

The Ethics of Virtual Reality Technology: Social Hazards and Public Policy Recommendations

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Abstract This article explores four major areas of moral concern regarding virtual reality (VR) technologies. First, VR poses potential mental health risks, including Depersonalization/Derealization Disorder. Second, VR technology raises serious concerns related to personal neglect of users' own actual bodies and real physical environments. Third, VR technologies may be used to record personal data which could be deployed in ways that threaten personal privacy and present a danger related to manipulation of users' beliefs, emotions, and behaviors. Finally, there are other moral and social risks associated with the way VR blurs the distinction between the real and illusory. These concerns regarding VR naturally raise questions about public policy. The article makes several recommendations for legal regulations of VR that together address each of the above concerns. It is argued that these regulations would not seriously threaten personal liberty but rather would protect and enhance the autonomy of VR consumers.

Keywords Virtual reality · Technology · Ethics · Mental health · Privacy · Autonomy

Virtual reality (VR) technology promises to impact Western society at a fundamental level. Madary and Metzinger go so far as to say that VR “will transform the structure of our life-world, bringing about entirely novel forms of everyday social interactions and changing the very relationship we have to our own minds” (Madary and Metzinger 2016, 1). But significant technological changes are always mixed blessings. For all of the potentially positive applications of VR, there are also psychological, moral, and social risks associated with this technology. Some of these dangers are reviewed below and it is argued that they are serious

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enough to warrant legal regulations of VR technology. Such measures naturally raise concerns regarding limitations on personal liberty. This worry will be addressed by showing that the proposed recommendations are not really a threat to personal liberty but actually would protect and enhance the autonomy of VR consumers.

Preliminary Remarks

VR has been called a “dream machine” (Blascovich and Bailenson 2011) and a form of “telepresence” (Steuer 1992). Philip Brey defines VR as “a three-dimensional interactive computer-generated environment that incorporates a first-person perspective” (Brey 1999, 6). In so far as VR is an interactive visual and auditory experience, it is like traditional two-dimensional video games. But VR is a significant departure from 2-D games in that VR provides omnidirectional experience of the virtual environment and may also include tactile sensory stimulation. VR worlds range from complete to partial virtuality. *Augmented* reality and *substitutional* reality systems feature varieties of mixtures of virtual elements with objects actually existing in one’s physical environment. In *immersive* VR, the illusion is complete, giving users the experience of being in a totally different environment and perhaps even occupying a different physical body. Unless otherwise indicated, all references to VR in what follows will regard immersive virtual reality technology.

Major brand VR headsets and smartglasses include Facebook’s Oculus Rift, HTC Vive, Microsoft’s HoloLens, and Sony’s Morpheus. While these products have recently begun to generate excitement in entertainment markets, the current and potential benefits of VR in other fields have been touted by scholars and practitioners for more than twenty years, particularly applications in education (Stewart, et al. 2010), aviation and maritime training (Basham 2017; Fachot 2016), military training (Bymer 2012), medicine (Riva 2003), surgical training (Gallagher et al. 2005), physical rehabilitation (Lucca 2009; Sveistrup 2004), mental health (Botella, et al. 1998; Gregg and Tarrier 2007), and disaster response training (Hsu et al. 2013). The reason VR is so effective in such a wide range of domains is the high level of realism provided by the simulations. Unfortunately, as with all technology, these benefits come with negative side effects. As Neil Postman has said, every technological advance constitutes a Faustian bargain, a trade-off where something good is gained while some other good is lost (Postman 1998). And just as the positive aspects of VR are significantly great, so are the negative aspects.

Mental Health Risks

As mentioned above, one of the areas where VR has potential benefits is mental health. A number of studies have been done on therapeutic applications of VR for pain management, quitting smoking and a wide range of anxieties and phobias,

including fear of heights, flying phobia, driving phobia, social phobias, arachnophobia, panic attacks, agoraphobia, body-image disturbance, fear of public speaking, and post-traumatic stress disorder. Thus far, VR treatments have shown some promising results, however it is not clear whether such therapies will ultimately be more effective than traditional therapeutic regimens (Gregg and Tarrier 2007; Parsons and Rizzo 2008).

All things considered, however, these potentially significant benefits might be offset by even more significant mental health hazards of VR. “Cybersickness” is a term that has been coined to describe the feelings of nausea, fatigue, dizziness, and bodily disorientation that users frequently experience following a VR session (LaViola 2000). Beyond these physical effects, VR users also commonly experience significant psychological symptoms, such as prolonged difficulty in readjusting to the real world (Behr et al. 2005), sometimes including a feeling that the real world isn’t real (Searles 2016).

Because VR creates the illusion of embodiment and what has been called “consensual hallucinations” (Mantovani 1995) this poses potential mental health risks. Many of the effects of VR immersion are consistent with the symptoms of depersonalization and derealization dissociative disorders (Aardema et al. 2010). According to the DSM-5 (300.6) *depersonalization* involves a sense of detachment or unreality of one’s own thoughts, feelings sensations, or actions, while *derealization* is marked by a sense of detachment or feeling of unreality with respect to one’s environment. Those who suffer from depersonalization manifest symptoms of a loss of the sense of personal agency. Since personal agency and the sense of freedom and responsibility this entails are fundamental to the moral life, the risk of depersonalization, as posed by extensive use of VR (Aardema et al. 2006), presents a significant potential ethical problem for VR technology. As for derealization, the sensation that one is living in a dream world, too, is not only a serious psychological condition but also potentially morally and socially problematic.

The exact extent of mental health risk posed by heavy VR use is not yet clear, but given that even extensive 2-D video gaming has been linked to anxiety, depression, and social phobias (Gentile et al. 2011) as well as potential neurological problems (West et al. 2015), one might expect that the effects of extensive VR experiences on users could be at least as significant.

Bodily Neglect

VR technology also raises serious concerns related to users’ personal neglect of their own actual bodies and physical environments. Risks in this area are already evident in those who spend excessively long periods on social media (Andreassen et al. 2012). And there have been numerous reports in recent years of severe illnesses and fatalities due to video gamers neglecting their own physical well-being, including an Ohio teenager who collapsed from dehydration after five days of playing *Call of Duty* (Oskin 2012) and a Taiwanese man who died of heart failure during a three-day gaming binge (Hunt 2015). Even more troubling are cases of

parents who have been so engrossed in video games that they seriously endangered their own children. For example, a California couple was recently imprisoned for neglecting their children while playing *World of Warcraft* (Kosoff 2014). And in 2010 a Korean couple was so consumed with playing a video game that they allowed their child to die (Elder 2014).

While reports of extreme self- and child-neglect are horrifying, they are not too surprising given the addictive nature of video games. And such incidents are likely to be increasingly common with the widespread use of VR. As Michael Cranford notes, “The greater our degree of participation, the more engrossed we become in the virtual world, and the less conscious of the real one” (Cranford 1996, 83). Just how “engrossing” immersive VR can be is suggested by research on bodily identification. The famous Botvinick and Cohen “rubber hand illusion” study shows how a person’s sensory stimulations may be referred to an alien limb, suggesting that bodily identification is not fixed and absolute (Botvinick and Cohen 1998; see also Bahrack and Watson 1985; Lewis and Brooks-Gunn 1979; Slater 2009). Botvinick and Cohen go so far as to suggest “the body is distinguished from other objects as belonging to the self by its participation in specific forms of intermodal perceptual correlation” (Botvinick and Cohen 1998, 756). Given the vast and realistic “perceptual correlations” experienced by VR users, the alteration of bodily identification is probably to be expected. And with the coming surge in numbers of VR users indulging in such altered bodily identification, we may likewise expect a surge of cases of bodily neglect which seriously endanger both the users and those who are in their care.

Privacy and Manipulation

Another moral hazard associated with VR regards privacy issues. In the age of the Internet, we are all accustomed to the fact that our buying habits are monitored and shared by merchandisers. But with VR technologies much more personal information will be gathered, pertaining to such things as patterns of eye-movement, motor responses, and reflexes, which together constitute a person’s distinct “kinematic fingerprint.” Yet more information about the habits, interests, and tendencies of VR users may be captured as well, which could be stored and deployed in ways that threaten personal privacy. The recent acquisition of Oculus VR by Facebook likely signals an eventual convergence of VR and social media (VRSN) which will constitute a new category of privacy risks. Whereas in traditional VR users may take on any avatar personality they wish, thus masking their actual identity, users of VRSN will be expected to appear as themselves. VRSN companies will certainly have a marketing interest in encouraging this, since this will mean more personal information can be harvested and sold (O’Brolcháin et al. 2016). So although VRSN will probably be marketed as a natural, seamless extension of traditional social media, in fact it will be a dramatically more pervasive intrusion into personal privacy and a more severe threat to personal autonomy.

O’Brolcháin et al. identify three general categories of the threat to privacy presented by VRSN: threats to informational privacy, threats to physical privacy,

and threats to associational privacy. The threat of informational privacy essentially refers to the ever increasing size of the digital footprint left behind by users which is in turn potentially available to an increasingly large group of individuals and agencies, from hackers and identity thieves to businesses and governments. Given the nature of data that may be gleaned via VR, this will include highly personal information, from one's physical features to facts about one's emotions and personal psychology, as well as one's location and physical environment. As VRSN grows more popular, O'Brolcháin et al. worry that the ubiquitous presence of recording devices will make it much easier for a person to be observed without his or her knowledge. Such are some of the threats to physical privacy presented by this technology. As for threats to associational privacy, this refers to the concern that with VRSN it will be increasingly difficult to control whom one interacts with in virtual environments, which, in the authors' words, "might mean that many of our conversations about trivial and important matters are potentially available to third parties" (Ibid., 11). These latter two threat concerns, regarding physical and associational privacy, do assume that VRSNs will become a major domain for public discourse and interaction, but given the massive popularity of social media and common expectations regarding VR technology, the practical implications of this eventuality should be considered in advance. Many other scholars and technology journalists are certainly doing so (Bates 2016; Kopstein 2016; Tsai 2016).

The capacity of VR technology to create a false sense of agency presents a further danger that extends beyond mere violation of privacy to personal manipulation. Human behavioral context sensitivity has been well documented (Asch 1951; Haney et al. 1973; Milgram 1974). And research has already shown that even through text-based social media significant behavioral influence occurs (Kramer et al. 2014). Since virtual environments can be readily modified according to specific aims of influencing beliefs, emotions, and behavior, such manipulative potential could be easily exploited for a variety of purposes, ranging from commercial to political ends. Paul Ford has critiqued VR regarding risks of problematic representations in virtual environments including inaccurate representations and biased representations of people and objects mimicked in virtual environments (Ford 2001; see also Brey 1999). Such misrepresentations can alter users' views of actual individuals, people groups, objects and perspectives on real-life issues. And as O'Brolcháin points out, VR programs could be used to manipulate users in other ways as well in order to influence their offline behaviors (O'Brolcháin, et al. 2016; see also Madary and Metzinger 2016).

Other Moral and Social Risks

There are other hazards related to VR technology which pose more or less direct public threats. As Michael Cranford has argued, there is a moral danger in the fact that VR provides for "abandonment of external constraints." Risk and consequence are crucial for moral living, so "with risk and consequence... go a substantive ethic." (Cranford 1996, 87). But in a virtual world there is no risk and there are no

consequences. So in the virtual realm we also lose moral accountability. After all, Cranford asks, “if I feel that I have nothing to lose, why treat other people with dignity and sensitivity?” (Ibid., 88). We have already seen the morally deleterious effect of anonymity and lack of consequences on the Internet. How much more so might VR undermine society morally?

Others are concerned about the potential for VR to negatively affect users’ attitudes with regard to aggression and violent behavior. This is a long-standing criticism of hyperviolent video games, especially as they influence younger viewers. Anderson and Bushman conducted a metaanalytic review of research on video games and concluded that playing violent video games results in an increase in aggressive thoughts, feelings, and behavior in children and young adults (Anderson and Bushman 2001; see also Gotterbarn 2010). We have reason to be concerned, then, about the potential connection between violent behavior in VR worlds and actual violence in the real world. Skeptics dismiss such worries as overblown and insist that there is no empirical evidence to suggest VR will have such a causal impact on conduct in the real world (Tavinor 2007). Cranford concedes this point but notes that it is more likely that “this technology will not affect our behavior directly but will erode our valuation of the rights of others in more subtle ways” (Cranford 1996, 88), the consequences of which may be no less severe. And Brey emphasizes that the crucial difference between VR programs and video games is that in VR the user is not merely a spectator but an *actor* (Brey 1999). If violent video games tend to incite aggressive thoughts and behavior in children, then we may expect *a fortiori* that VR applications will do so, notwithstanding the current lack of empirical evidence for this conclusion.

Geert Gooskens provides an insightful account as to why we should be concerned about the potentially negative impact of VR on users. He compares virtual worlds and stage plays, noting that both involve acting out “as if” intentions that have no real consequences (Gooskens 2010). If theatrical performances are morally harmless, as we believe them to be, then why not conclude the same regarding VR activity? The problem is that when a user is engaged in a VR world such as *Dead or Alive Xtreme 3* (a Japanese VR game where a person may sexually assault women), the virtual actor is not emotionally disengaged as a stage actor is. The VR user has real sexual desires and acts on them, and he is free to indulge those real desires because his activity is entirely private. As Gooskens puts it, in a stage play “the actor presents an immoral character to a *public* and is, in a way, playing for this public. Users of a virtual environment, however, are not playing for a public but only for themselves” (Ibid., 73).

Now to the extent that the VR user’s desires are real, his actual person and his “as if” virtual identity begin to coincide. Here is where it becomes problematic, because as the line is blurred between the virtual and actual persons, the “as if” immorality of the VR actor threatens to taint the real person. Thus, although Gooskens grants that there is nothing inherently wrong with “as if” activities in a virtual environment, they present a danger of real moral harm when the feelings and desires associated with such actions are carried into the real world. By collapsing the real and virtual, VR environments invite us to do just this.

All of these problems become more severe in a multi-user VR environment. Such VR worlds involve real-time interactions between users. So, as Paul Ford puts it, in a multi-user context, “virtual environments are real environments because they are affective for people.... The virtual only demarcates the computer mediated sphere of meaning from the traditional everyday life and not as a ‘pretend’ or ‘almost’ sphere of meaning” (Ford 2001, 114). Yet, from a phenomenological standpoint, the other people with whom a user is interacting in such a multi-user VR environment will be indistinguishable from fictional characters in a game like *Dead or Alive Xtreme 3*, where sexual abuse is welcomed and encouraged. The moral and social risks involved here should be obvious.

Public Policy Recommendations

The above noted concerns constitute real and potential threats posed by VR technology to mental health, personal autonomy, and personal privacy. Now these are threats to actual public goods and therefore it is in the public interest to implement legal regulations to guard these public goods. Before considering some recommendations along these lines, let us first clarify what it means to say that mental health, personal autonomy, and personal privacy are public goods. When we think of public goods, we ordinarily think of resources that are useful or beneficial to society generally. These include everything from tangible goods such as roads, bridges, public transit, and water, electrical, and security systems to intangible goods such as education and a common language. The knowledge and physical safety provided by educational and other public resources also qualify as public goods, since we all benefit from shared knowledge and a safe and healthy citizenry. Like these goods, the *mental* health of the citizenry is publicly beneficial in a variety of ways. When people are psychologically healthy, for example, they pose less of a risk to others, both physically and emotionally, and they are more energetic and productive in their work. So, from the standpoints of public safety and productiveness, mental health is itself a public good, an intangible good that has very tangible consequences for human flourishing.

As for personal autonomy, what Kant, Mill, and others strenuously defended in this regard is now a basic premise of political liberalism: other things being equal, rational individuals should be allowed to be self-determining. This is because autonomy is fundamental to moral agency and responsibility. Literally, our entire system of rewards and punishments hinges on the fact that human beings are capable of making their own informed voluntary choices. Every moral virtue, obligation and supererogatory act is possible only to the extent that humans are autonomous agents. Likewise, every punitive judgment and correctional mandate makes sense only in light of human autonomy. And to the extent that a person’s autonomy is undermined, their moral responsibility for their conduct is diminished. So if ever there was a universal public good, this is it.

Finally, as regards personal privacy, the United States Supreme Court has found a basis for the right of privacy in several Amendments of the U.S. Constitution, which

is certainly a strong signal from the legal domain that privacy is a public good.¹ But aside from this point of constitutional law, there is also the fact that personal privacy seems to be universally desirable and perhaps even a condition for psychological well-being. It has also been argued that privacy is a human right (Warren and Brandeis 1890), a fundamental requirement for human dignity (Bloustein 1964), a precondition for creating and maintaining social relationships (Fried 1970; Rachels 1975), and necessary for human flourishing (Moore 2003). Others, such as Fairfield and Engel (2015), have analyzed the public good of privacy inversely, by showing how personal privacy ensures avoidance of “public bads” or social harms created as a consequence of the loss of personal privacy.

Now if mental health, personal autonomy, and personal privacy are significant public goods, then to the extent that VR technology poses serious threats to these goods, careful consideration of legal regulations on VR is warranted. Accordingly, the following recommendations seem reasonable.

A Standardized Rating System for VR Technologies

To date, no game-rating entities, including BBFC, ESRB, PEGI, and USX, apply distinct classifications to VR products. VR providers deploy rigorous Terms of Use policies to regulate users’ activities in virtual environments, and Oculus provides a safety warning with each donning of a headset. It is expected that more VR manufacturers will follow suit with disclaimers and warning labels in order to further limit their legal liabilities when users begin to file lawsuits for physical and psychological damage resulting from use of their products. But industry leaders would be wise to caution potential users more earnestly and aggressively, even if this results in slightly lower sales, by enlisting game rating agencies to classify their products or perhaps by creating their own industry rating board like the MPAA for the film industry. Even aside from public interest in users’ psychological and even physical safety, the aim of mitigating potential legal problems would recommend such a move. (See Johnson 2015 and Ward 2016).

Minimum Age Requirements for Some VR Technologies

Should the VR industry fail to supply its own rating system, a legal mandate to do so might be appropriate. Whether or not this is done, a legal age restriction regarding some VR programs might be appropriate. In the United States there are minimum age requirements for the purchase and consumption of alcohol and tobacco products (though minimum consumption ages vary by state). The same has been proposed regarding video games, though no such laws have thus far passed. In the case of VR technology, the public risks appear to be substantially greater than for video games, so a minimum age requirement for the most violent, profane, or sexually explicit systems would be all the more advisable.

¹ Specifically, in *Griswold v. Connecticut* (1965), *Roe v. Wade* (1973), and *Lawrence v. Texas* (2003).

Informational and Warning Labels

In the United States food companies are required to provide information labels on their products; cigarette and alcohol manufacturers must provide warning labels on their products; and drug manufacturers are required to include warnings and lists of precautions and contraindications even when observed side effects are minimal or trivial. In the entertainment industry, music CDs which contain excessive profanities or inappropriate references must include a “parental advisory” label cautioning consumers about the content. Regarding similar warning labels on video games, several bills have been considered in Congress, but none have passed. When it comes to VR, a much stronger case can be made for the potential hazards, as we have seen. Accordingly, mandatory informational or warning labels for such content as hyper-violence and strong sexual elements may be appropriate, as well as for such things as physical, psychological, and informational privacy concerns.

Public Disclosure Mandates

The above recommendations seem appropriate for VR technology in its present form, but some further legal steps might be appropriate depending upon how things develop with regard to the convergence of VR and social media. Should VRSN become widespread and, concomitantly, the sharing of personal data gleaned from those who participate, public disclosure laws may be appropriate. Such laws may require VR companies to declare what sorts of personal data—e.g., physical, psychological, financial, associational, etc.—they share with other companies.

“No Share” Laws

Because certain categories of data, e.g. physical and psychological data, are so personal and such information is vulnerable to abuse, whether by hackers or irresponsible commercial dissemination, legal restrictions regarding the sharing of this information by VR companies might be advisable. Again, this assumes that VRSN use becomes widespread. If VRSN remains a niche market, then a legal requirement of information and/or warning labels might be sufficient to protect the public from the personal privacy hazards of involvement in these technologies.

Concerns Regarding Personal Liberty

The proposals above are modest. Still, some will object that even these regulations are too intrusive. Legal restrictions should always be balanced against the loss of personal liberty.² Thus, in their recently published “code of ethical conduct” for VR research, Madary and Metzinger refrain from proposing the sorts of regulations recommended here, and they worry that legal restrictions “may unnecessarily limit personal creative freedom” (Madary and Metzinger 2016, 7). So, we may ask, are

² I want to thank an anonymous referee for posing this objection.

such regulations really necessary? And would the benefits really outweigh the harm of the loss of personal liberty that they entail? There are several reasons to think so. First, the potential harms outlined above, ranging from mental and physical hazards to privacy violations and personal manipulation, are quite significant—significant enough to warrant strong regulatory measures. As noted, mental health, privacy, and autonomy, not to mention physical well being, are public goods, and as such they deserve public protections in the form of legal regulations of consumer products which pose serious risks to these goods.

Secondly, we should all take seriously the potential harm of the loss of personal liberty, even if this results from well-intended legal measures aimed at protecting the public. But notice: all of the the regulations proposed above are *made in the interest of protecting* personal liberty—specifically personal autonomy and privacy. So the objection ought not be taken to suggest that the dilemma is simply between social utility and personal autonomy (i.e. maximizing social benefits vs. maximizing individual freedoms)—as so many socio-legal dilemmas are often cast. Rather, the dilemma is also *internal* to the concern of personal liberty (i.e., either we strive to maximize liberty by not regulating public use of VR or we strive to maximize liberty by regulating VR). It is an ironic, perhaps paradoxical, fact of modern liberalism and social contract ethics, recognized at least since Thomas Hobbes, that some restriction of personal liberty is necessary in order to maximize public enjoyment of personal liberty. Public use of VR technology is just another domain in which the delicate balance between a *laissez-faire* approach and invasive legal restrictions needs to be achieved in order to effect optimum personal liberty for consumers. The regulations recommended here, or perhaps some combination among them, can strike such a balance as regards VR.

Thirdly, keep in mind that most of the regulations proposed above simply ensure that the public is properly educated about the potential dangers of VR technology and informed as to how VR companies will use data gleaned from consumers. As such, they are merely informational mandates, not properly construed as restrictions on personal autonomy. On the contrary, if genuine personal autonomy presupposes informed consent, then a mandate to ensure that the public is duly informed regarding a given product and the risks that its use poses is not a restriction on autonomy but, in fact, a necessary condition for its better realization throughout society. This reinforces the point that these recommendations do not oppose but rather support personal liberty.

Finally, among the proposed regulations, the only one that would impose an actual restriction of use is the minimum age requirement. For this reason, it is bound to be the most controversial in the list. Some will complain that until more empirical data is available—specifically data that reinforces the seriousness of the potential hazards for children posed by VR technology—no age restrictions are appropriate. However, there is arguably already plenty of empirical evidence—though much is indirect—which suggests that the risks involved in VR use for children are serious. If one demands more empirical evidence, then how much more is needed? And how many children might be harmed in the meantime as sufficient data accrues from studies about VR use?

Table 1 The VR age restriction wager

	Implement VR age restriction	Do not implement VR age restriction
VR use is harmful to children	Many children are saved from harm.	Many children suffer harm from VR use.
VR use is not harmful to children	Many children are deprived of VR entertainment for a few years (a harmless consequence).	Many children experience VR entertainment for a few years more than they otherwise would (no significant gain).

When it comes to our decision whether or not to impose an age restriction on VR use, we are essentially making a wager, and here are the alternative outcomes. Suppose we wager on implementing age restrictions. It may turn out that VR is indeed harmful to children, in which case we will have kept many children from harm. If it turns out VR is harmless, then a lot of kids will have missed out on a few years of VR entertainment (perhaps condemned instead to more engagement in activities such as reading or practicing piano). On the other hand, suppose we wager *against* age restrictions. If it turns out that VR is harmful to children, then our inaction will have resulted in the harm of many of the most vulnerable among us. And if it turns out the VR is harmless, then, again, for a few years many children will have been entertained by VR (as opposed to doing more reading and practicing piano) without being harmed in any way.

Now consider the fact that depriving a child VR use does not harm him or her in any way. (This is safe to assume, since even if it turned out that VR can provide certain developmental gains for children, this may be offset in non-users through athletic, musical, and other forms of skill development in which they are involved.) This means that, at least, VR deprivation for children is, all things considered, harmless. When we take all of these factors into account, it appears that the prudent choice is to implement age restrictions on VR use. For there is much to gain and little to lose with VR age restrictions, and there is little to gain and much to lose by failing to implement age restrictions. (See Table 1.) So even with the current lack of conclusive empirical evidence favoring the implementation of age restrictions, from the standpoint of practical reason the case for age restrictions seems strong.

Conclusion

The recommendations proposed in this article are all based on the assumption that mental health, personal autonomy, and personal privacy are public goods and thus reasonable ideals for the guidance of public policy. In other words, whatever laws are eventually passed regarding VR technology, they should aim to respect and preserve these goods for the well being of individual citizens and society as a whole. While any legal regulations of technological use may be resisted because they limit

personal liberty, the recommendations made here regarding VR technology are mild front-end curtailments of liberty which are necessary to prevent more serious back-end affronts on liberty potentially created by businesses, governments, criminal agencies, and fellow VR users.

As noted at the outset of this discussion, Madary and Metzinger (2016) have identified numerous moral risks regarding VR technology in the contexts of research and personal use. Many of the concerns raised here overlap with theirs. They offer what they call “concrete recommendations” for addressing these risks in the form of guidelines for scientific researchers, the media, and the general public. But their recommendations are not really so “concrete.” When it comes to public policy, they offer only general guidelines (e.g., that users ought to be informed of risks of personal surveillance during use of VR avatars, that users should be made aware that advertising tactics using VR technology can powerfully influence behavior, etc.). These guidelines are wise and valuable as far as they go, but they stop short of (1) making specific recommendations for how VR manufacturers can guard the public against the potential risks of VR and (2) proposing legal regulations to address the risks. The proposals made here for an industry-wide rating system, legal age requirements for some VR products, informational and warning labels, public disclosure mandates, and no-share laws do constitute genuinely concrete measures and thus may be construed as supplements to and applications of many of these authors’ recommendations.³

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