugene Volokh.

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 the First Amendment, notwithstanding any possible "right of publicity" claim.¹⁷⁸ 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.

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.

But perhaps such avatar design should not be allowed unless the person whose name and likeness is 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.

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 on-line conferences or chat rooms or bars that you frequent.

¹⁷⁸ See, e.g., JENNIFER E. ROTHMAN, *A RIGHT IS BORN: THE RIGHT OF PUBLICITY, CELEBRITY AND PRIVACY IN A PUBLIC WORLD* (forthcoming 2017); Stacey L. Dogan & Mark A. Lemley, *What the Right of Publicity Can Learn from Trademark Law*, 58 STAN. L. REV. 1161 (2006); Eugene Volokh, *Freedom of Speech and the Right of Publicity*, 40 U. HOUS. L. REV. 903 (2003).

The danger, then, is that your experience of the fictional “Eugene Volokh” will color your perception of the real Eugene Volokh. Even if you intellectually know that the dumb or rude things that “Eugene Volokh” says weren’t really said by the real Eugene Volokh, when you actually meet the real Eugene 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, of course, is much like the concern that animates the law of trademark dilution by tarnishment.¹⁷⁹ 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 may make the chocolates less appetizing.¹⁸⁰

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 marks,” ones “widely recognized by the general consuming public of the United States.”¹⁸¹ 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 Justin Bieber: You’re more likely to viscerally perceive the avatar as just a pseudonym, and because your mental image of Justin Bieber is going to be more molded by Bieber’s much larger media presence. 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.¹⁸²

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 to noncommercial uses.¹⁸³ Or perhaps we should be satisfied with some form of labeling, in much the way we distinguish “Real Donald Trump” from other Donald Trumps on Twitter by using a blue verified check mark.

¹⁷⁹ See, e.g., 15 U.S.C. § 1125(c); CAL. BUS. & PROF. CODE § 14202.

¹⁸⁰ *Grey v. Campbell Soup Co.*, 650 F. Supp. 1166 (C.D. Cal. 1986), *aff’d without op.*, 830 F.2d 197 (9th Cir. 1987).

¹⁸¹ 15 U.S.C. § 1125(c).

¹⁸² Some have likewise suggested that truly famous names and marks are actually hard to dilute. See, e.g., *Louis Vuitton Malletier v. Haute Diggity Dog*, 507 F.3d 252, 267 (4th Cir. 2007);

¹⁸³ 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 RESTATEMENT (SECOND) OF TORTS § 652C cmt. b.

We are inclined to be cautious in expanding both the right of publicity and the trademark dilution theory. The right of publicity has generally to exclude noncommercial uses, and we think that this is no balance an important safeguard. The scholarship on dilution is at best inconsistent,¹⁸⁴ and we have argued elsewhere that dilution law, like right of publicity law, raises significant First Amendment concerns.¹⁸⁵ 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

Finally, the fact that these contracts will vest rights with the hardware and software providers compounds another significant aspect of VR: because it is all software that 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 company probably has broad access to it under the terms of use. VR 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.¹⁸⁶ 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.

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. 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

¹⁸⁴ Compare Rebecca Tushnet, *Gone in Sixty Milliseconds: Trademark Law and Cognitive Science*; 86 TEX. L. REV. 507 (2008) with [**Dogan & Lemley.]

¹⁸⁵ Mark A. Lemley & Eugene Volokh, *Freedom of Speech and Injunctions in Intellectual Property Cases*, 48 DUKE L.J. 147, 221 n.325 (1998).

¹⁸⁶ Jonathan Mayer & John C. Mitchell, *Third Party Web Tracking: Policy and Technology*, IEEE SYMPOSIUM ON SECURITY AND PRIVACY (2012), <http://ieeexplore.ieee.org/document/6234427?reload=true>

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 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.¹⁸⁷ Should they be? Under current Fourth Amendment law there is no constitutional barrier to such subpoenas or even outright searches (on the theory that one can't have a strong expectation of privacy in data one turns over to VR and AR companies¹⁸⁸). 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? And the legal system needs to consider how broadly such records should be made available to the government and to litigants.

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 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. CONCLUSION: 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 anal-

¹⁸⁷ Some have argued that there should be a warrant required in such cases. See, e.g., Jonathan Mayer, *Constitutional Malware*, __ YALE L.J. __ (forthcoming 2017).

¹⁸⁸ See, e.g., *United States v. Jean*, 2016 WL 4771096 (W.D. Ark. Sept. 13, 2016) (summarizing caselaw on the limits to Fourth Amendment protection in material that users communicate to computer service providers).

ysis, 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. The availability of technologically enabled self-help will give people a cheap alternative to calling the police and going to court, and 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 relatively lack of government-imposed law may not be bad. 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.¹⁸⁹ The same may prove true of VR and AR. We don't yet know how these technologies will develop, both technologically and culturally. Setting legal rules too early risks rendering those rules irrelevant as the technology moves in unexpected ways.¹⁹⁰ Worse, legal rules can 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.

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.

¹⁸⁹ Anupam Chander, *How Law Made Silicon Valley*, 63 EMORY L.J. 639 (2014); Mark A. Lemley, *IP in a World Without Scarcity*, 90 N.Y.U. L. REV. 460 (2015).

¹⁹⁰ See, e.g., Jane Kaufman Winn, *Open Systems, Free Markets, and Regulation of Electronic Commerce*, 72 TUL. L. REV. 1177 (1998) (discussing examples of legal regulation of emerging technology that became irrelevant because the technology moved in an unexpected direction).

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 or at least serious psychological injury. That makes it important that consent at least be a real thing, not merely a conclusion that somewhere there is a terms of service contract posted and I am deemed to have agreed to it by turning my machine on.¹⁹¹

There is a good argument that courts have stretched the definition of consent too far in the browwrap cases generally.¹⁹² 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.¹⁹³ Consent should mean informed consent, 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.¹⁹⁴

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 nonspeech 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)?

There are good reasons in the physical world to distinguish between words and actions and between words and things. Some of the lines turn

¹⁹¹ 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. Joshua Fairfield, *Anti-Social Contracts*, *supra* note 146.

¹⁹² See, e.g., Kim, *supra* note 152; Lemley, *supra* note 152.

¹⁹³ For recent efforts to rein in the reach of browwrap contracts, see *Nguyen v. Barnes & Noble, Inc.*, 763 F.3d 1171 (9th Cir. 2014); *Specht v. Netscape Comm'ns Corp.*, 306 F.3d 17 (2d Cir. 2002); *Meyer v. Kalanick*, __ F. Supp. 3d __, 2016 WL 4073012 (S.D.N.Y. July 29, 2016); *Muhammed v. Uber Techs.*, 109 F. Supp. 3d 1185 (N.D. Cal. 2015).

¹⁹⁴ See *supra* notes 156 & 158.

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. The technologies challenge our perception of the real because they blur the cognitive line between imagery and physical presence. People react to a virtual slap as if they had actually been slapped.¹⁹⁵ The reaction is visceral; it doesn't involve real physical contact, but it feels real in a way.

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 reality or the perception should be the driving force.¹⁹⁶ 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-help 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 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.¹⁹⁷

¹⁹⁵ See *supra* Part I.C.2.

¹⁹⁶ For a similar discussion of whether Internet law should consider the way the Internet actually works or the way it seems to users to work, see Orin Kerr, *The Problem of Perspective in Internet Law*, 91 GEO. L.J. 357 (2003).

¹⁹⁷ 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

But maybe we should still be worried about even second-party perception. If I can superimpose clothes on your naked avatar, you can presumably do the opposite, viewing me as naked even when I am subjectively wearing clothes, or making me appear to you as Donald Trump or Hillary Clinton. You probably find that creepy in VR. It will be even creepier when it happens in AR. Similarly, even if I have a personal bubble in which you can't grope me—from my perspective—you might be subjectively experiencing a world in which you are groping me.

We might worry that this subjective or unshared experience will have corrosive effects on the real world. If you perceive me as naked when you are talking to me you are likely to treat me differently in that conversation, and perhaps treat me differently afterwards. It is not clear that the law should, or even can, regulate that behavior. But perhaps we should worry about the effects of that behavior as a society.

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 subjective perception of reality, not just the victim's, 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.

We don't have definitive answers to these questions. But the very existence of VR and AR poses the 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.

might be worse in that case, since I have no opportunity to respond to falsehoods I never hear about.