

## *Harm, Consent, and Virtual Selves in Full-Body Ownership Illusions: Real Concerns for Immersive Virtual Reality Therapies*

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**Abstract:** This paper analyzes in the use of virtual reality when used to induce full-body ownership in violent offenders in order to elicit empathetic feelings by allowing them to embody the virtual body of a victim of domestic abuse. The authors explore potentially harmful effects to individuals participating in this kind of therapy and question whether consent is fully informed. The paper concludes with guidelines for ethical research and rehabilitation using this innovative technology.

**Keywords:** virtual reality; domestic abuse; full-body ownership

Virtual reality (VR) is increasingly being used to investigate and to treat psychological disorders. The most common application of VR is in the treatment of phobias (e.g., fear of heights, fear of flying, and fear of public speaking) and other anxiety disorders (e.g., panic disorders, post-traumatic stress disorders, generalized anxiety disorders, and stress management) as well as eating disorders, autism spectrum disorders, depression, psychosis, and post-traumatic stress disorder (PTSD).<sup>1</sup> In particular, VR exposure therapy has been proposed as a new medium for exposure therapy<sup>2</sup> that is safer and less costly than reproducing the real-world situations.<sup>3</sup> VR technology provides an ideal context in which to study these disorders because, given the immersive nature of VR, researchers can simulate key aspects of the condition of interest but allow the subjects complete control. However, despite this success in reproducing real-world applications, some researchers have already described some of the possible negative consequences of these treatments. For example, Kellmeyer<sup>4</sup> argues that the immersive nature of VR can possibly have harmful consequences, such as disturbed sense of agency for vulnerable individuals.

Among these new applications of VR for psychological treatment and research is a different kind of therapeutic application of VR that has received less attention and can potentially be more harmful for individuals: the use of immersive VR to induce a full-body ownership illusion.<sup>5</sup> This form of full-body immersive VR has been characterized as a nonharmful alternative for studying violent behaviors, for studying the behavior of child molesters,<sup>6</sup> and the behavior of participants in Milgram obedience experiments.<sup>7</sup> It has been found that immersing individuals in this kind of VR experience alters the perceptions, attitudes, and behaviors of those individuals (see, e.g., improvements in racial bias<sup>8</sup> and the ability to engage in self-counseling<sup>9</sup>). We will focus on one specific application of this technology in which VR is used to induce full-body ownership in violent offenders to elicit empathetic feelings by allowing offenders to embody the virtual body of a victim of domestic abuse. We will analyze this application of immersive VR body illusion to illustrate

that, because of the immersive nature of VR, this kind of experience can potentially inflict harm on the individuals participating in this form of therapy. Moreover, we will use the analysis of this application to illustrate how, given the recent developments of the immersive experiences in VR, the use of this technology can give rise to ethical concerns regarding a participant's ability to provide consent. Through the analysis of this application we will show that it is not clear that, when individuals provide consent to participate in this form of therapy, they have full knowledge of the kind of harm they could potentially experience.

### **VR and the Reality of the Experience**

One of the most prevalent models in the study of aggression suggests a link between violent acts against others and a lack of empathy.<sup>10</sup> It has been argued that, despite the plausibility of this model, it is difficult to conduct a study that demonstrates the link between violent acts and lack of empathy. Most studies that attempt to demonstrate this link lack ecological validity because of the ethical implications that recreating a valid ecological environment would have for the participants.<sup>11</sup> Within this context, Seinfeld et al.<sup>12</sup> focus on one particular form of violence: domestic abuse and its link with lack of empathy, and they create a paradigm with ecological validity to study empathy and aggression in violent populations.

In their study, Seinfeld et al. recruited two groups of men as participants: the Convicted Group (i.e., men convicted by the Spanish legal system of an aggression against a woman and sentenced to attend a domestic violence intervention program) and a Control Group (i.e., men without a history of domestic violence recruited via advertisement in the community and from the maintenance staff of the university). Both groups were subjected to an immersive VR experience; however, the location was different for each group. The Offender Group experienced VR immersion in a consultation room of the Justice Department of Catalonia while the Control Group experienced this immersion in a research room at the university. Researchers induced in both groups of participants a full-body ownership illusion that allowed them to experience a violent virtual situation from the perspective of the victim. The researchers used VR to induce intense feelings of fear or distress in participants and recreate a situation similar to domestic abuse. Both groups entered a virtual environment where the male participants embodied a female body who experienced verbal abuse and intimidation by a violent virtual male. The participants, while embodied in a female body, experienced having their virtual personal space violated by the virtual abuser and experienced abusive speech. For example, if participants, while in full control of the virtual female body decided to look away from the virtual male abuser, the abuser would yell to them, "Look at me!" If the participants decided to talk, the virtual male abuser would yell at them, "Shut up!" The participants' capacity for empathy and emotion recognition was measured before and after this virtual experience to test whether this experience could alter their ability to read emotions. The results of this study indeed showed a change in the Offender Group participants' capacity for emotional recognition. The participants exhibited an improvement in the ability to recognize fear in female faces and reduced their response bias in wrongly attributing happy emotional states to fearful facial expressions in both genders (a change that was not observed in Control Groups). However, despite these positive results and potential positive affects for prevention of re-offenses, it is possible to ask whether harm was inflicted on the

participants and whether the participants were able to understand the kind of harmful experience they would have in this VR experience and, therefore, provide their consent to participate in this experience.

### **Harm in Immersive VR Experiences**

One of the main recommendations when using this kind of VR immersion therapy is to protect individuals from harm.<sup>13</sup> Seinfeld et al. argue that their use of VR, as the use of VR in several other similar studies, allows them to study violent behaviors without exposing participants to any real danger and without engaging in the ethical issues present in nonvirtual experiments. This assertion is true in the sense that the male offenders suffer no real physical harm (i.e., no one is going to physically harm them); however, this lack of harm is not so clear in the psychological sense. As Seinfeld et al. recognize in their study, “The virtual embodiment paradigm used in this study overcomes such limitations (of previous studies) by making the Offenders actually *experience* an abuse situation from the perspective of the victim.”<sup>14</sup> Thus, because the participants experienced a form of abuse, it is necessary to ask whether these participants were harmed.

There are two important aspects of the use of VR that may suggest that the participants in this study are subjected to psychological harm. First, research has shown that in these kinds of body ownership illusions, even though participants embody virtual bodies that look different than their own bodies (their virtual bodies may differ in size, height, skin tone, gender, or age), participants can still experience a strong body ownership illusion.<sup>15</sup> The success of participants embracing this new body as their own relies on providing them with congruent multisensory information.<sup>16</sup> Seinfeld et al. adopted such a congruent multisensory model. Moreover, they embedded participants in an ecologically valid experimental setup where individuals have the illusion of being in a real environment where they can control their movements and where others react to these movements. Thus, based on previous research and the interactive and multisensory information used in this study, despite the differences between their virtual bodies and their real bodies, it is likely the participants experienced their virtual bodies as their own body.

Second, researchers of the effects of VR have recognized the significant effects on participants of immersive full-body experiences. In what is known as the *Proteus effect*,<sup>17</sup> the significant impact of full-body immersive experiences on behavior is recognized; for example, participants assigned to more attractive or taller avatars tend to exhibit more intimate and confident behaviors than participants assigned to less attractive or shorter avatars. This is true not only in positive experiences but also in negative experiences. For example, researchers have shown that VR-stressful experiences have negative consequences, such as effects on working memory, similar to those caused by non-VR stressful experiences.<sup>18</sup>

Based on these two characteristics of VR, it is possible to conclude that any form of psychological abuse inflicted on an individual’s virtual persona is a form of harm exercised to the individual, and to some extent, on the self of the individual; moreover, that this kind of harm (as any other kind of intervention performed in these virtual selves) is likely to have consequences on the behavior of the participants.

The realism of the experience in VR is not limited to medical applications. Research on violent VR videogames reveals that there is a significant difference

between using handheld controllers and moving one's body to perform violent actions (i.e., punching, attacking, shooting, etc.) against virtual characters.<sup>19</sup> For example, a recent VR modification made to the popular videogame *Grand Theft Auto* includes a VR motion controller that enables gamers to manage their avatar through bodily movements as opposed to the traditional method of pressing a series of buttons on a handheld controller. Actions such as raising one's arm to point a virtual gun at a character or walking over to a virtual body and shooting it incite feelings of guilt that do not arise when using traditional game-controlling mechanisms.<sup>20</sup>

In short, the consequences of an immersive VR experience for the individual are comparable experiences in nonvirtual contexts such as the ones just described; Bailenson<sup>21</sup> refers to VR immersion as *psychological presence* and claims that, not unlike the real world, immersion has the capacity to incite "profound and lasting changes" in individuals. Chalmers<sup>22</sup> describes this effect as *virtual realism*, that is, virtual experiences are just as valuable as nonvirtual experiences. Thus, people experience virtual worlds as if these worlds are physical worlds and, as such, any form of psychological abuse inflicted on an individual's virtual persona is a form of harm exercised on the self of the individual.

## VR and Consent

If the virtual world of an immersive VR experience is experienced as real and if these VR experiences are capable of causing harm to participants, then we must consider the ethical implications that participating in an immersive VR experience has for a participant's capacity to provide consent. As reported in the additional materials to their article, Seinfeld et al. describe that both groups of participants (i.e., Offender Group and Control Group) in this study provided their consent. As part of the consent form, the researchers informed participants belonging to the Offender Group that the VR session would contain offensive or disturbing images involving domestic violence similar to those used in their therapy and rehabilitation sessions, images such as the ones they had been exposed to through movies during their court-mandated therapy and the testimonies they read in these therapies. In addition to their consent forms, participants were informed that they would experience a VR scenario in which they would have to carry out some small movements with their virtual body in order to become familiarized with it. They were also informed that their main task would involve observing the different events happening in the virtual scene and that they would be free to interact by talking or moving if they wished. The information sheet alerted participants to potential physical risks of VR use (e.g., dizziness and flashbacks). Finally, participants were also informed that they could choose to discontinue the experience and withdraw from the study at any time.

However, given the nature of the VR immersive experience and the body owning illusion, it is possible to question whether participants understood what the researchers meant by "experiencing a scene of domestic violence." The description provided in the information sheet regarding their ability to move and interact in the VR environment does not seem to convey strongly enough the immersive experience and body owning illusion they would undergo. Moreover, the information provided regarding the kind of domestic abuse they would experience (i.e., the comparison to watching a movie or reading a testimonial of domestic abuse) does not seem to inform them strongly enough about the actual immersiveness of the

domestic abuse they would experience in the VR. Furthermore, the Offender Group in this particular experiment is a vulnerable group<sup>23</sup>; they have been convicted of domestic violence and, in this particular context, they may not have been able to make a free and informed choice. For example, the experiment for the Offender Group was performed in a consultation room of the Justice Department of Catalonia. Given that they have been convicted for domestic abuse, this setting could potentially become a form of coercion that has an effect on their ability to grant their consent, or at least, this setting might exert some form of pressure that decreases the ability of participants to exercise free will in their choice to participate in the experiment.

It may be argued that no harm resulted from this experience because otherwise researchers would have found evidence of harm in the follow-up questionnaires they sent out after the experiment was conducted. As stated in the additional materials of Seinfeld et al.'s paper, researchers emailed a follow-up questionnaire to the Control Group 2 weeks after the experiment, asking whether the participants had experienced any side effects from being involved in the VR scenario (i.e., positive, negative, or strange feelings and thoughts after participating in the study). This same questionnaire was offered to the Offender Group by the therapists of the treatment program who carried out weekly treatment sessions. No effects were reported by either group in their responses to the questionnaire. However, it is possible to ask whether the Offender Group felt free to provide an honest response. The follow-up questionnaire for this group was given by a therapist during their court-mandated therapy sessions. This particular context could also potentially be a form of coercion for the participants.

In summary, it seems possible that the participants in this study experienced harm. The aim of the analysis of this particular application of VR therapy is to provide a case study to show that, just because the participants are exposed to a VR experience as opposed to a real one, this does not necessarily mean that it is a safe environment that will not bring harm to participants (or that the harm is limited to potential physically harmful side effects such as dizziness). In particular, when full-body immersive VR experiences are used as a form of therapy with the aim of rehabilitation, special considerations must be taken to avoid harm—psychological harm included. Moreover, specific provisions must be made in each case to guarantee a participant's ability to grant consent, especially if these therapies are to be applied to individuals who may be part of vulnerable populations. This means that the potential harmful effects that may be derived from this experience cannot be dismissed or categorized as safe just because they are virtual; and, that in obtaining consent from participants, accurate knowledge must be provided allowing them to understand the reality and consequences of these VR experiences.

### **Future Implications**

There have been more breakthroughs in VR technology in the past 4 years than in the two decades before 2014<sup>24</sup> and it is likely that this technology will continue to be developed in the future in ways that would make the immersive experience more realistic. More realistic immersive VR experiences will also mean that the person's experiences in the virtual world will have deeper cognitive and behavioral effects. This potential for harm requires the implementation of appropriate provisions and guidelines for ethical research and rehabilitation using this innovative technology.

These provisions must include trained ethical review boards (ERBs) able to effectively oversee such studies; their training must include competence in VR and VR immersive experiences to better assess any possible harm involving participants. Moreover, given that a VR immersive experience is potentially a new encounter for most participants, it will be the responsibility of ERBs to ensure that the VR experience is explained in a way accessible to participants in order that they fully understand the experiment before providing consent. This informed consent oversight will involve taking into consideration any special requirements of vulnerable populations. Following the guidelines proposed by Shivayogi,<sup>25</sup> ERBs should observe full-scheduled reviews and, prior to decision making, conduct site visits to research the conditions under which the experiment takes place. Given the unique nature of immersive VR experiences, these site visits would ideally include members of the ERBs participating in the immersive VR experience to better ensure that that the participants' rights, safety, and well-being are preserved. Finally, if it is determined that although there is a risk of harm to participants, the application of VR research/therapy is validated because there are foreseen reasonable direct benefits (e.g., a lower index of re-incidence for offenders), it will be necessary to consider in the calculation of benefits, that the sense of ownership of a VR body is real and that the experiences of participants while embodied in these virtual selves are real for the participants, and what those effects might be in the short and long term.

## Notes

1. For an overview, see Riva G. Medical clinical uses of virtual worlds. In: *The Oxford Handbook of Virtuality*. New York: Oxford University Press; 2014: 649–65.
2. When immersed in the VR experience, the patient is intentionally confronted with the feared stimuli while allowing the anxiety to attenuate. With each successive exposure, the patient experiences a reduction in anxiety through the processes of habituation and extinction.
3. Gorini A, Pallavicini F, Algeri D, Repetto C, Gaggioli A, Riva G. Virtual reality in the treatment of generalized anxiety disorders. *Studies in Health Technology and Informatics* 2010;154:39–43.
4. Kellmeyer P. Neurophilosophical and ethical aspects of virtual reality therapy in neurology and psychiatry. *Cambridge Quarterly of Healthcare Ethics* 2018;27(4):610–27.
5. Maister L, Slater M, Sanchez-Vives MV, Tsakiris M. Changing bodies changes minds: Owning another body affects social cognition. *Trends in Cognitive Sciences* 2015;19(1):6–12.
6. Renaud P, Chartier S, Rouleau JL, Proulx J, Goyette M, Trottier D, et al. Using immersive virtual reality and ecological psychology to probe into child molesters' phenomenology. *Journal of Sexual Aggression* 2014;18(1):102–20.
7. Slater M, Antley A, Davison A, Swapp D, Guger C, Barker C, et al. A virtual reprise of the Stanley Milgram obedience experiments. *PloS One* 2006;20(1):e39.
8. Peck TC, Seinfeld S, Aglioti SM, Slater M. Putting yourself in the skin of a black avatar reduces implicit racial bias. *Consciousness and Cognition* 2013;22(3):779–87.
9. Osimo SA, Pizarro R, Spanlang B, Slater M. Conversations between self and self as Sigmund Freud—A virtual body ownership paradigm for self counselling. *Scientific Reports* 2015;5:13899.
10. Marsh AA, Blair RJ. Deficits in facial affect recognition among antisocial populations: A meta-analysis. *Neuroscience & Biobehavioral Reviews* 2008;32(3):454–65.
11. Parsons TD. Virtual reality for enhanced ecological validity and experimental control in the clinical, affective and social neurosciences. *Frontiers in Human Neuroscience* 2015;9:660.
12. Seinfeld S, Arroyo-Palacios J, Iruretagoyena G, Hortensius R, Zapata LE, Borland D, et al. Offenders become the victim in virtual reality: Impact of changing perspective in domestic violence. *Nature Scientific Reports* 2018;8(1):2692.
13. Madary M, Metzinger TK. Recommendations for good scientific practice and the consumers of VR-technology. *Frontiers in Robotics and AI* 2016;3:3.
14. See note 12, Seinfeld et al. 2018, at 7. Italics are mine.

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15. Kilteni K, Maselli A, Kording KP, Slater M. Over my fake body: Body ownership illusions for studying the multisensory basis of own-body perception. *Frontiers in Human Neuroscience* 2015;9:141.
16. See [note 15](#), Kilteni et al. 2015.
17. Yee N, Bailenson J. The Proteus effect: The effect of transformed self-representation on behavior. *Human Communication Research* 2007;33(3):271–90.
18. Martens MA, Antley A, Freeman D, Slater M, Harrison PJ, Tunbridge EM. It feels real: Physiological responses to a stressful virtual reality environment and its impact on working memory. *Journal of Psychopharmacology* 2019;33(10):1264–73.
19. Bailenson J. *Experience on Demand: What Virtual Reality Is, How it Works, and What it Can Do*. New York: W.W. Norton & Company, Inc.; 2018.
20. Calpito D. 'GTA V' in VR might be too real for comfort. *Tech Times* 2016 Feb; available at <http://www.techtimes.com/articles/135159/20160220/gta-v-in-vr-might-be-too-real-for-comfort.htm> (last accessed 12 March 2020).
21. See [note 19](#), Bailenson 2018.
22. Chalmers DJ. The virtual and the real. *Disputatio* 2017;9(46):309–52.
23. Shivayogi P. Vulnerable population and methods for their safeguard. *Perspectives in Clinical Research* 2013;4(1):53.
24. See [note 19](#), Bailenson 2018.
25. Shivayogi P. Vulnerable population and methods for their safeguard. *Perspectives in Clinical Research* 2013;4(1):53.