

ANDREA PINOTTI\*

STAYING HERE, BEING THERE  
BILOCATION, EMPATHY AND SELF-EMPATHY IN VIRTUAL REALITY

Abstract:

This paper addresses an ancient desire, attested in several cultures: that of being able to bilocate, to be in two different places, “here” and “there”, at the same time. This desire, which has intercepted the spheres of religious, mystical, esoteric and sci-fi experience, is now being taken up and revived by new immersive virtual reality technologies. By teleporting us (either in the first person or through an avatar) to an “elsewhere”, virtual reality also takes us to other subjectivities, with whom it promises us the possibility of an empathic relationship. Also through a comparison with the medium of film, the paper criticises the dark side of this promise of empathy in VR, deconstructing its rhetoric, and in contrast highlights its bright side and utopian component.

*Keywords:* Avatar, Bilocation, Empathy, Teleporting, Virtual Reality

*1. Bilocation: yesterday today tomorrow*

Immersive environments in virtual reality, which have been realised ever since the first pioneering experiments in the 1960s, seem capable of tapping into very ancient, even ancestral desires – one above all, the desire to enter into the image – and seem to be able to reactivate issues and practices of theological descent, combining sophisticated digital technologies of three-dimensional simulation with representational techniques rooted in the sphere of religious worship.

Let us first think of the “presentness” effect, the powerful sense of presence elicited by such immersive environments. In the pre-virtual experience of images, as an observer I mostly find myself “in front” of an image delimited by a framing device that separates it from my real world and removes it from the teleological chain of practical intentions to elevate it to the status of an object of optical reception, analytical observation or aesthetic contemplation. Conversely, once I put on my virtual reality headset and accept the invitation to immerse myself in the simulated environment, I feel present, there, within that world, and the objects and people I encounter in that space present themselves to me with equal force.

The first-person perspective allowed by the headset transfers me to another “here”, suddenly splitting the deictic spatial centre<sup>1</sup> and radically challenging the phenomenological conception of the *Leib* as an inescapable centre of self-orientation, so characterised thus in the classic Husserlian description: «I do not have the possibility of distancing myself from my Body [*Leib*], or my Body from me»<sup>2</sup>.

In a pioneering paper published way back in 1980, MIT researcher Marvin Minsky foresaw a future in which, by means of a suit equipped with sensors and motors, the

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\* Università degli Studi di Milano.

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<sup>1</sup> Fillmore (1982).

<sup>2</sup> Husserl (1989), p. 167. See on this Furlanetto, Bertone, Becchio (2013).

operator would be able to act here and there at the same time, in a condition of “telepresence” that is at the same time “teleportation”:

You don a comfortable jacket lined with sensors and muscle-like motors. Each motion of your arm, hand, and fingers is reproduced at another place by mobile, mechanical hands. Light, dexterous, and strong, these hands have their own sensors through which you see and feel what is happening. Using this instrument, you can “work” in another room, in another city, in another country, or on another planet. Your remote presence possesses the strength of a giant or the delicacy of a surgeon. Heat or pain is translated into informative but tolerable sensation. Your dangerous job becomes safe and pleasant<sup>3</sup>.

It is Minsky himself who acknowledges a debt to futurologist Patrick Gunkel for the notion of “telepresence” and to science fiction writer Robert A. Heinlein for the idea, described in the novel *Waldo*, of tele-operation that allows the eponymous hero, suffering from congenital myasthenia, to run businesses on Earth by remotely directing them from his home on a space station launched into free orbit in zero gravity<sup>4</sup>.

The afflatus that inspires Minsky’s pages comes directly from that well-established Western tradition which optimistically identifies in technology the possibility of compensating for the human body’s anatomical deficiencies and relieving it of the drudgery of work, while protecting it from the risks associated with it. Telepresence as a promise of happiness, then, in a spirit that is echoed again today in the enthusiastic words with which Mark Zuckerberg announced, on 28 October 2021, the advent of the Metaverse as a hybrid dimension of virtual and augmented reality that responds to the need for «better tools to work together»:

Imagine if you could be at the office without the commute. You would still have that sense of presence, shared physical space, those chance interactions that make your day. All accessible from anywhere. Now imagine that you have your perfect work set-up, and you can actually do more than you could in your regular work set-up<sup>5</sup>.

And, icing on the cake, you can even keep your favourite sweatpants on...

Minsky had already identified the sense of presence as the main challenge of computer teleportation: «The biggest challenge to developing telepresence is achieving that sense of “being there”. Can telepresence be a true substitute for the real thing?»<sup>6</sup>. Since then, the question of presence has become so central to this field of enquiry that it has fuelled a strand of research in its own right: presence studies<sup>7</sup>, promoted first and foremost by the International Society for Presence Research<sup>8</sup>.

In representing the counterpoint of “television” (TV brings me to the other and the elsewhere here), teleporting (bringing me to the elsewhere and the other) seems to hark back to and revive an ancient dream – bilocation understood as the possibility of being in two different places simultaneously – which before the digital revolution was reserved for savants or saints endowed with special miraculous powers, and which has fuelled no small amount of occult and paranormal literature.

This is, for example, the case of Pythagoras. In the biography written by the Neo-Platonic philosopher Porphyry (active between the 3rd and 4th centuries) we read:

Almost unanimous is the report that on one and the same day he was present at Metapontum in Italy, and at Tauromenium in Sicily, in each place conversing with his

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<sup>3</sup> Minsky (1980), p. 45.

<sup>4</sup> Heinlein (1942).

<sup>5</sup> See the promotional video at: [www.youtube.com/watch?v=gElflo6uw4g](http://www.youtube.com/watch?v=gElflo6uw4g).

<sup>6</sup> Minsky (1980), p. 46.

<sup>7</sup> See Lombard, Ditton (1997); Lombard et al. (2015).

<sup>8</sup> [www.ispr.info](http://www.ispr.info).

friends, though the places are separated by many miles, both at sea and land, demanding many days' journey<sup>9</sup>.

Remaining within the Pythagorean sphere, the philosopher and ascetic Apollonius of Tyana (1st century) – according to at least the controversial *Life* written in the early 3rd century by Flavius Philostratus – was endowed with various superhuman powers, including clairvoyance, telepathy and specifically bilocation:

He knit together the people of Smyrna. But when the plague began to rage in Ephesus, and no remedy sufficed to check it, they sent a deputation to Apollonius, asking him to become physician of their infirmity; and he thought that he ought not to postpone his journey, but said: "Let us go". And forthwith he was in Ephesus, performing the same feat, I believe, as Pythagoras, who was in Thurii and Metapontum at one and the same moment<sup>10</sup>.

Apollonius has been considered by some traditions to be a kind of pagan Jesus Christ, of whom he is moreover a contemporary<sup>11</sup>. The Breaking of the Bread at the Last Supper has in turn been interpreted as a kind of bilocation, whereby Christ is both in his own body and blood and simultaneously in the bread and wine he offers to the Apostles. In the words of Matthew's Gospel (26: 26-28):

While they were eating, Jesus took bread, said the blessing, broke it, and giving it to his disciples said, «Take and eat; this is my body». Then he took a cup, gave thanks, and gave it to them, saying, «Drink from it, all of you, for this is my blood of the covenant, which will be shed on behalf of many for the forgiveness of sins».

Among the innumerable apparitions of the Virgin Mary, the first one (known as Our Lady of the Pillar) which took place near Saragossa before the eyes of the apostle James the Great was considered a true bilocation, as it occurred in 40 AD when Mary was still alive<sup>12</sup>.

Christian hagiography has, on various occasions, reported powers of bilocation on the part of saints. Famous examples include Saint Drogo of Sebourg (1118-1189), whose space-time miracles even inspired the French proverb «Je ne puis pas être comme saint Druon, en deux lieux en même temps» («I cannot be like Saint Druon, in two places at once»), and Saint Francis of Assisi (1181-1226) who, according to his biographer Saint Bonaventure, suddenly appeared in the form of a cross to the Chapter of Arles while Saint Anthony of Padua was preaching<sup>13</sup>: an event depicted by Giotto (Fig. 1).

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<sup>9</sup> Porphyry (1920).

<sup>10</sup> Philostratus (1989), vol. I, § IV.10, pp. 364-365.

<sup>11</sup> Reville (1866); Ruggeri (2014).

<sup>12</sup> Peterson (2017).

<sup>13</sup> See Cole (1974), p. 163.

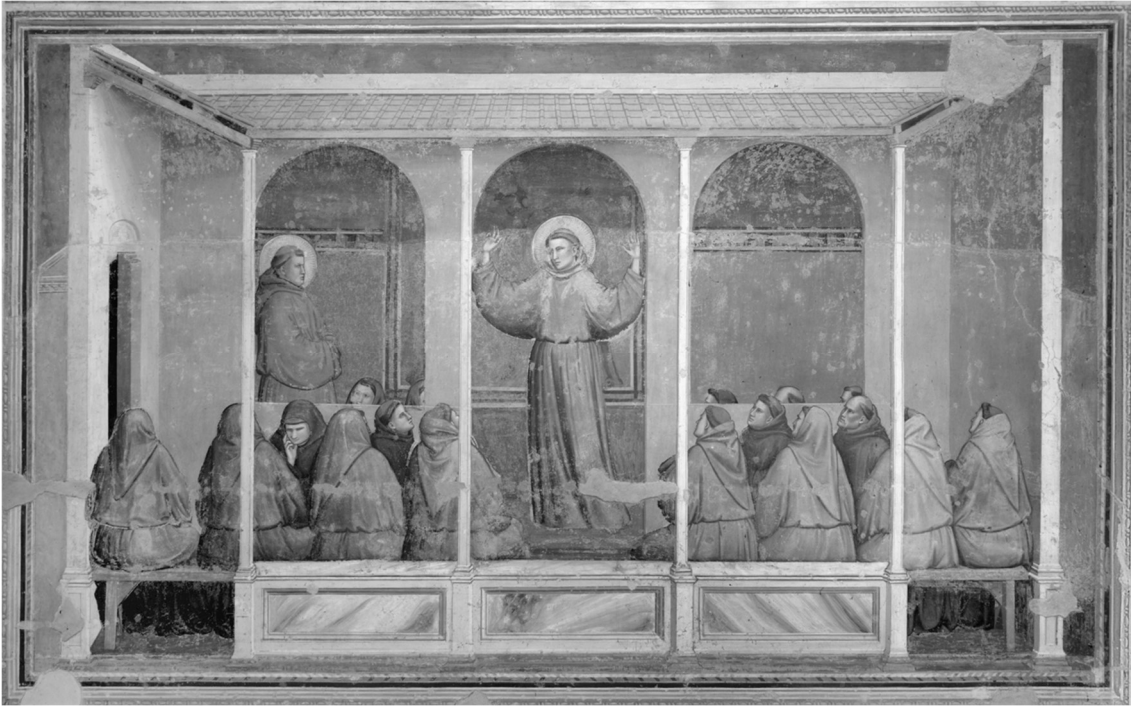


Fig. 1: Giotto, *San Francesco appears to the Chapter of Arles* (1317-1321), fresco, Florence, Santa Croce, Bardi Chapel.

During an Easter sermon in Montpellier in 1225, Anthony himself (1195-1231) suddenly remembered that he had to sing liturgical chant in his monastery. Then «God permitted that he should appear in the choir to sing the “Alleluia” at the same hour that he was seen in the pulpit. After having discharged his duty he returned to himself, as if awakening from a profound sleep, and continued his sermon»<sup>14</sup>. More recently, the case of Padre Pio of Pietrelcina (1887-1968) has aroused much debate; from 1918, the year he entered the convent of San Giovanni Rotondo, he would never again leave those walls, yet many people claimed to have seen him praying at their sickbed or in their prison cell, as when the friar allegedly bilocated himself in a cell in Budapest, where Cardinal József Mindszenty, Primate of Hungary, was imprisoned during the period 1948-1956 (Fig. 2)<sup>15</sup>.

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<sup>14</sup> Da Rieti (1895), pp. 47-48.

<sup>15</sup> I thank Giancarlo Grossi for this reference.

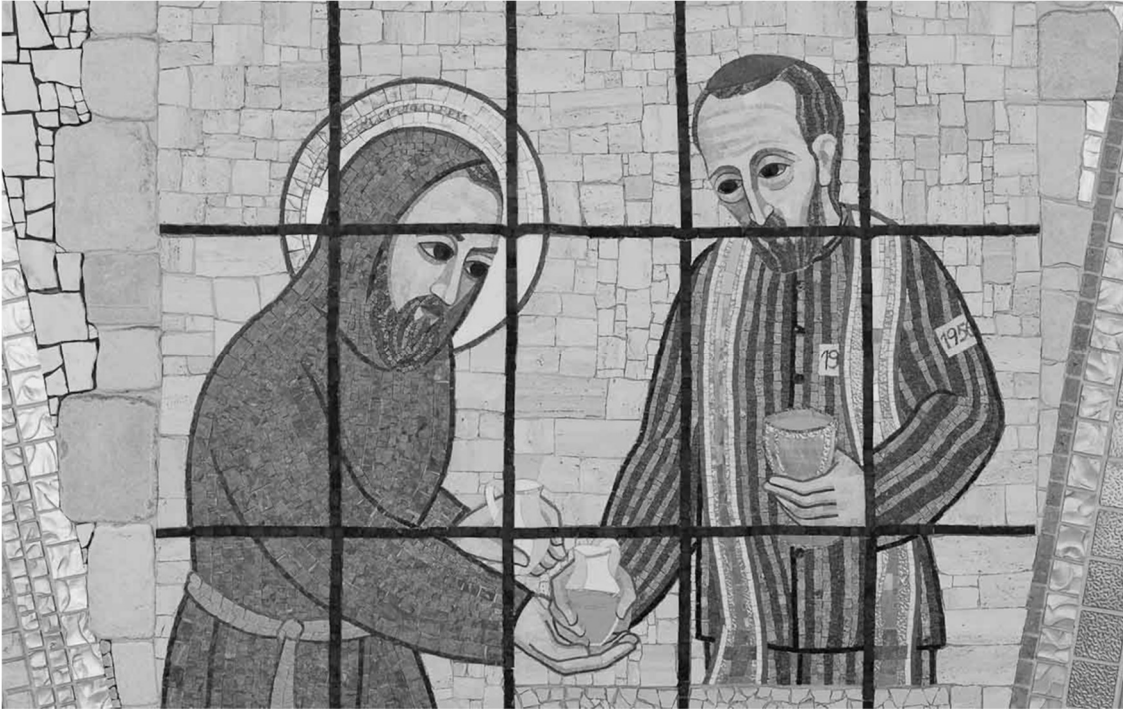


Fig. 2: Marko Rupnik, *Padre Pio brings bread and wine to the imprisoned Cardinal Mindszenty*, mosaic (2009), Chiesa Inferiore di San Pio da Pietrelcina a San Giovanni Rotondo.

To Msgr. Raffaello Carlo Rossi, Bishop of Volterra, who acted as the Inquisitor in San Giovanni Rotondo by order of the Holy Office in June 1921, Padre Pio prudently said about his power of bilocating himself:

I don't know how it is, or the nature of this phenomenon, and I certainly don't give it much thought, but it did happen to me to be in the presence of this or that person, to be in this or that place; I do not know whether my mind was transported there, or what I saw was some sort of representation of the place or the person; I do not know whether I was there with my body or without it<sup>16</sup>.

Interpreted sometimes in a more strictly corporeal sense (it is the body in its materiality that is present simultaneously in two different places), sometimes in a more spiritualistic sense (it is the soul, the spirit, the psyche, the mind, that detaches itself from the body to go to another place), the capacity, or dream, of bilocation seems to be a common element in many religious traditions well beyond Christianity, being attested for example in Chinese and Hindu cultures, to the point that one can speak without fear of exaggeration of a transcultural and anthropologically universal trait.

One thinks of certain "strange stories" in P'u Sung-Ling's *Liaozhai zhiyi* (a collection of Chinese fairy tales completed in 1679, but not published until 1766). which envisage bilocation in the form of the locomotion of the soul, which separates from the body and relocates elsewhere: «Bilocation of the self is a common theme in traditional strange tales. Most often it is the *hun*-soul, identifiable with the intellect and the moral self, that wanders away from the body. The animalistic and amoral *po*-soul, by contrast, is believed to be more corporeal and "of this world"»<sup>17</sup>.

The yoga tradition contemplates more overtly corporeal bilocations. As the famous mystic Paramahansa Yogananda recalls in chapter 19 of his autobiography entitled "My Master, in Calcutta, appears in Serampore", his master Sri Yukteswar, who had been summoned to Calcutta urgently, had managed to attend to his business earlier than planned. So, after sending a telepathic message asking his pupil to pick him up at the

<sup>16</sup> Castelli (2011), esp. chap. 2.2.

<sup>17</sup> Wang (2017), p. 171.

Serampore station before the time originally agreed upon, in order to be sure that the message had been received, he thought fit to materialise directly in front of the disciple, specifying: «This is not an apparition, but my flesh and blood form. I have been divinely commanded to give you this experience, rare to achieve on earth. Meet me at the station»<sup>18</sup>. What is striking in this anecdote is the purely practical, and very un-mystical, function of bilocation, serving to communicate what today we would entrust to a video call on Whatsapp.

From mysticism to occultism and esotericism, the step is of course a short one, and one that is supported by a fascination with supernatural powers. Suffice it to cite the case of the controversial personality of Aleister Crowley (for that matter, an adept of yoga), who was initiated by his friend Baker into the “astral journey”, the practice of splitting between the material body and the “Body of Light”, which allows the latter to travel «to the particular part of the universe which you desire to explore»<sup>19</sup>.

Science-fiction fiction has inherited and exponentially amplified this *topos*, imagining innumerable teleportation devices, of which the most famous is probably the Holodeck from the *Star Trek* saga: literally a “hologram bridge”, variously used for recreational and scientific purposes, producing realistic simulations of 3D environments (Fig. 3)<sup>20</sup>.



Fig. 3: Patrick Stewart plays Captain Jean-Luc Picard entering the holodeck in the *Star Trek: The Next Generation* episode “The Big Goodbye”, Season 1, episode 11. Original air date January 9, 1988.

Gene Dolgoff, who is credited as the inventor of the Holodeck, «in 1973 [...] spent a day showing Roddenberry [Gene Roddenberry, the creator of *Star Trek*] holograms and arguing that a vision of the future should include “a room [...] where people could be transported – not really transported – but believe they were in a new place”»<sup>21</sup>.

About the “hologram” it must first be said that what interests us for our discussion is not so much the object produced by holography (a technology dating back to the middle of

<sup>18</sup> Yogananda (1950), p. 177.

<sup>19</sup> Crowley (1989), p. 223. See Booth (2000), pp. 83-84; Sutin (2002), p. 170.

<sup>20</sup> See Krauss (2007), chap. 7: *Holodecks and Holograms*.

<sup>21</sup> Quoted in Murray (2015). See also Murray (2016).

the last century, which exploits the interference of two laser light beams to obtain a three-dimensional image), but rather the so-called “Pepper’s Ghost” (named after the chemist John Henry Pepper who, starting from an invention by Henry Dircks, patented it in 1879)<sup>22</sup>.

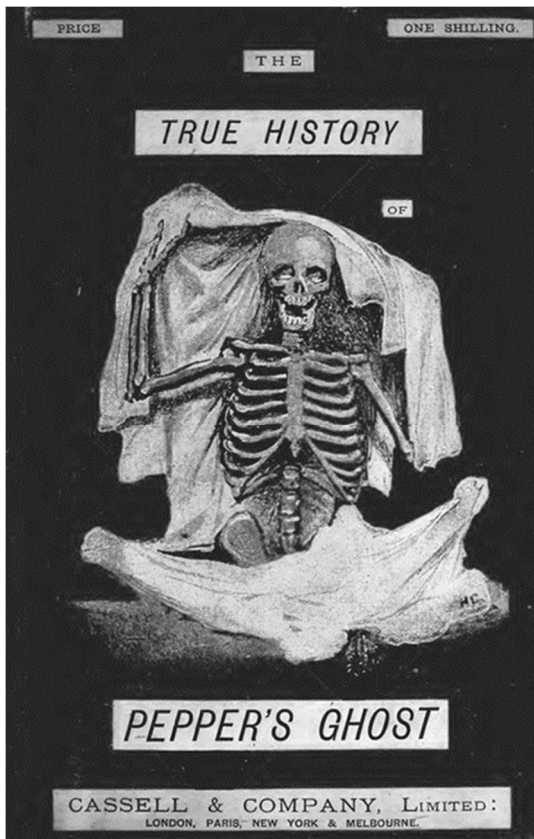
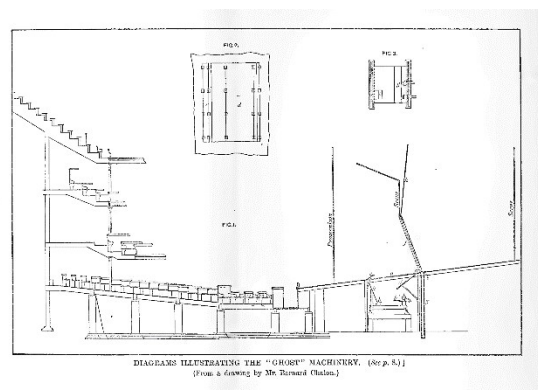


Fig. 4 a-b: Pepper, J.H. (1890), *The True History of the Ghost. And All About Metempsychosis*, London-Paris-New-York-Melbourne, Cassell & Company - Cover and Diagrams.



The fundamental elements of this optical trick had already been set out by Giambattista Della Porta in the second edition of his *Natural Magic*, published in 1589: in a chapter devoted to catoptric effects, the Neapolitan philosopher illustrated the procedure for making «things appear in a room that are not there»<sup>23</sup> through the use of a mirrored window placed in a darkened room. But it was from its popularity on Victorian stages that this illusory artifice took hold: in the midst of the actors in the flesh appeared on stage the

<sup>22</sup> Pepper (1890). On Pepper see Brooker (2007). On holograms see Johnston (2006), (2016).

<sup>23</sup> Della Porta (1589), XVII.xii, p. 270.

phantasmal figure of an actor hidden behind the scenes, whose likeness was reflected on glass panels on the stage but who was himself invisible to the audience<sup>24</sup>.

Pepper's Ghost has experienced a significant revival in more recent years. In fact, it has been used to allow Indian Prime Minister Narendra Modi (in 2014: Fig. 5)<sup>25</sup> and Jean-Luc Mélenchon (French presidential candidate in 2017<sup>26</sup> and again in 2022<sup>27</sup>) to appear in several different locations at the same time: bilocation becomes multilocation.



Fig. 5: Narendra Modi addresses people of India through 3D technology.

[https://commons.wikimedia.org/wiki/File:Narendra\\_Modi\\_addresses\\_people\\_of\\_India\\_through\\_3D\\_technology.jpg](https://commons.wikimedia.org/wiki/File:Narendra_Modi_addresses_people_of_India_through_3D_technology.jpg)

The march of the holograms, organised in Madrid in 2015 by the No Somos Delito association to protest against the promulgation of a national security law christened “Ley Mordaza” (“Gag Law”) by its opponents, made clear the urgency of reflecting on the new political subjectivities introduced by this emergent technology: banned by the authorities, the protest was able to circumvent the ban thanks to the holographic teleportation of the demonstrators<sup>28</sup>.

The fact that this type of apparatus has also been used to bring (iconic) music stars like Tupac Shakur and Michael Jackson<sup>29</sup> back to life reminds us of the intimate proximity between cutting-edge technology and the supernatural sphere.

## 2. *Virtual empathy: the dark side*

The bilocation technique made possible by virtual reality technologies does not only entail the possibility of being able to interact at a distance with tools and machines, as in that preconception outlined by Minsky from which we started. By teleporting us to another “where”, such technology also puts us in contact with another “who”, inaugurating new horizons of intersubjectivity. Admittedly, “contact” (from the Latin *contactus*, derived from the verb *contingere*: “to touch”) does not seem to be the most appropriate term for this type of experience, which – at least at the level of current VR technology – seems rather contactless and limited to a sensory dimension reserved to the audio-visual sphere. But the ongoing efforts to succeed in integrating touch in virtual experiences (through gloves

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<sup>24</sup> See Gunning (2007).

<sup>25</sup> [www.theverge.com/2014/5/7/5691714/indian-politician-uses-holograms-to-reach-voters\\_](http://www.theverge.com/2014/5/7/5691714/indian-politician-uses-holograms-to-reach-voters_)

<sup>26</sup> [www.leparisien.fr/elections/presidentielle/1-hologramme-de-melenchon-mode-d-emploi-18-04-2017-6864120.php](http://www.leparisien.fr/elections/presidentielle/1-hologramme-de-melenchon-mode-d-emploi-18-04-2017-6864120.php)

<sup>27</sup> [www.theguardian.com/world/2022/apr/06/jean-luc-melenchon-hologram-french-election](http://www.theguardian.com/world/2022/apr/06/jean-luc-melenchon-hologram-french-election).

<sup>28</sup> [www.youtube.com/watch?v=ehwBUe5O3zg](https://www.youtube.com/watch?v=ehwBUe5O3zg).

<sup>29</sup> See Famurewa (2018).



and haptic suits)<sup>30</sup> promise in a perhaps not too distant future to make this possibility a reality, thus averting the most pessimistic predictions of those who, like Naomi Klein, foresee a «Screen New Deal» signed by the big hi-tech companies which, following the Coronavirus pandemic, imposes «a permanent – and highly profitable – no-touch future»<sup>31</sup>.

In relation to the new possibilities of inter-subjective relations opened up by immersive devices, when speaking of “virtual reality” it is always important to premise ‘technologies of’, in the plural. According to pioneer Jaron Lanier’s definition, «VR is those big headsets that make people look ridiculous from the outside»<sup>32</sup>. It is a characterisation that at first glance seems crude, but which draws our attention to the correlation between technological variety and experiential variety: the various types of devices, in fact, allow for different experiences depending on the type of helmet one wears. In this regard, the terminology imported from robotics allows us to distinguish the following types: 3 DOF (Degrees OF Freedom) environments, in which the user can only orient his or her gaze at 360 degrees; 6 DOF environments, in which it is also possible to move around in the simulated space, going closer to or further away from the digital entities encountered. Two further considerations must be added to this macro-distinction: firstly, whether the user is present in the virtual world as the bearer of the gaze in the first person, or whether he or she is also represented within that world by an avatar, a digital proxy that can be either “total body” or “partial body” (in which case mostly the hand); secondly, whether the user is merely a passive spectator of what he or she encounters in the environment, or whether he or she can effectively interact with it. If, among the many definitions of “empathy” – so numerous that one is often tempted to abandon the concept itself<sup>33</sup> – one concentrates on that which identifies it with the capacity for “perspective taking” (that decentralisation of the self in the other that allows us, as we say in ordinary language, to put ourselves in the other’s shoes), the possibility of such decentralisation will be modulated differently depending on the device we wear and its specific mode of operation.

In the case of 3 DOF environments, we can cite the case of numerous 360° videos in the field of so-called immersive journalism<sup>34</sup>. An effective example is offered by the videos made by Chris Milk and collaborators commissioned by the UN. The author presents them as tools that give us access to «real life», «the truth»: in *Clouds over Sidra* (2015), the truth of the life of Sidra, a 12-year-old Syrian girl in a refugee camp in Jordan<sup>35</sup>; in *Waves of Grace* (2015), the truth of Deontee Davis, a 23-year-old Liberian survivor of the Ebola epidemic<sup>36</sup>; in *My Mother’s Wing* (2016), the truth of the mother who lost her two sons in Gaza<sup>37</sup>. Milk is decidedly optimistic about the anthropological, biopolitical and humanitarian potential of this kind of immersive approach: «We can change minds with this machine». For example, by presenting his films in VR at the World Economic Forum in Davos (January 2015), and thus affecting people whose decisions can affect the lives of millions of others. In Milk’s view, this would only be the beginning of a process of discovering the «true power of virtual reality»<sup>38</sup>: the power to transform people’s perceptions of others, and ultimately to change the world.

Similarly, Kathryn Bigelow (in collaboration with Imraan Ismail) embraced a VR turn to make the 3 DOF documentary *The Protectors. Walk in the Ranger’s Shoes* (released in 2017 and dedicated to the rangers of Garamba National Park in the Democratic Republic of Congo engaged in defending elephants from poachers: FIG. 6)<sup>39</sup>. To those who asked her

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<sup>30</sup> See Wang et al. (2019).

<sup>31</sup> [www.theguardian.com/news/2020/may/13/naomi-klein-how-big-tech-plans-to-profit-from-coronavirus-pandemic](http://www.theguardian.com/news/2020/may/13/naomi-klein-how-big-tech-plans-to-profit-from-coronavirus-pandemic).

<sup>32</sup> Lanier (2017), p. 13.

<sup>33</sup> Cfr. Cuff et al. (2014); Pinotti, Salgaro (2019).

<sup>34</sup> See De la Peña et al. (2010).

<sup>35</sup> [www.youtube.com/watch?v=mUosdCQsMkM](http://www.youtube.com/watch?v=mUosdCQsMkM).

<sup>36</sup> [www.with.in/watch/waves-of-grace](http://www.with.in/watch/waves-of-grace).

<sup>37</sup> [www.with.in/watch/my-mothers-wing/](http://www.with.in/watch/my-mothers-wing/).

<sup>38</sup> Milk (2015). For a critical analysis of Milk’s works see Zucconi (2018), chap. 5 (*On the limits of the virtual humanitarian experience*).

<sup>39</sup> [www.with.in/watch/the-protectors/](http://www.with.in/watch/the-protectors/).

why she did this, she replied without hesitation: «I think the simplest answer is empathy»<sup>40</sup>. Empathy, we might add, as much for the elephants as for their guardian angels.



Fig. 6: Still from *The Protectors. Walk in the Ranger's Shoes* (Kathryn Bigelow and Imraan Ismail, 2017).  
<https://www.commart.com/project/26377/the-protectors-walk-in-the-ranger-s-shoes>

In the same year, Alejandro G. Iñárritu presented his virtual reality installation *Carne y Arena. Virtually Present, Physically Invisible* at the Cannes Film Festival<sup>41</sup>: an immersive environment that transports you to the desert, in the midst of a group of South American migrants who are caught by the US Border Patrol trying to cross the border illegally. This environment is not only in 6 DOF (you can get closer to or farther away from the migrants or the guards), but also tries to integrate tactile sensory stimuli into the audiovisual experience: under your bare feet (they make you take off your shoes and socks before entering) you feel not the floor, but the sand, and you feel the wind on your face (or at least what is left of it after you put on your headset: Fig. 7). In an interview with the BBC in 2018 on the occasion of the installation's staging in Washington, Iñárritu explicitly states that empathy and compassion are the sentiments that *Carne y Arena* is intended to elicit<sup>42</sup>.

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<sup>40</sup> In Robertson (2017).

<sup>41</sup> <https://phi.ca/en/carne-y-arena/>.

<sup>42</sup> The interview «Carne y Arena» - BBC News Aircheck is accessible at: <https://vimeo.com/277983418>.



Fig. 7: *Carne y Arena* – A user in the experience, 2017. Photo credit: Emmanuel Lubezki.

As an example of a VR environment in 6 DOF interactive we can refer to *The Book of Distance* by Randall Okita, presented in 2020 at the VR Expanded section of the 77th Venice Biennale<sup>43</sup>. Mixing fiction and non-fiction, digital animation and period photographs, the author reconstructs the story of his grandfather, a Japanese emigrant who moved to Canada in 1935, only to be subjected to the harsh restrictions and institutional racism exercised by the Canadian government against Japanese migrants during the Second World War. The interactive mode allows the user to collaborate with the characters in tilling the soil, building the first house, harvesting the first fruits, and handling archive documents (FIG. 8). One is thus involved in a participatory experience, as described in the press kit: «Okita invites us to participate in this generous act of imagination: a space of magical theatre and generational echoes. [...] His need to reclaim his grandfather's lost moments becomes our own. Together we reimagine a significant moment in history and take part in a very personal journey of loss and recovery»<sup>44</sup>.

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<sup>43</sup> [www.randallokita.com/the-book-of-distance](http://www.randallokita.com/the-book-of-distance).

<sup>44</sup> <https://mediaspace.nfb.ca/epk/the-book-of-distance/>.



Fig. 8: *Farmphoto*, from the press kit of *The Book of Distance* (Randall Okita, 2020) <https://mediaspace.nfb.ca/epk/the-book-of-distance/>

In all these cases, regardless of the different experiences made possible by the technologies adopted each time, we witness an operation aimed at the decisive orientation of the consciousness and above all the emotions of the spectators, which (according to a tradition that can be traced back at least to Eisenstein) exploits the combination of technical apparatus, narrative form and affective content to induce a pathic transformation in the user: by bilocating himself in the Jordanian refugee camp, in the Congolese park, in the Mexican desert, in the Canadian concentration camp, the user feels present, “there”, sharing a destiny, participating in an experience. According to the apodictic definition offered by Milk, we would be in the presence of the «ultimate empathy machine»<sup>45</sup>.

However, this is an operation that has many dark and problematic sides. First of all, the premise that identifies empathy *eo ipso* with positive, pro-social, altruistic, humanitarian empathy is highly problematic: an equation that is completely unjustified, since the empathic faculty can also be abused to carry out acts of cruelty on the other<sup>46</sup>. Secondly, while the authors intend, as it were, to disappear as an authorial gaze, emancipating the users from the “tyranny” of the frame thanks to the 360-degree shot, which makes them “free” to direct his gaze on this or that portion of the field, they evidently take it for granted that they can steer our humanitarian empathic reaction in favour of migrants and refugees. But what would happen to a user infused with nationalism, racism, and animated by anti-immigrant sentiment? We can easily imagine such user empathising with border guards and immigration officers. Finally – and this is the key objection – the user does indeed teleport herself in the “there”, but what she encounters there is a recorded “here”: the other is frozen in the past of the recording, and no real interlocution is possible. The horizon of the unexpected, of the disorientation, of the failure to fill my expectations that forces me to constantly readjust my relationship with the other, proper to dialogue in real life, is here completely precluded. We are faced, *mutatis mutandis*, with what Roland Barthes notoriously called the «noeme» of photography: its «That-has-been»<sup>47</sup>. If it is true that every time I put on my headset I can have a different experience of that encounter with the Syrian refugee, the Mexican migrant, the Japanese internee, depending on where I decide to direct my gaze and move my body in the 360-degree environment, that difference is only the actualisation of a virtual recording, which, however virtual, remains a recording: it is, to paraphrase Nietzsche, the eternal return of the different.

<sup>45</sup> Milk (2015).

<sup>46</sup> See on this issue Donise (2019).

<sup>47</sup> Barthes (1981), pp. 76-77.

Even the attempt to allow for a semblance of dialogue on the basis of predetermined answers to a set of possible user questions – as can be experienced particularly clearly in those works which, responding to the needs of a post-witness era<sup>48</sup>, promise face-to-face interaction with Nazi extermination camp survivors (let's think of *116 Cameras*<sup>49</sup> or *The Last Goodbye*<sup>50</sup>) – ends up breaking down on the rock of the Barthesian «That-has-been»: «I'm actually a recording. I can't answer this question»<sup>51</sup>.

At the end of the day, with due respect to the desire for bilocation, they remain “there”, and we remain “here”.

### 3. *Virtual empathy: the bright side*

There is now an abundance of literature that gathers perplexities and criticisms which are difficult to challenge relating to this way of understanding empathy as we have seen it represented in the cases of immersive journalism described above<sup>52</sup>. So abundant, in fact, that one would be tempted to definitively dismiss the issue as one of the many blunders with which the history of ideas is replete.

Yet, in my opinion, a reason for continuing to address with it still exists, despite everything. It is that reason which unites virtual reality experiences with a series of attempts undertaken by its close relative, cinema, to allow us access to the “other”, exploiting in particular the subjective or point-of-view (POV) shot, which invites us to take on another's gaze as if it were our own, in an ideal identification of the first person of the protagonist and the spectator. This is a filming strategy that transforms the “camera-eye” into a “camera-I”<sup>53</sup>. The history of the reception of films shot exclusively in the subjective mode – from Robert Montgomery's pioneering *Lady in the Lake* (1947) to Ilya Naishuller's *Hardcore Henry* (2015) – tells us of considerable difficulty on the part of viewers in appreciating this kind of radical subjectivism, whereas the alternation of first and third person, subjective and objective, is considered much easier to take in<sup>54</sup>.

But, beyond the reactions of the public, the device of the first-person shot – later picked up and amplified by video games, GoPro cameras and, indeed, virtual reality headsets<sup>55</sup> – seems to correspond to the desire to bilocalize oneself through a process of embodiment in the body of the other, first and foremost through the appropriation of its visual system. As Erwin Panofsky put it, «the movies have the power, entirely denied to the theater, to convey psychological experiences by directly projecting their content to the screen, substituting, as it were, the eye of the beholder for the consciousness of the character»<sup>56</sup>. In this respect, media like cinema and virtual reality seem to radically challenge another tenet of the phenomenological approach to intersubjectivity, namely the inaccessibility of the primordial sphere of the other: as Husserl argues in the *Fifth Cartesian Meditation*,

the character of the existent “other” has its basis in this kind of verifiable accessibility of what is not originally accessible. Whatever can become presented, and evidently verified, originally is something *I* am; or else it belongs to me as peculiarly my own. Whatever, by virtue thereof, is experienced in that founded manner which characterizes a primordially unfulfillable experience an experience that does not give something itself originally but that consistently verifies something indicated is “other”<sup>57</sup>.

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<sup>48</sup> Popescu (2015).

<sup>49</sup> [www.116cameras.com](https://www.116cameras.com). See the trailer on: <https://vimeo.com/240741677>.

<sup>50</sup> <https://sfi.usc.edu/lastgoodbye>

<sup>51</sup> See Alexander (2021).

<sup>52</sup> Bollmer (2017); Andrejevic, Volcic (2019); D'Aloia (2020); Modena, Pinotti (2020); Nakamura (2020); Cotton (2021), chap. 5.

<sup>53</sup> Sobchack (1992), pp. 200-202.

<sup>54</sup> See Hanich (2017). See also Chateau (2011).

<sup>55</sup> See Eugeni (2012).

<sup>56</sup> Panofsky (1995), p. 98.

<sup>57</sup> Husserl (1982), § 52, pp. 114-115.

The spectrum of such appropriation is as broad as that of experience in its multifarious aspects: it ranges from ordinary perception through imaginative, recollective, dreamlike<sup>58</sup> states to states of intoxication, psychosis, and hallucination. For this last case, let us recall the paradigmatic example offered by Ken Russell's film *Altered States* (1980): the psychiatrist Edward Jessup (played by William Hurt), with the help of an isolation tank that facilitates sensory deprivation and the use of hallucinogenic drugs, bilocates himself in his own body genetically regressed to the stage of a prehistoric hominid, wandering around the city trying to satisfy his elementary needs. The shift from the third to the first person in the shot invites us to look at the world through his eyes as a transformed and hallucinating being.

In the case of VR, we now have several attempts to make present and accessible to the user in a radically subjective mode such as that afforded by the head-mounted display forms of "other" experience, for example, those represented by a man who sinks into the black hole of Alzheimer's (*Cosmos within Us*, Tupac Martir, 2019)<sup>59</sup> or who progressively loses his sight (*Notes on Blindness: Into Darkness*, Arnaud Colinart, Amaury La Burthe, Peter Middleton & James Spinney, 2016: Fig. 9)<sup>60</sup>.



Fig. 9: Still from the press kit of *Notes On Blindness* (Peter Middleton and James Spinney, 2016). <http://www.notesonblindness.co.uk/press/>

Beyond the species-specific threshold, the subjective shot has often been employed to transcend the limits of human experience and open it up to the horizons of the animal, the cyborg and the extra-terrestrial: let's think of the POV shot of the shark in Steven Spielberg's *Jaws* (1975) or of the fly in the opening scene of David Cronenberg's film of the same name (1986). Or of the subjective shots of the cyborg-cowboy played by Yul Brinner in Michael Crichton's *Westworld* (1973), or of Arnold Schwarzenegger in *Terminator* (James Cameron, 1984), and the POV shots of *Predator* (John McTiernan, 1987).

A common thread links these attempts in the medium of film to similar initiatives undertaken in the field of virtual reality. We are thinking, in terms of animal empathy, of bird flight simulators such as *Birdly*, designed in 2013 by Max Rheiner, Fabian Troxler and Thomas Tobler in the laboratories of Zurich University of the Arts (ZHdK) and subsequently developed by Somniacs (Fig. 10).

<sup>58</sup> In particular on the representation of oneiric states see Eberwein (1980).

<sup>59</sup> [www.labiennale.org/it/cinema/2019/venice-virtual-reality/cosmos-within-us](http://www.labiennale.org/it/cinema/2019/venice-virtual-reality/cosmos-within-us).

<sup>60</sup> [www.arte.tv/digitalproductions/en/notes-on-blindness/](http://www.arte.tv/digitalproductions/en/notes-on-blindness/).



Fig. 10: User operating with Birdly (Somniacs) at Virtuality (Salon de la Réalité Virtuelle), Centre CentQuatre, Paris 2018 (Photo © Giacomo Mercuriali).

The official presentation describes it as finally fulfilling, no less, «the Ultimate Dream of Flying». Unlike other flight simulators, *Birdly* requires no joystick or mouse but is directly controlled by a series of operations of the user's own body that include instinctive arm and hand movements in order to control speed, altitude and direction of navigation. The inputs provided by the user's body, lying horizontally on a cross-shaped stand with arms spread like wings, are translated by a virtual flight processor and then sent back in terms of physical feedback to the body itself. A fan placed in front of the user's face produces the sensation of wind, and surround sound diffused by headphones integrated into the helmet contributes to complete the reality effect of the flight experience as a whole. You can choose the "New York Experience" and fly through the skyscrapers of Manhattan to meet King Kong at the top of the Empire State Building, or opt for the prehistoric route, and dive like a pterosaur in the "Jurassic Flight".

*Birdly* seems to be aiming to realise what Primo Levi imagined back in 1966 in his short story *Retirement Package* by exploring the various applications of the Torec (Total Recorder): a total recorder of experience capable of making the wearer relive not only the experiences of other human beings, but also that of a bird of prey seizing a hare:

A hare, still in its winter coat, desperately bounded toward its burrow. I gathered my wings into my body and fell upon it like a rock: it was less than a meter from its refuge when I was on top of it, spreading my wings to brake the descent and drawing out my claws. I seized it in full flight, and regained altitude only by using the momentum of the dive and without flapping my wings. When the initial impetus had slackened, I killed the hare with two thrusts of my beak. I now understood what it was I "must do," the sensation of tension had ceased, and I directed my flight toward the nest<sup>61</sup>.

In the case of *Birdly* and other flight simulators, the bilocation experience can lead to problematic psychophysiological effects – dizziness, nausea, vomiting – known as cybersickness: these are symptoms caused by the conflict that arises between the information that reaches the brain on the one hand from the proprioceptive system (=I am standing

<sup>61</sup> Levi (2015), vol. I, p. 345.

still and lying on a cross-shaped machine placed on the floor), on the other hand from the audio-visual system (=not only am I moving, but I am even flying as if I were a bird, and I feel the rush of air that I am making with my wings).

To overcome this flaw, which can become very unpleasant in the flight simulator experience, the developers of another VR video game simulating the flight of an eagle, *Eagle Flight* (Ubisoft, 2016), noted that the inclusion in the user's field of vision of the beak of an eagle (the counterpart of our nose tip, which always accompanies us in every act of viewing even though it is not usually explicitly brought to our attention) helps to reduce the sense of discomfort<sup>62</sup>. The beak/nose thus acts as a partial avatar of the user, supporting the process of embodiment in the bird (Fig. 11).



Fig. 11: Still captured from headset during an experience with *Eagle Flight* (Ubisoft, 2016).  
<https://www.moddb.com/news/new-footage-of-ubisofts-first-vr-games-eagle-flight-and-werewolves-within>

Which leads us, in conclusion, to the very concept of the *avatar*: a digital proxy of the self, a contemporary heir to the alter-egos and Doppelgängers that have fuelled countless *topoi* of world literature and art, through which the user teleports himself into the virtual environment and interacts with other digital objects and other individuals who are themselves avatars. Far from being a one-way access from the real to the digital, avatars constitute a two-way mediation, which also allows interventions from the virtual to the real world. Recent neurocognitive experiments have proven that avatars have an impact on real life, for instance by modifying gender or racial prejudices through the production of the so-called “full-body ownership illusion”: adopting an avatar of a different gender (e.g. in the case of domestic violence: Fig. 12)<sup>63</sup> or putting oneself in an avatar with a different skin colour<sup>64</sup> in the virtual environment is an experience that can have resonance in the real world, helping to correct social stereotypes through the adoption of an alternative “perspective taking” and the stimulation of empathic processes.

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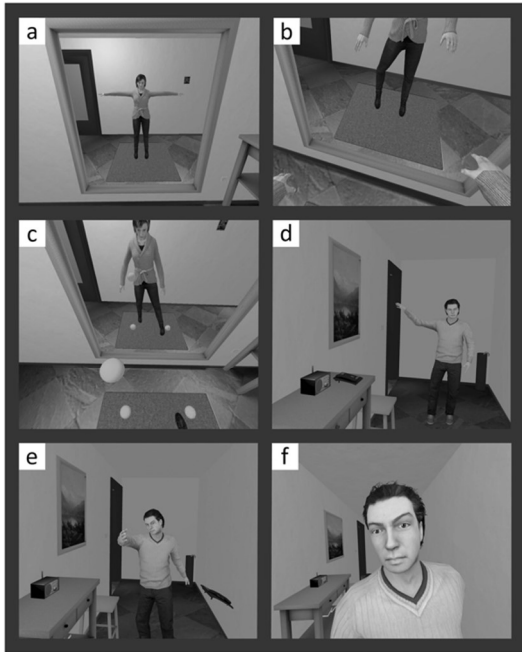
<sup>62</sup> See Whitlatch (2016).

<sup>63</sup> See Seinfeld et al. (2018).

<sup>64</sup> See Peck et al. (2013); Hasler et al. (2017).



Fig. 12: Image from: Seinfeld et al. (2018), pp. 1-11. Open Access: <https://www.nature.com/articles/s41598-018-19987-7>



**Figure 1.** The immersive virtual reality scenario. (a) The participant looks at his female virtual body in the mirror. (b) The participant looks down towards his own body from a first-person perspective. (c) The participant touches the virtual balls. (d) The male virtual character enters the room and starts to verbally abuse the female virtual character. (e) The male virtual character throws a telephone on the floor. (f) The male virtual character invades the personal space of the participant.

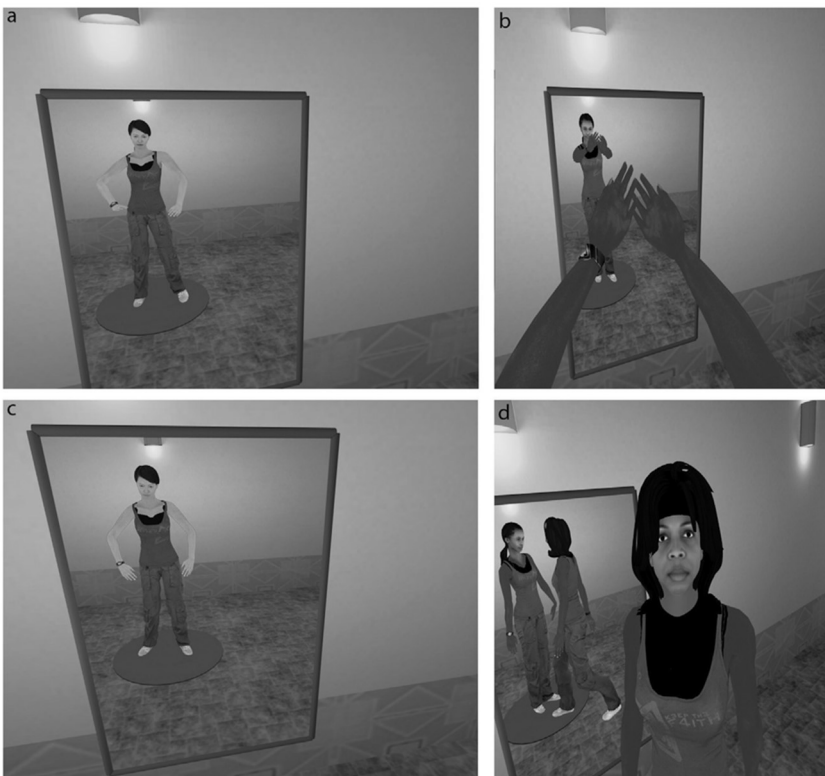


Fig. 13: Image from: Peck et al. (2013), p. 781 («The virtual body and scenario. (a) The light-skinned virtual body (EL) as seen in the mirror. (b) The dark-skinned virtual body (ED) in the mirror and directly»).

Mediatized “self-empathy”, as described by the psychologist Frédéric Tordo, occurs in this case:

L’auto-empathie est une relation empathique avec une part subjective de soi, grâce à la présence en nous d’un double imaginaire intériorisé qui nous permet de contempler notre monde subjectif comme si nous l’observions de l’extérieur. Autrement dit, comme si nous étions à la place d’un semblable, d’un autre. Mais cet autre est bien en soi-même, c’est pourquoi nous proposons d’appeler ce double l’“autrui-en-soi”. Dans le contexte numérique qui nous intéresse, nous constatons une médiatisation de ce processus d’auto-empathie dans les mondes virtuels. Elle intervient lorsque le sujet se met à la place d’une figure qui le représente dans les mondes virtuels – un avatar – de telle façon que son attention et son empathie pour cette figure sont aussi tournées indirectement vers lui-même”<sup>65</sup>.

In this case, bilocation operates as a true psycho-physical externalisation of the self, which alienates itself in its avatar by posing to itself as to another.

In one of the most famous philosophical arguments of the 20th century, Thomas Nagel peremptorily denied the possibility of phenomenological and first-person access to the experiential sphere not only of other species, but also of different types within the same species: not only will we never know what it is like to be a bat (since our human anatomical structure does not possess its own echolocation system), but neither will we ever be able to truly put ourselves in the shoes of a deaf or blind person, if we are able to hear and see<sup>66</sup>.

Even if we choose to overlook the fact that blind people have initiated astonishing practices of human biosonar using mouth-clicks<sup>67</sup>, as human beings we are on the one hand essentially bound to the experiential bubble that limits us as an insuperable transcendental which determines the conditions of possibility of our experience, and on the other hand irrepressibly tempted to tear through that bubble in order to transcend our own limitations, seeking to approach otherness, if only asymptotically. “Empathy” is then, perhaps, another name for this asymptote.

### *Bibliography*

- Alexander, N. (2021), “Obsolescence, Forgotten: ‘Survivor Holograms’, Virtual Reality, and the Future of Holocaust Commemoration”, *Cinergie – Il cinema e le altre arti*, n. 19, pp. 57-68.
- Andrejevic, M., Volcic, Z. (2019), “Virtual Empathy”, *Communication, Culture & Critique*, pp. 1-16.
- Barthes, R. (1981), *Camera Lucida. Reflections on Photography*, Engl. trans., Hill and Wang, New-York.
- Bollmer, G. (2017), “Empathy Machines”, *Media International Australia*, vol. 165, n. 1, pp. 1-14.
- Booth, M. (2000), *A Magick Life. A Biography of Aleister Crowley*, Hodder and Stoughton, London.
- Brooker, J. (2007), “The Polytechnic Ghost. Pepper’s Ghost, Metempsychosis and the Magic Lantern at the Royal Polytechnic Institution”, *Early Popular Visual Culture*, vol. 5, n. 2, pp. 189-206.
- Castelli, F. (2011), *Padre Pio Under Investigation. The Secret Vatican Files*, Engl. trans., Ignatius Press, San Francisco.

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<sup>65</sup> Tordo (2013), p. 98.

<sup>66</sup> Nagel (1974).

<sup>67</sup> Thaler et al. (2017). I thank Alessandro Costella for this reference.

- Chateau, D. (ed.) (2011), *Subjectivity. Filmic Representation and the Spectator's Experience*, Amsterdam University Press, Amsterdam.
- Cole, B. (1974), "Giotto's Apparition of St. Francis at Arles: The Case of the Missing Crucifix?", *Simiolus: Netherlands Quarterly for the History of Art*, vol. 7, n. 4, pp. 163-165.
- Cotton, M. (2021), *Virtual Reality, Empathy and Ethics*, Springer-Palgrave Macmillan, Cham.
- Crowley, A. (1989), *The Confessions of Aleister Crowley. An Autohagiography*, Penguin, London.
- Cuff, B.M. et al. (2016), "Empathy: A Review of the Concept", *Emotion Review*, vol. 8, n. 2, pp. 144-153.
- D'Aloia, A. (2020), *Gli inganni dell'empatia. Giornalismo immersivo e realtà virtuale*, in Rabbito, A. (ed.), *La cultura del falso. Inganni, illusioni e fake news*, Meltemi, Milano, pp. 159-73.
- Da Rieti, U. (1895), *Life of St. Anthony of Padua*, Angel Guardian Press, Boston.
- De la Peña N. et al. (2010), "Immersive Journalism. Immersive Virtual Reality for the First-Person Experience of News", *Presence*, vol. 19, n. 4, pp. 291-301.
- Della Porta, G.B. (1589), *Magiae naturalis libri 20*, apud Horatium Saluianum, Naples.
- Donise, A. (2019), *Critica della ragione empatica. Fenomenologia dell'altruismo e della crudeltà*, il Mulino, Bologna.
- Eberwein, R.T. (1980), "The Filmic Dream and Point of View", *Literature Film Quarterly*, vol. 8, n. 3, p. 197-203.
- Eugeni, R. (2012): "First Person Shot. New Forms of Subjectivity between Cinema and Intermedia Networks", *Anàlisi*, vol. 2, n. 3, p. 19-31.
- Famurewa, J. (2018), "Inside the Bitter War to Bring Tupac and Michael Jackson Back to Life", *Wired*, 8 May: <https://www.wired.co.uk/article/tupac-michael-jackson-billie-holiday-dead-celebrity-holograms>.
- Fillmore, Ch. J. (1982), *Santa Cruz Lectures on Deixis*, Indiana University Linguistics Club, Bloomington.
- Furlanetto, T., Bertone, C., Becchio, C. (2013), "The Bilocated Mind: New Perspectives on Self-Localization and Self-Identification", *Front. Hum. Neurosci.*, 8 March. DOI: <https://doi.org/10.3389/fnhum.2013.00071>.
- Gunning, T. (2007), "To Scan a Ghost. The Ontology of Mediated Vision", *Grey Room*, n. 26, pp. 94-127.
- Hanich, J. (2017), *Experiencing Extended Point-of-View Shots: A Film-Phenomenological Perspective on Extreme Character Subjectivity*, in Reinert, M.S., Thon, J.-N. (eds.), *Subjectivity Across Media: Interdisciplinary and Transmedial Perspectives*, Routledge, New York, pp. 127-144.
- Hasler B.S. et al. (2017), "Virtual Race Transformation Reverses Racial In-Group Bias", *PLOS ONE*, vol. 12, n. 4: <https://doi.org/10.1371/journal.pone.0174965>.
- Heinlein, R.A. (1942), "Waldo", *Astounding Science Fiction*, August.
- Husserl, E. (1982), *Cartesian Meditations. An Introduction to Phenomenology*, Engl. trans., Martinus Nijhoff, The Hague-Boston-London.
- Husserl, E. (1989), *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy, Book 2: Studies in the Phenomenology of Constitution*, Engl. trans., Kluwer Dordrecht-Boston-London.
- Johnston, S.F. (2006), *Holographic Visions. A History of New Science*, Oxford University Press, Oxford.
- Johnston, S. F. (2016), *Holograms. A Cultural History*, Oxford University Press, Oxford.
- Krauss, L.M. (2007), *The Physics of Star Trek*, Basic Books, New York.
- Lanier, J. (2017), *Dawn of the New Everything. Encounters with Reality and Virtual Reality*, Henry Holt & Co, New York.
- Levi, P. (2015), *Natural Histories*, in Id., *The Complete Works*, 3 vols., Liveright Publishing Corporation, New York-London.

- Lombard, M. et al. (2015), *Immersed in Media. Telepresence Theory, Measurement & Technology*, Springer, Cham.
- Lombard, M., Ditton, Th. (1997), "At the Heart of It All. The Concept of Presence", *Journal of Computer-Mediated Communication*, vol. 3, n. 2: <http://dx.doi.org/10.1111/j.1083-6101.1997.tb00072.x>.
- Milk, C. (2015), "How Virtual Reality Can Create the Ultimate Empathy Machine", TED Talk, 22 April: [https://www.ted.com/talks/chris\\_milk\\_how\\_virtual\\_reality\\_can\\_create\\_the\\_ultimate\\_empathy\\_machine](https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine).
- Minsky, M. (1980), "Telepresence", *Omni*, June, pp. 45-51.
- Modena, E., Pinotti, A. (2020), "Humanitarian VR as 360° Autopsy: Empathy and Sympathy in Immersive Storytelling", *Kodex: Jahrbuch der Internationalen Buchwissenschaftlichen Gesellschaft*, n. 10, pp. 145-162.
- Murray, J. H. (2015), *How Close Are We to the Holodeck?*, in *Proceedings of the 6th and 7th Conference and Theory of Digital Games Cologne Game Lab*: <http://penlab.gatech.edu/wpcontent/uploads/sites/9/2018/09/MurrayHowCloseHolodeck.pdf>.
- Murray, J.H. (2016), *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Simon & Schuster/Free Press, New York.
- Nagel, Th. (1974), "What Is It Like to Be a Bat?", *The Philosophical Review*, vol. 83, n. 4, pp. 435-450.
- Nakamura, L. (2020), "Feeling Good About Feeling Bad: Virtuos Virtual Reality and the Automation of Racial Empathy", *Journal of Visual Culture*, vol. 19, n. 1, pp. 47-64.
- Panofsky, E. (1995), *Style and Medium in the Motion Pictures*, in Id., *Three Essays on Style*, Cambridge (MA), The Mit Press, pp. 91-125.
- Peck, T.C. et al. (2013), "Putting Yourself in the Skin of a Black Avatar Reduces Implicit Racial Bias", *Consciousness and Cognition*, vol. 22, n. 3, pp. 779-787.
- Pepper, J. H. (1890), *The True History of the Ghost. And All About Metempsychosis*, Cassell & Company, London-Paris-New York-Melbourne.
- Peterson, L. (2017), "Did You Know the 1st Apparition of the Blessed Mother Was an Act of Bilocation", *Aleteia*: <https://aleteia.org/2017/10/12/did-you-know-the-1st-apparition-of-the-blessed-mother-was-an-act-of-bilocation/>.
- Philostratus (1989), *The Life of Apollonius of Tyana*, 2 vols., Engl trans., The Harvard University Press, Cambridge (MA)-London.
- Pinotti, A., Salgaro, M. (2019), "Empathy or Empathies? Uncertainties in the Interdisciplinary Discussion", *Gestalt Theory*, vol. 41, n. 2, pp. 141-158.
- Popescu, D. I. (2015), *Introduction: Memory and Imagination in the Post-Witness Era*, in Schult, T., Popescu, D.I. (eds.), *Revisiting Holocaust Representation in the Post-Witness Era*, London, Palgrave Macmillan, pp. 1-7.
- Porphyry (1919), *The Life of Pythagoras*, Engl. trans., Alpine (N.J.) Platonist Press.
- Reville, A. (2014), *Apollonius of Tyana, the Pagan Christ of the Third Century*, John Camden Hotten, London.
- Robertson, A. (2017), "VR Was Sold as an «Empathy Machine» – But Some Artists Are Getting Sick Of It", *The Verge*, 3 May: [www.theverge.com/2017/5/3/15524404/tribeca-film-festival-2017-vr-empathy-machine-backlash](http://www.theverge.com/2017/5/3/15524404/tribeca-film-festival-2017-vr-empathy-machine-backlash).
- Seinfeld, S. et al. (2018), "Offenders Become the Victim in Virtual Reality. Impact of Changing Perspective in Domestic Violence", *Scientific Reports*, vol. 8, n. 2692, pp. 1-11.
- Sobchack, V. (1992), *The Address of the Eye: A Phenomenology of Film Experience*, Princeton University Press, Princeton.
- Sutin, L. (2002), *Do What Thou Wilt. A Life of Aleister Crowley*, New York, St. Martin's Press.
- Thaler L. et al. (2017), "Mouth-Clicks Used by Blind Expert Human Echolocators – Signal Description and Model-Based Signal Synthesis", *PLoS Comput Biol*, vol. 13, n. 8: e1005670.

- Tordo, F. (2013), *L'auto-empathie médiatisée par l'avatar, une subjectivation de soi*, in Amato, E.-A., Perény, E. (eds.), *Les avatars jouables des mondes numériques. Théories, terrains et témoignages de pratiques interactives*, Paris, Lavoisier, pp. 91-109.
- Wang, D. et al. (2019), "Haptic Display for Virtual Reality: Progress and Challenges", *Virtual Reality & Intelligent Hardware*, vol. 1, n. 2, pp. 136-162.
- Wang, S. (2017), *Chinese Enchantment: Reinventing Pu Songling's Classical Tales in the Realm of World Literature, 1880-1920*, Dissertation, The University of Chicago, Chicago.
- Whitlatch, A. (2016), "Tunnel Vision. How Ubisoft Created 'Eagle Flight', a VR Flying Game With No Nausea": <https://uploadvr.com/how-ubisoft-created-eagle-flight-sickness/>.
- Yogananda, P. (1950), *Autobiography of a Yogi*, Rider and Company, London.
- Zucconi, F. (2018), *Displacing Caravaggio. Art, Media, and Humanitarian Visual Culture*, Palgrave Macmillan, Cham.